



A11102467088

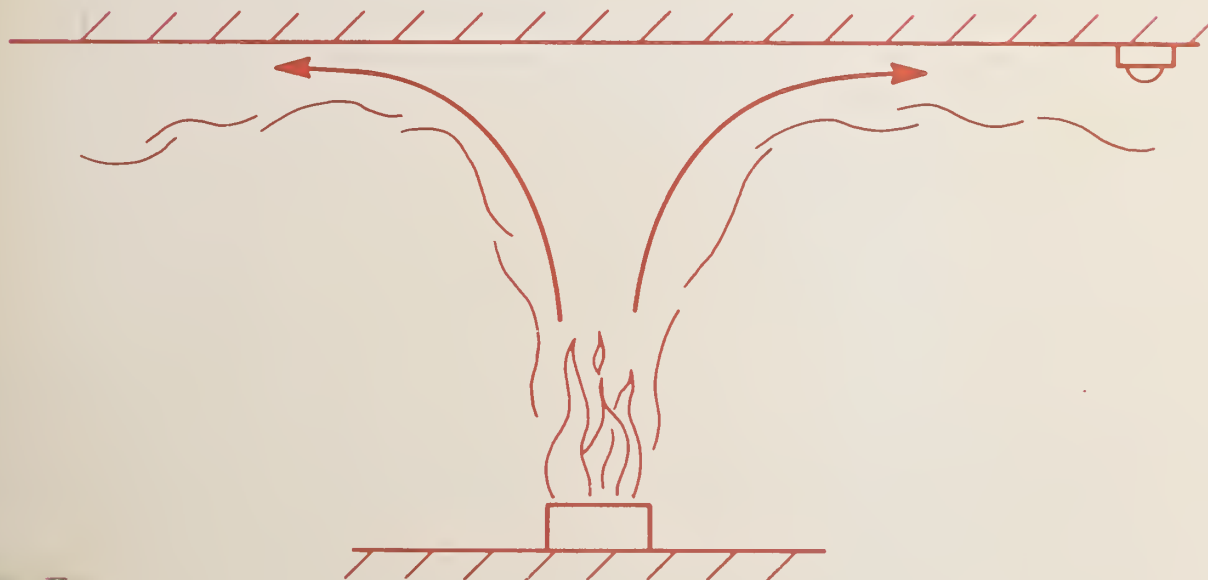
Stroup, David W/Evaluating thermal fire
QC100 .U57 NO.712 1986 C.3 C.1 NBS-PUB-C



NBS SPECIAL PUBLICATION 712

U.S. DEPARTMENT OF COMMERCE/National Bureau of Standards

Evaluating Thermal Fire Detection Systems (English Units)



David Stroup • David Evans • Phyllis Martin

QC

100

.U57

No. 712

1986



The National Bureau of Standards¹ was established by an act of Congress on March 3, 1901. The Bureau's overall goal is to strengthen and advance the nation's science and technology and facilitate their effective application for public benefit. To this end, the Bureau conducts research and provides: (1) a basis for the nation's physical measurement system, (2) scientific and technological services for industry and government, (3) a technical basis for equity in trade, and (4) technical services to promote public safety. The Bureau's technical work is performed by the National Measurement Laboratory, the National Engineering Laboratory, the Institute for Computer Sciences and Technology, and the Institute for Materials Science and Engineering.

The National Measurement Laboratory

Provides the national system of physical and chemical measurement; coordinates the system with measurement systems of other nations and furnishes essential services leading to accurate and uniform physical and chemical measurement throughout the Nation's scientific community, industry, and commerce; provides advisory and research services to other Government agencies; conducts physical and chemical research; develops, produces, and distributes Standard Reference Materials; and provides calibration services. The Laboratory consists of the following centers:

- Basic Standards²
- Radiation Research
- Chemical Physics
- Analytical Chemistry

The National Engineering Laboratory

Provides technology and technical services to the public and private sectors to address national needs and to solve national problems; conducts research in engineering and applied science in support of these efforts; builds and maintains competence in the necessary disciplines required to carry out this research and technical service; develops engineering data and measurement capabilities; provides engineering measurement traceability services; develops test methods and proposes engineering standards and code changes; develops and proposes new engineering practices; and develops and improves mechanisms to transfer results of its research to the ultimate user. The Laboratory consists of the following centers:

- Applied Mathematics
- Electronics and Electrical Engineering²
- Manufacturing Engineering
- Building Technology
- Fire Research
- Chemical Engineering²

The Institute for Computer Sciences and Technology

Conducts research and provides scientific and technical services to aid Federal agencies in the selection, acquisition, application, and use of computer technology to improve effectiveness and economy in Government operations in accordance with Public Law 89-306 (40 U.S.C. 759), relevant Executive Orders, and other directives; carries out this mission by managing the Federal Information Processing Standards Program, developing Federal ADP standards guidelines, and managing Federal participation in ADP voluntary standardization activities; provides scientific and technological advisory services and assistance to Federal agencies; and provides the technical foundation for computer-related policies of the Federal Government. The Institute consists of the following centers:

- Programming Science and Technology
- Computer Systems Engineering

The Institute for Materials Science and Engineering

Conducts research and provides measurements, data, standards, reference materials, quantitative understanding and other technical information fundamental to the processing, structure, properties and performance of materials; addresses the scientific basis for new advanced materials technologies; plans research around cross-country scientific themes such as nondestructive evaluation and phase diagram development; oversees Bureau-wide technical programs in nuclear reactor radiation research and nondestructive evaluation; and broadly disseminates generic technical information resulting from its programs. The Institute consists of the following Divisions:

- Ceramics
- Fracture and Deformation³
- Polymers
- Metallurgy
- Reactor Radiation

¹Headquarters and Laboratories at Gaithersburg, MD, unless otherwise noted; mailing address Gaithersburg, MD 20899.

²Some divisions within the center are located at Boulder, CO 80303.

³Located at Boulder, CO, with some elements at Gaithersburg, MD.

Evaluating Thermal Fire Detection Systems [English Units]

David W. Stroup
David D. Evans
Phyllis Martin

National Bureau of Standards
National Engineering Laboratory
Center for Fire Research
Gaithersburg, Maryland 20899



U.S. DEPARTMENT OF COMMERCE, Malcolm Baldrige, Secretary
NATIONAL BUREAU OF STANDARDS, Ernest Ambler, Director

Issued April 1986

Library of Congress Catalog Card Number: 86-600519
National Bureau of Standards Special Publication 712
Natl. Bur. Stand. (U.S.), Spec. Publ. 712, 557 pages (Apr. 1986)
CODEN: XNBSAV

U.S. GOVERNMENT PRINTING OFFICE
WASHINGTON: 1986

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402

3
RESEARCH
INFORMATION
CENTER
QC100
.U57
#712
Page 1986

TABLE OF CONTENTS

	Page
LIST OF TABLES.....	v
LIST OF FIGURES.....	v
NOMENCLATURE.....	vi
Abstract.....	1
1. INTRODUCTION.....	2
2. DESCRIPTION OF THE MODEL.....	3
2.1 Characteristic Fire.....	4
2.2 Temperature and Velocity Correlations.....	5
2.3 Detector Response Model.....	7
2.4 Velocity Correlation for $r/H < 0.3$	9
3. IMPLEMENTATION OF THE MODEL: COMPUTER PROGRAMS.....	10
3.1 General Program Structure.....	10
3.2 Main Program.....	12
3.2.1 Data Input Section.....	12
3.2.2 Calculation Initialization.....	12
3.2.3 Conversion and Output Section.....	13
3.3 Activation Time Equation Solution:	
Fixed Temperature.....	13
3.4 Activation Time Equation Solution:	
Rate of Temperature Rise.....	14
4. IMPLEMENTATION OF THE MODEL: TABLES OF RESULTS.....	14
5. EXAMPLES.....	16
5.1 Using the Tables.....	16
5.1.1 Example 1: Comparison with NFPA 72E	
Table Results.....	16
5.1.2 Example 2: Fixed Temperature vs.	
Rate of Rise.....	17
5.2 Example 3: Using the Computer Program.....	19
6. SUMMARY.....	21
7. REFERENCES.....	21
APPENDIX A - DETACT-T2 (FORTRAN VERSION).....	33

TABLE OF CONTENTS (continued)

	<u>Page</u>
APPENDIX B - DETACT-T2 (PC BASIC VERSION).....	43
APPENDIX C - DETECTOR ACTIVATION TIME TABLES: FIXED TEMPERATURE.....	51
APPENDIX D - DETECTOR ACTIVATION TIME TABLES: RATE OF TEMPERATURE RISE.....	301

NOTE: Appendixes C and D are available in metric units in another version of this report.

LIST OF TABLES

	<u>Page</u>
Table 1. Heat Release Rates of Warehouse Materials.....	23
Table 2. Maximum Heat Release Rates from Fire Detection Institute Analysis.....	27
Table 3. RTI Values for any Listed Detector (Fixed Temperature Type).....	28
Table 4. RTI Values for any Listed Detector (Rate of Rise Type).....	29

LIST OF FIGURES

	<u>Page</u>
Figure 1. Plot of t^2 Fire Growth Curves.....	30
Figure 2. Plot of Dimensionless Velocity Correlation.....	31

NOMENCLATURE

A	$g/(C_p T_\infty \rho_\infty)$
C_p	specific heat capacity of ambient air
C_T	constant used in equations 9 and 11
C_W	constant used in equations 10 and 11
g	acceleration of gravity
H	vertical distance from fuel to ceiling
\dot{Q}	fire energy release rate
\dot{Q}^*	dimensionless fire energy release rate
r	radial distance from fire axis to the detector
RTI	response time index, the product of the detector thermal time constant and the square root of the gas velocity used in the test to measure the time constant [8].
t	time
t_2^*	dimensionless time, $t/[A^{-1/5} \alpha^{-1/5} H^{4/5}]$
$(t_2^*)_f$	dimensionless time for time delay for gas front travel
T_∞	ambient temperature
T	gas temperature
T_s	temperature of detector sensing elements
ΔT	$T - T_\infty$

NOMENCLATURE (continued)

ΔT_2^*	dimensionless temperature difference, $\Delta T/[A^{2/5} (T_\infty/g) \alpha^{2/5} H^{-3/5}]$
U	gas velocity at the detector location
U_m	maximum gas velocity
U_2^*	dimensionless gas velocity, $U/[A \alpha H]^{1/5}$
α	proportionality constant for t^2 - fire growth = \dot{Q}/t^2
ρ_∞	ambient air density
τ	detector thermal time constant

Evaluating Thermal Fire Detection Systems [English Units]

David W. Stroup
David D. Evans
Phyllis Martin

ABSTRACT

This report presents a methodology for evaluating heat detection systems installed in buildings. Previous work for use primarily in designing new thermal fire detection systems was used as a starting point. The previous work was enhanced and supplemented to make it more useful for evaluating existing systems. The resulting equations were programmed into a user interactive computer program. This program is available in both BASIC and FORTRAN and will run on mainframes as well as personal computers. In addition, a modified version of the FORTRAN program was used to develop an extensive set of tables listing detector activation times for given building geometries, detector characteristics, and fire growth rates. These tables are useful for quick evaluation of alternative heat detector installations. Finally, practical examples are included to illustrate the use of the tables and computer programs.

Keywords: fire alarm systems; fire detection; fire detection systems; fire hazard assessment; fire protection; fire suppression; heat detectors; sprinkler systems.

1. INTRODUCTION

Studies of the response of heat detectors to fire driven flows under confined ceilings have been conducted since the early 1970's [1,2,3,4,5]¹. Results of these largely experimental studies have been used to develop correlations of data that are useful under a broad range of fire conditions and building geometries. These correlations have been used to construct engineering methods to determine heat detector spacing, sprinkler response time, and smoke detector alarm times for industrial buildings where large undivided ceilings over storage and manufacturing facilities are common. The National Fire Protection Association (NFPA) has adopted an alternate design method for determining heat detector spacing which is based on some of these correlations.

This alternate design method is contained in Appendix C of the NFPA 72E standard [6], "Guide for Automatic Fire Detector Spacing," which consists of tables listing maximum allowable detector spacings for given room sizes and fire growth rates calculated from correlations of experimental measurements. The tabular form of presentation is useful for specifying design requirements in new installations. However, the tables are inconvenient to use in evaluating changes to existing detector systems where the spacing is fixed. There appears to be a need for a method which determines detector activation times for specified building geometries, detector characteristics, detector spacings, and fire growth rates. This method would be useful in evaluating the

¹ Numbers in brackets refer to literature references at the end of this report

expected fire detection time for existing and proposed systems for use in determining available safe egress time, and the relative effectiveness of different detectors used at the same spacing.

This paper presents the results of work to develop an alternative method appropriate to existing installations. As part of this study, the basis for the calculation method published in Appendix C of the NFPA 72E standard was determined. Alternate correlations of the experimental data, used to develop the results presented in Appendix C of NFPA 72E, have been used to construct a FORTRAN program (DETECT-T2). This computer program evaluates the response time of heat detector systems [7]. In this work, a modified version of the DETECT-T2 program was used to generate tables of detector response times for a wide range of building geometries, detector characteristics, and fire growth rates. These calculated values for response time agree to within 5 percent of those published in the tables contained in Appendix C of the NFPA 72E standard.

2. DESCRIPTION OF THE MODEL

The problem of heat detector response is solved by predicting the time dependent temperature of the detector sensing element up to the point when it is heated to the specified alarm conditions. In order to predict the temperature of a heat detector element, it is necessary to describe the fire and the fire generated environment to which the detector is exposed. The primary fire related parameters which influence the response of heat detectors are the gas temperature and velocity. Once the fire-generated environmental

characteristics are known, a model of the response of the thermal sensing element in the detector is employed to calculate the detector element temperature as a function of time.

2.1 Characteristic Fire

Extensive full-scale tests have been conducted to determine the response of heat detectors [1-4]. These tests have studied two classes of fires. The first of these are steady fires. These fires have energy release rate histories which do not change with time. Results from work using this type of fire may be used to calculate heat detector response if the quasi-steady state assumption is invoked. In this case, a varying energy release rate history is approximated as a series of steady fires. In this type of analysis, the transport time of the gases to the detector is ignored. This usually results in a predicted actuation time which is earlier than that encountered in actual practice. This may or may not be acceptable depending on the case.

Another class of fires for which research results are available are called "t-squared" (t^2) fires. These fires have energy release rate histories which increase proportionally with the second power of time from ignition. This class of fires was used to develop the tables in the NFPA 72E document and will be used in this paper.

Appendix C of the NFPA 72E standard lists three fires which have t^2 type fire growth behavior. A slow developing fire is defined as one which would

take 600 seconds (10 minutes) from the time of flaming ignition until it reaches a heat release rate of 1000 BTU/s (1055 kW). A medium growth rate fire reaches a heat release rate of 1000 BTU/s (1055 kW) approximately 300 seconds (5 minutes) after flaming ignition occurs. The fast developing fire requires 150 seconds (2.5 minutes) to reach a heat release rate of 1000 BTU/s (1055 kW). In addition, a fourth t^2 fire has been developed in this report. This fire has been defined as one which takes 75 seconds (1.25 minutes) to reach a heat release rate of 1000 BTU/s (1055 kW). These four fire growth curves are plotted in Figure 1.

Table 1 is a reproduction of a table in NFPA 72E. It lists various warehouse commodities and their maximum fire heat release rates per unit floor area covered by the commodity. The time required for a fire, occurring in a particular commodity, to reach a heat release rate of 1000 BTU/s is also listed. If possible, each commodity is identified with a specific fire growth behavior - slow, medium, fast, or ultrafast fire. Table 2 is a reproduction of another table found in Appendix C of NFPA 72E. It lists the maximum heat release rates for various furnishing type fuel items. Both of these tables are useful for estimating fire growth rates that may be expected from various fuel packages.

2.2 Temperature and Velocity Correlations

Values of the time dependent gas velocity and temperature for t^2 fires may be obtained from work by Heskestad and Delichatsios [4]. From experiments and

use of dimensional arguments, they developed correlations of maximum temperature rise and velocity for unconfined ceiling layer flows as a function of radial distance from the axis of fire plume impingement. These correlations of dimensionless maximum temperature rise and dimensionless maximum velocity are:

$$\Delta T_2^* = \begin{cases} 0, & t_2^* \leq (t_2^*)_f \\ \left[\frac{t_2^* - 0.954 (1 + r/H)}{0.188 + 0.313 r/H} \right]^{4/3}, & t_2^* > (t_2^*)_f \end{cases} \quad (1)$$

$$U_2^* / \sqrt{\Delta T_2^*} = 0.59 (r/H)^{-0.63} \quad (2)$$

where

$$t_2^* = t / [A^{-1/5} \alpha^{-1/5} H^{4/5}]$$

$$U_2^* = U / [A^{1/5} \alpha^{1/5} H^{1/5}]$$

$$\Delta T_2^* = \Delta T / [A^{2/5} (T_\infty/g) \alpha^{2/5} H^{-3/5}]$$

$$A = g / [C_p T_\infty \rho_\infty]$$

$$\alpha = \dot{Q} / t^2$$

$$(t_2^*)_f = 0.954 (1 + r/H)$$

These equations may be used to predict the fire-generated environment (gas temperature and velocity) near a detector.

2.3 Detector Response Model

Characterization of the thermal response of heat detector and sprinkler thermal sensing elements is discussed by Heskestad and Smith [8], and Evans [9]. The model for the detector sensing element temperature is based on a convective heat transfer process. The first order differential equation that describes the rate of temperature increase of the sensing element is:

$$\frac{dT_s}{dt} = \frac{U^{1/2}}{RTI} [T - T_s] \quad (3)$$

This equation predicts the temperature change of a detector with known thermal characteristics to a given time dependent gas flow temperature and velocity. In particular, the rate of change of the detector element temperature at any time is equal to the gas velocity to the one-half power multiplied by the difference between the temperature of the hot fire generated gas flow near the detector and the temperature of the detector element. All divided by the detector RTI or response time index.

The RTI is a measure of the detector's thermal lag and can be determined for sprinkler or heat detector sensing elements using the plunge test [8]. NFPA 72E reports detector sensitivity in terms of time constants, τ . At any given time, the time constant for a given type of detector may be calculated from the RTI using:

$$\tau = RTI / U^{1/2} \quad (4)$$

Tables 3 and 4 relate heat detector listed spacings to RTI values for fixed temperature detectors and rate of rise detectors respectively. These Tables were derived from results published in references 3 and 5.

Beyler [10] used the correlations of Heskestad and Delichatsios [4] to derive a new form of equation (3). He was able to solve this new form of the heat detector response equation analytically. Using the condition that the initial detector element temperature is equal to ambient temperature ($T_s = T_\infty$), the equations for calculating the response of fixed temperature and rate of temperature rise detectors are, from Beyler:

$$\frac{dT_s}{dt} = \frac{(4/3) (\Delta T / \Delta T_2^*) (\Delta T_2^*)^{1/4}}{(t/t_2^*) (0.188 + 0.313 r/H)} (1 - e^{-Y}) \quad (5)$$

$$T_s - T_s(0) = (\Delta T / \Delta T_2^*) \Delta T_2^* \left[1 - \frac{(1 - e^{-Y})}{Y} \right] \quad (6)$$

where

$$Y = \frac{3}{4} \left(\frac{U}{U_2^*} \right)^{1/2} \left(\frac{U_2^*}{\sqrt{\Delta T_2^*}} \right)^{1/2} \frac{\Delta T_2^*}{RTI} \left(\frac{t}{t_2^*} \right) (0.188 + 0.313 r/H)$$

Using equations (1) and (2), equations (5) and (6) may be solved to predict the response of sprinkler and heat detector sensing elements to fire-driven ceiling jet flows.

2.4 Velocity Correlation for $r/H < 0.3$

While this exact solution to equation (3) is applicable to any r/H value, the dimensionless velocity correlation, previously discussed, is only valid for r/H values greater than 0.3. In an effort to extend the usefulness of the detector response calculations, an analysis was made of the available data for ceiling jets at r/H values less than 0.3. Results of this analysis indicated a lack of much quantitative information for this region. Therefore, an analysis to develop a rational estimation of velocities in the ceiling-jet close to the plume axis was undertaken by studying a simple extension of the velocities in the plume.

The dimensionless velocity and temperature change relations proposed by Heskestad and Delichatsios [4] together with equations proposed by Zukoski et. al. [11] to describe fire plume maximum temperature and velocity distributions were taken as a starting point.

$$U_2^* = U / [A^{1/5} \alpha^{1/5} H^{1/5}] \quad (7)$$

$$\Delta T_2^* = \Delta T / [A^{2/5} (T_\infty/g) \alpha^{2/5} H^{-3/5}] \quad (8)$$

$$\Delta T_m / T_\infty = C_T (\dot{Q}^*)^{2/3} \quad (9)$$

$$U_m = C_W g^{1/2} H^{1/2} (\dot{Q}^*)^{1/3} \quad (10)$$

These equations were used to obtain an expression of dimensionless maximum gas velocity in the same form as equation (2).

$$U_2^* / \sqrt{\Delta T_2^*} = c_W / \sqrt{c_T} \quad (11)$$

Using values suggested by Zukoski et. al. [11], the dimensionless gas velocity is found to be a constant at r/H values less than 0.3. The complete dimensionless gas velocity equation for all values of r/H is:

$$U_2^* / \sqrt{\Delta T_2^*} = \begin{cases} 3.87 / \sqrt{9.115}, & r/H \leq 0.3 \\ 0.59 (r/H)^{-0.63}, & r/H > 0.3 \end{cases} \quad (12)$$

This equation is plotted in Figure 2. The two curves merge nicely. This equation together with the previously discussed correlations and analytic solution may be used to calculate any aspect of the response of thermal detectors to t^2 fires.

3. IMPLEMENTATION OF THE MODEL: COMPUTER PROGRAMS

3.1 General Program Structure

The equations discussed in Section 2 were programmed into a user interactive computer code called DETACT-T2. To evaluate the response of a detector, the user enters values for ambient air temperature, detector activation temperature and rate of temperature rise, detector RTI, fuel to ceiling distance, detector spacing, and a fire growth rate constant, α (for t^2 fires). The program solves the appropriate equation to obtain the response time for a fixed temperature detector and a rate of rise detector with the

given characteristics. The fire energy release rate at each time step is also calculated.

The computer program is available in two versions. One version, contained in Appendix A, is written in FORTRAN 77. The program contains approximately 400 lines of source code and requires about 64k of computer memory in compiled form for execution. The source code may be compiled on any computer supporting an ANSI standard FORTRAN 77 compiler. The program has been compiled and run successfully on IBM² and compatible personal computers operating under MS-DOS³. A specially modified version of this program was used to generate the tables discussed in section 4.

The other version of the program, listed in Appendix B, is written in BASIC. It consists of approximately 350 lines of source code. This program has also been successfully tested on IBM and compatible micro-computers. Both programs have essentially the same structure and use the same variable names. To insure convergence, all variables are in double precision.

The program consists of three major sections. The main program reads and lists the required input data, performs the calculations necessary to set up the equations, calls the solution subroutines, and writes out the results. The second section is a subroutine which uses a Newton-Raphson technique to solve the equation describing the activation time of a fixed temperature detector.

² IBM is a trademark of International Business Machines Corporation and does not represent an endorsement by the National Bureau of Standards.

³ MS and Microsoft are trademarks of Microsoft Corporation and do not represent an endorsement by the National Bureau of Standards.

The last section is a subroutine which uses a bisection method to solve the rate of temperature rise detector activation time equation. Each of these sections is described in more detail below.

3.2 Main Program

3.2.1 Data Input Section

This section of the main program requests information from the user concerning the building geometry, the detector characteristics, and the fire growth rate. The user may also elect to enter data in either English or S.I. units.

3.2.2 Calculation Initialization

Several preliminary calculations must be made before the activation time equations may be solved. These calculations are done in the second section of the main program. In this section, the dimensionless time, velocity, and temperature are calculated. Based on the user-specified detector spacing, the maximum radial distance of the detector from the fire is calculated. After these calculations have been completed, the two activation time calculation subroutines are called. The results from these subroutines are converted into activation times, and the heat release rates are calculated.

3.2.3 Conversion and Output Section

The last section of the main program writes out the solutions to the equations. The results are printed in both English and S.I. units.

3.3 Activation Time Equation Solution: Fixed Temperature

The equation describing the activation time of a fixed temperature detector cannot be solved explicitly for activation time. Therefore, a numerical technique must be used. A Newton-Raphson technique was selected for use in solving the fixed temperature detector equation. This technique is discussed in most numerical methods textbooks [12].

The Newton-Raphson (or simply Newton's) method is one of the most powerful and well-known numerical methods for finding a root (solution) of $f(x) = 0$. To use this routine, the activation time equation is first adjusted to fit the appropriate form. This method converges very rapidly for the cases considered here.

3.4 Activation Time Equation Solution: Rate of Temperature Rise

A bisection technique was selected for use in solving the rate of rise activation time equation. This technique is also discussed in most numerical methods textbooks [12]. It was chosen for use in this instance because the Newton method would have introduced stability problems into the calculation. This method also converges very rapidly for the cases considered here.

4. IMPLEMENTATION OF THE MODEL: TABLES OF RESULTS

The computer programs calculate detector activation times one case at a time. In many instances, it is necessary to evaluate a number of alternatives. It would be tedious and inconvenient to run a computer program to examine each case of interest. In light of this fact, the FORTRAN version of the computer program was used to generate an extensive set of tables. These tables list detector activation time as a function of building geometry, detector characteristics, and fire growth rate constants.

Each entry in the tables was checked by first calculating the response time of the given detector numerically. Then the calculated time is substituted into the exact form of the equation, and it is solved for the temperature of the detector sensing element at that time. In each case, the calculated temperature agreed with the originally assumed one to within an accuracy of 0.005 percent.

The tables cover a wide range of parameter variations. Tables have been developed for each of the four fire growth rates that were described earlier. Tables are available in both English and S.I. units. The English units tables are contained in Appendixes C and D of this report. The S. I. units tables are available in the metric version [13].

For use with English units, tables cover detector spacings of 0 to 60 feet and fuel to ceiling heights of 4 to 80 feet. RTI values range from 0 to 800 $(\text{ft-s})^{1/2}$ for fixed temperature detectors and from 100 to 2000 $(\text{ft-s})^{1/2}$ for rate of temperature rise detectors. Temperature differences for fixed temperature detectors range from 10 to 140 degrees F, and available rate of temperature rise values are 15, 20, and 25 degrees F/minute.

The tables of detector activation times are organized according to: type of detector (fixed temperature or rate of temperature rise), detector spacing, and type of fire (ultrafast, fast, medium, or slow). Appendix C contains the tables listing activation times for fixed temperature heat detectors, and Appendix D contains the tables listing activation times for rate of temperature rise detectors. In each appendix, the tables are arranged in order of increasing detector spacing (i.e. 0 ft, 2 ft, 4 ft, etc.). For each spacing, the tables are arranged according to fire type. Ultrafast is first, followed by fast, medium, and slow.

The asterisks next to some of the table entries indicate that the detector location places it within the $r/H < 0.3$ region. This region is where the theoretical dimensionless velocity correlation, discussed in section 2.4, is

applicable. These values are flagged because the calculation of gas velocity in this region is based primarily on a theoretical analysis and not on a combination of theory and experiment. In addition, this region is not considered in the NFPA 72E Appendix C.

Finally, just as in Appendix C of NFPA 72E, for the tables in this report, the fire plume is assumed to impinge on the ceiling at the center of the square array of detectors spaced as indicated. So for detectors spaced at 10 ft (3.048 m), the distance of each detector from the gas impingement point would be 7.07 ft ($10\sqrt{2}/2$). Each table indicates this distance in parenthesis after the table spacing value.

5. EXAMPLES

5.1 Using the Tables

5.1.1 Example 1: Comparison with NFPA 72E Table Results

The first example will show that these new tables agree quite well with the results from the tables in Appendix C of NFPA 72E even though each set of tables were generated using different correlations of experimental data. Assume a system of detectors is installed using a 14 foot spacing in a room with a 12 foot ceiling height. A medium fire growth rate is expected. The detectors have an RTI rating of 50 (ft-s)^{1/2} which corresponds to a 22.4 second time constant. The ambient temperature is 70 degrees F and the rated

activation temperature of the detector is 190 degrees F. This gives a temperature difference of 120 degrees.

$$\Delta T = T_{\text{act}} - T_{\text{amb}} = 190 - 70 = 120 \text{ degrees F}$$

Looking in Appendix C, a detection system installed using a 14 foot spacing would detect a medium growth rate fire 4.91 minutes after ignition. If we next look for similar conditions in the 72E tables [NFPA, p. 72E-36], we find that a detector installed under these conditions with a time constant of 25s will activate when a medium growth rate fire reaches a heat release rate of 1000 BTU/s. A medium growth rate fire will reach this heat release rate 300 seconds or five minutes after ignition.

The detector listed in the NFPA table has a time constant of 25s. This is slightly higher than the 22.4s for the detector listed in the NBS table. Therefore, it is expected that the detector listed in the NBS table would have an activation time slightly lower than the one in the NFPA table. After extensive cross checks between the new NBS tables and the 72E tables, the results were found to agree to within 5 percent.

5.1.2 Example 2: Fixed Temperature vs. Rate of Rise

This example will show how alternative heat detector installations may be compared using the tabular results. In particular, the differences between fixed temperature and rate of rise detectors will be compared. Suppose a detection system is installed in a room with a ceiling height of 40 feet and

detection of a medium fire is desired. The detectors are spaced 20 feet apart. Currently, fixed temperature detectors with an RTI of $200 \text{ (ft-s)}^{1/2}$ and an activation temperature rating of 170 degrees F are installed in the room. Ambient temperature is 70 degrees F. (Temperature differential of 100 degrees.) Will the use of rate of rise detectors with the same RTI as the fixed temperature detectors and an activation rate of rise rating of 15 degrees F/min yield a lesser time to activate a detector in response to a medium growth rate fire?

From Appendix C, the activation time of the fixed temperature detectors, installed using a 20.0 foot spacing and exposed to a medium growth rate fire, is 12.27 minutes. The time required to activate the rate of rise detectors is obtained from Appendix D. The activation time for these detectors is 15.29 minutes. From Figure 1, the heat release rate at activation of the rate of rise detectors would be 9342 BTU/s compared to 6016 BTU/s for the fixed temperature detectors.

It would take about three minutes longer to activate the rate of rise detectors, and the fire heat release rate would have increased by about 3326 BTU/s. This is interesting in light of the generally held belief that rate of rise detectors activate before fixed temperature detectors. This is not true when the detectors are located in areas with high ceilings and the fire does not grow rapidly. This example illustrates how quick and sometimes surprising comparisons may be made using the tabular form of the detector activation time results.

5.2 Example 3: Using the Computer Program

The last example will be used to show how the computer programs work. Both the BASIC version and the FORTRAN version ask similar questions and operate in a similar manner so this discussion is applicable to both programs. The problem will be to calculate the activation time for fixed temperature and rate of rise detectors installed, using a 10 foot spacing, in an area with a ceiling height of 12 feet. The detectors have an RTI of $670.8 \text{ (ft-s)}^{1/2}$. The detector activation temperature is 130 degrees F, and the activation rate of rise is 15 degrees F/min. Ambient temperature is 70 degrees F. (User input is preceded by a > and, where possible, typed in lower case.)

```
ENTER 1 FOR ENGLISH UNIT INPUT
      2 FOR METRIC  UNIT INPUT
>1
```

```
ENTER THE AMBIENT TEMPERATURE IN DEGREES F.
>70
```

```
ENTER THE DETECTOR RESPONSE TIME INDEX (RTI) IN (FT-SEC)**1/2.
>670.8
```

```
ENTER THE DETECTOR ACTIVATION TEMPERATURE IN DEGREES F.
>130
```

```
ENTER THE DETECTOR RATE OF RISE IN DEGREES F/MIN.
>15
```

```
ENTER THE CEILING HEIGHT IN FEET.
>12
```

```
ENTER THE DETECTOR SPACING IN FEET.
>10
```

```
ENTER: S FOR SLOW FIRE GROWTH RATE,
      M FOR MEDIUM FIRE GROWTH RATE,
      F FOR FAST FIRE GROWTH RATE,
      U FOR ULTRAFAST FIRE GROWTH RATE, OR
      O FOR OTHER.
>m
```


RESULTS:

CEILING HEIGHT = 12.0 FEET (3.66 METERS)
DETECTOR SPACING = 10.0 FEET (3.05 METERS)

DETECTOR RTI = 670.8 (FT-SEC)**1/2 (370.3 (M-SEC)**1/2)

FIRE GROWTH RATE CONSTANT = .1111E-001 BTU/(SEC**3)
(.1171E+002 JOULES/SEC**3)

FOR TEMPERATURE ACTUATED DETECTOR:

ACTIVATION TEMPERATURE = 130.0 DEGREES F (54.4 DEGREES C)

TIME OF ACTIVATION = 4.96 MINUTES

HEAT RELEASE RATE = .9859E+003 BTU/SEC
(.1040E+004 KILOJOULES/SEC)

FOR RATE OF RISE ACTUATED DETECTOR:

ACTIVATION RATE OF RISE = 15.00 DEGREES F/MIN
(8.33 DEGREES C/MIN)

TIME OF ACTIVATION = 3.04 MINUTES

HEAT RELEASE RATE = .3707E+003 BTU/SEC
(.3911E+003 KILOJOULES/SEC)

The results show that the fixed temperature heat detector would activate approximately 5 minutes after the fire reaches a flaming state. The heat release rate at this time would be 986 BTU/s. A rate of rise detector would activate at about 3 minutes with a corresponding heat release rate of 371 BTU/s. (If metric units had been selected, the input requests would have called for data in metric units instead of English units.)

6. SUMMARY

This report presented a methodology for evaluating heat detection systems installed in existing buildings. Previous work for use primarily in designing new systems was enhanced and supplemented to broaden its application. The resulting equations were programmed into a user interactive computer program. This program is available in both BASIC and FORTRAN and will run on mainframes as well as personal computers. In addition, a modified version of the FORTRAN program was used to develop an extensive set of tables listing detector activation times for given building geometries, detector characteristics, and fire growth rates. These tables are useful for quick evaluation of alternative heat detector installations among other uses. Practical examples were utilized to illustrate the use of the tables and computer programs.

7. REFERENCES

- [1] Alpert, R.L. "Calculation of Response Time of Ceiling - Mounted Fire Detectors", Fire Technology, 8, 1972, p. 181.
- [2] Alpert, R.L. "Turbulent Ceiling - Jet Induced by Large - Scale Fires", Combustion Science and Technology, 11, 1975, p. 197.
- [3] Heskestad, G. and Delichatsios, M.A. "Environments of Fire Detectors Phase I; Effects of Fire Size, Ceiling Height and Material, Volume II - Analysis", Technical Report Serial No. 22427, RC 77-T-11, Factory Mutual Research Corporation, Norwood, Massachusetts 02062, 1977.
- [4] Heskestad, G. and Delichatsios, M.A. "The Initial Convective Flow in Fire", Seventeenth Symposium (International) on Combustion, The Combustion Institute, Pittsburgh, Pennsylvania, 1978, pp. 1113 - 1123.
- [5] Schifiliti, Robert "Use of Fire Plume Theory in the Design and Analysis of Fire Detector and Sprinkler Response", MS thesis, Worcester Polytechnic Institute, 1985.

- [6] Standard on Automatic Fire Detectors, NFPA 72E - 1984, Appendix C, National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269.
- [7] Evans, D.D. and Stroup, D.W. "Methods of Calculating the Response Time of Heat and Smoke Detectors Installed Below Large Unobstructed Ceilings", NBSIR 85-3167, U.S. Department of Commerce, National Bureau of Standards, Gaithersburg, Maryland 20899, 1985.
- [8] Heskestad, G. and Smith, H. "Investigation of a New Sprinkler Sensitivity Approval Test: The Plunge Test", FMRC Technical Report 22485, Factory Mutual Research Corporation, Norwood, Massachusetts 02062, 1976.
- [9] Evans, D.D., Madrzykowski, D. "Characterizing the Thermal Response of Fusible-Link Sprinklers", NBSIR 81-2329, U.S. Department of Commerce, National Bureau of Standards, Gaithersburg, Maryland 20899, 1981.
- [10] Beyler, C.L. "A Design Method for Flaming Fire Detection", Fire Technology, 20, 4, 1984, p. 5.
- [11] Zukoski, E.E., Kubota, T., and Cetegen, B. "Entrainment in Fire Plumes", Fire Safety Journal, 3, 1980, pp. 107 - 121.
- [12] Burden, R.L., Faires, J.D., Reynolds, A.C. Numerical Analysis; Boston, Massachusetts; Prindle, Weber & Schmidt; 1981, pp. 600.
- [13] Stroup, D.W., Evans, D.D., and Martin, P. "Evaluating Thermal Fire Detection Systems [S.I. Units]", NBS Special Publication 713, U.S. Department of Commerce, National Bureau of Standards, Gaithersburg, Maryland 20899, 1986.

TABLE 1. WAREHOUSE MATERIALS*

	Time to Reach 1000 BTU/s (sec)	Maximum Heat Release per Unit Floor Area (BTU/s/ft ²)	Classification (s - slow) (m - medium) (f - fast) (u - ultrafast)
1. Wood pallets, stack 1.5 ft high (6-12% moisture)	150-310	110	m-f
2. Wood pallets, stack 5 ft high (6-12% moisture)	90-190	330	f
3. Wood pallets, stack 10 ft high (6-12% moisture)	80-110	600	f
4. Wood pallets, stack 16 ft high (6-12% moisture)	75-105	900	f
5. Mail bags, filled, stored 5 ft high	190	35	f
6. Cartons, compart- mented, stacked 15 ft high	60	200	u
7. Paper, vertical rolls, stacked 20 ft high	15-28	-	-
8. Cotton (also PE, PE/Cot, Acrylic/ Nylon/PE), gar- ments in 12 ft high rack	20-42	-	-
9. Cartons on pallets rack storage, 15-30 ft high	40-280	-	m-f

* Adapted from Table C-2-2.2.1(a) of Ref. 5

TABLE 1. WAREHOUSE MATERIALS (continued)

	Time to Reach 1000 BTU/s (sec)	Maximum Heat Release per Unit Floor Area (BTU/s/ft ²)	Classification (s - slow) (m - medium) (f - fast) (u - ultrafast)
10. Paper products, densely packed in cartons, rack storage, 20 ft high	470	-	m-s
11. PE letter trays, filled, stacked 5 ft high on cart	190	750	f
12. PE trash barrels in cartons stacked 15 ft high	55	250	u
13. FRP shower stalls in cartons, stacked 15 ft high	85	110	u
14. PE bottles packed in Item 6	85	550	u
15. PE bottles in car- tons, stacked 15 ft high	75	170	u
16. PE pallets, stack 3 ft high	130	-	f
17. PE pallets, stack 6-8 ft high	30-55	-	-
18. PU mattress, single, horizontal	110	-	f
19. PF insulation board, rigid foam, stacked 15 ft high	8	170	-
20. PS jars packed in Item 6	55	1200	-

TABLE 1. WAREHOUSE MATERIALS (continued)

	Time to Reach 1000 BTU/s (sec)	Maximum Heat Release per Unit Floor Area (BTU/s/ft²)	Classification (s - slow) (m - medium) (f - fast) (u - ultrafast)
21. PS tubs nested in cartons, stacked 14 ft high	105	450	f
22. PS toy parts in cartons, stacked 15 ft high	110	180	f
23. PS insulation board, rigid, stacked 14 ft high	7	290	-
24. PVC bottles packed in Item 6	9	300	-
25. PP tubs packed in Item 6	10	390	-
26. PP and PE film in rolls, stacked 14 ft high	40	350	-
27. Distilled spirits in barrels, stacked 20 ft high	23-40	-	-
28. Methyl alcohol	-	65	-
29. Gasoline	-	200	-
30. Kerosine	-	200	-
31. Diesel Oil	-	180	-

Abbreviations:

FRP - Fire Retardant Plastic
PE - Polyethylene
PF - Phenolic Resins
PP - Polypropylene

PS - Polysytrene
PU - Polyurethane
PVC - Polyvinyl Chloride

**TABLE 2. MAXIMUM HEAT RELEASE RATES FROM
FIRE DETECTION INSTITUTE ANALYSIS***

	Approximate Values BTU/s
1. Medium wastebasket with milk cartons	100
2. Large barrel with milk cartons	140
3. Upholstered chair with polyurethane foam	350
4. Latex foam mattress (heat at room door)	1200
5. Furnished living room (heat at open door)	4000 - 8000

* Adapted from Table C-2-2.2.1(b) of Ref. 3

TABLE 3. RTI VALUES FOR ANY LISTED DETECTOR*
(FIXED TEMPERATURE TYPE) [(ft-s)^{1/2}]

Listed Spacing (ft)	UL Listed Activation Temperature						All FM Listed Temp.
	<u>128°F</u>	<u>135°F</u>	<u>145°F</u>	<u>160°F</u>	<u>170°F</u>	<u>196°F</u>	
10	894	738	586	436	358	217	436
15	559	425	349	246	199	101	246
20	369	302	235	157	116	38	157
25	277	224	174	107	72		107
30	212	179	136	81	49		81
40	159	128	92	40			
50	132	98	67				
70	81	54	20				

NOTE: These RTIs are based on an analysis of the Underwriters Laboratories and Factory Mutual listing test procedures. Plunge test (see Ref. 7) results performed on the detector to be used will give a more accurate response time index.

Abbreviations:

FM - Factory Mutual
 UL - Underwriters Laboratories Inc.

* Adapted from Table C-3-2.1.1 of Ref. 5

TABLE 4. RTI VALUES FOR ANY LISTED DETECTOR*
(RATE OF RISE TYPE) [(ft-s)^{1/2}]

Listed Spacing (ft)	UL Listed Activation Rate of Temp. Rise		
	<u>15 °F/min</u>	<u>20 °F/min</u>	<u>25 °F/min</u>
10	1834	1308	984
12.5	1453	1073	805
15	1185	872	637
20	872	581	425
30	559	380	280
40	447	291	206
50	425	246	161

Abbreviation:

UL - Underwriters Laboratories Inc.

* Adapted from Ref. 3

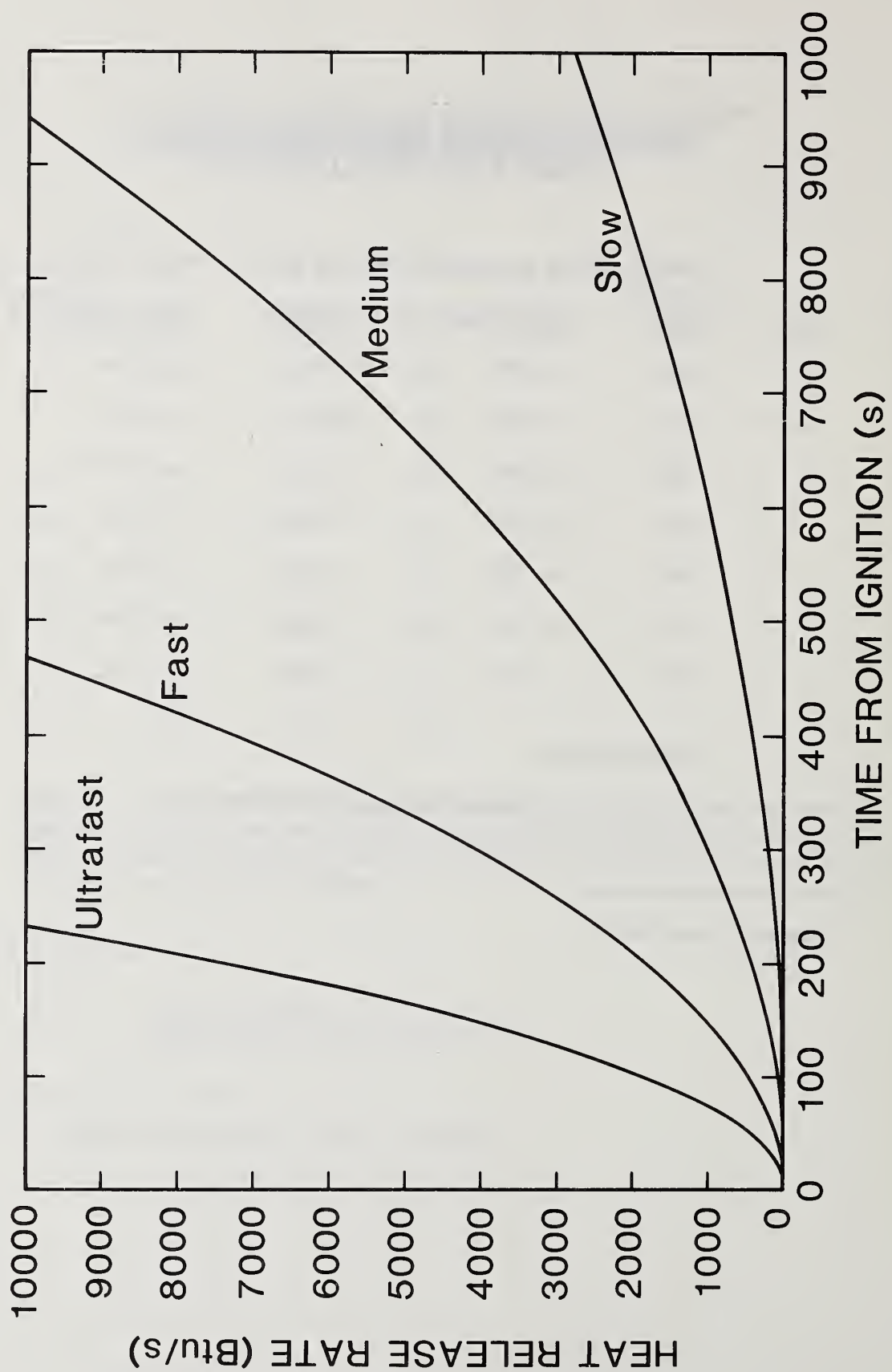


Figure 1. Plot of t^2 Fire Growth Curves

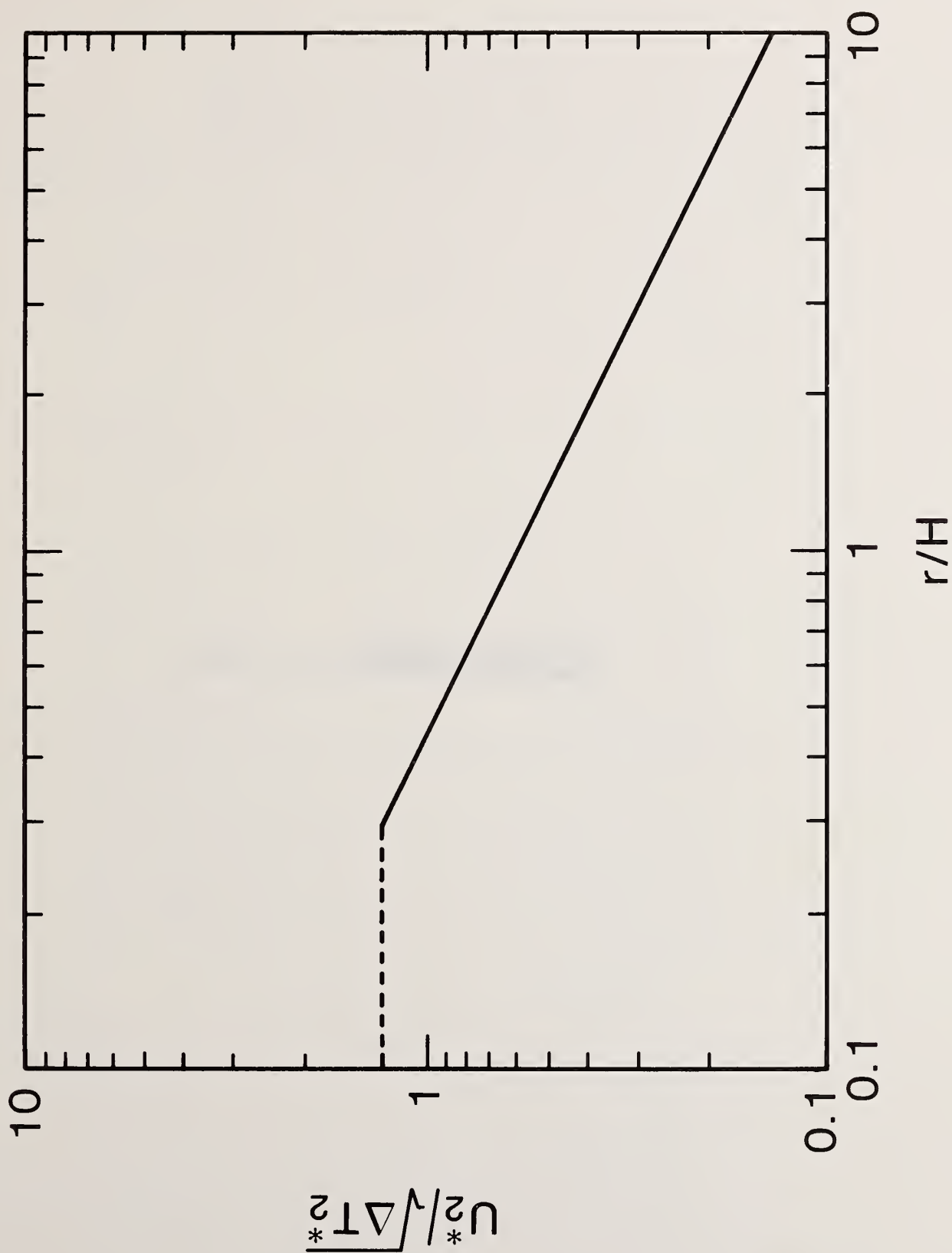


Figure 2. Plot of Dimensionless Velocity Correlation

This page intentionally left blank.

APPENDIX A. DETACT-T2
FORTAN VERSION

```

C
C      PROGRAM DETACT
C
C THIS IS PROGRAM DETACT-T2.
C IT CALCULATES THE RESPONSE OF THERMAL DETECTORS, BOTH FIXED TEMPERATURE
C AND RATE OF TEMPERATURE RISE, TO FIRES WHOSE HEAT RELEASE RATE GROWS
C PROPORTIONALLY WITH THE SQUARE OF TIME FROM IGNITION.
C
C WRITTEN BY DAVID W. STROUP, CENTER FOR FIRE RESEARCH, NBS
C
C THIS PROGRAM IS A CONTRIBUTION OF THE NATIONAL BUREAU OF STANDARDS AND
C IS NOT SUBJECT TO COPYRIGHT.
C
C VERSION 1.1
C
C ***** NOTATION *****
C
C INPUT:
C J      - UNITS CODE (1 OR 2)
C          1 - INPUT DATA IN ENGLISH UNITS
C          2 - INPUT DATA IN METRIC UNITS
C TAMB   - AMBIENT TEMPERATURE
C RTI    - DETECTOR RESPONSE TIME INDEX
C TACT   - DETECTOR ACTIVATION TEMPERATURE
C ROR    - DETECTOR ACTIVATION RATE OF RISE
C HF     - CEILING HEIGHT
C ZF     - DETECTOR SPACING
C M      - GROWTH FACTOR CODE, CHARACTER VARIABLE (S, M, F, U, OR O)
C ALPHA  - FIRE GROWTH RATE CONSTANT
C
C OUTPUT:
C T      - TIME OF ACTIVATION FOR FIXED TEMPERATURE DETECTOR
C QD     - HEAT RELEASE RATE AT TIME OF ACTIVATION, T
C TR     - TIME OF ACTIVATION FOR RATE OF RISE DETECTOR
C QDR    - HEAT RELEASE RATE AT TIME OF ACTIVATION, TR
C IERR   - ERROR CODE (0 OR 1)
C          0 - SUCCESSFUL
C          1 - UNSUCCESSFUL
C
C *****
C
C      IMPLICIT DOUBLE PRECISION (A-H,O-Z)
C      CHARACTER M
C      DATA IRTTY,IWTTY/5,6/
C      DATA GE,CPE,RHOE/32.2D0,0.24D0,0.0735D0/
C      DATA GM,CPM,RHOM/9.8D0,1.0035D0,1.1768D0/
C      IERR = 0
C      WRITE (IWTTY,1)
1  FORMAT (' DETACT-T2      VERSION 1.0'/
&         ' WRITTEN BY D.W. STROUP (1985)'//
&         ' CONTRIBUTION OF THE '/

```



```

&      ' NATIONAL BUREAU OF STANDARDS (U.S.).' /
&      ' NOT SUBJECT TO COPYRIGHT.' //
&      ' CALCULATES DETECTOR ACTUATION TIME' /
&      ' BELOW UNCONFINED CEILINGS WITH ' /
&      ' TIME SQUARED FIRE GROWTH RATES.' //)

C
C ENTER INPUT DATA
C
5      CONTINUE
      WRITE (IWTTY,10)
10     FORMAT (' ENTER: 1 FOR ENGLISH UNIT INPUT' / 8X, '2 FOR METRIC UNIT I
&NPUT' /)
      READ (IRTTY,*) J
      IF (J.EQ.1) THEN
      WRITE (IWTTY,20)
20     FORMAT (' ENTER THE AMBIENT TEMPERATURE IN DEGREES F.' /)
      READ (IRTTY,*) TAMB
      WRITE (IWTTY,30)
30     FORMAT (' ENTER THE DETECTOR RESPONSE TIME INDEX (RTI) IN (FT-SEC)
&**1/2.' /)
      READ (IRTTY,*) RTI
      IF (RTI.LE.0.000001D0) RTI = 0.000001D0
      RTIR = RTI
      WRITE (IWTTY,40)
40     FORMAT (' ENTER THE DETECTOR ACTIVATION TEMPERATURE IN DEGREES F.'
&/)
      READ (IRTTY,*) TACT
      WRITE (IWTTY,50)
50     FORMAT (' ENTER A DETECTOR RATE OF RISE IN DEGREES F/MINUTE.' /)
      READ (IRTTY,*) ROR
      WRITE (IWTTY,60)
60     FORMAT (' ENTER THE CEILING HEIGHT IN FEET.' /)
      READ (IRTTY,*) HF
      WRITE (IWTTY,70)
70     FORMAT (' ENTER THE DETECTOR SPACING IN FEET.' /)
      READ (IRTTY,*) ZF
      WRITE (IWTTY,80)
80     FORMAT (' ENTER: S FOR SLOW FIRE GROWTH RATE ' /
&      '      M FOR MEDIUM FIRE GROWTH RATE' /
&      '      F FOR FAST FIRE GROWTH RATE' /
&      '      U FOR ULTRAFAST FIRE GROWTH RATE OR' /
&      '      O FOR OTHER' /)
      READ (IRTTY,410) M
      IF ((M.EQ.'s').OR.(M.EQ.'S')) ALPHA = 0.00277778D0
      IF ((M.EQ.'m').OR.(M.EQ.'M')) ALPHA = 0.01111111D0
      IF ((M.EQ.'f').OR.(M.EQ.'F')) ALPHA = 0.04444445D0
      IF ((M.EQ.'u').OR.(M.EQ.'U')) ALPHA = 0.17777778D0
      IF ((M.EQ.'o').OR.(M.EQ.'O')) WRITE (IWTTY,90)
      IF ((M.EQ.'o').OR.(M.EQ.'O')) READ (IRTTY,*) ALPHA
90     FORMAT (' ENTER THE FIRE GROWTH RATE CONSTANT (ALPHA) IN BTU/SEC/S
&EC/SEC.' /)
100    CONTINUE

```

```

ELSE
C
C METRIC UNIT INPUT
C
    WRITE (IWTTY,110)
110  FORMAT (' ENTER THE AMBIENT TEMPERATURE IN DEGREES C.//')
    READ (IRTTY,*) TAMB
    WRITE (IWTTY,120)
120  FORMAT (' ENTER THE DETECTOR RESPONSE TIME INDEX (RTI) IN (M-SEC)*
    &*1/2.//')
    READ (IRTTY,*) RTI
    IF (RTI.LE.0.000001D0) RTI = 0.000001D0
    RTIR = RTI
    WRITE (IWTTY,130)
130  FORMAT (' ENTER THE DETECTOR ACTIVATION TEMPERATURE IN DEGREES C.'
    &/)
    READ (IRTTY,*) TACT
    WRITE (IWTTY,140)
140  FORMAT (' ENTER A DETECTOR RATE OF RISE IN DEGREES C/MINUTE.//')
    READ (IRTTY,*) ROR
    WRITE (IWTTY,150)
150  FORMAT (' ENTER THE CEILING HEIGHT IN METERS.//')
    READ (IRTTY,*) HF
    WRITE (IWTTY,160)
160  FORMAT (' ENTER THE DETECTOR SPACING IN METERS.//')
    READ (IRTTY,*) ZF
    WRITE (IWTTY,80)
    READ (IRTTY,410) M
    IF ((M.EQ.'s').OR.(M.EQ.'S')) ALPHA = 2.930555556D0
    IF ((M.EQ.'m').OR.(M.EQ.'M')) ALPHA = 11.72222222D0
    IF ((M.EQ.'f').OR.(M.EQ.'F')) ALPHA = 46.88888889D0
    IF ((M.EQ.'u').OR.(M.EQ.'U')) ALPHA = 187.5555556D0
    IF ((M.EQ.'o').OR.(M.EQ.'O')) WRITE (IWTTY,170)
    IF ((M.EQ.'o').OR.(M.EQ.'O')) READ (IRTTY,*) ALPHA
170  FORMAT (' ENTER THE FIRE GROWTH RATE CONSTANT (ALPHA) IN WATTS/SEC/
    &SEC.//')
180  CONTINUE
    ENDIF
C
C ***** CALCULATIONS *****
C
    R = 0.5D0*DSQRT(2.0D0)*ZF
    ROH = R/HF
    ROR = ROR/60.D0
    IF (J.EQ.1) THEN
    TAMB = TAMB + 460.D0
    TACT = TACT + 460.D0
    A = GE/(CPE*TAMB*RHOE)
    G = GE
    ELSE
    TAMB = TAMB + 273.D0
    TACT = TACT + 273.D0

```

```

A = GM/(CPM*TAMB*RHOM*1000.D0)
G = GM
ENDIF
TOTS2 = A**(-1.D0/5.D0)*ALPHA**(-1.D0/5.D0)*HF**(4.D0/5.D0)
DLTODL = A**(2.D0/5.D0)*(TAMB/G)*ALPHA**(2.D0/5.D0)
&      *HF**(-3.D0/5.D0)
UOUS2 = A**(1.D0/5.D0)*ALPHA**(1.D0/5.D0)*HF**(1.D0/5.D0)
DELTD = TACT - TAMB
IF (ROH.GT.0.3D0) THEN
UODLTH = 0.59D0*ROH**(-0.63D0)
ELSE
UODLTH = 3.87D0/(9.115D0**0.5D0)
ENDIF
TS2F = 0.954D0*(1.D0+ROH)
A2 = (4.D0/3.D0)*DLTODL*UOUS2**(-0.5D0)*UODLTH**(-0.5D0)*RTI/
&      (TOTS2*(0.188D0+0.313D0*ROH))
C = 1.D0+DELTD/A2
CALL NWTN (C,Y,IERR,IWTTY)
IF (IERR.EQ.1) GO TO 380
DELTS2 = (4.D0/3.D0)*UOUS2**(-0.5D0)*UODLTH**(-0.5D0)*RTI*Y/
&      (TOTS2*(0.188D0+0.313D0*ROH))
TS2 = 0.954D0*(1.D0+ROH)+(0.188D0+0.313D0*ROH)*DELTS2**(3.D0/4.D0)
TS2 = TS2 + TS2F
T = TS2*A**(-1.D0/5.D0)*ALPHA**(-1.D0/5.D0)*HF**(4.D0/5.D0)
QD = ALPHA*T**2
IF (RTIR.LE.2.0D0) RTIR = 2.0D0
D1 = (4.D0/3.D0)*DLTODL/(TOTS2*(0.188D0+0.313D0*ROH))
D2 = (3.D0/4.D0)*UOUS2**0.5D0*UODLTH**0.5D0*(1.D0/RTIR)*TOTS2
&      *(0.188D0+0.313D0*ROH)
CALL BISECT (D1,D2,ROR,DELTS2,IERR,IWTTY)
IF (IERR.EQ.1) GO TO 380
TS2R = 0.954D0*(1.D0+ROH)+(0.188D0+0.313D0*ROH)*DELTS2
&      *(3.D0/4.D0)
TS2R = TS2R + TS2F
TR = TS2R*A**(-1.D0/5.D0)*ALPHA**(-1.D0/5.D0)*HF**(4.D0/5.D0)
QDR = ALPHA*TR**2

C
C ***** PRINT OUT RESULTS *****
C
ROR = ROR*60.D0
WRITE (IWTTY,190)
190  FORMAT ('1  RESULTS:')
IF (J.EQ.1) THEN
C
C ENGLISH (METRIC) OUTPUT
C
HF2 = HF * 0.3048D0
ZF2 = ZF * 0.3048D0
WRITE (IWTTY,200) HF,HF2,ZF,ZF2
200  FORMAT ('0  CEILING HEIGHT  = ',F6.2,' FEET (' ,F6.2,' METERS)'/
&      5X,'DETECTOR SPACING = ',F6.2,' FEET (' ,F6.2,' METERS)')
RTI2 = RTI * (0.3048D0**0.5D0)

```



```

WRITE (IWTTY,210) RTI,RTI2
210  FORMAT ('0    DETECTOR RTI = ',F6.1,' (FT-SEC)**1/2 (' ,F6.1,' (M-S
&EC)**1/2)')
      ALPHA2 = ALPHA * 1055.D0
      WRITE (IWTTY,220) ALPHA,ALPHA2
220  FORMAT ('0    FIRE GROWTH CONSTANT = ',E12.4,' BTU/(SEC**3)'/
&      (' ,E12.4,' JOULES/SEC**3)')
      WRITE (IWTTY,400)
      READ (IRTTY,410) M
      WRITE (IWTTY,230)
230  FORMAT ('0    FOR TEMPERATURE ACTUATED DETECTOR:')
      TACT = TACT - 460.D0
      TACT2 = (5.D0/9.D0)*(TACT-32.D0)
      WRITE (IWTTY,240) TACT,TACT2
240  FORMAT ('0    ACTIVATION TEMPERATURE = ',F6.1,' DEGREES F (' ,F6.1,
& ' DEGREES C)')
      T = T / 60.D0
      WRITE (IWTTY,250) T
250  FORMAT ('0    TIME TO ACTIVATION = ',F8.2,' MINUTES')
      QD2 = QD * 1.055D0
      WRITE (IWTTY,260) QD,QD2
260  FORMAT ('0    HEAT RELEASE RATE = ',E12.4,' BTU/SEC'/
&      (' ,E12.4,' KILOJOULES/SEC)')
      WRITE (IWTTY,400)
      READ (IRTTY,410) M
      WRITE (IWTTY,270)
270  FORMAT ('0    FOR RATE OF RISE ACTUATED DETECTOR:')
      ROR2 = ROR * (5.D0/9.D0)
      WRITE (IWTTY,290) ROR,ROR2
290  FORMAT ('0    ACTIVATION RATE OF RISE = ',F6.2,' DEGREES F/MIN (' ,
&      F6.2,' DEGREES C/MIN)')
      TR = TR / 60.D0
      WRITE (IWTTY,250) TR
      QDR2 = QDR * 1.055D0
      WRITE (IWTTY,260) QDR,QDR2
      WRITE (IWTTY,400)
      READ (IRTTY,410) M
      ELSE
C
C METRIC (ENGLISH) OUTPUT
C
      HF2 = HF * (1.D0/0.3048D0)
      ZF2 = ZF * (1.D0/0.3048D0)
      WRITE (IWTTY,300) HF,HF2,ZF,ZF2
300  FORMAT ('0    CEILING HEIGHT = ',F6.2,' METERS (' ,F6.2,' FEET)'/
&      5X,'DETECTOR SPACING = ',F6.2,' METERS (' ,F6.2,' FEET)')
      RTI2 = RTI * ((1.D0/0.3048D0)**0.5D0)
      WRITE (IWTTY,320) RTI,RTI2
320  FORMAT ('0    DETECTOR RTI = ',F6.1,' (M-SEC)**1/2 (' ,F6.1,' (FT-S
&EC)**1/2)')
      ALPHA2 = ALPHA * (1.D0/1055.D0)
      WRITE (IWTTY,330) ALPHA,ALPHA2

```



```

330  FORMAT ('0      FIRE GROWTH CONSTANT = ',E12.4,' JOULES/(SEC**3)'/
&      '      (' ,E12.4,' BTU/SEC**3)')
      WRITE (IWTTY,400)
      READ (IRTTY,410) M
      WRITE (IWTTY,230)
      TACT = TACT - 273.D0
      TACT2 = (9.D0/5.D0) * TACT + 32.D0
      WRITE (IWTTY,340) TACT,TACT2
340  FORMAT ('0      ACTIVATION TEMPERATURE = ',F6.1,' DEGREES C (' ,F6.1,
&      ' DEGREES F)')
      T = T / 60.D0
      WRITE (IWTTY,350) T
350  FORMAT ('0      TIME TO ACTIVATION = ',F8.2,' MINUTES')
      QD = QD / 1000.D0
      QD2 = QD * (1.D0/1.055D0)
      WRITE (IWTTY,360) QD,QD2
360  FORMAT ('0      HEAT RELEASE RATE = ',E12.4,' KILOJOULES/SEC'/
&      '      (' ,E12.4,' BTU/SEC)')
      WRITE (IWTTY,400)
      READ (IRTTY,410) M
      WRITE (IWTTY,270)
      ROR2 = ROR * (9.D0/5.D0)
      WRITE (IWTTY,370) ROR,ROR2
370  FORMAT ('0      ACTIVATION RATE OF RISE = ',F6.2,' DEGREES C/MIN (' ,
&      ' F6.2,' DEGREES F/MIN)')
      TR = TR / 60.D0
      WRITE (IWTTY,350) TR
      QDR = QDR / 1000.D0
      QDR2 = QDR * (1.D0/1.055D0)
      WRITE (IWTTY,360) QDR,QDR2
      WRITE (IWTTY,400)
      READ (IRTTY,410) M
      ENDIF
      WRITE (IWTTY,420)
      READ (IRTTY,410) M
      IF ((M.EQ.'Y').OR.(M.EQ.'y')) GO TO 5
      STOP 'PROGRAM COMPLETED'
380  CONTINUE
      WRITE (IWTTY,390)
390  FORMAT (' *****> ERROR IN DETACT ROUTINE <*****')
400  FORMAT (// ' <RETURN> TO CONTINUE')
410  FORMAT (A1)
      WRITE (IWTTY,420)
420  FORMAT (' TRY ANOTHER CASE (Y/N) ?')
      READ (IRTTY,410) M
      IF ((M.EQ.'Y').OR.(M.EQ.'y')) GO TO 5
      STOP 'PROGRAM ABORTED'
      END

C
      SUBROUTINE NWTN (C,P,IERR,IWTTY)
C
C THIS IS ROUTINE NWTN. IT SOLVES THE FIXED TEMPERATURE DETECTOR

```

C ACTIVATION TIME EQUATION USING A NEWTON-RAPHSON METHOD.

C

```
      IMPLICIT DOUBLE PRECISION (A-H,O-Z)
      PO = 0.1D0
      TOL = 0.00001D0
      NO = 1000
      I = 1
      IERR = 0
10    CONTINUE
      IF (I.LE.NO) THEN
      IF (PO.GT.50.D0) THEN
      X = 0.0D0
      ELSE
      X = DEXP(-PO)
      ENDIF
      FX = PO + X - C
      FPMX = 1.0D0 - X
      IF (FPMX.LT.0.00000001D0) GO TO 30
      P = PO - (FX/FPMX)
      IF (ABS(P-PO).LT.TOL) THEN
      IERR = 0
      RETURN
      ELSE
      I = I + 1
      PO = P
      ENDIF
      GO TO 10
      ENDIF
      IERR = 1
      WRITE (IWTTY,20) I
20    FORMAT (' NEWTON-RAPHSON FAILED AFTER NO ITERATIONS, NO = ',I4)
      RETURN
30    WRITE (IWTTY,40)
40    FORMAT (' SLOPE OF EQUATION TOO CLOSE TO ZERO FOR '/
&      ' NEWTON-RAPHSON METHOD.'/
&      ' ERROR RETURN')
      IERR = 1
      RETURN
      END
```

C

SUBROUTINE BISECT (D1,D2,ROR,P,IERR,IWTTY)

C

C THIS IS ROUTINE BISECT. IT SOLVES THE RATE OF RISE DETECTOR ACTIVATION
C TIME EQUATION USING A BISECTION METHOD.

C

```
      IMPLICIT DOUBLE PRECISION (A-H,O-Z)
      IERR = 0
      TOL = 0.00001D0
      NO = 1000
      A = 0.0D0
      B = 1000.0D0
      RLMT = TOL / 20.0
```

```

10  CONTINUE
    IF ((D2*B).GT.50.D0) THEN
    X = 0.0D0
    ELSE
    X = DEXP (-D2*B)
    ENDIF
    FXB = D1*B**0.25D0-D1*B**0.25*X-ROR
    IF (FXB.LT.0.0D0) THEN
    A = B
    B = B + 500.D0
    GO TO 10
    ENDIF
    I = 1
20  CONTINUE
    IF (I.LE.NO) THEN
    P = A+(B-A)/2.0D0
    IF ((D2*P).GT.50.D0) THEN
    X = 0.0D0
    ELSE
    X = DEXP (-D2*P)
    ENDIF
    FX = D1*P**0.25D0-D1*P**0.25D0*X-ROR
    IF (((FX.GT.-RLMT).AND.(FX.LT.RLMT)).OR.
& ((B-A)/2.D0).LT.TOL)) THEN
    IERR = 0
    RETURN
    ELSE
    I = I + 1
    IF ((D2*A).GT.50.D0) THEN
    X = 0.0D0
    ELSE
    X = DEXP (-D2*A)
    ENDIF
    FXA = D1*A**0.25D0-D1*A**0.25D0*X-ROR
    IF ((FXA*FX).GT.0.0D0) THEN
    A = P
    ELSE
    B = P
    ENDIF
    ENDIF
    GO TO 20
    ENDIF
    IERR = 1
    WRITE (IWTTY,30) I
30  FORMAT (' BISECTION ROUTINE FAILED AFTER NO ITERATIONS, NO = ',I4)
    RETURN
    END

```

This page intentionally left blank.

APPENDIX B. DETACT-T2
BASIC VERSION

```

10 PRINT "DETECT-T2  VERSION 2.0"
20 PRINT "WRITTEN BY D.W. STROUP  (1985)"
30 PRINT " "
40 PRINT "CONTRIBUTION OF THE"
50 PRINT "NATIONAL BUREAU OF STANDARDS (U.S.)."
60 PRINT "NOT SUBJECT TO COPYRIGHT. "
70 PRINT " "
80 PRINT "CALCULATES DETECTOR ACTUATION TIME"
90 PRINT "BELOW UNCONFINED CEILINGS WITH "
100 PRINT "TIME SQUARED FIRE GROWTH RATES "
110 PRINT " "
120 REM
130 REM INPUT:
140 REM  J      - UNITS CODE (1 OR 2)
150 REM          1 - INPUT DATA IN ENGLISH UNITS
160 REM          2 - INPUT DATA IN METRIC  UNITS
170 REM  TAMB  - AMBIENT TEMPERATURE
180 REM  RTI   - DETECTOR RESPONSE TIME INDEX
190 REM  TACT  - DETECTOR ACTIVATION TEMPERATURE
200 REM  ROR   - DETECTOR ACTIVATION RATE OF RISE
210 REM  HF    - CEILING HEIGHT
220 REM  ZF    - DETECTOR SPACING
230 REM  M     - GROWTH RATE FACTOR CODE, CHARACTER (S, M, F, U, OR O)
240 REM  ALPHA - FIRE GROWTH RATE CONSTANT (FOR M = O)
250 REM
260 REM OUTPUT:
270 REM  T      - TIME OF ACTIVATION FOR FIXED TEMPERATURE DETECTOR
280 REM  QD     - HEAT RELEASE RATE AT TIME OF ACTIVATION, T
290 REM  TR     - TIME OF ACTIVATION FOR RATE OF RISE DETECTOR
300 REM  QDR    - HEAT RELEASE RATE AT TIME OF ACTIVATION, TR
310 REM  IERR   - ERROR CODE  (0 OR 1)
320 REM          0 - SUCCESSFUL
330 REM          1 - UNSUCCESSFUL
340 REM
350 CLEAR
360 REM
370 REM ENTER INPUT DATA
380 REM
390 READ GE#,CPE#,RHOE#
400 DATA 32.2#,0.24#,0.0735#
410 READ GM#,CPM#,RHOM#
420 DATA 9.8#,1.0035#,1.1768#
430 IERR% = 0
440 PRINT " ENTER: 1 FOR ENGLISH UNIT INPUT"
450 PRINT "          2 FOR METRIC  UNIT INPUT"
460 INPUT "SELECTION = ",J%
470 IF J%<>1 GOTO 740
480 REM
490 REM ENTER DATA IN ENGLISH UNITS
500 REM

```

```

510 INPUT "AMBIENT TEMPERATURE <DEGREES F> = ",TAMB#
520 INPUT "DETECTOR RESPONSE TIME INDEX, RTI <(FT-SEC)^(1/2)> = ",RTI#
530 IF RTI#<.0000001# THEN LET RTI# = .0000001#
540 RTIR# = RTI#
550 INPUT "DETECTOR ACTIVATION TEMPERATURE <DEGREES F> = ",TACT#
560 INPUT "DETECTOR RATE OF TEMPERATURE RISE <DEGREES F/MIN> = ",ROR#
570 INPUT "ROOM CEILING HEIGHT <FEET> = ",HF#
580 INPUT "DETECTOR SPACING <FEET> = ",ZF#
590 PRINT "ENTER: S FOR SLOW      FIRE GROWTH RATE,"
600 PRINT "      M FOR MEDIUM    FIRE GROWTH RATE,"
610 PRINT "      F FOR FAST        FIRE GROWTH RATE,"
620 PRINT "      U FOR ULTRAFAST    FIRE GROWTH RATE, OR"
630 PRINT "      O FOR OTHER        FIRE GROWTH RATE"
640 INPUT "SELECTION = ",M$
650 IF (M$="s" OR M$="S") THEN LET ALPHA# = .00277778#
660 IF (M$="m" OR M$="M") THEN LET ALPHA# = .01111111#
670 IF (M$="f" OR M$="F") THEN LET ALPHA# = .04444445#
680 IF (M$="u" OR M$="U") THEN LET ALPHA# = .17777778#
690 IF (M$="o" OR M$="O") THEN INPUT "FIRE GROWTH RATE <BTU/SEC^3> = ",ALPHA#
700 GOTO 940
710 REM
720 REM ENTER DATA IN METRIC UNITS
730 REM
740 INPUT "AMBIENT TEMPERATURE <DEGREES C> = ",TAMB#
750 INPUT "DETECTOR RESPONSE TIME INDEX, RTI <(M-SEC)^(1/2)> = ",RTI#
760 IF RTI#<.0000001# THEN LET RTI# = .0000001#
770 RTIR# = RTI#
780 INPUT "DETECTOR ACTIVATION TEMPERATURE <DEGREES C> = ",TACT#
790 INPUT "DETECTOR RATE OF TEMPERATURE RISE <DEGREES C/MIN> = ",ROR#
800 INPUT "ROOM CEILING HEIGHT <METERS> = ",HF#
810 INPUT "DETECTOR SPACING <METERS> = ",ZF#
820 PRINT "ENTER: S FOR SLOW      FIRE GROWTH RATE,"
830 PRINT "      M FOR MEDIUM    FIRE GROWTH RATE,"
840 PRINT "      F FOR FAST        FIRE GROWTH RATE,"
850 PRINT "      U FOR ULTRAFAST    FIRE GROWTH RATE, OR"
860 PRINT "      O FOR OTHER        FIRE GROWTH RATE"
870 INPUT "SELECTION = ",M$
880 IF (M$="s" OR M$="S") THEN LET ALPHA# = 2.9305556#
890 IF (M$="m" OR M$="M") THEN LET ALPHA# = 11.722222#
900 IF (M$="f" OR M$="F") THEN LET ALPHA# = 46.888889#
910 IF (M$="u" OR M$="U") THEN LET ALPHA# = 187.55556#
920 IF (M$="o" OR M$="O") THEN INPUT "FIRE GROWTH RATE <J/SEC^3> = ",ALPHA#
930 REM
940 REM ***** CALCULATIONS *****
950 REM
960 R# = .5# * SQR(2#) * ZF#
970 ROH# = R# / HF#
980 ROR# = ROR# / 60#
990 IF J%<>1 GOTO 1050
1000 TAMB# = TAMB# + 460#
1010 TACT# = TACT# + 460#
1020 A# = GE#/(CPE#*TAMB#*RHOE#)

```

```

1030 G# = GE#
1040 GOTO 1090
1050 TAMB# = TAMB# + 273#
1060 TACT# = TACT# + 273#
1070 A# = GM# / (CPM#*TAMB#*RHOM#*1000#)
1080 G# = GM#
1090 TOTS2# = A#^(-1#/5#)*ALPHA#^(-1#/5#)*HF#^(4#/5#)
1100 DLTODL# = A#^(2#/5#)*(TAMB#/G#)*ALPHA#^(2#/5#)*HF#^(-3#/5#)
1110 UOUS2# = A#^(1#/5#)*ALPHA#^(1#/5#)*HF#^(1#/5#)
1120 DELTD# = TACT# - TAMB#
1130 IF (ROH#>.3) THEN UODLTH# = .59*ROH#^(-.63#) ELSE UODLTH# = 3.87#/(SQR(9.115#))
1140 TS2F# = .954# * (1# + ROH#)
1150 P# = TOTS2#*(.188#+.313#*ROH#)
1160 A2# = (4#/3#)*DLTODL#*UOUS2#^(-.5#)*UODLTH#^(-.5#)*RTI#/P#
1170 C# = 1# + DELTD# / A2#
1180 GOSUB 2650
1190 IF IERR%=1 GOTO 2550
1200 DELTS2# = (4#/3#)*UOUS2#^(-.5#)*UODLTH#^(-.5#)*RTI#*Y#/P#
1210 TS2# = .954#*(1#+ROH#) + (.188#+.313#*ROH#)*DELTS2#^(3#/4#)
1220 TS2# = TS2# + TS2F#
1230 T# = TS2#*A#^(-1#/5#)*ALPHA#^(-1#/5#)*HF#^(4#/5#)
1240 QD# = ALPHA# * T#^2!
1250 IF RTIR#<=2# THEN LET RTIR# = 2#
1260 D1# = (4#/3#)*DLTODL#/P#
1270 D2# = (3#/4#)*UOUS2#^.5#*UODLTH#^.5#*(1#/RTIR#)*P#
1280 GOSUB 2950
1290 IF IERR%=1 GOTO 2550
1300 TS2R# = .954#*(1#+ROH#) + (.188#+.313#*ROH#)*DELTS2#^(3#/4#)
1310 TS2R# = TS2R# + TS2F#
1320 TR# = TS2R#*A#^(-1#/5#)*ALPHA#^(-1#/5#)*HF#^(4#/5#)
1330 QDR# = ALPHA# * TR#^2!
1340 ROR# = ROR# * 60#
1350 REM
1360 REM PRINT OUT RESULTS
1370 REM
1380 PRINT "RESULTS:"
1390 IF J%<>1 GOTO 1960
1400 REM
1410 REM ENGLISH (METRIC) OUTPUT
1420 REM
1430 HF2# = HF# * .3048
1440 ZF2# = ZF# * .3048
1450 PRINT " "
1460 PRINT " CEILING HEIGHT = ";CSNG(HF#);" FEET"
1470 PRINT " (";CSNG(HF2#);" METERS)"
1480 PRINT " "
1490 PRINT " DETECTOR SPACING = ";CSNG(ZF#);" FEET"
1500 PRINT " (";CSNG(ZF2#);" METERS)"
1510 PRINT " "
1520 RTI2# = RTI# * (.3048#^.5#)
1530 PRINT " RTI = ";CSNG(RTI#);" (FT-SEC)^0.5";" (";CSNG(RTI2#);" (M-SEC)^0.5)
1540 PRINT " "

```



```

1550 ALPHA2# = ALPHA# * 1055#
1560 PRINT " FIRE GROWTH RATE = ";CSNG(ALPHA#);" BTU/(SEC^3)"
1570 PRINT "          (";CSNG(ALPHA2#);" J/(SEC^3))"
1580 PRINT " "
1590 INPUT "<RETURN> TO CONTINUE ";O$
1600 PRINT " "
1610 PRINT " "
1620 PRINT " FOR TEMPERATURE ACTUATED DETECTOR:"
1630 TACT# = TACT# - 460#
1640 TACT2# = (5#/9#) * (TACT# - 32#)
1650 PRINT " "
1660 PRINT "  ACTIVATION TEMPERATURE = ";CSNG(TACT#);" DEGREES F"
1670 PRINT "          (";CSNG(TACT2#);" DEGREES C)"
1680 PRINT " "
1690 T# = T# / 60#
1700 PRINT "  TIME TO ACTIVATION = ";CSNG(T#);" MINUTES"
1710 PRINT " "
1720 QD2# = QD# * 1.055#
1730 PRINT "  HEAT RELEASE RATE = ";CSNG(QD#);" BTU/SEC"
1740 PRINT "          (";CSNG(QD2#);" kJ/SEC )"
1750 PRINT " "
1760 INPUT "<RETURN> TO CONTINUE ";O$
1770 PRINT " "
1780 PRINT " "
1790 PRINT " FOR RATE OF RISE ACTUATED DETECTOR:"
1800 ROR2# = ROR# * (5#/9#)
1810 PRINT " "
1820 PRINT "  ACTIVATION RATE OF RISE = ";CSNG(ROR#);" DEGREES F/MIN"
1830 PRINT "          (";CSNG(ROR2#);" DEGREES C/MIN)"
1840 PRINT " "
1850 TR# = TR# / 60#
1860 PRINT "  TIME TO ACTIVATION = ";CSNG(TR#);" MINUTES"
1870 QDR2# = QDR# * 1.055#
1880 PRINT " "
1890 PRINT "  HEAT RELEASE RATE = ";CSNG(QDR#);" BTU/SEC"
1900 PRINT "          (";CSNG(QDR2#);" kJ/SEC )"
1910 PRINT " "
1920 PRINT " "
1930 INPUT " TRY ANOTHER RUN (YES/NO) ";O$
1940 IF (O$="Y" OR O$="y") GOTO 120
1950 GOTO 2530
1960 HF2# = HF# * (1!/.3048)
1970 ZF2# = ZF# * (1!/.3048)
1980 REM
1990 REM METRIC (ENGLISH) OUTPUT
2000 REM
2010 PRINT " "
2020 PRINT " CEILING HEIGHT = ";CSNG(HF#);" METERS"
2030 PRINT "          (";CSNG(HF2#);" FEET)"
2040 PRINT " "
2050 PRINT " DETECTOR SPACING = ";CSNG(ZF#);" METERS"
2060 PRINT "          (";CSNG(ZF2#);" FEET)"

```



```

2070 PRINT " "
2080 RTI2# = RTI# * ((11/.3048)^(.5#))
2090 PRINT " RTI = ";CSNG(RTI#);" (M-SEC)^0.5";" (";CSNG(RTI2#);" (FT-SEC)^0.5)
2100 PRINT " "
2110 ALPHA2# = ALPHA# * (11/1055!)
2120 PRINT " FIRE GROWTH RATE = ";CSNG(ALPHA#);" J/(SEC^3)"
2130 PRINT " (";CSNG(ALPHA2#);" BTU/(SEC^3))"
2140 PRINT " "
2150 INPUT "<RETURN> TO CONTINUE ";O$
2160 PRINT " "
2170 PRINT " "
2180 PRINT " FOR TEMPERATURE ACTUATED DETECTOR:"
2190 PRINT " "
2200 TACT# = TACT# - 273#
2210 TACT2# = (9#/5#) * TACT# + 32#
2220 PRINT " ACTIVATION TEMPERATURE = ";CSNG(TACT#);" DEGREES C"
2230 PRINT " (";CSNG(TACT2#);" DEGREES F)"
2240 PRINT " "
2250 T# = T# / 60#
2260 PRINT " TIME TO ACTIVATION = ";CSNG(T#);" MINUTES"
2270 PRINT " "
2280 QD# = QD# / 1000#
2290 QD2# = QD# * (11/1.055)
2300 PRINT " HEAT RELEASE RATE = ";CSNG(QD#);" kJ/SEC"
2310 PRINT " (";CSNG(QD2#);" BTU/SEC )"
2320 PRINT " "
2330 INPUT "<RETURN> TO CONTINUE";O$
2340 PRINT " "
2350 PRINT " "
2360 PRINT " FOR RATE OF RISE ACTUATED DETECTOR:"
2370 ROR2# = ROR# * (9#/5#)
2380 PRINT " "
2390 PRINT " ACTIVATION RATE OF RISE = ";CSNG(ROR#);" DEGREES C/MIN"
2400 PRINT " (";CSNG(ROR2#);" DEGREES F/MIN)"
2410 PRINT " "
2420 TR# = TR# / 60#
2430 PRINT " TIME TO ACTIVATION = ";CSNG(TR#);" MINUTES"
2440 PRINT " "
2450 QDR# = QDR# / 1000#
2460 QDR2# = QDR# * (11/1.055)
2470 PRINT " HEAT RELEASE RATE = ";CSNG(QDR#);" kJ/SEC"
2480 PRINT " (";CSNG(QDR2#);" BTU/SEC )"
2490 PRINT " "
2500 PRINT " "
2510 INPUT " TRY ANOTHER RUN (YES/NO) ";O$
2520 IF (O$="Y" OR O$="y") GOTO 120
2530 END
2540 REM
2550 REM ***** ERROR HANDLING ROUTINE *****
2560 REM
2570 PRINT " "
2580 PRINT " !!!!! ERROR IN DETACT-T2 ROUTINE !!!!!"

```

```

2590 PRINT " !!!!! PROGRAM RUN ABORTED          !!!!!"
2600 PRINT " "
2610 INPUT " WOULD YOU LIKE TO TRY AGAIN (YES/NO) ?";O$
2620 IF (O$="Y" OR O$="y") GOTO 120
2630 END
2640 REM
2650 REM ** NEWTON RAPHSON ROUTINE TO FIND ACTIVATION **
2660 REM ** TIME OF FIXED TEMPERATURE DETECTOR.      **
2670 REM
2680 P0# = .1#
2690 TOL# = .00001#
2700 NO% = 1000
2710 I% = 1
2720 IERR% = 0
2730 REM
2740 IF I%>NO% GOTO 2870
2750 IF (P0#>50#) THEN LET X#=0# ELSE X#=EXP(-P0#)
2760 FX#=P0# + X# - C#
2770 FPMX# = 1# - X#
2780 IF (FPMX#<.00000001#) GOTO 2900
2790 P2# = P0# - (FX#/FPMX#)
2800 IF (ABS(P0#-P2#)>TOL#) GOTO 2840
2810 IERR% = 0
2820 Y# = P2#
2830 RETURN
2840 I% = I% + 1
2850 P0# = P2#
2860 GOTO 2730
2870 IERR% = 1
2880 PRINT "NEWTON RAPHSON FAILED AFTER NO ITERATIONS, NO = ",I%
2890 RETURN
2900 PRINT "SLOPE OF EQUATION TOO CLOSE TO ZERO!!!"
2910 PRINT "ERROR IN NEWTON RAPHSON ROUTINE"
2920 IERR% = 1
2930 RETURN
2940 REM
2950 REM ** BISECTION ROUTINE TO FIND ACTIVATION **
2960 REM ** TIME OF RATE OF RISE DETECTOR.          **
2970 REM
2980 IERR% = 0
2990 TOL# = .00001#
3000 NO% = 1000
3010 AA# = 0#
3020 B# = 1000#
3030 RLMT# = TOL# / 20#
3040 REM
3050 IF (D2#*B#)>50# THEN X# = 0# ELSE X# = EXP(-D2#*B#)
3060 FXB# = D1# * B# ^ .25# - D1# * B# ^ .25# * X# - ROR#
3070 IF FXB#>=0# GOTO 3110
3080 AA# = B#
3090 B# = B# + 500#
3100 GOTO 3040

```

```

3110 I% = 1
3120 REM
3130 IF I>N0 GOTO 3260
3140 P3# = AA# + (B# - AA#) / 2#
3150 IF (D2#*P3#)>50# THEN X# = 0# ELSE X# = EXP (-D2#*P3#)
3160 FX# = D1# * P3# ^ .25# - D1# * P3# ^ .25# * X# - ROR#
3170 DELTS2# = P3#
3180 IF ((FX#>(-RLMT#)) AND (FX#<RLMT#)) THEN RETURN
3190 IF ((B#-AA#)/2#)<TOL# THEN RETURN
3200 REM
3210 I% = I% + 1
3220 IF (D2#*AA#)>50# THEN X# = 0# ELSE X# = EXP(-D2#*AA#)
3230 FXA# = D1# * AA# ^ .25# - D1# * AA# ^ .25# * X# - ROR#
3240 IF (FXA#*FX#)>0# THEN AA# = P3# ELSE B# = P3#
3250 GOTO 3120
3260 IERR% = 1
3270 PRINT "BISECTION ALGORITHM FAILED TO CONVERGE AFTER ",I%," ITERATIONS."
3280 RETURN

```

APPENDIX C.

DETECTOR ACTIVATION TIME TABLES:
FIXED TEMPERATURE

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.0 Ft (RADIUS = 0.0 Ft)
 FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TEMPERATURE
 TIME INDEX RISE

CEILING HEIGHT, Ft

(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60	80
0	10	0.12*	0.22*	0.32*	0.41*	0.50*	0.59*	0.73*	0.84*	0.95*	1.39*	1.83*
	20	0.13*	0.25*	0.36*	0.47*	0.58*	0.69*	0.86*	1.00*	1.14*	1.70*	2.28*
	40	0.15*	0.29*	0.43*	0.57*	0.71*	0.86*	1.08*	1.27*	1.45*	2.23*	3.03*
	60	0.17*	0.33*	0.49*	0.66*	0.83*	1.01*	1.27*	1.50*	1.73*	2.69*	3.70*
	80	0.18*	0.36*	0.55*	0.74*	0.94*	1.14*	1.45*	1.72*	1.99*	3.12*	4.30*
	100	0.19*	0.39*	0.60*	0.82*	1.04*	1.27*	1.62*	1.92*	2.23*	3.52*	4.88*
	120	0.21*	0.42*	0.65*	0.89*	1.14*	1.39*	1.78*	2.12*	2.46*	3.89*	5.42*
25	140	0.22*	0.45*	0.70*	0.96*	1.23*	1.51*	1.93*	2.30*	2.68*	4.26*	5.94*
	10	0.18*	0.30*	0.41*	0.52*	0.62*	0.72*	0.86*	0.97*	1.08*	1.53*	1.96*
	20	0.20*	0.34*	0.47*	0.59*	0.71*	0.82*	0.99*	1.13*	1.27*	1.82*	2.39*
	40	0.23*	0.39*	0.55*	0.69*	0.84*	0.98*	1.20*	1.38*	1.57*	2.33*	3.13*
	60	0.25*	0.44*	0.61*	0.78*	0.95*	1.12*	1.39*	1.61*	1.84*	2.79*	3.78*
	80	0.27*	0.47*	0.66*	0.86*	1.05*	1.25*	1.56*	1.82*	2.09*	3.21*	4.39*
	100	0.29*	0.50*	0.72*	0.93*	1.15*	1.37*	1.72*	2.02*	2.32*	3.60*	4.95*
50	120	0.30*	0.54*	0.76*	1.00*	1.24*	1.49*	1.87*	2.21*	2.55*	3.97*	5.49*
	140	0.32*	0.56*	0.81*	1.07*	1.33*	1.60*	2.02*	2.39*	2.76*	4.34*	6.01*
	10	0.20*	0.33*	0.45*	0.57*	0.68*	0.78*	0.93*	1.05*	1.17*	1.63*	2.07*
	20	0.22*	0.38*	0.52*	0.65*	0.78*	0.90*	1.08*	1.22*	1.37*	1.93*	2.50*
	40	0.26*	0.45*	0.61*	0.77*	0.92*	1.07*	1.30*	1.49*	1.67*	2.44*	3.23*
	60	0.29*	0.49*	0.68*	0.86*	1.04*	1.22*	1.49*	1.71*	1.94*	2.88*	3.87*
	80	0.31*	0.54*	0.74*	0.95*	1.15*	1.35*	1.66*	1.92*	2.18*	3.29*	4.47*
100	100	0.33*	0.57*	0.80*	1.02*	1.24*	1.47*	1.81*	2.11*	2.41*	3.68*	5.03*
	120	0.35*	0.61*	0.85*	1.09*	1.33*	1.58*	1.97*	2.30*	2.63*	4.05*	5.57*
	140	0.37*	0.64*	0.90*	1.16*	1.42*	1.69*	2.11*	2.48*	2.85*	4.41*	6.08*
	10	0.22*	0.37*	0.51*	0.63*	0.75*	0.87*	1.03*	1.16*	1.29*	1.78*	2.24*
	20	0.26*	0.43*	0.59*	0.74*	0.87*	1.01*	1.20*	1.36*	1.51*	2.11*	2.69*
	40	0.31*	0.51*	0.70*	0.88*	1.04*	1.21*	1.45*	1.64*	1.84*	2.62*	3.41*
	60	0.34*	0.57*	0.78*	0.98*	1.18*	1.37*	1.65*	1.88*	2.11*	3.06*	4.04*
150	80	0.37*	0.62*	0.85*	1.08*	1.29*	1.50*	1.82*	2.09*	2.36*	3.46*	4.63*
	100	0.39*	0.67*	0.92*	1.16*	1.39*	1.63*	1.98*	2.28*	2.58*	3.85*	5.18*
	120	0.41*	0.71*	0.97*	1.23*	1.49*	1.75*	2.13*	2.46*	2.80*	4.21*	5.72*
	140	0.43*	0.74*	1.03*	1.30*	1.58*	1.86*	2.28*	2.64*	3.01*	4.56*	6.23*
	10	0.24*	0.40*	0.55*	0.68*	0.81*	0.93*	1.10*	1.24*	1.38*	1.89*	2.38*
	20	0.28*	0.47*	0.64*	0.80*	0.94*	1.09*	1.29*	1.46*	1.62*	2.24*	2.85*
	40	0.34*	0.56*	0.76*	0.95*	1.13*	1.31*	1.56*	1.77*	1.97*	2.78*	3.58*
	60	0.38*	0.63*	0.86*	1.07*	1.28*	1.48*	1.77*	2.01*	2.26*	3.22*	4.21*
	80	0.41*	0.69*	0.94*	1.17*	1.40*	1.63*	1.96*	2.23*	2.51*	3.62*	4.79*
	100	0.44*	0.73*	1.00*	1.26*	1.51*	1.76*	2.12*	2.43*	2.74*	4.00*	5.34*
	120	0.46*	0.78*	1.07*	1.34*	1.61*	1.88*	2.28*	2.61*	2.95*	4.36*	5.86*
	140	0.48*	0.82*	1.12*	1.42*	1.71*	1.99*	2.43*	2.79*	3.16*	4.71*	6.37*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.0 Ft (RADIUS = 0.0 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60
200	10	0.26*	0.43*	0.58*	0.72*	0.85*	0.98*	1.16*	1.30*	1.45*	1.56*	1.98*	2.49*
	20	0.30*	0.50*	0.68*	0.85*	1.00*	1.15*	1.37*	1.54*	1.71*	1.86*	2.36*	2.98*
	40	0.36*	0.60*	0.82*	1.02*	1.21*	1.39*	1.66*	1.87*	2.08*	2.27*	2.91*	3.73*
	60	0.41*	0.68*	0.92*	1.15*	1.36*	1.57*	1.88*	2.13*	2.38*	2.64*	3.36*	4.36*
	80	0.44*	0.74*	1.00*	1.25*	1.49*	1.73*	2.07*	2.35*	2.64*	2.87*	3.77*	4.94*
	100	0.47*	0.79*	1.08*	1.35*	1.61*	1.87*	2.24*	2.56*	2.87*	3.09*	4.15*	5.48*
300	120	0.50*	0.84*	1.14*	1.43*	1.72*	1.99*	2.40*	2.75*	3.09*	3.30*	4.51*	6.00*
	140	0.52*	0.88*	1.20*	1.51*	1.81*	2.11*	2.56*	2.93*	3.30*	3.55*	4.86*	6.50*
	10	0.28*	0.47*	0.63*	0.78*	0.92*	1.06*	1.25*	1.41*	1.56*	1.71*	2.13*	2.66*
	20	0.33*	0.55*	0.75*	0.93*	1.09*	1.26*	1.49*	1.67*	1.86*	2.04*	2.54*	3.20*
	40	0.40*	0.67*	0.90*	1.12*	1.33*	1.52*	1.81*	2.04*	2.27*	2.51*	3.14*	3.99*
	60	0.45*	0.75*	1.02*	1.26*	1.50*	1.72*	2.05*	2.32*	2.58*	2.86*	3.62*	4.64*
400	80	0.49*	0.82*	1.11*	1.38*	1.64*	1.89*	2.26*	2.56*	2.86*	3.11*	4.03*	5.22*
	100	0.53*	0.88*	1.19*	1.49*	1.77*	2.05*	2.45*	2.78*	3.11*	3.34*	4.42*	5.76*
	120	0.56*	0.93*	1.27*	1.58*	1.89*	2.18*	2.62*	2.98*	3.34*	3.55*	4.78*	6.28*
	140	0.59*	0.98*	1.34*	1.67*	1.99*	2.31*	2.78*	3.16*	3.55*	3.77*	5.13*	6.78*
	10	0.30*	0.50*	0.67*	0.83*	0.98*	1.13*	1.33*	1.50*	1.65*	1.80*	2.25*	2.81*
	20	0.36*	0.59*	0.80*	0.99*	1.17*	1.34*	1.59*	1.78*	1.97*	2.16*	2.70*	3.38*
600	40	0.43*	0.72*	0.97*	1.20*	1.42*	1.63*	1.93*	2.18*	2.42*	2.66*	3.33*	4.21*
	60	0.49*	0.81*	1.10*	1.36*	1.61*	1.85*	2.20*	2.48*	2.76*	3.05*	3.83*	4.88*
	80	0.54*	0.89*	1.20*	1.49*	1.77*	2.03*	2.42*	2.74*	3.05*	3.30*	4.26*	5.47*
	100	0.57*	0.95*	1.29*	1.60*	1.90*	2.19*	2.62*	2.96*	3.30*	3.54*	4.66*	6.02*
	120	0.61*	1.01*	1.37*	1.71*	2.03*	2.34*	2.80*	3.17*	3.54*	3.77*	5.03*	6.54*
	140	0.64*	1.07*	1.44*	1.80*	2.14*	2.47*	2.96*	3.37*	3.77*	4.03*	5.38*	7.03*
800	10	0.33*	0.55*	0.74*	0.91*	1.08*	1.23*	1.46*	1.63*	1.80*	1.95*	2.45*	3.05*
	20	0.40*	0.66*	0.89*	1.10*	1.29*	1.48*	1.75*	1.96*	2.17*	2.34*	2.95*	3.68*
	40	0.49*	0.80*	1.08*	1.34*	1.58*	1.81*	2.14*	2.40*	2.66*	2.91*	3.65*	4.58*
	60	0.55*	0.91*	1.23*	1.52*	1.79*	2.05*	2.43*	2.74*	3.04*	3.30*	4.19*	5.29*
	80	0.60*	1.00*	1.34*	1.66*	1.97*	2.26*	2.68*	3.02*	3.35*	3.60*	4.65*	5.91*
	100	0.65*	1.07*	1.45*	1.79*	2.12*	2.44*	2.90*	3.27*	3.63*	3.89*	5.06*	6.48*
	120	0.69*	1.14*	1.54*	1.91*	2.26*	2.60*	3.09*	3.49*	3.89*	4.13*	5.45*	7.00*
	140	0.72*	1.20*	1.62*	2.01*	2.38*	2.74*	3.27*	3.70*	4.13*	4.37*	5.81*	7.50*
	10	0.36*	0.59*	0.79*	0.98*	1.15*	1.32*	1.56*	1.74*	1.93*	2.10*	2.61*	3.24*
	20	0.43*	0.71*	0.96*	1.18*	1.39*	1.59*	1.88*	2.10*	2.32*	2.51*	3.15*	3.93*
	40	0.53*	0.87*	1.17*	1.45*	1.71*	1.95*	2.31*	2.59*	2.86*	3.11*	3.91*	4.89*
	60	0.60*	0.99*	1.33*	1.64*	1.94*	2.22*	2.62*	2.95*	3.27*	3.52*	4.48*	5.64*
	80	0.66*	1.09*	1.46*	1.80*	2.13*	2.44*	2.89*	3.25*	3.61*	3.86*	4.97*	6.29*
	100	0.71*	1.17*	1.57*	1.94*	2.30*	2.63*	3.12*	3.52*	3.91*	4.16*	5.41*	6.87*
	120	0.75*	1.24*	1.67*	2.07*	2.44*	2.81*	3.33*	3.76*	4.16*	4.40*	5.81*	7.41*
	140	0.79*	1.31*	1.76*	2.18*	2.58*	2.97*	3.53*	3.98*	4.43*	4.67*	6.18*	7.92*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.0 Ft (RADIUS = 0.0 Ft)
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		°F	4	8	12	16	20	24	30	35	40	60
0	10	0.17*	0.32*	0.46*	0.60*	0.74*	0.88*	1.09*	1.26*	1.44*	2.14*	2.86*
	20	0.19*	0.37*	0.54*	0.72*	0.90*	1.08*	1.35*	1.58*	1.82*	2.77*	3.76*
	40	0.23*	0.45*	0.69*	0.92*	1.17*	1.42*	1.80*	2.12*	2.45*	3.83*	5.27*
	60	0.26*	0.53*	0.81*	1.10*	1.40*	1.71*	2.19*	2.59*	3.01*	4.75*	6.60*
	80	0.29*	0.60*	0.92*	1.26*	1.62*	1.98*	2.54*	3.03*	3.52*	5.60*	7.81*
	100	0.32*	0.66*	1.03*	1.42*	1.82*	2.23*	2.88*	3.43*	4.00*	6.40*	8.96*
25	120	0.34*	0.72*	1.13*	1.56*	2.01*	2.48*	3.20*	3.82*	4.46*	7.16*	10.04*
	140	0.37*	0.78*	1.23*	1.70*	2.20*	2.71*	3.50*	4.19*	4.90*	7.89*	11.08*
	10	0.25*	0.43*	0.59*	0.74*	0.89*	1.03*	1.24*	1.42*	1.59*	2.29*	3.00*
	20	0.29*	0.49*	0.68*	0.87*	1.05*	1.23*	1.50*	1.72*	1.95*	2.90*	3.88*
	40	0.34*	0.59*	0.82*	1.06*	1.30*	1.55*	1.92*	2.24*	2.57*	3.93*	5.37*
	60	0.37*	0.66*	0.94*	1.23*	1.53*	1.83*	2.30*	2.70*	3.12*	4.85*	6.69*
50	80	0.41*	0.73*	1.05*	1.39*	1.73*	2.09*	2.65*	3.13*	3.62*	5.69*	7.90*
	100	0.44*	0.79*	1.15*	1.53*	1.93*	2.34*	2.98*	3.53*	4.10*	6.48*	9.03*
	120	0.46*	0.85*	1.25*	1.67*	2.12*	2.58*	3.29*	3.91*	4.55*	7.24*	10.12*
	140	0.49*	0.90*	1.34*	1.81*	2.30*	2.80*	3.60*	4.28*	4.98*	7.96*	11.16*
	10	0.28*	0.48*	0.65*	0.82*	0.97*	1.13*	1.35*	1.53*	1.71*	2.42*	3.13*
	20	0.33*	0.55*	0.76*	0.96*	1.15*	1.34*	1.61*	1.85*	2.08*	3.02*	3.99*
100	40	0.39*	0.66*	0.92*	1.17*	1.41*	1.66*	2.04*	2.36*	2.68*	4.04*	5.47*
	60	0.43*	0.75*	1.04*	1.34*	1.64*	1.94*	2.41*	2.81*	3.22*	4.94*	6.77*
	80	0.47*	0.82*	1.16*	1.49*	1.84*	2.20*	2.75*	3.23*	3.72*	5.78*	7.98*
	100	0.50*	0.88*	1.26*	1.64*	2.03*	2.44*	3.08*	3.62*	4.19*	6.57*	9.11*
	120	0.53*	0.94*	1.35*	1.78*	2.22*	2.67*	3.39*	4.00*	4.64*	7.32*	10.19*
	140	0.56*	1.00*	1.45*	1.91*	2.40*	2.90*	3.69*	4.37*	5.07*	8.04*	11.23*
150	10	0.32*	0.54*	0.73*	0.92*	1.09*	1.26*	1.50*	1.69*	1.88*	2.63*	3.35*
	20	0.38*	0.63*	0.87*	1.08*	1.29*	1.49*	1.79*	2.03*	2.28*	3.24*	4.21*
	40	0.45*	0.76*	1.05*	1.32*	1.58*	1.85*	2.24*	2.56*	2.89*	4.24*	5.66*
	60	0.51*	0.86*	1.19*	1.51*	1.82*	2.13*	2.61*	3.01*	3.42*	5.13*	6.95*
	80	0.55*	0.95*	1.31*	1.67*	2.03*	2.39*	2.95*	3.42*	3.91*	5.95*	8.14*
	100	0.59*	1.02*	1.42*	1.82*	2.22*	2.63*	3.27*	3.81*	4.37*	6.73*	9.27*
	120	0.63*	1.09*	1.53*	1.96*	2.41*	2.86*	3.57*	4.18*	4.81*	7.48*	10.34*
	140	0.66*	1.15*	1.62*	2.10*	2.58*	3.08*	3.86*	4.54*	5.24*	8.19*	11.37*
	10	0.35*	0.59*	0.79*	0.99*	1.17*	1.35*	1.61*	1.81*	2.01*	2.79*	3.54*
	20	0.41*	0.69*	0.94*	1.18*	1.40*	1.61*	1.93*	2.18*	2.43*	3.42*	4.41*
	40	0.50*	0.84*	1.15*	1.44*	1.72*	1.99*	2.40*	2.73*	3.07*	4.43*	5.85*
	60	0.56*	0.95*	1.30*	1.64*	1.97*	2.29*	2.78*	3.19*	3.60*	5.31*	7.12*
	80	0.61*	1.04*	1.43*	1.81*	2.19*	2.56*	3.12*	3.60*	4.09*	6.13*	8.30*
	100	0.66*	1.12*	1.55*	1.97*	2.39*	2.80*	3.44*	3.99*	4.54*	6.90*	9.42*
	120	0.70*	1.20*	1.66*	2.12*	2.57*	3.03*	3.74*	4.35*	4.98*	7.63*	10.49*
	140	0.74*	1.26*	1.76*	2.25*	2.75*	3.25*	4.04*	4.71*	5.40*	8.34*	11.51*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.0 Ft (RADIUS = 0.0 Ft)
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, Ft

(Ft*s)^{1/2}

°F

4

8

12

16

20

24

30

35

40

60

80

200

10

0.37*

0.62*

0.84*

1.05*

1.24*

1.43*

1.69*

1.91*

2.12*

2.92*

3.69*

3.69*

20

0.44*

0.74*

1.01*

1.25*

1.49*

1.71*

2.04*

2.30*

2.56*

3.58*

4.59*

4.59*

40

0.54*

0.90*

1.23*

1.53*

1.83*

2.11*

2.53*

2.88*

3.22*

4.61*

6.03*

6.03*

60

0.61*

1.02*

1.39*

1.75*

2.09*

2.43*

2.93*

3.35*

3.77*

5.48*

7.29*

7.29*

80

0.66*

1.12*

1.53*

1.93*

2.32*

2.70*

3.28*

3.76*

4.25*

6.29*

8.47*

8.47*

100

0.71*

1.21*

1.66*

2.10*

2.53*

2.95*

3.60*

4.15*

4.71*

7.06*

9.57*

9.57*

120

0.76*

1.29*

1.77*

2.25*

2.72*

3.19*

3.91*

4.52*

5.14*

7.79*

10.64*

10.64*

140

0.80*

1.36*

1.88*

2.39*

2.90*

3.41*

4.20*

4.87*

5.56*

8.50*

11.66*

11.66*

300

10

0.41*

0.68*

0.92*

1.14*

1.35*

1.55*

1.84*

2.07*

2.29*

3.15*

3.96*

3.96*

20

0.49*

0.82*

1.11*

1.37*

1.63*

1.87*

2.22*

2.50*

2.78*

3.85*

4.90*

4.90*

40

0.60*

1.00*

1.36*

1.69*

2.00*

2.31*

2.76*

3.13*

3.49*

4.92*

6.36*

6.36*

60

0.68*

1.13*

1.54*

1.93*

2.29*

2.65*

3.18*

3.62*

4.05*

5.81*

7.62*

7.62*

80

0.74*

1.25*

1.70*

2.13*

2.54*

2.95*

3.55*

4.05*

4.55*

6.62*

8.78*

8.78*

100

0.80*

1.34*

1.84*

2.30*

2.76*

3.21*

3.88*

4.45*

5.02*

7.37*

9.88*

9.88*

120

0.85*

1.43*

1.96*

2.47*

2.96*

3.45*

4.20*

4.82*

5.45*

8.10*

10.93*

10.93*

140

0.90*

1.51*

2.07*

2.62*

3.15*

3.68*

4.49*

5.17*

5.87*

8.79*

11.94*

11.94*

55

400

10

0.44*

0.73*

0.99*

1.22*

1.44*

1.65*

1.96*

2.20*

2.44*

3.33*

4.18*

4.18*

20

0.53*

0.88*

1.19*

1.47*

1.74*

2.00*

2.37*

2.67*

2.96*

4.08*

5.16*

5.16*

40

0.65*

1.08*

1.46*

1.81*

2.15*

2.48*

2.95*

3.33*

3.71*

5.19*

6.66*

6.66*

60

0.74*

1.23*

1.66*

2.07*

2.46*

2.84*

3.40*

3.85*

4.30*

6.10*

7.93*

7.93*

80

0.81*

1.35*

1.83*

2.29*

2.72*

3.15*

3.78*

4.30*

4.82*

6.91*

9.08*

9.08*

100

0.87*

1.45*

1.98*

2.48*

2.96*

3.43*

4.13*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.0 Ft (RADIUS = 0.0 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
(Ft*s) ^{1/2} 0	°F											
	10	0.25*	0.47*	0.69*	0.91*	1.14*	1.36*	1.70*	1.99*	2.28*	3.46*	4.67*
	20	0.29*	0.57*	0.86*	1.15*	1.45*	1.76*	2.23*	2.63*	3.03*	4.71*	6.47*
	40	0.36*	0.74*	1.14*	1.56*	1.99*	2.43*	3.12*	3.70*	4.30*	6.82*	9.49*
	60	0.42*	0.89*	1.39*	1.91*	2.46*	3.02*	3.89*	4.65*	5.42*	8.67*	12.14*
	80	0.48*	1.03*	1.62*	2.24*	2.89*	3.56*	4.61*	5.51*	6.44*	10.37*	14.58*
	100	0.54*	1.16*	1.83*	2.54*	3.29*	4.07*	5.28*	6.33*	7.40*	11.97*	16.86*
25	120	0.59*	1.28*	2.03*	2.84*	3.68*	4.55*	5.92*	7.10*	8.32*	13.48*	19.04*
	140	0.64*	1.40*	2.23*	3.11*	4.05*	5.01*	6.53*	7.84*	9.19*	14.94*	21.12*
	10	0.36*	0.62*	0.86*	1.09*	1.31*	1.54*	1.87*	2.15*	2.44*	3.60*	4.81*
	20	0.42*	0.73*	1.02*	1.32*	1.61*	1.91*	2.38*	2.77*	3.17*	4.84*	6.59*
	40	0.50*	0.90*	1.29*	1.70*	2.13*	2.56*	3.24*	3.82*	4.42*	6.93*	9.59*
	60	0.57*	1.04*	1.53*	2.04*	2.58*	3.14*	4.01*	4.76*	5.52*	8.77*	12.23*
	80	0.63*	1.17*	1.75*	2.36*	3.00*	3.67*	4.71*	5.61*	6.54*	10.46*	14.66*
50	100	0.68*	1.29*	1.95*	2.66*	3.40*	4.17*	5.38*	6.42*	7.50*	12.05*	16.94*
	120	0.73*	1.41*	2.15*	2.95*	3.78*	4.65*	6.01*	7.19*	8.41*	13.56*	19.11*
	140	0.78*	1.52*	2.34*	3.22*	4.15*	5.11*	6.62*	7.93*	9.28*	15.01*	21.19*
	10	0.41*	0.69*	0.95*	1.19*	1.43*	1.67*	2.01*	2.30*	2.58*	3.75*	4.95*
	20	0.48*	0.82*	1.14*	1.44*	1.75*	2.05*	2.51*	2.91*	3.30*	4.96*	6.70*
	40	0.58*	1.00*	1.42*	1.83*	2.26*	2.69*	3.36*	3.94*	4.54*	7.03*	9.69*
	60	0.65*	1.16*	1.65*	2.17*	2.70*	3.26*	4.12*	4.86*	5.63*	8.86*	12.32*
100	80	0.72*	1.29*	1.87*	2.48*	3.12*	3.78*	4.82*	5.72*	6.64*	10.55*	14.74*
	100	0.78*	1.41*	2.07*	2.77*	3.51*	4.28*	5.48*	6.52*	7.59*	12.13*	17.02*
	120	0.83*	1.53*	2.27*	3.06*	3.89*	4.75*	6.11*	7.28*	8.49*	13.64*	19.19*
	140	0.88*	1.64*	2.45*	3.33*	4.25*	5.21*	6.71*	8.02*	9.36*	15.09*	21.26*
	10	0.47*	0.79*	1.07*	1.34*	1.60*	1.85*	2.22*	2.52*	2.82*	4.01*	5.21*
	20	0.56*	0.94*	1.29*	1.63*	1.95*	2.27*	2.75*	3.15*	3.55*	5.20*	6.93*
	40	0.68*	1.16*	1.61*	2.04*	2.48*	2.92*	3.60*	4.17*	4.76*	7.24*	9.88*
150	60	0.77*	1.33*	1.86*	2.39*	2.93*	3.48*	4.34*	5.08*	5.84*	9.05*	12.50*
	80	0.84*	1.47*	2.08*	2.70*	3.34*	4.00*	5.02*	5.91*	6.83*	10.73*	14.91*
	100	0.91*	1.60*	2.29*	2.99*	3.72*	4.48*	5.67*	6.71*	7.77*	12.30*	17.18*
	120	0.97*	1.72*	2.48*	3.27*	4.09*	4.95*	6.30*	7.46*	8.67*	13.80*	19.34*
	140	1.03*	1.84*	2.66*	3.53*	4.44*	5.40*	6.89*	8.19*	9.53*	15.25*	21.41*
	10	0.51*	0.86*	1.17*	1.45*	1.73*	1.99*	2.38*	2.70*	3.01*	4.23*	5.44*
	20	0.61*	1.03*	1.41*	1.76*	2.11*	2.44*	2.94*	3.35*	3.76*	5.43*	7.15*
	40	0.75*	1.27*	1.75*	2.21*	2.67*	3.12*	3.81*	4.39*	4.98*	7.44*	10.08*
	60	0.85*	1.45*	2.02*	2.57*	3.12*	3.69*	4.55*	5.28*	6.04*	9.24*	12.67*
	80	0.94*	1.61*	2.25*	2.89*	3.54*	4.20*	5.23*	6.11*	7.02*	10.90*	15.07*
	100	1.01*	1.75*	2.46*	3.18*	3.92*	4.68*	5.87*	6.89*	7.95*	12.47*	17.33*
	120	1.08*	1.88*	2.66*	3.46*	4.29*	5.14*	6.48*	7.64*	8.84*	13.96*	19.48*
	140	1.14*	2.00*	2.85*	3.72*	4.64*	5.58*	7.07*	8.37*	9.70*	15.40*	21.55*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.0 Ft (RADIUS = 0.0 Ft)
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
(Ft*s) ^{1/2} 200	°F											
	10	0.55*	0.91*	1.24*	1.54*	1.83*	2.11*	2.52*	2.84*	3.16*	4.42*	5.65*
	20	0.66*	1.10*	1.50*	1.88*	2.24*	2.59*	3.10*	3.53*	3.95*	5.64*	7.37*
	40	0.81*	1.36*	1.87*	2.35*	2.82*	3.29*	3.99*	4.58*	5.17*	7.64*	10.27*
	60	0.92*	1.56*	2.15*	2.73*	3.30*	3.87*	4.74*	5.48*	6.23*	9.42*	12.85*
	80	1.01*	1.73*	2.40*	3.06*	3.72*	4.39*	5.42*	6.30*	7.21*	11.07*	15.24*
300	100	1.09*	1.87*	2.62*	3.35*	4.10*	4.87*	6.05*	7.08*	8.13*	12.63*	17.49*
	120	1.16*	2.01*	2.82*	3.64*	4.47*	5.33*	6.66*	7.82*	9.02*	14.12*	19.63*
	140	1.23*	2.13*	3.01*	3.90*	4.82*	5.77*	7.25*	8.54*	9.87*	15.55*	21.69*
	10	0.60*	1.01*	1.36*	1.69*	2.00*	2.30*	2.73*	3.08*	3.42*	4.74*	6.02*
	20	0.73*	1.22*	1.66*	2.06*	2.45*	2.83*	3.37*	3.82*	4.26*	6.01*	7.77*
	40	0.90*	1.51*	2.06*	2.58*	3.09*	3.58*	4.31*	4.92*	5.53*	8.03*	10.64*
400	60	1.03*	1.73*	2.37*	2.99*	3.59*	4.19*	5.08*	5.83*	6.60*	9.79*	13.19*
	80	1.13*	1.92*	2.64*	3.34*	4.03*	4.72*	5.77*	6.66*	7.57*	11.42*	15.56*
	100	1.22*	2.08*	2.87*	3.65*	4.43*	5.21*	6.41*	7.43*	8.49*	12.96*	17.79*
	120	1.30*	2.23*	3.09*	3.94*	4.80*	5.67*	7.01*	8.17*	9.36*	14.44*	19.93*
	140	1.38*	2.36*	3.29*	4.22*	5.15*	6.11*	7.59*	8.88*	10.20*	15.86*	21.98*
	10	0.65*	1.08*	1.46*	1.81*	2.14*	2.45*	2.91*	3.28*	3.64*	5.01*	6.34*
600	20	0.79*	1.32*	1.78*	2.21*	2.62*	3.02*	3.60*	4.07*	4.53*	6.33*	8.12*
	40	0.98*	1.64*	2.22*	2.77*	3.31*	3.82*	4.59*	5.22*	5.84*	8.38*	11.00*
	60	1.12*	1.87*	2.56*	3.20*	3.83*	4.46*	5.38*	6.15*	6.93*	10.14*	13.54*
	80	1.23*	2.07*	2.84*	3.57*	4.29*	5.01*	6.08*	6.99*	7.91*	11.76*	15.88*
	100	1.33*	2.25*	3.09*	3.90*	4.70*	5.51*	6.73*	7.76*	8.82*	13.29*	18.10*
	120	1.42*	2.40*	3.32*	4.20*	5.09*	5.98*	7.33*	8.50*	9.69*	14.75*	20.22*
800	140	1.50*	2.55*	3.53*	4.49*	5.45*	6.42*	7.92*	9.20*	10.52*	16.16*	22.26*
	10	0.72*	1.20*	1.61*	2.00*	2.36*	2.70*	3.20*	3.60*	3.98*	5.46*	6.87*
	20	0.89*	1.47*	1.98*	2.46*	2.91*	3.34*	3.96*	4.47*	4.96*	6.88*	8.75*
	40	1.10*	1.83*	2.48*	3.09*	3.66*	4.22*	5.04*	5.71*	6.37*	9.00*	11.67*
	60	1.26*	2.10*	2.85*	3.56*	4.24*	4.91*	5.89*	6.70*	7.51*	10.78*	14.19*
	80	1.39*	2.33*	3.17*	3.96*	4.73*	5.49*	6.62*	7.56*	8.51*	12.40*	16.51*
	100	1.50*	2.52*	3.44*	4.32*	5.17*	6.02*	7.29*	8.35*	9.43*	13.91*	18.71*
	120	1.60*	2.70*	3.69*	4.64*	5.58*	6.51*	7.91*	9.10*	10.30*	15.36*	20.80*
	140	1.70*	2.86*	3.92*	4.94*	5.96*	6.97*	8.50*	9.80*	11.13*	16.75*	22.82*
	10	0.78*	1.30*	1.74*	2.15*	2.54*	2.91*	3.43*	3.86*	4.27*	5.83*	7.30*
	20	0.97*	1.60*	2.15*	2.66*	3.14*	3.60*	4.26*	4.80*	5.32*	7.33*	9.28*
	40	1.21*	2.00*	2.69*	3.34*	3.96*	4.55*	5.42*	6.12*	6.82*	9.55*	12.28*
	60	1.38*	2.29*	3.10*	3.85*	4.58*	5.28*	6.31*	7.16*	8.00*	11.36*	14.81*
	80	1.52*	2.53*	3.43*	4.28*	5.10*	5.90*	7.08*	8.06*	9.03*	12.99*	17.12*
	100	1.65*	2.74*	3.73*	4.66*	5.57*	6.46*	7.77*	8.87*	9.97*	14.51*	19.30*
	120	1.76*	2.93*	4.00*	5.01*	5.99*	6.96*	8.42*	9.63*	10.86*	15.95*	21.38*
140	1.85*	3.11*	4.24*	5.33*	6.39*	7.44*	9.02*	10.35*	11.70*	17.33*	23.38*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.0 Ft (RADIUS = 0.0 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
0	°F												
	10	0.37*	0.72*	1.08*	1.45*	1.82*	2.20*	2.77*	3.26*	3.76*	5.81*	7.96*	
	20	0.45*	0.92*	1.42*	1.93*	2.45*	2.99*	3.83*	4.54*	5.27*	8.32*	11.55*	
	40	0.60*	1.26*	1.98*	2.74*	3.52*	4.34*	5.60*	6.69*	7.81*	12.54*	17.60*	
	60	0.72*	1.56*	2.48*	3.44*	4.46*	5.51*	7.16*	8.58*	10.04*	16.24*	22.90*	
	80	0.84*	1.84*	2.93*	4.10*	5.32*	6.59*	8.59*	10.31*	12.09*	19.64*	27.77*	
	100	0.95*	2.09*	3.36*	4.71*	6.13*	7.61*	9.93*	11.94*	14.01*	22.83*	32.34*	
	120	1.05*	2.34*	3.76*	5.29*	6.90*	8.57*	11.20*	13.48*	15.84*	25.87*	36.69*	
	140	1.15*	2.57*	4.15*	5.85*	7.63*	9.50*	12.43*	14.97*	17.59*	28.78*	40.86*	
	25	10	0.52*	0.91*	1.28*	1.64*	2.01*	2.38*	2.95*	3.43*	3.92*	5.96*	8.10*
20		0.62*	1.11*	1.60*	2.10*	2.62*	3.15*	3.98*	4.68*	5.41*	8.45*	11.67*	
40		0.77*	1.43*	2.14*	2.88*	3.66*	4.47*	5.73*	6.81*	7.93*	12.65*	17.70*	
60		0.89*	1.72*	2.62*	3.58*	4.58*	5.63*	7.27*	8.69*	10.15*	16.34*	22.99*	
80		1.00*	1.98*	3.06*	4.22*	5.44*	6.71*	8.69*	10.41*	12.19*	19.73*	27.86*	
100		1.10*	2.23*	3.48*	4.82*	6.24*	7.72*	10.03*	12.03*	14.10*	22.92*	32.42*	
120		1.20*	2.47*	3.88*	5.40*	7.00*	8.68*	11.30*	13.58*	15.93*	25.95*	36.76*	
140		1.29*	2.70*	4.27*	5.95*	7.74*	9.60*	12.52*	15.06*	17.68*	28.85*	40.93*	
50		10	0.59*	1.02*	1.41*	1.79*	2.17*	2.54*	3.11*	3.59*	4.08*	6.11*	8.23*
		20	0.71*	1.24*	1.74*	2.25*	2.77*	3.30*	4.12*	4.83*	5.55*	8.57*	11.79*
	40	0.88*	1.57*	2.28*	3.02*	3.80*	4.60*	5.85*	6.93*	8.05*	12.76*	17.80*	
	60	1.01*	1.86*	2.75*	3.71*	4.71*	5.75*	7.38*	8.80*	10.25*	16.44*	23.08*	
	80	1.13*	2.12*	3.19*	4.34*	5.55*	6.82*	8.80*	10.52*	12.29*	19.82*	27.94*	
	100	1.23*	2.36*	3.61*	4.94*	6.35*	7.82*	10.13*	12.13*	14.20*	23.00*	32.50*	
	120	1.33*	2.60*	4.00*	5.51*	7.11*	8.78*	11.39*	13.67*	16.02*	26.03*	36.84*	
	140	1.43*	2.82*	4.38*	6.06*	7.84*	9.69*	12.61*	15.14*	17.76*	28.93*	41.00*	
	100	10	0.68*	1.16*	1.59*	2.01*	2.41*	2.80*	3.39*	3.88*	4.37*	6.40*	8.51*
		20	0.83*	1.42*	1.97*	2.50*	3.04*	3.58*	4.40*	5.10*	5.81*	8.82*	12.02*
40		1.03*	1.79*	2.53*	3.28*	4.06*	4.85*	6.10*	7.17*	8.28*	12.96*	17.99*	
60		1.18*	2.09*	3.01*	3.96*	4.95*	5.99*	7.61*	9.01*	10.46*	16.63*	23.26*	
80		1.31*	2.36*	3.44*	4.58*	5.78*	7.04*	9.01*	10.72*	12.48*	20.00*	28.10*	
100		1.43*	2.60*	3.84*	5.17*	6.57*	8.03*	10.33*	12.32*	14.38*	23.17*	32.66*	
120		1.53*	2.84*	4.23*	5.73*	7.32*	8.98*	11.58*	13.85*	16.19*	26.19*	36.99*	
140		1.63*	3.06*	4.61*	6.27*	8.04*	9.89*	12.79*	15.32*	17.93*	29.08*	41.14*	
150		10	0.75*	1.27*	1.73*	2.17*	2.59*	3.01*	3.62*	4.12*	4.63*	6.67*	8.77*
		20	0.91*	1.55*	2.14*	2.70*	3.26*	3.81*	4.65*	5.35*	6.07*	9.06*	12.25*
	40	1.14*	1.96*	2.74*	3.51*	4.29*	5.09*	6.33*	7.40*	8.50*	13.17*	18.19*	
	60	1.30*	2.28*	3.22*	4.19*	5.18*	6.22*	7.83*	9.23*	10.67*	16.81*	23.44*	
	80	1.45*	2.55*	3.66*	4.81*	6.00*	7.25*	9.21*	10.92*	12.68*	20.17*	28.27*	
	100	1.57*	2.81*	4.07*	5.39*	6.78*	8.24*	10.52*	12.51*	14.57*	23.34*	32.81*	
	120	1.69*	3.04*	4.45*	5.94*	7.52*	9.17*	11.77*	14.03*	16.37*	26.35*	37.14*	
	140	1.79*	3.27*	4.82*	6.48*	8.24*	10.08*	12.97*	15.50*	18.10*	29.24*	41.29*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.0 Ft (RADIUS = 0.0 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		°F	4	8	12	16	20	24	30	35	40	60	80
200	(Ft*s) ^{1/2}												
	10	0.81*	1.35*	1.84*	2.31*	2.75*	3.18*	3.81*	4.33*	4.85*	6.91*	9.03*	
	20	0.98*	1.66*	2.28*	2.87*	3.45*	4.02*	4.87*	5.58*	6.31*	9.30*	12.48*	
	40	1.23*	2.10*	2.91*	3.71*	4.51*	5.32*	6.56*	7.63*	8.73*	13.38*	18.38*	
	60	1.41*	2.43*	3.41*	4.40*	5.40*	6.44*	8.04*	9.44*	10.88*	17.00*	23.61*	
	80	1.56*	2.72*	3.86*	5.02*	6.22*	7.47*	9.42*	11.12*	12.87*	20.35*	28.43*	
	100	1.69*	2.98*	4.27*	5.60*	6.99*	8.44*	10.72*	12.70*	14.75*	23.50*	32.97*	
300	120	1.82*	3.23*	4.66*	6.15*	7.72*	9.37*	11.96*	14.21*	16.55*	26.51*	37.29*	
	140	1.93*	3.46*	5.02*	6.68*	8.43*	10.27*	13.16*	15.67*	18.27*	29.39*	41.43*	
	10	0.89*	1.49*	2.03*	2.53*	3.00*	3.46*	4.13*	4.68*	5.22*	7.36*	9.50*	
	20	1.10*	1.84*	2.51*	3.15*	3.76*	4.36*	5.25*	5.99*	6.73*	9.76*	12.92*	
	40	1.37*	2.32*	3.20*	4.04*	4.88*	5.71*	6.98*	8.06*	9.16*	13.79*	18.77*	
	60	1.58*	2.69*	3.73*	4.76*	5.79*	6.84*	8.46*	9.85*	11.28*	17.38*	23.96*	
	80	1.75*	3.00*	4.20*	5.40*	6.62*	7.87*	9.82*	11.51*	13.25*	20.70*	28.76*	
400	100	1.89*	3.28*	4.62*	5.98*	7.38*	8.83*	11.10*	13.07*	15.11*	23.84*	33.28*	
	120	2.03*	3.54*	5.02*	6.54*	8.11*	9.75*	12.33*	14.57*	16.89*	26.83*	37.58*	
	140	2.15*	3.78*	5.39*	7.07*	8.82*	10.64*	13.51*	16.02*	18.61*	29.70*	41.72*	
	10	0.97*	1.61*	2.18*	2.70*	3.21*	3.69*	4.40*	4.97*	5.53*	7.74*	9.93*	
	20	1.19*	1.99*	2.70*	3.37*	4.02*	4.65*	5.58*	6.34*	7.10*	10.17*	13.35*	
	40	1.49*	2.51*	3.43*	4.32*	5.19*	6.05*	7.35*	8.45*	9.55*	14.19*	19.15*	
	60	1.71*	2.90*	4.00*	5.07*	6.14*	7.21*	8.84*	10.24*	11.67*	17.75*	24.31*	
600	80	1.90*	3.23*	4.49*	5.73*	6.98*	8.24*	10.20*	11.89*	13.63*	21.05*	29.09*	
	100	2.06*	3.53*	4.93*	6.33*	7.75*	9.21*	11.48*	13.44*	15.47*	24.17*	33.59*	
	120	2.20*	3.80*	5.34*	6.89*	8.48*	10.12*	12.69*	14.93*	17.24*	27.14*	37.88*	
	140	2.33*	4.05*	5.72*	7.42*	9.18*	11.00*	13.87*	16.36*	18.94*	30.00*	42.00*	
	10	1.08*	1.79*	2.42*	3.00*	3.54*	4.07*	4.83*	5.45*	6.05*	8.39*	10.66*	
	20	1.34*	2.22*	3.01*	3.74*	4.44*	5.12*	6.12*	6.93*	7.73*	10.92*	14.15*	
	40	1.68*	2.81*	3.82*	4.78*	5.72*	6.63*	8.00*	9.13*	10.27*	14.95*	19.90*	
800	60	1.93*	3.25*	4.45*	5.59*	6.72*	7.84*	9.53*	10.96*	12.40*	18.48*	25.00*	
	80	2.14*	3.61*	4.97*	6.29*	7.60*	8.91*	10.90*	12.61*	14.35*	21.74*	29.74*	
	100	2.32*	3.94*	5.44*	6.92*	8.39*	9.89*	12.18*	14.15*	16.18*	24.82*	34.21*	
	120	2.48*	4.23*	5.88*	7.50*	9.14*	10.81*	13.39*	15.62*	17.92*	27.77*	38.47*	
	140	2.63*	4.50*	6.28*	8.05*	9.85*	11.69*	14.55*	17.04*	19.60*	30.61*	42.57*	
	10	1.17*	1.94*	2.61*	3.23*	3.82*	4.38*	5.19*	5.84*	6.48*	8.93*	11.30*	
	20	1.46*	2.41*	3.26*	4.04*	4.79*	5.51*	6.56*	7.42*	8.26*	11.56*	14.86*	
	40	1.83*	3.05*	4.14*	5.17*	6.15*	7.12*	8.54*	9.72*	10.89*	15.66*	20.62*	
	60	2.11*	3.53*	4.81*	6.03*	7.21*	8.38*	10.13*	11.59*	13.06*	19.17*	25.69*	
	80	2.34*	3.93*	5.37*	6.76*	8.13*	9.48*	11.53*	13.26*	15.02*	22.41*	30.38*	
	100	2.54*	4.27*	5.87*	7.42*	8.95*	10.49*	12.82*	14.81*	16.84*	25.47*	34.82*	
	120	2.71*	4.59*	6.33*	8.03*	9.72*	11.42*	14.04*	16.28*	18.58*	28.40*	39.06*	
	140	2.87*	4.88*	6.75*	8.59*	10.44*	12.31*	15.20*	17.69*	20.25*	31.22*	43.14*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.0 Ft (RADIUS = 1.4 Ft)
 FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
0	10	0.17	0.27*	0.36*	0.45*	0.54*	0.63*	0.77*	0.88*	0.99*	1.43*	1.87*	
	20	0.19	0.30*	0.41*	0.52*	0.63*	0.74*	0.91*	1.05*	1.19*	1.75*	2.33*	
	40	0.21	0.35*	0.49*	0.64*	0.78*	0.93*	1.15*	1.34*	1.52*	2.30*	3.11*	
	60	0.24	0.40*	0.57*	0.74*	0.91*	1.09*	1.36*	1.59*	1.82*	2.78*	3.79*	
	80	0.26	0.45*	0.64*	0.83*	1.03*	1.24*	1.55*	1.82*	2.09*	3.22*	4.42*	
	100	0.28	0.49*	0.70*	0.92*	1.15*	1.38*	1.73*	2.04*	2.35*	3.64*	5.01*	
	120	0.30	0.53*	0.76*	1.00*	1.25*	1.51*	1.90*	2.24*	2.59*	4.03*	5.56*	
	140	0.32	0.57*	0.82*	1.08*	1.36*	1.64*	2.07*	2.44*	2.82*	4.41*	6.10*	
	25	10	0.24	0.36*	0.46*	0.57*	0.66*	0.76*	0.90*	1.01*	1.13*	1.57*	2.00*
		20	0.27	0.40*	0.53*	0.64*	0.76*	0.87*	1.04*	1.18*	1.32*	1.88*	2.45*
40		0.31	0.47*	0.62*	0.76*	0.91*	1.05*	1.27*	1.45*	1.64*	2.41*	3.21*	
60		0.35	0.52*	0.69*	0.86*	1.03*	1.20*	1.47*	1.69*	1.92*	2.88*	3.88*	
80		0.37	0.56*	0.76*	0.95*	1.15*	1.35*	1.65*	1.92*	2.19*	3.31*	4.50*	
100		0.40	0.61*	0.82*	1.03*	1.25*	1.48*	1.83*	2.13*	2.44*	3.72*	5.08*	
120		0.42	0.64*	0.87*	1.11*	1.36*	1.61*	2.00*	2.33*	2.68*	4.11*	5.64*	
140		0.44	0.68*	0.93*	1.19*	1.46*	1.73*	2.16*	2.53*	2.90*	4.49*	6.17*	
50		10	0.27	0.39*	0.51*	0.62*	0.73*	0.83*	0.98*	1.10*	1.21*	1.67*	2.11*
		20	0.31	0.45*	0.58*	0.71*	0.84*	0.96*	1.13*	1.28*	1.42*	1.99*	2.56*
	40	0.36	0.53*	0.69*	0.84*	1.00*	1.15*	1.37*	1.56*	1.74*	2.51*	3.30*	
	60	0.40	0.59*	0.77*	0.95*	1.13*	1.30*	1.57*	1.80*	2.02*	2.97*	3.97*	
	80	0.43	0.64*	0.84*	1.04*	1.24*	1.45*	1.75*	2.02*	2.28*	3.40*	4.58*	
	100	0.46	0.68*	0.91*	1.13*	1.35*	1.58*	1.93*	2.22*	2.53*	3.81*	5.16*	
	120	0.49	0.73*	0.97*	1.21*	1.45*	1.70*	2.09*	2.42*	2.76*	4.19*	5.71*	
	140	0.51	0.76*	1.02*	1.28*	1.55*	1.82*	2.25*	2.61*	2.99*	4.56*	6.24*	
	100	10	0.30	0.44*	0.57*	0.69*	0.81*	0.92*	1.08*	1.21*	1.34*	1.82*	2.29*
		20	0.35	0.51*	0.66*	0.80*	0.94*	1.07*	1.26*	1.42*	1.57*	2.16*	2.75*
40		0.42	0.61*	0.79*	0.96*	1.12*	1.29*	1.52*	1.72*	1.91*	2.69*	3.49*	
60		0.47	0.68*	0.88*	1.08*	1.27*	1.46*	1.74*	1.97*	2.20*	3.15*	4.14*	
80		0.51	0.74*	0.96*	1.18*	1.39*	1.61*	1.92*	2.19*	2.46*	3.57*	4.74*	
100		0.54	0.79*	1.04*	1.27*	1.51*	1.74*	2.10*	2.40*	2.70*	3.97*	5.31*	
120		0.57	0.84*	1.10*	1.36*	1.61*	1.87*	2.26*	2.59*	2.93*	4.35*	5.86*	
140		0.60	0.88*	1.16*	1.44*	1.71*	1.99*	2.42*	2.78*	3.15*	4.72*	6.39*	
150		10	0.33	0.48*	0.61*	0.74*	0.87*	0.98*	1.16*	1.29*	1.43*	1.94*	2.42*
		20	0.39	0.56*	0.72*	0.87*	1.01*	1.15*	1.36*	1.52*	1.68*	2.30*	2.90*
	40	0.46	0.67*	0.86*	1.04*	1.22*	1.39*	1.64*	1.85*	2.05*	2.85*	3.66*	
	60	0.52	0.75*	0.97*	1.17*	1.38*	1.58*	1.87*	2.11*	2.35*	3.31*	4.30*	
	80	0.56	0.81*	1.05*	1.29*	1.51*	1.73*	2.06*	2.34*	2.61*	3.73*	4.90*	
	100	0.60	0.87*	1.13*	1.39*	1.63*	1.88*	2.24*	2.55*	2.86*	4.13*	5.47*	
	120	0.63	0.92*	1.20*	1.48*	1.74*	2.01*	2.41*	2.75*	3.09*	4.50*	6.01*	
	140	0.67	0.97*	1.27*	1.56*	1.85*	2.13*	2.57*	2.93*	3.31*	4.87*	6.53*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.0 Ft (RADIUS = 1.4 Ft)
FIRE GROWTH: ULTRAFast (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft									
		°F									
		10	20	40	60	80	100	120	140	160	180
(Ft*s) ^{1/2}		10	20	40	60	80	100	120	140	160	180
200	10	0.35	0.50*	0.65*	0.79*	0.91*	1.04*	1.22*	1.36*	1.50*	1.62*
	20	0.41	0.59*	0.76*	0.92*	1.08*	1.22*	1.44*	1.61*	1.77*	1.93*
	40	0.49	0.71*	0.92*	1.11*	1.30*	1.48*	1.74*	1.95*	2.17*	2.35*
	60	0.55	0.80*	1.03*	1.25*	1.47*	1.67*	1.98*	2.23*	2.48*	2.69*
	80	0.60	0.87*	1.13*	1.37*	1.61*	1.84*	2.18*	2.47*	2.75*	2.98*
	100	0.65	0.94*	1.21*	1.48*	1.74*	1.99*	2.37*	2.68*	3.00*	3.24*
300	10	0.38	0.55*	0.71*	0.85*	0.99*	1.12*	1.32*	1.47*	1.62*	1.75*
	20	0.45	0.65*	0.84*	1.01*	1.18*	1.33*	1.56*	1.75*	1.93*	2.11*
	40	0.55	0.79*	1.01*	1.22*	1.42*	1.62*	1.90*	2.13*	2.35*	2.58*
	60	0.62	0.89*	1.14*	1.38*	1.61*	1.84*	2.16*	2.43*	2.69*	2.94*
	80	0.68	0.97*	1.25*	1.51*	1.77*	2.02*	2.38*	2.68*	2.98*	3.24*
	100	0.72	1.04*	1.34*	1.63*	1.91*	2.18*	2.58*	2.91*	3.24*	3.48*
400	10	0.41	0.59*	0.75*	0.91*	1.05*	1.19*	1.40*	1.56*	1.71*	1.87*
	20	0.49	0.70*	0.90*	1.08*	1.26*	1.42*	1.67*	1.86*	2.05*	2.23*
	40	0.59	0.85*	1.09*	1.31*	1.53*	1.73*	2.03*	2.27*	2.51*	2.74*
	60	0.67	0.96*	1.23*	1.49*	1.73*	1.97*	2.31*	2.59*	2.86*	3.11*
	80	0.73	1.05*	1.35*	1.63*	1.90*	2.16*	2.55*	2.86*	3.17*	3.44*
	100	0.79	1.13*	1.45*	1.76*	2.05*	2.34*	2.76*	3.10*	3.44*	3.69*
600	10	0.45	0.65*	0.83*	1.00*	1.16*	1.31*	1.53*	1.70*	1.87*	2.04*
	20	0.54	0.78*	0.99*	1.20*	1.39*	1.57*	1.83*	2.04*	2.25*	2.46*
	40	0.67	0.95*	1.21*	1.46*	1.70*	1.92*	2.25*	2.51*	2.76*	3.02*
	60	0.75	1.07*	1.38*	1.66*	1.92*	2.18*	2.56*	2.86*	3.16*	3.44*
	80	0.83	1.18*	1.51*	1.82*	2.11*	2.40*	2.82*	3.15*	3.49*	3.78*
	100	0.89	1.27*	1.62*	1.96*	2.28*	2.59*	3.05*	3.42*	3.78*	4.05*
800	10	0.49	0.69*	0.89*	1.07*	1.24*	1.40*	1.63*	1.82*	2.00*	2.18*
	20	0.59	0.84*	1.07*	1.29*	1.49*	1.69*	1.97*	2.19*	2.41*	2.67*
	40	0.72	1.03*	1.31*	1.58*	1.83*	2.07*	2.42*	2.70*	2.97*	3.23*
	60	0.82	1.17*	1.49*	1.79*	2.08*	2.36*	2.76*	3.08*	3.39*	3.66*
	80	0.90	1.28*	1.64*	1.97*	2.29*	2.60*	3.04*	3.40*	3.75*	4.06*
	100	0.97	1.38*	1.76*	2.12*	2.47*	2.80*	3.28*	3.68*	4.06*	4.34*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.0 Ft (RADIUS = 1.4 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE °F	CEILING HEIGHT, Ft									
		(Ft*s) ^{1/2}									
		4	8	12	16	20	24	30	35	40	80
0	10	0.24	0.38*	0.52*	0.67*	0.80*	0.94*	1.15*	1.33*	1.50*	2.93*
	20	0.27	0.45*	0.63*	0.80*	0.98*	1.16*	1.44*	1.67*	1.90*	3.85*
	40	0.33	0.56*	0.79*	1.04*	1.28*	1.53*	1.92*	2.24*	2.58*	5.41*
	60	0.38	0.66*	0.94*	1.24*	1.54*	1.86*	2.34*	2.75*	3.17*	6.77*
	80	0.43	0.74*	1.08*	1.43*	1.78*	2.15*	2.72*	3.21*	3.71*	8.03*
	100	0.47	0.83*	1.21*	1.60*	2.01*	2.43*	3.08*	3.64*	4.22*	9.20*
	120	0.51	0.91*	1.33*	1.77*	2.22*	2.70*	3.43*	4.06*	4.70*	10.32*
25	140	0.55	0.98*	1.44*	1.93*	2.43*	2.95*	3.76*	4.45*	5.17*	11.39*
	10	0.34	0.51*	0.66*	0.81*	0.96*	1.10*	1.31*	1.48*	1.66*	3.06*
	20	0.39	0.58*	0.77*	0.95*	1.13*	1.31*	1.58*	1.81*	2.04*	3.97*
	40	0.46	0.70*	0.94*	1.17*	1.42*	1.66*	2.04*	2.36*	2.69*	5.51*
	60	0.52	0.79*	1.08*	1.37*	1.67*	1.97*	2.45*	2.86*	3.27*	6.86*
	80	0.57	0.88*	1.21*	1.55*	1.90*	2.26*	2.83*	3.31*	3.81*	8.11*
	100	0.61	0.96*	1.33*	1.72*	2.12*	2.54*	3.18*	3.74*	4.31*	9.28*
50	120	0.65	1.03*	1.44*	1.88*	2.33*	2.80*	3.52*	4.15*	4.79*	10.40*
	140	0.69	1.11*	1.56*	2.03*	2.53*	3.05*	3.85*	4.54*	5.25*	11.46*
	10	0.38	0.56*	0.73*	0.89*	1.05*	1.20*	1.42*	1.60*	1.78*	3.19*
	20	0.45	0.66*	0.86*	1.05*	1.24*	1.42*	1.70*	1.93*	2.16*	4.08*
	40	0.53	0.79*	1.04*	1.29*	1.53*	1.78*	2.16*	2.48*	2.81*	5.60*
	60	0.60	0.89*	1.19*	1.48*	1.78*	2.09*	2.56*	2.96*	3.38*	6.95*
	80	0.65	0.98*	1.32*	1.66*	2.01*	2.37*	2.93*	3.41*	3.90*	8.19*
100	100	0.70	1.06*	1.44*	1.83*	2.23*	2.64*	3.28*	3.83*	4.40*	9.36*
	120	0.74	1.14*	1.55*	1.98*	2.43*	2.89*	3.62*	4.24*	4.88*	10.47*
	140	0.79	1.21*	1.66*	2.14*	2.63*	3.14*	3.94*	4.63*	5.34*	11.54*
	10	0.44	0.64*	0.82*	1.00*	1.17*	1.33*	1.57*	1.77*	1.96*	3.42*
	20	0.52	0.75*	0.97*	1.19*	1.39*	1.59*	1.89*	2.13*	2.37*	4.30*
	40	0.62	0.91*	1.18*	1.45*	1.71*	1.97*	2.36*	2.69*	3.02*	5.80*
	60	0.70	1.03*	1.35*	1.66*	1.97*	2.29*	2.76*	3.16*	3.58*	7.12*
150	80	0.76	1.13*	1.49*	1.85*	2.21*	2.57*	3.13*	3.60*	4.09*	8.35*
	100	0.82	1.22*	1.62*	2.02*	2.42*	2.83*	3.47*	4.02*	4.58*	9.51*
	120	0.87	1.30*	1.74*	2.18*	2.62*	3.09*	3.80*	4.42*	5.05*	10.62*
	140	0.92	1.38*	1.85*	2.33*	2.82*	3.33*	4.12*	4.80*	5.50*	11.68*
	10	0.48	0.69*	0.89*	1.08*	1.26*	1.43*	1.69*	1.89*	2.09*	3.61*
	20	0.57	0.82*	1.06*	1.29*	1.50*	1.72*	2.03*	2.28*	2.53*	4.50*
	40	0.69	0.99*	1.29*	1.58*	1.85*	2.12*	2.53*	2.86*	3.20*	5.98*
	60	0.77	1.13*	1.47*	1.80*	2.13*	2.45*	2.94*	3.35*	3.76*	7.30*
	80	0.85	1.24*	1.62*	2.00*	2.37*	2.74*	3.31*	3.79*	4.28*	8.52*
	100	0.91	1.34*	1.76*	2.17*	2.59*	3.01*	3.65*	4.20*	4.76*	9.67*
	120	0.97	1.43*	1.88*	2.34*	2.80*	3.26*	3.98*	4.59*	5.22*	10.77*
	140	1.02	1.51*	2.00*	2.49*	2.99*	3.50*	4.29*	4.97*	5.67*	11.82*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.0 Ft (RADIUS = 1.4 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
200 (Ft*s) ^{1/2}	10	0.51	0.73*	0.95*	1.14*	1.33*	1.52*	1.78*	1.99*	2.20*	3.00*	3.77*
	20	0.61	0.88*	1.13*	1.37*	1.60*	1.82*	2.14*	2.41*	2.67*	3.68*	4.68*
	40	0.74	1.07*	1.38*	1.68*	1.97*	2.25*	2.67*	3.01*	3.36*	4.74*	6.16*
	60	0.83	1.21*	1.57*	1.92*	2.26*	2.59*	3.09*	3.51*	3.93*	5.65*	7.47*
	80	0.91	1.33*	1.73*	2.12*	2.51*	2.89*	3.47*	3.95*	4.45*	6.50*	8.68*
	100	0.98	1.43*	1.88*	2.31*	2.74*	3.16*	3.81*	4.37*	4.93*	7.29*	9.82*
	120	1.05	1.53*	2.01*	2.48*	2.95*	3.42*	4.14*	4.76*	5.39*	8.05*	10.91*
300	140	1.10	1.62*	2.13*	2.64*	3.15*	3.66*	4.46*	5.13*	5.83*	8.79*	11.96*
	10	0.56	0.80*	1.03*	1.25*	1.45*	1.65*	1.93*	2.16*	2.38*	3.23*	4.03*
	20	0.67	0.97*	1.24*	1.50*	1.75*	1.99*	2.33*	2.61*	2.89*	3.96*	5.00*
	40	0.82	1.18*	1.52*	1.85*	2.16*	2.46*	2.91*	3.27*	3.63*	5.06*	6.50*
	60	0.93	1.34*	1.74*	2.11*	2.47*	2.83*	3.36*	3.79*	4.22*	5.98*	7.80*
	80	1.02	1.48*	1.91*	2.33*	2.74*	3.15*	3.75*	4.25*	4.75*	6.82*	8.99*
	100	1.10	1.59*	2.07*	2.53*	2.98*	3.43*	4.10*	4.67*	5.24*	7.61*	10.12*
400	120	1.17	1.70*	2.21*	2.71*	3.21*	3.70*	4.44*	5.06*	5.70*	8.36*	11.20*
	140	1.24	1.80*	2.35*	2.88*	3.41*	3.95*	4.76*	5.44*	6.14*	9.08*	12.25*
	10	0.60	0.86*	1.10*	1.33*	1.55*	1.75*	2.05*	2.29*	2.53*	3.41*	4.26*
	20	0.73	1.04*	1.33*	1.61*	1.87*	2.12*	2.49*	2.79*	3.08*	4.19*	5.27*
	40	0.89	1.28*	1.64*	1.98*	2.31*	2.63*	3.10*	3.48*	3.86*	5.33*	6.81*
	60	1.01	1.45*	1.87*	2.27*	2.65*	3.03*	3.58*	4.03*	4.48*	6.27*	8.11*
	80	1.11	1.60*	2.06*	2.51*	2.94*	3.36*	3.99*	4.50*	5.02*	7.12*	9.30*
600	100	1.20	1.72*	2.23*	2.72*	3.19*	3.66*	4.36*	4.94*	5.52*	7.91*	10.42*
	120	1.27	1.84*	2.38*	2.91*	3.43*	3.94*	4.70*	5.34*	5.98*	8.65*	11.49*
	140	1.34	1.94*	2.52*	3.09*	3.64*	4.19*	5.02*	5.72*	6.43*	9.37*	12.52*
	10	0.67	0.95*	1.22*	1.47*	1.70*	1.93*	2.25*	2.51*	2.76*	3.72*	4.62*
	20	0.81	1.16*	1.48*	1.78*	2.07*	2.35*	2.74*	3.06*	3.38*	4.57*	5.72*
	40	1.00	1.43*	1.83*	2.21*	2.57*	2.92*	3.42*	3.83*	4.24*	5.80*	7.34*
	60	1.14	1.63*	2.09*	2.53*	2.94*	3.35*	3.94*	4.43*	4.90*	6.78*	8.67*
800	80	1.25	1.79*	2.31*	2.79*	3.26*	3.71*	4.38*	4.93*	5.48*	7.65*	9.87*
	100	1.35	1.93*	2.49*	3.02*	3.54*	4.04*	4.78*	5.39*	6.00*	8.45*	10.98*
	120	1.44	2.06*	2.66*	3.23*	3.79*	4.33*	5.14*	5.81*	6.48*	9.20*	12.05*
	140	1.52	2.18*	2.82*	3.43*	4.02*	4.61*	5.48*	6.21*	6.93*	9.92*	13.07*
	10	0.72	1.03*	1.31*	1.58*	1.83*	2.07*	2.41*	2.69*	2.96*	3.97*	4.92*
	20	0.88	1.25*	1.60*	1.92*	2.23*	2.53*	2.95*	3.29*	3.62*	4.89*	6.09*
	40	1.09	1.55*	1.98*	2.39*	2.78*	3.15*	3.69*	4.12*	4.55*	6.19*	7.79*
	60	1.24	1.77*	2.27*	2.74*	3.18*	3.61*	4.24*	4.75*	5.26*	7.22*	9.16*
	80	1.37	1.95*	2.50*	3.02*	3.52*	4.01*	4.71*	5.29*	5.86*	8.12*	10.38*
	100	1.48	2.11*	2.71*	3.27*	3.82*	4.35*	5.13*	5.77*	6.41*	8.93*	11.50*
	120	1.57	2.25*	2.89*	3.50*	4.09*	4.66*	5.51*	6.21*	6.91*	9.70*	12.57*
	140	1.66	2.37*	3.06*	3.71*	4.34*	4.95*	5.87*	6.62*	7.37*	10.42*	13.59*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.0 Ft (RADIUS = 1.4 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
0	10	0.35	0.57*	0.79*	1.02*	1.24*	1.46*	1.81*	2.09*	2.38*	3.57*	4.78*	
	20	0.42	0.70*	0.99*	1.29*	1.59*	1.90*	2.38*	2.78*	3.18*	4.87*	6.64*	
	40	0.53	0.92*	1.33*	1.76*	2.19*	2.64*	3.33*	3.92*	4.53*	7.06*	9.75*	
	60	0.63	1.12*	1.63*	2.16*	2.72*	3.29*	4.17*	4.93*	5.71*	8.99*	12.48*	
	80	0.72	1.29*	1.90*	2.54*	3.20*	3.88*	4.94*	5.86*	6.79*	10.75*	14.98*	
	100	0.81	1.46*	2.15*	2.89*	3.65*	4.44*	5.67*	6.72*	7.81*	12.41*	17.34*	
	120	0.89	1.62*	2.40*	3.22*	4.08*	4.97*	6.35*	7.55*	8.78*	13.99*	19.57*	
	140	0.97	1.77*	2.63*	3.54*	4.49*	5.48*	7.01*	8.34*	9.71*	15.50*	21.72*	
	25	10	0.49	0.73*	0.97*	1.19*	1.42*	1.64*	1.98*	2.26*	2.55*	3.71*	4.92*
		20	0.58	0.87*	1.16*	1.46*	1.75*	2.06*	2.52*	2.92*	3.32*	5.00*	6.75*
40		0.70	1.08*	1.48*	1.90*	2.33*	2.77*	3.46*	4.05*	4.65*	7.17*	9.85*	
60		0.80	1.27*	1.77*	2.29*	2.84*	3.41*	4.28*	5.04*	5.82*	9.08*	12.57*	
80		0.89	1.44*	2.03*	2.66*	3.31*	3.99*	5.05*	5.96*	6.89*	10.84*	15.07*	
100		0.97	1.60*	2.28*	3.00*	3.76*	4.54*	5.76*	6.82*	7.90*	12.49*	17.41*	
120		1.05	1.75*	2.52*	3.33*	4.18*	5.07*	6.45*	7.64*	8.87*	14.07*	19.65*	
140		1.12	1.89*	2.74*	3.65*	4.59*	5.57*	7.10*	8.43*	9.79*	15.58*	21.79*	
50		10	0.56	0.82*	1.07*	1.31*	1.54*	1.78*	2.12*	2.41*	2.69*	3.86*	5.06*
		20	0.66	0.97*	1.28*	1.59*	1.89*	2.20*	2.66*	3.06*	3.46*	5.12*	6.87*
	40	0.80	1.20*	1.62*	2.03*	2.46*	2.90*	3.58*	4.16*	4.76*	7.27*	9.94*	
	60	0.91	1.39*	1.90*	2.42*	2.96*	3.52*	4.40*	5.15*	5.92*	9.18*	12.65*	
	80	1.01	1.56*	2.16*	2.78*	3.43*	4.10*	5.15*	6.06*	6.99*	10.93*	15.15*	
	100	1.09	1.72*	2.40*	3.12*	3.87*	4.65*	5.86*	6.92*	8.00*	12.58*	17.49*	
	120	1.17	1.87*	2.63*	3.44*	4.29*	5.17*	6.54*	7.73*	8.96*	14.15*	19.72*	
	140	1.25	2.02*	2.86*	3.75*	4.69*	5.67*	7.20*	8.52*	9.88*	15.65*	21.86*	
	100	10	0.64	0.93*	1.21*	1.47*	1.72*	1.97*	2.34*	2.64*	2.94*	4.12*	5.32*
		20	0.76	1.12*	1.46*	1.78*	2.11*	2.43*	2.90*	3.30*	3.71*	5.36*	7.10*
40		0.93	1.38*	1.82*	2.26*	2.69*	3.14*	3.81*	4.39*	4.99*	7.48*	10.14*	
60		1.06	1.59*	2.11*	2.65*	3.19*	3.75*	4.62*	5.36*	6.13*	9.37*	12.83*	
80		1.17	1.77*	2.38*	3.00*	3.65*	4.32*	5.36*	6.26*	7.18*	11.11*	15.31*	
100		1.27	1.93*	2.62*	3.34*	4.08*	4.85*	6.06*	7.11*	8.18*	12.75*	17.65*	
120		1.36	2.09*	2.85*	3.65*	4.49*	5.37*	6.73*	7.91*	9.13*	14.31*	19.87*	
140		1.44	2.23*	3.07*	3.96*	4.89*	5.86*	7.38*	8.69*	10.05*	15.81*	22.01*	
150		10	0.70	1.01*	1.31*	1.59*	1.86*	2.12*	2.51*	2.82*	3.13*	4.34*	5.56*
		20	0.84	1.22*	1.58*	1.93*	2.27*	2.61*	3.10*	3.51*	3.92*	5.59*	7.32*
	40	1.03	1.51*	1.98*	2.43*	2.89*	3.34*	4.03*	4.61*	5.20*	7.69*	10.33*	
	60	1.18	1.73*	2.29*	2.84*	3.40*	3.96*	4.83*	5.57*	6.33*	9.55*	13.01*	
	80	1.30	1.93*	2.56*	3.20*	3.85*	4.52*	5.56*	6.45*	7.38*	11.28*	15.48*	
	100	1.40	2.10*	2.81*	3.54*	4.28*	5.05*	6.25*	7.29*	8.36*	12.91*	17.80*	
	120	1.50	2.26*	3.05*	3.85*	4.69*	5.56*	6.92*	8.09*	9.31*	14.47*	20.02*	
	140	1.59	2.41*	3.27*	4.16*	5.08*	6.05*	7.56*	8.87*	10.22*	15.96*	22.15*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.0 Ft (RADIUS = 1.4 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, Ft

(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60	80
200	10	0.75	1.08*	1.39*	1.69*	1.97*	2.24*	2.64*	2.97*	3.29*	4.54*	5.77*
	20	0.90	1.31*	1.69*	2.06*	2.41*	2.76*	3.27*	3.69*	4.11*	5.80*	7.54*
	40	1.11	1.62*	2.11*	2.59*	3.05*	3.52*	4.22*	4.81*	5.41*	7.89*	10.52*
	60	1.27	1.86*	2.44*	3.01*	3.58*	4.15*	5.02*	5.77*	6.53*	9.74*	13.18*
	80	1.40	2.06*	2.72*	3.38*	4.04*	4.71*	5.75*	6.65*	7.56*	11.46*	15.64*
	100	1.51	2.24*	2.98*	3.72*	4.47*	5.24*	6.44*	7.48*	8.54*	13.08*	17.96*
	120	1.62	2.41*	3.22*	4.04*	4.88*	5.75*	7.10*	8.27*	9.48*	14.63*	20.17*
300	140	1.71	2.57*	3.44*	4.34*	5.27*	6.23*	7.73*	9.04*	10.38*	16.11*	22.29*
	10	0.82	1.19*	1.53*	1.84*	2.15*	2.44*	2.87*	3.22*	3.56*	4.87*	6.15*
	20	1.00	1.44*	1.86*	2.26*	2.64*	3.01*	3.55*	4.00*	4.43*	6.18*	7.94*
	40	1.24	1.79*	2.33*	2.84*	3.33*	3.82*	4.55*	5.16*	5.77*	8.27*	10.90*
	60	1.42	2.06*	2.68*	3.29*	3.88*	4.48*	5.37*	6.13*	6.90*	10.10*	13.53*
	80	1.56	2.28*	2.99*	3.68*	4.37*	5.06*	6.11*	7.01*	7.93*	11.80*	15.97*
	100	1.69	2.48*	3.26*	4.03*	4.81*	5.59*	6.80*	7.83*	8.90*	13.41*	18.27*
400	120	1.81	2.66*	3.51*	4.36*	5.22*	6.10*	7.45*	8.62*	9.82*	14.94*	20.46*
	140	1.91	2.83*	3.75*	4.67*	5.61*	6.58*	8.08*	9.38*	10.71*	16.42*	22.58*
	10	0.89	1.27*	1.63*	1.97*	2.30*	2.61*	3.06*	3.42*	3.78*	5.15*	6.47*
	20	1.08	1.56*	2.00*	2.42*	2.82*	3.21*	3.78*	4.25*	4.71*	6.51*	8.30*
	40	1.35	1.94*	2.50*	3.04*	3.56*	4.08*	4.84*	5.46*	6.09*	8.63*	11.26*
	60	1.54	2.22*	2.88*	3.52*	4.14*	4.76*	5.68*	6.46*	7.23*	10.46*	13.87*
	80	1.70	2.46*	3.21*	3.93*	4.65*	5.36*	6.43*	7.34*	8.27*	12.14*	16.29*
600	100	1.84	2.67*	3.50*	4.30*	5.10*	5.90*	7.13*	8.17*	9.23*	13.73*	18.57*
	120	1.96	2.87*	3.76*	4.64*	5.52*	6.42*	7.78*	8.95*	10.15*	15.25*	20.76*
	140	2.08	3.04*	4.00*	4.96*	5.92*	6.90*	8.41*	9.71*	11.04*	16.72*	22.86*
	10	0.99	1.41*	1.81*	2.18*	2.53*	2.87*	3.36*	3.75*	4.14*	5.60*	7.00*
	20	1.22	1.74*	2.23*	2.69*	3.13*	3.55*	4.17*	4.67*	5.16*	7.06*	8.93*
	40	1.52	2.17*	2.79*	3.38*	3.95*	4.50*	5.31*	5.97*	6.63*	9.26*	11.94*
	60	1.74	2.49*	3.21*	3.91*	4.58*	5.23*	6.21*	7.02*	7.82*	11.11*	14.53*
800	80	1.92	2.76*	3.57*	4.35*	5.11*	5.87*	6.99*	7.93*	8.88*	12.79*	16.92*
	100	2.07	2.99*	3.89*	4.75*	5.60*	6.44*	7.71*	8.78*	9.86*	14.36*	19.18*
	120	2.21	3.20*	4.17*	5.11*	6.04*	6.97*	8.38*	9.57*	10.78*	15.87*	21.34*
	140	2.34	3.40*	4.44*	5.45*	6.46*	7.47*	9.01*	10.32*	11.66*	17.32*	23.42*
	10	1.07	1.53*	1.95*	2.35*	2.72*	3.09*	3.61*	4.02*	4.43*	5.98*	7.45*
	20	1.32	1.88*	2.41*	2.90*	3.37*	3.82*	4.48*	5.01*	5.53*	7.53*	9.47*
	40	1.65	2.36*	3.02*	3.65*	4.26*	4.85*	5.70*	6.40*	7.09*	9.81*	12.55*
	60	1.89	2.71*	3.48*	4.22*	4.93*	5.63*	6.65*	7.49*	8.33*	11.70*	15.15*
	80	2.09	3.00*	3.87*	4.70*	5.51*	6.30*	7.47*	8.44*	9.42*	13.38*	17.53*
	100	2.26	3.25*	4.21*	5.12*	6.01*	6.90*	8.21*	9.31*	10.41*	14.96*	19.77*
	120	2.42	3.48*	4.51*	5.50*	6.48*	7.45*	8.90*	10.11*	11.34*	16.46*	21.92*
	140	2.56	3.69*	4.79*	5.86*	6.91*	7.96*	9.54*	10.88*	12.23*	17.90*	23.98*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.0 Ft (RADIUS = 1.4 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX		TEMPERATURE RISE		CEILING HEIGHT, Ft										
(Ft*s) ^{1/2}		°F	4	8	12	16	20	24	30	35	40	60	80	
0	10	0.88*	0.53	0.88*	1.25*	1.62*	1.99*	2.37*	2.95*	3.44*	3.94*	6.01*	8.16*	
	20	1.15*	0.66	1.15*	1.65*	2.17*	2.70*	3.25*	4.09*	4.81*	5.54*	8.62*	11.86*	
	40	1.59*	0.89	1.59*	2.32*	3.09*	3.90*	4.72*	6.00*	7.11*	8.24*	13.00*	18.09*	
	60	1.97*	1.09	1.97*	2.92*	3.91*	4.94*	6.01*	7.68*	9.12*	10.60*	16.85*	23.55*	
	80	2.33*	1.27	2.33*	3.46*	4.66*	5.91*	7.20*	9.22*	10.97*	12.77*	20.38*	28.56*	
	100	2.66*	1.44	2.66*	3.97*	5.36*	6.81*	8.32*	10.67*	12.70*	14.80*	23.70*	33.26*	
	120	2.98*	1.61	2.98*	4.45*	6.02*	7.67*	9.38*	12.04*	14.35*	16.74*	26.85*	37.74*	
25	140	3.28*	1.76	3.28*	4.92*	6.66*	8.49*	10.39*	13.36*	15.94*	18.59*	29.87*	42.03*	
	10	1.08*	0.72	1.08*	1.45*	1.81*	2.18*	2.55*	3.13*	3.61*	4.11*	6.16*	8.30*	
	20	1.34*	0.86	1.34*	1.83*	2.34*	2.86*	3.40*	4.24*	4.95*	5.68*	8.74*	11.98*	
	40	1.76*	1.09	1.76*	2.48*	3.24*	4.03*	4.85*	6.13*	7.23*	8.35*	13.11*	18.19*	
	60	2.13*	1.28	2.13*	3.06*	4.04*	5.07*	6.13*	7.79*	9.23*	10.70*	16.94*	23.64*	
	80	2.47*	1.45	2.47*	3.59*	4.78*	6.02*	7.31*	9.33*	11.07*	12.86*	20.47*	28.64*	
	100	2.80*	1.62	2.80*	4.09*	5.47*	6.92*	8.42*	10.77*	12.80*	14.89*	23.78*	33.34*	
50	120	3.11*	1.77	3.11*	4.57*	6.14*	7.77*	9.48*	12.14*	14.45*	16.82*	26.93*	37.81*	
	140	3.41*	1.92	3.41*	5.04*	6.77*	8.59*	10.49*	13.46*	16.03*	18.68*	29.95*	42.10*	
	10	1.21*	0.81	1.21*	1.59*	1.97*	2.34*	2.72*	3.29*	3.78*	4.27*	6.30*	8.44*	
	20	1.48*	0.98	1.48*	1.99*	2.50*	3.02*	3.56*	4.38*	5.09*	5.82*	8.87*	12.10*	
	40	1.91*	1.23	1.91*	2.63*	3.38*	4.17*	4.98*	6.25*	7.35*	8.47*	13.21*	18.28*	
	60	2.28*	1.43	2.28*	3.20*	4.17*	5.19*	6.25*	7.91*	9.34*	10.81*	17.04*	23.72*	
	80	2.61*	1.61	2.61*	3.72*	4.90*	6.14*	7.42*	9.43*	11.17*	12.96*	20.56*	28.72*	
100	100	1.77	1.92	2.93*	4.22*	5.59*	7.03*	8.53*	10.87*	12.90*	14.99*	23.86*	33.42*	
	120	1.92	1.92	3.24*	4.69*	6.25*	7.88*	9.58*	12.24*	14.54*	16.91*	27.01*	37.89*	
	140	2.07	2.07	3.53*	5.15*	6.88*	8.69*	10.59*	13.55*	16.11*	18.76*	30.03*	42.17*	
	10	0.94	0.94	1.38*	1.80*	2.20*	2.60*	2.99*	3.58*	4.07*	4.56*	6.59*	8.71*	
	20	1.14	1.14	1.69*	2.23*	2.76*	3.30*	3.84*	4.66*	5.37*	6.09*	9.11*	12.33*	
	40	1.43	1.43	2.15*	2.89*	3.65*	4.43*	5.24*	6.50*	7.58*	8.70*	13.42*	18.48*	
	60	1.65	1.65	2.53*	3.46*	4.42*	5.44*	6.49*	8.13*	9.55*	11.02*	17.23*	23.90*	
150	80	1.84	1.84	2.87*	3.97*	5.14*	6.37*	7.64*	9.64*	11.37*	13.16*	20.74*	28.89*	
	100	2.02	2.02	3.19*	4.46*	5.82*	7.25*	8.74*	11.07*	13.09*	15.17*	24.03*	33.58*	
	120	2.18	2.18	3.49*	4.93*	6.47*	8.09*	9.78*	12.43*	14.72*	17.09*	27.17*	38.04*	
	140	2.33	2.33	3.77*	5.38*	7.09*	8.89*	10.78*	13.73*	16.29*	18.93*	30.18*	42.32*	
	10	1.03	1.03	1.50*	1.95*	2.38*	2.80*	3.21*	3.81*	4.32*	4.82*	6.86*	8.97*	
	20	1.26	1.26	1.85*	2.42*	2.97*	3.53*	4.08*	4.92*	5.63*	6.35*	9.36*	12.56*	
	40	1.57	1.57	2.34*	3.11*	3.89*	4.68*	5.49*	6.74*	7.82*	8.93*	13.63*	18.68*	
	60	1.82	1.82	2.74*	3.69*	4.66*	5.67*	6.72*	8.35*	9.77*	11.23*	17.42*	24.08*	
	80	2.02	2.02	3.09*	4.21*	5.37*	6.59*	7.86*	9.85*	11.57*	13.35*	20.91*	29.05*	
	100	2.21	2.21	3.41*	4.69*	6.04*	7.46*	8.94*	11.26*	13.28*	15.36*	24.20*	33.73*	
	120	2.38	2.38	3.71*	5.15*	6.68*	8.29*	9.98*	12.61*	14.90*	17.27*	27.33*	38.19*	
	140	2.54	2.54	4.00*	5.60*	7.30*	9.09*	10.97*	13.91*	16.47*	19.10*	30.33*	42.46*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.0 Ft (RADIUS = 1.4 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
200	°F												
	10	1.11	1.60*	2.07*	2.52*	2.96*	3.39*	4.01*	4.53*	5.05*	7.11*	9.23*	
	20	1.35	1.97*	2.57*	3.15*	3.72*	4.29*	5.15*	5.86*	6.59*	9.60*	12.78*	
	40	1.70	2.50*	3.30*	4.10*	4.90*	5.71*	6.97*	8.05*	9.15*	13.84*	18.87*	
	60	1.96	2.92*	3.89*	4.88*	5.90*	6.94*	8.57*	9.98*	11.43*	17.61*	24.25*	
	80	2.17	3.28*	4.42*	5.59*	6.81*	8.08*	10.06*	11.77*	13.54*	21.09*	29.22*	
	100	2.37	3.61*	4.90*	6.26*	7.67*	9.15*	11.46*	13.47*	15.54*	24.37*	33.89*	
	120	2.55	3.91*	5.36*	6.89*	8.50*	10.17*	12.80*	15.08*	17.44*	27.49*	38.34*	
	140	2.71	4.20*	5.81*	7.50*	9.29*	11.16*	14.09*	16.64*	19.27*	30.49*	42.60*	
	300	10	1.23	1.77*	2.28*	2.76*	3.23*	3.68*	4.35*	4.89*	5.43*	7.56*	9.71*
20		1.51	2.18*	2.83*	3.45*	4.06*	4.65*	5.54*	6.28*	7.02*	10.05*	13.23*	
40		1.89	2.76*	3.62*	4.45*	5.29*	6.12*	7.40*	8.48*	9.58*	14.25*	19.26*	
60		2.18	3.21*	4.24*	5.27*	6.30*	7.36*	8.99*	10.39*	11.84*	17.98*	24.61*	
80		2.42	3.60*	4.79*	5.99*	7.22*	8.49*	10.46*	12.17*	13.93*	21.44*	29.55*	
100		2.64	3.94*	5.28*	6.66*	8.08*	9.55*	11.85*	13.84*	15.90*	24.70*	34.20*	
120		2.83	4.26*	5.75*	7.29*	8.89*	10.56*	13.17*	15.44*	17.79*	27.81*	38.63*	
140		3.01	4.56*	6.20*	7.90*	9.68*	11.54*	14.45*	16.99*	19.61*	30.80*	42.89*	
400		10	1.32	1.90*	2.44*	2.96*	3.45*	3.93*	4.63*	5.19*	5.75*	7.95*	10.14*
		20	1.63	2.35*	3.04*	3.70*	4.33*	4.96*	5.88*	6.64*	7.40*	10.48*	13.66*
	40	2.05	2.98*	3.88*	4.75*	5.62*	6.48*	7.78*	8.88*	9.99*	14.65*	19.64*	
	60	2.37	3.46*	4.54*	5.60*	6.66*	7.74*	9.38*	10.79*	12.23*	18.35*	24.96*	
	80	2.63	3.86*	5.10*	6.34*	7.59*	8.87*	10.85*	12.55*	14.31*	21.79*	29.87*	
	100	2.86	4.23*	5.62*	7.02*	8.45*	9.93*	12.22*	14.21*	16.26*	25.03*	34.51*	
	120	3.06	4.56*	6.09*	7.66*	9.27*	10.93*	13.54*	15.80*	18.14*	28.12*	38.93*	
	140	3.25	4.87*	6.55*	8.27*	10.05*	11.90*	14.81*	17.33*	19.94*	31.10*	43.18*	
	600	10	1.48	2.11*	2.71*	3.27*	3.81*	4.33*	5.08*	5.69*	6.29*	8.61*	10.89*
		20	1.83	2.63*	3.38*	4.10*	4.79*	5.46*	6.44*	7.25*	8.05*	11.23*	14.47*
40		2.31	3.33*	4.31*	5.25*	6.18*	7.09*	8.44*	9.58*	10.72*	15.42*	20.39*	
60		2.66	3.86*	5.03*	6.16*	7.28*	8.40*	10.09*	11.52*	12.97*	19.08*	25.65*	
80		2.96	4.30*	5.63*	6.94*	8.24*	9.56*	11.56*	13.28*	15.03*	22.48*	30.52*	
100		3.21	4.70*	6.18*	7.65*	9.13*	10.63*	12.94*	14.93*	16.97*	25.69*	35.13*	
120		3.44	5.06*	6.68*	8.31*	9.95*	11.64*	14.24*	16.50*	18.82*	28.76*	39.52*	
140		3.65	5.39*	7.15*	8.93*	10.74*	12.60*	15.50*	18.01*	20.61*	31.71*	43.75*	
800		10	1.60	2.29*	2.93*	3.53*	4.10*	4.66*	5.45*	6.10*	6.73*	9.17*	11.53*
		20	2.00	2.85*	3.66*	4.43*	5.16*	5.87*	6.91*	7.75*	8.59*	11.89*	15.19*
	40	2.52	3.62*	4.67*	5.67*	6.64*	7.60*	9.01*	10.18*	11.36*	16.13*	21.12*	
	60	2.91	4.19*	5.43*	6.63*	7.80*	8.96*	10.71*	12.17*	13.65*	19.79*	26.33*	
	80	3.23	4.67*	6.08*	7.45*	8.80*	10.16*	12.21*	13.94*	15.71*	23.15*	31.17*	
	100	3.50	5.09*	6.65*	8.18*	9.71*	11.25*	13.59*	15.60*	17.65*	26.34*	35.74*	
	120	3.75	5.47*	7.18*	8.86*	10.56*	12.27*	14.90*	17.16*	19.49*	29.38*	40.11*	
	140	3.98	5.83*	7.67*	9.50*	11.36*	13.24*	16.16*	18.67*	21.26*	32.31*	44.31*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.0 Ft (RADIUS = 2.8 Ft)
 FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX		TEMPERATURE RISE		CEILING HEIGHT, Ft										
(Ft*s) ^{1/2}		°F		4	8	12	16	20	24	30	35	40	60	80
0	10	0	10	0.22	0.31	0.40*	0.49*	0.58*	0.67*	0.81*	0.92*	1.03*	1.47*	1.91*
	20		20	0.24	0.35	0.46*	0.57*	0.68*	0.79*	0.96*	1.10*	1.24*	1.81*	2.38*
	40		40	0.28	0.42	0.56*	0.70*	0.85*	0.99*	1.22*	1.40*	1.59*	2.38*	3.18*
	60		60	0.31	0.48	0.64*	0.82*	0.99*	1.17*	1.44*	1.67*	1.91*	2.87*	3.89*
	80		80	0.34	0.53	0.72*	0.92*	1.12*	1.33*	1.65*	1.92*	2.19*	3.33*	4.53*
	100		100	0.37	0.58	0.80*	1.02*	1.25*	1.48*	1.84*	2.15*	2.46*	3.76*	5.14*
25	120	0	120	0.40	0.63	0.87*	1.12*	1.37*	1.63*	2.03*	2.37*	2.72*	4.17*	5.71*
	140		140	0.43	0.68	0.94*	1.21*	1.48*	1.77*	2.20*	2.58*	2.96*	4.56*	6.26*
	10		10	0.31	0.41	0.51*	0.61*	0.71*	0.80*	0.94*	1.06*	1.17*	1.61*	2.04*
	20		20	0.35	0.47	0.58*	0.70*	0.81*	0.93*	1.09*	1.23*	1.37*	1.93*	2.50*
	40		40	0.41	0.54	0.69*	0.83*	0.97*	1.12*	1.34*	1.52*	1.71*	2.48*	3.28*
	60		60	0.45	0.61	0.77*	0.94*	1.11*	1.29*	1.55*	1.78*	2.01*	2.97*	3.97*
50	80	0	80	0.49	0.66	0.85*	1.04*	1.24*	1.44*	1.75*	2.02*	2.29*	3.42*	4.61*
	100		100	0.52	0.71	0.92*	1.13*	1.36*	1.59*	1.94*	2.24*	2.55*	3.85*	5.21*
	120		120	0.55	0.76	0.98*	1.22*	1.47*	1.73*	2.12*	2.46*	2.80*	4.25*	5.79*
	140		140	0.58	0.80	1.05*	1.31*	1.58*	1.86*	2.29*	2.67*	3.05*	4.64*	6.33*
	10		10	0.35	0.45	0.56*	0.67*	0.77*	0.88*	1.02*	1.14*	1.26*	1.71*	2.16*
	20		20	0.40	0.52	0.65*	0.77*	0.89*	1.01*	1.19*	1.33*	1.47*	2.04*	2.61*
100	40	0	40	0.47	0.61	0.76*	0.92*	1.07*	1.22*	1.44*	1.63*	1.82*	2.58*	3.38*
	60		60	0.52	0.68	0.86*	1.03*	1.21*	1.39*	1.66*	1.88*	2.11*	3.06*	4.06*
	80		80	0.56	0.75	0.94*	1.14*	1.34*	1.54*	1.85*	2.12*	2.38*	3.51*	4.69*
	100		100	0.60	0.80	1.01*	1.23*	1.46*	1.69*	2.04*	2.34*	2.64*	3.93*	5.29*
	120		120	0.64	0.85	1.08*	1.32*	1.57*	1.82*	2.21*	2.55*	2.89*	4.33*	5.86*
	140		140	0.67	0.90	1.15*	1.41*	1.68*	1.96*	2.38*	2.75*	3.13*	4.72*	6.41*
150	10	0	10	0.39	0.51	0.63*	0.75*	0.86*	0.97*	1.13*	1.26*	1.38*	1.87*	2.33*
	20		20	0.46	0.59	0.73*	0.87*	1.00*	1.13*	1.32*	1.48*	1.63*	2.22*	2.80*
	40		40	0.54	0.71	0.87*	1.04*	1.20*	1.36*	1.60*	1.80*	1.99*	2.77*	3.56*
	60		60	0.61	0.79	0.98*	1.17*	1.36*	1.55*	1.83*	2.06*	2.29*	3.24*	4.23*
	80		80	0.66	0.86	1.07*	1.28*	1.50*	1.71*	2.03*	2.29*	2.56*	3.68*	4.86*
	100		100	0.71	0.92	1.15*	1.39*	1.62*	1.86*	2.21*	2.51*	2.82*	4.09*	5.44*
	120	0	120	0.75	0.98	1.23*	1.48*	1.74*	1.99*	2.39*	2.72*	3.06*	4.49*	6.01*
	140		140	0.79	1.03	1.30*	1.57*	1.85*	2.13*	2.55*	2.92*	3.29*	4.87*	6.55*
	10		10	0.43	0.55	0.68*	0.80*	0.92*	1.04*	1.21*	1.34*	1.48*	1.98*	2.47*
	20		20	0.50	0.65	0.79*	0.94*	1.08*	1.22*	1.42*	1.58*	1.74*	2.36*	2.96*
	40		40	0.60	0.77	0.95*	1.13*	1.30*	1.47*	1.72*	1.93*	2.13*	2.93*	3.73*
	60		60	0.67	0.87	1.07*	1.27*	1.47*	1.67*	1.96*	2.20*	2.44*	3.41*	4.40*
	80	0	80	0.73	0.95	1.17*	1.40*	1.62*	1.84*	2.17*	2.44*	2.72*	3.84*	5.01*
	100		100	0.79	1.02	1.26*	1.51*	1.75*	2.00*	2.36*	2.67*	2.98*	4.25*	5.60*
	120		120	0.83	1.08	1.34*	1.61*	1.87*	2.14*	2.54*	2.88*	3.22*	4.64*	6.15*
	140		140	0.87	1.14	1.41*	1.70*	1.99*	2.27*	2.71*	3.08*	3.45*	5.02*	6.69*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.0 Ft (RADIUS = 2.8 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		°F	4	8	12	16	20	24	30	35	40	60	80
(Ft*s) ^{1/2} 200	10	0.45	0.58	0.72*	0.85*	0.98*	1.10*	1.27*	1.41*	1.55*	2.08*	2.58*	
	20	0.54	0.69	0.84*	1.00*	1.15*	1.29*	1.50*	1.67*	1.84*	2.48*	3.10*	
	40	0.65	0.83	1.01*	1.20*	1.39*	1.56*	1.82*	2.04*	2.25*	3.07*	3.89*	
	60	0.73	0.93	1.14*	1.36*	1.57*	1.77*	2.08*	2.32*	2.57*	3.56*	4.56*	
	80	0.79	1.02	1.25*	1.49*	1.72*	1.95*	2.29*	2.57*	2.86*	3.99*	5.17*	
	100	0.85	1.09	1.34*	1.61*	1.86*	2.11*	2.49*	2.80*	3.12*	4.40*	5.74*	
	120	0.90	1.16	1.43*	1.71*	1.99*	2.26*	2.67*	3.02*	3.36*	4.79*	6.30*	
300	140	0.95	1.22	1.51*	1.81*	2.11*	2.40*	2.84*	3.22*	3.60*	5.16*	6.83*	
	10	0.50	0.64	0.78*	0.92*	1.06*	1.19*	1.38*	1.53*	1.68*	2.24*	2.76*	
	20	0.59	0.76	0.92*	1.09*	1.25*	1.41*	1.64*	1.82*	1.99*	2.67*	3.32*	
	40	0.72	0.92	1.12*	1.32*	1.52*	1.71*	1.99*	2.22*	2.44*	3.31*	4.15*	
	60	0.81	1.03	1.26*	1.50*	1.72*	1.94*	2.27*	2.53*	2.79*	3.81*	4.84*	
	80	0.89	1.13	1.38*	1.64*	1.89*	2.14*	2.50*	2.80*	3.09*	4.26*	5.45*	
	100	0.95	1.21	1.49*	1.77*	2.04*	2.31*	2.71*	3.04*	3.36*	4.68*	6.03*	
400	120	1.01	1.29	1.58*	1.88*	2.18*	2.47*	2.90*	3.26*	3.62*	5.07*	6.57*	
	140	1.06	1.36	1.67*	1.99*	2.31*	2.62*	3.08*	3.47*	3.85*	5.44*	7.10*	
	10	0.53	0.68	0.83*	0.98*	1.12*	1.26*	1.46*	1.62*	1.78*	2.36*	2.92*	
	20	0.64	0.81	0.99*	1.17*	1.34*	1.50*	1.74*	1.93*	2.12*	2.84*	3.51*	
	40	0.78	0.99	1.20*	1.42*	1.63*	1.83*	2.13*	2.37*	2.60*	3.51*	4.38*	
	60	0.88	1.12	1.36*	1.61*	1.85*	2.08*	2.42*	2.70*	2.97*	4.04*	5.09*	
	80	0.96	1.22	1.49*	1.77*	2.03*	2.29*	2.67*	2.98*	3.29*	4.50*	5.71*	
600	100	1.03	1.31	1.60*	1.90*	2.19*	2.48*	2.89*	3.23*	3.57*	4.92*	6.29*	
	120	1.10	1.39	1.71*	2.03*	2.34*	2.64*	3.09*	3.47*	3.83*	5.32*	6.84*	
	140	1.15	1.47	1.80*	2.14*	2.47*	2.80*	3.28*	3.68*	4.08*	5.69*	7.36*	
	10	0.59	0.75	0.91*	1.08*	1.23*	1.38*	1.60*	1.77*	1.94*	2.57*	3.16*	
	20	0.71	0.90	1.10*	1.29*	1.48*	1.66*	1.92*	2.13*	2.33*	3.10*	3.83*	
	40	0.87	1.10	1.34*	1.58*	1.81*	2.03*	2.35*	2.61*	2.86*	3.84*	4.77*	
	60	0.99	1.25	1.52*	1.79*	2.06*	2.31*	2.68*	2.98*	3.27*	4.41*	5.51*	
800	80	1.08	1.37	1.67*	1.97*	2.26*	2.54*	2.95*	3.29*	3.62*	4.90*	6.16*	
	100	1.17	1.47	1.79*	2.12*	2.44*	2.75*	3.19*	3.56*	3.92*	5.34*	6.76*	
	120	1.24	1.57	1.91*	2.26*	2.60*	2.93*	3.41*	3.81*	4.20*	5.75*	7.31*	
	140	1.31	1.65	2.01*	2.39*	2.75*	3.10*	3.62*	4.04*	4.46*	6.14*	7.84*	
	10	0.63	0.80	0.98*	1.15*	1.32*	1.48*	1.71*	1.89*	2.07*	2.74*	3.36*	
	20	0.77	0.97	1.18*	1.39*	1.59*	1.78*	2.06*	2.28*	2.50*	3.31*	4.08*	
	40	0.95	1.20	1.45*	1.71*	1.95*	2.19*	2.53*	2.81*	3.08*	4.11*	5.09*	
	60	1.08	1.36	1.65*	1.94*	2.22*	2.49*	2.89*	3.21*	3.52*	4.72*	5.87*	
	80	1.18	1.49	1.81*	2.13*	2.44*	2.75*	3.18*	3.54*	3.89*	5.23*	6.55*	
	100	1.27	1.60	1.95*	2.30*	2.64*	2.97*	3.44*	3.83*	4.21*	5.70*	7.16*	
	120	1.35	1.70	2.07*	2.45*	2.81*	3.16*	3.68*	4.10*	4.51*	6.13*	7.73*	
	140	1.43	1.80	2.19*	2.59*	2.97*	3.35*	3.89*	4.34*	4.78*	6.53*	8.27*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.0 Ft (RADIUS = 2.8 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
0 												

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.0 Ft (RADIUS = 2.8 Ft)
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
200 (Ft*s) ^{1/2}	°F											
	10	0.66	0.85	1.04*	1.24*	1.42*	1.60*	1.86*	2.07*	2.28*	3.07*	3.84*
	20	0.79	1.02	1.25*	1.48*	1.71*	1.93*	2.25*	2.51*	2.77*	3.78*	4.78*
	40	0.97	1.24	1.53*	1.82*	2.11*	2.39*	2.80*	3.15*	3.49*	4.88*	6.30*
	60	1.09	1.41	1.74*	2.08*	2.42*	2.75*	3.25*	3.67*	4.09*	5.82*	7.65*
	80	1.20	1.55	1.92*	2.31*	2.69*	3.08*	3.65*	4.14*	4.64*	6.70*	8.89*
	100	1.29	1.68	2.09*	2.52*	2.94*	3.37*	4.03*	4.58*	5.15*	7.52*	10.07*
300	120	1.37	1.79	2.24*	2.70*	3.17*	3.65*	4.38*	5.00*	5.63*	8.31*	11.19*
	140	1.45	1.90	2.38*	2.88*	3.39*	3.91*	4.71*	5.40*	6.10*	9.08*	12.27*
	10	0.73	0.93	1.14*	1.35*	1.55*	1.74*	2.02*	2.25*	2.47*	3.31*	4.11*
	20	0.88	1.12	1.37*	1.62*	1.87*	2.10*	2.45*	2.72*	3.00*	4.06*	5.10*
	40	1.08	1.38	1.69*	2.00*	2.31*	2.61*	3.05*	3.41*	3.77*	5.20*	6.64*
	60	1.22	1.56	1.92*	2.29*	2.65*	3.00*	3.53*	3.96*	4.39*	6.15*	7.98*
	80	1.34	1.72	2.12*	2.54*	2.94*	3.34*	3.94*	4.44*	4.95*	7.02*	9.21*
400	100	1.45	1.86	2.30*	2.75*	3.20*	3.65*	4.32*	4.89*	5.46*	7.84*	10.37*
	120	1.54	1.99	2.46*	2.95*	3.45*	3.94*	4.68*	5.31*	5.95*	8.62*	11.48*
	140	1.63	2.10	2.61*	3.14*	3.67*	4.21*	5.02*	5.71*	6.41*	9.38*	12.55*
	10	0.78	1.00	1.22*	1.44*	1.65*	1.85*	2.15*	2.39*	2.62*	3.50*	4.34*
	20	0.95	1.21	1.47*	1.74*	2.00*	2.25*	2.61*	2.90*	3.19*	4.30*	5.37*
	40	1.17	1.48	1.81*	2.15*	2.47*	2.79*	3.25*	3.63*	4.00*	5.48*	6.95*
	60	1.33	1.69	2.07*	2.46*	2.84*	3.21*	3.76*	4.21*	4.65*	6.45*	8.29*
600	80	1.46	1.86	2.29*	2.72*	3.15*	3.57*	4.19*	4.71*	5.22*	7.33*	9.51*
	100	1.57	2.01	2.47*	2.95*	3.42*	3.89*	4.58*	5.16*	5.75*	8.14*	10.67*
	120	1.68	2.15	2.65*	3.16*	3.68*	4.18*	4.95*	5.59*	6.24*	8.92*	11.77*
	140	1.77	2.27	2.80*	3.36*	3.91*	4.46*	5.29*	5.99*	6.70*	9.67*	12.83*
	10	0.87	1.10	1.34*	1.59*	1.82*	2.04*	2.36*	2.61*	2.86*	3.81*	4.71*
	20	1.06	1.34	1.63*	1.93*	2.21*	2.48*	2.87*	3.19*	3.50*	4.69*	5.83*
	40	1.31	1.66	2.02*	2.39*	2.74*	3.09*	3.59*	3.99*	4.39*	5.95*	7.49*
800	60	1.50	1.89	2.31*	2.74*	3.15*	3.55*	4.14*	4.62*	5.09*	6.97*	8.85*
	80	1.65	2.09	2.55*	3.03*	3.49*	3.94*	4.60*	5.15*	5.69*	7.87*	10.08*
	100	1.78	2.26	2.76*	3.28*	3.79*	4.28*	5.02*	5.63*	6.24*	8.69*	11.23*
	120	1.89	2.41	2.95*	3.51*	4.06*	4.60*	5.41*	6.07*	6.74*	9.47*	12.33*
	140	2.00	2.54	3.12*	3.72*	4.31*	4.90*	5.77*	6.49*	7.22*	10.22*	13.38*
	10	0.94	1.19	1.45*	1.70*	1.95*	2.18*	2.52*	2.80*	3.06*	4.07*	5.01*
	20	1.15	1.45	1.76*	2.08*	2.38*	2.67*	3.09*	3.43*	3.75*	5.01*	6.21*
	40	1.43	1.80	2.19*	2.59*	2.96*	3.33*	3.86*	4.29*	4.72*	6.35*	7.94*
	60	1.63	2.06	2.51*	2.96*	3.40*	3.83*	4.45*	4.96*	5.46*	7.41*	9.35*
	80	1.80	2.27	2.77*	3.27*	3.77*	4.24*	4.95*	5.52*	6.09*	8.34*	10.60*
	100	1.94	2.45	2.99*	3.55*	4.09*	4.61*	5.39*	6.02*	6.66*	9.18*	11.76*
	120	2.07	2.62	3.20*	3.80*	4.38*	4.95*	5.79*	6.49*	7.18*	9.97*	12.85*
	140	2.19	2.77	3.38*	4.02*	4.65*	5.26*	6.17*	6.92*	7.67*	10.72*	13.90*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.0 Ft (RADIUS 2.8 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX		TEMPERATURE RISE		CEILING HEIGHT, Ft										
(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60	80		
0	10	0.45	0.67	0.89*	1.12*	1.34*	1.57*	1.91*	2.20*	2.49*	3.68*	4.90*		
	20	0.54	0.83	1.13*	1.43*	1.73*	2.05*	2.52*	2.93*	3.34*	5.03*	6.80*		
	40	0.70	1.10	1.52*	1.95*	2.39*	2.85*	3.55*	4.15*	4.76*	7.31*	10.00*		
	60	0.84	1.34	1.87*	2.41*	2.97*	3.55*	4.45*	5.22*	6.00*	9.30*	12.81*		
	80	0.96	1.56	2.18*	2.83*	3.51*	4.20*	5.27*	6.20*	7.15*	11.13*	15.39*		
	100	1.08	1.76	2.48*	3.23*	4.00*	4.81*	6.05*	7.12*	8.22*	12.85*	17.81*		
	120	1.19	1.96	2.76*	3.60*	4.48*	5.38*	6.79*	8.00*	9.24*	14.49*	20.11*		
	140	1.30	2.14	3.03*	3.96*	4.93*	5.94*	7.50*	8.84*	10.22*	16.06*	22.32*		
	25	10	0.64	0.85	1.07*	1.30*	1.52*	1.75*	2.08*	2.37*	2.65*	3.82*	5.04*	
		20	0.75	1.02	1.30*	1.60*	1.90*	2.20*	2.67*	3.07*	3.47*	5.16*	6.92*	
40		0.92	1.28	1.67*	2.10*	2.53*	2.98*	3.67*	4.27*	4.87*	7.41*	10.10*		
60		1.05	1.50	2.01*	2.54*	3.10*	3.67*	4.56*	5.32*	6.11*	9.40*	12.90*		
80		1.17	1.71	2.31*	2.95*	3.62*	4.31*	5.38*	6.30*	7.24*	11.22*	15.47*		
100		1.28	1.91	2.60*	3.34*	4.11*	4.91*	6.15*	7.22*	8.31*	12.94*	17.89*		
120		1.39	2.09	2.88*	3.72*	4.58*	5.48*	6.88*	8.09*	9.33*	14.57*	20.18*		
140		1.49	2.28	3.15*	4.07*	5.04*	6.03*	7.59*	8.93*	10.31*	16.14*	22.39*		
50		10	0.72	0.95	1.18*	1.42*	1.65*	1.88*	2.23*	2.51*	2.80*	3.97*	5.17*	
		20	0.86	1.14	1.43*	1.73*	2.04*	2.34*	2.81*	3.21*	3.61*	5.28*	7.03*	
	40	1.05	1.41	1.81*	2.23*	2.67*	3.11*	3.80*	4.38*	4.99*	7.52*	10.20*		
	60	1.20	1.64	2.14*	2.67*	3.22*	3.79*	4.67*	5.43*	6.21*	9.49*	12.99*		
	80	1.32	1.85	2.44*	3.08*	3.74*	4.42*	5.48*	6.40*	7.34*	11.31*	15.55*		
	100	1.44	2.04	2.73*	3.46*	4.22*	5.02*	6.25*	7.31*	8.41*	13.02*	17.97*		
	120	1.55	2.23	3.00*	3.83*	4.69*	5.58*	6.98*	8.18*	9.42*	14.65*	20.26*		
	140	1.66	2.41	3.26*	4.18*	5.14*	6.13*	7.68*	9.02*	10.39*	16.21*	22.46*		
	100	10	0.83	1.08	1.34*	1.59*	1.85*	2.09*	2.45*	2.75*	3.05*	4.23*	5.43*	
		20	0.99	1.30	1.62*	1.94*	2.26*	2.58*	3.06*	3.46*	3.86*	5.52*	7.26*	
40		1.22	1.61	2.03*	2.46*	2.90*	3.35*	4.03*	4.62*	5.21*	7.73*	10.39*		
60		1.40	1.86	2.37*	2.90*	3.45*	4.02*	4.89*	5.65*	6.42*	9.68*	13.17*		
80		1.54	2.08	2.67*	3.30*	3.96*	4.64*	5.69*	6.60*	7.54*	11.49*	15.72*		
100		1.67	2.28	2.95*	3.68*	4.44*	5.22*	6.45*	7.50*	8.59*	13.19*	18.12*		
120		1.79	2.47	3.22*	4.04*	4.90*	5.78*	7.17*	8.36*	9.59*	14.81*	20.41*		
140		1.91	2.64	3.48*	4.39*	5.34*	6.32*	7.86*	9.19*	10.56*	16.37*	22.60*		
150		10	0.91	1.18	1.45*	1.72*	1.99*	2.25*	2.63*	2.94*	3.25*	4.46*	5.67*	
		20	1.10	1.42	1.76*	2.10*	2.44*	2.77*	3.26*	3.67*	4.08*	5.75*	7.49*	
	40	1.35	1.76	2.20*	2.65*	3.11*	3.56*	4.25*	4.84*	5.43*	7.93*	10.59*		
	60	1.54	2.03	2.55*	3.11*	3.66*	4.23*	5.10*	5.85*	6.62*	9.87*	13.34*		
	80	1.71	2.26	2.87*	3.51*	4.17*	4.85*	5.89*	6.80*	7.73*	11.66*	15.88*		
	100	1.85	2.47	3.15*	3.89*	4.64*	5.42*	6.64*	7.69*	8.77*	13.36*	18.28*		
	120	1.98	2.66	3.42*	4.24*	5.10*	5.98*	7.35*	8.54*	9.77*	14.97*	20.56*		
	140	2.10	2.85	3.68*	4.59*	5.53*	6.51*	8.04*	9.37*	10.73*	16.52*	22.75*		

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.0 Ft (RADIUS = 2.8 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE
TIME INDEX

TEMPERATURE
RISE

(Ft*s)^{1/2}

°F

		4	8	12	16	20	24	30	35	40	60	80
200	10	0.97	1.25	1.54*	1.83*	2.11*	2.38*	2.77*	3.09*	3.41*	4.66*	5.89*
	20	1.18	1.52	1.87*	2.23*	2.58*	2.93*	3.43*	3.85*	4.27*	5.96*	7.70*
	40	1.46	1.89	2.34*	2.81*	3.28*	3.74*	4.45*	5.04*	5.64*	8.13*	10.78*
	60	1.67	2.17	2.71*	3.28*	3.85*	4.43*	5.30*	6.05*	6.82*	10.06*	13.52*
	80	1.84	2.42	3.04*	3.69*	4.36*	5.04*	6.09*	6.99*	7.92*	11.84*	16.05*
	100	1.99	2.63	3.33*	4.08*	4.84*	5.62*	6.83*	7.88*	8.95*	13.52*	18.43*
300	120	2.13	2.83	3.61*	4.43*	5.29*	6.17*	7.54*	8.72*	9.94*	15.13*	20.71*
	140	2.26	3.02	3.87*	4.78*	5.72*	6.70*	8.22*	9.54*	10.90*	16.67*	22.89*
	10	1.08	1.38	1.69*	2.00*	2.30*	2.59*	3.01*	3.35*	3.69*	4.99*	6.27*
	20	1.31	1.68	2.06*	2.45*	2.82*	3.19*	3.73*	4.17*	4.61*	6.35*	8.11*
	40	1.63	2.09	2.58*	3.08*	3.57*	4.06*	4.79*	5.40*	6.01*	8.52*	11.16*
	60	1.86	2.40	2.98*	3.58*	4.17*	4.77*	5.67*	6.42*	7.20*	10.42*	13.86*
400	80	2.06	2.67	3.32*	4.01*	4.70*	5.39*	6.45*	7.36*	8.28*	12.18*	16.37*
	100	2.23	2.90	3.63*	4.41*	5.18*	5.98*	7.19*	8.24*	9.31*	13.85*	18.74*
	120	2.38	3.12	3.92*	4.77*	5.64*	6.52*	7.89*	9.07*	10.29*	15.44*	21.00*
	140	2.52	3.32	4.19*	5.12*	6.07*	7.05*	8.57*	9.88*	11.23*	16.98*	23.17*
	10	1.16	1.48	1.80*	2.13*	2.45*	2.76*	3.20*	3.56*	3.91*	5.28*	6.59*
	20	1.42	1.81	2.21*	2.62*	3.02*	3.40*	3.97*	4.43*	4.89*	6.68*	8.47*
600	40	1.77	2.26	2.77*	3.30*	3.82*	4.33*	5.08*	5.71*	6.34*	8.88*	11.52*
	60	2.02	2.60	3.20*	3.83*	4.45*	5.06*	5.98*	6.76*	7.54*	10.77*	14.20*
	80	2.24	2.88	3.56*	4.28*	4.99*	5.71*	6.79*	7.70*	8.63*	12.52*	16.69*
	100	2.42	3.13	3.89*	4.69*	5.49*	6.30*	7.53*	8.58*	9.65*	14.18*	19.05*
	120	2.59	3.36	4.19*	5.07*	5.95*	6.85*	8.23*	9.41*	10.62*	15.76*	21.29*
	140	2.74	3.57	4.47*	5.42*	6.39*	7.38*	8.90*	10.21*	11.56*	17.28*	23.46*
800	10	1.29	1.64	2.00*	2.36*	2.70*	3.04*	3.52*	3.91*	4.29*	5.74*	7.14*
	20	1.59	2.02	2.46*	2.91*	3.34*	3.76*	4.37*	4.86*	5.35*	7.25*	9.11*
	40	1.99	2.53	3.09*	3.66*	4.22*	4.77*	5.57*	6.24*	6.89*	9.52*	12.20*
	60	2.28	2.90	3.56*	4.24*	4.90*	5.56*	6.53*	7.33*	8.14*	11.43*	14.87*
	80	2.52	3.22	3.96*	4.73*	5.49*	6.24*	7.36*	8.30*	9.25*	13.17*	17.33*
	100	2.73	3.50	4.31*	5.17*	6.01*	6.85*	8.12*	9.19*	10.28*	14.81*	19.65*
	120	2.92	3.75	4.64*	5.57*	6.50*	7.43*	8.84*	10.03*	11.25*	16.37*	21.88*
	140	3.09	3.98	4.93*	5.94*	6.95*	7.97*	9.51*	10.83*	12.18*	17.88*	24.02*
	10	1.40	1.77	2.15*	2.54*	2.91*	3.26*	3.77*	4.19*	4.59*	6.13*	7.59*
	20	1.73	2.19	2.66*	3.14*	3.60*	4.05*	4.69*	5.22*	5.73*	7.72*	9.66*
	40	2.17	2.74	3.34*	3.96*	4.55*	5.13*	5.98*	6.68*	7.36*	10.08*	12.81*
	60	2.49	3.16	3.86*	4.58*	5.28*	5.97*	6.99*	7.83*	8.66*	12.03*	15.49*
	80	2.76	3.50	4.29*	5.10*	5.90*	6.69*	7.86*	8.83*	9.80*	13.78*	17.94*
	100	2.98	3.80	4.66*	5.57*	6.45*	7.33*	8.64*	9.74*	10.85*	15.41*	20.25*
	120	3.19	4.07	5.01*	5.99*	6.96*	7.92*	9.37*	10.59*	11.83*	16.97*	22.45*
	140	3.37	4.31	5.32*	6.38*	7.43*	8.48*	10.06*	11.40*	12.76*	18.46*	24.58*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.0 Ft (RADIUS = 2.8 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
0 <													

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.0 Ft (RADIUS = 2.8 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, Ft

(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60	80
200	10	1.44	1.86	2.30*	2.74*	3.17*	3.59*	4.22*	4.73*	5.25*	7.31*	9.44*
	20	1.77	2.30	2.86*	3.43*	4.00*	4.57*	5.42*	6.14*	6.87*	9.89*	13.09*
	40	2.23	2.93	3.68*	4.48*	5.29*	6.11*	7.37*	8.46*	9.58*	14.30*	19.30*
	60	2.58	3.43	4.36*	5.36*	6.39*	7.45*	9.10*	10.52*	11.99*	18.21*	24.90*
	80	2.87	3.86	4.97*	6.16*	7.40*	8.68*	10.69*	12.43*	14.22*	21.83*	30.00*
	100	3.13	4.26	5.53*	6.91*	8.35*	9.85*	12.20*	14.23*	16.33*	25.23*	34.81*
	120	3.37	4.63	6.07*	7.63*	9.27*	10.97*	13.64*	15.96*	18.34*	28.47*	39.38*
300	140	3.60	4.99	6.58*	8.32*	10.15*	12.05*	15.03*	17.61*	20.27*	31.58*	43.77*
	10	1.60	2.05	2.52*	2.99*	3.45*	3.90*	4.56*	5.10*	5.64*	7.77*	9.92*
	20	1.98	2.54	3.14*	3.75*	4.35*	4.94*	5.83*	6.57*	7.31*	10.35*	13.54*
	40	2.49	3.23	4.03*	4.86*	5.69*	6.53*	7.81*	8.90*	10.01*	14.71*	19.74*
	60	2.87	3.77	4.73*	5.76*	6.81*	7.87*	9.52*	10.94*	12.40*	18.59*	25.25*
	80	3.20	4.23	5.36*	6.57*	7.82*	9.10*	11.10*	12.82*	14.60*	22.18*	30.33*
	100	3.48	4.64	5.93*	7.32*	8.77*	10.26*	12.59*	14.61*	16.69*	25.56*	35.12*
400	120	3.74	5.03	6.47*	8.04*	9.67*	11.36*	14.02*	16.32*	18.69*	28.79*	39.68*
	140	3.98	5.39	6.99*	8.72*	10.54*	12.43*	15.39*	17.96*	20.61*	31.89*	44.06*
	10	1.73	2.21	2.70*	3.20*	3.69*	4.16*	4.85*	5.42*	5.97*	8.17*	10.35*
	20	2.14	2.74	3.37*	4.01*	4.64*	5.26*	6.18*	6.94*	7.70*	10.78*	13.97*
	40	2.70	3.48	4.31*	5.18*	6.04*	6.90*	8.20*	9.30*	10.42*	15.11*	20.13*
	60	3.12	4.05	5.05*	6.11*	7.18*	8.26*	9.92*	11.34*	12.79*	18.96*	25.60*
	80	3.47	4.53	5.70*	6.94*	8.20*	9.49*	11.49*	13.21*	14.98*	22.53*	30.66*
600	100	3.77	4.97	6.29*	7.70*	9.15*	10.64*	12.97*	14.98*	17.05*	25.89*	35.43*
	120	4.05	5.37	6.84*	8.42*	10.05*	11.74*	14.38*	16.67*	19.04*	29.11*	39.98*
	140	4.31	5.75	7.36*	9.10*	10.92*	12.80*	15.75*	18.30*	20.94*	32.20*	44.35*
	10	1.94	2.46	3.00*	3.54*	4.07*	4.58*	5.32*	5.93*	6.52*	8.84*	11.11*
	20	2.41	3.06	3.74*	4.44*	5.12*	5.78*	6.76*	7.56*	8.36*	11.54*	14.78*
	40	3.04	3.89	4.78*	5.71*	6.63*	7.53*	8.89*	10.02*	11.17*	15.89*	20.88*
	60	3.51	4.51	5.58*	6.71*	7.83*	8.94*	10.64*	12.08*	13.54*	19.69*	26.29*
800	80	3.90	5.04	6.27*	7.57*	8.88*	10.20*	12.22*	13.95*	15.72*	23.22*	31.31*
	100	4.24	5.51	6.89*	8.36*	9.85*	11.36*	13.69*	15.70*	17.76*	26.55*	36.05*
	120	4.55	5.94	7.47*	9.10*	10.76*	12.46*	15.09*	17.37*	19.72*	29.74*	40.57*
	140	4.83	6.34	8.00*	9.79*	11.62*	13.51*	16.44*	18.98*	21.61*	32.81*	44.92*
	10	2.10	2.66	3.23*	3.82*	4.38*	4.92*	5.71*	6.35*	6.98*	9.40*	11.76*
	20	2.62	3.32	4.05*	4.79*	5.52*	6.22*	7.25*	8.09*	8.92*	12.21*	15.51*
	40	3.32	4.22	5.17*	6.15*	7.12*	8.06*	9.47*	10.65*	11.82*	16.61*	21.61*
	60	3.83	4.89	6.03*	7.21*	8.37*	9.53*	11.28*	12.74*	14.23*	20.40*	26.98*
	80	4.26	5.46	6.75*	8.11*	9.47*	10.82*	12.88*	14.63*	16.40*	23.89*	31.95*
	100	4.63	5.96	7.41*	8.93*	10.46*	12.00*	14.36*	16.38*	18.44*	27.20*	36.66*
	120	4.96	6.42	8.00*	9.69*	11.39*	13.11*	15.77*	18.05*	20.39*	30.36*	41.16*
	140	5.26	6.84	8.56*	10.40*	12.26*	14.17*	17.11*	19.65*	22.26*	33.41*	45.48*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.0 Ft (RADIUS = 4.2 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
0	10	0.26	0.35	0.44	0.53*	0.62*	0.71*	0.85*	0.96*	1.07*	1.51*	1.95*	
	20	0.29	0.40	0.51	0.62*	0.73*	0.84*	1.01*	1.15*	1.29*	1.86*	2.44*	
	40	0.34	0.48	0.62	0.77*	0.91*	1.06*	1.28*	1.47*	1.66*	2.45*	3.26*	
	60	0.38	0.55	0.72	0.90*	1.07*	1.25*	1.52*	1.76*	1.99*	2.97*	3.98*	
	80	0.42	0.62	0.81	1.01*	1.22*	1.43*	1.75*	2.02*	2.29*	3.44*	4.64*	
	100	0.46	0.68	0.90	1.12*	1.35*	1.59*	1.95*	2.26*	2.58*	3.89*	5.26*	
	120	0.50	0.73	0.98	1.23*	1.48*	1.75*	2.15*	2.49*	2.84*	4.31*	5.86*	
	140	0.53	0.79	1.05	1.33*	1.61*	1.90*	2.34*	2.72*	3.10*	4.72*	6.42*	
	25	10	0.38	0.47	0.57	0.66*	0.75*	0.85*	0.99*	1.10*	1.21*	1.65*	2.08*
		20	0.43	0.54	0.64	0.75*	0.87*	0.98*	1.15*	1.28*	1.42*	1.98*	2.55*
40		0.50	0.63	0.76	0.90*	1.04*	1.19*	1.41*	1.59*	1.78*	2.55*	3.36*	
60		0.55	0.70	0.86	1.02*	1.19*	1.37*	1.64*	1.86*	2.10*	3.06*	4.07*	
80		0.60	0.77	0.94	1.13*	1.33*	1.54*	1.85*	2.12*	2.39*	3.53*	4.73*	
100		0.64	0.82	1.02	1.24*	1.46*	1.69*	2.05*	2.36*	2.67*	3.97*	5.34*	
120		0.67	0.88	1.10	1.34*	1.59*	1.85*	2.24*	2.59*	2.93*	4.39*	5.93*	
140		0.71	0.93	1.17	1.43*	1.71*	1.99*	2.43*	2.80*	3.19*	4.79*	6.49*	
50		10	0.42	0.52	0.62	0.72*	0.82*	0.92*	1.07*	1.19*	1.30*	1.76*	2.20*
		20	0.48	0.60	0.71	0.83*	0.95*	1.07*	1.24*	1.39*	1.53*	2.09*	2.66*
	40	0.57	0.71	0.85	0.99*	1.14*	1.29*	1.51*	1.70*	1.89*	2.65*	3.45*	
	60	0.63	0.79	0.95	1.12*	1.29*	1.47*	1.74*	1.97*	2.20*	3.15*	4.16*	
	80	0.69	0.86	1.04	1.23*	1.43*	1.64*	1.95*	2.22*	2.49*	3.62*	4.81*	
	100	0.73	0.93	1.13	1.34*	1.56*	1.79*	2.15*	2.45*	2.76*	4.05*	5.42*	
	120	0.78	0.99	1.20	1.44*	1.69*	1.94*	2.34*	2.67*	3.02*	4.47*	6.01*	
	140	0.82	1.04	1.28	1.53*	1.81*	2.09*	2.52*	2.89*	3.27*	4.87*	6.57*	
	100	10	0.48	0.59	0.70	0.80*	0.91*	1.02*	1.18*	1.31*	1.43*	1.91*	2.38*
		20	0.56	0.68	0.81	0.93*	1.07*	1.19*	1.38*	1.53*	1.68*	2.27*	2.86*
40		0.66	0.82	0.97	1.12*	1.28*	1.44*	1.68*	1.87*	2.06*	2.84*	3.64*	
60		0.74	0.91	1.09	1.26*	1.45*	1.64*	1.91*	2.15*	2.38*	3.33*	4.33*	
80		0.81	1.00	1.19	1.39*	1.60*	1.81*	2.13*	2.39*	2.67*	3.79*	4.97*	
100		0.86	1.07	1.28	1.50*	1.73*	1.97*	2.32*	2.63*	2.93*	4.22*	5.57*	
120		0.91	1.14	1.36	1.60*	1.86*	2.12*	2.51*	2.85*	3.19*	4.63*	6.15*	
140		0.96	1.20	1.44	1.70*	1.98*	2.26*	2.69*	3.06*	3.44*	5.02*	6.71*	
150		10	0.52	0.63	0.75	0.86*	0.98*	1.10*	1.26*	1.40*	1.53*	2.03*	2.51*
		20	0.61	0.75	0.88	1.01*	1.15*	1.29*	1.48*	1.65*	1.80*	2.42*	3.02*
	40	0.73	0.89	1.05	1.22*	1.39*	1.56*	1.80*	2.01*	2.21*	3.01*	3.81*	
	60	0.82	1.00	1.19	1.37*	1.57*	1.77*	2.05*	2.29*	2.53*	3.50*	4.50*	
	80	0.89	1.10	1.30	1.51*	1.73*	1.95*	2.28*	2.55*	2.82*	3.95*	5.13*	
	100	0.96	1.18	1.40	1.62*	1.87*	2.11*	2.48*	2.78*	3.09*	4.38*	5.73*	
	120	1.01	1.25	1.49	1.73*	2.00*	2.27*	2.67*	3.01*	3.35*	4.78*	6.30*	
	140	1.07	1.32	1.57	1.84*	2.12*	2.41*	2.85*	3.22*	3.59*	5.17*	6.85*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.0 Ft (RADIUS = 4.2 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, Ft

(Ft*s)^{1/2}

°F

4

8

12

16

20

24

30

35

40

60

80

200

10

20

40

60

80

100

120

140

0.55

0.65

0.79

0.88

0.96

1.03

1.10

1.15

0.79

0.93

1.12

1.27

1.39

1.49

1.59

1.68

0.91*

1.07*

1.29*

1.46*

1.60*

1.73*

1.85*

1.95*

1.04*

1.22*

1.47*

1.67*

1.84*

1.98*

2.12*

2.25*

1.15*

1.36*

1.65*

1.87*

2.06*

2.24*

2.61*

2.80*

2.99*

1.33*

1.57*

1.91*

2.17*

2.40*

2.61*

2.80*

2.99*

1.33*

1.57*

1.91*

2.17*

2.40*

2.61*

2.80*

2.99*

1.33*

1.57*

1.91*

2.17*

2.40*

2.61*

2.80*

2.99*

1.33*

1.57*

1.91*

2.17*

2.40*

2.61*

2.80*

2.99*

1.33*

1.57*

1.91*

2.17*

2.40*

2.61*

2.80*

2.99*

1.33*

1.57*

1.91*

2.17*

2.40*

2.61*

2.80*

2.99*

1.33*

1.57*

1.91*

2.17*

2.40*

2.61*

2.80*

2.99*

1.33*

1.57*

1.91*

2.17*

2.40*

2.61*

2.80*

2.99*

1.33*

1.57*

1.91*

2.17*

2.40*

2.61*

2.80*

2.99*

1.33*

1.57*

1.91*

2.17*

2.40*

2.61*

2.80*

2.99*

1.33*

1.57*

1.91*

2.17*

2.40*

2.61*

2.80*

2.99*

1.33*

1.57*

1.91*

2.17*

2.40*

2.61*

2.80*

2.99*

1.33*

1.57*

1.91*

2.17*

2.40*

2.61*

2.80*

2.99*

1.33*

1.57*

1.91*

2.17*

2.40*

2.61*

2.80*

2.99*

1.33*

1.57*

1.91*

2.17*

2.40*

2.61*

2.80*

2.99*

1.33*

1.57*

1.91*

2.17*

2.40*

2.61*

2.80*

2.99*

1.33*

1.57*

1.91*

2.17*

2.40*

2.61*

2.80*

2.99*

1.33*

1.57*

1.91*

2.17*

2.40*

2.61*

2.80*

2.99*

1.33*

1.57*

1.91*

2.17*

2.40*

2.61*

2.80*

2.99*

1.33*

1.57*

1.91*

2.17*

2.40*

2.61*

2.80*

2.99*

1.33*

1.57*

1.91*

2.17*

2.40*

2.61*

2.80*

2.99*

1.33*

1.57*

1.91*

2.17*

2.40*

2.61*

2.80*

2.99*

1.33*

1.57*

1.91*

2.17*

2.40*

2.61*

2.80*

2.99*

1.33*

1.57*

1.91*

2.17*

2.40*

2.61*

2.80*

2.99*

1.33*

1.57*

1.91*

2.17*

2.40*

2.61*

2.80*

2.99*

1.33*

1.57*

1.91*

2.17*

2.40*

2.61*

2.80*

2.99*

1.33*

1.57*

1.91*

2.17*

2.40*

2.61*

2.80*

2.99*

1.33*

1.57*

1.91*

2.17*

2.40*

2.61*

2.80*

2.99*

1.33*

1.57*

1.91*

2.17*

2.40*

2.61*

2.80*

2.99*

1.33*

1.57*

1.91*

2.17*

2.40*

2.61*

2.80*

2.99*

1.33*

1.57*

1.91*

2.17*

2.40*

2.61*

2.80*

2.99*

1.33*

1.57*

1.91*

2.17*

2.40*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.0 Ft (RADIUS = 4.2 Ft)
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TEMPERATURE
 TIME INDEX RISE

CEILING HEIGHT, Ft

(Ft*s)^{1/2}

°F

4

8

12

16

20

24

30

35

40

60

80

0

10

20

40

60

80

100

120

140

0.65

0.79

0.93

1.07

1.28

1.46

1.63

1.84

2.08

2.34

2.63

2.94

3.26

3.59

3.92

4.25

4.58

4.91

5.24

5.57

5.90

6.23

6.56

6.89

7.22

7.55

7.88

8.21

8.54

25

10

20

40

60

80

100

120

140

0.81

0.95

1.09

1.23

1.44

1.61

1.79

1.98

2.21

2.49

2.75

3.01

3.27

3.53

3.79

4.05

4.31

4.57

4.83

5.09

5.35

5.61

5.87

6.13

6.39

6.65

6.91

7.17

7.43

50

10

20

40

60

80

100

120

140

0.90

1.04

1.19

1.34

1.56

1.74

1.91

2.11

2.34

2.57

2.80

3.03

3.26

3.49

3.72

3.95

4.18

4.41

4.64

4.87

5.10

5.33

5.56

5.79

6.02

6.25

6.48

6.71

6.94

100

10

20

40

60

80

100

120

140

1.01

1.17

1.33

1.49

1.72

1.91

2.10

2.31

2.55

2.78

3.01

3.24

3.47

3.70

3.93

4.16

4.39

4.62

4.85

5.08

5.31

5.54

5.77

6.00

6.23

6.46

6.69

6.92

7.15

150

10

20

40

60

80

100

120

140

1.09

1.26

1.43

1.60

1.84

2.04

2.24

2.47

2.72

2.95

3.18

3.41

3.64

3.87

4.10

4.33

4.56

4.79

5.02

5.25

5.48

5.71

5.94

6.17

6.40

6.63

6.86

7.09

7.32

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.0 Ft (RADIUS = 4.2 Ft)
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		°F	4	8	12	16	20	24	30	35	40	60
200 (Ft*s) ^{1/2}	10	0.80	0.98	1.15	1.33*	1.51*	1.69*	1.95*	2.15*	2.36*	3.15*	3.91*
	20	0.96	1.18	1.38	1.59*	1.81*	2.03*	2.35*	2.61*	2.86*	3.87*	4.88*
	40	1.18	1.44	1.70	1.96*	2.24*	2.52*	2.94*	3.28*	3.62*	5.01*	6.44*
	60	1.33	1.64	1.94	2.25*	2.58*	2.92*	3.41*	3.83*	4.25*	5.99*	7.82*
	80	1.46	1.80	2.14	2.50*	2.88*	3.26*	3.84*	4.33*	4.83*	6.90*	9.10*
	100	1.58	1.95	2.32	2.72*	3.15*	3.58*	4.24*	4.79*	5.36*	7.76*	10.31*
300	120	1.68	2.08	2.49	2.93*	3.40*	3.88*	4.61*	5.24*	5.88*	8.58*	11.47*
	140	1.77	2.21	2.65	3.12*	3.64*	4.16*	4.97*	5.66*	6.37*	9.37*	12.58*
	10	0.88	1.08	1.26	1.45*	1.64*	1.83*	2.11*	2.33*	2.55*	3.39*	4.19*
	20	1.07	1.30	1.52	1.74*	1.98*	2.22*	2.55*	2.83*	3.10*	4.16*	5.20*
	40	1.31	1.59	1.87	2.15*	2.46*	2.75*	3.19*	3.55*	3.91*	5.34*	6.78*
	60	1.49	1.82	2.14	2.47*	2.82*	3.17*	3.69*	4.13*	4.56*	6.32*	8.15*
400	80	1.64	2.00	2.36	2.73*	3.14*	3.54*	4.14*	4.64*	5.14*	7.23*	9.42*
	100	1.77	2.16	2.56	2.97*	3.42*	3.87*	4.54*	5.11*	5.68*	8.07*	10.62*
	120	1.88	2.31	2.74	3.19*	3.68*	4.17*	4.92*	5.55*	6.19*	8.89*	11.76*
	140	1.99	2.44	2.91	3.40*	3.93*	4.46*	5.28*	5.97*	6.68*	9.67*	12.86*
	10	0.95	1.15	1.35	1.55*	1.75*	1.95*	2.24*	2.48*	2.71*	3.58*	4.42*
	20	1.15	1.40	1.63	1.87*	2.12*	2.37*	2.72*	3.01*	3.30*	4.40*	5.47*
600	40	1.42	1.72	2.01	2.31*	2.63*	2.94*	3.40*	3.78*	4.15*	5.62*	7.09*
	60	1.62	1.96	2.30	2.65*	3.02*	3.39*	3.93*	4.38*	4.83*	6.63*	8.47*
	80	1.78	2.16	2.54	2.93*	3.35*	3.77*	4.39*	4.91*	5.42*	7.53*	9.73*
	100	1.92	2.34	2.75	3.18*	3.65*	4.11*	4.81*	5.39*	5.97*	8.38*	10.91*
	120	2.04	2.50	2.94	3.41*	3.92*	4.43*	5.19*	5.84*	6.49*	9.18*	12.05*
	140	2.16	2.64	3.12	3.63*	4.18*	4.73*	5.56*	6.26*	6.98*	9.96*	13.14*
800	10	1.06	1.28	1.49	1.70*	1.93*	2.14*	2.46*	2.71*	2.96*	3.90*	4.79*
	20	1.29	1.56	1.81	2.07*	2.35*	2.61*	3.00*	3.31*	3.62*	4.80*	5.94*
	40	1.60	1.93	2.24	2.57*	2.92*	3.25*	3.75*	4.15*	4.55*	6.10*	7.64*
	60	1.82	2.20	2.57	2.94*	3.35*	3.74*	4.33*	4.80*	5.28*	7.15*	9.04*
	80	2.01	2.43	2.83	3.25*	3.71*	4.16*	4.82*	5.36*	5.91*	8.08*	10.30*
	100	2.17	2.62	3.07	3.53*	4.03*	4.53*	5.26*	5.87*	6.47*	8.93*	11.48*
	120	2.31	2.80	3.28	3.78*	4.33*	4.86*	5.67*	6.33*	7.00*	9.74*	12.61*
	140	2.44	2.96	3.48	4.01*	4.60*	5.18*	6.05*	6.77*	7.51*	10.51*	13.69*
	10	1.14	1.38	1.60	1.83*	2.07*	2.30*	2.63*	2.90*	3.17*	4.16*	5.10*
	20	1.40	1.69	1.96	2.23*	2.53*	2.81*	3.22*	3.56*	3.88*	5.13*	6.32*
	40	1.74	2.09	2.43	2.78*	3.15*	3.51*	4.03*	4.46*	4.88*	6.51*	8.10*
	60	1.99	2.39	2.78	3.18*	3.61*	4.04*	4.65*	5.15*	5.65*	7.60*	9.54*
	80	2.19	2.64	3.07	3.52*	4.00*	4.48*	5.17*	5.75*	6.31*	8.56*	10.82*
	100	2.37	2.85	3.33	3.82*	4.35*	4.87*	5.64*	6.27*	6.90*	9.43*	12.01*
	120	2.52	3.05	3.56	4.09*	4.66*	5.23*	6.07*	6.76*	7.45*	10.25*	13.13*
	140	2.67	3.22	3.77	4.33*	4.95*	5.56*	6.46*	7.21*	7.97*	11.03*	14.21*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.0 Ft (RADIUS = 4.2 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
(Ft*s) ^{1/2}	°F	0.55	0.77	0.99	1.22*	1.44*	1.67*	2.02*	2.30*	2.60*	3.79*	5.01*	
25	10	0.67	0.96	1.26	1.57*	1.87*	2.19*	2.67*	3.07*	3.49*	5.19*	6.97*	
	20	0.87	1.28	1.71	2.15*	2.60*	3.06*	3.76*	4.37*	4.98*	7.55*	10.26*	
	40	1.04	1.56	2.10	2.66*	3.23*	3.82*	4.72*	5.50*	6.29*	9.62*	13.14*	
	60	1.20	1.82	2.46	3.13*	3.81*	4.52*	5.61*	6.54*	7.50*	11.52*	15.79*	
	80	1.35	2.06	2.80	3.57*	4.36*	5.18*	6.44*	7.52*	8.63*	13.30*	18.28*	
	100	1.49	2.29	3.12	3.99*	4.88*	5.80*	7.22*	8.45*	9.70*	14.99*	20.65*	
	120	1.63	2.51	3.43	4.39*	5.38*	6.40*	7.98*	9.34*	10.73*	16.62*	22.91*	
	140	0.77	0.98	1.19	1.40*	1.63*	1.85*	2.19*	2.47*	2.76*	3.94*	5.15*	
	20	0.91	1.17	1.45	1.73*	2.04*	2.34*	2.81*	3.22*	3.62*	5.32*	7.09*	
	40	1.12	1.48	1.87	2.29*	2.74*	3.19*	3.89*	4.49*	5.10*	7.65*	10.36*	
50	60	1.29	1.75	2.25	2.79*	3.36*	3.94*	4.84*	5.61*	6.40*	9.71*	13.23*	
	80	1.44	2.00	2.60	3.25*	3.93*	4.63*	5.71*	6.64*	7.60*	11.61*	15.88*	
	100	1.59	2.23	2.94	3.69*	4.47*	5.28*	6.54*	7.61*	8.72*	13.38*	18.36*	
	120	1.72	2.45	3.25	4.10*	4.99*	5.90*	7.32*	8.54*	9.79*	15.07*	20.72*	
	140	1.85	2.67	3.56	4.50*	5.48*	6.50*	8.07*	9.43*	10.82*	16.70*	22.99*	
	10	0.88	1.09	1.31	1.53*	1.76*	1.99*	2.34*	2.62*	2.91*	4.08*	5.29*	
	20	1.04	1.31	1.59	1.88*	2.18*	2.49*	2.96*	3.35*	3.76*	5.44*	7.20*	
	40	1.28	1.64	2.02	2.43*	2.87*	3.32*	4.01*	4.61*	5.21*	7.76*	10.46*	
	60	1.46	1.91	2.39	2.92*	3.48*	4.06*	4.95*	5.72*	6.50*	9.81*	13.32*	
	80	1.63	2.16	2.74	3.37*	4.05*	4.74*	5.82*	6.74*	7.69*	11.69*	15.96*	
100	100	1.77	2.39	3.07	3.80*	4.58*	5.39*	6.63*	7.71*	8.81*	13.47*	18.44*	
	120	1.91	2.60	3.38	4.21*	5.09*	6.00*	7.41*	8.63*	9.88*	15.15*	20.80*	
	140	2.04	2.82	3.68	4.60*	5.58*	6.59*	8.16*	9.52*	10.91*	16.77*	23.06*	
	10	1.01	1.25	1.48	1.72*	1.96*	2.21*	2.57*	2.87*	3.16*	4.35*	5.55*	
	20	1.21	1.50	1.79	2.09*	2.41*	2.73*	3.21*	3.61*	4.01*	5.68*	7.43*	
	40	1.49	1.87	2.26	2.67*	3.11*	3.56*	4.25*	4.84*	5.44*	7.97*	10.65*	
	60	1.71	2.16	2.64	3.16*	3.71*	4.29*	5.17*	5.93*	6.71*	10.00*	13.50*	
	80	1.89	2.42	2.99	3.60*	4.27*	4.96*	6.02*	6.94*	7.89*	11.87*	16.12*	
	100	2.05	2.66	3.31	4.02*	4.80*	5.59*	6.83*	7.90*	9.00*	13.63*	18.59*	
	120	2.20	2.88	3.62	4.43*	5.30*	6.20*	7.60*	8.81*	10.06*	15.31*	20.94*	
150	140	2.34	3.09	3.91	4.81*	5.78*	6.78*	8.34*	9.69*	11.07*	16.93*	23.20*	
	10	1.10	1.36	1.60	1.85*	2.11*	2.37*	2.75*	3.06*	3.36*	4.58*	5.79*	
	20	1.34	1.64	1.95	2.26*	2.60*	2.93*	3.42*	3.83*	4.24*	5.91*	7.65*	
	40	1.65	2.05	2.45	2.87*	3.32*	3.78*	4.47*	5.06*	5.66*	8.17*	10.84*	
	60	1.89	2.36	2.85	3.37*	3.93*	4.50*	5.38*	6.14*	6.92*	10.18*	13.67*	
	80	2.09	2.63	3.20	3.82*	4.48*	5.17*	6.23*	7.14*	8.08*	12.05*	16.29*	
	100	2.26	2.88	3.53	4.24*	5.00*	5.79*	7.03*	8.09*	9.18*	13.80*	18.75*	
	120	2.43	3.11	3.84	4.63*	5.50*	6.39*	7.79*	8.99*	10.23*	15.47*	21.09*	
	140	2.58	3.32	4.13	5.02*	5.98*	6.97*	8.52*	9.87*	11.24*	17.08*	23.34*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.0 Ft (RADIUS = 4.2 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX
TEMPERATURE RISE
(Ft*s)^{1/2}

CEILING HEIGHT, Ft

	4	8	12	16	20	24	30	35	40	60	80
200	1.18	1.45	1.70	1.96*	2.24*	2.51*	2.90*	3.22*	3.53*	4.78*	6.01*
	1.44	1.76	2.08	2.40*	2.75*	3.09*	3.60*	4.02*	4.44*	6.13*	7.87*
	1.78	2.19	2.61	3.04*	3.50*	3.97*	4.67*	5.27*	5.87*	8.38*	11.04*
	2.03	2.53	3.02	3.55*	4.12*	4.70*	5.59*	6.34*	7.12*	10.37*	13.85*
	2.25	2.81	3.39	4.01*	4.68*	5.37*	6.43*	7.34*	8.27*	12.22*	16.45*
	2.44	3.07	3.72	4.43*	5.20*	5.99*	7.22*	8.27*	9.36*	13.97*	18.90*
	2.61	3.30	4.03	4.83*	5.69*	6.59*	7.97*	9.17*	10.41*	15.63*	21.24*
	2.77	3.52	4.33	5.21*	6.17*	7.16*	8.70*	10.04*	11.41*	17.24*	23.49*
300	1.31	1.59	1.87	2.14*	2.44*	2.73*	3.14*	3.48*	3.82*	5.12*	6.39*
	1.60	1.94	2.28	2.63*	3.00*	3.36*	3.90*	4.34*	4.78*	6.52*	8.28*
	1.99	2.43	2.87	3.32*	3.81*	4.30*	5.02*	5.63*	6.24*	8.76*	11.41*
	2.27	2.80	3.32	3.87*	4.46*	5.05*	5.96*	6.72*	7.49*	10.74*	14.20*
	2.51	3.11	3.71	4.34*	5.03*	5.73*	6.80*	7.71*	8.64*	12.57*	16.78*
	2.72	3.38	4.06	4.77*	5.56*	6.36*	7.58*	8.64*	9.72*	14.30*	19.21*
	2.91	3.63	4.38	5.18*	6.05*	6.95*	8.33*	9.52*	10.75*	15.95*	21.54*
	3.09	3.87	4.68	5.57*	6.53*	7.52*	9.05*	10.38*	11.74*	17.54*	23.77*
400	1.41	1.71	2.00	2.29*	2.60*	2.91*	3.34*	3.70*	4.05*	5.41*	6.72*
	1.73	2.10	2.45	2.82*	3.21*	3.59*	4.15*	4.61*	5.06*	6.85*	8.65*
	2.15	2.62	3.08	3.56*	4.07*	4.57*	5.33*	5.95*	6.58*	9.13*	11.78*
	2.47	3.02	3.56	4.13*	4.75*	5.36*	6.28*	7.06*	7.84*	11.09*	14.54*
	2.73	3.35	3.97	4.63*	5.34*	6.05*	7.13*	8.05*	8.99*	12.91*	17.10*
	2.96	3.64	4.34	5.07*	5.88*	6.69*	7.92*	8.98*	10.06*	14.62*	19.52*
	3.16	3.91	4.67	5.49*	6.38*	7.28*	8.67*	9.86*	11.09*	16.26*	21.83*
	3.35	4.16	4.99	5.88*	6.86*	7.85*	9.39*	10.71*	12.07*	17.84*	24.06*
600	1.57	1.90	2.21	2.53*	2.87*	3.20*	3.67*	4.06*	4.43*	5.88*	7.27*
	1.94	2.34	2.73	3.12*	3.55*	3.96*	4.56*	5.06*	5.54*	7.43*	9.29*
	2.43	2.93	3.43	3.94*	4.49*	5.03*	5.83*	6.49*	7.15*	9.78*	12.46*
	2.78	3.38	3.96	4.57*	5.23*	5.88*	6.84*	7.65*	8.46*	11.76*	15.20*
	3.08	3.75	4.41	5.10*	5.85*	6.60*	7.73*	8.67*	9.62*	13.56*	17.73*
	3.34	4.07	4.81	5.58*	6.42*	7.26*	8.54*	9.61*	10.70*	15.26*	20.13*
	3.56	4.36	5.17	6.02*	6.94*	7.88*	9.29*	10.50*	11.72*	16.88*	22.42*
	3.77	4.63	5.50	6.43*	7.44*	8.46*	10.01*	11.34*	12.70*	18.44*	24.62*
800	1.71	2.05	2.39	2.72*	3.08*	3.43*	3.94*	4.35*	4.75*	6.27*	7.73*
	2.11	2.54	2.95	3.37*	3.84*	4.26*	4.90*	5.42*	5.93*	7.91*	9.84*
	2.65	3.19	3.71	4.26*	4.84*	5.42*	6.26*	6.95*	7.63*	10.35*	13.08*
	3.04	3.67	4.29	4.93*	5.62*	6.31*	7.32*	8.15*	8.99*	12.36*	15.83*
	3.36	4.07	4.77	5.50*	6.29*	7.07*	8.24*	9.21*	10.18*	14.17*	18.35*
	3.64	4.42	5.19	6.00*	6.88*	7.76*	9.07*	10.17*	11.28*	15.86*	20.72*
	3.89	4.74	5.58	6.46*	7.43*	8.39*	9.84*	11.07*	12.31*	17.47*	22.99*
	4.12	5.03	5.93	6.89*	7.94*	8.99*	10.58*	11.92*	13.29*	19.03*	25.18*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.0 Ft (RADIUS = 4.2 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		°F	4	8	12	16	20	24	30	35	40	60	80
(Ft*s) ^{1/2} 0	10	0.85	1.21	1.58	1.95*	2.33*	2.72*	3.31*	3.81*	4.31*	6.40*	8.57*	
	20	1.08	1.59	2.11	2.65*	3.19*	3.75*	4.61*	5.35*	6.09*	9.20*	12.48*	
	40	1.48	2.23	3.01	3.81*	4.64*	5.49*	6.81*	7.93*	9.08*	13.92*	19.06*	
	60	1.83	2.79	3.79	4.84*	5.91*	7.02*	8.73*	10.20*	11.71*	18.06*	24.83*	
	80	2.14	3.31	4.52	5.77*	7.07*	8.42*	10.49*	12.28*	14.12*	21.86*	30.13*	
	100	2.44	3.79	5.19	6.66*	8.17*	9.73*	12.15*	14.24*	16.38*	25.42*	35.10*	
	120	2.73	4.25	5.84	7.49*	9.21*	10.98*	13.73*	16.09*	18.53*	28.81*	39.83*	
	140	3.00	4.69	6.46	8.30*	10.20*	12.18*	15.24*	17.88*	20.59*	32.06*	44.37*	
	25	10	1.14	1.46	1.80	2.15*	2.53*	2.91*	3.49*	3.98*	4.48*	6.55*	8.70*
		20	1.38	1.83	2.31	2.82*	3.36*	3.91*	4.76*	5.49*	6.23*	9.33*	12.60*
40		1.77	2.44	3.17	3.96*	4.78*	5.62*	6.93*	8.05*	9.20*	14.03*	19.16*	
60		2.10	2.98	3.95	4.97*	6.04*	7.14*	8.84*	10.31*	11.81*	18.15*	24.92*	
80		2.40	3.48	4.66	5.90*	7.19*	8.53*	10.60*	12.38*	14.21*	21.94*	30.21*	
100		2.69	3.96	5.33	6.77*	8.28*	9.83*	12.25*	14.33*	16.47*	25.50*	35.18*	
120		2.96	4.41	5.97	7.60*	9.31*	11.08*	13.82*	16.19*	18.62*	28.89*	39.91*	
140		3.23	4.85	6.58	8.40*	10.31*	12.27*	15.33*	17.97*	20.67*	32.14*	44.44*	
50		10	1.29	1.63	1.97	2.32*	2.70*	3.08*	3.65*	4.14*	4.64*	6.69*	8.84*
		20	1.57	2.01	2.48	2.98*	3.52*	4.06*	4.91*	5.63*	6.37*	9.45*	12.71*
	40	1.98	2.63	3.34	4.10*	4.92*	5.76*	7.06*	8.17*	9.32*	14.13*	19.26*	
	60	2.32	3.16	4.09	5.10*	6.16*	7.26*	8.95*	10.42*	11.92*	18.25*	25.01*	
	80	2.63	3.66	4.80	6.02*	7.31*	8.64*	10.70*	12.48*	14.31*	22.03*	30.30*	
	100	2.91	4.12	5.46	6.89*	8.39*	9.94*	12.35*	14.43*	16.56*	25.59*	35.26*	
	120	3.18	4.57	6.09	7.72*	9.42*	11.18*	13.92*	16.28*	18.71*	28.97*	39.98*	
	140	3.44	5.00	6.70	8.51*	10.41*	12.37*	15.42*	18.05*	20.76*	32.22*	44.51*	
	100	10	1.49	1.85	2.21	2.58*	2.98*	3.37*	3.95*	4.44*	4.94*	6.98*	9.11*
		20	1.82	2.29	2.77	3.27*	3.81*	4.35*	5.19*	5.91*	6.64*	9.70*	12.94*
40		2.30	2.94	3.63	4.38*	5.18*	6.01*	7.30*	8.41*	9.55*	14.34*	19.45*	
60		2.67	3.49	4.38	5.36*	6.41*	7.49*	9.18*	10.63*	12.13*	18.44*	25.19*	
80		2.99	3.98	5.07	6.26*	7.54*	8.86*	10.91*	12.69*	14.51*	22.21*	30.46*	
100		3.29	4.44	5.72	7.12*	8.61*	10.15*	12.55*	14.62*	16.75*	25.76*	35.42*	
120		3.56	4.87	6.34	7.94*	9.63*	11.38*	14.11*	16.46*	18.88*	29.13*	40.13*	
140		3.83	5.30	6.94	8.72*	10.61*	12.56*	15.60*	18.23*	20.93*	32.37*	44.66*	
150		10	1.64	2.02	2.40	2.78*	3.19*	3.60*	4.20*	4.70*	5.21*	7.26*	9.38*
		20	2.01	2.50	2.99	3.50*	4.06*	4.61*	5.45*	6.17*	6.90*	9.95*	13.17*
	40	2.53	3.19	3.89	4.63*	5.44*	6.26*	7.54*	8.65*	9.78*	14.55*	19.65*	
	60	2.93	3.76	4.64	5.60*	6.65*	7.72*	9.40*	10.85*	12.34*	18.63*	25.36*	
	80	3.28	4.26	5.33	6.50*	7.76*	9.08*	11.12*	12.89*	14.70*	22.39*	30.63*	
	100	3.59	4.72	5.97	7.34*	8.82*	10.36*	12.75*	14.81*	16.93*	25.92*	35.57*	
	120	3.88	5.16	6.59	8.15*	9.84*	11.58*	14.30*	16.64*	19.06*	29.29*	40.28*	
	140	4.15	5.58	7.18	8.93*	10.81*	12.75*	15.79*	18.41*	21.10*	32.53*	44.80*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.0 Ft (RADIUS = 4.2 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
200 (Ft*s) ^{1/2}	°F											
	10	1.76	2.16	2.55	2.95*	3.37*	3.79*	4.42*	4.93*	5.44*	7.51*	9.64*
	20	2.16	2.67	3.18	3.71*	4.27*	4.84*	5.69*	6.41*	7.15*	10.19*	13.40*
	40	2.73	3.41	4.11	4.86*	5.67*	6.50*	7.78*	8.88*	10.00*	14.76*	19.84*
	60	3.15	3.99	4.88	5.83*	6.88*	7.95*	9.62*	11.06*	12.54*	18.82*	25.54*
	80	3.52	4.51	5.57	6.73*	7.99*	9.29*	11.33*	13.09*	14.90*	22.56*	30.79*
	100	3.85	4.98	6.21	7.57*	9.04*	10.56*	12.94*	15.00*	17.12*	26.09*	35.73*
300	120	4.15	5.42	6.82	8.37*	10.04*	11.78*	14.48*	16.83*	19.23*	29.45*	40.43*
	140	4.43	5.84	7.41	9.14*	11.01*	12.95*	15.97*	18.58*	21.27*	32.68*	44.95*
	10	1.95	2.38	2.79	3.22*	3.68*	4.12*	4.77*	5.31*	5.85*	7.97*	10.12*
	20	2.41	2.95	3.49	4.04*	4.64*	5.23*	6.11*	6.85*	7.59*	10.65*	13.85*
	40	3.04	3.76	4.49	5.26*	6.09*	6.93*	8.22*	9.32*	10.44*	15.17*	20.23*
	60	3.51	4.39	5.29	6.25*	7.31*	8.38*	10.05*	11.48*	12.95*	19.19*	25.89*
	80	3.91	4.93	5.99	7.15*	8.41*	9.71*	11.73*	13.48*	15.28*	22.91*	31.12*
400	100	4.27	5.42	6.65	7.99*	9.45*	10.97*	13.33*	15.38*	17.48*	26.42*	36.04*
	120	4.59	5.88	7.26	8.78*	10.44*	12.17*	14.86*	17.19*	19.59*	29.77*	40.73*
	140	4.89	6.31	7.85	9.55*	11.40*	13.32*	16.33*	18.93*	21.61*	32.99*	45.23*
	10	2.11	2.56	3.00	3.44*	3.92*	4.39*	5.07*	5.63*	6.19*	8.38*	10.56*
	20	2.61	3.18	3.74	4.32*	4.94*	5.56*	6.47*	7.23*	7.99*	11.08*	14.29*
	40	3.30	4.05	4.80	5.59*	6.45*	7.31*	8.62*	9.73*	10.86*	15.57*	20.61*
	60	3.81	4.71	5.64	6.62*	7.69*	8.78*	10.45*	11.88*	13.35*	19.56*	26.24*
600	80	4.24	5.29	6.37	7.53*	8.81*	10.11*	12.13*	13.87*	15.66*	23.26*	31.45*
	100	4.62	5.80	7.03	8.38*	9.85*	11.36*	13.71*	15.75*	17.84*	26.76*	36.35*
	120	4.96	6.27	7.66	9.17*	10.83*	12.55*	15.23*	17.54*	19.93*	30.09*	41.03*
	140	5.28	6.71	8.25	9.94*	11.78*	13.70*	16.69*	19.27*	21.94*	33.29*	45.52*
	10	2.36	2.85	3.32	3.81*	4.32*	4.83*	5.57*	6.16*	6.76*	9.06*	11.33*
	20	2.94	3.55	4.16	4.78*	5.45*	6.11*	7.08*	7.88*	8.67*	11.85*	15.10*
	40	3.71	4.52	5.32	6.16*	7.07*	7.97*	9.33*	10.46*	11.61*	16.35*	21.37*
800	60	4.29	5.25	6.22	7.25*	8.36*	9.49*	11.19*	12.64*	14.11*	20.30*	26.94*
	80	4.77	5.88	7.00	8.20*	9.51*	10.84*	12.87*	14.61*	16.40*	23.95*	32.10*
	100	5.19	6.43	7.70	9.07*	10.56*	12.09*	14.45*	16.47*	18.56*	27.41*	36.97*
	120	5.57	6.93	8.35	9.88*	11.56*	13.28*	15.94*	18.25*	20.62*	30.72*	41.62*
	140	5.92	7.40	8.96	10.65*	12.50*	14.41*	17.39*	19.96*	22.61*	33.90*	46.09*
	10	2.56	3.08	3.59	4.10*	4.65*	5.19*	5.97*	6.60*	7.22*	9.64*	11.99*
	20	3.20	3.86	4.50	5.15*	5.86*	6.56*	7.58*	8.42*	9.25*	12.53*	15.84*
	40	4.05	4.91	5.75	6.63*	7.58*	8.53*	9.93*	11.10*	12.28*	17.08*	22.10*
	60	4.68	5.70	6.71	7.78*	8.94*	10.10*	11.84*	13.31*	14.80*	21.01*	27.62*
	80	5.20	6.36	7.53	8.77*	10.12*	11.48*	13.55*	15.30*	17.09*	24.64*	32.74*
	100	5.66	6.95	8.26	9.66*	11.20*	12.75*	15.13*	17.16*	19.24*	28.07*	37.58*
	120	6.06	7.49	8.94	10.50*	12.21*	13.95*	16.62*	18.93*	21.29*	31.35*	42.21*
	140	6.44	7.98	9.57	11.28*	13.16*	15.09*	18.06*	20.62*	23.26*	34.51*	46.65*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.0 Ft (RADIUS = 5.7 Ft)
 FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE °F	CEILING HEIGHT, Ft											
		$(Ft \cdot s)^{1/2}$											
		4	8	12	16	20	24	30	35	40	60	80	
0	10	0.31	0.40	0.49	0.58	0.67*	0.75*	0.89*	1.00*	1.11*	1.55*	1.99*	
	20	0.34	0.45	0.56	0.67	0.78*	0.89*	1.06*	1.20*	1.34*	1.91*	2.49*	
	40	0.40	0.54	0.69	0.83	0.98*	1.13*	1.35*	1.54*	1.73*	2.52*	3.34*	
	60	0.46	0.63	0.80	0.97	1.15*	1.33*	1.61*	1.84*	2.08*	3.06*	4.08*	
	80	0.51	0.70	0.90	1.10	1.31*	1.52*	1.84*	2.12*	2.39*	3.55*	4.76*	
	100	0.55	0.77	0.99	1.22	1.46*	1.70*	2.06*	2.37*	2.69*	4.01*	5.39*	
	120	0.59	0.84	1.09	1.34	1.60*	1.87*	2.27*	2.62*	2.97*	4.45*	6.00*	
	140	0.64	0.90	1.17	1.45	1.74*	2.03*	2.47*	2.86*	3.24*	4.87*	6.58*	
	25	10	0.44	0.53	0.62	0.71	0.80*	0.89*	1.03*	1.14*	1.25*	1.69*	2.12*
		20	0.50	0.60	0.71	0.81	0.92*	1.03*	1.20*	1.34*	1.47*	2.03*	2.61*
40		0.58	0.71	0.84	0.97	1.11*	1.25*	1.47*	1.66*	1.85*	2.63*	3.43*	
60		0.65	0.79	0.95	1.11	1.27*	1.45*	1.72*	1.95*	2.18*	3.15*	4.16*	
80		0.70	0.87	1.04	1.23	1.42*	1.63*	1.95*	2.22*	2.49*	3.64*	4.84*	
100		0.75	0.93	1.13	1.35	1.57*	1.80*	2.16*	2.47*	2.78*	4.09*	5.47*	
120		0.79	1.00	1.22	1.46	1.70*	1.97*	2.37*	2.71*	3.06*	4.53*	6.08*	
140		0.84	1.06	1.30	1.56	1.84*	2.12*	2.56*	2.94*	3.33*	4.95*	6.66*	
50		10	0.49	0.59	0.68	0.78	0.87*	0.97*	1.11*	1.23*	1.35*	1.80*	2.24*
		20	0.57	0.68	0.79	0.90	1.01*	1.12*	1.30*	1.44*	1.58*	2.15*	2.72*
	40	0.67	0.80	0.93	1.07	1.21*	1.36*	1.58*	1.77*	1.96*	2.73*	3.53*	
	60	0.74	0.89	1.05	1.21	1.38*	1.56*	1.82*	2.05*	2.28*	3.25*	4.25*	
	80	0.80	0.98	1.15	1.34	1.53*	1.73*	2.05*	2.32*	2.59*	3.72*	4.92*	
	100	0.86	1.05	1.25	1.45	1.67*	1.90*	2.26*	2.56*	2.88*	4.18*	5.55*	
	120	0.91	1.12	1.33	1.56	1.80*	2.06*	2.46*	2.80*	3.15*	4.61*	6.15*	
	140	0.96	1.18	1.42	1.67	1.93*	2.22*	2.65*	3.03*	3.41*	5.02*	6.73*	
	100	10	0.56	0.66	0.77	0.87	0.97*	1.07*	1.23*	1.36*	1.48*	1.96*	2.42*
		20	0.65	0.77	0.89	1.01	1.13*	1.25*	1.44*	1.59*	1.74*	2.33*	2.91*
40		0.78	0.92	1.07	1.21	1.36*	1.52*	1.75*	1.94*	2.14*	2.92*	3.72*	
60		0.87	1.03	1.20	1.37	1.54*	1.72*	2.00*	2.23*	2.47*	3.43*	4.42*	
80		0.94	1.13	1.32	1.50	1.70*	1.91*	2.23*	2.50*	2.77*	3.90*	5.08*	
100		1.01	1.21	1.42	1.63	1.84*	2.08*	2.44*	2.74*	3.05*	4.34*	5.70*	
120		1.07	1.29	1.51	1.74	1.98*	2.24*	2.64*	2.97*	3.32*	4.77*	6.30*	
140		1.13	1.36	1.60	1.85	2.11*	2.39*	2.83*	3.20*	3.58*	5.17*	6.87*	
150		10	0.60	0.71	0.82	0.93	1.04*	1.15*	1.31*	1.45*	1.58*	2.08*	2.56*
		20	0.71	0.84	0.97	1.09	1.22*	1.35*	1.55*	1.71*	1.86*	2.48*	3.07*
	40	0.85	1.01	1.16	1.32	1.47*	1.64*	1.88*	2.08*	2.28*	3.08*	3.89*	
	60	0.96	1.13	1.31	1.49	1.66*	1.86*	2.15*	2.39*	2.63*	3.59*	4.59*	
	80	1.05	1.24	1.44	1.63	1.83*	2.05*	2.38*	2.65*	2.93*	4.06*	5.24*	
	100	1.12	1.33	1.55	1.76	1.99*	2.23*	2.59*	2.90*	3.21*	4.50*	5.86*	
	120	1.19	1.42	1.65	1.88	2.13*	2.39*	2.79*	3.14*	3.48*	4.92*	6.44*	
	140	1.25	1.49	1.74	2.00	2.26*	2.55*	2.99*	3.36*	3.74*	5.32*	7.01*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.0 Ft (RADIUS = 5.7 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
200 (Ft*s) ^{1/2}	10	0.64	0.76	0.87	0.98	1.09*	1.21*	1.38*	1.52*	1.66*	2.18*	2.67*	
	20	0.76	0.90	1.03	1.16	1.29*	1.43*	1.64*	1.80*	1.97*	2.60*	3.21*	
	40	0.92	1.08	1.24	1.40	1.56*	1.73*	1.99*	2.20*	2.41*	3.23*	4.04*	
	60	1.03	1.22	1.40	1.59	1.77*	1.97*	2.27*	2.52*	2.76*	3.75*	4.75*	
	80	1.13	1.33	1.54	1.74	1.95*	2.17*	2.51*	2.79*	3.07*	4.21*	5.40*	
	100	1.21	1.43	1.66	1.88	2.11*	2.36*	2.73*	3.04*	3.36*	4.65*	6.01*	
	120	1.28	1.52	1.76	2.00	2.25*	2.52*	2.94*	3.28*	3.63*	5.07*	6.59*	
	140	1.35	1.60	1.86	2.12	2.39*	2.68*	3.13*	3.51*	3.89*	5.47*	7.15*	
	300	10	0.71	0.83	0.95	1.07	1.19*	1.31*	1.50*	1.64*	1.79*	2.34*	2.86*
		20	0.84	0.99	1.13	1.27	1.41*	1.56*	1.78*	1.96*	2.13*	2.80*	3.45*
		40	1.02	1.20	1.37	1.54	1.71*	1.90*	2.17*	2.39*	2.61*	3.47*	4.32*
		60	1.15	1.35	1.55	1.74	1.94*	2.16*	2.47*	2.73*	2.99*	4.01*	5.04*
		80	1.26	1.48	1.70	1.92	2.13*	2.37*	2.73*	3.03*	3.32*	4.49*	5.69*
		100	1.36	1.59	1.83	2.07	2.31*	2.57*	2.96*	3.29*	3.62*	4.93*	6.29*
120		1.44	1.69	1.95	2.20	2.46*	2.75*	3.18*	3.54*	3.89*	5.35*	6.87*	
140		1.51	1.78	2.06	2.33	2.61*	2.92*	3.38*	3.77*	4.15*	5.75*	7.42*	
400		10	0.76	0.88	1.01	1.14	1.26*	1.39*	1.59*	1.74*	1.89*	2.47*	3.02*
		20	0.91	1.06	1.21	1.36	1.50*	1.66*	1.89*	2.08*	2.27*	2.97*	3.64*
		40	1.11	1.29	1.48	1.65	1.83*	2.03*	2.32*	2.55*	2.78*	3.68*	4.55*
		60	1.25	1.46	1.67	1.88	2.08*	2.31*	2.64*	2.91*	3.18*	4.24*	5.29*
		80	1.37	1.60	1.83	2.06	2.29*	2.54*	2.92*	3.22*	3.53*	4.73*	5.95*
		100	1.47	1.72	1.98	2.22	2.47*	2.75*	3.16*	3.50*	3.84*	5.18*	6.56*
	120	1.56	1.83	2.10	2.37	2.64*	2.94*	3.38*	3.75*	4.12*	5.61*	7.13*	
	140	1.65	1.93	2.22	2.50	2.79*	3.11*	3.59*	3.99*	4.39*	6.01*	7.69*	
	600	10	0.84	0.98	1.11	1.25	1.38*	1.52*	1.73*	1.90*	2.07*	2.69*	3.27*
		20	1.01	1.18	1.34	1.50	1.66*	1.83*	2.08*	2.29*	2.49*	3.24*	3.96*
		40	1.24	1.44	1.64	1.84	2.03*	2.25*	2.56*	2.81*	3.06*	4.02*	4.95*
		60	1.41	1.64	1.87	2.09	2.31*	2.56*	2.92*	3.21*	3.50*	4.63*	5.73*
		80	1.54	1.80	2.05	2.29	2.54*	2.81*	3.22*	3.55*	3.87*	5.15*	6.41*
		100	1.66	1.94	2.21	2.47	2.74*	3.04*	3.48*	3.85*	4.20*	5.62*	7.03*
120		1.77	2.06	2.35	2.64	2.92*	3.25*	3.73*	4.12*	4.51*	6.06*	7.62*	
140		1.86	2.17	2.48	2.79	3.09*	3.44*	3.95*	4.37*	4.79*	6.47*	8.17*	
800		10	0.90	1.05	1.20	1.34	1.48*	1.63*	1.85*	2.03*	2.20*	2.86*	3.48*
		20	1.10	1.27	1.45	1.62	1.78*	1.97*	2.24*	2.45*	2.66*	3.47*	4.23*
		40	1.35	1.57	1.78	1.99	2.19*	2.42*	2.75*	3.02*	3.29*	4.30*	5.28*
		60	1.53	1.78	2.02	2.26	2.49*	2.76*	3.14*	3.45*	3.76*	4.95*	6.10*
		80	1.69	1.96	2.22	2.48	2.74*	3.04*	3.47*	3.82*	4.16*	5.50*	6.80*
		100	1.81	2.11	2.40	2.68	2.96*	3.28*	3.75*	4.13*	4.51*	5.99*	7.45*
	120	1.93	2.24	2.55	2.86	3.16*	3.50*	4.01*	4.42*	4.83*	6.44*	8.05*	
	140	2.03	2.37	2.70	3.02	3.34*	3.71*	4.25*	4.69*	5.13*	6.87*	8.61*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.0 Ft (RADIUS = 5.7 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE °F	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
0 (Ft*s) ^{1/2}	10	0.44	0.58	0.72	0.86	1.00*	1.13*	1.34*	1.52*	1.70*	2.40*	3.12*	
	20	0.51	0.69	0.87	1.05	1.23*	1.41*	1.69*	1.93*	2.16*	3.13*	4.13*	
	40	0.63	0.87	1.12	1.37	1.62*	1.88*	2.27*	2.61*	2.95*	4.35*	5.82*	
	60	0.74	1.04	1.34	1.65	1.97*	2.29*	2.79*	3.21*	3.64*	5.42*	7.30*	
	80	0.84	1.18	1.54	1.91	2.28*	2.67*	3.25*	3.76*	4.27*	6.40*	8.66*	
	100	0.93	1.32	1.73	2.15	2.58*	3.02*	3.69*	4.27*	4.86*	7.33*	9.94*	
	120	1.01	1.46	1.91	2.38	2.86*	3.36*	4.11*	4.76*	5.43*	8.20*	11.15*	
	140	1.10	1.59	2.09	2.60	3.13*	3.68*	4.52*	5.23*	5.97*	9.05*	12.32*	
	25	10	0.63	0.76	0.89	1.02	1.16*	1.30*	1.51*	1.68*	1.85*	2.55*	3.26*
		20	0.73	0.88	1.05	1.21	1.38*	1.56*	1.84*	2.07*	2.30*	3.26*	4.25*
40		0.87	1.07	1.29	1.52	1.76*	2.01*	2.40*	2.73*	3.06*	4.46*	5.92*	
60		0.98	1.23	1.50	1.79	2.09*	2.41*	2.90*	3.32*	3.74*	5.52*	7.39*	
80		1.07	1.37	1.69	2.04	2.40*	2.78*	3.36*	3.86*	4.37*	6.49*	8.74*	
100		1.16	1.50	1.88	2.27	2.69*	3.12*	3.79*	4.37*	4.95*	7.41*	10.02*	
120		1.25	1.63	2.05	2.50	2.97*	3.46*	4.21*	4.85*	5.52*	8.29*	11.23*	
140		1.33	1.75	2.22	2.72	3.23*	3.77*	4.61*	5.32*	6.05*	9.12*	12.39*	
50		10	0.71	0.84	0.99	1.12	1.26*	1.41*	1.63*	1.80*	1.98*	2.68*	3.39*
		20	0.83	0.99	1.16	1.33	1.50*	1.69*	1.96*	2.19*	2.43*	3.38*	4.36*
	40	0.99	1.20	1.42	1.65	1.88*	2.13*	2.52*	2.84*	3.18*	4.56*	6.01*	
	60	1.12	1.37	1.64	1.92	2.21*	2.52*	3.01*	3.42*	3.85*	5.61*	7.48*	
	80	1.23	1.52	1.83	2.16	2.51*	2.89*	3.46*	3.96*	4.46*	6.58*	8.83*	
	100	1.32	1.65	2.01	2.39	2.80*	3.23*	3.89*	4.46*	5.05*	7.50*	10.09*	
	120	1.41	1.78	2.18	2.61	3.07*	3.56*	4.30*	4.95*	5.60*	8.37*	11.30*	
	140	1.50	1.90	2.35	2.83	3.33*	3.87*	4.70*	5.41*	6.14*	9.20*	12.46*	
	100	10	0.81	0.96	1.11	1.26	1.41*	1.56*	1.80*	1.98*	2.17*	2.90*	3.63*
		20	0.96	1.14	1.32	1.50	1.68*	1.87*	2.16*	2.40*	2.64*	3.60*	4.58*
40		1.16	1.38	1.61	1.85	2.08*	2.34*	2.73*	3.06*	3.39*	4.77*	6.21*	
60		1.31	1.57	1.85	2.13	2.42*	2.74*	3.22*	3.63*	4.05*	5.80*	7.65*	
80		1.44	1.74	2.05	2.38	2.72*	3.09*	3.66*	4.15*	4.66*	6.76*	8.99*	
100		1.55	1.88	2.24	2.61	3.00*	3.43*	4.09*	4.65*	5.23*	7.66*	10.25*	
120		1.65	2.02	2.41	2.83	3.27*	3.75*	4.49*	5.13*	5.78*	8.52*	11.45*	
140		1.74	2.15	2.58	3.04	3.53*	4.06*	4.88*	5.58*	6.31*	9.35*	12.60*	
150		10	0.88	1.04	1.20	1.36	1.51*	1.68*	1.92*	2.12*	2.32*	3.08*	3.82*
		20	1.05	1.24	1.43	1.62	1.81*	2.02*	2.32*	2.57*	2.82*	3.80*	4.79*
	40	1.28	1.52	1.76	2.00	2.24*	2.51*	2.91*	3.25*	3.58*	4.96*	6.40*	
	60	1.45	1.73	2.01	2.30	2.59*	2.92*	3.41*	3.82*	4.24*	5.98*	7.83*	
	80	1.59	1.90	2.23	2.56	2.90*	3.28*	3.85*	4.34*	4.84*	6.93*	9.15*	
	100	1.71	2.06	2.42	2.80	3.19*	3.61*	4.27*	4.83*	5.41*	7.83*	10.40*	
	120	1.82	2.20	2.60	3.02	3.46*	3.93*	4.67*	5.30*	5.95*	8.68*	11.60*	
	140	1.93	2.34	2.78	3.23	3.71*	4.24*	5.05*	5.75*	6.47*	9.51*	12.75*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.0 Ft (RADIUS = 5.7 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX		TEMPERATURE RISE	CEILING HEIGHT, Ft											
			4	8	12	16	20	24	30	35	40	60	80	
200	°F	10	0.94	1.11	1.27	1.44	1.60*	1.77*	2.03*	2.23*	2.44*	3.22*	3.99*	
		20	1.13	1.33	1.53	1.72	1.92*	2.13*	2.45*	2.71*	2.96*	3.97*	4.97*	
		40	1.38	1.63	1.88	2.13	2.38*	2.66*	3.07*	3.57*	3.94*	3.75*	6.58*	
		60	1.56	1.85	2.15	2.44	2.74*	3.07*	3.57*	4.02*	4.52*	4.42*	8.00*	
		80	1.71	2.04	2.37	2.71	3.06*	3.44*	4.02*	4.44*	5.01*	5.02*	9.31*	
		100	1.85	2.21	2.58	2.96	3.35*	3.78*	4.44*	5.01*	5.58*	7.99*	10.56*	
		120	1.97	2.36	2.77	3.19	3.62*	4.10*	4.84*	5.47*	6.12*	8.84*	11.75*	
300		140	2.08	2.50	2.94	3.40	3.88*	4.41*	5.22*	5.92*	6.64*	9.66*	12.89*	
		10	1.03	1.21	1.39	1.57	1.74*	1.92*	2.20*	2.42*	2.63*	3.47*	4.26*	
		20	1.25	1.46	1.68	1.89	2.10*	2.33*	2.66*	2.94*	3.21*	4.26*	5.30*	
		40	1.53	1.80	2.07	2.34	2.60*	2.90*	3.33*	3.69*	4.05*	5.47*	6.92*	
		60	1.74	2.05	2.37	2.68	2.99*	3.34*	3.86*	4.30*	4.73*	6.50*	8.33*	
		80	1.92	2.27	2.62	2.97	3.33*	3.73*	4.33*	4.83*	5.34*	7.43*	9.63*	
		100	2.07	2.45	2.84	3.23	3.63*	4.08*	4.76*	5.33*	5.90*	8.31*	10.86*	
400		120	2.20	2.62	3.04	3.47	3.92*	4.41*	5.16*	5.79*	6.44*	9.15*	12.04*	
		140	2.33	2.77	3.23	3.70	4.18*	4.72*	5.54*	6.24*	6.95*	9.96*	13.17*	
		10	1.11	1.30	1.49	1.67	1.85*	2.05*	2.34*	2.57*	2.79*	3.67*	4.50*	
		20	1.35	1.58	1.80	2.02	2.24*	2.49*	2.84*	3.13*	3.41*	4.51*	5.58*	
		40	1.66	1.95	2.23	2.51	2.78*	3.09*	3.55*	3.92*	4.29*	5.76*	7.24*	
		60	1.89	2.22	2.55	2.87	3.20*	3.57*	4.11*	4.55*	5.00*	6.80*	8.65*	
		80	2.08	2.45	2.82	3.18	3.56*	3.97*	4.59*	5.11*	5.62*	7.74*	9.94*	
600		100	2.25	2.65	3.05	3.46	3.87*	4.34*	5.03*	5.61*	6.20*	8.61*	11.16*	
		120	2.39	2.83	3.27	3.71	4.17*	4.67*	5.44*	6.08*	6.74*	9.45*	12.33*	
		140	2.53	2.99	3.47	3.95	4.44*	4.99*	5.83*	6.53*	7.25*	10.25*	13.45*	
		10	1.24	1.44	1.64	1.84	2.03*	2.25*	2.56*	2.81*	3.06*	3.99*	4.88*	
		20	1.51	1.76	2.00	2.24	2.48*	2.74*	3.13*	3.44*	3.74*	4.92*	6.05*	
		40	1.87	2.18	2.49	2.78	3.08*	3.42*	3.91*	4.31*	4.71*	6.25*	7.78*	
		60	2.13	2.49	2.85	3.19	3.54*	3.94*	4.51*	4.99*	5.46*	7.33*	9.22*	
800		80	2.35	2.75	3.14	3.53	3.93*	4.37*	5.03*	5.58*	6.12*	8.29*	10.52*	
		100	2.54	2.97	3.41	3.84	4.27*	4.77*	5.50*	6.10*	6.71*	9.18*	11.73*	
		120	2.70	3.17	3.64	4.11	4.59*	5.12*	5.93*	6.59*	7.26*	10.01*	12.89*	
		140	2.85	3.35	3.86	4.36	4.88*	5.46*	6.33*	7.06*	7.79*	10.81*	14.00*	
		10	1.34	1.55	1.77	1.98	2.18*	2.41*	2.74*	3.01*	3.27*	4.26*	5.19*	
		20	1.64	1.90	2.17	2.42	2.67*	2.95*	3.36*	3.69*	4.01*	5.25*	6.44*	
		40	2.04	2.37	2.69	3.01	3.33*	3.68*	4.21*	4.63*	5.05*	6.67*	8.26*	
		60	2.33	2.71	3.09	3.45	3.82*	4.24*	4.85*	5.35*	5.85*	7.79*	9.73*	
		80	2.57	2.99	3.41	3.82	4.24*	4.71*	5.40*	5.97*	6.53*	8.78*	11.05*	
		100	2.77	3.23	3.69	4.15	4.61*	5.12*	5.89*	6.52*	7.15*	9.68*	12.26*	
		120	2.95	3.45	3.95	4.44	4.94*	5.50*	6.34*	7.03*	7.72*	10.52*	13.42*	
		140	3.12	3.65	4.18	4.71	5.25*	5.85*	6.76*	7.51*	8.26*	11.33*	14.52*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.0 Ft (RADIUS = 5.7 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		$(Ft \cdot s)^{1/2}$	4	8	12	16	20	24	30	35	40	60	80
0	10	0.66	0.87	1.10	1.32	1.55*	1.77*	2.12*	2.41*	2.70*	3.90*	5.13*	
	20	0.80	1.09	1.40	1.70	2.01*	2.33*	2.81*	3.22*	3.64*	5.35*	7.14*	
	40	1.04	1.46	1.90	2.34	2.80*	3.27*	3.98*	4.59*	5.21*	7.79*	10.51*	
	60	1.25	1.79	2.34	2.91	3.49*	4.08*	5.00*	5.78*	6.58*	9.93*	13.48*	
	80	1.44	2.09	2.75	3.43	4.12*	4.84*	5.94*	6.88*	7.85*	11.90*	16.20*	
	100	1.62	2.37	3.13	3.91	4.72*	5.54*	6.82*	7.92*	9.04*	13.74*	18.75*	
	120	1.80	2.63	3.49	4.37	5.28*	6.22*	7.66*	8.90*	10.17*	15.50*	21.18*	
25	140	1.96	2.89	3.84	4.82	5.82*	6.86*	8.46*	9.84*	11.25*	17.18*	23.51*	
	10	0.91	1.10	1.31	1.52	1.73*	1.95*	2.29*	2.58*	2.87*	4.05*	5.26*	
	20	1.07	1.33	1.60	1.88	2.18*	2.49*	2.96*	3.36*	3.78*	5.47*	7.25*	
	40	1.32	1.68	2.08	2.50	2.94*	3.40*	4.10*	4.71*	5.32*	7.90*	10.61*	
	60	1.53	1.99	2.50	3.05	3.61*	4.20*	5.11*	5.89*	6.69*	10.03*	13.57*	
	80	1.71	2.28	2.90	3.56	4.24*	4.95*	6.05*	6.99*	7.95*	11.99*	16.28*	
	100	1.88	2.55	3.27	4.03	4.83*	5.65*	6.92*	8.01*	9.13*	13.83*	18.83*	
50	120	2.05	2.81	3.63	4.49	5.39*	6.32*	7.75*	8.99*	10.25*	15.58*	21.26*	
	140	2.20	3.05	3.97	4.93	5.93*	6.96*	8.55*	9.93*	11.33*	17.26*	23.58*	
	10	1.03	1.23	1.45	1.66	1.87*	2.10*	2.44*	2.73*	3.02*	4.19*	5.40*	
	20	1.22	1.48	1.76	2.03	2.32*	2.63*	3.10*	3.50*	3.91*	5.60*	7.37*	
	40	1.50	1.86	2.24	2.65	3.07*	3.53*	4.23*	4.83*	5.44*	8.00*	10.71*	
	60	1.72	2.17	2.66	3.18	3.74*	4.32*	5.23*	6.00*	6.80*	10.12*	13.66*	
	80	1.92	2.45	3.05	3.68	4.35*	5.06*	6.15*	7.09*	8.05*	12.08*	16.36*	
100	100	2.10	2.72	3.41	4.16	4.94*	5.75*	7.02*	8.11*	9.22*	13.91*	18.91*	
	120	2.26	2.97	3.76	4.61	5.49*	6.42*	7.85*	9.08*	10.34*	15.66*	21.33*	
	140	2.42	3.22	4.10	5.04	6.03*	7.05*	8.65*	10.01*	11.42*	17.34*	23.66*	
	10	1.18	1.40	1.63	1.86	2.08*	2.32*	2.68*	2.98*	3.27*	4.46*	5.66*	
	20	1.42	1.70	1.98	2.27	2.56*	2.88*	3.36*	3.76*	4.17*	5.84*	7.60*	
	40	1.75	2.12	2.50	2.90	3.32*	3.77*	4.47*	5.06*	5.67*	8.21*	10.91*	
	60	2.01	2.45	2.93	3.44	3.98*	4.55*	5.45*	6.22*	7.00*	10.31*	13.83*	
150	80	2.22	2.75	3.32	3.93	4.58*	5.28*	6.36*	7.29*	8.24*	12.25*	16.53*	
	100	2.42	3.02	3.68	4.40	5.15*	5.96*	7.22*	8.30*	9.41*	14.08*	19.07*	
	120	2.60	3.28	4.03	4.84	5.70*	6.62*	8.04*	9.26*	10.52*	15.82*	21.48*	
	140	2.76	3.52	4.36	5.26	6.23*	7.25*	8.83*	10.19*	11.59*	17.49*	23.80*	
	10	1.29	1.53	1.77	2.00	2.24*	2.49*	2.87*	3.17*	3.48*	4.69*	5.91*	
	20	1.56	1.86	2.16	2.45	2.75*	3.03*	3.57*	3.98*	4.39*	6.07*	7.82*	
	40	1.93	2.32	2.71	3.12	3.54*	3.99*	4.69*	5.28*	5.89*	8.42*	11.10*	
	60	2.21	2.68	3.16	3.67	4.19*	4.77*	5.66*	6.43*	7.21*	10.50*	14.01*	
	80	2.45	2.99	3.56	4.16	4.80*	5.49*	6.56*	7.48*	8.43*	12.43*	16.69*	
	100	2.66	3.27	3.92	4.62	5.36*	6.16*	7.41*	8.49*	9.59*	14.25*	19.22*	
	120	2.85	3.53	4.27	5.06	5.90*	6.81*	8.23*	9.44*	10.69*	15.98*	21.63*	
	140	3.03	3.78	4.60	5.48	6.42*	7.43*	9.01*	10.36*	11.76*	17.64*	23.94*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.0 Ft (RADIUS = 5.7 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
(Ft*s) ^{1/2}	200	10	1.38	1.63	1.88	2.12	2.37*	2.63*	3.02*	3.34*	3.66*	4.90*	6.13*
		20	1.68	1.99	2.30	2.60	2.91*	3.25*	3.76*	4.18*	4.60*	6.29*	8.04*
		40	2.08	2.48	2.89	3.30	3.72*	4.19*	4.90*	5.49*	6.10*	8.62*	11.29*
		60	2.39	2.86	3.36	3.86	4.39*	4.98*	5.87*	6.63*	7.41*	10.69*	14.18*
		80	2.64	3.19	3.77	4.37	5.00*	5.69*	6.76*	7.68*	8.62*	12.60*	16.86*
		100	2.86	3.48	4.14	4.83	5.56*	6.36*	7.60*	8.67*	9.77*	14.41*	19.38*
		120	3.07	3.75	4.49	5.27	6.10*	7.00*	8.41*	9.62*	10.87*	16.14*	21.78*
	300	140	3.26	4.01	4.82	5.69	6.62*	7.62*	9.19*	10.54*	11.93*	17.80*	24.09*
		10	1.53	1.80	2.06	2.32	2.58*	2.86*	3.28*	3.61*	3.95*	5.24*	6.52*
		20	1.87	2.20	2.53	2.85	3.18*	3.54*	4.07*	4.51*	4.94*	6.68*	8.45*
		40	2.33	2.75	3.18	3.61	4.04*	4.53*	5.26*	5.87*	6.48*	9.01*	11.67*
		60	2.66	3.17	3.68	4.20	4.74*	5.34*	6.24*	7.01*	7.79*	11.05*	14.53*
		80	2.95	3.52	4.12	4.72	5.36*	6.06*	7.14*	8.05*	8.99*	12.95*	17.18*
		100	3.20	3.84	4.51	5.20	5.93*	6.73*	7.97*	9.04*	10.13*	14.74*	19.69*
400	120	3.42	4.13	4.87	5.65	6.47*	7.37*	8.77*	9.98*	11.21*	16.45*	22.07*	
	140	3.63	4.40	5.21	6.07	6.98*	7.98*	9.54*	10.88*	12.26*	18.10*	24.37*	
	10	1.65	1.93	2.21	2.48	2.75*	3.05*	3.49*	3.84*	4.19*	5.54*	6.85*	
	20	2.02	2.37	2.72	3.06	3.40*	3.77*	4.33*	4.79*	5.24*	7.03*	8.82*	
	40	2.52	2.97	3.42	3.86	4.31*	4.82*	5.57*	6.19*	6.82*	9.38*	12.04*	
	60	2.89	3.42	3.95	4.49	5.04*	5.65*	6.58*	7.36*	8.14*	11.41*	14.87*	
	80	3.20	3.80	4.41	5.03	5.68*	6.39*	7.48*	8.40*	9.35*	13.29*	17.50*	
600	100	3.47	4.13	4.82	5.52	6.26*	7.07*	8.32*	9.38*	10.47*	15.07*	19.99*	
	120	3.71	4.44	5.20	5.98	6.80*	7.71*	9.12*	10.32*	11.55*	16.77*	22.37*	
	140	3.93	4.72	5.55	6.41	7.32*	8.33*	9.88*	11.21*	12.59*	18.40*	24.65*	
	10	1.84	2.14	2.45	2.74	3.03*	3.36*	3.83*	4.21*	4.58*	6.02*	7.41*	
	20	2.27	2.65	3.02	3.39	3.75*	4.16*	4.76*	5.25*	5.73*	7.61*	9.47*	
	40	2.84	3.32	3.80	4.28	4.76*	5.30*	6.09*	6.75*	7.41*	10.03*	12.72*	
	60	3.26	3.83	4.40	4.96	5.54*	6.19*	7.16*	7.96*	8.77*	12.08*	15.54*	
800	80	3.61	4.25	4.90	5.55	6.22*	6.96*	8.09*	9.03*	9.99*	13.95*	18.14*	
	100	3.91	4.62	5.34	6.07	6.82*	7.67*	8.94*	10.02*	11.12*	15.70*	20.60*	
	120	4.18	4.95	5.75	6.55	7.39*	8.32*	9.75*	10.96*	12.19*	17.38*	22.95*	
	140	4.42	5.26	6.12	7.00	7.92*	8.95*	10.51*	11.85*	13.22*	19.00*	25.22*	
	10	1.99	2.32	2.64	2.95	3.26*	3.60*	4.10*	4.51*	4.90*	6.42*	7.87*	
	20	2.47	2.87	3.27	3.66	4.04*	4.48*	5.11*	5.63*	6.13*	8.10*	10.03*	
	40	3.10	3.61	4.12	4.62	5.13*	5.69*	6.53*	7.22*	7.90*	10.61*	13.35*	
	60	3.56	4.16	4.76	5.35	5.96*	6.64*	7.65*	8.48*	9.32*	12.69*	16.17*	
	80	3.94	4.61	5.30	5.98	6.67*	7.45*	8.61*	9.58*	10.56*	14.56*	18.76*	
	100	4.26	5.01	5.77	6.53	7.30*	8.18*	9.49*	10.59*	11.71*	16.31*	21.20*	
	120	4.56	5.37	6.20	7.03	7.89*	8.85*	10.31*	11.54*	12.79*	17.98*	23.53*	
140	4.83	5.70	6.60	7.50	8.44*	9.49*	11.09*	12.44*	13.82*	19.59*	25.78*		

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.0 Ft (RADIUS = 5.7 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft												
		4	8	12	16	20	24	30	35	40	60	80		
(Ft*s) ^{1/2}	0	10	1.01	1.37	1.74	2.12	2.51*	2.90*	3.49*	3.99*	4.50*	6.59*	8.77*	
		20	1.29	1.81	2.34	2.89	3.44*	4.01*	4.88*	5.61*	6.37*	9.50*	12.79*	
		40	1.77	2.55	3.35	4.17	5.01*	5.88*	7.21*	8.35*	9.51*	14.38*	19.55*	
		60	2.19	3.20	4.23	5.30	6.39*	7.52*	9.25*	10.74*	12.26*	18.66*	25.47*	
		80	2.58	3.80	5.05	6.33	7.66*	9.02*	11.13*	12.94*	14.79*	22.59*	30.92*	
		100	2.94	4.36	5.81	7.30	8.85*	10.44*	12.89*	15.00*	17.17*	26.28*	36.02*	
		120	3.29	4.89	6.53	8.23	9.98*	11.78*	14.57*	16.96*	19.42*	29.79*	40.88*	
		140	3.62	5.40	7.23	9.11	11.06*	13.07*	16.17*	18.85*	21.59*	33.16*	45.54*	
		25	10	1.34	1.65	1.99	2.34	2.70*	3.08*	3.66*	4.16*	4.66*	6.74*	8.91*
			20	1.63	2.07	2.56	3.07	3.61*	4.16*	5.02*	5.76*	6.51*	9.62*	12.91*
40	2.09		2.78	3.53	4.33	5.15*	6.01*	7.33*	8.47*	9.63*	14.49*	19.65*		
60	2.49		3.41	4.40	5.44	6.52*	7.64*	9.37*	10.85*	12.37*	18.76*	25.56*		
80	2.86		3.99	5.20	6.46	7.78*	9.13*	11.23*	13.04*	14.89*	22.68*	31.00*		
100	3.21		4.54	5.95	7.43	8.96*	10.54*	12.99*	15.10*	17.26*	26.37*	36.10*		
120	3.54		5.06	6.67	8.35	10.08*	11.88*	14.66*	17.06*	19.51*	29.87*	40.96*		
140	3.86		5.57	7.36	9.23	11.16*	13.16*	16.27*	18.94*	21.67*	33.24*	45.61*		
50	10		1.51	1.84	2.17	2.52	2.87*	3.25*	3.83*	4.33*	4.82*	6.89*	9.05*	
	20		1.85	2.28	2.75	3.25	3.77*	4.32*	5.17*	5.90*	6.64*	9.75*	13.02*	
	40	2.34	2.99	3.71	4.48	5.29*	6.14*	7.46*	8.59*	9.74*	14.59*	19.74*		
	60	2.75	3.61	4.56	5.58	6.64*	7.76*	9.48*	10.96*	12.47*	18.85*	25.65*		
	80	3.12	4.18	5.35	6.59	7.89*	9.24*	11.34*	13.14*	14.99*	22.77*	31.08*		
	100	3.46	4.72	6.10	7.55	9.07*	10.65*	13.09*	15.19*	17.35*	26.45*	36.18*		
	120	3.79	5.24	6.81	8.46	10.19*	11.98*	14.76*	17.15*	19.60*	29.95*	41.03*		
	140	4.10	5.73	7.49	9.34	11.26*	13.26*	16.36*	19.02*	21.76*	33.31*	45.68*		
	100	10	1.75	2.09	2.44	2.80	3.16*	3.55*	4.14*	4.63*	5.13*	7.18*	9.32*	
		20	2.14	2.59	3.06	3.55	4.06*	4.61*	5.46*	6.18*	6.91*	9.99*	13.25*	
40		2.70	3.34	4.04	4.77	5.56*	6.40*	7.70*	8.82*	9.97*	14.80*	19.94*		
60		3.14	3.97	4.88	5.85	6.89*	7.99*	9.70*	11.17*	12.68*	19.04*	25.83*		
80		3.53	4.53	5.65	6.85	8.12*	9.47*	11.55*	13.34*	15.18*	22.95*	31.25*		
100		3.89	5.07	6.38	7.80	9.29*	10.86*	13.29*	15.39*	17.54*	26.62*	36.34*		
120		4.22	5.57	7.08	8.70	10.40*	12.18*	14.95*	17.33*	19.78*	30.11*	41.18*		
140		4.54	6.06	7.76	9.57	11.47*	13.45*	16.54*	19.20*	21.93*	33.47*	45.83*		
150		10	1.92	2.28	2.65	3.02	3.39*	3.79*	4.39*	4.89*	5.40*	7.45*	9.59*	
		20	2.36	2.83	3.31	3.81	4.32*	4.87*	5.72*	6.44*	7.18*	10.24*	13.48*	
	40	2.97	3.62	4.32	5.05	5.82*	6.65*	7.95*	9.06*	10.20*	15.01*	20.14*		
	60	3.45	4.27	5.16	6.12	7.13*	8.23*	9.93*	11.39*	12.89*	19.23*	26.01*		
	80	3.86	4.85	5.93	7.10	8.35*	9.68*	11.76*	13.54*	15.38*	23.12*	31.41*		
	100	4.23	5.38	6.66	8.04	9.50*	11.06*	13.49*	15.58*	17.72*	26.79*	36.49*		
	120	4.58	5.89	7.35	8.93	10.61*	12.38*	15.14*	17.51*	19.96*	30.27*	41.33*		
	140	4.90	6.37	8.02	9.79	11.67*	13.65*	16.72*	19.38*	22.10*	33.62*	45.97*		

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.0 Ft (RADIUS = 5.7 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
(Ft*s) ^{1/2}	°F											
200	10	2.06	2.43	2.82	3.20	3.58*	3.99*	4.61*	5.13*	5.64*	7.71*	9.84*
	20	2.54	3.02	3.52	4.02	4.54*	5.11*	5.97*	6.69*	7.42*	10.48*	13.71*
	40	3.20	3.86	4.56	5.29	6.05*	6.89*	8.18*	9.29*	10.43*	15.22*	20.33*
	60	3.71	4.53	5.42	6.36	7.36*	8.45*	10.15*	11.60*	13.10*	19.42*	26.18*
	80	4.14	5.13	6.20	7.35	8.57*	9.90*	11.96*	13.74*	15.57*	23.30*	31.58*
	100	4.53	5.67	6.92	8.27	9.72*	11.27*	13.68*	15.77*	17.91*	26.95*	36.65*
	120	4.89	6.18	7.61	9.16	10.81*	12.58*	15.33*	17.70*	20.13*	30.43*	41.48*
140	5.22	6.66	8.27	10.01	11.87*	13.84*	16.90*	19.55*	22.27*	33.78*	46.12*	
300	10	2.28	2.69	3.09	3.49	3.89*	4.33*	4.98*	5.52*	6.05*	8.18*	10.33*
	20	2.82	3.34	3.86	4.39	4.92*	5.51*	6.39*	7.13*	7.88*	10.94*	14.16*
	40	3.56	4.26	4.98	5.72	6.49*	7.33*	8.63*	9.74*	10.87*	15.63*	20.72*
	60	4.12	4.98	5.88	6.81	7.80*	8.89*	10.57*	12.02*	13.51*	19.80*	26.53*
	80	4.60	5.60	6.67	7.80	9.01*	10.32*	12.37*	14.14*	15.96*	23.65*	31.90*
	100	5.02	6.16	7.40	8.72	10.14*	11.68*	14.07*	16.14*	18.27*	27.29*	36.96*
	120	5.40	6.69	8.09	9.60	11.22*	12.97*	15.70*	18.06*	20.48*	30.75*	41.78*
140	5.76	7.18	8.75	10.45	12.26*	14.22*	17.27*	19.90*	22.61*	34.08*	46.40*	
400	10	2.46	2.89	3.32	3.73	4.15*	4.61*	5.29*	5.85*	6.40*	8.59*	10.77*
	20	3.06	3.60	4.15	4.69	5.24*	5.85*	6.77*	7.52*	8.28*	11.38*	14.60*
	40	3.86	4.59	5.33	6.08	6.86*	7.73*	9.04*	10.15*	11.29*	16.03*	21.10*
	60	4.47	5.35	6.27	7.21	8.20*	9.30*	10.98*	12.43*	13.91*	20.17*	26.88*
	80	4.98	6.00	7.08	8.21	9.41*	10.73*	12.77*	14.53*	16.34*	24.00*	32.23*
	100	5.42	6.59	7.83	9.14	10.54*	12.07*	14.46*	16.52*	18.63*	27.62*	37.27*
	120	5.83	7.13	8.53	10.02	11.61*	13.35*	16.07*	18.42*	20.83*	31.07*	42.07*
140	6.21	7.64	9.19	10.86	12.65*	14.59*	17.62*	20.25*	22.94*	34.39*	46.69*	
600	10	2.76	3.22	3.68	4.13	4.57*	5.07*	5.80*	6.40*	6.99*	9.28*	11.55*
	20	3.43	4.02	4.61	5.19	5.77*	6.42*	7.39*	8.19*	8.98*	12.16*	15.42*
	40	4.35	5.12	5.91	6.70	7.50*	8.41*	9.76*	10.90*	12.05*	16.82*	21.86*
	60	5.03	5.96	6.92	7.89	8.90*	10.02*	11.74*	13.19*	14.67*	20.90*	27.58*
	80	5.59	6.67	7.79	8.93	10.13*	11.47*	13.52*	15.28*	17.08*	24.69*	32.88*
	100	6.09	7.30	8.57	9.88	11.27*	12.82*	15.20*	17.24*	19.35*	28.28*	37.89*
	120	6.53	7.88	9.29	10.78	12.35*	14.09*	16.79*	19.12*	21.52*	31.70*	42.67*
140	6.95	8.42	9.98	11.62	13.38*	15.32*	18.33*	20.93*	23.61*	35.00*	47.26*	
800	10	2.99	3.48	3.97	4.45	4.92*	5.45*	6.22*	6.85*	7.47*	9.87*	12.21*
	20	3.74	4.36	4.99	5.59	6.21*	6.90*	7.91*	8.74*	9.57*	12.85*	16.16*
	40	4.74	5.56	6.39	7.21	8.04*	8.98*	10.39*	11.56*	12.73*	17.55*	22.59*
	60	5.48	6.46	7.46	8.46	9.50*	10.66*	12.41*	13.88*	15.38*	21.62*	28.26*
	80	6.09	7.22	8.37	9.55	10.77*	12.13*	14.21*	15.98*	17.78*	25.38*	33.53*
	100	6.63	7.89	9.19	10.53	11.93*	13.49*	15.89*	17.94*	20.04*	28.93*	38.50*
	120	7.11	8.50	9.95	11.44	13.02*	14.77*	17.48*	19.81*	22.19*	32.33*	43.25*
140	7.55	9.07	10.65	12.31	14.05*	16.00*	19.01*	21.60*	24.27*	35.60*	47.83*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.0 Ft (RADIUS = 7.1 Ft)
 FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX		TEMPERATURE RISE		CEILING HEIGHT, Ft											
				4	8	12	16	20	24	30	35	40	60	80	
(Ft*s) ^{1/2}	°F	0	0.36	0.44	0.53	0.62	0.71	0.80*	0.93*	1.04*	1.15*	1.59*	2.03*		
		10	0.40	0.50	0.61	0.72	0.83	0.94*	1.11*	1.25*	1.39*	1.96*	2.54*		
		20	0.47	0.61	0.75	0.90	1.05	1.19*	1.42*	1.61*	1.80*	2.59*	3.41*		
		40	0.53	0.70	0.87	1.05	1.23	1.41*	1.69*	1.93*	2.16*	3.15*	4.17*		
		60	0.59	0.78	0.99	1.19	1.40	1.62*	1.94*	2.22*	2.50*	3.66*	4.87*		
		80	0.64	0.86	1.09	1.33	1.56	1.80*	2.17*	2.49*	2.81*	4.13*	5.52*		
25	100 <td>0.69</td> <td>0.94</td> <td>1.19</td> <td>1.45</td> <td>1.72</td> <td>1.98*</td> <td>2.40*</td> <td>2.75*</td> <td>3.10*</td> <td>4.59*</td> <td>6.15*</td>	0.69	0.94	1.19	1.45	1.72	1.98*	2.40*	2.75*	3.10*	4.59*	6.15*			
	120	0.74	1.01	1.29	1.57	1.86	2.16*	2.61*	2.99*	3.39*	5.02*	6.75*			
	140	0.50	0.59	0.67	0.76	0.85	0.94*	1.07*	1.18*	1.29*	1.73*	2.16*			
	20	0.57	0.67	0.77	0.88	0.98	1.08*	1.25*	1.39*	1.53*	2.09*	2.66*			
	40	0.67	0.79	0.92	1.05	1.18	1.32*	1.54*	1.73*	1.92*	2.70*	3.51*			
	60	0.74	0.88	1.03	1.19	1.36	1.53*	1.80*	2.03*	2.27*	3.24*	4.26*			
50	80 <td>0.80</td> <td>0.96</td> <td>1.14</td> <td>1.33</td> <td>1.52</td> <td>1.73*</td> <td>2.04*</td> <td>2.32*</td> <td>2.59*</td> <td>3.74*</td> <td>4.95*</td>	0.80	0.96	1.14	1.33	1.52	1.73*	2.04*	2.32*	2.59*	3.74*	4.95*			
	100	0.86	1.04	1.24	1.46	1.68	1.91*	2.27*	2.58*	2.90*	4.22*	5.60*			
	120	0.91	1.11	1.34	1.58	1.83	2.08*	2.49*	2.84*	3.19*	4.67*	6.22*			
	140	0.96	1.18	1.43	1.69	1.97	2.25*	2.70*	3.08*	3.47*	5.10*	6.82*			
	10	0.56	0.65	0.74	0.84	0.93	1.02*	1.16*	1.27*	1.39*	1.84*	2.28*			
	20	0.65	0.75	0.86	0.97	1.07	1.18*	1.35*	1.49*	1.63*	2.20*	2.77*			
100	40 <td>0.76</td> <td>0.89</td> <td>1.02</td> <td>1.16</td> <td>1.29</td> <td>1.43*</td> <td>1.65*</td> <td>1.84*</td> <td>2.03*</td> <td>2.80*</td> <td>3.60*</td>	0.76	0.89	1.02	1.16	1.29	1.43*	1.65*	1.84*	2.03*	2.80*	3.60*			
	60	0.85	0.99	1.15	1.31	1.47	1.64*	1.91*	2.14*	2.37*	3.34*	4.35*			
	80	0.92	1.09	1.26	1.45	1.64	1.83*	2.15*	2.42*	2.69*	3.83*	5.03*			
	100	0.98	1.17	1.37	1.57	1.79	2.01*	2.37*	2.68*	2.99*	4.30*	5.68*			
	120	1.04	1.24	1.46	1.69	1.93	2.18*	2.58*	2.93*	3.28*	4.75*	6.30*			
	140	1.10	1.32	1.55	1.81	2.07	2.35*	2.79*	3.17*	3.56*	5.18*	6.89*			
150	10 <td>0.64</td> <td>0.73</td> <td>0.83</td> <td>0.93</td> <td>1.03</td> <td>1.12*</td> <td>1.28*</td> <td>1.40*</td> <td>1.53*</td> <td>2.00*</td> <td>2.46*</td>	0.64	0.73	0.83	0.93	1.03	1.12*	1.28*	1.40*	1.53*	2.00*	2.46*			
	20	0.74	0.85	0.97	1.09	1.20	1.31*	1.50*	1.65*	1.80*	2.39*	2.97*			
	40	0.88	1.02	1.16	1.31	1.45	1.59*	1.82*	2.02*	2.21*	2.99*	3.79*			
	60	0.99	1.15	1.31	1.48	1.65	1.81*	2.09*	2.32*	2.56*	3.52*	4.52*			
	80	1.08	1.25	1.44	1.63	1.82	2.01*	2.33*	2.60*	2.87*	4.00*	5.20*			
	100	1.16	1.35	1.55	1.76	1.97	2.19*	2.55*	2.86*	3.17*	4.46*	5.83*			
	120 <td>1.22</td> <td>1.43</td> <td>1.66</td> <td>1.88</td> <td>2.12</td> <td>2.36*</td> <td>2.76*</td> <td>3.10*</td> <td>3.45*</td> <td>4.90*</td> <td>6.44*</td>	1.22	1.43	1.66	1.88	2.12	2.36*	2.76*	3.10*	3.45*	4.90*	6.44*			
	140	1.29	1.51	1.75	2.00	2.26	2.53*	2.96*	3.34*	3.72*	5.33*	7.03*			
	10	0.69	0.79	0.90	1.00	1.10	1.20*	1.37*	1.50*	1.63*	2.13*	2.60*			
	20	0.81	0.93	1.06	1.18	1.30	1.42*	1.61*	1.77*	1.92*	2.53*	3.13*			
	40	0.97	1.12	1.27	1.42	1.57	1.71*	1.96*	2.16*	2.36*	3.16*	3.96*			
	60	1.09	1.26	1.43	1.61	1.78	1.95*	2.24*	2.48*	2.72*	3.69*	4.69*			
	80 <td>1.19</td> <td>1.38</td> <td>1.57</td> <td>1.77</td> <td>1.96</td> <td>2.16*</td> <td>2.48*</td> <td>2.76*</td> <td>3.03*</td> <td>4.17*</td> <td>5.35*</td>	1.19	1.38	1.57	1.77	1.96	2.16*	2.48*	2.76*	3.03*	4.17*	5.35*			
	100	1.28	1.48	1.69	1.91	2.12	2.34*	2.71*	3.02*	3.33*	4.62*	5.99*			
	120	1.36	1.58	1.81	2.04	2.28	2.52*	2.92*	3.26*	3.61*	5.06*	6.59*			
	140	1.43	1.66	1.91	2.16	2.42	2.68*	3.12*	3.50*	3.88*	5.48*	7.17*			

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.0 Ft (RADIUS = 7.1 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		°F	4	8	12	16	20	24	30	35	40	60
200 (Ft*s) ^{1/2}	10	0.73	0.84	0.95	1.06	1.17	1.27*	1.44*	1.58*	1.71*	2.23*	2.72*
	20	0.87	0.99	1.12	1.25	1.38	1.50*	1.70*	1.87*	2.03*	2.66*	3.27*
	40	1.05	1.20	1.36	1.51	1.67	1.82*	2.07*	2.28*	2.49*	3.31*	4.12*
	60	1.18	1.35	1.53	1.71	1.89	2.07*	2.36*	2.61*	2.86*	3.84*	4.85*
	80	1.29	1.48	1.68	1.88	2.08	2.28*	2.62*	2.90*	3.18*	4.32*	5.51*
	100	1.38	1.59	1.81	2.03	2.25	2.47*	2.85*	3.16*	3.48*	4.78*	6.14*
	120	1.47	1.69	1.93	2.17	2.41	2.65*	3.07*	3.41*	3.76*	5.21*	6.73*
300	140	1.54	1.79	2.04	2.30	2.56	2.82*	3.27*	3.65*	4.03*	5.62*	7.31*
	10	0.80	0.92	1.04	1.15	1.26	1.37*	1.55*	1.70*	1.84*	2.39*	2.91*
	20	0.96	1.09	1.23	1.37	1.50	1.63*	1.85*	2.02*	2.20*	2.87*	3.51*
	40	1.17	1.33	1.50	1.66	1.83	1.99*	2.26*	2.48*	2.70*	3.56*	4.40*
	60	1.32	1.50	1.70	1.89	2.07	2.26*	2.57*	2.83*	3.09*	4.11*	5.14*
	80	1.44	1.65	1.86	2.07	2.28	2.49*	2.85*	3.14*	3.43*	4.60*	5.80*
	100	1.55	1.77	2.00	2.24	2.47	2.70*	3.09*	3.42*	3.74*	5.06*	6.42*
400	120	1.64	1.88	2.13	2.39	2.64	2.89*	3.32*	3.67*	4.03*	5.49*	7.02*
	140	1.73	1.99	2.25	2.52	2.79	3.06*	3.53*	3.91*	4.30*	5.91*	7.59*
	10	0.86	0.98	1.10	1.23	1.34	1.46*	1.65*	1.80*	1.95*	2.53*	3.07*
	20	1.03	1.18	1.32	1.46	1.60	1.74*	1.97*	2.16*	2.34*	3.04*	3.71*
	40	1.26	1.43	1.61	1.79	1.96	2.12*	2.41*	2.64*	2.87*	3.77*	4.64*
	60	1.43	1.62	1.83	2.03	2.22	2.42*	2.75*	3.02*	3.29*	4.34*	5.39*
	80	1.56	1.78	2.01	2.23	2.45	2.66*	3.04*	3.34*	3.65*	4.85*	6.07*
600	100	1.68	1.92	2.16	2.40	2.65	2.88*	3.29*	3.63*	3.97*	5.32*	6.69*
	120	1.78	2.04	2.30	2.56	2.82	3.08*	3.53*	3.90*	4.26*	5.75*	7.28*
	140	1.88	2.15	2.43	2.71	2.99	3.27*	3.75*	4.15*	4.54*	6.17*	7.85*
	10	0.95	1.08	1.22	1.35	1.47	1.59*	1.80*	1.97*	2.13*	2.75*	3.33*
	20	1.15	1.31	1.46	1.62	1.77	1.92*	2.16*	2.37*	2.56*	3.32*	4.03*
	40	1.41	1.60	1.80	1.99	2.17	2.35*	2.66*	2.91*	3.16*	4.11*	5.04*
	60	1.60	1.82	2.04	2.26	2.47	2.68*	3.03*	3.33*	3.61*	4.74*	5.83*
800	80	1.76	2.00	2.24	2.48	2.72	2.95*	3.35*	3.68*	4.00*	5.27*	6.53*
	100	1.89	2.15	2.42	2.68	2.94	3.19*	3.63*	3.99*	4.34*	5.76*	7.17*
	120	2.01	2.29	2.57	2.85	3.13	3.41*	3.88*	4.27*	4.66*	6.21*	7.77*
	140	2.12	2.41	2.72	3.02	3.31	3.61*	4.12*	4.54*	4.95*	6.63*	8.34*
	10	1.03	1.16	1.30	1.44	1.58	1.70*	1.92*	2.10*	2.27*	2.93*	3.54*
	20	1.25	1.41	1.58	1.74	1.90	2.06*	2.32*	2.54*	2.75*	3.54*	4.30*
	40	1.54	1.74	1.95	2.15	2.34	2.53*	2.86*	3.13*	3.39*	4.40*	5.37*
	60	1.75	1.98	2.21	2.44	2.67	2.89*	3.27*	3.58*	3.88*	5.06*	6.21*
	80	1.92	2.17	2.43	2.69	2.94	3.18*	3.61*	3.95*	4.29*	5.63*	6.93*
	100	2.07	2.34	2.62	2.90	3.17	3.44*	3.90*	4.28*	4.66*	6.13*	7.59*
	120	2.20	2.49	2.80	3.09	3.39	3.67*	4.17*	4.58*	4.99*	6.60*	8.20*
	140	2.32	2.63	2.95	3.27	3.58	3.89*	4.42*	4.86*	5.30*	7.04*	8.78*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.0 Ft (RADIUS = 7.1 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
(Ft*s) ^{1/2}	°F												
0	10	0.51	0.64	0.78	0.92	1.06	1.20*	1.41*	1.58*	1.76*	2.47*	3.19*	
	20	0.60	0.77	0.95	1.13	1.31	1.50*	1.78*	2.01*	2.25*	3.22*	4.22*	
	40	0.74	0.98	1.23	1.48	1.74	2.00*	2.39*	2.73*	3.07*	4.48*	5.96*	
	60	0.86	1.16	1.47	1.79	2.11	2.43*	2.93*	3.36*	3.79*	5.59*	7.48*	
	80	0.97	1.33	1.70	2.07	2.45	2.84*	3.43*	3.94*	4.46*	6.61*	8.87*	
	100	1.08	1.49	1.91	2.33	2.77	3.22*	3.90*	4.48*	5.08*	7.56*	10.18*	
	120	1.18	1.64	2.11	2.59	3.08	3.58*	4.34*	5.00*	5.67*	8.47*	11.43*	
	140	1.28	1.79	2.30	2.83	3.37	3.92*	4.77*	5.49*	6.24*	9.34*	12.63*	
	25	10	0.72	0.84	0.97	1.10	1.23	1.36*	1.57*	1.74*	1.92*	2.62*	3.33*
		20	0.83	0.98	1.14	1.31	1.48	1.65*	1.92*	2.15*	2.39*	3.34*	4.34*
40		0.99	1.19	1.41	1.64	1.88	2.13*	2.52*	2.85*	3.19*	4.59*	6.05*	
60		1.12	1.37	1.64	1.94	2.24	2.55*	3.05*	3.47*	3.90*	5.68*	7.57*	
80		1.23	1.53	1.86	2.21	2.57	2.95*	3.54*	4.04*	4.55*	6.69*	8.96*	
100		1.34	1.68	2.06	2.47	2.89	3.32*	4.00*	4.58*	5.17*	7.64*	10.26*	
120		1.43	1.83	2.26	2.71	3.19	3.68*	4.44*	5.09*	5.76*	8.55*	11.50*	
140		1.53	1.96	2.44	2.95	3.48	4.02*	4.86*	5.58*	6.32*	9.41*	12.70*	
50		10	0.81	0.94	1.07	1.21	1.34	1.48*	1.69*	1.87*	2.05*	2.75*	3.46*
		20	0.94	1.10	1.27	1.43	1.60	1.77*	2.05*	2.28*	2.51*	3.47*	4.45*
	40	1.13	1.34	1.55	1.78	2.01	2.25*	2.64*	2.97*	3.30*	4.69*	6.15*	
	60	1.28	1.53	1.79	2.07	2.37	2.67*	3.16*	3.58*	4.00*	5.78*	7.65*	
	80	1.40	1.69	2.01	2.34	2.69	3.06*	3.64*	4.14*	4.65*	6.78*	9.04*	
	100	1.52	1.85	2.21	2.59	3.00	3.42*	4.10*	4.67*	5.26*	7.73*	10.34*	
	120	1.62	1.99	2.40	2.84	3.30	3.78*	4.53*	5.18*	5.85*	8.63*	11.58*	
	140	1.72	2.13	2.58	3.07	3.58	4.11*	4.95*	5.67*	6.41*	9.49*	12.77*	
	100	10	0.92	1.06	1.21	1.35	1.50	1.64*	1.87*	2.06*	2.24*	2.97*	3.69*
		20	1.09	1.26	1.44	1.62	1.79	1.97*	2.25*	2.49*	2.73*	3.69*	4.67*
40		1.32	1.54	1.76	1.99	2.23	2.46*	2.85*	3.18*	3.52*	4.90*	6.34*	
60		1.49	1.75	2.02	2.30	2.59	2.88*	3.37*	3.78*	4.21*	5.97*	7.83*	
80		1.64	1.93	2.25	2.58	2.92	3.27*	3.84*	4.34*	4.84*	6.96*	9.20*	
100		1.77	2.10	2.45	2.83	3.22	3.63*	4.29*	4.86*	5.44*	7.89*	10.50*	
120		1.89	2.25	2.65	3.07	3.51	3.97*	4.72*	5.36*	6.02*	8.79*	11.73*	
140		2.00	2.40	2.83	3.30	3.79	4.30*	5.13*	5.84*	6.57*	9.64*	12.91*	
150		10	1.00	1.15	1.31	1.46	1.61	1.76*	2.00*	2.20*	2.39*	3.15*	3.89*
		20	1.20	1.38	1.56	1.75	1.93	2.11*	2.42*	2.66*	2.91*	3.89*	4.88*
	40	1.46	1.68	1.92	2.16	2.40	2.64*	3.04*	3.37*	3.71*	5.09*	6.53*	
	60	1.65	1.92	2.20	2.49	2.78	3.07*	3.56*	3.98*	4.40*	6.15*	8.00*	
	80	1.81	2.12	2.44	2.77	3.11	3.46*	4.03*	4.53*	5.03*	7.13*	9.36*	
	100	1.96	2.30	2.66	3.03	3.42	3.81*	4.48*	5.04*	5.62*	8.06*	10.65*	
	120	2.09	2.46	2.86	3.27	3.71	4.16*	4.90*	5.54*	6.19*	8.94*	11.88*	
	140	2.20	2.61	3.05	3.50	3.98	4.48*	5.31*	6.02*	6.74*	9.80*	13.05*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.0 Ft (RADIUS = 7.1 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX		TEMPERATURE RISE		CEILING HEIGHT, Ft									
(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60	80	
200	10	1.07	1.23	1.39	1.55	1.70	1.86*	2.11*	2.31*	2.52*	3.30*	4.06*	
	20	1.28	1.47	1.67	1.86	2.05	2.24*	2.55*	2.81*	3.06*	4.07*	5.07*	
	40	1.57	1.81	2.05	2.30	2.54	2.79*	3.20*	3.54*	3.89*	5.28*	6.72*	
	60	1.78	2.06	2.35	2.64	2.94	3.23*	3.73*	4.15*	4.58*	6.33*	8.17*	
	80	1.96	2.27	2.60	2.94	3.28	3.62*	4.21*	4.70*	5.21*	7.30*	9.53*	
	100	2.11	2.46	2.83	3.20	3.59	3.99*	4.65*	5.22*	5.80*	8.22*	10.80*	
	120	2.25	2.63	3.03	3.45	3.89	4.33*	5.07*	5.71*	6.36*	9.10*	12.02*	
300	140	2.38	2.79	3.23	3.69	4.16	4.66*	5.48*	6.18*	6.91*	9.95*	13.20*	
	10	1.18	1.35	1.52	1.69	1.85	2.01*	2.28*	2.50*	2.72*	3.54*	4.34*	
	20	1.42	1.63	1.83	2.04	2.24	2.44*	2.77*	3.04*	3.31*	4.36*	5.40*	
	40	1.75	2.00	2.26	2.52	2.78	3.04*	3.47*	3.83*	4.18*	5.61*	7.06*	
	60	1.99	2.28	2.59	2.90	3.20	3.51*	4.03*	4.46*	4.90*	6.67*	8.51*	
	80	2.19	2.52	2.87	3.22	3.57	3.92*	4.52*	5.02*	5.53*	7.63*	9.84*	
	100	2.36	2.73	3.11	3.50	3.89	4.29*	4.97*	5.54*	6.12*	8.54*	11.11*	
400	120	2.51	2.91	3.33	3.76	4.20	4.64*	5.40*	6.03*	6.69*	9.41*	12.32*	
	140	2.66	3.09	3.54	4.01	4.49	4.97*	5.80*	6.51*	7.22*	10.25*	13.48*	
	10	1.27	1.44	1.62	1.80	1.98	2.14*	2.43*	2.66*	2.88*	3.75*	4.58*	
	20	1.54	1.75	1.97	2.19	2.40	2.60*	2.95*	3.24*	3.52*	4.61*	5.68*	
	40	1.90	2.16	2.44	2.71	2.98	3.24*	3.70*	4.07*	4.44*	5.90*	7.38*	
	60	2.16	2.47	2.79	3.11	3.43	3.74*	4.28*	4.73*	5.17*	6.97*	8.83*	
	80	2.37	2.72	3.09	3.45	3.81	4.17*	4.79*	5.31*	5.82*	7.94*	10.15*	
600	100	2.56	2.95	3.35	3.75	4.15	4.56*	5.25*	5.83*	6.42*	8.85*	11.41*	
	120	2.73	3.15	3.58	4.02	4.47	4.92*	5.68*	6.33*	6.99*	9.71*	12.60*	
	140	2.88	3.33	3.80	4.28	4.76	5.25*	6.09*	6.80*	7.53*	10.54*	13.76*	
	10	1.41	1.60	1.79	1.99	2.17	2.35*	2.66*	2.91*	3.15*	4.08*	4.96*	
	20	1.72	1.95	2.19	2.42	2.65	2.87*	3.25*	3.56*	3.86*	5.03*	6.16*	
	40	2.13	2.42	2.72	3.01	3.30	3.58*	4.07*	4.47*	4.86*	6.40*	7.93*	
	60	2.43	2.77	3.11	3.46	3.79	4.12*	4.70*	5.17*	5.64*	7.52*	9.41*	
800	80	2.68	3.05	3.44	3.83	4.21	4.59*	5.24*	5.79*	6.33*	8.50*	10.74*	
	100	2.89	3.30	3.73	4.16	4.58	5.00*	5.73*	6.34*	6.95*	9.42*	11.98*	
	120	3.08	3.53	3.99	4.45	4.92	5.38*	6.18*	6.85*	7.52*	10.28*	13.17*	
	140	3.25	3.73	4.23	4.73	5.23	5.74*	6.61*	7.33*	8.07*	11.10*	14.31*	
	10	1.52	1.72	1.93	2.14	2.33	2.52*	2.85*	3.11*	3.37*	4.35*	5.28*	
	20	1.87	2.11	2.37	2.61	2.85	3.09*	3.49*	3.82*	4.14*	5.37*	6.55*	
	40	2.32	2.63	2.95	3.26	3.56	3.86*	4.37*	4.79*	5.21*	6.83*	8.41*	
1000	60	2.65	3.01	3.38	3.74	4.09	4.44*	5.05*	5.55*	6.04*	7.98*	9.92*	
	80	2.92	3.32	3.73	4.14	4.54	4.93*	5.62*	6.19*	6.75*	9.00*	11.27*	
	100	3.16	3.60	4.05	4.49	4.94	5.37*	6.14*	6.77*	7.40*	9.93*	12.52*	
	120	3.37	3.84	4.33	4.81	5.29	5.77*	6.61*	7.30*	7.99*	10.80*	13.70*	
	140	3.55	4.06	4.58	5.10	5.63	6.14*	7.05*	7.80*	8.55*	11.63*	14.84*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.0 Ft
 FIRE GROWTH: MEDIUM (RADIUS = 7.1 Ft)³
 (ALPHA = .0111 BTU/s³)

RESPONSE
 TIME INDEX

TEMPERATURE
 RISE

(Ft*s)^{1/2}

°F

4

8

12

16

20

24

30

35

40

60

80

PONSE INDEX		TEMPERATURE RISE °F	CEILING HEIGHT, Ft										
			4	8	12	16	20	24	30	35	40	60	80
s) 1/2	0	10	0.76	0.97	1.20	1.42	1.65	1.88	2.22*	2.52*	2.81*	4.01*	5.24*
		20	0.93	1.22	1.53	1.84	2.15	2.47*	2.96*	3.37*	3.79*	5.51*	7.30*
		40	1.21	1.64	2.09	2.54	3.00	3.47*	4.19*	4.81*	5.43*	8.03*	10.77*
		60	1.45	2.01	2.58	3.16	3.75	4.35*	5.28*	6.07*	6.88*	10.25*	13.81*
		80	1.68	2.35	3.03	3.72	4.43	5.16*	6.27*	7.23*	8.20*	12.28*	16.60*
		100	1.90	2.67	3.45	4.25	5.07	5.91*	7.21*	8.31*	9.44*	14.19*	19.23*
		120	2.10	2.97	3.85	4.76	5.68	6.63*	8.09*	9.35*	10.63*	16.00*	21.72*
		140	2.29	3.26	4.24	5.24	6.27	7.32*	8.95*	10.34*	11.76*	17.74*	24.11*
25	10	10	1.04	1.23	1.43	1.63	1.84	2.06*	2.40*	2.68*	2.97*	4.16*	5.38*
		20	1.23	1.48	1.75	2.03	2.33	2.63*	3.11*	3.51*	3.93*	5.63*	7.42*
		40	1.52	1.88	2.28	2.71	3.15	3.61*	4.32*	4.93*	5.55*	8.14*	10.87*
		60	1.76	2.23	2.75	3.31	3.88	4.47*	5.39*	6.18*	6.98*	10.34*	13.90*
		80	1.97	2.56	3.19	3.86	4.55	5.27*	6.38*	7.33*	8.30*	12.37*	16.69*
		100	2.18	2.86	3.61	4.38	5.19	6.02*	7.31*	8.41*	9.54*	14.27*	19.30*
		120	2.37	3.16	4.00	4.88	5.80	6.73*	8.19*	9.44*	10.72*	16.08*	21.79*
		140	2.55	3.44	4.38	5.36	6.38	7.42*	9.04*	10.43*	11.85*	17.82*	24.18*
50	10	10	1.17	1.37	1.58	1.79	2.00	2.21*	2.55*	2.84*	3.13*	4.30*	5.51*
		20	1.40	1.65	1.92	2.20	2.48	2.78*	3.25*	3.65*	4.06*	5.76*	7.53*
		40	1.72	2.07	2.46	2.86	3.29	3.74*	4.44*	5.05*	5.67*	8.24*	10.97*
		60	1.98	2.43	2.92	3.45	4.01	4.59*	5.50*	6.29*	7.09*	10.44*	13.99*
		80	2.20	2.75	3.35	4.00	4.68	5.38*	6.48*	7.43*	8.40*	12.46*	16.77*
		100	2.41	3.05	3.76	4.52	5.31	6.12*	7.41*	8.51*	9.63*	14.36*	19.38*
		120	2.61	3.34	4.15	5.01	5.91	6.83*	8.28*	9.53*	10.81*	16.16*	21.87*
		140	2.79	3.62	4.52	5.48	6.48	7.52*	9.13*	10.51*	11.93*	17.90*	24.25*
100	10	10	1.35	1.56	1.78	2.00	2.22	2.44*	2.79*	3.09*	3.39*	4.57*	5.78*
		20	1.62	1.89	2.17	2.45	2.74	3.03*	3.51*	3.91*	4.32*	6.00*	7.76*
		40	2.00	2.36	2.74	3.14	3.56	3.98*	4.68*	5.28*	5.89*	8.45*	11.16*
		60	2.29	2.74	3.22	3.73	4.26	4.82*	5.72*	6.50*	7.29*	10.63*	14.17*
		80	2.54	3.07	3.65	4.27	4.92	5.60*	6.69*	7.63*	8.59*	12.63*	16.93*
		100	2.77	3.38	4.05	4.77	5.54	6.33*	7.60*	8.70*	9.81*	14.52*	19.54*
		120	2.98	3.67	4.43	5.26	6.13	7.03*	8.47*	9.71*	10.98*	16.32*	22.02*
		140	3.17	3.94	4.80	5.72	6.70	7.71*	9.31*	10.69*	12.10*	18.05*	24.40*
150	10	10	1.47	1.70	1.93	2.16	2.39	2.61*	2.99*	3.29*	3.60*	4.81*	6.02*
		20	1.78	2.06	2.36	2.65	2.94	3.24*	3.73*	4.14*	4.55*	6.23*	7.99*
		40	2.21	2.58	2.97	3.37	3.79	4.21*	4.91*	5.51*	6.12*	8.66*	11.36*
		60	2.53	2.98	3.47	3.97	4.50	5.04*	5.94*	6.71*	7.50*	10.81*	14.34*
		80	2.80	3.33	3.91	4.51	5.15	5.81*	6.90*	7.83*	8.78*	12.81*	17.10*
		100	3.05	3.65	4.31	5.01	5.76	6.53*	7.80*	8.88*	10.00*	14.69*	19.69*
		120	3.27	3.95	4.69	5.49	6.34	7.23*	8.66*	9.89*	11.16*	16.48*	22.17*
		140	3.47	4.23	5.06	5.96	6.91	7.90*	9.49*	10.86*	12.27*	18.20*	24.54*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.0 Ft (RADIUS = 7.1 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
(Ft*s) ^{1/2}	°F											
200	10	1.58	1.81	2.05	2.29	2.53	2.76*	3.15*	3.46*	3.78*	5.01*	6.25*
	20	1.92	2.21	2.51	2.81	3.12	3.41*	3.92*	4.34*	4.76*	6.45*	8.21*
	40	2.38	2.76	3.16	3.57	3.99	4.41*	5.12*	5.72*	6.33*	8.86*	11.55*
	60	2.73	3.19	3.68	4.19	4.71	5.25*	6.15*	6.92*	7.70*	11.00*	14.52*
	80	3.02	3.55	4.13	4.73	5.36	6.01*	7.10*	8.02*	8.98*	12.98*	17.26*
	100	3.27	3.88	4.54	5.24	5.97	6.73*	7.99*	9.07*	10.18*	14.86*	19.85*
	120	3.51	4.19	4.93	5.72	6.55	7.42*	8.85*	10.07*	11.33*	16.64*	22.31*
140	3.73	4.48	5.30	6.18	7.11	8.08*	9.67*	11.04*	12.44*	18.36*	24.68*	
300	10	1.74	1.99	2.25	2.51	2.75	3.00*	3.41*	3.74*	4.07*	5.37*	6.64*
	20	2.13	2.44	2.76	3.08	3.40	3.71*	4.24*	4.68*	5.11*	6.85*	8.62*
	40	2.65	3.06	3.48	3.90	4.33	4.76*	5.49*	6.10*	6.71*	9.25*	11.93*
	60	3.04	3.53	4.03	4.55	5.08	5.62*	6.53*	7.30*	8.09*	11.37*	14.86*
	80	3.37	3.92	4.51	5.12	5.75	6.39*	7.48*	8.40*	9.35*	13.33*	17.59*
	100	3.65	4.28	4.95	5.64	6.36	7.11*	8.36*	9.44*	10.54*	15.19*	20.16*
	120	3.91	4.60	5.35	6.13	6.94	7.79*	9.21*	10.43*	11.68*	16.96*	22.61*
140	4.14	4.90	5.72	6.59	7.50	8.45*	10.02*	11.38*	12.77*	18.66*	24.97*	
400	10	1.88	2.14	2.41	2.68	2.94	3.19*	3.62*	3.98*	4.32*	5.66*	6.97*
	20	2.30	2.63	2.97	3.30	3.63	3.96*	4.51*	4.96*	5.41*	7.20*	8.99*
	40	2.87	3.30	3.74	4.18	4.62	5.06*	5.81*	6.43*	7.06*	9.62*	12.29*
	60	3.30	3.80	4.33	4.86	5.40	5.95*	6.87*	7.65*	8.44*	11.73*	15.21*
	80	3.65	4.23	4.83	5.45	6.09	6.73*	7.83*	8.76*	9.70*	13.67*	17.91*
	100	3.96	4.60	5.29	5.99	6.71	7.46*	8.71*	9.79*	10.89*	15.51*	20.47*
	120	4.23	4.95	5.70	6.49	7.30	8.14*	9.56*	10.77*	12.01*	17.27*	22.90*
140	4.49	5.27	6.09	6.96	7.86	8.80*	10.37*	11.72*	13.10*	18.97*	25.25*	
600	10	2.10	2.38	2.67	2.96	3.24	3.51*	3.98*	4.35*	4.73*	6.16*	7.54*
	20	2.58	2.94	3.30	3.66	4.01	4.36*	4.95*	5.44*	5.91*	7.79*	9.65*
	40	3.23	3.69	4.16	4.63	5.10	5.56*	6.35*	7.00*	7.66*	10.29*	12.99*
	60	3.71	4.26	4.82	5.38	5.94	6.50*	7.46*	8.27*	9.08*	12.40*	15.88*
	80	4.11	4.73	5.37	6.01	6.66	7.32*	8.45*	9.40*	10.36*	14.33*	18.55*
	100	4.46	5.14	5.86	6.58	7.32	8.07*	9.35*	10.44*	11.54*	16.15*	21.07*
	120	4.76	5.52	6.30	7.11	7.93	8.77*	10.20*	11.42*	12.66*	17.89*	23.49*
140	5.05	5.86	6.72	7.60	8.50	9.43*	11.01*	12.36*	13.74*	19.56*	25.82*	
800	10	2.27	2.57	2.88	3.19	3.48	3.77*	4.26*	4.66*	5.06*	6.56*	8.01*
	20	2.81	3.19	3.57	3.95	4.33	4.69*	5.31*	5.83*	6.33*	8.30*	10.22*
	40	3.53	4.01	4.51	5.00	5.49	5.97*	6.80*	7.49*	8.17*	10.88*	13.62*
	60	4.05	4.62	5.21	5.80	6.39	6.96*	7.97*	8.80*	9.64*	13.02*	16.51*
	80	4.49	5.13	5.80	6.48	7.15	7.82*	8.99*	9.96*	10.94*	14.95*	19.17*
	100	4.86	5.58	6.33	7.08	7.84	8.60*	9.91*	11.02*	12.14*	16.77*	21.67*
	120	5.20	5.98	6.80	7.63	8.47	9.31*	10.78*	12.01*	13.26*	18.49*	24.07*
140	5.50	6.35	7.24	8.14	9.06	9.99*	11.60*	12.96*	14.34*	20.15*	26.38*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.0 Ft (RADIUS = 7.1 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, Ft

(Ft*s)^{1/2}

°F

4

8

12

16

20

24

30

35

40

60

80

0

10

20

40

60

80

100

120

140

1.17

1.50

2.07

2.56

3.02

3.44

3.85

4.24

1.53

2.03

2.87

3.61

4.29

4.92

5.53

6.11

1.91

2.58

3.69

4.67

5.57

6.42

7.22

7.99

2.29

3.13

4.53

5.76

6.89

7.95

8.96

9.93

2.68

3.69

5.39

6.88

8.24

9.53

11.14

13.63

15.41

17.11

3.67

5.14

7.61

9.78

11.76

15.77

17.83

22.59

4.17

5.88

8.76

11.28

13.59

15.47

17.95

20.32

30.77

34.25

46.71

6.79

9.79

14.84

19.26

23.33

26.12

31.70

36.95

41.93

46.71

4.68

6.64

9.93

12.82

15.47

17.95

20.32

30.77

34.25

46.71

4.85

6.78

10.05

12.92

15.57

18.05

20.41

22.67

34.33

46.78

9.11

13.21

20.13

26.21

31.78

37.02

42.01

46.78

4.51

6.17

9.00

11.50

13.80

15.96

18.02

19.99

5.01

6.92

10.17

13.03

15.66

18.14

20.50

22.76

34.41

46.86

4.01

5.43

7.86

10.00

11.98

13.83

15.60

17.29

3.43

4.57

6.53

8.26

9.85

11.35

12.78

14.15

17.29

3.73

4.87

6.79

8.11

10.23

12.19

14.03

15.79

17.48

4.32

5.72

8.11

10.23

12.19

14.03

15.86

18.33

20.67

22.93

4.82

6.45

9.24

11.71

14.00

16.15

18.20

20.17

5.32

7.19

10.40

13.24

15.86

18.33

20.67

22.93

34.56

47.00

4.58

5.99

8.35

10.45

12.39

14.23

15.98

17.66

3.98

5.14

7.04

8.73

10.29

11.77

13.18

14.54

17.66

20.35

5.09

6.71

9.47

11.93

14.20

16.34

18.38

20.85

23.10

25.10

27.65

31.26

34.72

47.14

9.79

13.79

20.62

26.65

32.20

37.41

42.38

47.14

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.0 Ft (RADIUS = 7.1 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, Ft

(Ft*s)^{1/2}

°F

4

8

12

16

20

24

30

35

40

60

80

200

10

20

40

60

80

100

120

140

2.35

2.70

3.08

3.45

3.82

4.19

4.81

5.32

5.84

7.91

10.05

14.02

20.82

26.83

32.36

37.57

42.53

47.29

300

10

20

40

60

80

100

120

140

2.60

2.98

3.38

3.77

4.16

4.54

5.19

5.73

6.26

8.38

10.54

14.47

21.20

27.18

32.69

37.88

42.83

47.57

400

10

20

40

60

80

100

120

140

2.81

3.21

3.62

4.03

4.44

4.84

5.51

6.07

6.62

8.80

10.98

14.91

21.59

27.53

33.02

38.19

43.12

47.86

600

10

20

40

60

80

100

120

140

3.14

3.57

4.02

4.46

4.89

5.31

6.04

6.63

7.21

9.50

11.77

15.73

22.35

28.22

33.67

38.81

43.71

48.43

800

10

20

40

60

80

100

120

140

3.41

3.87

4.34

4.81

5.26

5.70

6.47

7.09

7.71

10.10

13.17

16.48

23.08

28.91

34.31

39.42

44.30

49.00

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.0 Ft
 FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)
 (RADIUS = 8.5 Ft)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
0 (Ft*s) ^{1/2}	°F												
	10	0.40	0.48	0.57	0.66	0.75	0.84	0.97*	1.08*	1.19*	1.63*	2.07*	
	20	0.45	0.55	0.66	0.77	0.88	0.99	1.16*	1.30*	1.44*	2.02*	2.60*	
	40	0.53	0.67	0.82	0.96	1.11	1.26	1.49*	1.68*	1.87*	2.67*	3.49*	
	60	0.60	0.77	0.95	1.13	1.31	1.49	1.77*	2.01*	2.25*	3.24*	4.27*	
	80	0.67	0.87	1.07	1.28	1.49	1.71	2.04*	2.32*	2.60*	3.76*	4.98*	
	100	0.73	0.96	1.19	1.43	1.67	1.91	2.28*	2.60*	2.92*	4.26*	5.65*	
	120	0.79	1.04	1.30	1.56	1.83	2.10	2.52*	2.87*	3.23*	4.72*	6.29*	
	140	0.84	1.12	1.41	1.70	1.99	2.29	2.74*	3.13*	3.53*	5.17*	6.91*	
	25	10	0.57	0.64	0.73	0.81	0.90	0.98	1.11*	1.22*	1.33*	1.77*	2.20*
20		0.64	0.73	0.83	0.94	1.04	1.14	1.30*	1.44*	1.58*	2.14*	2.71*	
40		0.75	0.86	0.99	1.12	1.26	1.40	1.61*	1.80*	1.99*	2.77*	3.58*	
60		0.83	0.97	1.12	1.28	1.45	1.62	1.89*	2.12*	2.36*	3.33*	4.35*	
80		0.90	1.06	1.24	1.43	1.62	1.83	2.14*	2.42*	2.70*	3.85*	5.06*	
100		0.97	1.15	1.35	1.56	1.79	2.02	2.38*	2.70*	3.02*	4.34*	5.73*	
120		1.03	1.23	1.45	1.70	1.95	2.21	2.61*	2.96*	3.32*	4.80*	6.37*	
140		1.08	1.31	1.56	1.82	2.10	2.39	2.83*	3.22*	3.61*	5.25*	6.98*	
50		10	0.63	0.71	0.80	0.89	0.98	1.07	1.20*	1.32*	1.43*	1.88*	2.32*
		20	0.72	0.82	0.93	1.03	1.14	1.25	1.41*	1.55*	1.69*	2.25*	2.82*
	40	0.85	0.97	1.10	1.24	1.37	1.51	1.72*	1.91*	2.10*	2.87*	3.68*	
	60	0.95	1.09	1.25	1.40	1.57	1.73	1.99*	2.22*	2.46*	3.43*	4.44*	
	80	1.03	1.19	1.37	1.55	1.74	1.94	2.24*	2.51*	2.79*	3.94*	5.15*	
	100	1.11	1.29	1.48	1.69	1.91	2.13	2.48*	2.79*	3.11*	4.42*	5.81*	
	120	1.17	1.37	1.59	1.82	2.06	2.31	2.71*	3.05*	3.41*	4.88*	6.44*	
	140	1.23	1.45	1.69	1.94	2.21	2.49	2.92*	3.31*	3.70*	5.33*	7.05*	
	100	10	0.71	0.80	0.90	1.00	1.09	1.19	1.33*	1.45*	1.57*	2.05*	2.50*
		20	0.83	0.94	1.05	1.16	1.28	1.39	1.56*	1.71*	1.86*	2.44*	3.02*
40		0.99	1.12	1.26	1.40	1.54	1.68	1.90*	2.09*	2.28*	3.07*	3.87*	
60		1.11	1.26	1.42	1.59	1.75	1.92	2.18*	2.41*	2.65*	3.61*	4.62*	
80		1.21	1.38	1.56	1.75	1.93	2.13	2.43*	2.70*	2.97*	4.11*	5.31*	
100		1.30	1.48	1.68	1.89	2.10	2.32	2.66*	2.97*	3.28*	4.59*	5.96*	
120		1.37	1.58	1.80	2.02	2.26	2.50	2.89*	3.23*	3.58*	5.04*	6.59*	
140		1.44	1.66	1.90	2.15	2.41	2.68	3.10*	3.48*	3.86*	5.48*	7.19*	
150		10	0.77	0.87	0.97	1.07	1.17	1.27	1.42*	1.55*	1.68*	2.17*	2.65*
		20	0.91	1.02	1.14	1.26	1.38	1.50	1.67*	1.83*	1.98*	2.59*	3.19*
	40	1.09	1.23	1.37	1.52	1.67	1.81	2.04*	2.24*	2.44*	3.23*	4.04*	
	60	1.23	1.38	1.55	1.72	1.89	2.07	2.33*	2.57*	2.81*	3.78*	4.78*	
	80	1.34	1.51	1.70	1.89	2.09	2.28	2.59*	2.86*	3.14*	4.28*	5.47*	
	100	1.43	1.63	1.84	2.05	2.26	2.48	2.82*	3.13*	3.45*	4.75*	6.12*	
	120	1.52	1.73	1.96	2.19	2.43	2.67	3.05*	3.39*	3.74*	5.20*	6.74*	
	140	1.60	1.83	2.07	2.32	2.58	2.85	3.26*	3.64*	4.02*	5.63*	7.33*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.0 Ft (RADIUS = 8.5 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		(Ft*s) ^{1/2}	4	8	12	16	20	24	30	35	40	60	80
200	10	0.82	0.92	1.03	1.13	1.24	1.34	1.49*	1.63*	1.76*	2.28*	2.77*	
	20	0.97	1.09	1.21	1.34	1.46	1.58	1.77*	1.93*	2.09*	2.72*	3.33*	
	40	1.17	1.32	1.47	1.62	1.77	1.92	2.15*	2.36*	2.57*	3.38*	4.20*	
	60	1.32	1.48	1.66	1.84	2.01	2.19	2.46*	2.70*	2.95*	3.93*	4.94*	
	80	1.44	1.63	1.82	2.02	2.22	2.42	2.73*	3.01*	3.29*	4.43*	5.62*	
	100	1.55	1.75	1.96	2.18	2.40	2.62	2.97*	3.28*	3.60*	4.90*	6.27*	
	120	1.64	1.86	2.09	2.33	2.57	2.82	3.20*	3.54*	3.89*	5.35*	6.88*	
300	140	1.73	1.96	2.21	2.47	2.73	3.00	3.41*	3.79*	4.18*	5.78*	7.47*	
	10	0.90	1.01	1.12	1.23	1.34	1.45	1.61*	1.76*	1.90*	2.44*	2.96*	
	20	1.07	1.20	1.33	1.47	1.60	1.73	1.92*	2.09*	2.27*	2.93*	3.57*	
	40	1.30	1.46	1.62	1.78	1.95	2.10	2.34*	2.56*	2.78*	3.64*	4.48*	
	60	1.47	1.65	1.84	2.02	2.21	2.39	2.67*	2.93*	3.19*	4.21*	5.23*	
	80	1.61	1.81	2.01	2.22	2.43	2.64	2.96*	3.25*	3.54*	4.72*	5.92*	
	100	1.73	1.94	2.17	2.40	2.63	2.86	3.21*	3.54*	3.87*	5.19*	6.55*	
400	120	1.84	2.07	2.31	2.56	2.81	3.06	3.45*	3.81*	4.17*	5.63*	7.16*	
	140	1.93	2.18	2.44	2.71	2.98	3.25	3.67*	4.06*	4.45*	6.06*	7.75*	
	10	0.96	1.07	1.19	1.31	1.43	1.54	1.71*	1.86*	2.01*	2.58*	3.12*	
	20	1.16	1.29	1.43	1.57	1.71	1.84	2.04*	2.23*	2.41*	3.10*	3.77*	
	40	1.41	1.57	1.74	1.92	2.08	2.25	2.50*	2.73*	2.96*	3.85*	4.72*	
	60	1.60	1.78	1.98	2.18	2.37	2.56	2.85*	3.12*	3.39*	4.45*	5.49*	
	80	1.75	1.95	2.17	2.39	2.61	2.83	3.15*	3.46*	3.76*	4.97*	6.18*	
600	100	1.88	2.10	2.34	2.58	2.82	3.06	3.42*	3.76*	4.10*	5.45*	6.82*	
	120	1.99	2.24	2.49	2.75	3.01	3.27	3.67*	4.04*	4.41*	5.90*	7.43*	
	140	2.10	2.36	2.63	2.91	3.19	3.47	3.90*	4.30*	4.70*	6.32*	8.01*	
	10	1.07	1.19	1.31	1.44	1.56	1.69	1.87*	2.03*	2.19*	2.81*	3.39*	
	20	1.29	1.43	1.58	1.74	1.88	2.03	2.24*	2.44*	2.64*	3.39*	4.10*	
	40	1.58	1.76	1.94	2.13	2.31	2.49	2.76*	3.01*	3.25*	4.21*	5.13*	
	60	1.79	2.00	2.21	2.42	2.63	2.84	3.15*	3.44*	3.73*	4.84*	5.94*	
800	80	1.97	2.19	2.43	2.66	2.90	3.13	3.48*	3.80*	4.13*	5.39*	6.65*	
	100	2.12	2.36	2.62	2.88	3.13	3.38	3.77*	4.13*	4.48*	5.89*	7.31*	
	120	2.25	2.51	2.79	3.07	3.34	3.61	4.03*	4.42*	4.81*	6.36*	7.92*	
	140	2.37	2.65	2.94	3.24	3.54	3.83	4.28*	4.70*	5.12*	6.79*	8.51*	
	10	1.15	1.28	1.41	1.54	1.68	1.80	1.99*	2.17*	2.34*	2.99*	3.60*	
	20	1.39	1.55	1.71	1.87	2.03	2.18	2.41*	2.62*	2.83*	3.62*	4.37*	
	40	1.72	1.91	2.11	2.30	2.50	2.68	2.97*	3.23*	3.49*	4.50*	5.46*	
	60	1.95	2.17	2.40	2.62	2.84	3.06	3.39*	3.70*	4.00*	5.18*	6.32*	
	80	2.15	2.38	2.64	2.89	3.13	3.37	3.74*	4.09*	4.43*	5.75*	7.06*	
	100	2.31	2.57	2.84	3.12	3.38	3.65	4.05*	4.43*	4.80*	6.27*	7.73*	
	120	2.46	2.74	3.03	3.32	3.61	3.90	4.33*	4.74*	5.15*	6.75*	8.36*	
	140	2.59	2.89	3.20	3.51	3.82	4.13	4.59*	5.03*	5.47*	7.20*	8.95*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.0 Ft (RADIUS = 8.5 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft													
		$(Ft*s)^{1/2}$	°F	4	8	12	16	20	24	30	35	40	60	80	
0	10	0.58	0.71	0.84	0.98	1.12	1.26	1.47*	1.65*	1.82*	2.03*	2.23*	2.53*	3.26*	
	20	0.68	0.85	1.03	1.21	1.39	1.58	1.86*	2.10*	2.33*	2.58*	2.83*	3.31*	4.31*	
	40	0.84	1.08	1.33	1.59	1.85	2.11	2.51*	2.85*	3.19*	3.51*	3.85*	4.61*	6.09*	
	60	0.98	1.29	1.60	1.92	2.25	2.58	3.08*	3.51*	3.95*	4.36*	4.76*	5.76*	7.65*	
	80	1.11	1.48	1.85	2.23	2.62	3.01	3.61*	4.12*	4.64*	5.03*	5.43*	6.81*	9.08*	
	100	1.23	1.66	2.08	2.52	2.96	3.41	4.10*	4.69*	5.29*	5.86*	6.43*	7.79*	10.43*	
	120	1.35	1.83	2.30	2.79	3.29	3.79	4.57*	5.23*	5.91*	6.58*	7.25*	8.73*	11.71*	
	140	1.46	1.99	2.52	3.05	3.60	4.16	5.02*	5.75*	6.50*	7.25*	8.00*	9.63*	12.93*	
	25	10	0.81	0.92	1.05	1.18	1.31	1.44	1.64*	1.81*	1.98*	2.18*	2.38*	2.68*	3.39*
		20	0.93	1.08	1.24	1.40	1.57	1.74	2.01*	2.24*	2.47*	2.71*	2.94*	3.43*	4.43*
40		1.12	1.31	1.53	1.76	2.00	2.25	2.64*	2.97*	3.31*	3.65*	3.99*	4.72*	6.19*	
60		1.26	1.51	1.79	2.08	2.39	2.71	3.20*	3.62*	4.05*	4.47*	4.89*	5.85*	7.74*	
80		1.39	1.69	2.02	2.38	2.75	3.13	3.71*	4.22*	4.74*	5.25*	5.76*	6.89*	9.17*	
100		1.51	1.86	2.25	2.66	3.08	3.52	4.20*	4.79*	5.38*	5.97*	6.56*	7.88*	10.51*	
120		1.62	2.02	2.46	2.93	3.41	3.90	4.67*	5.33*	6.00*	6.67*	7.34*	8.81*	11.78*	
140		1.73	2.18	2.67	3.18	3.72	4.27	5.11*	5.84*	6.59*	7.34*	8.09*	9.70*	13.01*	
50		10	0.90	1.03	1.16	1.29	1.43	1.56	1.76*	1.94*	2.11*	2.31*	2.49*	2.82*	3.53*
		20	1.06	1.21	1.37	1.54	1.70	1.87	2.14*	2.37*	2.60*	2.82*	3.04*	3.56*	4.55*
	40	1.27	1.47	1.68	1.91	2.14	2.38	2.76*	3.09*	3.43*	3.76*	4.09*	4.82*	6.29*	
	60	1.44	1.68	1.95	2.23	2.52	2.83	3.31*	3.73*	4.16*	4.58*	4.99*	5.95*	7.83*	
	80	1.58	1.86	2.18	2.52	2.87	3.24	3.82*	4.32*	4.84*	5.35*	5.86*	6.98*	9.25*	
	100	1.71	2.04	2.40	2.79	3.21	3.63	4.30*	4.88*	5.48*	6.09*	6.69*	7.96*	10.59*	
	120	1.82	2.20	2.61	3.06	3.52	4.01	4.76*	5.42*	6.09*	6.76*	7.43*	8.89*	11.86*	
	140	1.94	2.35	2.81	3.31	3.83	4.37	5.20*	5.93*	6.67*	7.42*	8.17*	9.78*	13.08*	
	100	10	1.03	1.16	1.31	1.45	1.59	1.73	1.94*	2.13*	2.31*	2.50*	2.68*	3.04*	3.76*
		20	1.22	1.38	1.56	1.73	1.90	2.08	2.35*	2.58*	2.82*	3.04*	3.26*	3.78*	4.77*
40		1.48	1.69	1.91	2.14	2.37	2.61	2.98*	3.31*	3.64*	3.97*	4.30*	5.03*	6.48*	
60		1.68	1.92	2.19	2.47	2.76	3.06	3.52*	3.94*	4.36*	4.78*	5.19*	6.13*	8.01*	
80		1.84	2.13	2.44	2.77	3.11	3.46	4.02*	4.52*	5.03*	5.54*	6.05*	7.16*	9.41*	
100		1.99	2.31	2.67	3.04	3.44	3.85	4.50*	5.07*	5.66*	6.25*	6.84*	8.13*	10.74*	
120		2.12	2.48	2.88	3.30	3.75	4.21	4.95*	5.60*	6.26*	6.93*	7.60*	9.05*	12.01*	
140		2.24	2.64	3.08	3.55	4.05	4.57	5.38*	6.10*	6.84*	7.59*	8.34*	9.93*	13.22*	
150		10	1.13	1.26	1.41	1.56	1.71	1.86	2.08*	2.27*	2.47*	2.66*	2.85*	3.22*	3.96*
		20	1.34	1.51	1.69	1.87	2.06	2.24	2.51*	2.76*	3.00*	3.24*	3.48*	3.98*	4.97*
	40	1.63	1.85	2.08	2.32	2.56	2.80	3.17*	3.50*	3.84*	4.17*	4.50*	5.23*	6.67*	
	60	1.85	2.11	2.38	2.67	2.96	3.25	3.71*	4.13*	4.56*	4.99*	5.42*	6.32*	8.18*	
	80	2.03	2.33	2.65	2.98	3.32	3.67	4.21*	4.71*	5.22*	5.73*	6.24*	7.33*	9.58*	
	100	2.19	2.52	2.88	3.26	3.65	4.05	4.68*	5.25*	5.84*	6.43*	7.02*	8.29*	10.90*	
	120	2.34	2.70	3.10	3.52	3.96	4.41	5.13*	5.78*	6.43*	7.08*	7.73*	9.21*	12.15*	
	140	2.47	2.87	3.31	3.77	4.26	4.76	5.56*	6.28*	7.01*	7.76*	8.51*	10.09*	13.36*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.0 Ft (RADIUS = 8.5 Ft)
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		$(Ft \cdot s)^{1/2}$	4	8	12	16	20	24	30	35	40	60
200	10	1.20	1.35	1.50	1.66	1.81	1.96	2.19*	2.39*	2.59*	3.37*	4.13*
	20	1.44	1.61	1.80	1.99	2.18	2.37	2.65*	2.90*	3.16*	4.16*	5.16*
	40	1.76	1.98	2.22	2.47	2.71	2.95	3.33*	3.67*	4.02*	5.41*	6.86*
	60	2.00	2.26	2.54	2.83	3.13	3.43	3.89*	4.31*	4.74*	6.50*	8.35*
	80	2.19	2.50	2.82	3.15	3.50	3.85	4.39*	4.89*	5.39*	7.50*	9.74*
	100	2.37	2.70	3.07	3.44	3.83	4.23	4.86*	5.43*	6.01*	8.45*	11.05*
	120	2.52	2.89	3.29	3.71	4.15	4.60	5.31*	5.95*	6.60*	9.36*	12.30*
	140	2.66	3.07	3.51	3.97	4.45	4.95	5.73*	6.45*	7.17*	10.24*	13.51*
300	10	1.32	1.48	1.64	1.81	1.97	2.13	2.37*	2.59*	2.80*	3.62*	4.42*
	20	1.59	1.78	1.98	2.19	2.38	2.58	2.88*	3.15*	3.42*	4.46*	5.50*
	40	1.96	2.20	2.45	2.71	2.96	3.22	3.61*	3.96*	4.32*	5.75*	7.20*
	60	2.23	2.51	2.81	3.11	3.42	3.72	4.19*	4.63*	5.06*	6.84*	8.69*
	80	2.45	2.77	3.11	3.45	3.80	4.16	4.71*	5.21*	5.73*	7.83*	10.06*
	100	2.64	3.00	3.37	3.76	4.16	4.56	5.18*	5.76*	6.34*	8.77*	11.35*
	120	2.82	3.20	3.62	4.04	4.48	4.93	5.63*	6.28*	6.93*	9.67*	12.59*
	140	2.97	3.39	3.84	4.31	4.79	5.28	6.06*	6.77*	7.49*	10.54*	13.79*
400	10	1.42	1.58	1.76	1.93	2.10	2.27	2.52*	2.75*	2.97*	3.83*	4.66*
	20	1.72	1.92	2.13	2.34	2.55	2.76	3.06*	3.35*	3.63*	4.72*	5.78*
	40	2.12	2.37	2.64	2.91	3.17	3.44	3.84*	4.21*	4.58*	6.05*	7.52*
	60	2.41	2.71	3.02	3.34	3.65	3.97	4.45*	4.90*	5.34*	7.15*	9.01*
	80	2.66	2.99	3.34	3.70	4.06	4.43	4.99*	5.50*	6.02*	8.15*	10.37*
	100	2.87	3.24	3.63	4.03	4.43	4.84	5.47*	6.06*	6.65*	9.08*	11.65*
	120	3.06	3.46	3.89	4.32	4.77	5.22	5.93*	6.58*	7.24*	9.98*	12.88*
	140	3.23	3.66	4.13	4.60	5.09	5.58	6.36*	7.07*	7.80*	10.83*	14.07*
600	10	1.58	1.75	1.94	2.13	2.31	2.49	2.76*	3.00*	3.24*	4.17*	5.05*
	20	1.92	2.14	2.37	2.60	2.82	3.04	3.37*	3.68*	3.98*	5.14*	6.26*
	40	2.38	2.66	2.94	3.23	3.52	3.80	4.22*	4.62*	5.01*	6.55*	8.08*
	60	2.72	3.04	3.37	3.71	4.04	4.38	4.88*	5.36*	5.83*	7.70*	9.59*
	80	2.99	3.35	3.73	4.11	4.49	4.87	5.45*	5.99*	6.53*	8.71*	10.95*
	100	3.23	3.63	4.04	4.47	4.89	5.31	5.96*	6.57*	7.18*	9.66*	12.23*
	120	3.45	3.87	4.33	4.79	5.25	5.72	6.44*	7.11*	7.78*	10.55*	13.45*
	140	3.64	4.10	4.59	5.09	5.59	6.09	6.88*	7.61*	8.35*	11.40*	14.62*
800	10	1.70	1.89	2.09	2.29	2.48	2.67	2.95*	3.21*	3.47*	4.44*	5.37*
	20	2.09	2.32	2.56	2.80	3.04	3.27	3.62*	3.94*	4.26*	5.49*	6.67*
	40	2.59	2.88	3.19	3.50	3.80	4.09	4.54*	4.96*	5.37*	6.98*	8.56*
	60	2.96	3.30	3.66	4.01	4.37	4.71	5.24*	5.74*	6.23*	8.17*	10.11*
	80	3.27	3.65	4.05	4.45	4.84	5.24	5.84*	6.41*	6.97*	9.21*	11.49*
	100	3.53	3.95	4.39	4.83	5.27	5.71	6.38*	7.01*	7.64*	10.17*	12.77*
	120	3.76	4.21	4.69	5.17	5.65	6.13	6.87*	7.56*	8.26*	11.07*	13.98*
	140	3.97	4.46	4.97	5.49	6.01	6.53	7.33*	8.08*	8.84*	11.93*	15.15*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.0 Ft
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)
(RADIUS = 8.5 Ft)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		°F	4	8	12	16	20	24	30	35	40	60	80
0	10	0.86	1.07	1.30	1.52	1.75	1.98	2.33*	2.62*	2.92*	4.12*	5.35*	
	20	1.05	1.35	1.66	1.98	2.29	2.62	3.10*	3.52*	3.94*	5.67*	7.47*	
	40	1.38	1.82	2.28	2.74	3.21	3.68	4.41*	5.03*	5.66*	8.28*	11.03*	
	60	1.66	2.24	2.82	3.40	4.01	4.62	5.55*	6.35*	7.17*	10.56*	14.14*	
	80	1.92	2.62	3.31	4.02	4.74	5.48	6.61*	7.57*	8.55*	12.66*	17.01*	
	100	2.17	2.97	3.78	4.59	5.43	6.28	7.59*	8.71*	9.85*	14.63*	19.70*	
	120	2.40	3.31	4.22	5.14	6.08	7.05	8.53*	9.80*	11.09*	16.51*	22.25*	
	140	2.62	3.63	4.64	5.67	6.71	7.78	9.43*	10.84*	12.28*	18.30*	24.71*	
	25	10	1.17	1.35	1.54	1.75	1.96	2.17	2.50*	2.79*	3.08*	4.27*	5.49*
		20	1.38	1.63	1.90	2.18	2.48	2.78	3.25*	3.66*	4.08*	5.79*	7.58*
40		1.71	2.08	2.48	2.91	3.36	3.82	4.54*	5.15*	5.78*	8.38*	11.12*	
60		1.98	2.47	3.00	3.56	4.15	4.74	5.67*	6.46*	7.27*	10.66*	14.23*	
80		2.23	2.83	3.48	4.17	4.87	5.59	6.71*	7.67*	8.65*	12.75*	17.09*	
100		2.47	3.18	3.94	4.73	5.55	6.39	7.69*	8.81*	9.95*	14.72*	19.78*	
120		2.69	3.51	4.37	5.28	6.20	7.16	8.63*	9.89*	11.18*	16.59*	22.33*	
140		2.90	3.82	4.79	5.80	6.83	7.89	9.52*	10.93*	12.36*	18.38*	24.78*	
50		10	1.32	1.50	1.70	1.91	2.12	2.33	2.66*	2.94*	3.23*	4.41*	5.63*
		20	1.57	1.81	2.08	2.36	2.64	2.94	3.40*	3.80*	4.21*	5.92*	7.70*
	40	1.94	2.28	2.67	3.08	3.51	3.96	4.66*	5.27*	5.89*	8.49*	11.22*	
	60	2.23	2.68	3.18	3.72	4.28	4.87	5.78*	6.57*	7.38*	10.75*	14.32*	
	80	2.48	3.04	3.65	4.31	5.00	5.71	6.82*	7.77*	8.75*	12.84*	17.17*	
	100	2.72	3.38	4.10	4.87	5.68	6.50	7.79*	8.90*	10.04*	14.80*	19.85*	
	120	2.94	3.70	4.53	5.41	6.32	7.26	8.72*	9.98*	11.27*	16.67*	22.40*	
	140	3.16	4.01	4.94	5.92	6.94	7.99	9.61*	11.01*	12.45*	18.46*	24.85*	
	100	10	1.51	1.71	1.92	2.14	2.36	2.58	2.91*	3.20*	3.50*	4.68*	5.89*
		20	1.82	2.07	2.35	2.63	2.92	3.21	3.66*	4.06*	4.47*	6.16*	7.93*
40		2.25	2.60	2.98	3.38	3.79	4.22	4.90*	5.50*	6.12*	8.70*	11.42*	
60		2.58	3.02	3.50	4.01	4.55	5.12	6.00*	6.79*	7.59*	10.94*	14.50*	
80		2.86	3.39	3.97	4.60	5.25	5.94	7.02*	7.97*	8.94*	13.02*	17.34*	
100		3.12	3.73	4.41	5.14	5.92	6.73	7.99*	9.09*	10.22*	14.97*	20.01*	
120		3.35	4.05	4.83	5.67	6.55	7.47	8.91*	10.16*	11.44*	16.83*	22.55*	
140		3.57	4.36	5.24	6.18	7.17	8.19	9.79*	11.19*	12.62*	18.61*	24.99*	
150		10	1.65	1.86	2.09	2.31	2.54	2.76	3.10*	3.41*	3.71*	4.92*	6.14*
		20	2.00	2.27	2.55	2.84	3.13	3.43	3.88*	4.29*	4.71*	6.40*	8.16*
	40	2.48	2.83	3.22	3.62	4.04	4.46	5.13*	5.73*	6.34*	8.90*	11.61*	
	60	2.84	3.28	3.76	4.27	4.80	5.35	6.22*	7.00*	7.79*	11.13*	14.68*	
	80	3.15	3.67	4.25	4.86	5.50	6.17	7.23*	8.17*	9.14*	13.19*	17.50*	
	100	3.42	4.02	4.69	5.40	6.16	6.94	8.18*	9.28*	10.41*	15.13*	20.17*	
	120	3.67	4.35	5.11	5.92	6.78	7.68	9.10*	10.34*	11.62*	16.99*	22.70*	
	140	3.91	4.67	5.51	6.42	7.39	8.39	9.98*	11.36*	12.79*	18.76*	25.14*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.0 Ft (RADIUS = 8.5 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
(Ft*s) ^{1/2} 200	°F												
	10	1.77	1.99	2.22	2.45	2.69	2.92	3.27*	3.58*	3.90*	5.13*	6.36*	
	20	2.15	2.42	2.72	3.02	3.32	3.62	4.08*	4.50*	4.92*	6.62*	8.37*	
	40	2.66	3.03	3.43	3.84	4.25	4.68	5.34*	5.94*	6.56*	9.10*	11.80*	
	60	3.05	3.51	3.99	4.50	5.03	5.57	6.43*	7.20*	7.99*	11.32*	14.85*	
	80	3.38	3.91	4.49	5.09	5.73	6.39	7.43*	8.37*	9.33*	13.37*	17.67*	
	100	3.67	4.28	4.94	5.64	6.38	7.15	8.38*	9.47*	10.59*	15.30*	20.32*	
300	120	3.94	4.62	5.37	6.16	7.00	7.89	9.28*	10.52*	11.79*	17.14*	22.85*	
	140	4.19	4.94	5.77	6.66	7.60	8.59	10.16*	11.54*	12.95*	18.92*	25.28*	
	10	1.95	2.19	2.44	2.68	2.93	3.17	3.54*	3.87*	4.20*	5.49*	6.76*	
	20	2.39	2.68	2.99	3.31	3.62	3.93	4.41*	4.84*	5.28*	7.02*	8.79*	
	40	2.97	3.36	3.77	4.19	4.62	5.05	5.72*	6.33*	6.95*	9.50*	12.18*	
	60	3.41	3.87	4.38	4.89	5.42	5.97	6.82*	7.59*	8.38*	11.69*	15.20*	
	80	3.77	4.31	4.90	5.51	6.14	6.79	7.81*	8.75*	9.70*	13.71*	17.99*	
400	100	4.09	4.71	5.37	6.07	6.80	7.55	8.75*	9.84*	10.95*	15.63*	20.63*	
	120	4.38	5.07	5.81	6.60	7.42	8.28	9.65*	10.88*	12.14*	17.46*	23.15*	
	140	4.65	5.40	6.23	7.10	8.02	8.98	10.51*	11.88*	13.29*	19.22*	25.57*	
	10	2.10	2.35	2.61	2.87	3.13	3.38	3.76*	4.11*	4.45*	5.79*	7.10*	
	20	2.58	2.89	3.21	3.54	3.87	4.19	4.68*	5.14*	5.59*	7.37*	9.17*	
	40	3.22	3.62	4.05	4.49	4.93	5.37	6.05*	6.67*	7.30*	9.87*	12.55*	
	60	3.69	4.18	4.70	5.23	5.77	6.31	7.16*	7.95*	8.74*	12.04*	15.54*	
600	80	4.09	4.65	5.25	5.87	6.50	7.15	8.17*	9.11*	10.06*	14.06*	18.32*	
	100	4.43	5.06	5.74	6.45	7.17	7.92	9.11*	10.19*	11.30*	15.96*	20.94*	
	120	4.74	5.44	6.20	6.98	7.80	8.65	10.00*	11.22*	12.48*	17.78*	23.44*	
	140	5.03	5.80	6.62	7.49	8.40	9.35	10.85*	12.22*	13.62*	19.53*	25.85*	
	10	2.34	2.61	2.89	3.17	3.45	3.72	4.13*	4.50*	4.87*	6.29*	7.67*	
	20	2.89	3.22	3.58	3.93	4.28	4.62	5.14*	5.62*	6.10*	7.98*	9.83*	
	40	3.62	4.05	4.51	4.97	5.44	5.90	6.60*	7.26*	7.91*	10.54*	13.25*	
800	60	4.16	4.67	5.22	5.78	6.34	6.90	7.77*	8.58*	9.39*	12.72*	16.21*	
	80	4.60	5.19	5.82	6.46	7.12	7.78	8.80*	9.76*	10.72*	14.72*	18.95*	
	100	4.99	5.65	6.36	7.08	7.82	8.57	9.76*	10.85*	11.96*	16.60*	21.55*	
	120	5.33	6.06	6.84	7.65	8.47	9.32	10.65*	11.88*	13.13*	18.40*	24.03*	
	140	5.65	6.45	7.30	8.18	9.09	10.02	11.51*	12.87*	14.26*	20.13*	26.41*	
	10	2.54	2.82	3.12	3.42	3.71	3.99	4.42*	4.82*	5.21*	6.71*	8.15*	
	20	3.14	3.50	3.87	4.24	4.61	4.97	5.52*	6.02*	6.53*	8.48*	10.41*	
1000	40	3.94	4.40	4.89	5.37	5.86	6.33	7.07*	7.75*	8.43*	11.14*	13.88*	
	60	4.53	5.08	5.65	6.23	6.81	7.40	8.29*	9.12*	9.96*	13.35*	16.85*	
	80	5.02	5.64	6.30	6.96	7.63	8.31	9.36*	10.33*	11.31*	15.34*	19.57*	
	100	5.44	6.13	6.86	7.61	8.37	9.13	10.33*	11.44*	12.56*	17.22*	22.15*	
	120	5.82	6.57	7.38	8.20	9.04	9.90	11.24*	12.48*	13.74*	19.00*	24.60*	
	140	6.16	6.98	7.86	8.76	9.68	10.62	12.10*	13.47*	14.87*	20.72*	26.97*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.0 Ft (RADIUS = 8.5 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
(Ft*s) ^{1/2} 0	°F												
	10	1.33	1.70	2.08	2.46	2.85	3.25	3.85*	4.36*	4.87*	6.98*	9.17*	
	20	1.71	2.26	2.81	3.37	3.94	4.52	5.40*	6.15*	6.92*	10.08*	13.41*	
	40	2.36	3.20	4.04	4.89	5.76	6.65	8.01*	9.17*	10.36*	15.30*	20.52*	
	60	2.93	4.02	5.11	6.23	7.36	8.52	10.30*	11.82*	13.37*	19.87*	26.76*	
	80	3.45	4.78	6.10	7.45	8.83	10.24	12.40*	14.25*	16.14*	24.07*	32.49*	
	100	3.94	5.49	7.03	8.60	10.21	11.85	14.37*	16.53*	18.74*	28.01*	37.87*	
	120	4.41	6.17	7.92	9.70	11.52	13.38	16.25*	18.70*	21.22*	31.76*	42.98*	
	140	4.85	6.81	8.76	10.75	12.78	14.85	18.05*	20.79*	23.59*	35.35*	47.88*	
	25	10	1.72	2.02	2.35	2.70	3.07	3.44	4.02*	4.52*	5.03*	7.13*	9.31*
	20	2.11	2.55	3.05	3.58	4.12	4.68	5.55*	6.29*	7.05*	10.21*	13.52*	
	40	2.73	3.46	4.24	5.07	5.92	6.79	8.14*	9.29*	10.47*	15.40*	20.62*	
	60	3.27	4.26	5.30	6.39	7.50	8.65	10.41*	11.93*	13.48*	19.96*	26.85*	
	80	3.77	5.00	6.28	7.60	8.96	10.35	12.51*	14.35*	16.24*	24.16*	32.57*	
	100	4.25	5.70	7.20	8.74	10.33	11.96	14.47*	16.63*	18.84*	28.09*	37.94*	
	120	4.70	6.36	8.07	9.83	11.64	13.49	16.34*	18.80*	21.30*	31.84*	43.05*	
	140	5.13	7.01	8.92	10.88	12.89	14.95	18.14*	20.87*	23.67*	35.43*	47.95*	
50	10	1.94	2.24	2.57	2.91	3.27	3.63	4.19*	4.69*	5.19*	7.28*	9.45*	
	20	2.38	2.80	3.27	3.78	4.30	4.85	5.70*	6.44*	7.19*	10.33*	13.64*	
	40	3.03	3.70	4.45	5.24	6.07	6.93	8.26*	9.41*	10.59*	15.51*	20.72*	
	60	3.58	4.48	5.49	6.54	7.64	8.77	10.53*	12.04*	13.58*	20.06*	26.94*	
	80	4.07	5.21	6.45	7.75	9.09	10.47	12.61*	14.45*	16.34*	24.25*	32.65*	
	100	4.54	5.90	7.36	8.88	10.46	12.07	14.57*	16.73*	18.93*	28.18*	38.02*	
	120	4.98	6.56	8.23	9.97	11.76	13.60	16.44*	18.89*	21.39*	31.92*	43.13*	
	140	5.41	7.19	9.07	11.01	13.00	15.06	18.23*	20.96*	23.76*	35.50*	48.03*	
100	10	2.24	2.55	2.89	3.24	3.59	3.95	4.51*	5.00*	5.50*	7.57*	9.72*	
	20	2.75	3.17	3.64	4.13	4.63	5.16	5.98*	6.72*	7.46*	10.58*	13.87*	
	40	3.48	4.11	4.82	5.58	6.37	7.20	8.51*	9.65*	10.82*	15.72*	20.91*	
	60	4.06	4.90	5.84	6.86	7.92	9.02	10.75*	12.25*	13.79*	20.25*	27.11*	
	80	4.58	5.62	6.79	8.04	9.35	10.71	12.82*	14.66*	16.53*	24.42*	32.82*	
	100	5.05	6.30	7.69	9.16	10.70	12.29	14.77*	16.92*	19.11*	28.34*	38.18*	
	120	5.49	6.94	8.54	10.23	11.99	13.81	16.63*	19.07*	21.57*	32.08*	43.28*	
	140	5.92	7.57	9.37	11.26	13.23	15.26	18.42*	21.14*	23.93*	35.66*	48.17*	
150	10	2.45	2.78	3.13	3.49	3.85	4.21	4.77*	5.27*	5.78*	7.85*	9.99*	
	20	3.02	3.46	3.93	4.42	4.93	5.44	6.25*	6.98*	7.73*	10.83*	14.10*	
	40	3.82	4.45	5.15	5.89	6.66	7.47	8.75*	9.89*	11.05*	15.93*	21.11*	
	60	4.44	5.26	6.18	7.16	8.19	9.27	10.97*	12.47*	14.00*	20.44*	27.29*	
	80	4.98	5.99	7.12	8.33	9.61	10.94	13.03*	14.86*	16.73*	24.60*	32.98*	
	100	5.47	6.67	8.00	9.44	10.95	12.52	14.97*	17.11*	19.30*	28.51*	38.33*	
	120	5.93	7.31	8.85	10.50	12.23	14.02	16.82*	19.25*	21.75*	32.24*	43.43*	
	140	6.36	7.93	9.66	11.52	13.46	15.47	18.60*	21.32*	24.10*	35.81*	48.31*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.0 Ft (RADIUS = 8.5 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
200 (Ft*s) ^{1/2}	10	2.63	2.97	3.33	3.70	4.07	4.44	5.00*	5.52*	6.03*	8.11*	10.25*
	20	3.24	3.69	4.18	4.67	5.18	5.70	6.51*	7.24*	7.98*	11.07*	14.33*
	40	4.10	4.74	5.44	6.17	6.93	7.73	8.99*	10.12*	11.28*	16.14*	21.30*
	60	4.76	5.58	6.48	7.44	8.45	9.52	11.19*	12.68*	14.21*	20.63*	27.47*
	80	5.33	6.32	7.42	8.61	9.86	11.17	13.24*	15.06*	16.92*	24.78*	33.15*
	100	5.84	7.00	8.30	9.71	11.19	12.74	15.17*	17.30*	19.48*	28.68*	38.49*
	120	6.31	7.65	9.14	10.76	12.46	14.23	17.01*	19.44*	21.92*	32.40*	43.58*
300	140	6.75	8.26	9.95	11.77	13.68	15.67	18.78*	21.49*	24.27*	35.97*	48.46*
	10	2.91	3.27	3.66	4.04	4.43	4.81	5.40*	5.93*	6.46*	8.59*	10.74*
	20	3.61	4.08	4.58	5.10	5.62	6.14	6.95*	7.70*	8.45*	11.54*	14.78*
	40	4.56	5.22	5.93	6.66	7.42	8.21	9.45*	10.57*	11.72*	16.55*	21.69*
	60	5.28	6.11	7.01	7.96	8.95	9.99	11.63*	13.11*	14.62*	21.01*	27.82*
	80	5.90	6.89	7.97	9.13	10.35	11.62	13.65*	15.46*	17.31*	25.13*	33.48*
	100	6.45	7.60	8.86	10.22	11.66	13.17	15.56*	17.68*	19.85*	29.01*	38.80*
400	120	6.95	8.26	9.70	11.26	12.92	14.65	17.38*	19.80*	22.27*	32.72*	43.87*
	140	7.42	8.88	10.51	12.26	14.12	16.07	19.14*	21.84*	24.61*	36.27*	48.74*
	10	3.14	3.52	3.92	4.33	4.73	5.12	5.73*	6.28*	6.83*	9.01*	11.19*
	20	3.90	4.39	4.92	5.45	5.98	6.52	7.35*	8.10*	8.87*	11.98*	15.22*
	40	4.94	5.61	6.34	7.09	7.85	8.64	9.87*	11.00*	12.15*	16.95*	22.07*
	60	5.72	6.56	7.47	8.42	9.40	10.43	12.05*	13.52*	15.02*	21.38*	28.17*
	80	6.37	7.37	8.46	9.60	10.80	12.06	14.05*	15.85*	17.69*	25.48*	33.80*
600	100	6.96	8.11	9.36	10.70	12.11	13.59	15.94*	18.05*	20.21*	29.34*	39.11*
	120	7.49	8.78	10.21	11.74	13.36	15.06	17.75*	20.16*	22.62*	33.03*	44.17*
	140	7.98	9.42	11.02	12.74	14.56	16.47	19.50*	22.19*	24.94*	36.58*	49.03*
	10	3.51	3.92	4.35	4.78	5.21	5.63	6.27*	6.86*	7.44*	9.72*	11.99*
	20	4.38	4.91	5.47	6.03	6.59	7.15	8.01*	8.80*	9.59*	12.78*	16.05*
	40	5.55	6.26	7.02	7.80	8.59	9.38	10.63*	11.77*	12.93*	17.74*	22.83*
	60	6.42	7.30	8.24	9.20	10.20	11.22	12.82*	14.30*	15.80*	22.12*	28.87*
800	80	7.15	8.18	9.28	10.43	11.63	12.86	14.82*	16.61*	18.44*	26.17*	34.46*
	100	7.79	8.96	10.23	11.56	12.95	14.39	16.69*	18.78*	20.93*	30.00*	39.73*
	120	8.37	9.68	11.11	12.61	14.19	15.85	18.48*	20.87*	23.31*	33.67*	44.76*
	140	8.90	10.35	11.94	13.62	15.39	17.25	20.21*	22.87*	25.61*	37.19*	49.60*
	10	3.81	4.24	4.70	5.16	5.61	6.05	6.71*	7.33*	7.95*	10.33*	12.67*
	20	4.76	5.32	5.91	6.50	7.09	7.67	8.56*	9.39*	10.21*	13.49*	16.80*
	40	6.04	6.79	7.59	8.39	9.20	10.02	11.28*	12.46*	13.64*	18.49*	23.57*
	60	6.99	7.91	8.88	9.87	10.88	11.91	13.52*	15.01*	16.52*	22.83*	29.55*
	80	7.78	8.84	9.98	11.15	12.35	13.58	15.53*	17.32*	19.16*	26.86*	35.10*
	100	8.47	9.68	10.97	12.31	13.69	15.13	17.40*	19.49*	21.63*	30.66*	40.34*
	120	9.09	10.43	11.88	13.38	14.96	16.59	19.19*	21.56*	23.99*	34.30*	45.35*
	140	9.67	11.14	12.73	14.40	16.16	17.99	20.90*	23.55*	26.27*	37.80*	50.17*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.0 Ft (RADIUS = 9.9 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE °F	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
0 (Ft*s) ^{1/2}	10	0.45	0.53	0.61	0.70	0.79	0.88	1.01	1.12*	1.23*	1.67*	2.11*	
	20	0.50	0.61	0.71	0.82	0.93	1.05	1.21	1.35*	1.50*	2.07*	2.65*	
	40	0.60	0.74	0.88	1.03	1.18	1.33	1.56	1.75*	1.94*	2.74*	3.56*	
	60	0.68	0.85	1.03	1.21	1.39	1.58	1.86	2.10*	2.34*	3.33*	4.36*	
	80	0.75	0.95	1.16	1.37	1.59	1.80	2.13	2.41*	2.70*	3.87*	5.09*	
	100	0.82	1.05	1.29	1.53	1.77	2.02	2.39	2.71*	3.04*	4.38*	5.78*	
	120	0.88	1.15	1.41	1.68	1.95	2.22	2.64	3.00*	3.36*	4.86*	6.44*	
	140	0.95	1.24	1.52	1.82	2.11	2.42	2.88	3.27*	3.67*	5.33*	7.07*	
	25	10	0.63	0.70	0.78	0.86	0.95	1.03	1.16	1.27*	1.37*	1.81*	2.24*
		20	0.71	0.80	0.90	1.00	1.10	1.20	1.36	1.49*	1.63*	2.19*	2.77*
40		0.83	0.94	1.07	1.20	1.33	1.47	1.68	1.87*	2.06*	2.84*	3.66*	
60		0.92	1.06	1.21	1.37	1.53	1.71	1.97	2.20*	2.44*	3.42*	4.45*	
80		1.00	1.16	1.34	1.53	1.72	1.93	2.24	2.52*	2.80*	3.96*	5.18*	
100		1.07	1.25	1.46	1.67	1.90	2.13	2.50	2.81*	3.13*	4.46*	5.86*	
120		1.14	1.34	1.57	1.82	2.07	2.33	2.74	3.09*	3.45*	4.94*	6.51*	
140		1.20	1.43	1.68	1.95	2.23	2.52	2.97	3.36*	3.76*	5.40*	7.14*	
50		10	0.70	0.77	0.86	0.95	1.04	1.12	1.25	1.36*	1.48*	1.92*	2.36*
		20	0.80	0.89	0.99	1.10	1.20	1.31	1.47	1.60*	1.74*	2.31*	2.88*
	40	0.94	1.06	1.19	1.32	1.45	1.59	1.80	1.98*	2.17*	2.95*	3.76*	
	60	1.05	1.19	1.34	1.50	1.66	1.83	2.09	2.31*	2.54*	3.52*	4.54*	
	80	1.14	1.30	1.47	1.66	1.85	2.04	2.35	2.61*	2.89*	4.05*	5.26*	
	100	1.22	1.40	1.60	1.80	2.02	2.25	2.60	2.90*	3.22*	4.55*	5.94*	
	120	1.30	1.49	1.71	1.94	2.19	2.44	2.84	3.18*	3.54*	5.02*	6.59*	
	140	1.37	1.58	1.82	2.08	2.35	2.63	3.07	3.45*	3.84*	5.48*	7.21*	
	100	10	0.79	0.87	0.96	1.06	1.15	1.25	1.38	1.50*	1.62*	2.09*	2.55*
		20	0.92	1.02	1.13	1.24	1.35	1.46	1.63	1.76*	1.91*	2.50*	3.08*
40		1.10	1.22	1.35	1.49	1.63	1.77	1.98	2.16*	2.36*	3.14*	3.94*	
60		1.23	1.37	1.53	1.69	1.86	2.02	2.28	2.50*	2.73*	3.70*	4.71*	
80		1.34	1.50	1.68	1.86	2.05	2.24	2.54	2.80*	3.08*	4.22*	5.42*	
100		1.43	1.61	1.81	2.02	2.23	2.45	2.79	3.08*	3.40*	4.71*	6.09*	
120		1.52	1.72	1.93	2.16	2.40	2.64	3.02	3.36*	3.71*	5.18*	6.74*	
140		1.60	1.81	2.05	2.30	2.56	2.83	3.25	3.62*	4.01*	5.63*	7.35*	
150		10	0.86	0.94	1.04	1.14	1.24	1.34	1.48	1.60*	1.73*	2.22*	2.69*
		20	1.01	1.11	1.22	1.34	1.46	1.57	1.74	1.89*	2.04*	2.65*	3.24*
	40	1.21	1.33	1.48	1.62	1.77	1.91	2.13	2.31*	2.51*	3.31*	4.12*	
	60	1.35	1.50	1.67	1.84	2.01	2.18	2.44	2.66*	2.90*	3.87*	4.88*	
	80	1.48	1.65	1.83	2.02	2.21	2.41	2.71	2.97*	3.24*	4.39*	5.58*	
	100	1.58	1.77	1.98	2.19	2.40	2.62	2.96	3.25*	3.57*	4.87*	6.25*	
	120	1.68	1.88	2.11	2.34	2.58	2.82	3.19	3.52*	3.87*	5.34*	6.88*	
	140	1.77	1.99	2.23	2.48	2.74	3.01	3.42	3.78*	4.17*	5.78*	7.49*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.0 Ft (RADIUS = 9.9 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60
200	10	0.91	1.00	1.10	1.20	1.31	1.41	1.56	1.68*	1.81*	1.95*	2.32*	2.81*
	20	1.07	1.18	1.30	1.43	1.55	1.67	1.84	1.99*	2.15*	2.33*	2.78*	3.39*
	40	1.30	1.43	1.58	1.73	1.88	2.03	2.25	2.44*	2.65*	2.87*	3.46*	4.28*
	60	1.46	1.61	1.78	1.96	2.13	2.31	2.57	2.80*	3.04*	3.29*	4.03*	5.04*
	80	1.59	1.77	1.96	2.15	2.35	2.55	2.85	3.11*	3.39*	3.66*	4.54*	5.74*
	100	1.71	1.90	2.11	2.33	2.55	2.77	3.11	3.40*	3.72*	3.99*	5.03*	6.40*
	120	1.81	2.02	2.25	2.49	2.73	2.97	3.35	3.67*	4.03*	4.30*	5.49*	7.03*
300	140	1.91	2.13	2.38	2.64	2.90	3.16	3.57	3.93*	4.32*	4.60*	5.93*	7.63*
	10	0.99	1.09	1.20	1.31	1.42	1.53	1.68	1.81*	1.95*	2.16*	2.50*	3.01*
	20	1.19	1.30	1.43	1.56	1.69	1.82	2.00	2.16*	2.33*	2.52*	2.99*	3.63*
	40	1.44	1.58	1.74	1.90	2.06	2.22	2.45	2.65*	2.87*	3.03*	3.72*	4.56*
	60	1.62	1.79	1.97	2.16	2.34	2.52	2.80	3.03*	3.29*	3.56*	4.31*	5.33*
	80	1.78	1.96	2.17	2.37	2.58	2.79	3.10	3.36*	3.66*	3.92*	4.83*	6.03*
	100	1.91	2.11	2.33	2.56	2.79	3.02	3.37	3.66*	3.99*	4.30*	5.32*	6.69*
400	120	2.03	2.25	2.49	2.73	2.98	3.23	3.61	3.94*	4.30*	4.60*	5.77*	7.31*
	140	2.13	2.37	2.63	2.89	3.16	3.43	3.85	4.21*	4.60*	4.92*	6.21*	7.91*
	10	1.06	1.17	1.28	1.40	1.51	1.62	1.78	1.92*	2.07*	2.24*	2.64*	3.18*
	20	1.28	1.40	1.53	1.67	1.81	1.94	2.13	2.30*	2.48*	2.67*	3.17*	3.84*
	40	1.56	1.71	1.87	2.04	2.21	2.37	2.62	2.82*	3.05*	3.29*	3.94*	4.81*
	60	1.76	1.93	2.13	2.32	2.51	2.70	2.99	3.23*	3.49*	3.75*	4.55*	5.59*
	80	1.93	2.12	2.33	2.55	2.77	2.98	3.30	3.58*	3.88*	4.18*	5.08*	6.30*
600	100	2.07	2.29	2.52	2.75	2.99	3.23	3.58	3.89*	4.22*	4.55*	5.58*	6.96*
	120	2.20	2.43	2.68	2.94	3.19	3.45	3.84	4.18*	4.55*	4.85*	6.04*	7.58*
	140	2.32	2.56	2.83	3.11	3.38	3.66	4.08	4.45*	4.85*	5.28*	6.48*	8.18*
	10	1.18	1.29	1.41	1.53	1.65	1.77	1.95	2.09*	2.25*	2.41*	2.86*	3.44*
	20	1.42	1.55	1.70	1.85	1.99	2.14	2.35	2.52*	2.72*	2.91*	3.46*	4.17*
	40	1.74	1.91	2.09	2.27	2.45	2.63	2.89	3.11*	3.35*	3.60*	4.30*	5.22*
	60	1.98	2.17	2.37	2.58	2.79	2.99	3.29	3.55*	3.84*	4.12*	4.95*	6.05*
800	80	2.17	2.38	2.61	2.84	3.07	3.30	3.64	3.93*	4.25*	4.56*	5.52*	6.78*
	100	2.33	2.56	2.81	3.07	3.32	3.57	3.94	4.26*	4.62*	4.96*	6.03*	7.45*
	120	2.48	2.73	3.00	3.27	3.54	3.82	4.22	4.57*	4.96*	5.28*	6.51*	8.07*
	140	2.61	2.88	3.17	3.46	3.75	4.04	4.48	4.86*	5.28*	5.64*	6.96*	8.67*
	10	1.27	1.38	1.51	1.64	1.77	1.90	2.08	2.24*	2.41*	2.58*	3.05*	3.66*
	20	1.54	1.68	1.84	1.99	2.15	2.30	2.52	2.70*	2.91*	3.11*	3.70*	4.45*
	40	1.89	2.07	2.26	2.45	2.64	2.83	3.11	3.34*	3.60*	3.84*	4.60*	5.56*
	60	2.15	2.36	2.58	2.80	3.01	3.23	3.55	3.82*	4.12*	4.42*	5.29*	6.43*
	80	2.36	2.59	2.83	3.08	3.32	3.56	3.92	4.22*	4.56*	4.90*	5.88*	7.19*
	100	2.55	2.79	3.06	3.32	3.59	3.85	4.24	4.58*	4.95*	5.31*	6.42*	7.87*
	120	2.71	2.97	3.26	3.54	3.83	4.12	4.54	4.90*	5.31*	5.64*	6.91*	8.51*
	140	2.85	3.14	3.44	3.75	4.05	4.36	4.81	5.20*	5.64*	6.05*	7.37*	9.12*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.0 Ft (RADIUS = 9.9 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
0 <													

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.0 Ft (RADIUS = 9.9 Ft)
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE °F	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
200 (Ft*s) ^{1/2}	10	1.33	1.46	1.61	1.76	1.91	2.06	2.28	2.47*	2.67*	3.45*	4.20*	
	20	1.59	1.75	1.94	2.12	2.31	2.49	2.77	3.00*	3.25*	4.26*	5.26*	
	40	1.94	2.15	2.39	2.63	2.87	3.12	3.48	3.80*	4.15*	5.54*	6.99*	
	60	2.20	2.46	2.74	3.03	3.32	3.62	4.07	4.47*	4.90*	6.67*	8.53*	
	80	2.42	2.71	3.04	3.37	3.71	4.06	4.60	5.07*	5.58*	7.70*	9.95*	
	100	2.61	2.94	3.30	3.68	4.07	4.47	5.10	5.64*	6.23*	8.69*	11.29*	
	120	2.79	3.15	3.55	3.97	4.41	4.86	5.56	6.19*	6.85*	9.63*	12.58*	
300	140	2.94	3.34	3.78	4.24	4.73	5.23	6.02	6.71*	7.44*	10.53*	13.81*	
	10	1.46	1.60	1.76	1.92	2.08	2.24	2.47	2.67*	2.88*	3.70*	4.49*	
	20	1.76	1.94	2.13	2.33	2.52	2.72	3.01	3.25*	3.52*	4.56*	5.60*	
	40	2.16	2.39	2.64	2.89	3.14	3.39	3.77	4.10*	4.46*	5.88*	7.34*	
	60	2.46	2.73	3.02	3.32	3.62	3.93	4.39	4.79*	5.23*	7.01*	8.86*	
	80	2.70	3.01	3.34	3.69	4.04	4.39	4.93	5.41*	5.92*	8.04*	10.27*	
	100	2.92	3.26	3.63	4.02	4.41	4.81	5.43	5.98*	6.56*	9.01*	11.60*	
400	120	3.11	3.49	3.90	4.32	4.76	5.21	5.90	6.52*	7.18*	9.94*	12.87*	
	140	3.29	3.69	4.14	4.61	5.09	5.58	6.36	7.03*	7.76*	10.83*	14.10*	
	10	1.57	1.72	1.89	2.05	2.22	2.39	2.63	2.83*	3.06*	3.91*	4.73*	
	20	1.90	2.08	2.29	2.50	2.70	2.90	3.20	3.46*	3.74*	4.82*	5.89*	
	40	2.34	2.58	2.84	3.10	3.36	3.63	4.02	4.35*	4.72*	6.19*	7.66*	
	60	2.66	2.95	3.25	3.56	3.87	4.19	4.66	5.07*	5.52*	7.32*	9.18*	
	80	2.93	3.25	3.60	3.95	4.31	4.67	5.22	5.70*	6.22*	8.35*	10.58*	
600	100	3.17	3.52	3.90	4.30	4.70	5.11	5.73	6.28*	6.87*	9.32*	11.90*	
	120	3.37	3.76	4.18	4.62	5.06	5.52	6.21	6.82*	7.48*	10.24*	13.16*	
	140	3.56	3.99	4.44	4.92	5.40	5.90	6.67	7.34*	8.07*	11.13*	14.38*	
	10	1.74	1.90	2.08	2.27	2.45	2.62	2.88	3.10*	3.34*	4.26*	5.13*	
	20	2.12	2.32	2.54	2.77	2.99	3.20	3.52	3.79*	4.09*	5.25*	6.37*	
	40	2.63	2.88	3.16	3.45	3.73	4.01	4.42	4.77*	5.16*	6.70*	8.23*	
	60	3.00	3.30	3.63	3.96	4.29	4.62	5.11	5.54*	6.01*	7.88*	9.77*	
800	80	3.30	3.64	4.01	4.39	4.76	5.14	5.71	6.20*	6.74*	8.92*	11.17*	
	100	3.57	3.94	4.35	4.77	5.19	5.61	6.25	6.80*	7.41*	9.89*	12.48*	
	120	3.80	4.21	4.66	5.11	5.57	6.04	6.75	7.36*	8.04*	10.81*	13.73*	
	140	4.02	4.46	4.94	5.43	5.93	6.44	7.21	7.89*	8.63*	11.69*	14.93*	
	10	1.88	2.05	2.24	2.44	2.63	2.81	3.09	3.32*	3.57*	4.54*	5.46*	
	20	2.30	2.52	2.75	2.99	3.22	3.45	3.79	4.07*	4.39*	5.61*	6.78*	
	40	2.86	3.13	3.43	3.73	4.02	4.32	4.75	5.12*	5.53*	7.14*	8.72*	
	60	3.27	3.59	3.93	4.28	4.63	4.98	5.49	5.93*	6.42*	8.36*	10.30*	
	80	3.60	3.96	4.35	4.75	5.14	5.53	6.12	6.63*	7.19*	9.43*	11.71*	
	100	3.89	4.29	4.72	5.15	5.59	6.03	6.68	7.25*	7.88*	10.42*	13.02*	
	120	4.15	4.58	5.05	5.52	6.00	6.48	7.20	7.83*	8.52*	11.34*	14.26*	
	140	4.38	4.85	5.35	5.86	6.38	6.90	7.69	8.37*	9.13*	12.22*	15.46*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.0 Ft (RADIUS = 9.9 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
0 (Ft*s) ^{1/2}	10	0.96	1.18	1.40	1.62	1.85	2.08	2.43	2.73*	3.02*	4.23*	5.47*	
	20	1.18	1.48	1.80	2.11	2.43	2.76	3.25	3.67*	4.09*	5.83*	7.63*	
	40	1.55	2.00	2.47	2.93	3.41	3.89	4.63	5.25*	5.89*	8.52*	11.28*	
	60	1.87	2.46	3.05	3.65	4.26	4.88	5.83	6.64*	7.46*	10.88*	14.48*	
	80	2.16	2.88	3.59	4.31	5.05	5.79	6.94	7.91*	8.90*	13.04*	17.41*	
	100	2.44	3.27	4.10	4.94	5.78	6.65	7.98	9.11*	10.26*	15.08*	20.17*	
	120	2.70	3.65	4.58	5.53	6.49	7.46	8.96	10.25*	11.55*	17.01*	22.79*	
25	140	2.95	4.01	5.04	6.09	7.16	8.24	9.91	11.34*	12.79*	18.86*	25.30*	
	10	1.29	1.47	1.66	1.86	2.07	2.29	2.61	2.89*	3.19*	4.38*	5.60*	
	20	1.54	1.77	2.04	2.33	2.62	2.93	3.40	3.81*	4.23*	5.95*	7.75*	
	40	1.90	2.27	2.68	3.12	3.57	4.04	4.76	5.37*	6.00*	8.62*	11.38*	
	60	2.21	2.70	3.25	3.82	4.41	5.02	5.95	6.75*	7.57*	10.97*	14.57*	
	80	2.49	3.11	3.78	4.47	5.19	5.92	7.05	8.01*	9.00*	13.13*	17.50*	
	100	2.75	3.49	4.27	5.08	5.92	6.77	8.08	9.20*	10.35*	15.16*	20.25*	
50	120	3.00	3.85	4.75	5.67	6.61	7.58	9.06	10.34*	11.64*	17.09*	22.87*	
	140	3.25	4.21	5.20	6.23	7.28	8.35	10.01	11.42*	12.87*	18.94*	25.38*	
	10	1.46	1.63	1.83	2.04	2.24	2.45	2.78	3.05*	3.34*	4.52*	5.74*	
	20	1.74	1.97	2.24	2.51	2.80	3.10	3.55	3.95*	4.36*	6.08*	7.87*	
	40	2.15	2.49	2.88	3.29	3.73	4.18	4.88	5.49*	6.12*	8.73*	11.48*	
	60	2.47	2.93	3.44	3.98	4.56	5.15	6.07	6.86*	7.67*	11.07*	14.66*	
	80	2.76	3.32	3.95	4.62	5.32	6.04	7.16	8.11*	9.10*	13.22*	17.58*	
100	100	3.03	3.70	4.44	5.23	6.04	6.88	8.18	9.30*	10.45*	15.24*	20.33*	
	120	3.28	4.06	4.91	5.81	6.73	7.69	9.16	10.43*	11.73*	17.17*	22.94*	
	140	3.52	4.40	5.36	6.36	7.40	8.46	10.10	11.51*	12.96*	19.02*	25.45*	
	10	1.67	1.86	2.07	2.28	2.50	2.71	3.04	3.31*	3.61*	4.79*	6.01*	
	20	2.01	2.25	2.52	2.80	3.09	3.38	3.83	4.21*	4.62*	6.32*	8.10*	
	40	2.49	2.83	3.21	3.61	4.03	4.46	5.14	5.73*	6.35*	8.94*	11.67*	
	60	2.85	3.29	3.77	4.29	4.84	5.41	6.30	7.07*	7.88*	11.26*	14.83*	
150	80	3.17	3.70	4.29	4.92	5.59	6.29	7.37	8.32*	9.30*	13.40*	17.74*	
	100	3.46	4.07	4.77	5.51	6.30	7.12	8.39	9.49*	10.63*	15.41*	20.48*	
	120	3.72	4.43	5.23	6.08	6.98	7.91	9.36	10.61*	11.91*	17.33*	23.09*	
	140	3.97	4.77	5.67	6.63	7.63	8.67	10.29	11.69*	13.13*	19.17*	25.59*	
	10	1.83	2.02	2.24	2.46	2.69	2.91	3.24	3.52*	3.83*	5.03*	6.25*	
	20	2.21	2.46	2.74	3.03	3.32	3.61	4.06	4.45*	4.86*	6.56*	8.32*	
	40	2.74	3.09	3.47	3.87	4.28	4.71	5.37	5.95*	6.57*	9.14*	11.87*	
	60	3.14	3.58	4.06	4.57	5.10	5.65	6.52	7.28*	8.08*	11.45*	15.01*	
	80	3.48	4.00	4.58	5.20	5.85	6.52	7.59	8.51*	9.49*	13.57*	17.91*	
	100	3.79	4.39	5.07	5.79	6.55	7.34	8.59	9.68*	10.82*	15.58*	20.64*	
	120	4.07	4.75	5.52	6.35	7.22	8.13	9.55	10.79*	12.08*	17.49*	23.24*	
	140	4.33	5.10	5.96	6.89	7.87	8.89	10.48	11.86*	13.30*	19.33*	25.74*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.0 Ft (RADIUS = 9.9 Ft)³
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft												
		(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60	80
200	10	1.95	2.16	2.38	2.61	2.84	3.07	3.41	3.70*	4.01*	4.33*	4.65*	5.25*	6.48*
	20	2.37	2.63	2.92	3.22	3.51	3.81	4.27	4.65*	5.07*	5.44*	5.89*	6.78*	8.54*
	40	2.94	3.30	3.69	4.10	4.51	4.94	5.59	6.17*	6.78*	7.18*	7.63*	9.35*	12.06*
	60	3.38	3.82	4.30	4.81	5.34	5.89	6.74	7.49*	8.29*	8.68*	9.13*	11.63*	15.18*
	80	3.74	4.26	4.84	5.45	6.09	6.75	7.80	8.71*	9.68*	10.55*	11.42*	13.75*	18.07*
	100	4.07	4.67	5.33	6.04	6.79	7.57	8.79	9.87*	11.00*	12.04*	13.12*	15.74*	20.79*
	120	4.36	5.04	5.79	6.60	7.45	8.35	9.75	10.97*	12.26*	13.60*	14.98*	17.65*	23.39*
300	140	4.63	5.39	6.23	7.14	8.09	9.10	10.67	12.04*	13.47*	14.94*	16.46*	19.48*	25.88*
	10	2.16	2.37	2.62	2.86	3.10	3.34	3.70	4.00*	4.33*	4.65*	5.01*	5.61*	6.88*
	20	2.63	2.91	3.22	3.52	3.83	4.15	4.61	5.01*	5.44*	5.89*	6.34*	7.18*	8.96*
	40	3.28	3.65	4.06	4.47	4.90	5.33	5.99	6.56*	7.18*	7.74*	8.31*	9.74*	12.44*
	60	3.76	4.22	4.71	5.23	5.76	6.30	7.14	7.88*	8.68*	9.49*	10.30*	12.00*	15.53*
	80	4.17	4.70	5.28	5.89	6.52	7.17	8.20	9.09*	10.05*	11.00*	11.97*	14.10*	18.40*
	100	4.52	5.13	5.79	6.49	7.23	7.99	9.18	10.24*	11.36*	12.50*	13.66*	16.07*	21.10*
400	120	4.84	5.52	6.27	7.06	7.89	8.76	10.13	11.33*	12.60*	13.94*	15.26*	17.97*	23.68*
	140	5.14	5.89	6.72	7.60	8.53	9.50	11.04	12.38*	13.80*	15.26*	16.74*	19.78*	26.16*
	10	2.32	2.55	2.80	3.06	3.31	3.56	3.93	4.25*	4.59*	4.94*	5.31*	5.92*	7.22*
	20	2.85	3.14	3.45	3.78	4.10	4.42	4.90	5.31*	5.76*	6.23*	6.70*	7.54*	9.34*
	40	3.55	3.94	4.36	4.79	5.23	5.66	6.33	6.91*	7.54*	8.17*	8.80*	10.12*	12.81*
	60	4.08	4.55	5.06	5.58	6.12	6.67	7.51	8.24*	9.04*	9.84*	10.64*	12.36*	15.88*
	80	4.51	5.06	5.65	6.27	6.90	7.56	8.57	9.46*	10.42*	11.44*	12.46*	14.44*	18.72*
600	100	4.90	5.51	6.19	6.89	7.62	8.38	9.55	10.59*	11.71*	12.84*	13.97*	16.40*	21.41*
	120	5.24	5.93	6.68	7.47	8.29	9.15	10.49	11.68*	12.94*	14.26*	15.58*	18.28*	23.98*
	140	5.56	6.31	7.14	8.02	8.94	9.89	11.40	12.72*	14.13*	15.58*	17.04*	20.09*	26.45*
	10	2.59	2.83	3.11	3.38	3.65	3.92	4.31	4.65*	5.01*	5.38*	5.76*	6.43*	7.80*
	20	3.19	3.50	3.84	4.19	4.53	4.87	5.38	5.81*	6.28*	6.76*	7.24*	8.16*	10.01*
	40	3.99	4.40	4.85	5.31	5.77	6.22	6.91	7.51*	8.16*	8.80*	9.44*	10.80*	13.51*
	60	4.58	5.08	5.62	6.17	6.73	7.29	8.14	8.89*	9.70*	10.51*	11.32*	13.05*	16.55*
800	80	5.08	5.65	6.27	6.91	7.56	8.22	9.23	10.12*	11.08*	12.04*	13.00*	15.10*	19.36*
	100	5.50	6.15	6.84	7.57	8.30	9.06	10.23	11.26*	12.37*	13.50*	14.64*	17.04*	22.02*
	120	5.89	6.60	7.37	8.17	9.00	9.85	11.17	12.34*	13.60*	14.94*	16.28*	18.90*	24.56*
	140	6.24	7.02	7.86	8.74	9.66	10.60	12.07	13.37*	14.78*	16.24*	17.69*	20.69*	27.01*
	10	2.80	3.06	3.35	3.64	3.93	4.21	4.62	4.97*	5.36*	5.76*	6.16*	6.85*	8.29*
	20	3.46	3.80	4.16	4.52	4.88	5.24	5.77	6.22*	6.70*	7.18*	7.66*	8.67*	10.59*
	40	4.35	4.78	5.26	5.73	6.21	6.69	7.40	8.01*	8.69*	9.38*	10.07*	11.40*	14.15*
	60	5.00	5.52	6.08	6.66	7.23	7.81	8.69	9.44*	10.28*	11.13*	12.00*	13.67*	17.19*
	80	5.53	6.13	6.78	7.44	8.10	8.78	9.81	10.70*	11.69*	12.69*	13.69*	15.73*	19.98*
	100	6.00	6.67	7.39	8.13	8.89	9.65	10.83	11.86*	12.99*	14.13*	15.28*	17.66*	22.62*
	120	6.42	7.15	7.95	8.77	9.61	10.47	11.79	12.95*	14.22*	15.54*	16.87*	19.51*	25.14*
	140	6.80	7.60	8.47	9.36	10.28	11.23	12.70	13.98*	15.39*	16.84*	18.29*	21.28*	27.57*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.0 Ft (RADIUS = 9.9 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
(Ft*s) ^{1/2} 0	°F												
	10	1.49	1.86	2.24	2.63	3.02	3.42	4.03	4.54*	5.05*	7.18*	9.38*	
	20	1.92	2.48	3.04	3.61	4.18	4.77	5.66	6.42*	7.19*	10.38*	13.71*	
	40	2.65	3.52	4.38	5.25	6.13	7.03	8.41	9.58*	10.78*	15.76*	21.01*	
	60	3.30	4.43	5.55	6.69	7.84	9.02	10.82	12.36*	13.93*	20.47*	27.40*	
	80	3.89	5.27	6.63	8.01	9.41	10.84	13.04	14.91*	16.82*	24.80*	33.27*	
	100	4.44	6.06	7.65	9.25	10.89	12.55	15.11	17.30*	19.53*	28.87*	38.79*	
	120	4.97	6.80	8.61	10.43	12.29	14.18	17.09	19.57*	22.11*	32.74*	44.03*	
	140	5.47	7.52	9.53	11.56	13.63	15.74	18.98	21.76*	24.59*	36.45*	49.05*	
	25	10	1.91	2.20	2.53	2.89	3.25	3.63	4.21	4.71*	5.22*	7.33*	9.52*
20		2.35	2.79	3.29	3.83	4.38	4.94	5.82	6.56*	7.33*	10.50*	13.83*	
40		3.04	3.79	4.60	5.43	6.30	7.18	8.54	9.71*	10.90*	15.86*	21.11*	
60		3.66	4.68	5.75	6.86	7.99	9.15	10.94	12.47*	14.03*	20.57*	27.49*	
80		4.22	5.50	6.82	8.17	9.55	10.97	13.15	15.01*	16.92*	24.89*	33.36*	
100		4.76	6.27	7.82	9.40	11.02	12.67	15.22	17.40*	19.62*	28.96*	38.86*	
120		5.27	7.01	8.77	10.57	12.41	14.29	17.19	19.67*	22.20*	32.82*	44.10*	
140		5.77	7.72	9.69	11.70	13.75	15.85	19.08	21.84*	24.67*	36.52*	49.13*	
50		10	2.15	2.44	2.77	3.11	3.46	3.82	4.39	4.87*	5.38*	7.47*	9.65*
		20	2.64	3.06	3.53	4.04	4.57	5.12	5.97	6.70*	7.47*	10.63*	13.95*
	40	3.37	4.05	4.81	5.62	6.46	7.33	8.67	9.83*	11.01*	15.97*	21.20*	
	60	3.98	4.92	5.95	7.02	8.14	9.29	11.06	12.58*	14.14*	20.66*	27.58*	
	80	4.54	5.73	7.00	8.32	9.69	11.09	13.26	15.11*	17.01*	24.98*	33.44*	
	100	5.07	6.49	7.99	9.55	11.15	12.79	15.32	17.49*	19.72*	29.04*	38.94*	
	120	5.57	7.22	8.94	10.71	12.54	14.41	17.29	19.76*	22.29*	32.90*	44.18*	
	140	6.06	7.92	9.85	11.84	13.87	15.96	19.18	21.93*	24.76*	36.60*	49.20*	
	100	10	2.48	2.77	3.11	3.45	3.80	4.16	4.71	5.19*	5.69*	7.76*	9.93*
		20	3.04	3.46	3.92	4.41	4.92	5.45	6.27	6.98*	7.74*	10.87*	14.18*
40		3.85	4.49	5.21	5.97	6.78	7.62	8.93	10.06*	11.24*	16.18*	21.40*	
60		4.51	5.36	6.32	7.35	8.43	9.55	11.29	12.79*	14.35*	20.85*	27.76*	
80		5.08	6.16	7.36	8.63	9.96	11.34	13.47	15.31*	17.21*	25.16*	33.60*	
100		5.62	6.91	8.33	9.84	11.41	13.02	15.53	17.68*	19.90*	29.21*	39.10*	
120		6.12	7.62	9.27	10.99	12.79	14.63	17.49	19.94*	22.47*	33.06*	44.33*	
140		6.60	8.31	10.17	12.11	14.11	16.17	19.37	22.11*	24.93*	36.75*	49.34*	
150		10	2.71	3.02	3.37	3.72	4.08	4.44	4.99	5.46*	5.97*	8.04*	10.19*
		20	3.34	3.76	4.23	4.72	5.23	5.74	6.55	7.25*	8.00*	11.12*	14.41*
	40	4.23	4.85	5.55	6.30	7.08	7.90	9.18	10.30*	11.47*	16.39*	21.60*	
	60	4.92	5.75	6.67	7.67	8.72	9.81	11.52	13.01*	14.56*	21.04*	27.93*	
	80	5.53	6.55	7.70	8.93	10.23	11.58	13.69	15.51*	17.41*	25.34*	33.77*	
	100	6.08	7.30	8.66	10.13	11.66	13.26	15.73	17.87*	20.09*	29.37*	39.26*	
	120	6.59	8.01	9.59	11.27	13.03	14.85	17.68	20.12*	22.64*	33.22*	44.48*	
	140	7.08	8.69	10.48	12.37	14.35	16.39	19.56	22.29*	25.10*	36.91*	49.49*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.0 Ft (RADIUS = 9.9 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft												
		(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60	80
200	10	2.90	3.23	3.58	3.94	4.31	4.68	5.23	5.71*	6.22*	6.66*	8.31*	10.46*	
	20	3.58	4.02	4.50	4.99	5.50	6.01	6.81	7.51*	8.26*	8.73*	11.36*	14.64*	
	40	4.53	5.16	5.86	6.60	7.37	8.17	9.43	10.53*	11.70*	12.15*	16.59*	21.79*	
	60	5.27	6.09	7.00	7.97	8.99	10.07	11.75	13.22*	14.76*	15.18*	21.23*	28.11*	
	80	5.90	6.90	8.02	9.22	10.50	11.82	13.91	15.71*	17.60*	17.99*	25.51*	33.93*	
	100	6.47	7.66	8.98	10.41	11.92	13.49	15.94	18.06*	20.27*	20.64*	29.54*	39.41*	
	120	7.00	8.37	9.90	11.54	13.27	15.07	17.88	20.31*	22.82*	23.17*	33.38*	44.62*	
300	140	7.50	9.05	10.78	12.64	14.58	16.60	19.75	22.46*	25.27*	25.61*	37.06*	49.63*	
	10	3.22	3.56	3.93	4.31	4.69	5.07	5.64	6.13*	6.66*	7.04*	9.21*	11.40*	
	20	3.98	4.44	4.93	5.44	5.96	6.48	7.28	7.98*	8.73*	9.16*	12.28*	15.53*	
	40	5.04	5.68	6.39	7.12	7.89	8.68	9.91	10.99*	12.15*	12.58*	17.42*	22.56*	
	60	5.84	6.66	7.56	8.52	9.52	10.56	12.20	13.65*	15.18*	15.58*	21.98*	28.81*	
	80	6.53	7.51	8.61	9.78	11.01	12.30	14.33	16.11*	17.99*	18.37*	26.22*	34.59*	
	100	7.14	8.29	9.58	10.95	12.41	13.94	16.34	18.44*	20.64*	21.00*	30.21*	40.03*	
400	120	7.70	9.02	10.49	12.08	13.76	15.51	18.27	20.67*	23.17*	23.52*	34.02*	45.22*	
	140	8.22	9.71	11.37	13.16	15.05	17.03	20.12	22.81*	25.61*	25.94*	37.68*	50.20*	
	10	3.47	3.82	4.21	4.61	5.01	5.40	5.99	6.49*	7.04*	7.42*	9.21*	11.40*	
	20	4.31	4.78	5.29	5.81	6.34	6.88	7.69	8.39*	9.16*	9.54*	12.28*	15.53*	
	40	5.45	6.11	6.83	7.57	8.34	9.13	10.35	11.42*	12.58*	12.96*	17.42*	22.56*	
	60	6.32	7.14	8.05	9.00	9.99	11.02	12.64	14.06*	15.58*	15.96*	21.98*	28.81*	
	80	7.05	8.04	9.12	10.28	11.49	12.76	14.75	16.51*	18.37*	18.75*	26.22*	34.59*	
600	100	7.69	8.84	10.11	11.46	12.89	14.39	16.75	18.82*	21.00*	21.38*	30.21*	40.03*	
	120	8.28	9.59	11.03	12.58	14.22	15.94	18.66	21.03*	23.52*	23.90*	34.02*	45.22*	
	140	8.83	10.29	11.91	13.66	15.51	17.45	20.49	23.16*	25.94*	26.32*	37.68*	50.20*	
	10	3.87	4.26	4.68	5.10	5.52	5.94	6.56	7.08*	7.66*	8.10*	9.94*	12.20*	
	20	4.83	5.33	5.88	6.43	6.99	7.54	8.38	9.10*	9.89*	10.27*	13.09*	16.36*	
	40	6.12	6.81	7.56	8.33	9.12	9.91	11.14	12.21*	13.37*	13.75*	18.21*	23.32*	
	60	7.09	7.94	8.87	9.84	10.83	11.86	13.45	14.85*	16.36*	16.74*	22.72*	29.51*	
800	80	7.89	8.90	10.01	11.16	12.36	13.60	15.55	17.27*	19.12*	19.50*	26.91*	35.24*	
	100	8.60	9.76	11.03	12.37	13.77	15.23	17.53	19.55*	21.72*	22.08*	30.87*	40.65*	
	120	9.25	10.55	11.99	13.51	15.10	16.78	19.41	21.74*	24.21*	24.57*	34.65*	45.81*	
	140	9.84	11.29	12.89	14.59	16.38	18.26	21.23	23.85*	26.61*	26.97*	38.29*	50.77*	
	10	4.20	4.61	5.05	5.50	5.94	6.38	7.02	7.57*	8.18*	8.56*	10.56*	12.89*	
	20	5.25	5.78	6.36	6.94	7.52	8.10	8.96	9.70*	10.52*	10.90*	13.80*	17.12*	
	40	6.66	7.38	8.16	8.96	9.77	10.58	11.82	12.90*	14.09*	14.47*	18.96*	24.06*	
	60	7.71	8.60	9.56	10.55	11.56	12.59	14.18	15.57*	17.09*	17.47*	23.44*	30.20*	
	80	8.59	9.62	10.75	11.92	13.12	14.36	16.29	17.99*	19.84*	20.22*	27.60*	35.89*	
	100	9.35	10.53	11.82	13.17	14.56	16.01	18.27	20.27*	22.42*	22.78*	31.52*	41.27*	
	120	10.04	11.37	12.81	14.32	15.91	17.55	20.15	22.44*	24.89*	25.25*	35.28*	46.40*	
	140	10.68	12.14	13.73	15.42	17.19	19.04	21.95	24.52*	27.27*	27.63*	38.89*	51.34*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 16.0 Ft (RADIUS = 11.3 Ft)
 FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		$(Ft*s)^{1/2}$	4	8	12	16	20	24	30	35	40	60	80
0	10	0.50	0.57	0.66	0.74	0.83	0.92	1.05	1.16	1.27*	1.71*	2.15*	
	20	0.56	0.66	0.76	0.87	0.98	1.10	1.26	1.40	1.55*	2.12*	2.70*	
	40	0.66	0.80	0.94	1.09	1.24	1.40	1.62	1.82	2.01*	2.81*	3.64*	
	60	0.75	0.92	1.10	1.29	1.47	1.66	1.94	2.18	2.42*	3.42*	4.46*	
	80	0.83	1.04	1.25	1.46	1.68	1.90	2.23	2.51	2.80*	3.98*	5.21*	
	100	0.91	1.15	1.39	1.63	1.88	2.13	2.51	2.83	3.15*	4.50*	5.91*	
	120	0.98	1.25	1.52	1.79	2.06	2.34	2.76	3.12	3.49*	5.00*	6.58*	
	140	1.05	1.35	1.64	1.94	2.24	2.55	3.01	3.41	3.81*	5.48*	7.23*	
	25	10	0.69	0.75	0.83	0.92	1.00	1.08	1.21	1.31	1.42*	1.85*	2.28*
		20	0.78	0.86	0.96	1.05	1.16	1.26	1.41	1.55	1.68*	2.24*	2.82*
40		0.91	1.02	1.14	1.27	1.40	1.54	1.76	1.94	2.13*	2.92*	3.74*	
60		1.01	1.14	1.29	1.45	1.62	1.79	2.06	2.29	2.53*	3.52*	4.54*	
80		1.10	1.25	1.43	1.62	1.82	2.03	2.35	2.62	2.90*	4.07*	5.29*	
100		1.18	1.36	1.56	1.78	2.01	2.25	2.61	2.93	3.25*	4.59*	5.99*	
120		1.25	1.45	1.69	1.93	2.19	2.46	2.87	3.22	3.58*	5.08*	6.66*	
140		1.32	1.55	1.81	2.08	2.37	2.66	3.11	3.50	3.90*	5.56*	7.30*	
50		10	0.76	0.83	0.92	1.00	1.09	1.18	1.31	1.41	1.52*	1.96*	2.40*
		20	0.88	0.96	1.06	1.16	1.27	1.37	1.53	1.66	1.79*	2.36*	2.93*
	40	1.03	1.14	1.27	1.40	1.53	1.67	1.88	2.06	2.24*	3.02*	3.83*	
	60	1.15	1.28	1.43	1.59	1.75	1.92	2.18	2.40	2.63*	3.61*	4.63*	
	80	1.25	1.40	1.58	1.76	1.95	2.15	2.46	2.72	2.99*	4.16*	5.37*	
	100	1.34	1.51	1.71	1.92	2.14	2.36	2.72	3.02	3.34*	4.67*	6.07*	
	120	1.42	1.62	1.84	2.07	2.31	2.57	2.97	3.31	3.67*	5.16*	6.73*	
	140	1.50	1.71	1.95	2.21	2.49	2.77	3.21	3.59	3.98*	5.63*	7.37*	
	100	10	0.86	0.94	1.03	1.12	1.21	1.31	1.44	1.55	1.67*	2.13*	2.59*
		20	1.01	1.10	1.20	1.31	1.42	1.53	1.69	1.83	1.97*	2.55*	3.13*
40		1.20	1.31	1.45	1.58	1.72	1.86	2.07	2.25	2.43*	3.21*	4.02*	
60		1.34	1.48	1.63	1.79	1.96	2.12	2.38	2.60	2.82*	3.79*	4.81*	
80		1.46	1.62	1.79	1.98	2.17	2.36	2.66	2.91	3.18*	4.33*	5.53*	
100		1.57	1.74	1.94	2.14	2.36	2.58	2.92	3.21	3.52*	4.83*	6.22*	
120		1.66	1.85	2.07	2.30	2.54	2.78	3.16	3.49	3.84*	5.32*	6.88*	
140		1.75	1.96	2.19	2.45	2.71	2.98	3.40	3.77	4.15*	5.79*	7.51*	
150		10	0.94	1.02	1.11	1.21	1.30	1.40	1.54	1.66	1.77*	2.26*	2.74*
		20	1.10	1.20	1.31	1.42	1.54	1.65	1.82	1.96	2.10*	2.71*	3.30*
	40	1.32	1.44	1.58	1.72	1.86	2.01	2.22	2.40	2.59*	3.39*	4.20*	
	60	1.48	1.62	1.78	1.95	2.12	2.29	2.55	2.76	2.99*	3.96*	4.97*	
	80	1.61	1.78	1.96	2.15	2.34	2.53	2.83	3.08	3.35*	4.50*	5.69*	
	100	1.73	1.91	2.11	2.32	2.54	2.76	3.09	3.38	3.68*	5.00*	6.38*	
	120	1.84	2.03	2.25	2.48	2.72	2.96	3.34	3.66	4.00*	5.47*	7.03*	
	140	1.93	2.15	2.39	2.64	2.90	3.16	3.58	3.94	4.31*	5.94*	7.66*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 16.0 Ft (RADIUS = 11.3 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		$(Ft*s)^{1/2}$	4	8	12	16	20	24	30	35	40	60	80
200	10		0.99	1.08	1.18	1.28	1.38	1.48	1.62	1.74	1.86*	2.37*	2.86*
	20		1.17	1.28	1.39	1.51	1.63	1.75	1.92	2.07	2.21*	2.84*	3.45*
	40		1.42	1.54	1.68	1.83	1.98	2.13	2.35	2.53	2.72*	3.54*	4.36*
	60		1.59	1.74	1.91	2.08	2.25	2.42	2.69	2.91	3.14*	4.12*	5.13*
	80		1.74	1.91	2.09	2.29	2.48	2.68	2.98	3.24	3.50*	4.65*	5.85*
	100		1.87	2.05	2.26	2.47	2.69	2.91	3.25	3.54	3.84*	5.15*	6.53*
	120		1.98	2.18	2.41	2.64	2.88	3.13	3.50	3.82	4.16*	5.63*	7.17*
	140		2.08	2.30	2.55	2.80	3.06	3.33	3.74	4.09	4.46*	6.08*	7.80*
300	10		1.09	1.18	1.28	1.39	1.49	1.60	1.75	1.88	2.01*	2.55*	3.06*
	20		1.30	1.40	1.53	1.65	1.78	1.91	2.09	2.24	2.40*	3.06*	3.69*
	40		1.57	1.71	1.86	2.02	2.17	2.33	2.56	2.75	2.95*	3.80*	4.64*
	60		1.77	1.93	2.11	2.29	2.47	2.65	2.92	3.15	3.39*	4.40*	5.43*
	80		1.94	2.12	2.31	2.52	2.72	2.93	3.24	3.50	3.77*	4.94*	6.15*
	100		2.08	2.28	2.50	2.72	2.95	3.17	3.52	3.81	4.11*	5.44*	6.82*
	120		2.21	2.42	2.66	2.90	3.15	3.40	3.78	4.10	4.44*	5.92*	7.46*
	140		2.33	2.56	2.81	3.07	3.34	3.61	4.03	4.38	4.75*	6.37*	8.07*
400	10		1.16	1.26	1.37	1.48	1.59	1.70	1.86	1.99	2.13*	2.69*	3.23*
	20		1.39	1.51	1.64	1.77	1.90	2.03	2.23	2.39	2.55*	3.24*	3.90*
	40		1.70	1.84	2.00	2.16	2.33	2.49	2.73	2.93	3.14*	4.02*	4.89*
	60		1.92	2.09	2.27	2.46	2.65	2.84	3.12	3.36	3.60*	4.65*	5.70*
	80		2.10	2.29	2.49	2.71	2.92	3.13	3.45	3.72	3.99*	5.20*	6.42*
	100		2.26	2.46	2.69	2.92	3.16	3.39	3.75	4.04	4.35*	5.71*	7.09*
	120		2.40	2.62	2.87	3.12	3.37	3.63	4.02	4.35	4.69*	6.18*	7.73*
	140		2.53	2.77	3.03	3.30	3.57	3.85	4.27	4.63	5.00*	6.64*	8.34*
600	10		1.29	1.39	1.50	1.62	1.74	1.86	2.03	2.17	2.32*	2.92*	3.50*
	20		1.55	1.67	1.82	1.96	2.10	2.24	2.45	2.62	2.79*	3.53*	4.24*
	40		1.90	2.06	2.23	2.41	2.58	2.76	3.02	3.23	3.44*	4.39*	5.30*
	60		2.16	2.33	2.53	2.74	2.94	3.14	3.44	3.69	3.95*	5.06*	6.15*
	80		2.37	2.56	2.79	3.01	3.24	3.47	3.81	4.08	4.37*	5.64*	6.90*
	100		2.55	2.76	3.01	3.26	3.50	3.75	4.13	4.44	4.76*	6.16*	7.58*
	120		2.71	2.94	3.20	3.47	3.74	4.01	4.42	4.76	5.11*	6.65*	8.22*
	140		2.85	3.10	3.38	3.67	3.96	4.25	4.69	5.06	5.44*	7.12*	8.84*
800	10		1.38	1.49	1.62	1.74	1.87	1.99	2.17	2.32	2.47*	3.11*	3.72*
	20		1.68	1.81	1.96	2.11	2.26	2.41	2.63	2.81	2.99*	3.77*	4.52*
	40		2.07	2.23	2.41	2.60	2.79	2.97	3.25	3.47	3.70*	4.69*	5.65*
	60		2.35	2.54	2.75	2.97	3.18	3.39	3.71	3.97	4.23*	5.40*	6.54*
	80		2.58	2.79	3.03	3.27	3.51	3.74	4.10	4.39	4.69*	6.01*	7.31*
	100		2.78	3.01	3.27	3.53	3.79	4.05	4.44	4.76	5.09*	6.56*	8.01*
	120		2.95	3.20	3.48	3.76	4.04	4.33	4.75	5.10	5.46*	7.06*	8.67*
	140		3.11	3.38	3.67	3.98	4.28	4.58	5.04	5.41	5.81*	7.54*	9.29*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 16.0 Ft (RADIUS = 11.3 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
0 (Ft*s) ^{1/2}	10	0.72	0.84	0.97	1.11	1.25	1.39	1.60	1.77	1.95*	2.66*	3.39*	
	20	0.84	1.01	1.19	1.37	1.56	1.74	2.03	2.27	2.51*	3.49*	4.50*	
	40	1.04	1.29	1.55	1.81	2.08	2.34	2.75	3.09	3.44*	4.88*	6.37*	
	60	1.22	1.54	1.87	2.20	2.53	2.87	3.38	3.82	4.26*	6.09*	8.00*	
	80	1.38	1.77	2.16	2.55	2.95	3.35	3.96	4.49	5.01*	7.21*	9.51*	
	100	1.54	1.99	2.44	2.89	3.34	3.80	4.51	5.11	5.72*	8.26*	10.92*	
	120	1.68	2.19	2.70	3.20	3.71	4.23	5.03	5.71	6.39*	9.25*	12.26*	
	140	1.83	2.39	2.95	3.51	4.07	4.65	5.53	6.28	7.04*	10.21*	13.55*	
25	10	0.98	1.08	1.20	1.33	1.45	1.58	1.78	1.94	2.11*	2.81*	3.53*	
	20	1.14	1.27	1.42	1.58	1.75	1.92	2.19	2.41	2.64*	3.61*	4.62*	
	40	1.36	1.55	1.77	2.00	2.24	2.50	2.88	3.22	3.56*	4.98*	6.47*	
	60	1.54	1.79	2.07	2.37	2.68	3.01	3.51	3.93	4.37*	6.19*	8.09*	
	80	1.70	2.01	2.35	2.71	3.09	3.48	4.08	4.59	5.11*	7.30*	9.59*	
	100	1.85	2.21	2.61	3.04	3.48	3.93	4.62	5.21	5.81*	8.34*	11.00*	
	120	1.99	2.41	2.87	3.35	3.84	4.35	5.13	5.80	6.48*	9.33*	12.34*	
	140	2.12	2.60	3.11	3.65	4.20	4.76	5.63	6.37	7.12*	10.28*	13.62*	
50	10	1.10	1.20	1.33	1.46	1.59	1.72	1.91	2.08	2.25*	2.95*	3.66*	
	20	1.28	1.42	1.57	1.73	1.90	2.07	2.33	2.55	2.77*	3.74*	4.73*	
	40	1.54	1.73	1.94	2.17	2.40	2.64	3.02	3.34	3.67*	5.09*	6.56*	
	60	1.75	1.98	2.25	2.53	2.83	3.14	3.63	4.04	4.47*	6.28*	8.18*	
	80	1.92	2.20	2.52	2.87	3.23	3.61	4.19	4.69	5.21*	7.38*	9.67*	
	100	2.08	2.41	2.79	3.19	3.61	4.05	4.73	5.31	5.91*	8.42*	11.08*	
	120	2.22	2.60	3.03	3.49	3.97	4.47	5.24	5.89	6.57*	9.41*	12.41*	
	140	2.36	2.79	3.27	3.79	4.32	4.87	5.73	6.46	7.21*	10.36*	13.69*	
100	10	1.25	1.36	1.50	1.63	1.77	1.91	2.11	2.28	2.45*	3.18*	3.90*	
	20	1.48	1.62	1.78	1.95	2.12	2.30	2.56	2.78	3.00*	3.97*	4.95*	
	40	1.79	1.98	2.20	2.42	2.65	2.89	3.26	3.57	3.89*	5.29*	6.76*	
	60	2.03	2.26	2.53	2.81	3.09	3.39	3.86	4.26	4.68*	6.47*	8.36*	
	80	2.23	2.50	2.82	3.15	3.49	3.85	4.41	4.90	5.40*	7.56*	9.84*	
	100	2.41	2.72	3.08	3.46	3.86	4.28	4.94	5.50	6.09*	8.59*	11.23*	
	120	2.57	2.93	3.33	3.76	4.22	4.69	5.44	6.08	6.75*	9.57*	12.56*	
	140	2.72	3.12	3.57	4.05	4.56	5.09	5.92	6.64	7.38*	10.52*	13.84*	
150	10	1.36	1.48	1.62	1.76	1.91	2.05	2.26	2.43	2.61*	3.36*	4.10*	
	20	1.62	1.77	1.94	2.12	2.29	2.47	2.74	2.96	3.19*	4.17*	5.16*	
	40	1.97	2.17	2.39	2.62	2.86	3.10	3.46	3.77	4.09*	5.49*	6.95*	
	60	2.24	2.48	2.75	3.03	3.31	3.61	4.07	4.46	4.87*	6.65*	8.53*	
	80	2.46	2.74	3.05	3.38	3.72	4.07	4.62	5.10	5.59*	7.73*	10.00*	
	100	2.65	2.97	3.33	3.70	4.10	4.50	5.14	5.69	6.27*	8.75*	11.39*	
	120	2.83	3.19	3.58	4.01	4.45	4.91	5.64	6.26	6.92*	9.73*	12.71*	
	140	2.99	3.39	3.83	4.30	4.79	5.30	6.11	6.82	7.54*	10.67*	13.98*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 16.0 Ft (RADIUS = 11.3 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60
200	10	1.45	1.57	1.72	1.87	2.02	2.16	2.38	2.56	2.75*	3.52*	4.27*	
	20	1.74	1.89	2.07	2.25	2.43	2.62	2.89	3.12	3.35*	4.35*	5.35*	
	40	2.12	2.32	2.55	2.79	3.03	3.27	3.64	3.95	4.28*	5.68*	7.13*	
	60	2.41	2.65	2.93	3.21	3.50	3.80	4.26	4.65	5.06*	6.83*	8.70*	
	80	2.65	2.93	3.25	3.58	3.92	4.27	4.82	5.28	5.77*	7.91*	10.16*	
	100	2.86	3.18	3.54	3.91	4.30	4.71	5.33	5.88	6.45*	8.92*	11.54*	
	120	3.05	3.40	3.80	4.22	4.66	5.12	5.83	6.44	7.09*	9.89*	12.86*	
300	140	3.22	3.61	4.05	4.52	5.00	5.51	6.30	6.99	7.71*	10.82*	14.12*	
	10	1.59	1.73	1.88	2.04	2.20	2.35	2.58	2.77	2.96*	3.78*	4.57*	
	20	1.92	2.09	2.28	2.47	2.66	2.85	3.14	3.38	3.62*	4.66*	5.69*	
	40	2.36	2.57	2.82	3.06	3.32	3.57	3.95	4.26	4.59*	6.02*	7.48*	
	60	2.68	2.94	3.23	3.52	3.82	4.13	4.59	4.98	5.39*	7.18*	9.04*	
	80	2.95	3.25	3.58	3.92	4.26	4.62	5.16	5.63	6.11*	8.24*	10.48*	
	100	3.19	3.52	3.89	4.27	4.66	5.07	5.69	6.22	6.78*	9.24*	11.85*	
400	120	3.40	3.76	4.17	4.59	5.03	5.48	6.18	6.79	7.42*	10.20*	13.15*	
	140	3.59	3.99	4.43	4.90	5.38	5.88	6.66	7.33	8.03*	11.12*	14.40*	
	10	1.71	1.85	2.01	2.18	2.34	2.50	2.74	2.94	3.14*	3.99*	4.81*	
	20	2.07	2.25	2.44	2.65	2.85	3.05	3.35	3.59	3.84*	4.93*	5.99*	
	40	2.55	2.78	3.03	3.29	3.55	3.81	4.20	4.53	4.86*	6.33*	7.81*	
	60	2.91	3.18	3.47	3.78	4.09	4.40	4.88	5.27	5.68*	7.50*	9.36*	
	80	3.20	3.51	3.85	4.20	4.55	4.91	5.46	5.93	6.42*	8.56*	10.79*	
600	100	3.46	3.80	4.18	4.57	4.97	5.38	6.00	6.53	7.09*	9.55*	12.15*	
	120	3.68	4.06	4.48	4.91	5.35	5.80	6.50	7.10	7.73*	10.50*	13.44*	
	140	3.89	4.30	4.75	5.23	5.71	6.21	6.98	7.65	8.34*	11.42*	14.68*	
	10	1.90	2.05	2.22	2.40	2.58	2.75	3.01	3.22	3.43*	4.34*	5.22*	
	20	2.31	2.50	2.72	2.93	3.15	3.36	3.68	3.94	4.21*	5.36*	6.48*	
	40	2.87	3.11	3.38	3.66	3.93	4.21	4.62	4.96	5.31*	6.85*	8.38*	
	60	3.27	3.56	3.88	4.20	4.53	4.86	5.35	5.76	6.19*	8.06*	9.95*	
800	80	3.60	3.93	4.29	4.66	5.03	5.41	5.98	6.45	6.95*	9.13*	11.39*	
	100	3.89	4.25	4.65	5.06	5.48	5.90	6.54	7.08	7.64*	10.13*	12.73*	
	120	4.15	4.54	4.98	5.43	5.89	6.35	7.06	7.66	8.29*	11.08*	14.00*	
	140	4.38	4.81	5.28	5.77	6.27	6.78	7.55	8.22	8.91*	11.99*	15.24*	
	10	2.05	2.21	2.39	2.58	2.77	2.95	3.22	3.44	3.67*	4.63*	5.55*	
	20	2.51	2.71	2.94	3.17	3.40	3.62	3.96	4.23	4.51*	5.72*	6.89*	
	40	3.12	3.38	3.66	3.96	4.25	4.54	4.97	5.32	5.69*	7.29*	8.87*	
	60	3.56	3.87	4.20	4.55	4.89	5.23	5.74	6.17	6.61*	8.54*	10.48*	
	80	3.93	4.27	4.65	5.04	5.43	5.82	6.40	6.89	7.40*	9.65*	11.93*	
	100	4.24	4.62	5.04	5.47	5.90	6.34	7.00	7.55	8.12*	10.66*	13.27*	
	120	4.53	4.94	5.40	5.86	6.34	6.82	7.54	8.15	8.79*	11.61*	14.55*	
	140	4.78	5.23	5.72	6.23	6.74	7.26	8.05	8.72	9.42*	12.52*	15.77*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 16.0 Ft (RADIUS = 11.3 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft													
		(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60	80	
0	10	1.06	1.28	1.50	1.73	1.96	2.19	2.54	2.83	3.13*	3.44*	3.72*	4.34*	5.58*	
	20	1.31	1.61	1.93	2.25	2.57	2.90	3.40	3.82	4.24*	4.78*	5.26*	5.99*	7.80*	
	40	1.72	2.19	2.66	3.13	3.61	4.10	4.84	5.47	6.11*	6.87*	7.64*	8.76*	11.54*	
	60	2.07	2.69	3.29	3.90	4.52	5.15	6.11	6.92	7.75*	8.71*	9.68*	11.19*	14.81*	
	80	2.40	3.14	3.88	4.61	5.36	6.11	7.27	8.25	9.26*	10.42*	11.67*	13.42*	17.82*	
	100	2.71	3.58	4.42	5.28	6.14	7.02	8.36	9.51	10.67*	12.01*	13.33*	15.52*	20.64*	
	120	3.00	3.99	4.94	5.91	6.89	7.88	9.40	10.69	12.01*	13.33*	14.65*	17.51*	23.33*	
	140	3.29	4.38	5.44	6.52	7.60	8.71	10.40	11.84	13.30*	14.73*	16.15*	19.42*	25.90*	
	25	10	1.42	1.58	1.77	1.98	2.18	2.40	2.73	3.01	3.29*	3.57*	3.85*	4.49*	5.72*
		20	1.69	1.92	2.19	2.47	2.77	3.08	3.56	3.96	4.38*	4.80*	5.22*	6.11*	7.92*
40		2.09	2.46	2.88	3.32	3.78	4.25	4.98	5.60	6.23*	6.85*	7.47*	8.87*	11.64*	
60		2.43	2.94	3.50	4.08	4.67	5.29	6.23	7.04	7.86*	8.68*	9.50*	11.29*	14.90*	
80		2.75	3.38	4.07	4.77	5.50	6.24	7.38	8.36	9.35*	10.33*	11.31*	13.51*	17.90*	
100		3.04	3.80	4.60	5.43	6.28	7.14	8.47	9.60	10.76*	11.91*	13.06*	15.60*	20.72*	
120		3.32	4.20	5.12	6.06	7.02	8.00	9.50	10.79	12.10*	13.41*	14.72*	17.59*	23.40*	
140		3.59	4.59	5.61	6.66	7.73	8.82	10.50	11.93	13.39*	14.81*	16.23*	19.50*	25.97*	
50		10	1.60	1.76	1.96	2.16	2.36	2.57	2.90	3.17	3.45*	3.73*	4.01*	4.63*	5.85*
		20	1.91	2.13	2.39	2.67	2.96	3.25	3.71	4.11	4.52*	4.93*	5.34*	6.24*	8.03*
	40	2.35	2.70	3.09	3.51	3.95	4.40	5.11	5.72	6.34*	6.95*	7.56*	8.97*	11.73*	
	60	2.71	3.17	3.69	4.25	4.83	5.43	6.35	7.15	7.96*	8.77*	9.58*	11.38*	14.99*	
	80	3.03	3.61	4.25	4.93	5.64	6.37	7.50	8.46	9.45*	10.43*	11.41*	13.60*	17.99*	
	100	3.33	4.02	4.78	5.58	6.41	7.26	8.58	9.70	10.86*	12.01*	13.16*	15.69*	20.80*	
	120	3.61	4.41	5.29	6.20	7.15	8.11	9.61	10.88	12.19*	13.50*	14.81*	17.67*	23.48*	
	140	3.88	4.79	5.78	6.80	7.85	8.93	10.59	12.02	13.47*	14.90*	16.33*	19.58*	26.05*	
	100	10	1.83	2.00	2.21	2.42	2.63	2.84	3.17	3.44	3.72*	4.00*	4.28*	4.91*	6.12*
		20	2.20	2.43	2.70	2.98	3.26	3.55	4.00	4.38	4.78*	5.16*	5.54*	6.48*	8.26*
40		2.72	3.06	3.43	3.84	4.26	4.69	5.37	5.96	6.57*	7.16*	7.75*	9.18*	11.93*	
60		3.13	3.56	4.05	4.57	5.12	5.70	6.59	7.37	8.17*	8.96*	9.75*	11.57*	15.17*	
80		3.47	4.00	4.60	5.24	5.92	6.63	7.72	8.67	9.65*	10.63*	11.61*	13.78*	18.15*	
100		3.79	4.42	5.12	5.88	6.68	7.51	8.79	9.90	11.04*	12.19*	13.34*	15.86*	20.96*	
120		4.08	4.81	5.62	6.49	7.40	8.35	9.81	11.07	12.37*	13.67*	14.97*	17.83*	23.63*	
140		4.36	5.18	6.10	7.08	8.10	9.15	10.79	12.20	13.64*	15.07*	16.50*	19.73*	26.19*	
150		10	2.00	2.18	2.39	2.61	2.83	3.05	3.38	3.66	3.94*	4.22*	4.50*	5.15*	6.37*
		20	2.42	2.66	2.93	3.21	3.50	3.80	4.24	4.62	5.02*	5.40*	5.78*	6.72*	8.49*
	40	2.99	3.33	3.71	4.11	4.53	4.96	5.62	6.20	6.80*	7.39*	7.98*	9.39*	12.12*	
	60	3.44	3.87	4.35	4.86	5.40	5.95	6.83	7.59	8.38*	9.14*	9.90*	11.76*	15.34*	
	80	3.81	4.33	4.91	5.53	6.19	6.87	7.95	8.88	9.84*	10.82*	11.80*	13.95*	18.31*	
	100	4.15	4.75	5.44	6.17	6.94	7.74	9.00	10.10	11.22*	12.34*	13.46*	16.02*	21.11*	
	120	4.46	5.15	5.93	6.77	7.65	8.57	10.02	11.26	12.54*	13.82*	15.10*	17.99*	23.78*	
	140	4.75	5.53	6.41	7.35	8.34	9.38	10.99	12.38	13.81*	15.24*	16.67*	19.89*	26.33*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 16.0 Ft (RADIUS = 11.3 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
200 (Ft*s) ^{1/2}	10	2.13	2.33	2.55	2.77	3.00	3.22	3.56	3.84	4.13*	5.36*	6.60*	
	20	2.59	2.84	3.12	3.41	3.71	4.01	4.46	4.84	5.23*	6.94*	8.71*	
	40	3.22	3.56	3.95	4.35	4.77	5.19	5.85	6.42	7.01*	9.59*	12.31*	
	60	3.69	4.12	4.61	5.12	5.65	6.20	7.06	7.80	8.58*	11.95*	15.52*	
	80	4.09	4.61	5.19	5.80	6.44	7.11	8.16	9.08	10.03*	14.13*	18.48*	
	100	4.45	5.05	5.72	6.43	7.19	7.98	9.21	10.29	11.41*	16.19*	21.27*	
	120	4.77	5.45	6.22	7.03	7.90	8.80	10.22	11.45	12.72*	18.15*	23.92*	
300	140	5.08	5.84	6.69	7.61	8.58	9.59	11.18	12.56	13.98*	20.04*	26.48*	
	10	2.36	2.56	2.79	3.03	3.27	3.51	3.86	4.15	4.45*	5.73*	7.00*	
	20	2.88	3.14	3.43	3.74	4.05	4.35	4.82	5.21	5.61*	7.35*	9.13*	
	40	3.58	3.94	4.34	4.75	5.17	5.61	6.26	6.83	7.41*	9.99*	12.69*	
	60	4.11	4.55	5.04	5.56	6.09	6.63	7.48	8.21	8.97*	12.32*	15.87*	
	80	4.55	5.07	5.65	6.26	6.90	7.56	8.58	9.47	10.41*	14.48*	18.80*	
	100	4.94	5.54	6.21	6.91	7.65	8.42	9.62	10.67	11.77*	16.52*	21.58*	
400	120	5.30	5.97	6.72	7.52	8.36	9.23	10.61	11.81	13.07*	18.47*	24.22*	
	140	5.62	6.37	7.21	8.10	9.04	10.02	11.57	12.91	14.32*	20.35*	26.76*	
	10	2.53	2.75	2.99	3.24	3.49	3.74	4.11	4.41	4.72*	6.05*	7.35*	
	20	3.11	3.38	3.69	4.01	4.33	4.64	5.12	5.52	5.93*	7.71*	9.51*	
	40	3.88	4.25	4.66	5.09	5.52	5.96	6.62	7.19	7.78*	10.36*	13.07*	
	60	4.45	4.90	5.41	5.93	6.47	7.02	7.86	8.58	9.34*	12.68*	16.21*	
	80	4.93	5.46	6.05	6.66	7.30	7.95	8.97	9.85	10.77*	14.82*	19.13*	
600	100	5.35	5.95	6.63	7.33	8.06	8.82	10.01	11.04	12.12*	16.85*	21.88*	
	120	5.73	6.40	7.16	7.95	8.78	9.64	10.99	12.17	13.41*	18.78*	24.51*	
	140	6.07	6.82	7.66	8.54	9.46	10.43	11.94	13.27	14.65*	20.65*	27.05*	
	10	2.82	3.05	3.32	3.58	3.85	4.11	4.50	4.82	5.15*	6.57*	7.94*	
	20	3.48	3.77	4.10	4.44	4.78	5.12	5.62	6.04	6.47*	8.33*	10.19*	
	40	4.35	4.75	5.19	5.64	6.09	6.54	7.23	7.81	8.41*	11.05*	13.77*	
	60	5.00	5.48	6.01	6.55	7.11	7.67	8.52	9.25	10.01*	13.37*	16.88*	
800	80	5.54	6.09	6.70	7.34	7.99	8.65	9.66	10.54	11.45*	15.49*	19.77*	
	100	6.01	6.63	7.32	8.04	8.78	9.54	10.72	11.73	12.79*	17.49*	22.49*	
	120	6.43	7.12	7.89	8.69	9.52	10.38	11.71	12.86	14.07*	19.41*	25.10*	
	140	6.81	7.58	8.42	9.30	10.22	11.17	12.65	13.94	15.29*	21.25*	27.61*	
	10	3.06	3.30	3.58	3.86	4.14	4.42	4.83	5.17	5.51*	7.00*	8.43*	
	20	3.78	4.09	4.44	4.80	5.15	5.51	6.03	6.47	6.91*	8.86*	10.78*	
	40	4.74	5.16	5.62	6.09	6.56	7.03	7.74	8.33	8.95*	11.66*	14.41*	
	60	5.45	5.95	6.50	7.07	7.64	8.22	9.09	9.83	10.60*	14.00*	17.53*	
	80	6.04	6.61	7.25	7.90	8.57	9.24	10.27	11.14	12.06*	16.12*	20.39*	
	100	6.55	7.19	7.91	8.64	9.40	10.16	11.34	12.35	13.41*	18.11*	23.09*	
	120	7.00	7.72	8.50	9.32	10.16	11.02	12.35	13.49	14.69*	20.01*	25.68*	
	140	7.42	8.20	9.06	9.96	10.88	11.83	13.30	14.57	15.91*	21.84*	28.17*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 16.0 Ft (RADIUS = 11.3 Ft)³
 FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
(Ft*s) ^{1/2}	°F												
	10	1.65	2.02	2.41	2.80	3.20	3.60	4.21	4.72	5.24*	7.37*	9.58*	
	20	2.13	2.70	3.27	3.85	4.43	5.02	5.92	6.69	7.46*	10.67*	14.02*	
	40	2.95	3.84	4.72	5.61	6.51	7.42	8.81	10.00	11.20*	16.21*	21.49*	
	60	3.66	4.84	5.99	7.15	8.33	9.52	11.35	12.90	14.48*	21.08*	28.04*	
	80	4.32	5.76	7.16	8.57	10.00	11.45	13.67	15.56	17.49*	25.54*	34.06*	
	100	4.94	6.62	8.26	9.90	11.57	13.26	15.85	18.07	20.32*	29.73*	39.71*	
	120	5.53	7.44	9.30	11.17	13.06	14.98	17.93	20.44	23.01*	33.72*	45.08*	
	140	6.09	8.23	10.30	12.38	14.49	16.63	19.92	22.73	25.59*	37.54*	50.22*	
	25	10	2.10	2.38	2.71	3.07	3.43	3.81	4.40	4.89	5.40*	7.52*	9.72*
20		2.58	3.03	3.54	4.08	4.63	5.20	6.09	6.84	7.60*	10.79*	14.14*	
40		3.36	4.12	4.95	5.80	6.68	7.57	8.95	10.12	11.32*	16.32*	21.59*	
60		4.04	5.10	6.20	7.33	8.48	9.66	11.47	13.01	14.59*	21.17*	28.13*	
80		4.67	6.00	7.35	8.73	10.14	11.58	13.79	15.67	17.59*	25.63*	34.14*	
100		5.27	6.85	8.44	10.06	11.70	13.38	15.96	18.17	20.41*	29.82*	39.78*	
120		5.85	7.66	9.47	11.31	13.19	15.10	18.03	20.54	23.10*	33.80*	45.15*	
140		6.40	8.44	10.47	12.52	14.62	16.75	20.02	22.82	25.67*	37.62*	50.30*	
50		10	2.36	2.64	2.96	3.30	3.65	4.02	4.58	5.07	5.57*	7.67*	9.86*
		20	2.89	3.31	3.79	4.30	4.83	5.38	6.24	6.98	7.74*	10.92*	14.26*
	40	3.70	4.39	5.17	5.99	6.85	7.73	9.08	10.25	11.44*	16.43*	21.69*	
	60	4.38	5.35	6.40	7.50	8.63	9.80	11.59	13.12	14.69*	21.27*	28.22*	
	80	5.01	6.24	7.54	8.90	10.29	11.71	13.90	15.77	17.69*	25.72*	34.22*	
	100	5.60	7.07	8.62	10.21	11.84	13.51	16.07	18.26	20.51*	29.90*	39.86*	
	120	6.16	7.87	9.65	11.46	13.32	15.22	18.14	20.63	23.19*	33.88*	45.23*	
	140	6.70	8.65	10.63	12.66	14.74	16.86	20.12	22.91	25.76*	37.70*	50.37*	
	100	10	2.71	3.00	3.32	3.66	4.01	4.37	4.92	5.39	5.88*	7.96*	10.13*
		20	3.33	3.74	4.20	4.69	5.20	5.73	6.56	7.27	8.01*	11.17*	14.49*
40		4.22	4.86	5.59	6.36	7.18	8.03	9.35	10.49	11.67*	16.64*	21.89*	
60		4.95	5.82	6.80	7.84	8.94	10.07	11.83	13.35	14.90*	21.46*	28.40*	
80		5.59	6.69	7.92	9.22	10.57	11.97	14.13	15.98	17.89*	25.90*	34.39*	
100		6.18	7.51	8.97	10.51	12.11	13.75	16.29	18.46	20.69*	30.07*	40.02*	
120		6.74	8.30	9.99	11.75	13.58	15.45	18.34	20.82	23.36*	34.04*	45.37*	
140		7.27	9.05	10.96	12.95	14.99	17.09	20.32	23.09	25.93*	37.85*	50.51*	
150		10	2.97	3.26	3.60	3.95	4.30	4.66	5.21	5.68	6.16*	8.24*	10.40*
		20	3.65	4.06	4.53	5.02	5.52	6.04	6.85	7.55	8.28*	11.41*	14.72*
	40	4.63	5.25	5.95	6.71	7.50	8.32	9.62	10.74	11.90*	16.85*	22.08*	
	60	5.39	6.23	7.17	8.17	9.24	10.35	12.08	13.57	15.11*	21.65*	28.58*	
	80	6.06	7.11	8.28	9.53	10.85	12.22	14.35	16.19	18.08*	26.07*	34.56*	
	100	6.67	7.92	9.32	10.81	12.38	13.99	16.50	18.66	20.88*	30.24*	40.18*	
	120	7.24	8.70	10.32	12.04	13.83	15.68	18.55	21.01	23.54*	34.20*	45.52*	
	140	7.78	9.45	11.29	13.22	15.24	17.31	20.52	23.27	26.10*	38.01*	50.66*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 16.0 Ft (RADIUS = 11.3 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		°F	4	8	12	16	20	24	30	35	40	60	80
200 (Ft*s) ^{1/2}	10	3.18	3.48	3.83	4.18	4.55	4.91	5.47	5.93	6.42*	8.51*	10.66*	
	20	3.92	4.34	4.81	5.30	5.81	6.32	7.13	7.82	8.53*	11.66*	14.95*	
	40	4.96	5.58	6.28	7.02	7.80	8.61	9.88	10.98	12.13*	17.05*	22.28*	
	60	5.77	6.59	7.51	8.49	9.53	10.61	12.32	13.79	15.32*	21.84*	28.75*	
	80	6.47	7.48	8.62	9.84	11.13	12.47	14.58	16.40	18.28*	26.25*	34.72*	
	100	7.10	8.30	9.66	11.11	12.64	14.23	16.71	18.86	21.06*	30.40*	40.33*	
	120	7.68	9.08	10.65	12.33	14.09	15.91	18.75	21.20	23.72*	34.36*	45.67*	
300	140	8.23	9.83	11.61	13.50	15.48	17.53	20.71	23.45	26.27*	38.16*	50.80*	
	10	3.51	3.83	4.20	4.57	4.95	5.33	5.90	6.37	6.86*	8.99*	11.16*	
	20	4.35	4.78	5.27	5.78	6.29	6.81	7.62	8.30	9.01*	12.13*	15.40*	
	40	5.51	6.13	6.84	7.57	8.34	9.13	10.37	11.45	12.57*	17.47*	22.66*	
	60	6.39	7.20	8.11	9.07	10.08	11.13	12.79	14.23	15.73*	22.21*	29.11*	
	80	7.14	8.13	9.23	10.42	11.66	12.97	15.02	16.81	18.66*	26.60*	35.05*	
	100	7.81	8.98	10.28	11.68	13.16	14.71	17.14	19.25	21.43*	30.74*	40.64*	
400	120	8.43	9.77	11.27	12.88	14.59	16.37	19.16	21.57	24.07*	34.68*	45.97*	
	140	9.01	10.53	12.22	14.04	15.97	17.97	21.11	23.81	26.61*	38.47*	51.09*	
	10	3.79	4.12	4.50	4.89	5.28	5.67	6.26	6.74	7.25*	9.42*	11.61*	
	20	4.70	5.15	5.65	6.17	6.70	7.23	8.04	8.73	9.44*	12.58*	15.84*	
	40	5.95	6.59	7.31	8.05	8.82	9.61	10.84	11.89	13.00*	17.88*	23.05*	
	60	6.90	7.72	8.62	9.58	10.58	11.61	13.24	14.66	16.14*	22.59*	29.46*	
	80	7.70	8.69	9.78	10.95	12.17	13.45	15.46	17.21	19.04*	26.95*	35.38*	
600	100	8.41	9.56	10.84	12.21	13.66	15.17	17.56	19.63	21.79*	31.07*	40.95*	
	120	9.06	10.38	11.84	13.42	15.08	16.82	19.56	21.95	24.42*	35.00*	46.27*	
	140	9.67	11.15	12.79	14.57	16.45	18.41	21.50	24.17	26.94*	38.77*	51.37*	
	10	4.23	4.59	4.99	5.41	5.82	6.24	6.85	7.36	7.89*	10.16*	12.42*	
	20	5.27	5.75	6.28	6.83	7.38	7.93	8.77	9.47	10.20*	13.39*	16.68*	
	40	6.68	7.35	8.09	8.85	9.64	10.43	11.66	12.71	13.81*	18.67*	23.81*	
	60	7.74	8.57	9.50	10.46	11.46	12.49	14.09	15.47	16.92*	23.33*	30.15*	
800	80	8.62	9.62	10.72	11.88	13.08	14.33	16.30	18.00	19.80*	27.65*	36.03*	
	100	9.40	10.55	11.82	13.17	14.58	16.06	18.37	20.40	22.51*	31.73*	41.57*	
	120	10.11	11.41	12.85	14.39	16.00	17.69	20.36	22.68	25.11*	35.63*	46.86*	
	140	10.76	12.21	13.82	15.54	17.36	19.26	22.27	24.88	27.61*	39.38*	51.94*	
	10	4.59	4.97	5.39	5.83	6.27	6.70	7.34	7.87	8.42*	10.79*	13.12*	
	20	5.73	6.23	6.79	7.36	7.94	8.51	9.37	10.09	10.84*	14.12*	17.44*	
	40	7.27	7.96	8.73	9.52	10.32	11.14	12.38	13.43	14.54*	19.42*	24.55*	
	60	8.42	9.28	10.23	11.21	12.22	13.25	14.85	16.22	17.66*	24.05*	30.84*	
	80	9.38	10.39	11.51	12.68	13.89	15.13	17.07	18.75	20.52*	28.33*	36.68*	
	100	10.21	11.38	12.66	14.01	15.41	16.87	19.15	21.13	23.22*	32.39*	42.19*	
	120	10.97	12.28	13.72	15.25	16.84	18.51	21.12	23.40	25.79*	36.26*	47.45*	
	140	11.67	13.12	14.72	16.42	18.21	20.07	23.02	25.58	28.28*	39.99*	52.51*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 18.0 Ft (RADIUS = 12.7 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE
TIME INDEX

CEILING HEIGHT, Ft

(Ft*s)^{1/2}

°F

4

8

12

16

20

24

30

35

40

60

80

0

10

20

40

60

80

100

120

140

0.54

0.61

0.70

0.78

0.87

0.96

1.09

1.20

1.31

1.75*

2.19*

25

10

20

40

60

80

100

120

140

0.75

0.81

0.88

0.97

1.05

1.13

1.25

1.36

1.46

1.89*

2.32*

50

10

20

40

60

80

100

120

140

0.83

0.89

0.97

1.06

1.14

1.23

1.36

1.46

1.57

2.01*

2.44*

100

10

20

40

60

80

100

120

140

0.94

1.01

1.09

1.18

1.27

1.36

1.50

1.61

1.72

2.18*

2.63*

150

10

20

40

60

80

100

120

140

1.01

1.09

1.18

1.27

1.36

1.46

1.60

1.72

2.03

2.31*

2.78*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 18.0 Ft (RADIUS = 12.7 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
200 (Ft*s) ^{1/2}	10	1.08	1.15	1.25	1.35	1.44	1.54	1.69	1.81	1.92	2.42*	2.91*
	20	1.27	1.37	1.48	1.59	1.71	1.83	2.00	2.14	2.29	2.90*	3.51*
	40	1.53	1.65	1.79	1.93	2.08	2.23	2.45	2.63	2.82	3.62*	4.43*
	60	1.73	1.86	2.03	2.20	2.37	2.54	2.80	3.02	3.24	4.22*	5.23*
	80	1.88	2.04	2.23	2.42	2.61	2.81	3.11	3.36	3.62	4.76*	5.96*
	100	2.02	2.20	2.40	2.61	2.83	3.05	3.39	3.68	3.97	5.28*	6.66*
	120	2.15	2.34	2.56	2.79	3.03	3.28	3.65	3.98	4.31	5.77*	7.32*
	140	2.26	2.47	2.71	2.96	3.22	3.49	3.90	4.26	4.62	6.24*	7.96*
300	10	1.18	1.26	1.36	1.46	1.57	1.67	1.82	1.95	2.07	2.60*	3.11*
	20	1.40	1.50	1.62	1.75	1.87	1.99	2.18	2.33	2.48	3.12*	3.76*
	40	1.70	1.83	1.98	2.13	2.28	2.44	2.67	2.86	3.05	3.88*	4.72*
	60	1.92	2.07	2.24	2.42	2.60	2.78	3.05	3.27	3.50	4.50*	5.53*
	80	2.10	2.27	2.46	2.66	2.86	3.07	3.38	3.64	3.90	5.05*	6.26*
	100	2.26	2.44	2.65	2.87	3.10	3.33	3.67	3.96	4.26	5.57*	6.95*
	120	2.40	2.60	2.83	3.07	3.31	3.56	3.94	4.27	4.60	6.06*	7.60*
	140	2.52	2.74	2.99	3.25	3.52	3.79	4.20	4.56	4.92	6.52*	8.23*
400	10	1.26	1.35	1.45	1.56	1.67	1.78	1.94	2.07	2.19	2.74*	3.28*
	20	1.51	1.61	1.74	1.87	2.00	2.13	2.32	2.48	2.63	3.30*	3.96*
	40	1.84	1.97	2.13	2.29	2.45	2.61	2.85	3.05	3.24	4.11*	4.97*
	60	2.08	2.23	2.41	2.60	2.79	2.97	3.25	3.49	3.72	4.75*	5.80*
	80	2.28	2.45	2.65	2.86	3.07	3.28	3.60	3.87	4.13	5.31*	6.53*
	100	2.45	2.64	2.86	3.09	3.32	3.56	3.91	4.21	4.51	5.83*	7.22*
	120	2.60	2.81	3.05	3.30	3.55	3.81	4.19	4.52	4.85	6.32*	7.87*
	140	2.74	2.96	3.22	3.49	3.76	4.04	4.46	4.82	5.18	6.79*	8.50*
600	10	1.39	1.48	1.60	1.71	1.83	1.95	2.12	2.26	2.39	2.98*	3.55*
	20	1.68	1.79	1.93	2.07	2.21	2.35	2.55	2.72	2.88	3.60*	4.31*
	40	2.06	2.20	2.37	2.54	2.71	2.89	3.14	3.35	3.56	4.48*	5.39*
	60	2.33	2.50	2.69	2.89	3.09	3.29	3.59	3.84	4.08	5.16*	6.26*
	80	2.56	2.75	2.96	3.18	3.41	3.63	3.97	4.25	4.53	5.76*	7.02*
	100	2.75	2.96	3.20	3.44	3.69	3.93	4.30	4.61	4.92	6.30*	7.72*
	120	2.93	3.15	3.41	3.67	3.94	4.21	4.61	4.95	5.29	6.80*	8.38*
	140	3.08	3.32	3.60	3.88	4.17	4.46	4.89	5.26	5.63	7.28*	9.00*
800	10	1.50	1.60	1.72	1.84	1.96	2.08	2.26	2.41	2.55	3.17*	3.78*
	20	1.82	1.94	2.08	2.23	2.38	2.52	2.74	2.91	3.09	3.85*	4.59*
	40	2.24	2.39	2.56	2.75	2.93	3.11	3.38	3.60	3.82	4.79*	5.74*
	60	2.54	2.72	2.92	3.13	3.34	3.55	3.87	4.12	4.38	5.51*	6.65*
	80	2.79	2.99	3.21	3.45	3.69	3.92	4.27	4.56	4.85	6.14*	7.44*
	100	3.00	3.22	3.47	3.73	3.99	4.24	4.63	4.95	5.27	6.70*	8.16*
	120	3.19	3.43	3.70	3.98	4.26	4.54	4.95	5.30	5.65	7.22*	8.82*
	140	3.37	3.62	3.91	4.20	4.50	4.80	5.25	5.63	6.01	7.71*	9.46*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 18.0 Ft (RADIUS = 12.7 Ft)₃
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft													
		(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60	80	
0	10	0.78	0.90	1.04	1.17	1.31	1.45	1.66	1.84	2.02	2.18	2.35	2.59	2.73*	3.45*
	20	0.92	1.09	1.27	1.45	1.64	1.83	2.11	2.35	2.59	2.73*	2.88*	3.58*	4.59*	
	40	1.14	1.40	1.66	1.92	2.19	2.46	2.83	3.22	3.57	3.84	4.06*	5.01*	6.50*	
	60	1.34	1.67	2.00	2.34	2.67	3.01	3.53	3.97	4.42	4.84	5.10*	6.26*	8.18*	
	80	1.52	1.92	2.32	2.71	3.12	3.52	4.14	4.67	5.20	5.74	6.05*	7.41*	9.72*	
	100	1.69	2.15	2.61	3.07	3.53	4.00	4.71	5.32	5.94	6.53	6.84*	8.49*	11.17*	
	120	1.85	2.38	2.89	3.41	3.93	4.45	5.26	5.94	6.64	7.31	7.62*	9.51*	12.54*	
25	140	2.01	2.59	3.16	3.73	4.31	4.89	5.78	6.54	7.31	8.08	8.39*	10.50*	13.86*	
	10	1.07	1.16	1.28	1.40	1.53	1.65	1.85	2.01	2.18	2.35	2.50	2.88*	3.59*	
	20	1.23	1.36	1.51	1.67	1.84	2.01	2.28	2.50	2.73	2.96	3.19	3.70*	4.71*	
	40	1.48	1.67	1.88	2.12	2.36	2.62	3.01	3.34	3.69	4.03	4.36	5.11*	6.60*	
	60	1.68	1.92	2.21	2.51	2.83	3.16	3.66	4.09	4.53	4.97	5.30	6.35*	8.27*	
	80	1.85	2.16	2.51	2.88	3.26	3.66	4.26	4.78	5.30	5.84	6.16*	7.50*	9.80*	
	100	2.01	2.39	2.80	3.23	3.67	4.13	4.83	5.42	6.03	6.63	6.94*	8.57*	11.24*	
50	120	2.17	2.60	3.07	3.56	4.06	4.58	5.37	6.04	6.73	7.39	7.70*	9.59*	12.61*	
	140	2.32	2.81	3.33	3.88	4.44	5.01	5.88	6.63	7.39	8.15	8.46*	10.57*	13.93*	
	10	1.19	1.29	1.41	1.54	1.66	1.79	1.99	2.15	2.32	2.53	2.70	3.01*	3.73*	
	20	1.39	1.52	1.67	1.83	2.00	2.17	2.42	2.64	2.87	3.10	3.33	3.83*	4.82*	
	40	1.68	1.86	2.07	2.29	2.53	2.77	3.15	3.47	3.80	4.13	4.46	5.22*	6.70*	
	60	1.90	2.13	2.40	2.68	2.98	3.30	3.78	4.20	4.63	5.07	5.40	6.45*	8.36*	
	80	2.09	2.37	2.69	3.04	3.41	3.79	4.38	4.88	5.40	5.92	6.24*	7.59*	9.89*	
100	100	2.26	2.59	2.97	3.38	3.81	4.25	4.94	5.53	6.13	6.73	7.33	8.66*	11.32*	
	120	2.42	2.81	3.24	3.71	4.19	4.70	5.47	6.14	6.82	7.48	7.79*	9.67*	12.69*	
	140	2.57	3.01	3.50	4.02	4.56	5.12	5.99	6.73	7.48	8.24	8.55*	10.65*	14.00*	
	10	1.36	1.46	1.59	1.72	1.86	1.99	2.20	2.36	2.53	2.74	2.91	3.25*	3.96*	
	20	1.60	1.74	1.90	2.06	2.23	2.40	2.66	2.88	3.10	3.33	3.56	4.06*	5.05*	
	40	1.94	2.13	2.34	2.56	2.79	3.03	3.39	3.71	4.03	4.36	4.69	5.42*	6.89*	
	60	2.20	2.43	2.69	2.97	3.26	3.56	4.03	4.43	4.84	5.25	5.58	6.64*	8.53*	
150	80	2.42	2.69	3.00	3.33	3.68	4.04	4.61	5.10	5.60	6.10	6.60	7.76*	10.05*	
	100	2.61	2.93	3.29	3.67	4.08	4.50	5.16	5.73	6.31	6.89	7.20*	8.82*	11.48*	
	120	2.79	3.15	3.55	3.99	4.45	4.93	5.68	6.33	7.00	7.65	7.96*	9.83*	12.84*	
	140	2.95	3.36	3.81	4.30	4.81	5.35	6.19	6.91	7.65	8.41	8.72*	10.81*	14.14*	
	10	1.48	1.59	1.72	1.86	2.00	2.14	2.35	2.52	2.70	2.91	3.14	3.43*	4.17*	
	20	1.76	1.90	2.06	2.24	2.41	2.59	2.85	3.07	3.30	3.53	3.76	4.26*	5.26*	
	40	2.14	2.33	2.54	2.77	3.01	3.24	3.61	3.92	4.24	4.57	4.90	5.62*	7.08*	
	60	2.43	2.66	2.92	3.20	3.49	3.79	4.24	4.64	5.05	5.46	5.79	6.82*	8.71*	
	80	2.67	2.94	3.25	3.58	3.92	4.27	4.82	5.30	5.79	6.20	6.53	7.93*	10.21*	
	100	2.88	3.19	3.54	3.92	4.32	4.73	5.37	5.93	6.50	7.00	7.33	8.99*	11.63*	
	120	3.07	3.42	3.82	4.25	4.69	5.16	5.89	6.52	7.18	7.65	7.98	9.99*	12.99*	
	140	3.25	3.64	4.08	4.55	5.05	5.57	6.39	7.10	7.83	8.58	8.91	10.96*	14.29*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 18.0 Ft (RADIUS = 12.7 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft													
		(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60	80	
200	10		1.57	1.69	1.83	1.97	2.12	2.26	2.48	2.66	2.83	3.59*	4.34*		
	20		1.88	2.03	2.20	2.38	2.56	2.74	3.01	3.24	3.46	4.45*	5.45*		
	40		2.30	2.49	2.71	2.95	3.19	3.43	3.80	4.11	4.42	5.81*	7.27*		
	60		2.61	2.84	3.11	3.40	3.69	3.99	4.44	4.84	5.24	7.00*	8.88*		
	80		2.87	3.14	3.46	3.79	4.13	4.48	5.03	5.50	5.98	8.11*	10.37*		
	100		3.10	3.41	3.77	4.14	4.53	4.94	5.57	6.12	6.68	9.15*	11.79*		
	120		3.30	3.65	4.05	4.47	4.91	5.37	6.09	6.71	7.35	10.15*	13.13*		
300	140		3.49	3.88	4.32	4.78	5.27	5.78	6.58	7.28	8.00	11.11*	14.43*		
	10		1.73	1.85	2.00	2.15	2.31	2.46	2.69	2.87	3.06	3.86*	4.64*		
	20		2.08	2.24	2.42	2.61	2.80	2.99	3.27	3.51	3.74	4.76*	5.79*		
	40		2.56	2.76	2.99	3.24	3.49	3.74	4.11	4.43	4.75	6.16*	7.62*		
	60		2.91	3.15	3.43	3.73	4.02	4.33	4.79	5.18	5.58	7.35*	9.22*		
	80		3.20	3.48	3.80	4.14	4.49	4.84	5.39	5.85	6.33	8.44*	10.69*		
	100		3.45	3.77	4.14	4.52	4.91	5.31	5.94	6.47	7.03	9.47*	12.09*		
400	120		3.68	4.04	4.44	4.86	5.30	5.75	6.46	7.06	7.69	10.46*	13.43*		
	140		3.89	4.28	4.72	5.19	5.67	6.17	6.95	7.63	8.33	11.41*	14.71*		
	10		1.85	1.98	2.14	2.30	2.46	2.62	2.86	3.05	3.24	4.07*	4.89*		
	20		2.24	2.41	2.60	2.79	2.99	3.19	3.49	3.73	3.97	5.03*	6.09*		
	40		2.76	2.98	3.22	3.48	3.73	3.99	4.38	4.70	5.03	6.47*	7.95*		
	60		3.15	3.40	3.69	4.00	4.30	4.61	5.09	5.48	5.88	7.67*	9.54*		
	80		3.46	3.76	4.09	4.44	4.79	5.15	5.70	6.17	6.64	8.76*	11.01*		
600	100		3.74	4.07	4.44	4.83	5.23	5.64	6.26	6.80	7.35	9.79*	12.39*		
	120		3.99	4.35	4.76	5.19	5.64	6.09	6.79	7.39	8.01	10.77*	13.72*		
	140		4.21	4.61	5.06	5.53	6.02	6.52	7.29	7.96	8.65	11.71*	14.99*		
	10		2.05	2.19	2.36	2.53	2.71	2.88	3.13	3.34	3.54	4.43*	5.30*		
	20		2.50	2.68	2.88	3.10	3.31	3.52	3.84	4.09	4.35	5.47*	6.59*		
	40		3.10	3.33	3.59	3.86	4.14	4.41	4.82	5.16	5.50	7.00*	8.52*		
	60		3.54	3.81	4.12	4.44	4.76	5.09	5.58	5.99	6.40	8.24*	10.14*		
800	80		3.90	4.21	4.56	4.93	5.30	5.67	6.24	6.71	7.19	9.34*	11.60*		
	100		4.21	4.55	4.95	5.35	5.77	6.19	6.83	7.37	7.91	10.37*	12.97*		
	120		4.49	4.87	5.30	5.74	6.20	6.66	7.37	7.98	8.59	11.35*	14.28*		
	140		4.74	5.15	5.62	6.11	6.60	7.11	7.89	8.55	9.23	12.28*	15.55*		
	10		2.22	2.37	2.54	2.73	2.91	3.09	3.36	3.57	3.79	4.72*	5.64*		
	20		2.72	2.90	3.12	3.34	3.57	3.79	4.12	4.39	4.66	5.84*	7.01*		
	40		3.37	3.61	3.89	4.18	4.47	4.75	5.18	5.53	5.88	7.44*	9.02*		
	60		3.85	4.14	4.47	4.80	5.14	5.48	5.99	6.41	6.84	8.73*	10.67*		
	80		4.25	4.57	4.94	5.33	5.71	6.10	6.68	7.17	7.66	9.86*	12.15*		
	100		4.59	4.95	5.36	5.78	6.21	6.65	7.30	7.85	8.41	10.90*	13.52*		
	120		4.89	5.29	5.74	6.20	6.67	7.15	7.87	8.48	9.10	11.88*	14.83*		
	140		5.17	5.60	6.08	6.58	7.10	7.61	8.40	9.07	9.75	12.82*	16.08*		

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 18.0 Ft (RADIUS = 12.7 Ft)³
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
(Ft*s) ^{1/2} 0	10	1.17	1.38	1.60	1.83	2.06	2.29	2.64	2.94	3.24	4.45*	5.69*	
	20	1.43	1.75	2.06	2.39	2.71	3.04	3.54	3.97	4.39	6.15*	7.97*	
	40	1.88	2.37	2.84	3.33	3.81	4.31	5.06	5.69	6.34	9.00*	11.79*	
	60	2.28	2.91	3.53	4.15	4.78	5.41	6.38	7.21	8.04	11.51*	15.15*	
	80	2.64	3.41	4.16	4.91	5.67	6.43	7.60	8.60	9.61	13.81*	18.22*	
	100	2.98	3.88	4.75	5.62	6.50	7.39	8.75	9.90	11.08	15.96*	21.12*	
	120	3.31	4.32	5.31	6.29	7.29	8.30	9.84	11.14	12.48	18.02*	23.86*	
	140	3.62	4.75	5.85	6.94	8.05	9.17	10.88	12.33	13.82	19.99*	26.50*	
	25	1.54	1.70	1.89	2.09	2.30	2.51	2.84	3.12	3.40	4.60*	5.83*	
	40	1.84	2.06	2.33	2.62	2.92	3.23	3.71	4.12	4.53	6.27*	8.08*	
50	60	2.28	2.65	3.08	3.53	3.99	4.47	5.20	5.82	6.46	9.11*	11.89*	
	80	2.66	3.17	3.74	4.33	4.94	5.56	6.51	7.32	8.15	11.60*	15.23*	
	100	3.00	3.66	4.36	5.08	5.81	6.57	7.72	8.71	9.71	13.90*	18.31*	
	120	3.32	4.11	4.94	5.78	6.64	7.52	8.86	10.01	11.17	16.05*	21.19*	
	140	3.63	4.55	5.49	6.45	7.42	8.42	9.94	11.24	12.57	18.10*	23.94*	
	50	3.93	4.97	6.02	7.09	8.18	9.28	10.98	12.43	13.90	20.06*	26.57*	
	10	1.73	1.89	2.08	2.28	2.48	2.69	3.01	3.29	3.56	4.74*	5.97*	
	20	2.07	2.29	2.55	2.82	3.11	3.41	3.87	4.27	4.67	6.40*	8.20*	
	40	2.56	2.90	3.29	3.72	4.16	4.62	5.34	5.95	6.58	9.21*	11.99*	
	60	2.95	3.42	3.95	4.51	5.10	5.70	6.64	7.44	8.26	11.70*	15.32*	
100	80	3.31	3.89	4.55	5.24	5.96	6.70	7.84	8.81	9.81	13.98*	18.39*	
	100	3.63	4.34	5.12	5.94	6.78	7.64	8.97	10.11	11.27	16.13*	21.27*	
	120	3.94	4.77	5.67	6.60	7.56	8.54	10.05	11.34	12.66	18.18*	24.01*	
	140	4.23	5.18	6.19	7.23	8.31	9.40	11.09	12.52	13.99	20.14*	26.64*	
	10	1.98	2.15	2.35	2.55	2.76	2.98	3.30	3.57	3.84	5.02*	6.23*	
	20	2.39	2.61	2.87	3.15	3.43	3.72	4.17	4.55	4.94	6.64*	8.43*	
	40	2.95	3.28	3.66	4.06	4.48	4.92	5.61	6.20	6.81	9.42*	12.18*	
	60	3.39	3.83	4.32	4.85	5.40	5.98	6.89	7.67	8.47	11.89*	15.50*	
	80	3.77	4.31	4.92	5.57	6.25	6.96	8.07	9.03	10.01	14.16*	18.56*	
	100	4.12	4.76	5.48	6.25	7.05	7.89	9.19	10.31	11.46	16.30*	21.43*	
150	120	4.44	5.18	6.01	6.90	7.82	8.78	10.26	11.54	12.84	18.34*	24.16*	
	140	4.74	5.59	6.53	7.52	8.56	9.63	11.29	12.71	14.17	20.29*	26.79*	
	10	2.17	2.34	2.54	2.76	2.97	3.19	3.52	3.80	4.07	5.26*	6.48*	
	20	2.62	2.85	3.12	3.40	3.68	3.98	4.42	4.80	5.19	6.88*	8.66*	
	40	3.25	3.58	3.95	4.35	4.77	5.20	5.87	6.45	7.04	9.63*	12.38*	
	60	3.73	4.15	4.63	5.15	5.69	6.25	7.13	7.90	8.68	12.08*	15.68*	
	80	4.14	4.65	5.24	5.87	6.53	7.22	8.31	9.24	10.21	14.34*	18.72*	
	100	4.50	5.11	5.80	6.54	7.32	8.14	9.41	10.52	11.65	16.47*	21.58*	
	120	4.84	5.54	6.34	7.19	8.08	9.02	10.47	11.73	13.02	18.50*	24.31*	
	140	5.16	5.95	6.85	7.81	8.81	9.86	11.49	12.90	14.34	20.45*	26.93*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 18.0 Ft (RADIUS = 12.7 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
200 (Ft*s) ^{1/2}	°F											
	10	2.31	2.49	2.70	2.93	3.15	3.37	3.71	3.99	4.27	5.48*	6.71*
	20	2.81	3.04	3.32	3.61	3.90	4.19	4.65	5.03	5.41	7.10*	8.88*
	40	3.49	3.82	4.20	4.60	5.02	5.45	6.11	6.68	7.26	9.83*	12.57*
	60	4.00	4.43	4.91	5.42	5.95	6.50	7.37	8.12	8.89	12.26*	15.85*
	80	4.44	4.95	5.53	6.15	6.79	7.47	8.53	9.45	10.41	14.51*	18.88*
	100	4.83	5.42	6.10	6.82	7.58	8.38	9.63	10.72	11.83	16.63*	21.74*
300	120	5.18	5.86	6.63	7.46	8.34	9.25	10.68	11.92	13.20	18.66*	24.46*
	140	5.51	6.28	7.15	8.08	9.06	10.09	11.70	13.09	14.51	20.60*	27.07*
	10	2.55	2.74	2.97	3.20	3.43	3.67	4.02	4.31	4.60	5.86*	7.12*
	20	3.12	3.36	3.65	3.95	4.25	4.56	5.02	5.41	5.80	7.52*	9.30*
	40	3.88	4.22	4.61	5.03	5.45	5.88	6.54	7.10	7.68	10.23*	12.95*
	60	4.45	4.88	5.37	5.88	6.41	6.96	7.81	8.54	9.30	12.63*	16.20*
	80	4.93	5.44	6.02	6.63	7.27	7.93	8.97	9.86	10.79	14.86*	19.21*
400	100	5.36	5.95	6.61	7.32	8.07	8.84	10.05	11.11	12.21	16.96*	22.05*
	120	5.74	6.41	7.17	7.97	8.82	9.70	11.09	12.31	13.56	18.97*	24.76*
	140	6.10	6.85	7.69	8.59	9.54	10.53	12.10	13.46	14.86	20.91*	27.36*
	10	2.74	2.94	3.18	3.42	3.67	3.91	4.28	4.58	4.88	6.17*	7.47*
	20	3.36	3.62	3.92	4.23	4.55	4.86	5.34	5.74	6.13	7.88*	9.68*
	40	4.20	4.55	4.96	5.38	5.81	6.24	6.91	7.48	8.05	10.61*	13.32*
	60	4.82	5.26	5.75	6.28	6.81	7.36	8.21	8.93	9.68	13.00*	16.54*
600	80	5.34	5.86	6.44	7.06	7.69	8.35	9.37	10.25	11.17	15.20*	19.53*
	100	5.79	6.39	7.06	7.76	8.50	9.26	10.46	11.49	12.57	17.29*	22.36*
	120	6.20	6.87	7.63	8.42	9.26	10.13	11.49	12.68	13.91	19.29*	25.05*
	140	6.58	7.33	8.16	9.05	9.98	10.95	12.49	13.82	15.20	21.21*	27.64*
	10	3.06	3.27	3.52	3.78	4.04	4.31	4.69	5.01	5.33	6.70*	8.07*
	20	3.76	4.04	4.36	4.69	5.03	5.36	5.86	6.28	6.69	8.51*	10.37*
	40	4.71	5.09	5.51	5.96	6.41	6.86	7.55	8.12	8.71	11.30*	14.03*
800	60	5.41	5.87	6.39	6.93	7.48	8.04	8.90	9.63	10.37	13.69*	17.22*
	80	5.99	6.53	7.13	7.76	8.41	9.07	10.09	10.97	11.86	15.87*	20.17*
	100	6.50	7.11	7.80	8.51	9.25	10.01	11.19	12.21	13.26	17.94*	22.97*
	120	6.96	7.64	8.40	9.20	10.04	10.89	12.23	13.39	14.59	19.91*	25.64*
	140	7.38	8.13	8.97	9.85	10.77	11.73	13.22	14.52	15.86	21.81*	28.21*
	10	3.31	3.53	3.80	4.08	4.35	4.63	5.03	5.37	5.69	7.14*	8.57*
	20	4.09	4.38	4.72	5.07	5.42	5.77	6.29	6.72	7.15	9.05*	10.96*
	40	5.13	5.52	5.97	6.43	6.90	7.37	8.08	8.67	9.26	11.92*	14.68*
	60	5.90	6.37	6.91	7.47	8.04	8.62	9.49	10.23	10.97	14.33*	17.87*
	80	6.53	7.08	7.71	8.36	9.02	9.69	10.72	11.60	12.49	16.51*	20.80*
	100	7.08	7.71	8.41	9.14	9.90	10.66	11.85	12.86	13.90	18.56*	23.57*
	120	7.58	8.27	9.05	9.87	10.71	11.57	12.90	14.05	15.23	20.52*	26.22*
	140	8.03	8.79	9.65	10.54	11.47	12.42	13.90	15.18	16.50	22.41*	28.77*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 18.0 Ft (RADIUS = 12.7 Ft)³
 FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
0	10	1.81	2.18	2.57	2.97	3.37	3.77	4.39	4.90	5.42	7.57*	9.78*	
	20	2.34	2.92	3.50	4.09	4.68	5.28	6.19	6.96	7.74	10.96*	14.33*	
	40	3.24	4.16	5.06	5.97	6.88	7.80	9.21	10.41	11.63	16.67*	21.98*	
	60	4.03	5.25	6.43	7.62	8.81	10.02	11.87	13.44	15.04	21.68*	28.69*	
	80	4.76	6.25	7.69	9.13	10.58	12.06	14.31	16.22	18.17	26.28*	34.85*	
	100	5.44	7.19	8.87	10.55	12.25	13.97	16.60	18.83	21.11	30.60*	40.63*	
25	10	6.09	8.08	9.99	11.90	13.83	15.78	18.77	21.31	23.90	34.70*	46.12*	
	20	6.71	8.93	11.07	13.20	15.35	17.53	20.86	23.70	26.58	38.64*	51.40*	
	40	2.28	2.56	2.89	3.25	3.62	4.00	4.58	5.08	5.59	7.71*	9.92*	
	60	2.81	3.26	3.78	4.32	4.89	5.47	6.35	7.11	7.88	11.09*	14.45*	
	80	3.67	4.46	5.30	6.17	7.06	7.96	9.36	10.54	11.75	16.78*	22.08*	
	100	4.42	5.52	6.65	7.80	8.97	10.17	12.00	13.56	15.15	21.78*	28.78*	
50	10	5.12	6.50	7.89	9.30	10.73	12.19	14.43	16.33	18.27	26.37*	34.93*	
	20	5.79	7.42	9.06	10.71	12.39	14.09	16.71	18.93	21.20	30.68*	40.70*	
	40	6.42	8.31	10.17	12.05	13.96	15.91	18.88	21.41	24.00	34.78*	46.20*	
	60	7.03	9.15	11.24	13.34	15.48	17.64	20.96	23.79	26.67	38.71*	51.47*	
	80	2.56	2.83	3.15	3.49	3.84	4.21	4.78	5.26	5.76	7.86*	10.06*	
	100	3.14	3.56	4.04	4.55	5.09	5.65	6.52	7.26	8.02	11.21*	14.56*	
100	20	4.03	4.74	5.53	6.37	7.23	8.12	9.50	10.67	11.87	16.88*	22.18*	
	40	4.78	5.78	6.86	7.98	9.13	10.31	12.12	13.67	15.25	21.87*	28.86*	
	60	5.47	6.75	8.09	9.47	10.88	12.33	14.54	16.44	18.37	26.46*	35.01*	
	80	6.12	7.66	9.25	10.87	12.53	14.22	16.82	19.04	21.30	30.76*	40.78*	
	100	6.74	8.53	10.35	12.21	14.10	16.03	18.99	21.51	24.09	34.86*	46.27*	
	140	7.34	9.37	11.41	13.49	15.61	17.76	21.07	23.88	26.76	38.79*	51.54*	
150	10	2.94	3.21	3.53	3.87	4.22	4.58	5.13	5.60	6.08	8.15*	10.33*	
	20	3.61	4.01	4.47	4.96	5.48	6.01	6.84	7.56	8.30	11.46*	14.80*	
	40	4.59	5.23	5.96	6.75	7.58	8.44	9.77	10.93	12.10	17.10*	22.37*	
	60	5.38	6.27	7.27	8.33	9.45	10.60	12.38	13.91	15.47	22.06*	29.04*	
	80	6.08	7.22	8.47	9.80	11.18	12.59	14.78	16.66	18.57	26.63*	35.18*	
	100	6.73	8.11	9.61	11.19	12.81	14.47	17.04	19.24	21.49	30.93*	40.94*	
180	10	7.35	8.97	10.71	12.51	14.37	16.27	19.20	21.71	24.27	35.02*	46.42*	
	20	7.94	9.79	11.76	13.78	15.86	17.99	21.27	24.07	26.94	38.95*	51.68*	
	40	3.22	3.50	3.83	4.17	4.52	4.88	5.43	5.90	6.37	8.43*	10.60*	
	60	3.96	4.36	4.82	5.31	5.81	6.34	7.15	7.85	8.57	11.71*	15.03*	
	80	5.02	5.64	6.35	7.11	7.91	8.74	10.05	11.18	12.34	17.30*	22.57*	
	100	5.86	6.70	7.65	8.68	9.76	10.88	12.63	14.14	15.68	22.25*	29.22*	
210	10	6.59	7.65	8.85	10.13	11.47	12.86	15.02	16.87	18.77	26.81*	35.34*	
	20	7.26	8.54	9.98	11.50	13.09	14.73	17.27	19.45	21.68	31.10*	41.10*	
	40	7.88	9.39	11.05	12.81	14.63	16.51	19.41	21.90	24.45	35.18*	46.57*	
	140	8.48	10.21	12.09	14.07	16.12	18.23	21.48	24.26	27.11	39.10*	51.83*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 18.0 Ft (RADIUS = 12.7 Ft)³
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
200 (Ft*s) ^{1/2}	10	3.44	3.73	4.07	4.42	4.78	5.14	5.70	6.16	6.64	8.70*	10.86*
	20	4.25	4.65	5.12	5.61	6.11	6.63	7.44	8.13	8.84	11.95*	15.26*
	40	5.38	5.99	6.69	7.44	8.22	9.04	10.32	11.43	12.58	17.51*	22.76*
	60	6.26	7.08	8.01	9.01	10.06	11.16	12.88	14.37	15.90	22.44*	29.40*
	80	7.02	8.05	9.20	10.45	11.76	13.12	15.25	17.09	18.97	26.99*	35.51*
	100	7.71	8.94	10.33	11.81	13.36	14.98	17.49	19.65	21.87	31.27*	41.25*
	120	8.35	9.79	11.40	13.11	14.90	16.75	19.63	22.10	24.63	35.34*	46.72*
	140	8.96	10.60	12.43	14.36	16.38	18.46	21.68	24.45	27.29	39.25*	51.97*
300	10	3.81	4.11	4.46	4.83	5.20	5.58	6.14	6.62	7.10	9.19*	11.36*
	20	4.71	5.13	5.61	6.11	6.62	7.14	7.95	8.63	9.33	12.42*	15.71*
	40	5.97	6.58	7.28	8.02	8.79	9.59	10.83	11.92	13.04	17.93*	23.15*
	60	6.93	7.73	8.64	9.61	10.63	11.69	13.37	14.82	16.32	22.82*	29.75*
	80	7.75	8.74	9.85	11.05	12.31	13.64	15.71	17.51	19.37	27.34*	35.83*
	100	8.48	9.66	10.98	12.40	13.90	15.47	17.93	20.06	22.25	31.60*	41.56*
	120	9.16	10.52	12.05	13.69	15.42	17.23	20.05	22.49	24.99	35.66*	47.02*
	140	9.79	11.34	13.07	14.93	16.88	18.92	22.09	24.83	27.63	39.56*	52.26*
400	10	4.10	4.42	4.78	5.17	5.55	5.94	6.52	7.01	7.49	9.63*	11.82*
	20	5.09	5.52	6.01	6.53	7.05	7.58	8.39	9.08	9.78	12.87*	16.15*
	40	6.45	7.07	7.78	8.52	9.29	10.08	11.32	12.38	13.48	18.34*	23.54*
	60	7.48	8.28	9.19	10.15	11.15	12.20	13.84	15.26	16.74	23.19*	30.10*
	80	8.35	9.33	10.43	11.60	12.84	14.13	16.16	17.93	19.76	27.69*	36.16*
	100	9.12	10.28	11.57	12.96	14.42	15.95	18.36	20.46	22.62	31.93*	41.87*
	120	9.83	11.16	12.64	14.24	15.93	17.69	20.47	22.87	25.35	35.98*	47.32*
	140	10.49	11.99	13.67	15.47	17.38	19.37	22.49	25.20	27.98	39.87*	52.54*
600	10	4.58	4.91	5.31	5.71	6.12	6.53	7.14	7.65	8.15	10.38*	12.64*
	20	5.70	6.16	6.68	7.22	7.76	8.31	9.15	9.85	10.55	13.70*	16.99*
	40	7.23	7.87	8.60	9.37	10.15	10.95	12.17	13.23	14.31	19.13*	24.30*
	60	8.38	9.19	10.11	11.08	12.08	13.11	14.72	16.11	17.55	23.93*	30.80*
	80	9.34	10.32	11.42	12.58	13.80	15.06	17.03	18.75	20.54	28.39*	36.81*
	100	10.19	11.33	12.60	13.96	15.39	16.87	19.21	21.25	23.36	32.59*	42.49*
	120	10.95	12.25	13.71	15.26	16.89	18.60	21.29	23.64	26.07	36.61*	47.91*
	140	11.67	13.12	14.75	16.49	18.33	20.26	23.29	25.94	28.67	40.48*	53.11*
800	10	4.96	5.32	5.73	6.16	6.59	7.02	7.65	8.18	8.70	11.01*	13.34*
	20	6.20	6.67	7.22	7.78	8.35	8.92	9.78	10.50	11.22	14.43*	17.76*
	40	7.87	8.53	9.29	10.07	10.87	11.68	12.92	13.98	15.06	19.89*	25.04*
	60	9.11	9.95	10.88	11.87	12.88	13.91	15.51	16.89	18.31	24.66*	31.49*
	80	10.15	11.14	12.26	13.42	14.64	15.89	17.84	19.53	21.28	29.07*	37.46*
	100	11.06	12.21	13.49	14.84	16.25	17.72	20.02	22.02	24.09	33.25*	43.11*
	120	11.88	13.18	14.63	16.16	17.77	19.45	22.08	24.38	26.77	37.24*	48.50*
	140	12.64	14.08	15.70	17.41	19.22	21.10	24.07	26.66	29.35	41.09*	53.68*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 20.0 Ft (RADIUS = 14.1 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE °F	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
0	10	0.59	0.66	0.74	0.83	0.91	1.00	1.13	1.24	1.35	1.79*	2.23*	
	20	0.66	0.76	0.86	0.97	1.08	1.20	1.37	1.51	1.65	2.22*	2.81*	
	40	0.79	0.93	1.07	1.22	1.38	1.53	1.76	1.96	2.15	2.96*	3.79*	
	60	0.89	1.07	1.26	1.44	1.63	1.82	2.11	2.35	2.60	3.60*	4.65*	
	80	0.99	1.21	1.43	1.64	1.86	2.09	2.43	2.71	3.00	4.19*	5.43*	
	100	1.09	1.33	1.58	1.83	2.08	2.34	2.73	3.05	3.38	4.75*	6.17*	
	120	1.17	1.45	1.73	2.01	2.29	2.58	3.01	3.38	3.75	5.28*	6.88*	
	140	1.26	1.57	1.88	2.18	2.49	2.81	3.28	3.69	4.10	5.78*	7.55*	
	25	10	0.81	0.86	0.94	1.01	1.10	1.18	1.30	1.40	1.51	1.93*	2.36*
		20	0.92	0.99	1.08	1.17	1.27	1.37	1.53	1.66	1.79	2.35*	2.93*
40		1.07	1.17	1.29	1.41	1.55	1.69	1.90	2.09	2.28	3.06*	3.89*	
60		1.19	1.31	1.46	1.62	1.79	1.97	2.24	2.47	2.71	3.70*	4.73*	
80		1.29	1.44	1.62	1.81	2.02	2.23	2.55	2.82	3.11	4.28*	5.52*	
100		1.38	1.56	1.77	2.00	2.23	2.47	2.84	3.16	3.48	4.83*	6.25*	
120		1.47	1.68	1.91	2.17	2.43	2.70	3.12	3.48	3.84	5.36*	6.95*	
140		1.55	1.79	2.05	2.34	2.63	2.93	3.39	3.78	4.19	5.86*	7.62*	
50		10	0.89	0.95	1.03	1.11	1.20	1.28	1.41	1.51	1.62	2.05*	2.48*
		20	1.03	1.10	1.19	1.29	1.39	1.50	1.65	1.78	1.91	2.46*	3.04*
	40	1.21	1.31	1.43	1.56	1.69	1.82	2.03	2.21	2.39	3.17*	3.98*	
	60	1.35	1.47	1.62	1.77	1.93	2.10	2.36	2.59	2.82	3.79*	4.82*	
	80	1.47	1.61	1.78	1.97	2.16	2.36	2.67	2.93	3.21	4.37*	5.60*	
	100	1.57	1.74	1.93	2.14	2.37	2.60	2.95	3.26	3.58	4.92*	6.33*	
	120	1.67	1.86	2.08	2.32	2.57	2.83	3.23	3.58	3.93	5.44*	7.03*	
	140	1.76	1.97	2.21	2.48	2.76	3.05	3.49	3.88	4.28	5.94*	7.69*	
	100	10	1.01	1.07	1.16	1.24	1.33	1.42	1.55	1.66	1.77	2.22*	2.68*
		20	1.18	1.25	1.35	1.46	1.56	1.67	1.83	1.97	2.10	2.66*	3.24*
40		1.40	1.50	1.63	1.76	1.89	2.03	2.24	2.42	2.60	3.36*	4.17*	
60		1.57	1.69	1.84	2.00	2.16	2.32	2.58	2.80	3.02	3.98*	5.00*	
80		1.71	1.85	2.02	2.20	2.39	2.58	2.88	3.14	3.41	4.54*	5.76*	
100		1.83	1.99	2.19	2.39	2.60	2.83	3.17	3.46	3.77	5.08*	6.48*	
120		1.94	2.12	2.34	2.57	2.80	3.05	3.44	3.77	4.12	5.60*	7.17*	
140		2.04	2.24	2.48	2.73	3.00	3.27	3.70	4.07	4.45	6.09*	7.84*	
150		10	1.09	1.16	1.25	1.34	1.43	1.52	1.66	1.78	1.89	2.36*	2.83*
		20	1.28	1.36	1.47	1.58	1.69	1.80	1.97	2.11	2.24	2.82*	3.41*
	40	1.54	1.64	1.77	1.91	2.05	2.19	2.41	2.59	2.77	3.54*	4.35*	
	60	1.73	1.85	2.01	2.17	2.33	2.50	2.76	2.98	3.20	4.15*	5.17*	
	80	1.88	2.03	2.20	2.39	2.58	2.77	3.07	3.33	3.59	4.71*	5.92*	
	100	2.02	2.18	2.38	2.59	2.80	3.02	3.36	3.65	3.95	5.24*	6.64*	
	120	2.14	2.33	2.54	2.77	3.01	3.25	3.63	3.96	4.29	5.75*	7.32*	
	140	2.26	2.46	2.69	2.94	3.20	3.47	3.89	4.25	4.62	6.24*	7.98*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 20.0 Ft (RADIUS = 14.1 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		°F	4	8	12	16	20	24	30	35	40	60
200 (Ft*s) ^{1/2}	10	1.16	1.23	1.32	1.41	1.51	1.61	1.75	1.87	1.99	2.47*	2.95*
	20	1.37	1.46	1.56	1.68	1.79	1.91	2.08	2.22	2.36	2.96*	3.56*
	40	1.65	1.76	1.89	2.04	2.18	2.33	2.54	2.73	2.91	3.69*	4.51*
	60	1.86	1.99	2.14	2.31	2.48	2.65	2.91	3.13	3.35	4.31*	5.33*
	80	2.03	2.18	2.36	2.54	2.74	2.93	3.24	3.49	3.75	4.87*	6.08*
	100	2.17	2.34	2.54	2.75	2.97	3.19	3.53	3.82	4.11	5.40*	6.79*
300	120	2.31	2.49	2.71	2.94	3.18	3.43	3.80	4.13	4.46	5.90*	7.47*
	140	2.43	2.63	2.87	3.12	3.38	3.65	4.07	4.42	4.79	6.39*	8.12*
	10	1.27	1.34	1.44	1.54	1.64	1.74	1.89	2.02	2.14	2.65*	3.16*
	20	1.51	1.60	1.72	1.84	1.96	2.08	2.26	2.41	2.56	3.18*	3.82*
	40	1.83	1.95	2.09	2.24	2.39	2.54	2.77	2.96	3.15	3.96*	4.80*
	60	2.06	2.20	2.37	2.54	2.72	2.90	3.17	3.40	3.62	4.60*	5.63*
400	80	2.26	2.41	2.60	2.80	3.00	3.20	3.51	3.77	4.03	5.17*	6.38*
	100	2.42	2.60	2.81	3.03	3.25	3.48	3.82	4.11	4.41	5.70*	7.08*
	120	2.57	2.77	2.99	3.23	3.48	3.73	4.11	4.43	4.76	6.20*	7.75*
	140	2.71	2.92	3.17	3.42	3.69	3.96	4.37	4.73	5.09	6.68*	8.40*
	10	1.36	1.43	1.53	1.64	1.75	1.85	2.01	2.14	2.27	2.80*	3.33*
	20	1.62	1.72	1.84	1.97	2.09	2.22	2.41	2.57	2.72	3.37*	4.03*
600	40	1.98	2.10	2.25	2.41	2.56	2.72	2.96	3.16	3.35	4.19*	5.05*
	60	2.23	2.38	2.55	2.73	2.92	3.11	3.38	3.62	3.85	4.85*	5.90*
	80	2.45	2.61	2.81	3.01	3.22	3.43	3.75	4.01	4.28	5.43*	6.65*
	100	2.63	2.81	3.03	3.25	3.48	3.72	4.07	4.36	4.66	5.96*	7.35*
	120	2.79	2.99	3.23	3.47	3.72	3.98	4.36	4.69	5.02	6.47*	8.02*
	140	2.94	3.16	3.41	3.68	3.95	4.22	4.64	5.00	5.36	6.95*	8.66*
800	10	1.50	1.58	1.69	1.80	1.92	2.03	2.20	2.34	2.47	3.04*	3.61*
	20	1.80	1.91	2.04	2.17	2.31	2.45	2.65	2.82	2.98	3.67*	4.38*
	40	2.21	2.34	2.50	2.67	2.84	3.01	3.27	3.48	3.68	4.57*	5.48*
	60	2.51	2.66	2.85	3.04	3.24	3.44	3.74	3.98	4.22	5.27*	6.36*
	80	2.75	2.92	3.13	3.35	3.57	3.80	4.13	4.41	4.68	5.88*	7.14*
	100	2.96	3.15	3.38	3.62	3.87	4.11	4.48	4.79	5.10	6.43*	7.85*
	120	3.14	3.35	3.60	3.86	4.13	4.40	4.80	5.13	5.47	6.95*	8.53*
	140	3.31	3.54	3.81	4.09	4.37	4.66	5.09	5.46	5.83	7.44*	9.17*
	10	1.61	1.70	1.81	1.93	2.05	2.17	2.35	2.49	2.64	3.23*	3.83*
	20	1.95	2.06	2.20	2.34	2.49	2.63	2.85	3.02	3.19	3.92*	4.66*
	40	2.40	2.54	2.71	2.89	3.07	3.25	3.52	3.74	3.95	4.88*	5.84*
	60	2.73	2.89	3.09	3.30	3.50	3.71	4.02	4.28	4.53	5.62*	6.76*
	80	2.99	3.18	3.40	3.63	3.86	4.10	4.45	4.73	5.02	6.26*	7.56*
	100	3.22	3.43	3.67	3.92	4.18	4.43	4.82	5.14	5.46	6.84*	8.30*
	120	3.43	3.65	3.91	4.19	4.46	4.74	5.16	5.51	5.85	7.37*	8.98*
	140	3.61	3.85	4.13	4.43	4.72	5.02	5.47	5.85	6.22	7.87*	9.63*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 20.0 Ft (RADIUS = 14.1 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
0 (Ft*s) ^{1/2}	°F												
	10	0.85	0.97	1.10	1.24	1.38	1.51	1.73	1.90	2.08	2.79*	3.52*	
	20	1.00	1.17	1.35	1.53	1.72	1.91	2.20	2.44	2.68	3.67*	4.68*	
	40	1.24	1.50	1.77	2.03	2.30	2.58	2.99	3.34	3.69	5.14*	6.64*	
	60	1.46	1.80	2.13	2.47	2.81	3.16	3.68	4.13	4.57	6.43*	8.36*	
	80	1.66	2.07	2.47	2.87	3.28	3.69	4.32	4.85	5.39	7.61*	9.93*	
	100	1.84	2.32	2.79	3.25	3.72	4.20	4.92	5.53	6.15	8.72*	11.41*	
	120	2.02	2.56	3.09	3.61	4.14	4.67	5.49	6.18	6.88	9.78*	12.82*	
	140	2.19	2.79	3.37	3.96	4.54	5.13	6.03	6.80	7.57	10.79*	14.17*	
	25	10	1.15	1.24	1.35	1.47	1.60	1.72	1.92	2.08	2.25	2.94*	3.66*
20		1.33	1.45	1.60	1.76	1.93	2.10	2.37	2.59	2.83	3.79*	4.80*	
40		1.60	1.78	2.00	2.24	2.48	2.74	3.13	3.47	3.81	5.24*	6.74*	
60		1.81	2.06	2.35	2.66	2.98	3.31	3.81	4.25	4.69	6.52*	8.45*	
80		2.00	2.32	2.67	3.05	3.44	3.83	4.44	4.96	5.49	7.70*	10.01*	
100		2.18	2.56	2.98	3.42	3.87	4.33	5.03	5.64	6.25	8.80*	11.49*	
120		2.35	2.79	3.27	3.77	4.28	4.80	5.60	6.28	6.97	9.86*	12.89*	
140		2.51	3.01	3.55	4.11	4.68	5.25	6.14	6.89	7.66	10.87*	14.24*	
50		10	1.29	1.38	1.49	1.62	1.74	1.87	2.07	2.23	2.39	3.08*	3.79*
		20	1.50	1.62	1.77	1.93	2.09	2.26	2.52	2.74	2.96	3.92*	4.92*
	40	1.81	1.98	2.19	2.42	2.65	2.89	3.27	3.60	3.93	5.35*	6.84*	
	60	2.05	2.27	2.54	2.83	3.14	3.45	3.94	4.37	4.80	6.62*	8.53*	
	80	2.25	2.54	2.86	3.22	3.59	3.97	4.56	5.07	5.60	7.79*	10.10*	
	100	2.44	2.78	3.16	3.58	4.01	4.46	5.15	5.74	6.35	8.89*	11.57*	
	120	2.61	3.01	3.45	3.92	4.42	4.92	5.71	6.38	7.06	9.94*	12.97*	
	140	2.78	3.23	3.73	4.26	4.81	5.37	6.25	6.99	7.75	10.94*	14.31*	
	100	10	1.46	1.56	1.68	1.81	1.94	2.08	2.28	2.45	2.61	3.31*	4.03*
		20	1.73	1.85	2.01	2.17	2.34	2.51	2.77	2.99	3.21	4.15*	5.14*
40		2.09	2.27	2.48	2.70	2.93	3.17	3.53	3.85	4.17	5.55*	7.03*	
60		2.37	2.59	2.85	3.13	3.42	3.72	4.19	4.60	5.01	6.80*	8.71*	
80		2.61	2.87	3.18	3.52	3.87	4.23	4.80	5.29	5.80	7.96*	10.26*	
100		2.82	3.13	3.49	3.88	4.28	4.71	5.38	5.95	6.54	9.05*	11.72*	
120		3.01	3.36	3.78	4.22	4.68	5.17	5.93	6.58	7.25	10.10*	13.12*	
140		3.19	3.59	4.05	4.54	5.07	5.61	6.46	7.19	7.93	11.10*	14.45*	
150		10	1.59	1.69	1.82	1.96	2.09	2.23	2.44	2.61	2.79	3.50*	4.24*
		20	1.89	2.02	2.18	2.35	2.53	2.70	2.96	3.19	3.41	4.36*	5.35*
	40	2.30	2.48	2.69	2.92	3.15	3.39	3.75	4.07	4.38	5.75*	7.22*	
	60	2.61	2.83	3.10	3.37	3.66	3.96	4.42	4.82	5.22	6.99*	8.88*	
	80	2.87	3.13	3.44	3.77	4.12	4.47	5.03	5.51	6.00	8.14*	10.42*	
	100	3.10	3.40	3.76	4.14	4.54	4.95	5.59	6.16	6.73	9.22*	11.88*	
	120	3.31	3.65	4.05	4.48	4.93	5.40	6.14	6.78	7.44	10.25*	13.26*	
	140	3.50	3.89	4.33	4.81	5.31	5.84	6.66	7.38	8.11	11.25*	14.60*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 20.0 Ft (RADIUS = 14.1 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE
TIME INDEX

CEILING HEIGHT, Ft

TEMPERATURE
RISE

(Ft*s)^{1/2}

°F

4

8

12

16

20

24

30

35

40

60

80

200

10

20

40

60

80

100

120

140

1.93

2.33

2.87

3.30

3.66

3.99

4.30

4.58

2.57

3.13

3.35

4.26

5.02

5.71

6.35

6.97

7.56

2.93

3.58

4.58

5.42

6.19

6.92

7.62

8.29

3.66*

4.54*

5.94*

7.17*

8.31*

9.38*

10.41*

13.41*

14.74*

300

10

20

40

60

80

100

120

140

2.11

2.56

3.17

3.63

4.03

4.37

4.76

5.13

2.79

3.40

4.60

5.38

6.08

6.72

7.34

7.93

3.16

3.87

4.91

5.78

6.55

7.28

7.97

8.63

3.93*

4.86*

6.29*

7.52*

8.64*

9.71*

10.91*

12.34*

13.70*

15.02*

400

10

20

40

60

80

100

120

140

2.26

2.75

3.41

3.91

4.21

4.51

4.82

5.09

2.97

3.62

4.88

5.69

6.40

7.06

7.68

8.27

3.35

4.11

5.20

6.09

6.88

7.61

8.30

8.96

4.15*

5.13*

6.61*

7.84*

8.96*

10.02*

11.03*

12.64*

13.99*

15.30*

600

10

20

40

60

80

100

120

140

2.50

3.05

3.80

4.36

4.83

5.24

5.61

5.95

3.25

3.99

4.25

5.35

6.22

6.97

7.45

8.20

8.90

9.57

3.66

4.50

5.69

6.63

7.45

8.20

10.61*

11.82*

13.22*

14.56*

15.85*

4.52*

5.58*

7.14*

8.41*

9.55*

10.32*

11.82*

12.64*

12.00*

15.30*

800

10

20

40

60

80

100

120

140

2.69

3.30

4.12

4.73

5.23

5.67

6.07

6.44

3.49

4.29

5.74

6.66

7.44

8.15

8.81

9.42

3.92

4.82

6.09

7.08

7.94

8.71

9.43

10.11

4.81*

5.95*

7.60*

8.91*

10.86*

12.37*

13.77*

15.11*

16.39*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 20.0 Ft (RADIUS = 14.1 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		(Ft*s) ^{1/2}	4	8	12	16	20	24	30	35	40	60	80
0	10		1.27	1.48	1.70	1.93	2.16	2.39	2.75	3.04	3.34	4.56*	5.81*
	20		1.56	1.88	2.20	2.52	2.85	3.18	3.69	4.11	4.54	6.31*	8.13*
	40		2.05	2.55	3.03	3.52	4.02	4.51	5.27	5.91	6.56	9.25*	12.05*
	60		2.49	3.13	3.77	4.40	5.04	5.68	6.66	7.49	8.33	11.82*	15.48*
	80		2.88	3.67	4.44	5.20	5.97	6.75	7.94	8.94	9.96	14.19*	18.63*
	100		3.25	4.18	5.07	5.96	6.85	7.76	9.13	10.30	11.49	16.41*	21.59*
	120		3.61	4.66	5.67	6.68	7.69	8.71	10.27	11.59	12.94	18.52*	24.40*
25	10		1.67	1.82	2.00	2.20	2.41	2.62	2.95	3.23	3.52	4.71*	5.95*
	20		1.98	2.21	2.48	2.76	3.07	3.38	3.86	4.27	4.69	6.43*	8.25*
	40		2.47	2.84	3.27	3.73	4.20	4.68	5.42	6.05	6.69	9.35*	12.15*
	60		2.88	3.41	3.99	4.59	5.20	5.83	6.79	7.61	8.45	11.92*	15.57*
	80		3.25	3.93	4.64	5.38	6.13	6.89	8.06	9.05	10.06	14.28*	18.71*
	100		3.61	4.42	5.27	6.12	7.00	7.89	9.25	10.41	11.59	16.49*	21.67*
	120		3.95	4.89	5.86	6.84	7.83	8.84	10.38	11.70	13.03	18.60*	24.48*
50	10		1.87	2.02	2.20	2.40	2.60	2.81	3.13	3.40	3.68	4.85*	6.08*
	20		2.23	2.45	2.70	2.98	3.27	3.56	4.03	4.43	4.83	6.56*	8.37*
	40		2.76	3.10	3.50	3.93	4.38	4.84	5.56	6.18	6.81	9.46*	12.24*
	60		3.19	3.66	4.20	4.77	5.36	5.98	6.92	7.73	8.56	12.01*	15.66*
	80		3.57	4.18	4.85	5.55	6.28	7.03	8.18	9.16	10.17	14.37*	18.80*
	100		3.93	4.66	5.46	6.29	7.14	8.02	9.36	10.51	11.68	16.58*	21.74*
	120		4.27	5.12	6.04	6.99	7.97	8.96	10.49	11.80	13.13	18.68*	24.55*
100	10		2.14	2.29	2.48	2.69	2.89	3.11	3.43	3.70	3.97	5.13*	6.35*
	20		2.57	2.78	3.04	3.31	3.60	3.89	4.34	4.72	5.11	6.80*	8.60*
	40		3.18	3.50	3.88	4.29	4.71	5.15	5.84	6.44	7.05	9.67*	12.44*
	60		3.66	4.09	4.59	5.12	5.68	6.27	7.18	7.97	8.78	12.20*	15.83*
	80		4.07	4.61	5.23	5.89	6.58	7.30	8.42	9.39	10.38	14.54*	18.96*
	100		4.45	5.09	5.83	6.61	7.43	8.28	9.59	10.72	11.88	16.74*	21.90*
	120		4.79	5.55	6.40	7.30	8.24	9.21	10.71	12.00	13.31	18.84*	24.70*
150	10		2.33	2.49	2.69	2.90	3.12	3.33	3.66	3.93	4.21	5.38*	6.60*
	20		2.82	3.04	3.30	3.58	3.86	4.15	4.60	4.98	5.37	7.04*	8.82*
	40		3.50	3.82	4.19	4.59	5.01	5.44	6.11	6.69	7.29	9.87*	12.63*
	60		4.01	4.43	4.92	5.43	5.98	6.55	7.43	8.20	9.00	12.39*	16.01*
	80		4.46	4.97	5.56	6.20	6.87	7.57	8.66	9.61	10.58	14.72*	19.12*
	100		4.85	5.47	6.17	6.92	7.71	8.53	9.82	10.93	12.07	16.91*	22.06*
	120		5.22	5.93	6.74	7.60	8.51	9.46	10.93	12.20	13.50	19.00*	24.85*
	140		5.56	6.37	7.28	8.26	9.29	10.35	12.00	13.42	14.87	21.01*	27.53*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 20.0 Ft (RADIUS = 14.1 Ft)³
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TEMPERATURE
 TIME INDEX RISE

CEILING HEIGHT, Ft

(Ft*s)^{1/2}

	°F	4	8	12	16	20	24	30	35	40	60	80
200	10	2.49	2.66	2.86	3.08	3.30	3.52	3.86	4.13	4.41	5.60*	6.83*
	20	3.02	3.25	3.51	3.80	4.09	4.38	4.83	5.21	5.60	7.27*	9.04*
	40	3.75	4.07	4.45	4.85	5.27	5.70	6.36	6.93	7.52	10.08*	12.83*
	60	4.31	4.72	5.20	5.72	6.25	6.81	7.68	8.43	9.21	12.58*	16.19*
	80	4.78	5.29	5.87	6.49	7.14	7.83	8.90	9.83	10.78	14.89*	19.29*
	100	5.20	5.79	6.48	7.21	7.98	8.78	10.05	11.14	12.27	17.08*	22.21*
	120	5.58	6.27	7.05	7.89	8.78	9.70	11.15	12.40	13.69	19.16*	25.00*
300	140	5.94	6.72	7.60	8.54	9.54	10.58	12.21	13.61	15.05	21.16*	27.67*
	10	2.75	2.92	3.14	3.37	3.60	3.83	4.18	4.47	4.76	5.98*	7.24*
	20	3.35	3.58	3.86	4.16	4.46	4.76	5.22	5.61	6.00	7.68*	9.47*
	40	4.17	4.50	4.89	5.30	5.72	6.14	6.81	7.37	7.95	10.48*	13.21*
	60	4.79	5.21	5.69	6.20	6.73	7.28	8.14	8.87	9.63	12.95*	16.53*
	80	5.31	5.81	6.39	7.00	7.64	8.31	9.35	10.25	11.18	15.24*	19.61*
	100	5.76	6.35	7.02	7.73	8.48	9.26	10.48	11.55	12.65	17.41*	22.52*
400	120	6.18	6.85	7.61	8.42	9.27	10.17	11.57	12.79	14.06	19.48*	25.29*
	140	6.56	7.31	8.16	9.07	10.04	11.04	12.62	13.99	15.41	21.47*	27.96*
	10	2.95	3.13	3.36	3.60	3.84	4.08	4.44	4.74	5.04	6.30*	7.60*
	20	3.62	3.86	4.15	4.46	4.77	5.08	5.55	5.95	6.35	8.05*	9.86*
	40	4.51	4.85	5.25	5.67	6.09	6.53	7.19	7.76	8.34	10.86*	13.58*
	60	5.18	5.60	6.10	6.61	7.15	7.70	8.55	9.28	10.03	13.31*	16.88*
	80	5.74	6.24	6.83	7.44	8.08	8.74	9.77	10.65	11.57	15.59*	19.94*
600	100	6.23	6.81	7.48	8.19	8.93	9.70	10.90	11.95	13.03	17.74*	22.83*
	120	6.67	7.34	8.09	8.89	9.73	10.61	11.98	13.18	14.42	19.79*	25.59*
	140	7.08	7.82	8.66	9.56	10.50	11.48	13.02	14.37	15.76	21.77*	28.24*
	10	3.28	3.48	3.72	3.98	4.24	4.49	4.88	5.19	5.51	6.83*	8.20*
	20	4.04	4.30	4.61	4.94	5.27	5.60	6.10	6.51	6.92	8.69*	10.55*
	40	5.06	5.42	5.84	6.27	6.72	7.17	7.85	8.43	9.01	11.56*	14.29*
	60	5.82	6.26	6.77	7.30	7.85	8.41	9.27	10.00	10.74	14.01*	17.56*
800	80	6.44	6.96	7.56	8.18	8.83	9.49	10.51	11.39	12.29	16.26*	20.58*
	100	6.99	7.58	8.26	8.98	9.72	10.48	11.67	12.69	13.74	18.38*	23.44*
	120	7.48	8.15	8.91	9.71	10.54	11.41	12.75	13.92	15.12	20.42*	26.17*
	140	7.93	8.67	9.51	10.40	11.32	12.28	13.79	15.09	16.45	22.37*	28.81*
	10	3.55	3.76	4.02	4.29	4.56	4.83	5.23	5.56	5.89	7.28*	8.70*
	20	4.39	4.66	4.99	5.33	5.68	6.03	6.54	6.97	7.40	9.23*	11.15*
	40	5.51	5.88	6.32	6.77	7.24	7.70	8.41	9.00	9.59	12.18*	14.94*
	60	6.33	6.79	7.32	7.87	8.44	9.01	9.88	10.62	11.37	14.65*	18.20*
	80	7.01	7.55	8.16	8.81	9.47	10.14	11.17	12.05	12.94	16.90*	21.21*
	100	7.61	8.21	8.91	9.64	10.39	11.16	12.34	13.36	14.40	19.01*	24.04*
	120	8.14	8.82	9.59	10.40	11.24	12.11	13.44	14.60	15.78	21.03*	26.75*
	140	8.63	9.37	10.22	11.12	12.05	13.00	14.49	15.78	17.11	22.97*	29.37*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 20.0 Ft (RADIUS = 14.1 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, Ft

(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60	80
0	10	1.97	2.35	2.74	3.14	3.54	3.95	4.56	5.08	5.61	7.76*	9.98*
	20	2.55	3.14	3.73	4.33	4.93	5.53	6.45	7.22	8.01	11.26*	14.64*
	40	3.54	4.49	5.41	6.33	7.25	8.19	9.62	10.82	12.05	17.13*	22.47*
	60	4.40	5.66	6.87	8.08	9.29	10.52	12.39	13.98	15.59	22.29*	29.33*
	80	5.19	6.74	8.22	9.69	11.17	12.66	14.94	16.88	18.84	27.02*	35.63*
	100	5.94	7.75	9.48	11.20	12.93	14.67	17.34	19.60	21.90	31.46*	41.55*
	120	6.64	8.72	10.68	12.64	14.60	16.58	19.61	22.18	24.80	35.68*	47.17*
25	140	7.32	9.64	11.84	14.01	16.20	18.42	21.80	24.66	27.58	39.73*	52.57*
	10	2.47	2.74	3.07	3.43	3.80	4.18	4.77	5.27	5.78	7.91*	10.12*
	20	3.04	3.50	4.02	4.57	5.14	5.73	6.62	7.38	8.16	11.38*	14.76*
	40	3.98	4.79	5.65	6.53	7.44	8.35	9.76	10.96	12.17	17.24*	22.57*
	60	4.80	5.94	7.09	8.27	9.46	10.67	12.52	14.10	15.70	22.38*	29.42*
	80	5.57	7.00	8.42	9.86	11.32	12.80	15.07	16.99	18.95	27.11*	35.71*
	100	6.30	8.00	9.68	11.37	13.07	14.81	17.45	19.70	22.00	31.54*	41.63*
50	120	6.99	8.95	10.87	12.79	14.74	16.71	19.72	22.29	24.89	35.76*	47.25*
	140	7.65	9.87	12.02	14.17	16.34	18.54	21.90	24.76	27.67	39.81*	52.64*
	10	2.76	3.02	3.34	3.68	4.03	4.40	4.97	5.46	5.96	8.06*	10.26*
	20	3.39	3.81	4.29	4.81	5.35	5.92	6.79	7.54	8.30	11.51*	14.87*
	40	4.36	5.08	5.89	6.74	7.62	8.52	9.91	11.09	12.30	17.34*	22.66*
	60	5.18	6.21	7.31	8.45	9.62	10.82	12.66	14.22	15.82	22.48*	29.51*
	80	5.94	7.25	8.63	10.04	11.48	12.94	15.19	17.10	19.05	27.19*	35.80*
100	100	6.65	8.24	9.87	11.53	13.22	14.94	17.57	19.81	22.09	31.63*	41.70*
	120	7.33	9.18	11.06	12.95	14.88	16.84	19.83	22.39	24.99	35.84*	47.32*
	140	7.98	10.09	12.19	14.32	16.47	18.66	22.01	24.86	27.77	39.89*	52.71*
	10	3.17	3.43	3.74	4.08	4.43	4.78	5.33	5.80	6.29	8.35*	10.54*
	20	3.89	4.28	4.74	5.24	5.75	6.29	7.13	7.85	8.59	11.75*	15.10*
	40	4.95	5.60	6.34	7.14	7.97	8.84	10.19	11.36	12.54	17.55*	22.86*
	60	5.81	6.72	7.74	8.82	9.95	11.12	12.92	14.46	16.04	22.67*	29.68*
150	80	6.58	7.74	9.03	10.38	11.78	13.22	15.43	17.33	19.26	27.37*	35.96*
	100	7.29	8.71	10.25	11.86	13.51	15.20	17.80	20.02	22.29	31.80*	41.86*
	120	7.96	9.64	11.42	13.27	15.16	17.09	20.06	22.59	25.18	36.00*	47.47*
	140	8.60	10.53	12.55	14.62	16.74	18.90	22.22	25.06	27.95	40.04*	52.85*
	10	3.46	3.73	4.05	4.39	4.74	5.10	5.65	6.11	6.59	8.63*	10.80*
	20	4.27	4.65	5.11	5.60	6.10	6.63	7.44	8.15	8.88	12.00*	15.34*
	40	5.41	6.03	6.74	7.51	8.32	9.16	10.48	11.62	12.79	17.76*	23.06*
	60	6.32	7.17	8.14	9.18	10.27	11.41	13.18	14.70	16.26	22.86*	29.86*
	80	7.11	8.20	9.42	10.72	12.08	13.49	15.67	17.55	19.47	27.55*	36.13*
	100	7.84	9.16	10.63	12.18	13.80	15.46	18.03	20.23	22.49	31.96*	42.02*
	120	8.52	10.08	11.78	13.58	15.43	17.34	20.28	22.79	25.37	36.16*	47.62*
	140	9.17	10.96	12.90	14.92	17.00	19.14	22.43	25.25	28.13	40.20*	53.00*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 20.0 Ft (RADIUS = 14.1 Ft)³
 FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft												
		(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60	80
200	10	3.70	3.98	4.31	4.65	5.01	5.37	5.92	6.39	6.86	7.34	7.75	8.90*	11.07*
	20	4.57	4.96	5.42	5.91	6.41	6.93	7.74	8.44	9.15	9.66	10.12	12.24*	15.56*
	40	5.79	6.40	7.10	7.85	8.64	9.47	10.76	11.88	13.03	13.51	13.97	17.97*	23.25*
	60	6.75	7.57	8.51	9.52	10.58	11.70	13.43	14.94	16.48	16.92	17.35	23.05*	30.04*
	80	7.57	8.61	9.79	11.05	12.38	13.76	15.92	17.77	19.67	20.09	20.46	27.73*	36.29*
	100	8.32	9.58	10.99	12.50	14.08	15.72	18.26	20.45	22.68	23.40	23.80	32.13*	42.17*
	120	9.02	10.50	12.14	13.88	15.70	17.58	20.50	23.00	25.55	25.83	26.22	36.32*	47.77*
300	140	9.68	11.37	13.24	15.22	17.27	19.38	22.65	25.45	28.31	28.67	29.03	40.35*	53.14*
	10	4.09	4.38	4.72	5.08	5.45	5.83	6.39	6.86	7.34	7.75	8.12	9.39*	11.57*
	20	5.07	5.47	5.94	6.44	6.95	7.47	8.27	8.96	9.66	10.12	10.55	12.72*	16.02*
	40	6.42	7.02	7.72	8.46	9.23	10.04	11.29	12.38	13.51	13.97	14.43	18.39*	23.64*
	60	7.46	8.26	9.17	10.15	11.18	12.25	13.94	15.41	16.92	17.35	17.77	23.42*	30.39*
	80	8.34	9.34	10.47	11.68	12.96	14.30	16.39	18.21	20.09	20.46	20.86	28.08*	36.62*
	100	9.14	10.33	11.67	13.12	14.64	16.23	18.71	20.86	23.07	23.40	23.80	32.46*	42.48*
400	120	9.87	11.26	12.81	14.48	16.24	18.08	20.93	23.40	25.93	26.22	26.63	36.64*	48.07*
	140	10.56	12.14	13.91	15.80	17.79	19.86	23.07	25.83	28.67	29.03	29.44	40.66*	53.43*
	10	4.41	4.70	5.06	5.44	5.82	6.20	6.78	7.27	7.75	8.12	8.54	9.84*	12.03*
	20	5.47	5.88	6.37	6.87	7.40	7.92	8.73	9.42	10.12	10.55	10.93	13.17*	16.46*
	40	6.93	7.54	8.24	8.99	9.76	10.55	11.79	12.86	13.97	14.43	14.82	18.79*	24.02*
	60	8.04	8.84	9.75	10.71	11.72	12.78	14.43	15.87	17.35	17.77	18.19	23.80*	30.74*
	80	8.99	9.96	11.07	12.26	13.51	14.81	16.86	18.65	20.49	20.86	21.29	28.43*	36.95*
600	100	9.82	10.98	12.29	13.69	15.18	16.73	19.16	21.28	23.46	23.80	24.23	32.80*	42.79*
	120	10.59	11.93	13.44	15.06	16.77	18.56	21.37	23.80	26.30	26.63	27.03	36.96*	48.36*
	140	11.31	12.83	14.53	16.37	18.31	20.33	23.49	26.22	29.03	29.44	29.85	40.97*	53.71*
	10	4.92	5.23	5.61	6.01	6.42	6.82	7.43	7.93	8.44	8.86	9.27	10.59*	12.85*
	20	6.13	6.56	7.07	7.60	8.14	8.69	9.52	10.22	10.93	11.35	11.76	14.00*	17.30*
	40	7.77	8.39	9.11	9.87	10.65	11.45	12.68	13.74	14.82	15.29	15.70	19.59*	24.78*
	60	9.00	9.80	10.72	11.68	12.69	13.72	15.34	16.74	18.19	18.56	18.97	24.54*	31.44*
800	80	10.04	11.01	12.11	13.28	14.50	15.77	17.76	19.50	21.29	21.66	22.03	29.12*	37.60*
	100	10.95	12.09	13.37	14.74	16.18	17.68	20.04	22.10	24.23	24.58	24.93	33.46*	43.41*
	120	11.79	13.09	14.55	16.12	17.77	19.50	22.22	24.58	27.03	27.36	27.76	37.60*	48.96*
	140	12.56	14.02	15.67	17.43	19.29	21.24	24.31	26.98	29.74	30.07	30.44	41.58*	54.29*
	10	5.33	5.66	6.06	6.48	6.90	7.33	7.96	8.48	9.01	9.42	9.83	11.24*	13.57*
	20	6.66	7.11	7.64	8.19	8.75	9.32	10.18	10.89	11.61	11.97	12.38	14.75*	18.08*
	40	8.45	9.09	9.83	10.61	11.41	12.22	13.46	14.52	15.60	15.97	16.38	20.36*	25.53*
	60	9.79	10.60	11.53	12.51	13.52	14.56	16.17	17.55	18.98	19.35	19.76	25.27*	32.13*
	80	10.91	11.88	12.99	14.16	15.38	16.64	18.60	20.30	22.07	22.36	22.76	29.81*	38.25*
	100	11.89	13.02	14.30	15.66	17.08	18.56	20.87	22.89	24.98	25.26	25.66	34.11*	44.03*
	120	12.77	14.06	15.52	17.06	18.69	20.38	23.04	25.36	27.76	28.04	28.44	38.23*	49.55*
	140	13.59	15.04	16.66	18.39	20.21	22.12	25.12	27.73	30.44	30.72	31.12	42.18*	54.85*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 22.0 Ft (RADIUS = 15.6 Ft)
 FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
0	°F												
	10	0.64	0.70	0.78	0.87	0.95	1.04	1.17	1.28	1.39	1.83*	2.27*	
	20	0.72	0.81	0.91	1.02	1.13	1.25	1.42	1.56	1.70	2.28*	2.86*	
	40	0.85	0.99	1.14	1.29	1.44	1.60	1.83	2.03	2.22	3.03*	3.86*	
	60	0.97	1.15	1.33	1.52	1.71	1.90	2.19	2.44	2.68	3.69*	4.74*	
	80	1.07	1.29	1.51	1.73	1.96	2.18	2.52	2.81	3.10	4.30*	5.55*	
	100	1.18	1.43	1.68	1.93	2.19	2.45	2.84	3.17	3.50	4.87*	6.30*	
	120	1.27	1.56	1.84	2.12	2.41	2.70	3.13	3.50	3.88	5.42*	7.02*	
	140	1.36	1.68	1.99	2.31	2.62	2.94	3.42	3.83	4.24	5.94*	7.71*	
	25	10	0.87	0.92	0.99	1.06	1.14	1.22	1.35	1.45	1.55	1.97*	2.40*
20		0.98	1.05	1.13	1.23	1.33	1.43	1.58	1.71	1.85	2.40*	2.98*	
40		1.15	1.24	1.36	1.49	1.62	1.76	1.98	2.16	2.35	3.14*	3.96*	
60		1.27	1.40	1.55	1.71	1.88	2.05	2.33	2.56	2.80	3.79*	4.83*	
80		1.39	1.54	1.72	1.91	2.11	2.32	2.65	2.93	3.21	4.39*	5.63*	
100		1.49	1.66	1.88	2.10	2.34	2.58	2.96	3.28	3.60	4.96*	6.38*	
120		1.58	1.79	2.03	2.29	2.55	2.83	3.25	3.61	3.97	5.50*	7.10*	
140		1.67	1.91	2.18	2.46	2.76	3.06	3.53	3.93	4.33	6.01*	7.78*	
50		10	0.96	1.01	1.09	1.17	1.25	1.33	1.46	1.56	1.67	2.09*	2.52*
		20	1.10	1.17	1.26	1.36	1.46	1.56	1.71	1.84	1.97	2.52*	3.09*
	40	1.30	1.39	1.51	1.63	1.77	1.90	2.11	2.29	2.47	3.24*	4.06*	
	60	1.45	1.56	1.71	1.86	2.02	2.19	2.45	2.68	2.91	3.88*	4.92*	
	80	1.57	1.71	1.88	2.07	2.26	2.46	2.77	3.04	3.32	4.48*	5.71*	
	100	1.68	1.85	2.04	2.26	2.48	2.71	3.07	3.38	3.70	5.04*	6.46*	
	120	1.79	1.98	2.20	2.44	2.69	2.95	3.36	3.71	4.07	5.58*	7.17*	
	140	1.88	2.10	2.34	2.61	2.89	3.18	3.64	4.03	4.42	6.09*	7.86*	
	100	10	1.08	1.14	1.22	1.30	1.39	1.48	1.61	1.72	1.83	2.27*	2.72*
		20	1.26	1.33	1.43	1.53	1.63	1.74	1.90	2.03	2.16	2.72*	3.29*
40		1.50	1.59	1.72	1.85	1.98	2.12	2.33	2.50	2.68	3.44*	4.25*	
60		1.68	1.79	1.94	2.10	2.26	2.42	2.68	2.90	3.12	4.07*	5.09*	
80		1.83	1.97	2.13	2.31	2.50	2.70	3.00	3.25	3.52	4.65*	5.87*	
100		1.96	2.12	2.31	2.51	2.73	2.95	3.29	3.59	3.90	5.21*	6.61*	
120		2.08	2.26	2.47	2.70	2.94	3.19	3.58	3.91	4.26	5.73*	7.32*	
140		2.19	2.39	2.62	2.87	3.14	3.41	3.85	4.22	4.61	6.24*	8.00*	
150		10	1.17	1.23	1.31	1.40	1.49	1.59	1.72	1.84	1.95	2.40*	2.87*
		20	1.37	1.45	1.55	1.65	1.76	1.87	2.04	2.18	2.31	2.88*	3.47*
	40	1.65	1.74	1.87	2.01	2.14	2.28	2.50	2.68	2.86	3.61*	4.43*	
	60	1.85	1.97	2.12	2.28	2.44	2.61	2.86	3.08	3.30	4.24*	5.26*	
	80	2.01	2.15	2.33	2.51	2.70	2.89	3.19	3.45	3.71	4.82*	6.03*	
	100	2.16	2.32	2.51	2.72	2.93	3.15	3.49	3.78	4.08	5.37*	6.77*	
	120	2.29	2.47	2.68	2.91	3.15	3.39	3.77	4.10	4.44	5.89*	7.47*	
	140	2.41	2.61	2.84	3.09	3.35	3.62	4.04	4.41	4.78	6.39*	8.14*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 22.0 Ft (RADIUS = 15.6 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE °F	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
200 (Ft*s) ^{1/2}	10	1.24	1.30	1.39	1.48	1.58	1.67	1.81	1.93	2.05	2.51*	3.00*
	20	1.47	1.54	1.65	1.76	1.87	1.98	2.16	2.30	2.44	3.01*	3.62*
	40	1.76	1.87	2.00	2.14	2.28	2.42	2.64	2.82	3.01	3.77*	4.59*
	60	1.98	2.11	2.26	2.43	2.59	2.76	3.02	3.24	3.47	4.40*	5.42*
	80	2.17	2.31	2.48	2.67	2.86	3.06	3.36	3.61	3.87	4.98*	6.19*
	100	2.32	2.49	2.68	2.89	3.11	3.33	3.67	3.96	4.25	5.52*	6.92*
	120	2.47	2.65	2.86	3.09	3.33	3.58	3.95	4.28	4.61	6.04*	7.61*
300	140	2.60	2.79	3.03	3.28	3.54	3.81	4.23	4.58	4.95	6.54*	8.28*
	10	1.36	1.42	1.52	1.61	1.71	1.81	1.96	2.09	2.21	2.70*	3.21*
	20	1.61	1.70	1.81	1.92	2.04	2.16	2.34	2.49	2.64	3.24*	3.88*
	40	1.96	2.06	2.20	2.35	2.50	2.65	2.88	3.07	3.26	4.04*	4.88*
	60	2.21	2.34	2.50	2.67	2.85	3.02	3.29	3.52	3.74	4.69*	5.73*
	80	2.41	2.56	2.74	2.94	3.14	3.34	3.65	3.91	4.17	5.28*	6.49*
	100	2.59	2.76	2.96	3.18	3.40	3.62	3.97	4.26	4.56	5.82*	7.21*
400	120	2.75	2.94	3.16	3.40	3.64	3.89	4.27	4.59	4.92	6.34*	7.90*
	140	2.90	3.10	3.34	3.60	3.86	4.13	4.55	4.90	5.27	6.83*	8.56*
	10	1.45	1.52	1.62	1.72	1.82	1.93	2.08	2.21	2.34	2.85*	3.38*
	20	1.73	1.82	1.94	2.06	2.19	2.31	2.50	2.65	2.81	3.43*	4.09*
	40	2.11	2.22	2.37	2.52	2.68	2.84	3.07	3.27	3.46	4.27*	5.14*
	60	2.39	2.52	2.69	2.87	3.05	3.24	3.51	3.74	3.98	4.95*	6.00*
	80	2.61	2.77	2.96	3.16	3.37	3.57	3.89	4.15	4.42	5.54*	6.77*
600	100	2.81	2.98	3.19	3.41	3.64	3.87	4.23	4.52	4.82	6.09*	7.49*
	120	2.98	3.17	3.40	3.65	3.90	4.15	4.53	4.86	5.19	6.61*	8.17*
	140	3.14	3.35	3.60	3.86	4.13	4.40	4.82	5.18	5.54	7.10*	8.83*
	10	1.60	1.68	1.78	1.89	2.00	2.11	2.28	2.41	2.55	3.09*	3.66*
	20	1.93	2.02	2.15	2.28	2.41	2.55	2.75	2.91	3.08	3.74*	4.44*
	40	2.36	2.48	2.64	2.80	2.97	3.14	3.39	3.60	3.81	4.66*	5.57*
	60	2.68	2.82	3.00	3.19	3.39	3.58	3.88	4.12	4.36	5.38*	6.47*
800	80	2.93	3.10	3.30	3.52	3.74	3.96	4.29	4.56	4.84	6.00*	7.26*
	100	3.16	3.34	3.56	3.80	4.04	4.28	4.65	4.96	5.27	6.57*	7.99*
	120	3.36	3.56	3.80	4.06	4.32	4.58	4.98	5.32	5.66	7.10*	8.68*
	140	3.54	3.75	4.02	4.29	4.57	4.86	5.29	5.66	6.03	7.60*	9.33*
	10	1.72	1.80	1.91	2.03	2.14	2.26	2.44	2.58	2.72	3.29*	3.89*
	20	2.08	2.18	2.32	2.46	2.60	2.74	2.95	3.13	3.30	4.00*	4.73*
	40	2.56	2.69	2.86	3.03	3.21	3.39	3.65	3.87	4.08	4.98*	5.93*
	60	2.91	3.06	3.26	3.46	3.66	3.87	4.18	4.43	4.68	5.74*	6.87*
	80	3.20	3.37	3.58	3.81	4.04	4.27	4.62	4.90	5.19	6.39*	7.69*
	100	3.44	3.63	3.87	4.12	4.37	4.62	5.00	5.32	5.64	6.98*	8.44*
	120	3.66	3.87	4.12	4.39	4.67	4.94	5.36	5.70	6.05	7.52*	9.13*
	140	3.86	4.08	4.36	4.65	4.94	5.24	5.68	6.06	6.44	8.04*	9.80*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 22.0 Ft (RADIUS = 15.6 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		$(Ft \cdot s)^{1/2}$	4	8	12	16	20	24	30	35	40	60	80
0	10	0.92	1.03	1.16	1.30	1.44	1.58	1.79	1.97	2.14	2.86*	3.59*	
	20	1.08	1.25	1.43	1.62	1.80	1.99	2.28	2.52	2.77	3.76*	4.78*	
	40	1.35	1.61	1.88	2.15	2.42	2.69	3.11	3.46	3.81	5.27*	6.78*	
	60	1.58	1.92	2.27	2.61	2.95	3.30	3.83	4.28	4.73	6.59*	8.53*	
	80	1.79	2.21	2.63	3.04	3.45	3.87	4.50	5.03	5.57	7.81*	10.14*	
	100	2.00	2.49	2.96	3.44	3.91	4.39	5.12	5.74	6.37	8.95*	11.66*	
	120	2.19	2.75	3.28	3.82	4.35	4.89	5.72	6.41	7.12	10.04*	13.09*	
25	140	2.37	2.99	3.59	4.18	4.78	5.38	6.29	7.06	7.84	11.08*	14.47*	
	10	1.24	1.32	1.43	1.54	1.67	1.79	1.99	2.15	2.32	3.01*	3.72*	
	20	1.43	1.54	1.69	1.85	2.02	2.19	2.46	2.68	2.92	3.88*	4.89*	
	40	1.71	1.90	2.12	2.35	2.60	2.86	3.26	3.60	3.94	5.37*	6.88*	
	60	1.95	2.20	2.49	2.80	3.12	3.46	3.97	4.40	4.85	6.69*	8.62*	
	80	2.15	2.47	2.83	3.21	3.61	4.01	4.62	5.15	5.68	7.90*	10.23*	
	100	2.35	2.73	3.16	3.61	4.06	4.53	5.24	5.85	6.47	9.04*	11.73*	
50	120	2.53	2.98	3.47	3.98	4.50	5.02	5.83	6.52	7.22	10.12*	13.17*	
	140	2.70	3.22	3.77	4.34	4.91	5.50	6.40	7.16	7.93	11.16*	14.55*	
	10	1.38	1.46	1.57	1.69	1.82	1.95	2.14	2.30	2.47	3.15*	3.86*	
	20	1.61	1.72	1.87	2.03	2.19	2.36	2.61	2.83	3.06	4.01*	5.01*	
	40	1.94	2.11	2.32	2.54	2.78	3.02	3.40	3.73	4.07	5.48*	6.97*	
	60	2.19	2.42	2.69	2.98	3.29	3.61	4.10	4.53	4.96	6.78*	8.71*	
	80	2.42	2.70	3.03	3.39	3.76	4.15	4.75	5.26	5.79	7.99*	10.31*	
100	100	2.62	2.96	3.35	3.77	4.21	4.66	5.36	5.96	6.57	9.12*	11.81*	
	120	2.81	3.20	3.66	4.14	4.64	5.15	5.94	6.62	7.31	10.20*	13.24*	
	140	2.98	3.44	3.95	4.49	5.05	5.62	6.51	7.26	8.03	11.23*	14.62*	
	10	1.57	1.65	1.77	1.90	2.03	2.16	2.36	2.53	2.70	3.38*	4.10*	
	20	1.85	1.97	2.12	2.28	2.44	2.61	2.87	3.09	3.31	4.24*	5.23*	
	40	2.24	2.41	2.61	2.84	3.07	3.30	3.67	3.98	4.31	5.68*	7.17*	
	60	2.54	2.75	3.01	3.29	3.58	3.89	4.36	4.77	5.18	6.97*	8.89*	
150	80	2.79	3.05	3.37	3.70	4.05	4.42	4.99	5.49	6.00	8.16*	10.47*	
	100	3.02	3.33	3.69	4.08	4.49	4.92	5.59	6.17	6.77	9.29*	11.97*	
	120	3.22	3.58	3.99	4.44	4.91	5.40	6.17	6.83	7.50	10.36*	13.39*	
	140	3.41	3.82	4.29	4.79	5.32	5.87	6.72	7.46	8.21	11.39*	14.76*	
	10	1.70	1.79	1.92	2.05	2.19	2.32	2.53	2.70	2.87	3.57*	4.31*	
	20	2.02	2.14	2.30	2.47	2.64	2.81	3.07	3.30	3.52	4.45*	5.44*	
	40	2.46	2.63	2.84	3.07	3.30	3.54	3.90	4.21	4.53	5.88*	7.36*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 22.0 Ft (RADIUS = 15.6 Ft)₃
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
200 (Ft*s) ^{1/2}	°F											
	10	1.81	1.91	2.04	2.17	2.31	2.46	2.67	2.84	3.02	3.74*	4.49*
	20	2.17	2.29	2.45	2.62	2.80	2.98	3.25	3.47	3.70	4.64*	5.64*
	40	2.64	2.82	3.03	3.26	3.49	3.73	4.10	4.41	4.73	6.08*	7.54*
	60	3.00	3.22	3.48	3.76	4.05	4.35	4.81	5.20	5.60	7.34*	9.23*
	80	3.30	3.56	3.87	4.20	4.54	4.89	5.44	5.92	6.40	8.51*	10.80*
	100	3.56	3.86	4.22	4.59	4.99	5.40	6.04	6.59	7.16	9.62*	12.28*
300	120	3.80	4.14	4.54	4.96	5.41	5.87	6.60	7.23	7.88	10.67*	13.69*
	140	4.02	4.40	4.84	5.31	5.81	6.33	7.14	7.85	8.58	11.69*	15.05*
	10	1.99	2.09	2.23	2.37	2.52	2.67	2.89	3.08	3.26	4.01*	4.79*
	20	2.39	2.53	2.70	2.88	3.06	3.25	3.53	3.76	3.99	4.96*	5.99*
	40	2.94	3.12	3.34	3.58	3.82	4.07	4.44	4.76	5.08	6.43*	7.90*
	60	3.34	3.56	3.83	4.12	4.42	4.72	5.18	5.57	5.97	7.69*	9.57*
	80	3.67	3.94	4.25	4.59	4.93	5.28	5.83	6.30	6.78	8.85*	11.12*
400	100	3.97	4.27	4.62	5.00	5.40	5.80	6.43	6.97	7.53	9.94*	12.58*
	120	4.23	4.57	4.97	5.39	5.83	6.29	7.00	7.61	8.24	10.98*	13.98*
	140	4.47	4.85	5.29	5.75	6.24	6.75	7.54	8.22	8.93	11.99*	15.33*
	10	2.13	2.24	2.38	2.53	2.69	2.84	3.08	3.27	3.46	4.23*	5.05*
	20	2.58	2.72	2.89	3.08	3.28	3.47	3.76	4.00	4.24	5.23*	6.29*
	40	3.17	3.36	3.59	3.84	4.09	4.35	4.73	5.05	5.38	6.74*	8.23*
	60	3.61	3.84	4.12	4.42	4.72	5.03	5.50	5.89	6.30	8.01*	9.90*
600	80	3.98	4.25	4.57	4.91	5.26	5.62	6.17	6.64	7.11	9.17*	11.43*
	100	4.30	4.60	4.97	5.35	5.75	6.15	6.78	7.32	7.87	10.25*	12.88*
	120	4.58	4.92	5.33	5.75	6.20	6.65	7.35	7.96	8.59	11.29*	14.27*
	140	4.84	5.22	5.66	6.13	6.62	7.12	7.90	8.58	9.27	12.29*	15.61*
	10	2.36	2.48	2.63	2.79	2.96	3.13	3.37	3.58	3.78	4.60*	5.47*
	20	2.88	3.02	3.21	3.42	3.62	3.83	4.14	4.39	4.65	5.69*	6.80*
	40	3.56	3.76	4.00	4.27	4.53	4.80	5.20	5.54	5.88	7.29*	8.82*
800	60	4.06	4.30	4.60	4.91	5.22	5.55	6.03	6.44	6.85	8.59*	10.50*
	80	4.47	4.75	5.09	5.45	5.81	6.18	6.74	7.22	7.70	9.76*	12.03*
	100	4.83	5.15	5.52	5.92	6.33	6.75	7.39	7.93	8.48	10.85*	13.47*
	120	5.15	5.50	5.92	6.36	6.81	7.27	7.98	8.59	9.21	11.88*	14.84*
	140	5.44	5.83	6.28	6.76	7.26	7.76	8.54	9.21	9.90	12.87*	16.16*
	10	2.55	2.67	2.83	3.00	3.18	3.36	3.62	3.83	4.04	4.90*	5.81*
	20	3.12	3.27	3.47	3.69	3.91	4.12	4.45	4.71	4.98	6.07*	7.23*
	40	3.87	4.08	4.34	4.61	4.89	5.17	5.59	5.94	6.29	7.75*	9.33*
	60	4.42	4.67	4.98	5.31	5.64	5.97	6.48	6.90	7.32	9.10*	11.04*
	80	4.87	5.16	5.52	5.89	6.26	6.65	7.23	7.71	8.20	10.29*	12.59*
	100	5.26	5.59	5.98	6.40	6.82	7.25	7.90	8.45	9.01	11.39*	14.02*
	120	5.61	5.97	6.41	6.86	7.32	7.80	8.52	9.13	9.75	12.42*	15.39*
	140	5.93	6.33	6.79	7.29	7.79	8.31	9.10	9.77	10.45	13.41*	16.70*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 22.0 Ft (RADIUS = 15.6 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, Ft

(Ft*s)^{1/2}

°F

4

8

12

16

20

24

30

35

40

60

80

0

10

20

40

60

80

100

120

140

1.37

1.58

1.80

2.03

2.26

2.50

2.85

3.15

3.45

4.67*

5.92*

6.47*

12.30*

15.81*

19.04*

22.06*

24.94*

27.70*

25

10

20

40

60

80

100

120

140

1.79

1.93

2.11

2.31

2.52

2.73

3.06

3.34

3.63

4.82*

6.06*

8.42*

12.40*

15.90*

19.12*

22.14*

25.01*

27.77*

50

10

20

40

60

80

100

120

140

2.00

2.14

2.32

2.52

2.72

2.93

3.25

3.52

3.80

4.96*

6.20*

8.53*

12.50*

15.99*

19.20*

22.22*

25.09*

27.84*

100

10

20

40

60

80

100

120

140

2.29

2.43

2.62

2.82

3.02

3.23

3.55

3.82

4.10

5.24*

6.46*

8.76*

12.69*

16.17*

19.37*

22.37*

25.24*

27.98*

150

10

20

40

60

80

100

120

140

2.50

2.64

2.84

3.04

3.26

3.47

3.80

4.07

4.34

5.49*

6.71*

8.99*

12.89*

16.34*

19.53*

22.53*

25.38*

28.13*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 22.0 Ft (RADIUS = 15.6 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
200 (Ft*s) ^{1/2}	°F											
	10	2.66	2.82	3.02	3.23	3.45	3.67	4.00	4.28	4.56	5.71*	6.95*
	20	3.23	3.44	3.71	3.99	4.27	4.57	5.02	5.40	5.78	7.43*	9.21*
	40	4.01	4.33	4.70	5.10	5.52	5.94	6.61	7.19	7.78	10.32*	13.08*
	60	4.61	5.02	5.50	6.01	6.55	7.11	7.99	8.75	9.53	12.89*	16.52*
	80	5.11	5.62	6.20	6.83	7.49	8.18	9.26	10.20	11.16	15.28*	19.69*
	100	5.56	6.16	6.85	7.59	8.37	9.18	10.46	11.56	12.70	17.52*	22.68*
300	120	5.98	6.67	7.46	8.31	9.21	10.15	11.61	12.87	14.17	19.66*	25.53*
	140	6.36	7.15	8.05	9.01	10.02	11.07	12.72	14.13	15.59	21.72*	28.27*
	10	2.94	3.10	3.31	3.53	3.76	3.99	4.33	4.62	4.91	6.10*	7.36*
	20	3.58	3.80	4.07	4.36	4.66	4.96	5.42	5.81	6.20	7.85*	9.64*
	40	4.46	4.78	5.16	5.56	5.98	6.41	7.07	7.64	8.22	10.72*	13.46*
	60	5.12	5.53	6.01	6.52	7.05	7.60	8.46	9.20	9.96	13.26*	16.87*
	80	5.67	6.17	6.75	7.36	8.01	8.68	9.72	10.63	11.57	15.62*	20.02*
400	100	6.16	6.75	7.42	8.13	8.89	9.68	10.91	11.99	13.10	17.85*	22.99*
	120	6.61	7.28	8.04	8.86	9.73	10.63	12.05	13.28	14.55	19.98*	25.83*
	140	7.02	7.78	8.64	9.56	10.53	11.55	13.14	14.53	15.95	22.03*	28.56*
	10	3.16	3.32	3.54	3.78	4.01	4.25	4.61	4.91	5.20	6.42*	7.72*
	20	3.86	4.09	4.37	4.68	4.98	5.29	5.76	6.16	6.55	8.22*	10.03*
	40	4.82	5.14	5.54	5.95	6.37	6.81	7.47	8.04	8.62	11.10*	13.84*
	60	5.54	5.95	6.43	6.95	7.49	8.03	8.89	9.62	10.37	13.63*	17.21*
600	80	6.13	6.63	7.21	7.82	8.46	9.12	10.16	11.05	11.97	15.97*	20.34*
	100	6.66	7.24	7.90	8.62	9.36	10.13	11.34	12.39	13.48	18.18*	23.30*
	120	7.13	7.79	8.55	9.36	10.20	11.09	12.47	13.68	14.93	20.30*	26.12*
	140	7.57	8.31	9.16	10.06	11.01	12.00	13.56	14.91	16.32	22.33*	28.84*
	10	3.51	3.69	3.92	4.17	4.43	4.68	5.06	5.37	5.69	6.97*	8.33*
	20	4.32	4.56	4.86	5.18	5.51	5.84	6.33	6.74	7.15	8.87*	10.72*
	40	5.41	5.74	6.15	6.59	7.03	7.48	8.16	8.74	9.32	11.81*	14.55*
800	60	6.21	6.64	7.14	7.67	8.22	8.77	9.63	10.36	11.11	14.33*	17.89*
	80	6.88	7.38	7.98	8.60	9.25	9.91	10.93	11.81	12.72	16.64*	20.99*
	100	7.47	8.05	8.72	9.44	10.18	10.94	12.13	13.16	14.22	18.83*	23.91*
	120	7.99	8.65	9.40	10.21	11.05	11.91	13.27	14.44	15.65	20.92*	26.71*
	140	8.48	9.21	10.04	10.93	11.87	12.83	14.35	15.66	17.03	22.94*	29.41*
	10	3.79	3.99	4.23	4.50	4.76	5.03	5.43	5.76	6.08	7.42*	8.84*
	20	4.69	4.94	5.26	5.60	5.94	6.28	6.79	7.22	7.64	9.42*	11.33*
	40	5.88	6.23	6.66	7.11	7.57	8.03	8.73	9.32	9.92	12.44*	15.21*
	60	6.76	7.20	7.72	8.27	8.83	9.40	10.27	11.01	11.76	14.98*	18.54*
	80	7.49	8.00	8.61	9.25	9.91	10.58	11.61	12.49	13.39	17.29*	21.61*
	100	8.12	8.71	9.40	10.13	10.88	11.65	12.84	13.86	14.90	19.46*	24.52*
	120	8.69	9.36	10.12	10.93	11.78	12.64	13.98	15.14	16.33	21.53*	27.29*
	140	9.21	9.95	10.79	11.69	12.62	13.58	15.07	16.37	17.71	23.53*	29.97*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 22.0 Ft (RADIUS = 15.6 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft												
		(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60	80
0	10													
	20													
	40													
	60													
	80													
	100													
	120													
	140													
25	10													
	20													
	40													
	60													
	80													
	100													
	120													
	140													
50	10													
	20													
	40													
	60													
	80													
	100													
	120													
	140													
100	10													
	20													
	40													
	60													
	80													
	100													
	120													
	140													
150	10													
	20													
	40													
	60													
	80													
	100													
	120													
	140													

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 22.0 Ft (RADIUS = 15.6 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	(Ft*s) ^{1/2}	CEILING HEIGHT, Ft									
			°F	4	8	12	16	20	24	30	35	40
200	10	3.96	4.22	4.54	4.88	5.24	5.60	6.15	6.62	7.09	7.58	8.01
	20	4.89	5.27	5.72	6.21	6.71	7.24	8.04	8.74	9.46	9.99	10.46
	40	6.20	6.80	7.51	8.27	9.06	9.89	11.19	12.32	13.48	13.98	14.45
	60	7.23	8.06	9.01	10.03	11.11	12.23	13.99	15.51	17.06	17.52	17.96
	80	8.12	9.17	10.37	11.65	13.00	14.40	16.58	18.46	20.38	20.80	21.22
	100	8.92	10.21	11.65	13.19	14.80	16.46	19.03	21.24	23.50	23.90	24.30
	120	9.68	11.19	12.88	14.66	16.51	18.42	21.36	23.89	26.47	26.86	27.24
300	140	10.39	12.14	14.06	16.07	18.16	20.30	23.61	26.44	29.33	29.70	30.07
	10	4.38	4.64	4.98	5.33	5.70	6.07	6.63	7.11	7.58	7.99	8.34
	20	5.42	5.80	6.27	6.76	7.27	7.79	8.59	9.28	9.99	10.46	10.84
	40	6.87	7.46	8.16	8.90	9.68	10.48	11.75	12.84	13.98	14.45	14.82
	60	7.98	8.78	9.70	10.68	11.72	12.81	14.51	15.99	17.52	18.00	18.37
	80	8.93	9.93	11.08	12.31	13.60	14.95	17.07	18.91	20.80	21.22	21.59
	100	9.79	10.99	12.36	13.83	15.37	16.98	19.50	21.67	23.90	24.30	24.67
400	120	10.58	11.99	13.58	15.28	17.07	18.92	21.81	24.30	26.86	27.24	27.61
	140	11.31	12.94	14.74	16.68	18.70	20.79	24.04	26.84	29.70	30.07	30.44
	10	4.71	4.99	5.34	5.70	6.08	6.46	7.04	7.52	8.01	8.34	8.71
	20	5.85	6.24	6.72	7.22	7.74	8.26	9.07	9.76	10.46	10.84	11.21
	40	7.41	8.01	8.70	9.45	10.22	11.02	12.26	13.34	14.45	14.82	15.19
	60	8.60	9.39	10.30	11.27	12.29	13.35	15.02	16.46	17.96	18.37	18.74
	80	9.61	10.59	11.71	12.91	14.17	15.49	17.56	19.36	21.22	21.59	21.96
600	100	10.51	11.68	13.00	14.43	15.93	17.50	19.96	22.10	24.30	24.67	25.04
	120	11.34	12.69	14.23	15.87	17.61	19.42	22.26	24.71	27.24	27.61	27.98
	140	12.11	13.65	15.39	17.26	19.23	21.28	24.47	27.24	30.07	30.44	30.81
	10	5.26	5.55	5.92	6.31	6.71	7.11	7.71	8.21	8.71	9.04	9.41
	20	6.55	6.95	7.45	7.98	8.51	9.06	9.89	10.59	11.29	11.66	12.03
	40	8.30	8.91	9.62	10.37	11.15	11.95	13.18	14.25	15.33	15.70	16.07
	60	9.62	10.41	11.32	12.28	13.29	14.33	15.96	17.37	18.82	19.23	19.59
800	80	10.73	11.69	12.79	13.97	15.20	16.48	18.49	20.23	22.04	22.41	22.78
	100	11.71	12.85	14.14	15.52	16.97	18.48	20.87	22.94	25.09	25.46	25.83
	120	12.61	13.91	15.39	16.97	18.64	20.39	23.14	25.53	28.00	28.37	28.74
	140	13.43	14.91	16.57	18.36	20.25	22.22	25.33	28.02	30.80	31.17	31.54
	10	5.69	6.00	6.39	6.80	7.22	7.63	8.26	8.78	9.30	9.67	10.04
	20	7.11	7.54	8.05	8.60	9.16	9.72	10.57	11.28	12.01	12.38	12.75
	40	9.02	9.64	10.37	11.14	11.94	12.75	13.99	15.05	16.14	16.51	16.88

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 24.0 Ft (RADIUS = 17.0 Ft)
 FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE
 TIME INDEX
 (Ft*s)^{1/2}

CEILING HEIGHT, Ft

TEMPERATURE
 RISE

°F	4	8	12	16	20	24	30	35	40	60	80
0	0.68	0.75	0.82	0.91	0.99	1.08	1.21	1.32	1.43	1.87*	2.31*
10	0.77	0.86	0.97	1.07	1.19	1.30	1.47	1.61	1.75	2.33*	2.92*
20	0.91	1.05	1.20	1.35	1.51	1.66	1.90	2.09	2.29	3.10*	3.94*
40	1.04	1.22	1.41	1.60	1.79	1.98	2.27	2.52	2.77	3.79*	4.84*
60	1.16	1.38	1.60	1.82	2.05	2.28	2.62	2.91	3.21	4.41*	5.66*
80	1.26	1.52	1.78	2.04	2.29	2.55	2.95	3.28	3.62	5.00*	6.43*
100	1.37	1.66	1.95	2.24	2.53	2.82	3.26	3.63	4.01	5.55*	7.17*
120	1.47	1.79	2.11	2.43	2.75	3.07	3.55	3.96	4.38	6.09*	7.87*
140											
25	0.92	0.97	1.04	1.11	1.19	1.27	1.39	1.49	1.60	2.01*	2.44*
10	1.05	1.11	1.19	1.29	1.38	1.48	1.64	1.77	1.90	2.45*	3.03*
20	1.22	1.31	1.43	1.56	1.69	1.83	2.05	2.23	2.42	3.21*	4.04*
40	1.36	1.48	1.63	1.79	1.96	2.14	2.41	2.65	2.89	3.88*	4.92*
60	1.48	1.63	1.81	2.01	2.21	2.42	2.75	3.03	3.32	4.50*	5.74*
80	1.59	1.77	1.98	2.21	2.45	2.69	3.07	3.39	3.72	5.08*	6.51*
100	1.69	1.90	2.14	2.40	2.67	2.95	3.37	3.74	4.10	5.63*	7.24*
120	1.78	2.02	2.30	2.59	2.89	3.20	3.67	4.07	4.47	6.17*	7.94*
140											
50	1.02	1.07	1.14	1.22	1.30	1.38	1.51	1.61	1.71	2.13*	2.57*
10	1.18	1.24	1.32	1.42	1.52	1.62	1.77	1.90	2.03	2.57*	3.14*
20	1.38	1.47	1.59	1.71	1.84	1.98	2.19	2.36	2.55	3.31*	4.13*
40	1.54	1.65	1.80	1.95	2.11	2.28	2.54	2.77	3.00	3.97*	5.01*
60	1.68	1.81	1.98	2.17	2.36	2.56	2.88	3.15	3.42	4.59*	5.82*
80	1.80	1.96	2.15	2.37	2.59	2.83	3.19	3.50	3.82	5.16*	6.59*
100	1.91	2.09	2.32	2.56	2.81	3.08	3.49	3.84	4.20	5.71*	7.32*
120	2.01	2.22	2.47	2.74	3.03	3.32	3.78	4.17	4.57	6.24*	8.02*
140											
100	1.15	1.20	1.28	1.36	1.45	1.53	1.66	1.77	1.88	2.31*	2.76*
10	1.34	1.41	1.50	1.60	1.70	1.81	1.96	2.10	2.23	2.77*	3.35*
20	1.60	1.69	1.80	1.93	2.07	2.20	2.41	2.59	2.76	3.51*	4.32*
40	1.79	1.90	2.04	2.20	2.36	2.52	2.78	2.99	3.22	4.16*	5.19*
60	1.95	2.08	2.25	2.42	2.61	2.81	3.11	3.37	3.63	4.76*	5.99*
80	2.09	2.24	2.43	2.63	2.85	3.07	3.42	3.72	4.02	5.33*	6.74*
100	2.21	2.39	2.60	2.83	3.07	3.32	3.71	4.05	4.40	5.87*	7.46*
120	2.33	2.53	2.76	3.01	3.28	3.56	3.99	4.37	4.76	6.40*	8.16*
140											
150	1.25	1.30	1.38	1.47	1.56	1.65	1.78	1.89	2.01	2.45*	2.91*
10	1.46	1.53	1.63	1.73	1.84	1.95	2.11	2.25	2.38	2.93*	3.53*
20	1.75	1.84	1.97	2.10	2.24	2.37	2.59	2.76	2.94	3.69*	4.50*
40	1.97	2.08	2.23	2.38	2.55	2.71	2.97	3.19	3.41	4.33*	5.36*
60	2.14	2.28	2.45	2.63	2.82	3.01	3.31	3.56	3.82	4.93*	6.15*
80	2.30	2.45	2.64	2.85	3.06	3.28	3.62	3.91	4.21	5.49*	6.90*
100	2.44	2.61	2.82	3.05	3.29	3.53	3.92	4.24	4.58	6.03*	7.61*
120	2.57	2.76	2.99	3.24	3.50	3.77	4.20	4.56	4.94	6.55*	8.30*
140											

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 24.0 Ft (RADIUS = 17.0 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, Ft

(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60	80
200	10	1.32	1.38	1.46	1.55	1.64	1.74	1.88	1.99	2.11	2.56*	3.04*
	20	1.56	1.63	1.73	1.84	1.95	2.06	2.23	2.37	2.51	3.07*	3.68*
	40	1.88	1.97	2.10	2.24	2.38	2.52	2.74	2.92	3.10	3.85*	4.67*
	60	2.11	2.23	2.38	2.54	2.71	2.88	3.13	3.35	3.57	4.50*	5.52*
	80	2.30	2.44	2.61	2.80	2.99	3.18	3.48	3.74	4.00	5.09*	6.30*
	100	2.47	2.63	2.82	3.03	3.24	3.46	3.80	4.09	4.39	5.65*	7.05*
	120	2.62	2.80	3.01	3.24	3.48	3.72	4.10	4.43	4.76	6.18*	7.76*
300	140	2.76	2.95	3.19	3.44	3.70	3.97	4.38	4.74	5.11	6.70*	8.44*
	10	1.45	1.50	1.59	1.69	1.78	1.88	2.03	2.15	2.27	2.75*	3.26*
	20	1.72	1.79	1.90	2.01	2.13	2.25	2.43	2.57	2.72	3.30*	3.94*
	40	2.08	2.18	2.31	2.46	2.61	2.76	2.98	3.17	3.36	4.12*	4.96*
	60	2.35	2.47	2.62	2.79	2.97	3.14	3.41	3.63	3.86	4.79*	5.82*
	80	2.56	2.71	2.88	3.08	3.27	3.47	3.78	4.04	4.30	5.39*	6.61*
	100	2.75	2.91	3.11	3.33	3.55	3.77	4.11	4.41	4.70	5.95*	7.34*
400	120	2.93	3.10	3.32	3.56	3.80	4.04	4.42	4.75	5.08	6.48*	8.04*
	140	3.08	3.27	3.51	3.77	4.03	4.30	4.72	5.07	5.44	6.99*	8.72*
	10	1.54	1.61	1.70	1.80	1.90	2.00	2.16	2.28	2.41	2.90*	3.43*
	20	1.85	1.92	2.04	2.15	2.28	2.40	2.59	2.74	2.89	3.50*	4.15*
	40	2.24	2.35	2.49	2.64	2.79	2.95	3.18	3.38	3.57	4.36*	5.22*
	60	2.54	2.66	2.83	3.00	3.18	3.36	3.64	3.87	4.10	5.05*	6.10*
	80	2.78	2.92	3.11	3.31	3.51	3.72	4.03	4.29	4.56	5.66*	6.88*
600	100	2.98	3.15	3.35	3.57	3.80	4.03	4.38	4.68	4.97	6.22*	7.62*
	120	3.17	3.35	3.58	3.82	4.06	4.32	4.70	5.03	5.36	6.75*	8.32*
	140	3.34	3.54	3.78	4.04	4.31	4.58	5.00	5.36	5.72	7.26*	8.99*
	10	1.70	1.77	1.87	1.97	2.08	2.19	2.36	2.49	2.63	3.15*	3.72*
	20	2.05	2.14	2.25	2.38	2.52	2.65	2.85	3.01	3.17	3.81*	4.51*
	40	2.51	2.62	2.77	2.93	3.10	3.26	3.51	3.72	3.92	4.75*	5.65*
	60	2.84	2.98	3.15	3.34	3.53	3.73	4.02	4.26	4.50	5.48*	6.57*
800	80	3.12	3.27	3.47	3.68	3.90	4.11	4.44	4.72	4.99	6.12*	7.38*
	100	3.35	3.53	3.75	3.98	4.22	4.46	4.82	5.13	5.44	6.70*	8.13*
	120	3.57	3.75	3.99	4.25	4.50	4.77	5.17	5.50	5.84	7.24*	8.83*
	140	3.76	3.96	4.22	4.49	4.77	5.06	5.49	5.85	6.22	7.76*	9.50*
	10	1.83	1.90	2.01	2.12	2.23	2.35	2.52	2.66	2.80	3.35*	3.95*
	20	2.22	2.31	2.43	2.57	2.71	2.85	3.06	3.23	3.40	4.07*	4.80*
	40	2.72	2.84	3.00	3.17	3.35	3.52	3.78	4.00	4.21	5.07*	6.02*
	60	3.09	3.23	3.42	3.62	3.82	4.02	4.33	4.58	4.83	5.85*	6.98*
	80	3.39	3.56	3.76	3.99	4.21	4.44	4.78	5.07	5.36	6.51*	7.81*
	100	3.65	3.83	4.06	4.31	4.56	4.81	5.19	5.50	5.82	7.12*	8.58*
	120	3.89	4.08	4.33	4.60	4.87	5.14	5.55	5.90	6.25	7.67*	9.29*
	140	4.10	4.31	4.58	4.86	5.15	5.45	5.89	6.27	6.64	8.20*	9.96*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 24.0 Ft (RADIUS = 17.0 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
0 (Ft*s) ^{1/2}	°F												
	10	0.99	1.10	1.23	1.36	1.50	1.64	1.85	2.03	2.21	2.92*	3.65*	
	20	1.16	1.33	1.51	1.70	1.89	2.08	2.36	2.61	2.85	3.85*	4.87*	
	40	1.45	1.71	1.98	2.26	2.53	2.81	3.23	3.58	3.94	5.40*	6.92*	
	60	1.70	2.05	2.40	2.75	3.10	3.45	3.98	4.43	4.89	6.76*	8.71*	
	80	1.93	2.36	2.78	3.20	3.62	4.04	4.68	5.21	5.76	8.01*	10.36*	
	100	2.15	2.65	3.14	3.62	4.10	4.59	5.33	5.95	6.58	9.18*	11.90*	
	120	2.36	2.93	3.48	4.02	4.57	5.11	5.95	6.65	7.36	10.30*	13.37*	
	140	2.56	3.19	3.80	4.41	5.01	5.62	6.54	7.32	8.11	11.37*	14.78*	
	25	10	1.32	1.39	1.50	1.62	1.74	1.86	2.06	2.22	2.39	3.07*	3.79*
20		1.53	1.64	1.78	1.94	2.11	2.28	2.54	2.77	3.01	3.97*	4.99*	
40		1.83	2.01	2.23	2.47	2.72	2.98	3.38	3.72	4.07	5.51*	7.01*	
60		2.08	2.33	2.63	2.94	3.27	3.61	4.12	4.56	5.01	6.86*	8.80*	
80		2.30	2.63	2.99	3.38	3.78	4.18	4.80	5.33	5.87	8.10*	10.44*	
100		2.51	2.91	3.34	3.79	4.26	4.73	5.45	6.06	6.69	9.27*	11.98*	
120		2.71	3.17	3.67	4.19	4.71	5.25	6.06	6.76	7.46	10.38*	13.45*	
140		2.90	3.43	3.99	4.57	5.15	5.75	6.65	7.42	8.20	11.45*	14.85*	
50		10	1.47	1.55	1.65	1.77	1.90	2.02	2.21	2.38	2.54	3.21*	3.92*
		20	1.72	1.82	1.97	2.12	2.28	2.45	2.71	2.93	3.15	4.09*	5.10*
	40	2.07	2.23	2.44	2.66	2.90	3.15	3.53	3.86	4.20	5.61*	7.11*	
	60	2.34	2.56	2.84	3.13	3.44	3.76	4.26	4.69	5.12	6.95*	8.89*	
	80	2.58	2.86	3.20	3.56	3.94	4.33	4.93	5.45	5.98	8.19*	10.52*	
	100	2.80	3.14	3.54	3.96	4.41	4.87	5.57	6.17	6.79	9.35*	12.06*	
	120	3.00	3.40	3.86	4.35	4.86	5.38	6.18	6.86	7.56	10.46*	13.52*	
	140	3.19	3.66	4.18	4.73	5.29	5.87	6.76	7.52	8.30	11.52*	14.93*	
	100	10	1.67	1.75	1.86	1.99	2.12	2.25	2.45	2.61	2.78	3.45*	4.17*
		20	1.97	2.08	2.23	2.38	2.55	2.72	2.97	3.19	3.41	4.33*	5.33*
40		2.39	2.55	2.75	2.97	3.20	3.44	3.80	4.12	4.44	5.82*	7.30*	
60		2.70	2.91	3.17	3.45	3.74	4.05	4.52	4.93	5.35	7.14*	9.06*	
80		2.97	3.23	3.55	3.88	4.24	4.61	5.18	5.68	6.20	8.36*	10.69*	
100		3.21	3.52	3.89	4.28	4.70	5.13	5.81	6.40	6.99	9.52*	12.21*	
120		3.43	3.79	4.21	4.67	5.14	5.64	6.41	7.07	7.76	10.62*	13.67*	
140		3.64	4.05	4.52	5.03	5.57	6.12	6.99	7.73	8.49	11.68*	15.07*	
150		10	1.81	1.90	2.01	2.14	2.28	2.41	2.62	2.79	2.96	3.64*	4.38*
		20	2.16	2.27	2.42	2.58	2.75	2.92	3.18	3.40	3.63	4.54*	5.54*
	40	2.62	2.78	2.99	3.21	3.44	3.68	4.04	4.35	4.67	6.02*	7.50*	
	60	2.97	3.18	3.44	3.71	4.00	4.30	4.76	5.16	5.58	7.32*	9.24*	
	80	3.27	3.52	3.83	4.16	4.50	4.86	5.42	5.91	6.41	8.54*	10.85*	
	100	3.53	3.83	4.18	4.57	4.97	5.39	6.04	6.61	7.20	9.68*	12.37*	
	120	3.77	4.11	4.52	4.95	5.41	5.89	6.64	7.28	7.95	10.78*	13.82*	
	140	3.99	4.38	4.83	5.32	5.83	6.37	7.21	7.93	8.68	11.83*	15.21*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 24.0 Ft (RADIUS = 17.0 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
(Ft*s) ^{1/2} 200	°F											
	10	1.93	2.01	2.14	2.27	2.41	2.55	2.76	2.94	3.11	3.81*	4.56*
	20	2.30	2.42	2.58	2.74	2.92	3.09	3.36	3.58	3.81	4.73*	5.74*
	40	2.81	2.98	3.19	3.41	3.65	3.89	4.25	4.56	4.88	6.21*	7.68*
	60	3.19	3.40	3.66	3.94	4.23	4.53	4.99	5.38	5.78	7.51*	9.41*
	80	3.51	3.76	4.07	4.40	4.74	5.10	5.65	6.12	6.61	8.71*	11.01*
	100	3.79	4.09	4.44	4.82	5.21	5.62	6.27	6.82	7.40	9.85*	12.52*
300	120	4.05	4.38	4.78	5.21	5.65	6.12	6.85	7.49	8.14	10.93*	13.97*
	140	4.28	4.66	5.10	5.58	6.08	6.60	7.42	8.13	8.86	11.98*	15.35*
	10	2.12	2.21	2.34	2.48	2.63	2.77	2.99	3.18	3.36	4.08*	4.87*
	20	2.55	2.67	2.83	3.01	3.19	3.38	3.65	3.88	4.12	5.06*	6.09*
	40	3.12	3.29	3.51	3.75	3.99	4.23	4.60	4.92	5.24	6.56*	8.04*
	60	3.55	3.76	4.03	4.31	4.61	4.91	5.37	5.76	6.16	7.86*	9.75*
	80	3.91	4.16	4.47	4.80	5.15	5.50	6.05	6.52	7.00	9.05*	11.33*
400	100	4.22	4.51	4.87	5.24	5.64	6.04	6.67	7.22	7.78	10.17*	12.83*
	120	4.50	4.83	5.23	5.65	6.09	6.55	7.26	7.88	8.52	11.25*	14.26*
	140	4.76	5.13	5.56	6.03	6.52	7.03	7.83	8.52	9.23	12.28*	15.64*
	10	2.27	2.36	2.50	2.65	2.80	2.96	3.19	3.38	3.56	4.31*	5.12*
	20	2.74	2.87	3.04	3.23	3.41	3.61	3.89	4.13	4.37	5.33*	6.39*
	40	3.37	3.55	3.78	4.02	4.27	4.52	4.90	5.22	5.55	6.88*	8.37*
	60	3.84	4.06	4.33	4.63	4.93	5.23	5.70	6.10	6.50	8.18*	10.08*
600	80	4.23	4.49	4.80	5.14	5.49	5.85	6.40	6.87	7.35	9.37*	11.65*
	100	4.57	4.86	5.22	5.60	6.00	6.41	7.04	7.58	8.13	10.49*	13.13*
	120	4.87	5.20	5.60	6.03	6.47	6.93	7.63	8.24	8.87	11.55*	14.55*
	140	5.15	5.52	5.96	6.42	6.91	7.42	8.20	8.88	9.58	12.58*	15.92*
	10	2.51	2.61	2.76	2.92	3.08	3.25	3.49	3.70	3.90	4.69*	5.55*
	20	3.06	3.19	3.38	3.57	3.78	3.98	4.29	4.54	4.79	5.80*	6.91*
	40	3.78	3.97	4.21	4.46	4.73	4.99	5.39	5.73	6.06	7.43*	8.96*
800	60	4.31	4.54	4.83	5.14	5.45	5.77	6.25	6.66	7.07	8.77*	10.68*
	80	4.75	5.02	5.35	5.70	6.06	6.43	6.99	7.47	7.95	9.97*	12.25*
	100	5.13	5.44	5.81	6.20	6.61	7.03	7.66	8.20	8.76	11.08*	13.72*
	120	5.47	5.81	6.22	6.66	7.11	7.57	8.28	8.89	9.51	12.14*	15.12*
	140	5.78	6.16	6.61	7.08	7.58	8.08	8.86	9.53	10.22	13.16*	16.47*
	10	2.71	2.82	2.97	3.14	3.31	3.49	3.74	3.96	4.17	4.99*	5.90*
	20	3.31	3.45	3.65	3.86	4.07	4.29	4.61	4.87	5.13	6.18*	7.34*
	40	4.11	4.30	4.56	4.83	5.10	5.38	5.80	6.15	6.49	7.90*	9.48*
	60	4.69	4.93	5.23	5.55	5.88	6.21	6.71	7.13	7.55	9.28*	11.23*
	80	5.17	5.45	5.80	6.16	6.54	6.92	7.49	7.98	8.47	10.50*	12.81*
	100	5.59	5.90	6.29	6.70	7.12	7.54	8.19	8.74	9.30	11.63*	14.27*
	120	5.96	6.31	6.73	7.18	7.64	8.12	8.84	9.45	10.07	12.69*	15.67*
	140	6.30	6.68	7.14	7.63	8.13	8.65	9.44	10.11	10.80	13.71*	17.01*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 24.0 Ft (RADIUS = 17.0 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
0	10	1.47	1.68	1.90	2.13	2.37	2.60	2.96	3.25	3.56	4.78*	6.03*
	20	1.82	2.14	2.47	2.80	3.13	3.47	3.98	4.41	4.85	6.63*	8.47*
	40	2.39	2.91	3.41	3.92	4.42	4.93	5.70	6.36	7.02	9.73*	12.56*
	60	2.90	3.58	4.24	4.90	5.55	6.21	7.21	8.06	8.92	12.45*	16.15*
	80	3.36	4.20	5.00	5.80	6.59	7.39	8.60	9.63	10.66	14.95*	19.44*
	100	3.80	4.79	5.72	6.64	7.57	8.49	9.90	11.10	12.30	17.30*	22.53*
	120	4.21	5.34	6.40	7.45	8.49	9.54	11.14	12.49	13.86	19.53*	25.47*
	140	4.61	5.87	7.05	8.22	9.38	10.55	12.33	13.83	15.36	21.67*	28.29*
25	10	1.91	2.05	2.22	2.42	2.63	2.84	3.17	3.45	3.74	4.93*	6.17*
	20	2.27	2.49	2.76	3.05	3.36	3.68	4.16	4.58	5.00	6.75*	8.58*
	40	2.83	3.22	3.67	4.13	4.61	5.11	5.86	6.50	7.15	9.84*	12.66*
	60	3.32	3.87	4.47	5.09	5.73	6.37	7.35	8.19	9.04	12.55*	16.23*
	80	3.76	4.47	5.22	5.98	6.75	7.54	8.73	9.74	10.77	15.04*	19.52*
	100	4.17	5.04	5.93	6.82	7.72	8.63	10.03	11.21	12.41	17.38*	22.61*
	120	4.57	5.59	6.60	7.61	8.64	9.68	11.26	12.60	13.96	19.61*	25.55*
	140	4.96	6.11	7.24	8.38	9.52	10.68	12.44	13.94	15.45	21.74*	28.37*
50	10	2.14	2.27	2.44	2.64	2.84	3.05	3.36	3.64	3.91	5.07*	6.31*
	20	2.55	2.75	3.01	3.28	3.57	3.87	4.34	4.74	5.15	6.88*	8.70*
	40	3.16	3.50	3.91	4.35	4.80	5.28	6.01	6.64	7.28	9.94*	12.76*
	60	3.66	4.15	4.70	5.29	5.90	6.53	7.49	8.32	9.15	12.64*	16.32*
	80	4.11	4.74	5.43	6.16	6.92	7.68	8.86	9.86	10.88	15.13*	19.61*
	100	4.52	5.29	6.13	6.99	7.87	8.77	10.15	11.32	12.51	17.47*	22.69*
	120	4.91	5.83	6.79	7.78	8.79	9.81	11.38	12.71	14.06	19.69*	25.62*
	140	5.29	6.34	7.43	8.54	9.66	10.81	12.56	14.04	15.55	21.82*	28.44*
100	10	2.44	2.57	2.75	2.95	3.15	3.36	3.68	3.95	4.22	5.35*	6.58*
	20	2.93	3.13	3.38	3.65	3.93	4.22	4.67	5.05	5.45	7.12*	8.93*
	40	3.63	3.94	4.32	4.73	5.16	5.61	6.31	6.91	7.53	10.15*	12.95*
	60	4.18	4.61	5.12	5.66	6.24	6.83	7.77	8.57	9.39	12.83*	16.50*
	80	4.66	5.21	5.84	6.52	7.23	7.97	9.12	10.10	11.10	15.31*	19.77*
	100	5.09	5.76	6.52	7.33	8.18	9.05	10.39	11.54	12.72	17.63*	22.85*
	120	5.49	6.29	7.17	8.11	9.08	10.07	11.61	12.92	14.26	19.85*	25.77*
	140	5.88	6.79	7.80	8.86	9.95	11.06	12.78	14.25	15.74	21.98*	28.58*
150	10	2.66	2.80	2.98	3.19	3.39	3.61	3.93	4.20	4.48	5.60*	6.83*
	20	3.21	3.41	3.66	3.93	4.22	4.51	4.95	5.33	5.72	7.36*	9.16*
	40	3.98	4.29	4.66	5.06	5.48	5.91	6.59	7.18	7.79	10.36*	13.14*
	60	4.58	4.99	5.48	6.00	6.55	7.13	8.03	8.82	9.62	13.02*	16.68*
	80	5.09	5.60	6.21	6.86	7.54	8.26	9.37	10.33	11.32	15.48*	19.94*
	100	5.54	6.17	6.89	7.66	8.47	9.32	10.63	11.77	12.93	17.80*	23.00*
	120	5.97	6.70	7.53	8.43	9.36	10.33	11.84	13.13	14.46	20.01*	25.92*
	140	6.36	7.21	8.15	9.17	10.22	11.31	13.00	14.45	15.93	22.13*	28.72*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 24.0 Ft (RADIUS = 17.0 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, Ft

(Ft*s)^{1/2}

°F	4	8	12	16	20	24	30	35	40	60	80
200	2.84	2.98	3.17	3.38	3.59	3.81	4.14	4.42	4.69	5.83*	7.06*
	3.44	3.64	3.90	4.17	4.46	4.75	5.20	5.58	5.97	7.59*	9.38*
	4.27	4.58	4.95	5.34	5.76	6.19	6.86	7.44	8.03	10.56*	13.34*
	4.91	5.31	5.79	6.31	6.85	7.41	8.29	9.06	9.85	13.21*	16.85*
	5.45	5.95	6.54	7.17	7.83	8.53	9.62	10.56	11.54	15.66*	20.10*
	5.93	6.53	7.22	7.97	8.76	9.58	10.87	11.99	13.13	17.97*	23.16*
	6.37	7.07	7.87	8.73	9.64	10.59	12.07	13.35	14.66	20.17*	26.07*
	6.78	7.58	8.49	9.47	10.50	11.56	13.22	14.66	16.12	22.28*	28.87*
300	3.12	3.27	3.47	3.69	3.92	4.15	4.49	4.77	5.06	6.22*	7.48*
	3.81	4.02	4.28	4.57	4.86	5.16	5.62	6.00	6.39	8.01*	9.80*
	4.74	5.05	5.42	5.83	6.24	6.67	7.34	7.90	8.49	10.96*	13.72*
	5.45	5.84	6.32	6.83	7.37	7.92	8.78	9.53	10.29	13.58*	17.20*
	6.04	6.53	7.10	7.72	8.37	9.04	10.10	11.01	11.96	16.01*	20.43*
	6.56	7.14	7.81	8.54	9.30	10.09	11.34	12.42	13.54	18.30*	23.47*
	7.04	7.70	8.48	9.30	10.18	11.09	12.52	13.76	15.05	20.49*	26.37*
	7.48	8.24	9.10	10.04	11.02	12.05	13.66	15.06	16.50	22.59*	29.15*
400	3.36	3.51	3.72	3.95	4.18	4.42	4.77	5.07	5.36	6.55*	7.85*
	4.11	4.32	4.60	4.89	5.20	5.51	5.97	6.37	6.76	8.39*	10.20*
	5.13	5.44	5.82	6.23	6.65	7.09	7.75	8.32	8.90	11.35*	14.09*
	5.89	6.29	6.77	7.28	7.82	8.37	9.22	9.96	10.71	13.94*	17.55*
	6.52	7.01	7.58	8.20	8.84	9.51	10.54	11.44	12.37	16.35*	20.75*
	7.08	7.65	8.32	9.03	9.78	10.56	11.78	12.84	13.94	18.63*	23.77*
	7.59	8.24	9.00	9.82	10.67	11.56	12.96	14.17	15.43	20.80*	26.66*
	8.06	8.80	9.64	10.56	11.52	12.52	14.09	15.46	16.87	22.89*	29.44*
600	3.73	3.90	4.12	4.36	4.61	4.86	5.24	5.55	5.86	7.10*	8.46*
	4.59	4.82	5.11	5.42	5.74	6.07	6.56	6.97	7.38	9.04*	10.90*
	5.75	6.07	6.47	6.89	7.33	7.78	8.46	9.04	9.62	12.06*	14.81*
	6.60	7.01	7.51	8.03	8.58	9.13	9.99	10.72	11.47	14.65*	18.23*
	7.31	7.80	8.39	9.01	9.66	10.32	11.35	12.23	13.14	17.03*	21.39*
	7.94	8.50	9.17	9.89	10.63	11.40	12.60	13.63	14.70	19.27*	24.39*
	8.50	9.14	9.90	10.70	11.54	12.42	13.78	14.96	16.18	21.43*	27.25*
	9.01	9.73	10.57	11.47	12.40	13.38	14.90	16.23	17.60	23.50*	30.00*
800	4.03	4.21	4.45	4.70	4.96	5.23	5.62	5.95	6.27	7.56*	8.98*
	4.98	5.22	5.53	5.85	6.19	6.53	7.04	7.46	7.89	9.60*	11.51*
	6.25	6.58	7.00	7.44	7.90	8.36	9.05	9.64	10.24	12.70*	15.47*
	7.18	7.60	8.11	8.65	9.21	9.78	10.65	11.39	12.14	15.30*	18.88*
	7.96	8.46	9.05	9.69	10.34	11.02	12.05	12.93	13.83	17.67*	22.02*
	8.63	9.21	9.89	10.61	11.36	12.13	13.32	14.35	15.40	19.91*	24.99*
	9.24	9.89	10.65	11.46	12.30	13.17	14.52	15.68	16.88	22.04*	27.83*
	9.79	10.51	11.36	12.25	13.18	14.15	15.65	16.96	18.30	24.09*	30.57*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 24.0 Ft (RADIUS = 17.0 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft												
		(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60	80
0	10	2.29	2.67	3.07	3.48	3.89	4.30	4.72	5.14	5.55	5.98	8.15*	10.39*	
	20	2.97	3.59	4.20	4.81	5.42	6.04	6.66	7.27	7.89	8.50	11.84*	15.26*	
	40	4.12	5.13	6.09	7.04	8.00	8.96	9.92	10.88	11.84	12.80	18.05*	23.44*	
	60	5.14	6.48	7.75	9.01	10.26	11.52	12.78	14.04	15.30	16.56	23.49*	30.61*	
	80	6.06	7.72	9.28	10.81	12.34	13.88	15.41	16.94	18.47	19.99	28.49*	37.20*	
	100	6.94	8.89	10.71	12.50	14.29	16.09	17.88	19.67	21.46	23.25	33.18*	43.39*	
	120	7.76	9.99	12.07	14.11	16.14	18.19	20.22	22.25	24.28	26.31	37.65*	49.27*	
	140	8.56	11.06	13.37	15.65	17.92	20.20	22.47	24.74	27.01	29.28	41.92*	54.91*	
25	10	2.83	3.09	3.42	3.78	4.16	4.54	4.92	5.30	5.68	6.06	8.30*	10.53*	
	20	3.50	3.97	4.50	5.07	5.65	6.24	6.82	7.41	7.99	8.58	11.97*	15.37*	
	40	4.59	5.45	6.35	7.26	8.19	9.14	10.09	11.04	11.99	12.94	18.16*	23.54*	
	60	5.57	6.77	7.99	9.21	10.44	11.68	12.91	14.15	15.38	16.61	23.59*	30.70*	
	80	6.47	7.99	9.49	10.99	12.50	14.02	15.53	17.04	18.55	20.06	28.58*	37.29*	
	100	7.32	9.14	10.91	12.67	14.44	16.23	18.02	19.81	21.60	23.39	33.27*	43.47*	
	120	8.13	10.24	12.27	14.27	16.29	18.32	20.34	22.37	24.39	26.42	37.73*	49.34*	
	140	8.91	11.29	13.56	15.81	18.06	20.33	22.59	24.85	27.11	29.37	42.00*	54.98*	
50	10	3.16	3.41	3.72	4.05	4.41	4.78	5.15	5.52	5.89	6.26	8.45*	10.67*	
	20	3.89	4.30	4.79	5.32	5.87	6.45	7.03	7.61	8.19	8.77	12.09*	15.49*	
	40	5.01	5.76	6.60	7.48	8.39	9.31	10.23	11.15	12.07	12.99	18.26*	23.64*	
	60	5.97	7.06	8.22	9.40	10.61	11.84	13.07	14.30	15.53	16.76	23.68*	30.79*	
	80	6.85	8.26	9.71	11.18	12.66	14.17	15.67	17.18	18.68	20.19	28.67*	37.37*	
	100	7.69	9.40	11.12	12.85	14.60	16.37	18.14	19.91	21.68	23.45	33.35*	43.54*	
	120	8.49	10.49	12.46	14.44	16.44	18.45	20.46	22.47	24.48	26.49	37.81*	49.42*	
	140	9.26	11.53	13.75	15.97	18.20	20.46	22.71	24.97	27.23	29.49	42.08*	55.05*	
100	10	3.62	3.85	4.16	4.49	4.83	5.19	5.54	5.89	6.24	6.59	8.74*	10.94*	
	20	4.45	4.82	5.28	5.78	6.30	6.84	7.37	7.91	8.44	8.97	12.34*	15.72*	
	40	5.66	6.32	7.09	7.91	8.76	9.65	10.54	11.43	12.32	13.21	18.47*	23.83*	
	60	6.66	7.61	8.67	9.79	10.96	12.15	13.34	14.53	15.72	16.91	23.87*	30.97*	
	80	7.55	8.79	10.14	11.54	12.99	14.46	15.93	17.40	18.87	20.34	28.85*	37.53*	
	100	8.38	9.90	11.52	13.19	14.90	16.64	18.38	20.12	21.86	23.60	33.52*	43.70*	
	120	9.17	10.97	12.85	14.77	16.73	18.72	20.71	22.70	24.69	26.68	37.97*	49.57*	
	140	9.92	12.00	14.13	16.29	18.49	20.71	22.93	25.15	27.37	29.59	42.23*	55.20*	
150	10	3.95	4.19	4.49	4.83	5.17	5.53	5.88	6.24	6.59	6.94	9.02*	11.21*	
	20	4.86	5.23	5.68	6.17	6.68	7.21	7.74	8.27	8.80	9.33	12.59*	15.95*	
	40	6.18	6.80	7.52	8.30	9.13	9.99	10.85	11.71	12.57	13.43	18.68*	24.03*	
	60	7.22	8.10	9.10	10.17	11.30	12.46	13.62	14.78	15.94	17.10	24.06*	31.15*	
	80	8.14	9.28	10.55	11.90	13.31	14.75	16.19	17.63	19.07	20.51	29.02*	37.70*	
	100	8.99	10.39	11.92	13.54	15.21	16.92	18.63	20.34	22.05	23.76	33.69*	43.86*	
	120	9.78	11.44	13.23	15.10	17.02	18.98	20.94	22.90	24.86	26.82	38.13*	49.72*	
	140	10.54	12.46	14.50	16.61	18.77	20.97	23.17	25.37	27.57	29.77	42.39*	55.34*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 24.0 Ft (RADIUS = 17.0 Ft)³
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX		TEMPERATURE RISE	CEILING HEIGHT, Ft												
(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60	80			
200	10	4.22	4.46	4.77	5.11	5.46	5.82	6.37	6.84	7.31	9.29*	11.48*			
	20	5.21	5.57	6.02	6.51	7.01	7.53	8.35	9.05	9.77	12.83*	16.18*			
	40	6.60	7.20	7.91	8.67	9.48	10.32	11.63	12.77	13.94	18.89*	24.22*			
	60	7.70	8.54	9.50	10.54	11.63	12.77	14.54	16.07	17.64	24.25*	31.32*			
	80	8.65	9.73	10.95	12.25	13.62	15.04	17.25	19.14	21.08	29.20*	37.86*			
	100	9.52	10.84	12.31	13.88	15.51	17.19	19.80	22.03	24.31	33.86*	44.01*			
	120	10.33	11.89	13.61	15.43	17.31	19.25	22.23	24.78	27.39	38.29*	49.87*			
300	140	11.09	12.90	14.87	16.92	19.05	21.22	24.57	27.43	30.35	42.54*	55.48*			
	10	4.66	4.91	5.23	5.58	5.94	6.31	6.87	7.34	7.82	9.80*	11.98*			
	20	5.77	6.13	6.59	7.08	7.59	8.11	8.91	9.60	10.31	13.31*	16.64*			
	40	7.31	7.89	8.59	9.33	10.11	10.93	12.20	13.30	14.44	19.30*	24.61*			
	60	8.49	9.29	10.22	11.21	12.26	13.36	15.08	16.57	18.11	24.63*	31.68*			
	80	9.51	10.52	11.68	12.93	14.24	15.61	17.75	19.60	21.51	29.55*	38.19*			
	100	10.43	11.65	13.04	14.53	16.10	17.73	20.28	22.47	24.72	34.19*	44.32*			
400	120	11.27	12.72	14.34	16.07	17.88	19.77	22.69	25.21	27.78	38.61*	50.16*			
	140	12.07	13.73	15.58	17.54	19.60	21.73	25.02	27.84	30.73	42.85*	55.77*			
	10	5.01	5.27	5.61	5.97	6.34	6.72	7.29	7.77	8.26	10.25*	12.45*			
	20	6.22	6.60	7.06	7.56	8.07	8.60	9.41	10.10	10.80	13.77*	17.08*			
	40	7.88	8.47	9.16	9.90	10.68	11.48	12.73	13.81	14.93	19.71*	25.00*			
	60	9.15	9.93	10.85	11.82	12.85	13.92	15.60	17.06	18.57	25.01*	32.03*			
	80	10.23	11.21	12.34	13.55	14.82	16.16	18.25	20.07	21.94	29.90*	38.52*			
600	100	11.19	12.37	13.71	15.16	16.68	18.27	20.75	22.91	25.13	34.52*	44.64*			
	120	12.08	13.45	15.01	16.68	18.44	20.28	23.15	25.63	28.18	38.93*	50.46*			
	140	12.90	14.48	16.25	18.15	20.15	22.22	25.46	28.25	31.11	43.16*	56.06*			
	10	5.59	5.86	6.22	6.60	6.99	7.39	7.99	8.49	8.99	11.03*	13.29*			
	20	6.96	7.35	7.83	8.35	8.88	9.42	10.25	10.95	11.66	14.61*	17.93*			
	40	8.82	9.41	10.11	10.87	11.64	12.44	13.68	14.75	15.84	20.52*	25.76*			
	60	10.23	11.00	11.91	12.88	13.89	14.94	16.57	17.99	19.45	25.75*	32.72*			
800	80	11.41	12.37	13.47	14.65	15.89	17.18	19.21	20.97	22.79	30.60*	39.17*			
	100	12.46	13.59	14.89	16.28	17.75	19.28	21.69	23.78	25.94	35.18*	45.25*			
	120	13.41	14.72	16.22	17.82	19.51	21.28	24.05	26.47	28.96	39.56*	51.05*			
	140	14.30	15.79	17.47	19.29	21.20	23.20	26.34	29.06	31.86	43.77*	56.63*			
	10	6.05	6.34	6.71	7.11	7.52	7.94	8.56	9.08	9.60	11.69*	14.01*			
	20	7.56	7.96	8.46	9.00	9.55	10.11	10.96	11.67	12.39	15.37*	18.72*			
	40	9.59	10.19	10.91	11.67	12.46	13.27	14.52	15.58	16.67	21.29*	26.51*			
	60	11.11	11.89	12.80	13.78	14.79	15.83	17.45	18.85	20.29	26.48*	33.42*			
	80	12.39	13.33	14.44	15.61	16.84	18.11	20.10	21.83	23.61	31.29*	39.82*			
	100	13.51	14.62	15.91	17.28	18.72	20.22	22.57	24.62	26.74	35.84*	45.87*			
	120	14.52	15.80	17.27	18.84	20.50	22.22	24.93	27.29	29.73	40.19*	51.64*			
	140	15.46	16.91	18.56	20.32	22.19	24.13	27.19	29.86	32.61	44.38*	57.20*			

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 26.0 Ft (RADIUS = 18.4 Ft)
 FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE
 TIME INDEX
 (Ft*s)^{1/2}

TEMPERATURE
 RISE
 °F

CEILING HEIGHT, Ft

	4	8	12	16	20	24	30	35	40	60	80
0	0.73 0.82 0.98 1.11 1.24 1.35 1.46 1.57	0.79 0.91 1.12 1.30 1.46 1.62 1.76 1.91	0.87 1.02 1.27 1.49 1.69 1.88 2.06 2.23	0.95 1.12 1.42 1.68 1.91 2.14 2.35 2.55	1.03 1.24 1.57 1.87 2.14 2.40 2.64 2.87	1.12 1.35 1.73 2.06 2.37 2.66 2.93 3.20	1.25 1.52 1.97 2.36 2.72 3.06 3.38 3.69	1.36 1.66 2.16 2.61 3.01 3.39 3.75 4.10	1.47 1.80 2.36 2.86 3.31 3.73 4.13 4.52	1.91 2.38 3.18 3.88 4.52 5.12 5.69 6.24	2.35* 2.97* 4.01* 4.93* 5.77* 6.56* 7.31* 8.03*
25	0.98 1.11 1.30 1.45 1.57 1.69 1.80 1.90	1.02 1.17 1.39 1.56 1.72 1.87 2.01 2.14	1.09 1.25 1.50 1.71 1.90 2.08 2.26 2.42	1.16 1.34 1.63 1.87 2.10 2.31 2.52 2.72	1.24 1.44 1.76 2.05 2.31 2.55 2.79 3.02	1.32 1.54 1.90 2.22 2.52 2.80 3.07 3.33	1.44 1.69 2.12 2.50 2.85 3.18 3.50 3.80	1.54 1.82 2.31 2.74 3.13 3.51 3.86 4.21	1.64 1.96 2.50 2.98 3.42 3.84 4.24 4.62	2.05 2.51 3.28 3.97 4.61 5.21 5.77 6.32	2.48* 3.09* 4.11* 5.02* 5.86* 6.64* 7.39* 8.11*
50	1.09 1.25 1.47 1.64 1.78 1.91 2.03 2.13	1.13 1.30 1.55 1.74 1.91 2.07 2.21 2.35	1.20 1.39 1.66 1.89 2.08 2.26 2.44 2.60	1.27 1.48 1.79 2.04 2.27 2.48 2.68 2.87	1.35 1.58 1.92 2.20 2.46 2.70 2.94 3.16	1.43 1.68 2.05 2.37 2.66 2.94 3.20 3.46	1.56 1.83 2.26 2.64 2.98 3.31 3.62 3.92	1.66 1.96 2.44 2.86 3.25 3.62 3.97 4.31	1.76 2.09 2.62 3.09 3.53 3.94 4.34 4.72	2.17 2.63 3.39 4.07 4.70 5.29 5.86 6.40	2.61* 3.20* 4.21* 5.11* 5.94* 6.72* 7.46* 8.18*
100	1.22 1.42 1.69 1.89 2.06 2.21 2.35 2.47	1.27 1.48 1.78 2.00 2.19 2.36 2.52 2.66	1.34 1.57 1.89 2.14 2.36 2.55 2.73 2.90	1.42 1.67 2.02 2.29 2.53 2.75 2.96 3.15	1.51 1.77 2.15 2.45 2.72 2.97 3.20 3.42	1.59 1.87 2.29 2.62 2.92 3.19 3.45 3.70	1.72 2.03 2.49 2.87 3.22 3.54 3.85 4.14	1.83 2.16 2.67 3.09 3.48 3.84 4.19 4.52	1.93 2.29 2.85 3.32 3.74 4.15 4.54 4.91	2.36 2.83 3.59 4.26 4.87 5.46 6.02 6.55	2.80* 3.40* 4.40* 5.28* 6.10* 6.87* 7.61* 8.32*
150	1.32 1.55 1.86 2.08 2.27 2.44 2.58 2.72	1.37 1.61 1.94 2.19 2.40 2.58 2.75 2.91	1.45 1.70 2.06 2.33 2.57 2.77 2.96 3.14	1.53 1.81 2.19 2.49 2.75 2.98 3.19 3.39	1.62 1.91 2.33 2.65 2.93 3.19 3.43 3.65	1.71 2.02 2.46 2.82 3.13 3.41 3.67 3.92	1.84 2.18 2.68 3.07 3.42 3.75 4.06 4.35	1.95 2.32 2.85 3.29 3.68 4.04 4.39 4.72	2.06 2.45 3.03 3.51 3.94 4.34 4.73 5.10	2.50 3.00 3.77 4.43 5.04 5.62 6.17 6.71	2.96* 3.58* 4.58* 5.45* 6.26* 7.03* 7.76* 8.46*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 26.0 Ft (RADIUS = 18.4 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
200 (Ft*s) ^{1/2}	10	1.40	1.45	1.53	1.62	1.71	1.80	1.94	2.05	2.17	2.62	3.09*
	20	1.65	1.72	1.81	1.92	2.03	2.14	2.31	2.45	2.58	3.14	3.74*
	40	1.99	2.08	2.20	2.33	2.47	2.61	2.83	3.01	3.19	3.93	4.74*
	60	2.24	2.34	2.49	2.65	2.82	2.99	3.24	3.46	3.68	4.60	5.62*
	80	2.44	2.57	2.74	2.92	3.11	3.31	3.61	3.86	4.12	5.21	6.42*
	100	2.62	2.77	2.96	3.16	3.38	3.60	3.94	4.23	4.53	5.78	7.18*
	120	2.78	2.95	3.16	3.39	3.62	3.87	4.25	4.57	4.91	6.33	7.90*
300	140	2.93	3.11	3.34	3.59	3.85	4.12	4.54	4.90	5.28	6.86	8.60*
	10	1.53	1.58	1.67	1.76	1.86	1.95	2.10	2.22	2.34	2.81	3.30*
	20	1.82	1.89	1.99	2.10	2.22	2.33	2.51	2.65	2.80	3.38	4.00*
	40	2.20	2.29	2.42	2.57	2.71	2.86	3.08	3.27	3.46	4.21	5.04*
	60	2.48	2.60	2.75	2.92	3.09	3.26	3.53	3.75	3.98	4.90	5.92*
	80	2.72	2.85	3.02	3.21	3.41	3.61	3.91	4.17	4.43	5.51	6.72*
	100	2.92	3.07	3.26	3.47	3.69	3.92	4.26	4.55	4.85	6.09	7.47*
400	120	3.10	3.27	3.48	3.71	3.95	4.20	4.58	4.91	5.24	6.63	8.19*
	140	3.26	3.45	3.68	3.94	4.20	4.47	4.88	5.24	5.61	7.15	8.88*
	10	1.64	1.69	1.78	1.87	1.97	2.08	2.23	2.35	2.48	2.96	3.48*
	20	1.95	2.02	2.13	2.25	2.37	2.49	2.67	2.83	2.98	3.57	4.22*
	40	2.38	2.47	2.61	2.75	2.91	3.06	3.29	3.49	3.68	4.45	5.30*
	60	2.68	2.80	2.96	3.13	3.31	3.49	3.77	4.00	4.23	5.16	6.20*
	80	2.94	3.08	3.26	3.45	3.65	3.86	4.17	4.43	4.70	5.79	7.00*
600	100	3.16	3.31	3.51	3.73	3.96	4.19	4.53	4.83	5.13	6.36	7.75*
	120	3.35	3.53	3.75	3.99	4.23	4.48	4.87	5.19	5.53	6.91	8.46*
	140	3.53	3.72	3.96	4.22	4.49	4.76	5.18	5.54	5.90	7.43	9.15*
	10	1.80	1.86	1.96	2.06	2.17	2.27	2.44	2.57	2.70	3.22	3.77*
	20	2.17	2.25	2.36	2.49	2.62	2.75	2.94	3.10	3.26	3.89	4.58*
	40	2.66	2.76	2.90	3.06	3.22	3.39	3.63	3.84	4.04	4.85	5.74*
	60	3.01	3.13	3.30	3.49	3.68	3.87	4.16	4.40	4.64	5.60	6.68*
800	80	3.30	3.44	3.63	3.84	4.05	4.27	4.60	4.87	5.15	6.26	7.50*
	100	3.55	3.71	3.92	4.15	4.39	4.63	4.99	5.30	5.60	6.86	8.26*
	120	3.77	3.95	4.18	4.43	4.69	4.95	5.35	5.68	6.02	7.41	8.98*
	140	3.97	4.17	4.42	4.69	4.97	5.25	5.68	6.05	6.41	7.94	9.66*
	10	1.94	2.00	2.10	2.21	2.32	2.44	2.61	2.75	2.89	3.42	4.00*
	20	2.35	2.43	2.55	2.68	2.82	2.95	3.16	3.33	3.50	4.16	4.87*
	40	2.88	2.99	3.14	3.31	3.48	3.65	3.91	4.13	4.34	5.18	6.11*
	60	3.27	3.40	3.58	3.77	3.97	4.17	4.48	4.73	4.98	5.98	7.09*
	80	3.59	3.74	3.94	4.16	4.38	4.61	4.95	5.23	5.52	6.66	7.94*
	100	3.87	4.03	4.26	4.50	4.74	4.99	5.37	5.68	6.00	7.28	8.71*
	120	4.11	4.30	4.54	4.80	5.07	5.34	5.75	6.09	6.44	7.85	9.44*
	140	4.33	4.53	4.80	5.08	5.36	5.66	6.10	6.47	6.85	8.39	10.13*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 26.0 Ft (RADIUS = 18.4 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s)

RESPONSE TIME INDEX	TEMPERATURE RISE °F	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
0	10	1.05	1.16	1.29	1.43	1.57	1.71	1.92	2.09	2.27	2.99	3.72*
	20	1.24	1.41	1.59	1.78	1.97	2.16	2.45	2.69	2.94	3.94	4.96*
	40	1.55	1.82	2.09	2.37	2.64	2.92	3.35	3.70	4.06	5.53	7.05*
	60	1.82	2.18	2.53	2.88	3.24	3.59	4.13	4.59	5.04	6.93	8.88*
	80	2.07	2.51	2.93	3.36	3.78	4.21	4.85	5.40	5.95	8.21	10.57*
	100	2.30	2.82	3.31	3.80	4.29	4.78	5.53	6.16	6.80	9.42	12.15*
	120	2.52	3.11	3.67	4.23	4.78	5.33	6.17	6.88	7.60	10.56	13.65*
25	140	2.74	3.40	4.02	4.63	5.24	5.86	6.79	7.58	8.38	11.66	15.09*
	10	1.40	1.47	1.57	1.69	1.81	1.93	2.13	2.29	2.46	3.14	3.86*
	20	1.62	1.73	1.87	2.03	2.19	2.37	2.63	2.86	3.10	4.06	5.08*
	40	1.95	2.13	2.35	2.59	2.84	3.10	3.50	3.85	4.19	5.64	7.15*
	60	2.21	2.47	2.77	3.09	3.42	3.75	4.27	4.72	5.17	7.02	8.97*
	80	2.45	2.78	3.16	3.55	3.95	4.36	4.99	5.52	6.06	8.30	10.65*
	100	2.67	3.08	3.52	3.98	4.45	4.93	5.66	6.27	6.90	9.50	12.23*
50	120	2.89	3.36	3.87	4.40	4.93	5.47	6.29	6.99	7.70	10.64	13.72*
	140	3.09	3.64	4.21	4.80	5.39	5.99	6.91	7.69	8.47	11.74	15.16*
	10	1.56	1.63	1.73	1.85	1.97	2.10	2.29	2.45	2.61	3.28	3.99*
	20	1.82	1.92	2.06	2.22	2.38	2.54	2.80	3.02	3.25	4.19	5.19*
	40	2.19	2.36	2.56	2.79	3.02	3.27	3.66	3.99	4.33	5.74	7.25*
	60	2.49	2.71	2.98	3.28	3.59	3.91	4.41	4.85	5.29	7.12	9.06*
	80	2.74	3.03	3.36	3.73	4.11	4.51	5.12	5.64	6.17	8.39	10.73*
100	100	2.97	3.32	3.72	4.16	4.61	5.07	5.78	6.39	7.01	9.59	12.30*
	120	3.19	3.60	4.07	4.57	5.08	5.61	6.41	7.10	7.81	10.72	13.80*
	140	3.39	3.87	4.40	4.96	5.53	6.12	7.02	7.79	8.57	11.82	15.23*
	10	1.77	1.84	1.95	2.07	2.20	2.33	2.53	2.69	2.86	3.52	4.24*
	20	2.09	2.19	2.33	2.49	2.65	2.82	3.08	3.29	3.51	4.43	5.42*
	40	2.53	2.69	2.89	3.10	3.33	3.57	3.94	4.26	4.58	5.95	7.44*
	60	2.87	3.07	3.33	3.61	3.90	4.21	4.69	5.10	5.52	7.31	9.24*
150	80	3.15	3.41	3.72	4.06	4.42	4.79	5.38	5.88	6.40	8.57	10.90*
	100	3.41	3.72	4.09	4.49	4.91	5.34	6.03	6.62	7.22	9.75	12.46*
	120	3.65	4.01	4.43	4.89	5.37	5.87	6.65	7.32	8.01	10.89	13.95*
	140	3.86	4.28	4.76	5.27	5.82	6.38	7.25	8.00	8.77	11.97	15.38*
	10	1.92	2.00	2.11	2.24	2.37	2.50	2.71	2.88	3.04	3.72	4.45*
	20	2.28	2.39	2.53	2.70	2.86	3.03	3.29	3.51	3.73	4.64	5.63*
	40	2.78	2.93	3.13	3.35	3.58	3.82	4.18	4.50	4.82	6.16	7.63*
	60	3.15	3.35	3.61	3.88	4.17	4.47	4.94	5.34	5.75	7.50	9.41*
	80	3.47	3.71	4.02	4.35	4.70	5.06	5.62	6.11	6.61	8.75	11.06*
	100	3.74	4.04	4.39	4.78	5.18	5.61	6.27	6.84	7.43	9.92	12.61*
	120	4.00	4.34	4.74	5.18	5.64	6.13	6.88	7.54	8.21	11.05	14.10*
	140	4.23	4.62	5.08	5.57	6.09	6.63	7.48	8.21	8.96	12.13	15.52*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 26.0 Ft (RADIUS = 18.4 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX		CEILING HEIGHT, Ft										
TEMPERATURE RISE												
(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60	80
200	10	2.04	2.12	2.24	2.37	2.51	2.65	2.85	3.03	3.20	3.89	4.63*
	20	2.44	2.55	2.70	2.87	3.04	3.21	3.48	3.70	3.92	4.83	5.83*
	40	2.98	3.14	3.34	3.56	3.80	4.03	4.40	4.71	5.03	6.35	7.82*
	60	3.38	3.58	3.84	4.12	4.40	4.70	5.16	5.56	5.97	7.69	9.59*
	80	3.72	3.97	4.27	4.60	4.94	5.30	5.85	6.33	6.82	8.92	11.22*
	100	4.02	4.31	4.66	5.04	5.43	5.85	6.49	7.05	7.63	10.09	12.77*
	120	4.29	4.62	5.02	5.45	5.90	6.37	7.11	7.75	8.41	11.21	14.24*
	140	4.54	4.91	5.36	5.84	6.34	6.87	7.70	8.41	9.15	12.28	15.66*
300	10	2.24	2.32	2.45	2.59	2.73	2.88	3.10	3.28	3.46	4.17	4.94*
	20	2.70	2.81	2.97	3.14	3.32	3.50	3.78	4.01	4.24	5.17	6.18*
	40	3.31	3.47	3.68	3.91	4.15	4.39	4.77	5.08	5.40	6.72	8.18*
	60	3.76	3.96	4.23	4.51	4.80	5.10	5.56	5.95	6.36	8.04	9.93*
	80	4.14	4.38	4.69	5.02	5.36	5.72	6.26	6.73	7.22	9.26	11.54*
	100	4.47	4.75	5.10	5.48	5.87	6.28	6.91	7.46	8.02	10.42	13.07*
	120	4.76	5.09	5.48	5.91	6.35	6.81	7.53	8.15	8.79	11.52	14.54*
	140	5.04	5.40	5.84	6.31	6.80	7.31	8.11	8.81	9.53	12.59	15.95*
400	10	2.40	2.49	2.62	2.76	2.91	3.06	3.29	3.48	3.67	4.41	5.20*
	20	2.90	3.02	3.18	3.37	3.55	3.74	4.03	4.26	4.50	5.45	6.49*
	40	3.57	3.74	3.96	4.20	4.44	4.69	5.07	5.39	5.72	7.04	8.51*
	60	4.07	4.27	4.54	4.83	5.13	5.43	5.90	6.30	6.70	8.38	10.25*
	80	4.48	4.72	5.04	5.37	5.72	6.08	6.63	7.10	7.57	9.59	11.86*
	100	4.83	5.12	5.47	5.86	6.25	6.66	7.29	7.83	8.38	10.74	13.38*
	120	5.16	5.48	5.88	6.30	6.74	7.20	7.91	8.52	9.15	11.84	14.83*
	140	5.45	5.81	6.25	6.72	7.20	7.71	8.50	9.18	9.89	12.89	16.23*
600	10	2.66	2.75	2.89	3.05	3.21	3.37	3.61	3.81	4.01	4.79	5.63*
	20	3.24	3.36	3.54	3.73	3.93	4.13	4.43	4.68	4.93	5.93	7.02*
	40	4.00	4.17	4.41	4.66	4.92	5.18	5.58	5.91	6.25	7.60	9.11*
	60	4.56	4.78	5.06	5.36	5.67	5.99	6.47	6.88	7.29	8.97	10.86*
	80	5.03	5.28	5.61	5.95	6.31	6.68	7.24	7.72	8.20	10.20	12.46*
	100	5.43	5.72	6.09	6.48	6.88	7.30	7.93	8.48	9.03	11.35	13.97*
	120	5.79	6.12	6.52	6.96	7.41	7.87	8.58	9.19	9.81	12.44	15.40*
	140	6.12	6.48	6.93	7.40	7.89	8.40	9.18	9.86	10.55	13.48	16.78*
800	10	2.87	2.96	3.11	3.28	3.45	3.62	3.87	4.08	4.29	5.10	5.98*
	20	3.50	3.63	3.82	4.03	4.23	4.45	4.76	5.03	5.29	6.32	7.45*
	40	4.35	4.53	4.77	5.04	5.31	5.58	6.00	6.34	6.69	8.08	9.63*
	60	4.96	5.19	5.48	5.80	6.12	6.45	6.95	7.37	7.79	9.50	11.42*
	80	5.47	5.73	6.07	6.43	6.80	7.18	7.76	8.24	8.73	10.75	13.02*
	100	5.91	6.21	6.59	6.99	7.41	7.83	8.48	9.03	9.59	11.90	14.52*
	120	6.30	6.64	7.06	7.50	7.96	8.43	9.15	9.76	10.39	13.00	15.95*
	140	6.66	7.03	7.49	7.97	8.47	8.99	9.78	10.45	11.14	14.04	17.32*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 26.0 Ft (RADIUS = 18.4 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		$(Ft*s)^{1/2}$	4	8	12	16	20	24	30	35	40	60
0	10	1.58	1.78	2.00	2.23	2.47	2.70	3.06	3.36	3.66	4.89	6.15*
	20	1.94	2.27	2.60	2.93	3.27	3.61	4.13	4.56	5.00	6.79	8.63*
	40	2.56	3.09	3.60	4.11	4.62	5.14	5.92	6.58	7.24	9.97	12.81*
	60	3.10	3.81	4.48	5.15	5.81	6.48	7.49	8.34	9.21	12.77	16.48*
	80	3.60	4.47	5.29	6.09	6.90	7.71	8.93	9.97	11.02	15.33	19.85*
	100	4.07	5.09	6.04	6.98	7.92	8.86	10.29	11.49	12.71	17.74	23.01*
	120	4.51	5.68	6.76	7.83	8.89	9.96	11.58	12.94	14.32	20.03	26.01*
	140	4.94	6.24	7.46	8.64	9.83	11.01	12.81	14.33	15.87	22.23	28.89*
25	10	2.03	2.16	2.33	2.53	2.74	2.95	3.28	3.56	3.85	5.04	6.29*
	20	2.42	2.63	2.90	3.20	3.50	3.82	4.31	4.73	5.16	6.91	8.75*
	40	3.02	3.41	3.86	4.34	4.82	5.32	6.08	6.72	7.38	10.08	12.91*
	60	3.53	4.10	4.72	5.35	5.99	6.64	7.63	8.48	9.33	12.86	16.57*
	80	4.01	4.75	5.51	6.28	7.07	7.86	9.07	10.09	11.13	15.42	19.93*
	100	4.46	5.35	6.26	7.16	8.08	9.01	10.41	11.61	12.82	17.83	23.08*
	120	4.89	5.93	6.97	8.00	9.04	10.10	11.70	13.05	14.43	20.11	26.08*
	140	5.30	6.49	7.65	8.81	9.97	11.14	12.93	14.44	15.97	22.31	28.96*
50	10	2.27	2.39	2.56	2.75	2.95	3.16	3.48	3.75	4.03	5.19	6.42*
	20	2.71	2.91	3.16	3.43	3.72	4.03	4.50	4.90	5.31	7.04	8.87*
	40	3.36	3.70	4.11	4.55	5.02	5.49	6.23	6.87	7.51	10.19	13.01*
	60	3.89	4.39	4.95	5.55	6.17	6.80	7.78	8.61	9.45	12.96	16.66*
	80	4.37	5.02	5.73	6.47	7.23	8.01	9.20	10.21	11.24	15.51	20.01*
	100	4.81	5.61	6.46	7.34	8.24	9.15	10.54	11.72	12.93	17.91	23.16*
	120	5.24	6.18	7.17	8.17	9.20	10.23	11.82	13.16	14.53	20.20	26.16*
	140	5.64	6.73	7.84	8.97	10.12	11.28	13.04	14.54	16.07	22.39	29.03*
100	10	2.59	2.71	2.89	3.08	3.28	3.49	3.81	4.07	4.35	5.47	6.69*
	20	3.11	3.30	3.54	3.81	4.09	4.38	4.83	5.22	5.62	7.29	9.10*
	40	3.85	4.16	4.54	4.95	5.38	5.84	6.54	7.15	7.77	10.40	13.21*
	60	4.44	4.87	5.38	5.93	6.51	7.12	8.06	8.86	9.69	13.15	16.83*
	80	4.95	5.50	6.15	6.84	7.56	8.31	9.46	10.45	11.47	15.69	20.18*
	100	5.41	6.09	6.87	7.69	8.55	9.43	10.79	11.95	13.14	18.08	23.32*
	120	5.84	6.65	7.56	8.51	9.49	10.50	12.06	13.38	14.73	20.36	26.31*
	140	6.25	7.19	8.22	9.30	10.40	11.54	13.27	14.76	16.26	22.54	29.18*
150	10	2.82	2.94	3.13	3.32	3.53	3.74	4.06	4.34	4.61	5.73	6.94*
	20	3.41	3.59	3.84	4.11	4.39	4.68	5.12	5.51	5.89	7.53	9.32*
	40	4.22	4.52	4.89	5.29	5.71	6.15	6.83	7.42	8.03	10.61	13.40*
	60	4.85	5.26	5.75	6.28	6.84	7.42	8.33	9.12	9.93	13.34	17.01*
	80	5.40	5.92	6.53	7.18	7.88	8.60	9.72	10.69	11.69	15.87	20.34*
	100	5.88	6.52	7.25	8.03	8.85	9.71	11.04	12.18	13.35	18.25	23.47*
	120	6.33	7.08	7.93	8.84	9.79	10.77	12.29	13.60	14.94	20.52	26.46*
	140	6.76	7.62	8.59	9.62	10.69	11.79	13.50	14.97	16.46	22.70	29.32*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 26.0 Ft (RADIUS = 18.4 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
200 (Ft*s) ^{1/2}	°F											
	10	3.01	3.14	3.32	3.53	3.74	3.95	4.28	4.56	4.83	5.96	7.18*
	20	3.65	3.83	4.09	4.36	4.64	4.93	5.38	5.76	6.15	7.76	9.55*
	40	4.53	4.82	5.19	5.59	6.00	6.43	7.11	7.69	8.28	10.82	13.59*
	60	5.20	5.60	6.08	6.60	7.14	7.71	8.60	9.37	10.17	13.54	17.19*
	80	5.77	6.27	6.87	7.50	8.18	8.88	9.98	10.93	11.91	16.05	20.50*
	100	6.29	6.89	7.59	8.35	9.15	9.98	11.28	12.41	13.56	18.42	23.63*
300	120	6.76	7.46	8.28	9.15	10.08	11.03	12.53	13.82	15.14	20.68	26.61*
	140	7.20	8.01	8.93	9.93	10.97	12.05	13.73	15.18	16.65	22.85	29.47*
	10	3.31	3.44	3.64	3.85	4.08	4.30	4.64	4.92	5.21	6.35	7.60*
	20	4.03	4.23	4.49	4.77	5.06	5.36	5.81	6.20	6.59	8.19	9.97*
	40	5.02	5.32	5.69	6.09	6.50	6.93	7.60	8.17	8.75	11.23	13.97*
	60	5.77	6.16	6.63	7.14	7.68	8.23	9.10	9.85	10.62	13.91	17.53*
	80	6.40	6.88	7.46	8.08	8.73	9.41	10.47	11.39	12.35	16.40	20.83*
400	100	6.95	7.53	8.20	8.93	9.70	10.50	11.76	12.85	13.98	18.76	23.94*
	120	7.46	8.13	8.90	9.74	10.63	11.55	12.99	14.25	15.54	21.00	26.90*
	140	7.93	8.69	9.57	10.51	11.51	12.55	14.18	15.59	17.04	23.16	29.75*
	10	3.55	3.69	3.90	4.12	4.35	4.58	4.94	5.23	5.52	6.69	7.97*
	20	4.35	4.55	4.82	5.11	5.41	5.71	6.18	6.57	6.97	8.58	10.37*
	40	5.43	5.72	6.10	6.51	6.93	7.36	8.03	8.60	9.18	11.62	14.35*
	60	6.23	6.62	7.10	7.61	8.15	8.70	9.55	10.29	11.05	14.28	17.88*
600	80	6.91	7.38	7.96	8.57	9.22	9.89	10.93	11.83	12.77	16.75	21.16*
	100	7.50	8.07	8.73	9.45	10.20	10.99	12.22	13.28	14.39	19.09	24.25*
	120	8.04	8.69	9.45	10.27	11.13	12.03	13.44	14.67	15.93	21.32	27.20*
	140	8.54	9.28	10.13	11.05	12.02	13.03	14.62	16.00	17.42	23.47	30.04*
	10	3.95	4.10	4.32	4.55	4.80	5.05	5.42	5.73	6.04	7.26	8.59*
	20	4.86	5.07	5.35	5.66	5.98	6.30	6.78	7.19	7.60	9.25	11.08*
	40	6.08	6.38	6.78	7.20	7.63	8.08	8.76	9.33	9.92	12.34	15.07*
800	60	6.99	7.38	7.87	8.39	8.93	9.49	10.35	11.08	11.83	15.00	18.56*
	80	7.74	8.22	8.80	9.42	10.06	10.73	11.76	12.64	13.56	17.44	21.80*
	100	8.40	8.96	9.62	10.34	11.08	11.86	13.06	14.09	15.17	19.75	24.86*
	120	8.99	9.63	10.38	11.19	12.04	12.91	14.28	15.47	16.70	21.96	27.78*
	140	9.54	10.26	11.10	12.00	12.94	13.92	15.46	16.79	18.17	24.09	30.60*
	10	4.27	4.43	4.66	4.91	5.16	5.42	5.81	6.14	6.46	7.72	9.11*
	20	5.27	5.49	5.79	6.11	6.44	6.78	7.28	7.70	8.13	9.82	11.70*
	40	6.61	6.92	7.33	7.77	8.22	8.68	9.37	9.96	10.55	12.99	15.73*
	60	7.60	8.00	8.50	9.04	9.59	10.16	11.03	11.77	12.52	15.66	19.22*
	80	8.42	8.90	9.49	10.12	10.78	11.45	12.48	13.36	14.27	18.10	22.43*
	100	9.13	9.69	10.37	11.09	11.84	12.61	13.81	14.83	15.89	20.39	25.46*
	120	9.78	10.41	11.17	11.98	12.82	13.69	15.05	16.22	17.42	22.58	28.37*
	140	10.36	11.07	11.91	12.81	13.75	14.72	16.23	17.54	18.89	24.69	31.16*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 26.0 Ft (RADIUS = 18.4 Ft)³
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft												
		(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60	80
0	10		2.45	2.83	3.24	3.65	4.06	4.47	5.10	5.63	6.16	8.34	10.59*	
	20		3.18	3.81	4.43	5.05	5.67	6.29	7.23	8.03	8.83	12.13	15.56*	
	40		4.42	5.45	6.43	7.40	8.37	9.35	10.82	12.06	13.32	18.51	23.93*	
	60		5.50	6.89	8.19	9.47	10.74	12.02	13.96	15.60	17.26	24.10	31.26*	
	80		6.50	8.21	9.81	11.37	12.92	14.48	16.85	18.85	20.87	29.23	37.99*	
	100		7.43	9.45	11.32	13.15	14.97	16.79	19.56	21.90	24.26	34.05	44.31*	
	120		8.32	10.63	12.76	14.84	16.91	18.99	22.14	24.79	27.49	38.63	50.32*	
	140		9.18	11.76	14.14	16.46	18.77	21.09	24.61	27.57	30.58	43.02	56.08*	
	25	10		3.01	3.27	3.60	3.96	4.34	4.72	5.32	5.84	6.35	8.50	10.73*
		20		3.72	4.20	4.74	5.31	5.90	6.50	7.42	8.20	8.99	12.26	15.68*
40			4.90	5.78	6.70	7.63	8.57	9.53	10.98	12.21	13.46	18.62	24.02*	
60			5.94	7.19	8.43	9.67	10.92	12.19	14.11	15.73	17.38	24.19	31.35*	
80			6.91	8.49	10.03	11.56	13.09	14.64	16.98	18.97	20.98	29.32	38.07*	
100			7.83	9.72	11.53	13.33	15.13	16.94	19.69	22.01	24.37	34.13	44.39*	
120			8.70	10.89	12.96	15.01	17.06	19.13	22.26	24.90	27.59	38.71	50.39*	
140			9.54	12.01	14.34	16.63	18.92	21.23	24.72	27.68	30.68	43.10	56.15*	
50		10		3.36	3.59	3.90	4.24	4.60	4.97	5.54	6.04	6.54	8.65	10.87*
		20		4.13	4.54	5.04	5.57	6.13	6.71	7.61	8.37	9.15	12.39	15.80*
	40		5.33	6.10	6.96	7.85	8.77	9.70	11.14	12.35	13.59	18.72	24.12*	
	60		6.36	7.49	8.67	9.88	11.10	12.35	14.25	15.86	17.50	24.29	31.43*	
	80		7.31	8.77	10.25	11.75	13.26	14.79	17.12	19.09	21.10	29.41	38.15*	
	100		8.21	9.98	11.74	13.51	15.28	17.08	19.81	22.13	24.48	34.22	44.46*	
	120		9.07	11.14	13.16	15.18	17.21	19.26	22.38	25.02	27.69	38.79	50.47*	
	140		9.89	12.25	14.53	16.80	19.07	21.36	24.84	27.79	30.78	43.18	56.22*	
	100	10		3.84	4.06	4.36	4.69	5.03	5.39	5.94	6.42	6.90	8.94	11.14*
		20		4.72	5.09	5.55	6.04	6.57	7.12	7.97	8.71	9.47	12.64	16.03*
40			6.02	6.68	7.46	8.29	9.16	10.06	11.45	12.64	13.86	18.94	24.32*	
60			7.08	8.05	9.13	10.28	11.46	12.67	14.53	16.12	17.74	24.48	31.61*	
80			8.03	9.31	10.69	12.12	13.59	15.09	17.38	19.33	21.32	29.59	38.32*	
100			8.92	10.50	12.16	13.86	15.60	17.36	20.06	22.36	24.69	34.39	44.62*	
120			9.77	11.63	13.56	15.52	17.51	19.53	22.62	25.24	27.90	38.95	50.62*	
140			10.58	12.73	14.92	17.12	19.36	21.62	25.07	28.00	30.98	43.33	56.37*	
150		10		4.19	4.41	4.71	5.04	5.39	5.74	6.29	6.76	7.23	9.23	11.41*
		20		5.16	5.52	5.96	6.45	6.96	7.49	8.32	9.04	9.77	12.89	16.26*
	40		6.55	7.17	7.91	8.70	9.53	10.40	11.76	12.93	14.12	19.15	24.51*	
	60		7.67	8.56	9.58	10.67	11.81	12.99	14.82	16.38	17.98	24.68	31.79*	
	80		8.65	9.81	11.11	12.49	13.92	15.38	17.64	19.58	21.55	29.77	38.48*	
	100		9.55	10.99	12.57	14.21	15.91	17.65	20.31	22.59	24.90	34.56	44.78*	
	120		10.40	12.12	13.96	15.86	17.81	19.80	22.86	25.46	28.10	39.12	50.77*	
	140		11.22	13.20	15.30	17.45	19.65	21.88	25.30	28.21	31.17	43.49	56.51*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 26.0 Ft (RADIUS = 18.4 Ft)³
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
200 (Ft*s) ^{1/2}	°F												
	10	4.47	4.70	5.01	5.34	5.69	6.05	6.59	7.06	7.53	9.51	11.68*	
	20	5.52	5.87	6.32	6.80	7.31	7.83	8.65	9.35	10.07	13.14	16.49*	
	40	7.00	7.60	8.31	9.08	9.89	10.74	12.06	13.21	14.39	19.36	24.71*	
	60	8.17	9.01	9.99	11.04	12.15	13.30	15.10	16.64	18.22	24.87	31.97*	
	80	9.19	10.28	11.52	12.85	14.24	15.68	17.91	19.82	21.77	29.95	38.65*	
	100	10.11	11.46	12.97	14.56	16.22	17.93	20.56	22.82	25.12	34.73	44.93*	
300	120	10.98	12.58	14.34	16.20	18.11	20.07	23.10	25.67	28.31	39.28	50.91*	
	140	11.79	13.66	15.67	17.77	19.93	22.14	25.53	28.42	31.37	43.65	56.65*	
	10	4.93	5.17	5.48	5.83	6.19	6.55	7.11	7.58	8.06	10.02	12.19*	
	20	6.11	6.46	6.91	7.40	7.90	8.42	9.23	9.92	10.63	13.63	16.95*	
	40	7.74	8.32	9.01	9.76	10.55	11.37	12.65	13.76	14.90	19.78	25.10*	
	60	9.00	9.80	10.74	11.74	12.80	13.91	15.65	17.15	18.70	25.25	32.32*	
	80	10.09	11.11	12.28	13.54	14.87	16.26	18.43	20.30	22.22	30.31	38.98*	
400	100	11.06	12.31	13.72	15.24	16.83	18.48	21.06	23.27	25.54	35.07	45.24*	
	120	11.96	13.44	15.09	16.85	18.70	20.61	23.57	26.11	28.71	39.60	51.21*	
	140	12.81	14.51	16.41	18.41	20.50	22.66	25.99	28.84	31.76	43.96	56.94*	
	10	5.31	5.55	5.88	6.23	6.60	6.97	7.54	8.02	8.51	10.48	12.66*	
	20	6.59	6.94	7.40	7.90	8.41	8.93	9.74	10.43	11.13	14.09	17.39*	
	40	8.35	8.92	9.61	10.35	11.13	11.94	13.19	14.28	15.41	20.20	25.48*	
	60	9.70	10.47	11.39	12.37	13.41	14.49	16.18	17.65	19.17	25.63	32.67*	
600	80	10.84	11.83	12.96	14.19	15.48	16.82	18.94	20.77	22.66	30.66	39.31*	
	100	11.87	13.06	14.42	15.88	17.42	19.03	21.55	23.72	25.96	35.41	45.56*	
	120	12.81	14.20	15.79	17.49	19.28	21.14	24.04	26.54	29.12	39.93	51.51*	
	140	13.69	15.29	17.10	19.03	21.06	23.17	26.44	29.26	32.15	44.27	57.23*	
	10	5.91	6.16	6.51	6.89	7.27	7.67	8.26	8.76	9.26	11.27	13.50*	
	20	7.36	7.73	8.21	8.72	9.25	9.79	10.61	11.31	12.02	14.95	18.24*	
	40	9.34	9.91	10.61	11.35	12.13	12.93	14.18	15.24	16.34	21.02	26.25*	
800	60	10.83	11.59	12.50	13.47	14.48	15.54	17.18	18.61	20.08	26.39	33.37*	
	80	12.09	13.03	14.14	15.33	16.58	17.88	19.92	21.70	23.53	31.37	39.96*	
	100	13.20	14.33	15.64	17.05	18.53	20.07	22.50	24.61	26.79	36.08	46.18*	
	120	14.21	15.53	17.04	18.66	20.37	22.16	24.97	27.40	29.92	40.57	52.10*	
	140	15.15	16.66	18.37	20.21	22.15	24.17	27.34	30.09	32.92	44.89	57.80*	
	10	6.40	6.67	7.03	7.42	7.83	8.24	8.85	9.37	9.88	11.95	14.23*	
	20	8.00	8.37	8.87	9.40	9.94	10.50	11.34	12.05	12.77	15.72	19.04*	
	40	10.15	10.72	11.43	12.19	12.98	13.79	15.04	16.10	17.19	21.80	27.00*	
	60	11.76	12.52	13.43	14.40	15.42	16.46	18.09	19.49	20.94	27.13	34.06*	
	80	13.11	14.05	15.15	16.33	17.56	18.84	20.84	22.58	24.37	32.07	40.61*	
	100	14.30	15.41	16.70	18.08	19.53	21.04	23.42	25.48	27.61	36.75	46.79*	
	120	15.38	16.66	18.14	19.72	21.39	23.13	25.86	28.24	30.71	41.21	52.69*	
140	16.37	17.83	19.49	21.28	23.16	25.13	28.22	30.91	33.69	45.51	58.37*		

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 28.0 Ft (RADIUS = 19.8 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		$(Ft*s)^{1/2}$	°F	4	8	12	16	20	24	30	35	40
0	10	0.78	0.83	0.91	0.99	1.08	1.16	1.29	1.40	1.51	1.95	2.39*
	20	0.87	0.96	1.07	1.18	1.29	1.40	1.57	1.71	1.85	2.43	3.02*
	40	1.04	1.18	1.33	1.48	1.64	1.80	2.03	2.23	2.43	3.25	4.09*
	60	1.18	1.37	1.56	1.76	1.95	2.15	2.44	2.69	2.94	3.97	5.03*
	80	1.32	1.55	1.78	2.00	2.23	2.47	2.82	3.11	3.41	4.63	5.89*
	100	1.44	1.71	1.98	2.24	2.50	2.77	3.17	3.51	3.85	5.24	6.69*
	120	1.56	1.87	2.17	2.46	2.76	3.05	3.50	3.88	4.26	5.83	7.46*
	140	1.68	2.02	2.35	2.67	3.00	3.33	3.82	4.24	4.66	6.39	8.20*
25	10	1.04	1.08	1.14	1.21	1.29	1.36	1.48	1.58	1.68	2.10	2.52*
	20	1.18	1.23	1.31	1.40	1.50	1.60	1.75	1.88	2.01	2.56	3.14*
	40	1.38	1.46	1.57	1.70	1.83	1.97	2.19	2.38	2.57	3.36	4.19*
	60	1.53	1.64	1.79	1.96	2.13	2.31	2.59	2.82	3.07	4.07	5.11*
	80	1.67	1.81	2.00	2.20	2.40	2.62	2.95	3.24	3.52	4.72	5.97*
	100	1.79	1.97	2.19	2.42	2.66	2.91	3.30	3.62	3.96	5.33	6.77*
	120	1.90	2.12	2.37	2.63	2.91	3.19	3.63	3.99	4.37	5.91	7.53*
	140	2.01	2.26	2.54	2.84	3.15	3.46	3.94	4.35	4.76	6.47	8.27*
50	10	1.15	1.19	1.25	1.33	1.40	1.48	1.60	1.71	1.81	2.22	2.65*
	20	1.32	1.37	1.45	1.54	1.64	1.74	1.89	2.02	2.15	2.68	3.25*
	40	1.55	1.63	1.74	1.86	1.99	2.13	2.34	2.52	2.70	3.47	4.29*
	60	1.73	1.83	1.97	2.13	2.29	2.46	2.73	2.95	3.19	4.16	5.20*
	80	1.88	2.01	2.18	2.37	2.56	2.77	3.08	3.36	3.64	4.81	6.05*
	100	2.02	2.18	2.37	2.59	2.82	3.05	3.42	3.74	4.06	5.42	6.85*
	120	2.14	2.33	2.55	2.80	3.06	3.33	3.75	4.10	4.47	6.00	7.61*
	140	2.26	2.47	2.73	3.00	3.29	3.59	4.06	4.46	4.86	6.55	8.34*
100	10	1.30	1.33	1.40	1.48	1.56	1.65	1.77	1.88	1.99	2.41	2.85*
	20	1.50	1.56	1.64	1.74	1.84	1.94	2.10	2.23	2.36	2.89	3.46*
	40	1.79	1.87	1.98	2.10	2.23	2.37	2.57	2.75	2.93	3.67	4.47*
	60	2.00	2.10	2.24	2.39	2.55	2.72	2.97	3.19	3.41	4.36	5.38*
	80	2.18	2.30	2.47	2.64	2.83	3.03	3.33	3.59	3.86	4.99	6.21*
	100	2.34	2.48	2.67	2.87	3.09	3.31	3.66	3.96	4.28	5.59	7.00*
	120	2.48	2.65	2.86	3.09	3.33	3.58	3.98	4.32	4.67	6.16	7.76*
	140	2.61	2.80	3.04	3.29	3.56	3.85	4.29	4.67	5.06	6.71	8.48*
150	10	1.40	1.44	1.51	1.59	1.68	1.77	1.90	2.01	2.12	2.55	3.00*
	20	1.64	1.69	1.78	1.88	1.98	2.09	2.25	2.39	2.52	3.06	3.64*
	40	1.96	2.04	2.15	2.28	2.42	2.55	2.76	2.94	3.12	3.86	4.65*
	60	2.20	2.30	2.44	2.59	2.76	2.92	3.18	3.39	3.61	4.54	5.55*
	80	2.40	2.52	2.68	2.86	3.05	3.24	3.54	3.80	4.06	5.17	6.37*
	100	2.57	2.71	2.90	3.10	3.32	3.54	3.88	4.17	4.48	5.76	7.16*
	120	2.73	2.89	3.10	3.33	3.56	3.81	4.20	4.53	4.87	6.32	7.90*
	140	2.87	3.06	3.29	3.54	3.80	4.07	4.50	4.87	5.25	6.87	8.62*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 28.0 Ft (RADIUS = 19.8 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
200 (Ft*s) ^{1/2}	°F											
	10	1.48	1.52	1.60	1.68	1.77	1.86	2.00	2.11	2.23	2.67	3.13*
	20	1.75	1.80	1.89	2.00	2.11	2.21	2.38	2.52	2.66	3.21	3.79*
	40	2.10	2.18	2.30	2.43	2.57	2.71	2.92	3.10	3.28	4.02	4.82*
	60	2.36	2.46	2.61	2.76	2.93	3.09	3.35	3.57	3.79	4.71	5.71*
	80	2.58	2.70	2.86	3.04	3.23	3.43	3.73	3.98	4.24	5.33	6.53*
	100	2.76	2.91	3.09	3.30	3.51	3.73	4.07	4.36	4.66	5.92	7.31*
300	120	2.93	3.10	3.30	3.53	3.77	4.01	4.39	4.72	5.06	6.48	8.05*
	140	3.09	3.27	3.50	3.75	4.01	4.28	4.70	5.06	5.44	7.03	8.76*
	10	1.62	1.66	1.74	1.83	1.93	2.02	2.16	2.28	2.40	2.87	3.35*
	20	1.92	1.98	2.08	2.19	2.30	2.42	2.59	2.73	2.88	3.45	4.06*
	40	2.32	2.41	2.53	2.67	2.82	2.96	3.18	3.37	3.56	4.31	5.12*
	60	2.62	2.73	2.87	3.04	3.21	3.38	3.65	3.87	4.09	5.01	6.02*
	80	2.86	2.99	3.16	3.35	3.54	3.74	4.04	4.30	4.56	5.65	6.83*
400	100	3.08	3.22	3.41	3.62	3.84	4.06	4.40	4.69	4.99	6.23	7.60*
	120	3.27	3.43	3.64	3.87	4.11	4.36	4.74	5.06	5.39	6.79	8.34*
	140	3.44	3.62	3.85	4.10	4.36	4.63	5.05	5.41	5.78	7.33	9.04*
	10	1.73	1.77	1.86	1.95	2.05	2.15	2.30	2.42	2.55	3.03	3.53*
	20	2.06	2.12	2.23	2.34	2.46	2.58	2.76	2.91	3.06	3.65	4.28*
	40	2.51	2.59	2.72	2.87	3.02	3.17	3.40	3.59	3.78	4.56	5.38*
	60	2.83	2.94	3.09	3.26	3.44	3.62	3.89	4.12	4.35	5.28	6.30*
600	80	3.10	3.23	3.40	3.60	3.80	4.00	4.31	4.57	4.84	5.92	7.12*
	100	3.33	3.48	3.67	3.89	4.11	4.34	4.69	4.98	5.28	6.52	7.88*
	120	3.54	3.70	3.92	4.15	4.40	4.65	5.03	5.36	5.69	7.08	8.61*
	140	3.73	3.91	4.14	4.40	4.66	4.94	5.36	5.71	6.08	7.61	9.31*
	10	1.90	1.95	2.04	2.14	2.25	2.35	2.51	2.65	2.78	3.29	3.82*
	20	2.29	2.36	2.47	2.59	2.72	2.84	3.04	3.20	3.36	3.98	4.64*
	40	2.80	2.89	3.03	3.19	3.35	3.51	3.75	3.96	4.16	4.96	5.83*
800	60	3.17	3.29	3.45	3.63	3.82	4.01	4.29	4.53	4.77	5.74	6.78*
	80	3.48	3.61	3.80	4.00	4.21	4.43	4.75	5.02	5.30	6.41	7.62*
	100	3.74	3.89	4.10	4.32	4.56	4.80	5.16	5.46	5.77	7.02	8.40*
	120	3.98	4.14	4.37	4.62	4.87	5.13	5.53	5.86	6.20	7.59	9.13*
	140	4.19	4.38	4.62	4.89	5.16	5.44	5.87	6.24	6.61	8.13	9.83*
	10	2.04	2.10	2.19	2.30	2.41	2.52	2.69	2.83	2.97	3.50	4.06*
	20	2.47	2.54	2.66	2.79	2.92	3.06	3.26	3.43	3.60	4.25	4.95*
	40	3.04	3.13	3.28	3.44	3.61	3.78	4.04	4.25	4.46	5.30	6.20*
	60	3.45	3.57	3.74	3.93	4.13	4.32	4.62	4.87	5.12	6.12	7.19*
	80	3.78	3.92	4.12	4.33	4.55	4.78	5.11	5.40	5.68	6.82	8.06*
	100	4.07	4.23	4.45	4.68	4.93	5.17	5.55	5.86	6.18	7.45	8.85*
	120	4.33	4.51	4.74	5.00	5.26	5.53	5.94	6.28	6.63	8.04	9.59*
	140	4.56	4.76	5.01	5.29	5.57	5.86	6.30	6.68	7.05	8.60	10.30*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 28.0 Ft (RADIUS = 19.8 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		$(Ft*s)^{1/2}$	4	8	12	16	20	24	30	35	40	60	80
0	10		1.12	1.23	1.36	1.49	1.63	1.77	1.98	2.16	2.33	3.05	3.78*
	20		1.32	1.49	1.67	1.86	2.05	2.24	2.53	2.78	3.02	4.03	5.05*
	40		1.65	1.92	2.20	2.48	2.76	3.04	3.46	3.82	4.18	5.66	7.19*
	60		1.94	2.30	2.66	3.02	3.38	3.74	4.28	4.74	5.20	7.10	9.06*
	80		2.21	2.65	3.09	3.52	3.95	4.38	5.03	5.58	6.13	8.41	10.78*
	100		2.45	2.98	3.49	3.99	4.48	4.98	5.73	6.37	7.01	9.65	12.39*
	120		2.69	3.30	3.87	4.43	4.99	5.55	6.40	7.12	7.84	10.82	13.93*
	140		2.92	3.60	4.23	4.86	5.48	6.10	7.05	7.84	8.64	11.95	15.40*
25	10		1.49	1.55	1.65	1.76	1.88	2.00	2.19	2.36	2.52	3.21	3.92*
	20		1.72	1.82	1.96	2.12	2.28	2.45	2.72	2.95	3.19	4.16	5.17*
	40		2.06	2.24	2.46	2.70	2.96	3.22	3.63	3.97	4.32	5.77	7.29*
	60		2.35	2.60	2.90	3.23	3.56	3.90	4.43	4.87	5.32	7.19	9.15*
	80		2.60	2.94	3.32	3.71	4.12	4.53	5.17	5.70	6.25	8.50	10.86*
	100		2.84	3.25	3.70	4.17	4.64	5.13	5.86	6.49	7.12	9.73	12.47*
	120		3.06	3.55	4.07	4.61	5.15	5.69	6.53	7.23	7.95	10.91	14.00*
	140		3.28	3.84	4.43	5.03	5.63	6.24	7.16	7.95	8.74	12.03	15.47*
50	10		1.65	1.71	1.81	1.93	2.05	2.17	2.36	2.52	2.69	3.35	4.06*
	20		1.93	2.02	2.16	2.31	2.47	2.64	2.90	3.12	3.34	4.28	5.29*
	40		2.32	2.48	2.68	2.91	3.15	3.40	3.78	4.12	4.46	5.88	7.38*
	60		2.63	2.85	3.13	3.42	3.74	4.06	4.57	5.00	5.45	7.29	9.24*
	80		2.90	3.19	3.53	3.90	4.29	4.68	5.30	5.83	6.36	8.60	10.94*
	100		3.15	3.50	3.91	4.35	4.80	5.27	5.99	6.60	7.23	9.82	12.55*
	120		3.38	3.80	4.27	4.78	5.30	5.83	6.65	7.34	8.05	10.99	14.08*
	140		3.59	4.08	4.63	5.19	5.78	6.37	7.28	8.06	8.84	12.11	15.54*
100	10		1.87	1.94	2.04	2.16	2.29	2.41	2.61	2.77	2.94	3.60	4.30*
	20		2.21	2.30	2.44	2.59	2.76	2.92	3.18	3.39	3.61	4.53	5.51*
	40		2.67	2.82	3.02	3.24	3.47	3.70	4.07	4.39	4.72	6.09	7.58*
	60		3.03	3.23	3.49	3.77	4.06	4.37	4.85	5.26	5.69	7.49	9.41*
	80		3.33	3.59	3.90	4.24	4.60	4.98	5.57	6.07	6.59	8.78	11.11*
	100		3.60	3.91	4.28	4.69	5.11	5.55	6.24	6.84	7.45	9.99	12.70*
	120		3.85	4.22	4.65	5.11	5.60	6.10	6.89	7.57	8.26	11.15	14.23*
	140		4.09	4.51	4.99	5.52	6.07	6.63	7.52	8.27	9.04	12.27	15.69*
150	10		2.03	2.10	2.21	2.33	2.46	2.59	2.79	2.96	3.13	3.80	4.51*
	20		2.41	2.51	2.65	2.81	2.97	3.14	3.40	3.62	3.84	4.75	5.73*
	40		2.93	3.08	3.28	3.50	3.73	3.96	4.33	4.64	4.96	6.30	7.77*
	60		3.33	3.52	3.78	4.05	4.34	4.64	5.11	5.51	5.92	7.68	9.59*
	80		3.66	3.90	4.21	4.54	4.89	5.25	5.82	6.31	6.82	8.96	11.27*
	100		3.95	4.25	4.60	4.99	5.40	5.82	6.49	7.06	7.66	10.17	12.86*
	120		4.22	4.56	4.97	5.41	5.88	6.37	7.13	7.79	8.46	11.32	14.37*
	140		4.47	4.86	5.32	5.82	6.34	6.89	7.75	8.48	9.24	12.43	15.83*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 28.0 Ft (RADIUS = 19.8 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, Ft

(Ft*s)^{1/2}

°F

4

8

12

16

20

24

30

35

40

60

80

200	10	2.16	2.23	2.34	2.47	2.60	2.74	2.95	3.12	3.29	3.98	4.70*
	20	2.58	2.68	2.82	2.98	3.15	3.33	3.59	3.81	4.03	4.95	5.92*
	40	3.15	3.29	3.49	3.72	3.95	4.18	4.55	4.86	5.18	6.50	7.96*
	60	3.57	3.76	4.02	4.29	4.58	4.88	5.34	5.74	6.14	7.87	9.76*
	80	3.93	4.17	4.47	4.80	5.14	5.50	6.05	6.54	7.03	9.14	11.43*
	100	4.24	4.53	4.88	5.26	5.66	6.07	6.72	7.29	7.87	10.34	13.01*
	120	4.53	4.86	5.25	5.69	6.14	6.62	7.36	8.00	8.67	11.48	14.52*
300	140	4.79	5.16	5.61	6.09	6.60	7.14	7.97	8.69	9.44	12.59	15.97*
	10	2.37	2.44	2.56	2.69	2.84	2.98	3.19	3.37	3.55	4.27	5.01*
	20	2.85	2.95	3.10	3.27	3.45	3.63	3.90	4.13	4.36	5.29	6.28*
	40	3.49	3.64	3.85	4.07	4.31	4.55	4.92	5.24	5.56	6.87	8.32*
	60	3.97	4.16	4.42	4.70	4.99	5.29	5.75	6.14	6.54	8.24	10.10*
	80	4.36	4.60	4.90	5.23	5.58	5.93	6.48	6.95	7.44	9.49	11.76*
	100	4.71	4.99	5.34	5.72	6.11	6.52	7.15	7.70	8.27	10.68	13.32*
400	120	5.03	5.35	5.74	6.16	6.61	7.07	7.79	8.42	9.06	11.81	14.82*
	140	5.32	5.68	6.11	6.58	7.08	7.59	8.40	9.10	9.82	12.90	16.25*
	10	2.53	2.61	2.74	2.88	3.02	3.17	3.40	3.58	3.77	4.51	5.28*
	20	3.06	3.17	3.33	3.50	3.69	3.88	4.16	4.39	4.63	5.58	6.59*
	40	3.77	3.92	4.14	4.37	4.61	4.86	5.24	5.56	5.88	7.21	8.65*
	60	4.29	4.49	4.75	5.03	5.33	5.63	6.10	6.50	6.90	8.58	10.43*
	80	4.72	4.96	5.27	5.60	5.95	6.30	6.85	7.32	7.80	9.83	12.07*
600	100	5.10	5.38	5.73	6.10	6.50	6.91	7.54	8.08	8.64	11.00	13.62*
	120	5.44	5.75	6.15	6.57	7.01	7.47	8.18	8.80	9.43	12.13	15.11*
	140	5.75	6.10	6.54	7.01	7.50	8.00	8.80	9.48	10.19	13.21	16.54*
	10	2.80	2.89	3.02	3.17	3.33	3.49	3.73	3.93	4.12	4.90	5.71*
	20	3.41	3.52	3.69	3.88	4.08	4.28	4.58	4.83	5.08	6.06	7.12*
	40	4.22	4.38	4.60	4.85	5.11	5.37	5.77	6.10	6.43	7.78	9.25*
	60	4.81	5.01	5.29	5.58	5.89	6.21	6.69	7.09	7.50	9.19	11.04*
800	80	5.30	5.54	5.86	6.20	6.56	6.93	7.49	7.96	8.44	10.45	12.68*
	100	5.72	6.00	6.36	6.75	7.15	7.57	8.20	8.75	9.30	11.63	14.21*
	120	6.10	6.42	6.82	7.25	7.70	8.16	8.87	9.48	10.10	12.74	15.68*
	140	6.45	6.80	7.24	7.71	8.21	8.72	9.50	10.18	10.87	13.81	17.09*
	10	3.02	3.11	3.25	3.41	3.58	3.74	3.99	4.20	4.41	5.22	6.07*
	20	3.69	3.81	3.99	4.19	4.40	4.60	4.92	5.18	5.44	6.47	7.56*
	40	4.58	4.75	4.99	5.25	5.51	5.79	6.20	6.54	6.89	8.27	9.78*
	60	5.23	5.44	5.73	6.04	6.36	6.68	7.18	7.60	8.02	9.72	11.60*
	80	5.77	6.02	6.34	6.70	7.07	7.45	8.02	8.50	8.99	11.01	13.24*
	100	6.23	6.52	6.89	7.29	7.70	8.12	8.77	9.32	9.88	12.20	14.77*
	120	6.64	6.97	7.38	7.82	8.27	8.74	9.46	10.08	10.70	13.32	16.23*
	140	7.02	7.38	7.83	8.31	8.81	9.32	10.11	10.79	11.48	14.39	17.63*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 28.0 Ft (RADIUS = 19.8 Ft)³
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TEMPERATURE
 TIME INDEX RISE

CEILING HEIGHT, Ft

(Ft*s)^{1/2}

°F

4

8

12

16

20

24

30

35

40

60

80

0

10

20

40

60

80

100

120

140

25

10

20

40

60

80

100

120

140

50

10

20

40

60

80

100

120

140

100

10

20

40

60

80

100

120

140

150

10

20

40

60

80

100

120

140

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 28.0 Ft (RADIUS = 19.8 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		°F	4	8	12	16	20	24	30	35	40	60	80
200 (Ft*s) ^{1/2}	10		3.18	3.29	3.47	3.67	3.88	4.10	4.42	4.69	4.97	6.09	7.30*
	20		3.85	4.03	4.27	4.54	4.82	5.11	5.56	5.94	6.33	7.95	9.71*
	40		4.78	5.07	5.43	5.83	6.24	6.68	7.35	7.93	8.53	11.08	13.85*
	60		5.49	5.89	6.37	6.89	7.44	8.01	8.90	9.68	10.48	13.87	17.52*
	80		6.10	6.60	7.19	7.84	8.52	9.23	10.34	11.30	12.28	16.45	20.91*
	100		6.64	7.25	7.96	8.73	9.53	10.38	11.69	12.83	13.99	18.88	24.10*
	120		7.14	7.86	8.68	9.57	10.51	11.48	12.99	14.29	15.62	21.20	27.14*
	140		7.61	8.43	9.38	10.38	11.44	12.54	14.24	15.69	17.19	23.43	30.06*
300	10		3.49	3.62	3.80	4.01	4.23	4.45	4.79	5.07	5.36	6.50	7.72*
	20		4.26	4.44	4.69	4.97	5.26	5.55	6.01	6.39	6.78	8.39	10.14*
	40		5.30	5.58	5.95	6.35	6.76	7.19	7.86	8.43	9.01	11.50	14.23*
	60		6.09	6.47	6.94	7.45	7.99	8.55	9.42	10.17	10.95	14.25	17.87*
	80		6.75	7.23	7.81	8.43	9.09	9.77	10.84	11.77	12.73	16.81	21.24*
	100		7.34	7.91	8.59	9.33	10.10	10.91	12.18	13.28	14.42	19.23	24.41*
	120		7.88	8.55	9.33	10.18	11.07	12.00	13.46	14.73	16.03	21.53	27.44*
	140		8.37	9.14	10.03	10.99	12.00	13.05	14.70	16.12	17.58	23.75	30.35*
400	10		3.75	3.88	4.07	4.29	4.52	4.75	5.10	5.39	5.68	6.85	8.09*
	20		4.59	4.77	5.03	5.32	5.62	5.92	6.38	6.78	7.17	8.78	10.54*
	40		5.72	6.01	6.38	6.78	7.20	7.63	8.30	8.87	9.45	11.90	14.61*
	60		6.57	6.95	7.43	7.94	8.47	9.02	9.88	10.62	11.39	14.63	18.22*
	80		7.29	7.76	8.33	8.94	9.59	10.26	11.31	12.22	13.16	17.17	21.56*
	100		7.92	8.47	9.14	9.86	10.62	11.41	12.65	13.72	14.83	19.57	24.72*
	120		8.49	9.13	9.90	10.72	11.59	12.50	13.92	15.16	16.43	21.86	27.73*
	140		9.01	9.75	10.61	11.54	12.52	13.54	15.15	16.54	17.98	24.06	30.63*
600	10		4.17	4.30	4.51	4.74	4.98	5.23	5.59	5.90	6.21	7.42	8.72*
	20		5.12	5.32	5.59	5.89	6.21	6.53	7.01	7.41	7.82	9.47	11.25*
	40		6.41	6.70	7.08	7.50	7.93	8.38	9.05	9.63	10.21	12.64	15.33*
	60		7.37	7.74	8.23	8.75	9.29	9.84	10.70	11.44	12.19	15.36	18.90*
	80		8.16	8.63	9.20	9.82	10.46	11.13	12.16	13.05	13.97	17.87	22.20*
	100		8.86	9.40	10.07	10.78	11.53	12.31	13.51	14.56	15.63	20.24	25.33*
	120		9.49	10.11	10.87	11.68	12.53	13.41	14.79	15.98	17.22	22.51	28.32*
	140		10.06	10.77	11.61	12.52	13.47	14.46	16.01	17.35	18.74	24.69	31.20*
800	10		4.50	4.64	4.86	5.11	5.36	5.62	6.00	6.32	6.64	7.90	9.25*
	20		5.56	5.76	6.05	6.36	6.69	7.02	7.52	7.94	8.36	10.05	11.88*
	40		6.97	7.26	7.66	8.09	8.54	8.99	9.69	10.27	10.87	13.31	16.00*
	60		8.01	8.39	8.89	9.42	9.97	10.54	11.41	12.14	12.90	16.05	19.55*
	80		8.87	9.34	9.92	10.55	11.20	11.87	12.91	13.80	14.70	18.55	22.84*
	100		9.63	10.17	10.84	11.56	12.31	13.09	14.28	15.32	16.38	20.90	25.94*
	120		10.31	10.93	11.68	12.49	13.34	14.21	15.57	16.75	17.96	23.15	28.90*
	140		10.93	11.63	12.46	13.36	14.30	15.28	16.80	18.12	19.48	25.31	31.76*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 28.0 Ft (RADIUS = 19.8 Ft)³
 FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
(Ft*s) ^{1/2}	°F												
	0	2.61	3.00	3.40	3.82	4.23	4.65	5.28	5.81	6.35	8.54	10.80*	
	10	3.39	4.03	4.66	5.29	5.91	6.54	7.50	8.30	9.11	12.43	15.87*	
	20	4.71	5.77	6.78	7.76	8.75	9.73	11.22	12.48	13.75	18.97	24.41*	
	40	5.87	7.30	8.63	9.93	11.23	12.52	14.49	16.14	17.81	24.70	31.90*	
	60	6.94	8.70	10.33	11.93	13.51	15.09	17.48	19.50	21.55	29.97	38.77*	
	80	7.93	10.02	11.93	13.80	15.65	17.50	20.30	22.66	25.05	34.91	45.23*	
25	100	8.88	11.27	13.45	15.58	17.68	19.79	22.98	25.66	28.38	39.61	51.37*	
	120	9.79	12.47	14.91	17.28	19.63	21.99	25.54	28.54	31.58	44.12	57.25*	
	140												
	10	3.19	3.44	3.77	4.14	4.51	4.91	5.51	6.02	6.54	8.69	10.93*	
	20	3.95	4.43	4.98	5.56	6.16	6.76	7.69	8.47	9.27	12.56	15.99*	
	40	5.21	6.11	7.05	7.99	8.95	9.91	11.38	12.62	13.88	19.08	24.51*	
	60	6.32	7.61	8.88	10.14	11.41	12.69	14.63	16.27	17.94	24.80	31.99*	
50	80	7.36	8.99	10.56	12.12	13.68	15.25	17.62	19.63	21.66	30.06	38.86*	
	100	8.33	10.29	12.15	13.98	15.81	17.65	20.43	22.78	25.16	35.00	45.31*	
	120	9.27	11.53	13.66	15.75	17.84	19.93	23.10	25.78	28.49	39.69	51.44*	
	140	10.16	12.72	15.11	17.45	19.78	22.12	25.66	28.65	31.68	44.20	57.32*	
	10	3.55	3.78	4.09	4.42	4.78	5.15	5.73	6.23	6.73	8.85	11.07*	
	20	4.37	4.78	5.28	5.83	6.39	6.98	7.88	8.65	9.43	12.69	16.11*	
	40	5.65	6.44	7.31	8.22	9.15	10.10	11.54	12.77	14.02	19.19	24.61*	
100	60	6.75	7.91	9.12	10.35	11.60	12.86	14.78	16.41	18.06	24.90	32.08*	
	80	7.77	9.27	10.79	12.31	13.85	15.40	17.76	19.75	21.78	30.15	38.94*	
	100	8.73	10.56	12.36	14.16	15.97	17.79	20.56	22.90	25.27	35.08	45.39*	
	120	9.64	11.79	13.87	15.93	17.99	20.07	23.22	25.89	28.59	39.78	51.51*	
	140	10.53	12.97	15.31	17.62	19.93	22.26	25.78	28.76	31.78	44.28	57.39*	
	10	4.05	4.27	4.56	4.89	5.23	5.59	6.14	6.62	7.10	9.15	11.35*	
	20	4.99	5.35	5.81	6.31	6.84	7.39	8.25	8.99	9.76	12.95	16.34*	
150	40	6.37	7.04	7.83	8.67	9.55	10.46	11.86	13.07	14.29	19.41	24.81*	
	60	7.50	8.49	9.60	10.76	11.96	13.19	15.07	16.68	18.31	25.10	32.25*	
	80	8.51	9.83	11.24	12.70	14.19	15.71	18.03	20.00	22.01	30.34	39.11*	
	100	9.46	11.09	12.79	14.53	16.29	18.08	20.82	23.13	25.49	35.26	45.54*	
	120	10.37	12.30	14.27	16.28	18.30	20.35	23.47	26.12	28.80	39.94	51.66*	
	140	11.23	13.46	15.70	17.96	20.23	22.52	26.02	28.98	31.98	44.44	57.54*	
	10	4.42	4.63	4.93	5.26	5.60	5.95	6.50	6.97	7.44	9.45	11.62*	
20	20	5.45	5.80	6.24	6.73	7.24	7.78	8.61	9.33	10.07	13.20	16.57*	
	40	6.93	7.55	8.29	9.09	9.94	10.81	12.18	13.36	14.57	19.62	25.00*	
	60	8.11	9.02	10.05	11.16	12.32	13.51	15.36	16.94	18.56	25.30	32.43*	
	80	9.16	10.35	11.68	13.08	14.53	16.01	18.30	20.25	22.24	30.52	39.27*	
	100	10.12	11.60	13.21	14.89	16.61	18.37	21.07	23.37	25.71	35.43	45.70*	
	120	11.02	12.79	14.68	16.62	18.61	20.63	23.71	26.34	29.01	40.11	51.81*	
	140	11.89	13.94	16.09	18.29	20.52	22.79	26.25	29.20	32.19	44.60	57.68*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 28.0 Ft (RADIUS = 19.8 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60	80
200	10	4.72	4.93	5.23	5.56	5.91	6.27	6.81	7.28	7.75	9.73	11.88*
	20	5.83	6.17	6.61	7.09	7.60	8.13	8.94	9.65	10.38	13.46	16.80*
	40	7.40	7.99	8.71	9.48	10.30	11.16	12.49	13.65	14.84	19.84	25.20*
	60	8.63	9.49	10.48	11.55	12.67	13.83	15.65	17.20	18.80	25.49	32.61*
	80	9.71	10.83	12.10	13.45	14.86	16.31	18.57	20.50	22.47	30.70	39.44*
	100	10.70	12.08	13.62	15.25	16.93	18.66	21.33	23.60	25.93	35.61	45.85*
	120	11.62	13.27	15.08	16.96	18.91	20.90	23.96	26.57	29.22	40.28	51.96*
300	140	12.49	14.41	16.48	18.62	20.82	23.06	26.49	29.41	32.39	44.76	57.83*
	10	5.21	5.42	5.73	6.07	6.43	6.79	7.35	7.82	8.29	10.25	12.39*
	20	6.45	6.78	7.23	7.71	8.22	8.74	9.54	10.24	10.95	13.95	17.25*
	40	8.17	8.74	9.44	10.19	10.98	11.80	13.09	14.21	15.37	20.27	25.58*
	60	9.51	10.31	11.25	12.27	13.34	14.46	16.21	17.73	19.29	25.88	32.96*
	80	10.66	11.69	12.88	14.16	15.51	16.91	19.10	20.99	22.93	31.07	39.76*
	100	11.69	12.96	14.40	15.94	17.55	19.23	21.83	24.07	26.36	35.95	46.17*
400	120	12.65	14.16	15.84	17.64	19.51	21.45	24.44	27.01	29.64	40.61	52.26*
	140	13.55	15.30	17.23	19.28	21.40	23.59	26.96	29.84	32.79	45.08	58.11*
	10	5.60	5.82	6.14	6.49	6.86	7.23	7.79	8.27	8.75	10.72	12.87*
	20	6.95	7.29	7.74	8.23	8.74	9.26	10.07	10.76	11.47	14.43	17.70*
	40	8.81	9.37	10.06	10.80	11.58	12.39	13.65	14.75	15.88	20.70	25.97*
	60	10.24	11.01	11.93	12.92	13.96	15.05	16.76	18.24	19.77	26.27	33.31*
	80	11.45	12.44	13.58	14.82	16.13	17.49	19.62	21.47	23.38	31.43	40.09*
600	100	12.53	13.74	15.12	16.60	18.16	19.79	22.33	24.53	26.79	36.30	46.48*
	120	13.53	14.95	16.56	18.29	20.10	21.99	24.93	27.46	30.05	40.94	52.56*
	140	14.46	16.10	17.95	19.91	21.97	24.11	27.42	30.27	33.19	45.40	58.40*
	10	6.24	6.47	6.80	7.17	7.56	7.94	8.53	9.03	9.53	11.54	13.71*
	20	7.77	8.11	8.58	9.08	9.61	10.15	10.97	11.66	12.37	15.31	18.56*
	40	9.85	10.40	11.09	11.84	12.62	13.42	14.67	15.74	16.84	21.53	26.74*
	60	11.43	12.17	13.08	14.05	15.07	16.13	17.79	19.22	20.70	27.05	34.01*
800	80	12.75	13.70	14.81	16.00	17.26	18.58	20.63	22.44	24.27	32.16	40.75*
	100	13.93	15.06	16.38	17.80	19.30	20.86	23.31	25.44	27.64	36.99	47.10*
	120	15.00	16.33	17.86	19.50	21.23	23.04	25.88	28.34	30.87	41.60	53.15*
	140	16.00	17.52	19.26	21.12	23.09	25.14	28.34	31.12	33.98	46.03	58.97*
	10	6.75	6.99	7.34	7.73	8.13	8.53	9.15	9.66	10.17	12.23	14.46*
	20	8.43	8.78	9.27	9.79	10.33	10.88	11.72	12.43	13.15	16.10	19.36*
	40	10.70	11.25	11.95	12.71	13.50	14.31	15.55	16.62	17.71	22.34	27.49*
	60	12.40	13.14	14.05	15.02	16.04	17.09	18.72	20.13	21.59	27.81	34.70*
	80	13.83	14.75	15.85	17.04	18.28	19.56	21.58	23.33	25.13	32.88	41.39*
	100	15.08	16.19	17.48	18.87	20.34	21.86	24.25	26.33	28.48	37.67	47.71*
	120	16.22	17.51	19.00	20.60	22.28	24.04	26.80	29.20	31.68	42.25	53.74*
	140	17.28	18.74	20.42	22.23	24.13	26.12	29.25	31.96	34.76	46.67	59.54*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 30.0 Ft (RADIUS = 21.2 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		$(Ft*s)^{1/2}$	4	8	12	16	20	24	30	35	40	60	80
0	10	0.82	0.88	0.95	1.03	1.12	1.20	1.33	1.44	1.55	1.99	2.43*	
	20	0.93	1.01	1.12	1.23	1.34	1.45	1.62	1.76	1.90	2.49	3.08*	
	40	1.10	1.24	1.40	1.55	1.71	1.86	2.10	2.30	2.50	3.32	4.17*	
	60	1.26	1.45	1.64	1.83	2.03	2.23	2.52	2.78	3.03	4.06	5.12*	
	80	1.40	1.63	1.86	2.10	2.33	2.56	2.91	3.21	3.51	4.73	6.00*	
	100	1.53	1.80	2.07	2.34	2.61	2.87	3.28	3.62	3.96	5.37	6.82*	
	120	1.66	1.97	2.27	2.57	2.87	3.17	3.63	4.01	4.39	5.97	7.61*	
25	140	1.78	2.13	2.47	2.80	3.13	3.46	3.96	4.38	4.80	6.55	8.36*	
	10	1.10	1.13	1.19	1.26	1.33	1.41	1.53	1.63	1.73	2.14	2.56*	
	20	1.24	1.29	1.37	1.46	1.55	1.65	1.80	1.93	2.07	2.62	3.19*	
	40	1.45	1.53	1.64	1.77	1.91	2.05	2.26	2.45	2.64	3.44	4.26*	
	60	1.61	1.73	1.88	2.04	2.21	2.39	2.67	2.91	3.15	4.16	5.21*	
	80	1.76	1.90	2.09	2.29	2.50	2.72	3.05	3.34	3.63	4.83	6.08*	
	100	1.89	2.07	2.29	2.53	2.77	3.02	3.41	3.74	4.07	5.46	6.90*	
50	120	2.01	2.23	2.48	2.75	3.03	3.31	3.75	4.12	4.50	6.05	7.68*	
	140	2.13	2.38	2.67	2.97	3.28	3.60	4.08	4.49	4.91	6.63	8.43*	
	10	1.21	1.24	1.31	1.38	1.45	1.53	1.65	1.75	1.86	2.27	2.69*	
	20	1.39	1.44	1.51	1.60	1.70	1.80	1.95	2.08	2.21	2.74	3.30*	
	40	1.64	1.71	1.82	1.94	2.07	2.20	2.41	2.59	2.78	3.54	4.36*	
	60	1.82	1.92	2.06	2.22	2.38	2.55	2.82	3.04	3.28	4.26	5.30*	
	80	1.98	2.11	2.28	2.47	2.66	2.87	3.19	3.46	3.74	4.92	6.16*	
100	100	2.13	2.28	2.48	2.70	2.93	3.17	3.54	3.86	4.18	5.54	6.98*	
	120	2.26	2.44	2.67	2.92	3.18	3.45	3.87	4.24	4.60	6.14	7.75*	
	140	2.38	2.60	2.85	3.13	3.43	3.73	4.20	4.60	5.01	6.71	8.50*	
	10	1.36	1.40	1.46	1.54	1.62	1.70	1.83	1.93	2.04	2.46	2.89*	
	20	1.58	1.63	1.71	1.81	1.90	2.01	2.16	2.29	2.42	2.96	3.51*	
	40	1.88	1.95	2.06	2.19	2.32	2.45	2.66	2.83	3.01	3.75	4.55*	
	60	2.11	2.20	2.34	2.49	2.65	2.81	3.07	3.29	3.51	4.46	5.47*	
150	80	2.29	2.41	2.57	2.75	2.94	3.13	3.44	3.70	3.97	5.11	6.33*	
	100	2.46	2.60	2.79	2.99	3.21	3.43	3.78	4.09	4.40	5.72	7.13*	
	120	2.61	2.77	2.99	3.22	3.46	3.72	4.11	4.46	4.81	6.31	7.90*	
	140	2.75	2.94	3.17	3.43	3.70	3.99	4.43	4.82	5.21	6.87	8.64*	
	10	1.47	1.51	1.58	1.66	1.74	1.83	1.96	2.07	2.17	2.61	3.05*	
	20	1.72	1.77	1.86	1.95	2.06	2.16	2.32	2.46	2.59	3.13	3.69*	
	40	2.06	2.13	2.25	2.37	2.51	2.64	2.85	3.03	3.21	3.94	4.73*	
	60	2.31	2.41	2.55	2.70	2.86	3.02	3.28	3.49	3.72	4.64	5.64*	
	80	2.52	2.64	2.80	2.98	3.16	3.36	3.66	3.91	4.18	5.28	6.49*	
	100	2.71	2.84	3.03	3.23	3.44	3.66	4.01	4.30	4.60	5.89	7.29*	
	120	2.87	3.03	3.24	3.46	3.70	3.95	4.34	4.67	5.01	6.47	8.05*	
	140	3.02	3.20	3.43	3.68	3.95	4.22	4.65	5.02	5.41	7.03	8.78*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 30.0 Ft (RADIUS = 21.2 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		(Ft*s) ^{1/2}	4	8	12	16	20	24	30	35	40	60	80
200	10	1.56	1.60	1.67	1.75	1.84	1.93	2.06	2.17	2.29	2.73	3.18*	
	20	1.84	1.89	1.98	2.08	2.18	2.29	2.45	2.59	2.73	3.28	3.85*	
	40	2.21	2.28	2.40	2.53	2.66	2.80	3.01	3.19	3.37	4.11	4.90*	
	60	2.48	2.58	2.72	2.87	3.03	3.20	3.46	3.68	3.90	4.82	5.81*	
	80	2.71	2.83	2.99	3.17	3.36	3.55	3.85	4.10	4.36	5.46	6.65*	
	100	2.91	3.04	3.23	3.43	3.64	3.86	4.20	4.50	4.80	6.06	7.44*	
	120	3.09	3.24	3.45	3.67	3.91	4.16	4.54	4.87	5.20	6.64	8.19*	
300	140	3.25	3.43	3.65	3.90	4.16	4.43	4.86	5.22	5.60	7.19	8.92*	
	10	1.70	1.74	1.82	1.90	2.00	2.09	2.23	2.35	2.47	2.93	3.40*	
	20	2.02	2.07	2.17	2.27	2.38	2.50	2.67	2.81	2.96	3.53	4.12*	
	40	2.44	2.52	2.64	2.78	2.92	3.06	3.28	3.47	3.66	4.41	5.20*	
	60	2.76	2.85	3.00	3.16	3.33	3.50	3.76	3.98	4.21	5.13	6.12*	
	80	3.01	3.13	3.30	3.48	3.67	3.87	4.17	4.43	4.69	5.78	6.95*	
	100	3.23	3.37	3.56	3.77	3.98	4.20	4.55	4.84	5.13	6.38	7.73*	
400	120	3.43	3.59	3.80	4.03	4.27	4.51	4.89	5.22	5.55	6.95	8.48*	
	140	3.62	3.79	4.02	4.27	4.53	4.80	5.22	5.58	5.94	7.50	9.20*	
	10	1.82	1.86	1.94	2.03	2.12	2.22	2.37	2.49	2.61	3.09	3.58*	
	20	2.17	2.22	2.32	2.43	2.55	2.67	2.85	3.00	3.14	3.73	4.34*	
	40	2.63	2.71	2.84	2.98	3.13	3.28	3.51	3.70	3.89	4.66	5.47*	
	60	2.98	3.08	3.23	3.39	3.57	3.74	4.01	4.24	4.47	5.40	6.40*	
	80	3.26	3.38	3.55	3.74	3.94	4.14	4.45	4.71	4.97	6.06	7.23*	
600	100	3.50	3.64	3.83	4.04	4.26	4.49	4.84	5.13	5.43	6.67	8.01*	
	120	3.72	3.87	4.09	4.32	4.56	4.81	5.20	5.52	5.85	7.24	8.76*	
	140	3.92	4.09	4.32	4.58	4.84	5.11	5.53	5.89	6.26	7.79	9.47*	
	10	2.00	2.04	2.13	2.23	2.33	2.43	2.59	2.72	2.85	3.36	3.88*	
	20	2.41	2.47	2.57	2.69	2.81	2.94	3.13	3.29	3.45	4.07	4.71*	
	40	2.94	3.03	3.16	3.31	3.47	3.63	3.87	4.07	4.27	5.08	5.91*	
	60	3.33	3.44	3.60	3.77	3.96	4.14	4.43	4.67	4.91	5.87	6.88*	
800	80	3.65	3.78	3.96	4.16	4.37	4.58	4.90	5.17	5.45	6.56	7.74*	
	100	3.93	4.07	4.27	4.50	4.73	4.96	5.32	5.63	5.93	7.18	8.53*	
	120	4.18	4.34	4.56	4.80	5.05	5.31	5.71	6.04	6.38	7.77	9.28*	
	140	4.40	4.58	4.82	5.08	5.35	5.63	6.06	6.43	6.80	8.33	9.99*	
	10	2.15	2.20	2.29	2.39	2.50	2.61	2.77	2.91	3.05	3.58	4.12*	
	20	2.60	2.66	2.77	2.90	3.03	3.16	3.36	3.53	3.70	4.35	5.02*	
	40	3.19	3.28	3.42	3.58	3.74	3.91	4.17	4.38	4.59	5.42	6.29*	
	60	3.62	3.73	3.90	4.08	4.28	4.47	4.77	5.02	5.27	6.26	7.30*	
	80	3.97	4.10	4.29	4.50	4.72	4.94	5.28	5.56	5.84	6.98	8.19*	
	100	4.28	4.42	4.64	4.87	5.11	5.35	5.72	6.04	6.35	7.63	8.99*	
	120	4.55	4.71	4.94	5.19	5.46	5.72	6.13	6.47	6.82	8.23	9.75*	
	140	4.79	4.97	5.22	5.50	5.78	6.07	6.51	6.88	7.25	8.80	10.47*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 30.0 Ft (RADIUS = 21.2 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60
0	10	1.29	1.42	1.55	1.69	1.83	2.04	2.22	2.40	2.59	3.12	3.85*	
	20	1.57	1.75	1.94	2.13	2.33	2.62	2.86	3.11	3.28	4.12	5.15*	
	40	2.03	2.31	2.59	2.87	3.15	3.58	3.94	4.31	4.45	5.79	7.33*	
	60	2.43	2.80	3.16	3.52	3.88	4.43	4.89	5.36	5.48	7.26	9.24*	
	80	2.80	3.24	3.68	4.11	4.55	5.21	5.76	6.32	6.44	8.61	10.99*	
	100	3.15	3.66	4.17	4.67	5.18	5.94	6.58	7.23	7.36	9.88	12.64*	
	120	3.48	4.06	4.64	5.20	5.77	6.63	7.36	8.09	8.10	11.08	14.20*	
	140	3.80	4.45	5.08	5.71	6.35	7.30	8.10	8.91	8.91	12.24	15.71*	
	25	10	1.62	1.72	1.83	1.95	2.07	2.26	2.43	2.59	3.28	3.99*	
		20	1.91	2.05	2.20	2.37	2.54	2.81	3.04	3.28	4.25	5.26*	
40		2.35	2.58	2.82	3.08	3.34	3.75	4.10	4.45	5.90	7.42*		
60		2.74	3.04	3.37	3.71	4.05	4.58	5.03	5.48	7.36	9.33*		
80		3.09	3.48	3.88	4.29	4.71	5.35	5.89	6.44	8.71	11.07*		
100		3.42	3.88	4.36	4.84	5.33	6.07	6.70	7.34	9.97	12.72*		
120		3.74	4.27	4.82	5.36	5.92	6.76	7.47	8.19	11.17	14.28*		
140		4.05	4.65	5.26	5.87	6.48	7.42	8.21	9.01	12.32	15.78*		
50		10	1.80	1.89	2.01	2.12	2.25	2.44	2.60	2.76	3.42	4.12*	
		20	2.12	2.25	2.40	2.56	2.73	2.99	3.21	3.43	4.38	5.38*	
	40	2.60	2.80	3.03	3.27	3.52	3.91	4.24	4.59	6.02	7.52*		
	60	2.99	3.27	3.57	3.89	4.22	4.73	5.16	5.61	7.46	9.41*		
	80	3.35	3.70	4.07	4.46	4.86	5.48	6.02	6.56	8.80	11.16*		
	100	3.68	4.10	4.54	5.00	5.47	6.20	6.82	7.45	10.06	12.79*		
	120	3.99	4.48	4.99	5.52	6.06	6.88	7.59	8.30	11.25	14.35*		
	140	4.30	4.85	5.43	6.02	6.62	7.54	8.32	9.12	12.40	15.85*		
	100	10	2.03	2.13	2.25	2.37	2.50	2.69	2.85	3.01	3.68	4.37*	
		20	2.41	2.55	2.70	2.86	3.02	3.28	3.49	3.71	4.63	5.60*	
40		2.96	3.15	3.37	3.60	3.84	4.21	4.53	4.85	6.23	7.72*		
60		3.39	3.64	3.92	4.22	4.53	5.01	5.43	5.86	7.66	9.59*		
80		3.76	4.08	4.42	4.79	5.16	5.75	6.27	6.79	8.99	11.32*		
100		4.11	4.48	4.89	5.32	5.76	6.46	7.06	7.67	10.23	12.95*		
120		4.43	4.86	5.33	5.82	6.34	7.13	7.81	8.51	11.42	14.50*		
140		4.73	5.23	5.76	6.31	6.89	7.78	8.54	9.32	12.57	15.99*		
150		10	2.20	2.30	2.42	2.55	2.68	2.88	3.05	3.21	3.89	4.58*	
		20	2.63	2.76	2.92	3.08	3.25	3.51	3.73	3.95	4.85	5.82*	
	40	3.23	3.42	3.64	3.87	4.10	4.47	4.78	5.10	6.45	7.91*		
	60	3.69	3.94	4.22	4.51	4.81	5.27	5.68	6.10	7.86	9.76*		
	80	4.09	4.40	4.73	5.08	5.44	6.01	6.51	7.02	9.17	11.48*		
	100	4.45	4.81	5.20	5.61	6.04	6.71	7.29	7.89	10.41	13.11*		
	120	4.78	5.20	5.64	6.11	6.60	7.37	8.04	8.72	11.59	14.65*		
	140	5.10	5.56	6.07	6.60	7.15	8.01	8.76	9.52	12.73	16.14*		

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 30.0 Ft (RADIUS = 21.2 Ft) ³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
(Ft*s) ^{1/2} 200	°F											
	10	2.27	2.33	2.44	2.57	2.70	2.83	3.04	3.21	3.38	4.06	4.77*
	20	2.71	2.80	2.94	3.10	3.27	3.44	3.70	3.92	4.15	5.06	6.02*
	40	3.31	3.45	3.65	3.86	4.09	4.33	4.69	5.01	5.32	6.65	8.10*
	60	3.76	3.94	4.19	4.47	4.75	5.05	5.51	5.91	6.32	8.06	9.94*
	80	4.13	4.37	4.67	4.99	5.34	5.70	6.26	6.74	7.24	9.36	11.65*
	100	4.46	4.74	5.09	5.47	5.88	6.29	6.95	7.52	8.10	10.58	13.26*
300	120	4.76	5.09	5.49	5.92	6.38	6.86	7.61	8.26	8.93	11.76	14.80*
	140	5.04	5.41	5.86	6.35	6.87	7.40	8.24	8.97	9.72	12.89	16.28*
	10	2.49	2.55	2.67	2.80	2.94	3.08	3.29	3.47	3.65	4.36	5.09*
	20	2.99	3.08	3.23	3.40	3.57	3.75	4.02	4.25	4.48	5.41	6.38*
	40	3.67	3.81	4.01	4.24	4.47	4.71	5.08	5.40	5.71	7.03	8.46*
	60	4.17	4.36	4.61	4.89	5.18	5.47	5.94	6.33	6.73	8.43	10.28*
	80	4.59	4.82	5.12	5.45	5.79	6.14	6.69	7.17	7.65	9.71	11.97*
400	100	4.96	5.23	5.57	5.95	6.34	6.75	7.39	7.94	8.51	10.93	13.57*
	120	5.29	5.60	5.99	6.42	6.86	7.33	8.05	8.68	9.33	12.09	15.09*
	140	5.59	5.95	6.38	6.86	7.35	7.87	8.68	9.39	10.12	13.21	16.56*
	10	2.67	2.73	2.85	2.99	3.13	3.28	3.50	3.69	3.87	4.60	5.35*
	20	3.22	3.32	3.47	3.64	3.82	4.01	4.29	4.52	4.76	5.70	6.69*
	40	3.96	4.10	4.31	4.54	4.78	5.03	5.41	5.73	6.05	7.37	8.79*
	60	4.51	4.70	4.95	5.23	5.53	5.83	6.30	6.69	7.10	8.78	10.61*
600	80	4.96	5.19	5.49	5.82	6.17	6.53	7.08	7.55	8.03	10.06	12.28*
	100	5.36	5.63	5.97	6.35	6.75	7.16	7.79	8.33	8.89	11.27	13.87*
	120	5.72	6.02	6.41	6.84	7.28	7.74	8.46	9.07	9.71	12.42	15.38*
	140	6.04	6.39	6.82	7.29	7.78	8.29	9.09	9.78	10.49	13.53	16.84*
	10	2.95	3.02	3.15	3.30	3.45	3.61	3.84	4.04	4.24	5.01	5.79*
	20	3.59	3.69	3.85	4.03	4.23	4.42	4.72	4.97	5.22	6.20	7.23*
	40	4.43	4.58	4.80	5.04	5.30	5.55	5.95	6.28	6.61	7.96	9.40*
800	60	5.05	5.24	5.51	5.81	6.11	6.43	6.90	7.31	7.72	9.40	11.23*
	80	5.57	5.80	6.11	6.45	6.81	7.17	7.73	8.20	8.69	10.70	12.89*
	100	6.01	6.28	6.64	7.02	7.42	7.84	8.47	9.02	9.57	11.90	14.46*
	120	6.41	6.72	7.11	7.54	7.99	8.45	9.16	9.77	10.40	13.05	15.96*
	140	6.78	7.12	7.56	8.03	8.52	9.03	9.82	10.49	11.19	14.14	17.40*
	10	3.18	3.25	3.39	3.54	3.71	3.87	4.12	4.32	4.53	5.33	6.16*
	20	3.88	3.99	4.16	4.35	4.56	4.76	5.07	5.33	5.59	6.61	7.67*
	40	4.81	4.97	5.20	5.45	5.72	5.98	6.39	6.74	7.08	8.46	9.93*
	60	5.50	5.69	5.97	6.28	6.59	6.92	7.41	7.82	8.24	9.95	11.78*
	80	6.06	6.29	6.61	6.97	7.33	7.71	8.28	8.76	9.25	11.27	13.46*
	100	6.54	6.82	7.18	7.58	7.99	8.41	9.06	9.60	10.16	12.49	15.02*
	120	6.98	7.29	7.69	8.13	8.58	9.05	9.77	10.39	11.01	13.63	16.51*
	140	7.38	7.72	8.16	8.64	9.14	9.65	10.44	11.12	11.81	14.73	17.94*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 30.0 Ft (RADIUS = 21.2 Ft)³
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TEMPERATURE
 TIME INDEX RISE

CEILING HEIGHT, Ft

(Ft*s)^{1/2}

°F	4	8	12	16	20	24	30	35	40	60	80
0	1.78	1.98	2.20	2.44	2.67	2.91	3.27	3.57	3.88	5.11	6.37*
10	2.20	2.53	2.87	3.21	3.55	3.90	4.42	4.86	5.30	7.10	8.97*
20	2.90	3.45	3.98	4.51	5.03	5.56	6.35	7.02	7.69	10.46	13.33*
40	3.52	4.26	4.96	5.64	6.33	7.01	8.04	8.91	9.79	13.40	17.15*
60	4.08	5.00	5.85	6.69	7.52	8.35	9.60	10.65	11.72	16.10	20.66*
80	4.61	5.69	6.69	7.67	8.63	9.60	11.06	12.29	13.53	18.63	23.95*
100	5.12	6.35	7.49	8.60	9.70	10.79	12.45	13.84	15.25	21.04	27.08*
120	5.60	6.99	8.26	9.49	10.71	11.94	13.78	15.33	16.90	23.35	30.09*
140											
25	2.27	2.38	2.56	2.75	2.95	3.17	3.50	3.78	4.07	5.27	6.51*
10	2.70	2.91	3.19	3.48	3.80	4.12	4.61	5.04	5.47	7.24	9.08*
20	3.38	3.79	4.25	4.74	5.24	5.74	6.52	7.17	7.83	10.57	13.42*
40	3.97	4.57	5.21	5.86	6.51	7.18	8.19	9.05	9.92	13.50	17.24*
60	4.51	5.29	6.08	6.89	7.69	8.50	9.74	10.78	11.84	16.19	20.74*
80	5.02	5.97	6.91	7.85	8.80	9.75	11.19	12.41	13.64	18.72	24.03*
100	5.51	6.62	7.70	8.78	9.85	10.94	12.57	13.96	15.36	21.12	27.16*
120	5.98	7.24	8.46	9.67	10.87	12.07	13.90	15.44	17.00	23.43	30.16*
140											
50	2.53	2.64	2.80	2.99	3.19	3.39	3.71	3.98	4.26	5.42	6.65*
10	3.02	3.21	3.46	3.73	4.03	4.33	4.80	5.21	5.63	7.37	9.20*
20	3.75	4.10	4.52	4.97	5.44	5.93	6.68	7.32	7.97	10.68	13.52*
40	4.35	4.86	5.45	6.06	6.70	7.35	8.34	9.19	10.05	13.60	17.32*
60	4.89	5.57	6.31	7.08	7.86	8.66	9.88	10.91	11.96	16.28	20.82*
80	5.40	6.24	7.13	8.04	8.96	9.90	11.32	12.53	13.75	18.81	24.11*
100	5.88	6.88	7.91	8.96	10.01	11.08	12.70	14.07	15.46	21.21	27.23*
120	6.34	7.50	8.66	9.84	11.02	12.21	14.02	15.55	17.10	23.51	30.23*
140											
100	2.88	2.98	3.15	3.34	3.54	3.74	4.05	4.32	4.59	5.72	6.92*
10	3.46	3.63	3.87	4.14	4.42	4.71	5.16	5.55	5.95	7.63	9.43*
20	4.29	4.59	4.97	5.39	5.83	6.29	7.00	7.62	8.25	10.90	13.72*
40	4.95	5.38	5.90	6.47	7.06	7.68	8.64	9.46	10.30	13.80	17.50*
60	5.52	6.09	6.75	7.47	8.21	8.97	10.15	11.16	12.19	16.47	20.99*
80	6.04	6.75	7.56	8.41	9.29	10.19	11.58	12.77	13.98	18.99	24.26*
100	6.53	7.38	8.32	9.31	10.32	11.36	12.95	14.30	15.68	21.38	27.38*
120	6.99	7.98	9.06	10.18	11.32	12.48	14.26	15.77	17.31	23.68	30.37*
140											
150	3.14	3.24	3.41	3.60	3.80	4.01	4.33	4.60	4.87	5.99	7.17*
10	3.79	3.95	4.19	4.46	4.73	5.02	5.47	5.85	6.24	7.88	9.66*
20	4.70	4.98	5.35	5.75	6.17	6.62	7.31	7.91	8.52	11.12	13.91*
40	5.40	5.81	6.30	6.84	7.41	8.00	8.93	9.73	10.55	14.00	17.68*
60	6.01	6.53	7.16	7.83	8.54	9.28	10.42	11.41	12.42	16.66	21.15*
80	6.56	7.20	7.96	8.76	9.61	10.49	11.84	13.01	14.20	19.16	24.42*
100	7.06	7.84	8.72	9.65	10.63	11.64	13.20	14.53	15.89	21.55	27.53*
120	7.54	8.44	9.45	10.51	11.62	12.75	14.50	15.99	17.51	23.84	30.52*
140											

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 30.0 Ft (RADIUS = 21.2 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
(Ft*s) ^{1/2} 200	10	3.34	3.45	3.62	3.82	4.02	4.24	4.56	4.83	5.11	6.23	7.41*	
	20	4.05	4.22	4.46	4.72	5.00	5.29	5.74	6.12	6.51	8.13	9.88*	
	40	5.03	5.31	5.67	6.07	6.48	6.92	7.60	8.18	8.78	11.34	14.10*	
	60	5.78	6.17	6.65	7.17	7.73	8.30	9.21	9.99	10.79	14.20	17.85*	
	80	6.42	6.92	7.52	8.17	8.86	9.57	10.69	11.66	12.66	16.85	21.31*	
	100	6.99	7.61	8.33	9.10	9.92	10.77	12.10	13.24	14.42	19.34	24.57*	
	120	7.52	8.25	9.09	9.99	10.93	11.92	13.44	14.76	16.10	21.72	27.68*	
300	140	8.01	8.85	9.81	10.84	11.91	13.02	14.74	16.21	17.72	24.00	30.66*	
	10	3.68	3.78	3.97	4.17	4.39	4.61	4.94	5.22	5.50	6.64	7.84*	
	20	4.48	4.65	4.89	5.17	5.45	5.75	6.20	6.58	6.97	8.58	10.31*	
	40	5.57	5.85	6.21	6.60	7.02	7.45	8.12	8.69	9.28	11.77	14.49*	
	60	6.40	6.78	7.25	7.76	8.30	8.86	9.73	10.49	11.27	14.60	18.20*	
	80	7.10	7.58	8.15	8.78	9.44	10.13	11.21	12.15	13.11	17.22	21.64*	
	100	7.72	8.30	8.98	9.72	10.51	11.32	12.60	13.71	14.85	19.69	24.88*	
400	120	8.29	8.96	9.75	10.61	11.51	12.46	13.93	15.21	16.52	22.06	27.98*	
	140	8.81	9.59	10.49	11.46	12.48	13.55	15.21	16.65	18.12	24.33	30.95*	
	10	3.95	4.06	4.25	4.46	4.68	4.91	5.26	5.55	5.84	7.00	8.21*	
	20	4.83	5.00	5.25	5.53	5.83	6.13	6.59	6.98	7.37	8.98	10.71*	
	40	6.02	6.29	6.66	7.06	7.47	7.91	8.57	9.14	9.72	12.18	14.86*	
	60	6.91	7.28	7.75	8.26	8.80	9.35	10.21	10.96	11.72	14.98	18.55*	
	80	7.66	8.12	8.70	9.31	9.96	10.64	11.69	12.61	13.55	17.58	21.97*	
600	100	8.33	8.88	9.55	10.27	11.04	11.83	13.08	14.16	15.28	20.04	25.19*	
	120	8.93	9.57	10.34	11.18	12.05	12.97	14.40	15.65	16.93	22.39	28.27*	
	140	9.48	10.22	11.09	12.03	13.02	14.05	15.67	17.08	18.52	24.65	31.23*	
	10	4.38	4.50	4.70	4.93	5.16	5.40	5.77	6.07	6.38	7.59	8.85*	
	20	5.39	5.56	5.83	6.13	6.44	6.75	7.23	7.63	8.04	9.68	11.43*	
	40	6.74	7.01	7.39	7.80	8.23	8.67	9.35	9.92	10.51	12.94	15.59*	
	60	7.74	8.11	8.58	9.10	9.64	10.19	11.05	11.79	12.54	15.73	19.23*	
800	80	8.58	9.03	9.60	10.22	10.86	11.53	12.57	13.46	14.38	18.30	22.61*	
	100	9.31	9.85	10.51	11.23	11.98	12.75	13.97	15.02	16.10	20.73	25.80*	
	120	9.97	10.59	11.35	12.16	13.01	13.90	15.29	16.49	17.74	23.06	28.86*	
	140	10.58	11.29	12.13	13.04	14.00	14.99	16.55	17.91	19.31	25.29	31.80*	
	10	4.73	4.86	5.07	5.31	5.55	5.81	6.19	6.51	6.82	8.08	9.38*	
	20	5.84	6.02	6.30	6.61	6.93	7.26	7.76	8.18	8.60	10.28	12.06*	
	40	7.32	7.60	7.99	8.41	8.86	9.31	10.00	10.58	11.18	13.62	16.26*	
	60	8.42	8.78	9.27	9.80	10.35	10.91	11.78	12.52	13.27	16.43	19.89*	
	80	9.32	9.77	10.35	10.98	11.63	12.30	13.33	14.22	15.13	18.99	23.24*	
	100	10.12	10.65	11.31	12.03	12.78	13.56	14.76	15.80	16.86	21.40	26.41*	
	120	10.83	11.44	12.19	13.00	13.85	14.73	16.09	17.28	18.50	23.71	29.44*	
	140	11.48	12.17	13.01	13.91	14.86	15.84	17.37	18.69	20.06	25.93	32.36*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 30.0 Ft (RADIUS = 21.2 Ft)³
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		°F	4	8	12	16	20	24	30	35	40	60	80
0	(Ft*s) ^{1/2}												
	10	2.77	3.16	3.57	3.98	4.40	4.82	5.46	6.00	6.53	8.73	11.00*	
	20	3.60	4.25	4.89	5.53	6.16	6.80	7.76	8.57	9.38	12.72	16.18*	
	40	5.01	6.10	7.12	8.12	9.12	10.12	11.62	12.89	14.17	19.43	24.90*	
	60	6.24	7.71	9.07	10.40	11.71	13.03	15.01	16.68	18.37	25.31	32.54*	
	80	7.37	9.19	10.86	12.49	14.09	15.70	18.12	20.16	22.22	30.70	39.56*	
	100	8.43	10.58	12.55	14.45	16.33	18.21	21.04	23.43	25.84	35.77	46.15*	
25	120	9.44	11.91	14.15	16.31	18.45	20.59	23.82	26.53	29.28	40.59	52.41*	
	140	10.41	13.18	15.68	18.10	20.49	22.88	26.48	29.51	32.58	45.21	58.42*	
	10	3.37	3.62	3.95	4.31	4.69	5.09	5.69	6.21	6.73	8.89	11.14*	
	20	4.17	4.66	5.22	5.81	6.41	7.02	7.95	8.75	9.55	12.85	16.30*	
	40	5.51	6.44	7.40	8.36	9.33	10.30	11.79	13.04	14.31	19.54	25.00*	
	60	6.70	8.02	9.32	10.61	11.90	13.20	15.16	16.82	18.49	25.41	32.63*	
	80	7.80	9.49	11.10	12.68	14.27	15.86	18.26	20.29	22.34	30.80	39.64*	
50	100	8.84	10.86	12.77	14.63	16.49	18.36	21.17	23.55	25.95	35.86	46.23*	
	120	9.83	12.17	14.36	16.49	18.61	20.73	23.94	26.65	29.39	40.68	52.49*	
	140	10.79	13.43	15.88	18.27	20.64	23.02	26.60	29.62	32.68	45.29	58.49*	
	10	3.75	3.97	4.27	4.61	4.97	5.34	5.92	6.42	6.93	9.05	11.28*	
	20	4.62	5.03	5.53	6.08	6.65	7.24	8.15	8.93	9.72	12.99	16.42*	
	40	5.97	6.78	7.67	8.59	9.53	10.49	11.95	13.19	14.45	19.65	25.10*	
	60	7.14	8.33	9.57	10.82	12.09	13.36	15.31	16.95	18.62	25.51	32.72*	
100	80	8.22	9.78	11.33	12.88	14.44	16.01	18.40	20.42	22.46	30.89	39.73*	
	100	9.24	11.14	12.99	14.82	16.66	18.50	21.30	23.67	26.06	35.95	46.31*	
	120	10.22	12.44	14.57	16.67	18.77	20.88	24.07	26.77	29.50	40.76	52.56*	
	140	11.16	13.69	16.09	18.44	20.79	23.15	26.72	29.74	32.79	45.38	58.57*	
	10	4.27	4.47	4.77	5.09	5.43	5.79	6.34	6.82	7.31	9.36	11.55*	
	20	5.26	5.61	6.07	6.58	7.11	7.66	8.53	9.28	10.04	13.25	16.65*	
	40	6.71	7.39	8.19	9.05	9.94	10.86	12.28	13.49	14.73	19.87	25.29*	
150	60	7.91	8.93	10.06	11.24	12.46	13.70	15.61	17.23	18.88	25.71	32.90*	
	80	8.99	10.34	11.79	13.27	14.79	16.33	18.68	20.67	22.70	31.08	39.89*	
	100	10.00	11.68	13.42	15.19	16.99	18.80	21.57	23.91	26.29	36.13	46.46*	
	120	10.96	12.96	14.99	17.03	19.08	21.16	24.32	27.00	29.71	40.93	52.71*	
	140	11.88	14.19	16.49	18.79	21.10	23.43	26.97	29.96	32.99	45.54	58.71*	
	10	4.66	4.85	5.15	5.47	5.81	6.16	6.71	7.18	7.65	9.66	11.82*	
	20	5.74	6.08	6.52	7.01	7.52	8.05	8.90	9.62	10.37	13.51	16.88*	
	40	7.30	7.92	8.67	9.48	10.34	11.22	12.60	13.79	15.01	20.10	25.49*	
	60	8.55	9.47	10.53	11.65	12.82	14.03	15.90	17.50	19.13	25.91	33.07*	
	80	9.66	10.88	12.24	13.66	15.13	16.64	18.95	20.92	22.93	31.27	40.06*	
	100	10.68	12.20	13.85	15.56	17.31	19.10	21.83	24.15	26.51	36.31	46.62*	
	120	11.64	13.47	15.40	17.38	19.40	21.44	24.57	27.23	29.92	41.10	52.86*	
	140	12.56	14.68	16.89	19.13	21.40	23.70	27.21	30.18	33.20	45.70	58.85*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 30.0 Ft (RADIUS = 21.2 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		°F	4	8	12	16	20	24	30	35	40	60	80
200 (Ft*s) ^{1/2}	10	4.97	5.17	5.46	5.79	6.13	6.49	7.03	7.50	7.97	9.95	12.09*	
	20	6.13	6.47	6.90	7.38	7.89	8.42	9.24	9.95	10.68	13.77	17.11*	
	40	7.79	8.38	9.10	9.89	10.71	11.58	12.92	14.09	15.28	20.32	25.68*	
	60	9.10	9.96	10.97	12.05	13.18	14.36	16.19	17.77	19.38	26.11	33.25*	
	80	10.24	11.38	12.67	14.04	15.47	16.95	19.23	21.18	23.17	31.46	40.22*	
	100	11.28	12.70	14.27	15.93	17.64	19.39	22.09	24.39	26.73	36.49	46.77*	
	120	12.26	13.96	15.81	17.73	19.71	21.73	24.82	27.46	30.14	41.27	53.01*	
	140	13.18	15.17	17.28	19.47	21.70	23.97	27.45	30.40	33.40	45.87	59.00*	
300	10	5.48	5.68	5.98	6.31	6.67	7.03	7.58	8.05	8.52	10.49	12.60*	
	20	6.78	7.11	7.54	8.02	8.53	9.05	9.86	10.55	11.26	14.28	17.56*	
	40	8.60	9.16	9.86	10.61	11.41	12.24	13.54	14.66	15.83	20.76	26.07*	
	60	10.01	10.81	11.76	12.79	13.87	15.00	16.77	18.30	19.88	26.51	33.60*	
	80	11.22	12.27	13.47	14.77	16.14	17.56	19.77	21.68	23.63	31.83	40.55*	
	100	12.32	13.61	15.07	16.64	18.28	19.98	22.61	24.87	27.18	36.84	47.09*	
	120	13.33	14.87	16.59	18.42	20.32	22.29	25.32	27.91	30.56	41.61	53.31*	
	140	14.28	16.08	18.05	20.14	22.30	24.51	27.93	30.84	33.81	46.20	59.28*	
400	10	5.89	6.09	6.40	6.75	7.11	7.48	8.04	8.52	9.00	10.97	13.07*	
	20	7.31	7.63	8.08	8.56	9.07	9.59	10.40	11.09	11.80	14.77	18.01*	
	40	9.27	9.82	10.50	11.25	12.03	12.84	14.11	15.21	16.35	21.20	26.46*	
	60	10.77	11.54	12.46	13.46	14.51	15.61	17.33	18.83	20.37	26.91	33.96*	
	80	12.05	13.04	14.20	15.45	16.77	18.15	20.31	22.17	24.10	32.20	40.88*	
	100	13.19	14.41	15.81	17.32	18.90	20.55	23.12	25.34	27.62	37.19	47.40*	
	120	14.25	15.69	17.33	19.09	20.93	22.84	25.81	28.37	30.98	41.95	53.61*	
	140	15.23	16.91	18.79	20.79	22.88	25.05	28.40	31.28	34.22	46.52	59.57*	
600	10	6.56	6.77	7.09	7.46	7.83	8.22	8.80	9.30	9.79	11.80	13.93*	
	20	8.16	8.49	8.95	9.45	9.97	10.50	11.32	12.02	12.73	15.67	18.87*	
	40	10.35	10.89	11.58	12.32	13.10	13.90	15.15	16.23	17.34	22.05	27.22*	
	60	12.01	12.75	13.65	14.63	15.66	16.72	18.39	19.83	21.32	27.70	34.65*	
	80	13.41	14.35	15.47	16.67	17.94	19.27	21.34	23.14	25.01	32.95	41.53*	
	100	14.65	15.79	17.12	18.56	20.07	21.65	24.12	26.27	28.49	37.90	48.02*	
	120	15.78	17.12	18.67	20.33	22.09	23.92	26.78	29.26	31.82	42.62	54.20*	
	140	16.83	18.38	20.14	22.03	24.02	26.10	29.34	32.15	35.03	47.17	60.14*	
800	10	7.10	7.32	7.66	8.03	8.43	8.83	9.43	9.94	10.46	12.51	14.68*	
	20	8.86	9.19	9.66	10.18	10.71	11.26	12.10	12.81	13.52	16.48	19.67*	
	40	11.24	11.78	12.47	13.22	14.01	14.81	16.06	17.13	18.23	22.87	27.97*	
	60	13.03	13.76	14.66	15.63	16.65	17.70	19.35	20.77	22.23	28.48	35.35*	
	80	14.53	15.45	16.55	17.74	18.99	20.28	22.31	24.07	25.89	33.68	42.18*	
	100	15.86	16.96	18.26	19.66	21.14	22.67	25.08	27.18	29.35	38.60	48.63*	
	120	17.06	18.34	19.85	21.46	23.16	24.94	27.72	30.15	32.65	43.29	54.79*	
	140	18.17	19.64	21.34	23.17	25.10	27.11	30.27	33.01	35.83	47.82	60.71*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 32.0 Ft (RADIUS = 22.6 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft												
		4	8	12	16	20	24	30	35	40	60	80		
(Ft*s) ^{1/2}	0	10	0.87	0.92	0.99	1.07	1.16	1.24	1.37	1.48	1.59	2.03	2.47*	
		20	0.98	1.06	1.17	1.28	1.39	1.50	1.67	1.81	1.96	2.54	3.13*	
		40	1.17	1.31	1.46	1.61	1.77	1.93	2.17	2.37	2.57	3.40	4.24*	
		60	1.33	1.52	1.72	1.91	2.11	2.31	2.61	2.86	3.11	4.15	5.22*	
		80	1.48	1.72	1.95	2.19	2.42	2.66	3.01	3.31	3.61	4.84	6.11*	
		100	1.62	1.90	2.17	2.44	2.71	2.98	3.39	3.73	4.08	5.49	6.95*	
		120	1.75	2.07	2.38	2.69	2.99	3.29	3.75	4.13	4.52	6.11	7.75*	
		140	1.88	2.24	2.58	2.92	3.25	3.59	4.09	4.52	4.95	6.70	8.52*	
		25	10	1.16	1.18	1.24	1.31	1.38	1.46	1.57	1.67	1.77	2.18	2.60*
			20	1.31	1.35	1.43	1.51	1.61	1.71	1.86	1.99	2.12	2.67	3.25*
40	1.53		1.60	1.71	1.84	1.98	2.12	2.34	2.52	2.72	3.51	4.34*		
60	1.70		1.81	1.96	2.12	2.30	2.48	2.76	3.00	3.24	4.25	5.30*		
80	1.85		2.00	2.18	2.38	2.60	2.82	3.15	3.44	3.73	4.94	6.19*		
100	1.99		2.17	2.39	2.63	2.88	3.13	3.52	3.85	4.19	5.58	7.03*		
120	2.12		2.34	2.59	2.87	3.15	3.44	3.88	4.25	4.63	6.19	7.83*		
140	2.24		2.49	2.79	3.09	3.41	3.73	4.22	4.63	5.05	6.78	8.59*		
50	10		1.28	1.30	1.36	1.43	1.51	1.58	1.70	1.80	1.90	2.31	2.73*	
	20		1.46	1.50	1.58	1.67	1.76	1.86	2.01	2.13	2.26	2.80	3.36*	
	40	1.72	1.79	1.89	2.02	2.14	2.28	2.49	2.67	2.85	3.62	4.44*		
	60	1.92	2.01	2.15	2.30	2.47	2.64	2.90	3.13	3.37	4.35	5.39*		
	80	2.08	2.21	2.38	2.57	2.76	2.97	3.29	3.57	3.85	5.03	6.28*		
	100	2.24	2.39	2.59	2.81	3.04	3.28	3.65	3.98	4.30	5.67	7.11*		
	120	2.37	2.56	2.79	3.04	3.30	3.58	4.00	4.37	4.74	6.28	7.90*		
	140	2.50	2.72	2.98	3.26	3.56	3.87	4.34	4.74	5.16	6.87	8.66*		
	100	10	1.43	1.46	1.52	1.60	1.68	1.76	1.88	1.99	2.09	2.51	2.93*	
		20	1.66	1.70	1.78	1.87	1.97	2.07	2.23	2.36	2.49	3.02	3.57*	
40		1.98	2.04	2.15	2.27	2.40	2.53	2.74	2.91	3.09	3.84	4.63*		
60		2.21	2.30	2.44	2.58	2.74	2.91	3.16	3.38	3.61	4.55	5.57*		
80		2.41	2.52	2.68	2.86	3.05	3.24	3.55	3.81	4.08	5.22	6.44*		
100		2.58	2.72	2.91	3.11	3.33	3.55	3.91	4.21	4.52	5.85	7.26*		
120		2.74	2.90	3.11	3.35	3.59	3.85	4.25	4.59	4.95	6.45	8.05*		
140		2.89	3.07	3.31	3.57	3.84	4.13	4.58	4.96	5.36	7.03	8.80*		
150		10	1.55	1.57	1.64	1.72	1.80	1.88	2.01	2.12	2.23	2.66	3.09*	
		20	1.81	1.85	1.93	2.03	2.13	2.23	2.39	2.52	2.66	3.20	3.75*	
	40	2.16	2.23	2.34	2.46	2.59	2.73	2.94	3.11	3.29	4.03	4.81*		
	60	2.43	2.52	2.65	2.80	2.96	3.12	3.38	3.60	3.82	4.75	5.74*		
	80	2.65	2.76	2.92	3.09	3.28	3.47	3.77	4.03	4.29	5.40	6.60*		
	100	2.84	2.97	3.15	3.36	3.57	3.79	4.13	4.43	4.73	6.03	7.42*		
	120	3.01	3.17	3.37	3.60	3.84	4.09	4.47	4.81	5.16	6.62	8.20*		
	140	3.17	3.35	3.58	3.83	4.09	4.37	4.80	5.18	5.56	7.20	8.95*		

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 32.0 Ft (RADIUS = 22.6 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
200	10	1.64	1.67	1.74	1.82	1.90	1.99	2.12	2.23	2.34	2.79	3.23*	
	20	1.93	1.97	2.06	2.15	2.26	2.36	2.53	2.66	2.80	3.35	3.91*	
	40	2.32	2.38	2.50	2.62	2.76	2.89	3.11	3.28	3.46	4.20	4.98*	
	60	2.60	2.69	2.83	2.98	3.14	3.31	3.56	3.78	4.00	4.92	5.90*	
	80	2.84	2.95	3.11	3.29	3.48	3.67	3.97	4.22	4.48	5.58	6.76*	
	100	3.05	3.18	3.36	3.56	3.78	4.00	4.34	4.63	4.93	6.20	7.57*	
	120	3.24	3.39	3.59	3.82	4.05	4.30	4.68	5.01	5.35	6.79	8.34*	
300	140	3.41	3.58	3.81	4.05	4.31	4.59	5.01	5.38	5.75	7.36	9.09*	
	10	1.79	1.82	1.89	1.97	2.06	2.16	2.30	2.41	2.53	2.99	3.45*	
	20	2.12	2.16	2.25	2.36	2.47	2.58	2.75	2.89	3.03	3.60	4.18*	
	40	2.56	2.63	2.75	2.88	3.02	3.16	3.38	3.57	3.75	4.50	5.28*	
	60	2.89	2.98	3.12	3.28	3.44	3.61	3.88	4.10	4.32	5.24	6.21*	
	80	3.16	3.27	3.43	3.61	3.80	4.00	4.30	4.56	4.82	5.91	7.06*	
	100	3.39	3.52	3.71	3.91	4.12	4.35	4.69	4.98	5.28	6.52	7.86*	
400	120	3.60	3.75	3.95	4.18	4.42	4.66	5.04	5.37	5.70	7.11	8.63*	
	140	3.79	3.96	4.18	4.43	4.69	4.96	5.38	5.74	6.11	7.67	9.36*	
	10	1.91	1.94	2.01	2.10	2.20	2.29	2.44	2.56	2.68	3.16	3.63*	
	20	2.27	2.32	2.41	2.52	2.64	2.75	2.93	3.08	3.23	3.81	4.40*	
	40	2.76	2.83	2.95	3.09	3.24	3.39	3.61	3.80	3.99	4.76	5.55*	
	60	3.12	3.21	3.36	3.52	3.69	3.87	4.14	4.36	4.59	5.52	6.49*	
	80	3.41	3.52	3.69	3.88	4.08	4.28	4.58	4.85	5.11	6.20	7.35*	
600	100	3.67	3.80	3.99	4.20	4.42	4.64	4.99	5.28	5.58	6.82	8.15*	
	120	3.90	4.04	4.25	4.48	4.73	4.97	5.36	5.68	6.02	7.41	8.91*	
	140	4.10	4.27	4.50	4.75	5.01	5.29	5.70	6.06	6.43	7.97	9.64*	
	10	2.10	2.13	2.22	2.31	2.41	2.51	2.67	2.80	2.93	3.43	3.93*	
	20	2.52	2.57	2.67	2.79	2.91	3.04	3.22	3.38	3.54	4.16	4.78*	
	40	3.08	3.16	3.29	3.43	3.59	3.75	3.99	4.19	4.39	5.19	6.00*	
	60	3.49	3.59	3.74	3.91	4.10	4.28	4.56	4.80	5.04	6.00	6.99*	
800	80	3.83	3.94	4.12	4.31	4.52	4.73	5.05	5.32	5.60	6.70	7.86*	
	100	4.12	4.25	4.45	4.67	4.89	5.13	5.49	5.79	6.09	7.35	8.67*	
	120	4.38	4.53	4.74	4.98	5.23	5.49	5.88	6.22	6.55	7.95	9.43*	
	140	4.61	4.78	5.01	5.27	5.54	5.82	6.25	6.61	6.98	8.52	10.16*	
	10	2.25	2.29	2.38	2.48	2.58	2.69	2.85	2.99	3.13	3.65	4.17*	
	20	2.72	2.78	2.88	3.01	3.13	3.27	3.46	3.63	3.79	4.44	5.08*	
	40	3.34	3.42	3.56	3.71	3.87	4.04	4.29	4.50	4.71	5.54	6.38*	
	60	3.79	3.89	4.05	4.24	4.43	4.62	4.91	5.16	5.41	6.40	7.41*	
	80	4.16	4.28	4.46	4.67	4.88	5.10	5.44	5.72	6.00	7.14	8.31*	
	100	4.48	4.62	4.82	5.05	5.29	5.53	5.90	6.21	6.53	7.80	9.13*	
	120	4.76	4.92	5.14	5.39	5.65	5.91	6.32	6.66	7.01	8.42	9.90*	
	140	5.02	5.19	5.43	5.70	5.98	6.27	6.71	7.08	7.45	9.00	10.63*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 32.0 Ft (RADIUS = 22.6 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60	80
0	10	1.26	1.36	1.48	1.62	1.76	1.90	2.11	2.28	2.46	3.18	3.92*
	20	1.48	1.65	1.83	2.02	2.21	2.41	2.70	2.95	3.20	4.21	5.24*
	40	1.85	2.13	2.42	2.70	2.98	3.27	3.70	4.07	4.43	5.92	7.46*
	60	2.18	2.56	2.93	3.29	3.66	4.03	4.58	5.04	5.51	7.43	9.41*
	80	2.48	2.95	3.40	3.84	4.28	4.72	5.39	5.94	6.51	8.81	11.20*
	100	2.76	3.32	3.84	4.35	4.86	5.37	6.14	6.79	7.44	10.11	12.88*
	120	3.03	3.66	4.26	4.84	5.42	5.99	6.86	7.59	8.33	11.35	14.48*
25	140	3.28	4.00	4.66	5.31	5.95	6.59	7.55	8.36	9.18	12.53	16.01*
	10	1.65	1.70	1.79	1.90	2.02	2.14	2.33	2.49	2.66	3.34	4.05*
	20	1.91	2.00	2.13	2.29	2.46	2.63	2.90	3.13	3.37	4.34	5.36*
	40	2.29	2.47	2.69	2.94	3.19	3.46	3.87	4.22	4.57	6.04	7.56*
	60	2.61	2.87	3.18	3.51	3.85	4.20	4.73	5.18	5.64	7.53	9.50*
	80	2.89	3.24	3.63	4.04	4.46	4.88	5.53	6.07	6.63	8.91	11.29*
	100	3.16	3.60	4.06	4.54	5.03	5.53	6.28	6.91	7.55	10.20	12.96*
50	120	3.42	3.93	4.47	5.02	5.58	6.14	6.99	7.71	8.44	11.43	14.56*
	140	3.66	4.26	4.87	5.48	6.10	6.73	7.67	8.47	9.28	12.61	16.09*
	10	1.83	1.88	1.97	2.08	2.20	2.32	2.51	2.67	2.83	3.50	4.19*
	20	2.14	2.22	2.35	2.50	2.66	2.82	3.08	3.30	3.53	4.47	5.47*
	40	2.57	2.72	2.92	3.15	3.39	3.64	4.03	4.37	4.72	6.15	7.66*
	60	2.92	3.14	3.41	3.72	4.04	4.37	4.88	5.32	5.77	7.64	9.59*
	80	3.22	3.51	3.86	4.24	4.63	5.04	5.67	6.20	6.75	9.00	11.37*
100	100	3.49	3.86	4.28	4.73	5.20	5.68	6.41	7.03	7.67	10.29	13.04*
	120	3.75	4.19	4.68	5.20	5.74	6.28	7.12	7.83	8.55	11.52	14.63*
	140	4.00	4.51	5.07	5.66	6.26	6.87	7.80	8.59	9.39	12.70	16.16*
	10	2.07	2.12	2.22	2.33	2.45	2.58	2.77	2.93	3.09	3.75	4.44*
	20	2.44	2.52	2.65	2.80	2.96	3.12	3.38	3.59	3.81	4.73	5.70*
	40	2.96	3.09	3.29	3.50	3.73	3.97	4.34	4.66	4.99	6.37	7.85*
	60	3.35	3.54	3.80	4.08	4.38	4.69	5.17	5.59	6.02	7.84	9.77*
150	80	3.69	3.94	4.25	4.60	4.97	5.35	5.94	6.46	6.99	9.20	11.53*
	100	3.99	4.30	4.68	5.09	5.52	5.97	6.67	7.28	7.89	10.47	13.20*
	120	4.27	4.64	5.08	5.55	6.05	6.57	7.37	8.06	8.76	11.69	14.78*
	140	4.53	4.96	5.46	6.00	6.56	7.14	8.04	8.81	9.60	12.86	16.30*
	10	2.25	2.29	2.40	2.51	2.64	2.77	2.96	3.13	3.30	3.97	4.65*
	20	2.67	2.74	2.88	3.03	3.19	3.36	3.61	3.83	4.05	4.96	5.91*
	40	3.24	3.37	3.56	3.78	4.01	4.24	4.61	4.92	5.24	6.59	8.04*
	60	3.68	3.86	4.11	4.38	4.67	4.97	5.44	5.85	6.27	8.04	9.94*
	80	4.04	4.28	4.58	4.91	5.27	5.63	6.21	6.71	7.22	9.38	11.70*
	100	4.37	4.66	5.01	5.41	5.82	6.25	6.93	7.51	8.12	10.65	13.35*
	120	4.67	5.01	5.42	5.87	6.35	6.84	7.62	8.29	8.98	11.86	14.93*
	140	4.94	5.34	5.81	6.31	6.85	7.41	8.28	9.03	9.80	13.03	16.44*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 32.0 Ft (RADIUS = 22.6 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
200 (Ft*s) ^{1/2}	°F												
	10	2.39	2.44	2.54	2.66	2.79	2.92	3.13	3.30	3.47	4.15	4.84*	
	20	2.85	2.93	3.06	3.22	3.38	3.55	3.81	4.03	4.26	5.17	6.11*	
	40	3.47	3.60	3.80	4.01	4.24	4.48	4.84	5.15	5.47	6.80	8.23*	
	60	3.94	4.12	4.37	4.64	4.93	5.23	5.69	6.09	6.50	8.24	10.11*	
	80	4.34	4.56	4.86	5.19	5.53	5.89	6.46	6.94	7.44	9.57	11.86*	
	100	4.68	4.96	5.31	5.69	6.09	6.52	7.17	7.75	8.33	10.83	13.51*	
	120	5.00	5.32	5.72	6.16	6.62	7.10	7.86	8.51	9.19	12.04	15.08*	
	140	5.29	5.66	6.12	6.61	7.13	7.67	8.52	9.25	10.01	13.19	16.59*	
	300	10	2.61	2.67	2.78	2.91	3.04	3.18	3.39	3.57	3.75	4.45	5.16*
20		3.14	3.22	3.36	3.53	3.70	3.88	4.15	4.37	4.60	5.52	6.48*	
40		3.85	3.98	4.18	4.40	4.63	4.87	5.24	5.55	5.87	7.19	8.59*	
60		4.37	4.55	4.80	5.07	5.36	5.66	6.12	6.52	6.92	8.62	10.46*	
80		4.81	5.03	5.33	5.66	6.00	6.35	6.90	7.38	7.87	9.94	12.18*	
100		5.20	5.46	5.81	6.18	6.58	6.99	7.63	8.18	8.75	11.18	13.81*	
120		5.54	5.85	6.24	6.67	7.12	7.58	8.31	8.94	9.60	12.37	15.37*	
140		5.86	6.22	6.65	7.13	7.63	8.15	8.97	9.68	10.41	13.52	16.87*	
400		10	2.80	2.85	2.97	3.10	3.24	3.39	3.61	3.79	3.97	4.70	5.43*
		20	3.38	3.46	3.61	3.78	3.96	4.14	4.42	4.65	4.89	5.83	6.79*
	40	4.15	4.28	4.49	4.72	4.95	5.20	5.57	5.89	6.21	7.54	8.93*	
	60	4.73	4.90	5.15	5.43	5.73	6.03	6.49	6.89	7.29	8.98	10.79*	
	80	5.20	5.42	5.72	6.05	6.39	6.75	7.30	7.77	8.25	10.29	12.50*	
	100	5.62	5.88	6.22	6.60	6.99	7.40	8.04	8.58	9.14	11.53	14.11*	
	120	5.99	6.29	6.68	7.10	7.55	8.01	8.73	9.35	9.99	12.71	15.66*	
	140	6.34	6.68	7.11	7.58	8.07	8.58	9.38	10.08	10.79	13.85	17.15*	
	600	10	3.09	3.15	3.28	3.42	3.57	3.72	3.96	4.15	4.35	5.11	5.88*
		20	3.76	3.85	4.01	4.19	4.37	4.57	4.86	5.11	5.35	6.34	7.33*
40		4.64	4.78	4.99	5.23	5.48	5.74	6.13	6.46	6.79	8.14	9.54*	
60		5.30	5.47	5.74	6.03	6.33	6.64	7.12	7.52	7.93	9.62	11.41*	
80		5.83	6.05	6.36	6.70	7.05	7.41	7.97	8.44	8.93	10.94	13.11*	
100		6.30	6.56	6.91	7.29	7.69	8.10	8.74	9.28	9.84	12.18	14.71*	
120		6.72	7.02	7.41	7.83	8.28	8.74	9.45	10.07	10.69	13.35	16.24*	
140		7.10	7.44	7.87	8.34	8.83	9.34	10.13	10.81	11.51	14.47	17.71*	
800		10	3.33	3.40	3.53	3.68	3.83	4.00	4.24	4.45	4.65	5.45	6.24*
		20	4.07	4.16	4.33	4.52	4.71	4.92	5.23	5.48	5.74	6.76	7.78*
	40	5.04	5.18	5.41	5.66	5.92	6.18	6.59	6.93	7.27	8.65	10.08*	
	60	5.76	5.94	6.21	6.51	6.83	7.15	7.64	8.05	8.47	10.18	11.97*	
	80	6.35	6.57	6.88	7.23	7.59	7.96	8.53	9.02	9.51	11.53	13.68*	
	100	6.86	7.11	7.47	7.86	8.27	8.69	9.34	9.89	10.45	12.77	15.27*	
	120	7.31	7.61	8.00	8.44	8.89	9.36	10.08	10.69	11.32	13.95	16.79*	
	140	7.73	8.06	8.50	8.97	9.47	9.98	10.77	11.45	12.14	15.07	18.25*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 32.0 Ft (RADIUS = 22.6 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, Ft

(Ft*s)^{1/2}

°F

80

60

40

35

30

24

20

16

12

8

4

0

10

20

30

40

50

60

70

80

90

100

110

120

130

140

150

160

170

180

190

200

210

220

230

240

250

260

270

280

290

300

310

320

330

340

350

360

370

380

390

400

410

420

430

440

450

460

470

480

490

500

510

520

530

540

550

560

570

580

590

600

610

620

630

640

650

660

670

680

690

700

710

720

730

740

750

760

770

780

790

800

810

820

830

840

850

860

870

880

890

900

910

920

930

940

950

960

970

980

990

1000

1010

1020

1030

1040

1050

1060

1070

1080

1090

1100

1110

1120

1130

1140

1150

1160

1170

1180

1190

1200

1210

1220

1230

1240

1250

1260

1270

1280

1290

1300

1310

1320

1330

1340

1350

1360

1370

1380

1390

1400

1410

1420

1430

1440

1450

1460

1470

1480

1490

1500

1510

1520

1530

1540

1550

1560

1570

1580

1590

1600

1610

1620

1630

1640

1650

1660

1670

1680

1690

1700

1710

1720

1730

1740

1750

1760

1770

1780

1790

1800

1810

1820

1830

1840

1850

1860

1870

1880

1890

1900

1910

1920

1930

1940

1950

1960

1970

1980

1990

2000

2010

2020

2030

2040

2050

2060

2070

2080

2090

2100

2110

2120

2130

2140

2150

2160

2170

2180

2190

2200

2210

2220

2230

2240

2250

2260

2270

2280

2290

2300

2310

2320

2330

2340

2350

2360

2370

2380

2390

2400

2410

2420

2430

2440

2450

2460

2470

2480

2490

2500

2510

2520

2530

2540

2550

2560

2570

2580

2590

2600

2610

2620

2630

2640

2650

2660

2670

2680

2690

2700

2710

2720

2730

2740

2750

2760

2770

2780

2790

2800

2810

2820

2830

2840

2850

2860

28

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 32.0 Ft (RADIUS = 22.6 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
200 (Ft*s) ^{1/2}	°F											
	10	3.51	3.60	3.77	3.96	4.17	4.38	4.70	4.97	5.24	6.36	7.53*
	20	4.25	4.41	4.64	4.91	5.18	5.47	5.92	6.30	6.68	8.31	10.05*
	40	5.28	5.55	5.91	6.30	6.72	7.16	7.84	8.43	9.03	11.60	14.36*
	60	6.07	6.45	6.93	7.46	8.02	8.60	9.51	10.29	11.11	14.53	18.19*
	80	6.74	7.24	7.85	8.50	9.20	9.92	11.05	12.02	13.03	17.24	21.72*
	100	7.34	7.96	8.69	9.48	10.30	11.17	12.51	13.66	14.84	19.80	25.05*
	120	7.90	8.63	9.49	10.40	11.36	12.36	13.90	15.23	16.58	22.24	28.22*
140	8.42	9.27	10.25	11.29	12.38	13.51	15.24	16.73	18.25	24.58	31.26*	
300	10	3.86	3.95	4.13	4.33	4.54	4.76	5.09	5.37	5.65	6.79	7.96*
	20	4.70	4.85	5.09	5.36	5.65	5.94	6.39	6.77	7.16	8.77	10.48*
	40	5.85	6.11	6.47	6.86	7.27	7.70	8.37	8.95	9.54	12.04	14.74*
	60	6.72	7.08	7.55	8.06	8.60	9.17	10.05	10.81	11.59	14.94	18.54*
	80	7.45	7.92	8.50	9.13	9.80	10.49	11.58	12.52	13.49	17.62	22.05*
	100	8.10	8.68	9.37	10.11	10.90	11.73	13.02	14.14	15.29	20.16	25.36*
	120	8.70	9.37	10.18	11.04	11.96	12.91	14.40	15.68	17.01	22.58	28.51*
	140	9.25	10.03	10.95	11.93	12.97	14.04	15.72	17.17	18.66	24.91	31.54*
400	10	4.14	4.24	4.42	4.63	4.85	5.07	5.41	5.70	5.99	7.15	8.34*
	20	5.06	5.22	5.46	5.74	6.03	6.33	6.79	7.18	7.57	9.18	10.88*
	40	6.31	6.57	6.93	7.33	7.74	8.17	8.84	9.41	9.99	12.46	15.12*
	60	7.25	7.61	8.07	8.58	9.12	9.67	10.54	11.29	12.06	15.33	18.88*
	80	8.04	8.49	9.06	9.68	10.33	11.01	12.07	12.99	13.94	18.00	22.37*
	100	8.73	9.28	9.95	10.68	11.45	12.25	13.51	14.60	15.73	20.52	25.66*
	120	9.36	10.01	10.78	11.62	12.51	13.43	14.88	16.13	17.43	22.92	28.81*
	140	9.95	10.69	11.57	12.52	13.52	14.56	16.20	17.61	19.07	25.24	31.83*
600	10	4.59	4.70	4.89	5.11	5.34	5.58	5.94	6.25	6.55	7.76	8.98*
	20	5.64	5.81	6.07	6.36	6.66	6.97	7.45	7.85	8.26	9.90	11.61*
	40	7.06	7.32	7.69	8.10	8.52	8.96	9.64	10.21	10.80	13.23	15.84*
	60	8.11	8.46	8.93	9.45	9.99	10.54	11.40	12.14	12.90	16.09	19.57*
	80	8.99	9.43	10.00	10.61	11.26	11.93	12.97	13.87	14.79	18.73	23.02*
	100	9.76	10.29	10.95	11.66	12.42	13.20	14.42	15.47	16.56	21.22	26.28*
	120	10.45	11.07	11.82	12.64	13.50	14.39	15.79	17.00	18.25	23.60	29.40*
	140	11.09	11.79	12.64	13.56	14.52	15.52	17.10	18.46	19.87	25.90	32.40*
800	10	4.96	5.07	5.27	5.50	5.75	6.00	6.37	6.69	7.01	8.26	9.52*
	20	6.12	6.29	6.56	6.86	7.18	7.50	8.00	8.41	8.83	10.51	12.24*
	40	7.67	7.93	8.31	8.73	9.17	9.62	10.31	10.89	11.48	13.93	16.52*
	60	8.82	9.17	9.65	10.17	10.72	11.28	12.15	12.89	13.64	16.81	20.23*
	80	9.77	10.21	10.78	11.40	12.05	12.72	13.76	14.65	15.56	19.43	23.65*
	100	10.60	11.12	11.78	12.50	13.25	14.02	15.23	16.27	17.34	21.91	26.88*
	120	11.35	11.95	12.70	13.51	14.36	15.24	16.61	17.80	19.03	24.27	29.98*
	140	12.04	12.72	13.55	14.46	15.40	16.39	17.93	19.26	20.64	26.54	32.96*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 32.0 Ft (RADIUS = 22.6 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		(Ft*s) ^{1/2}											
	°F	4	8	12	16	20	24	30	35	40	60	80	
0	10	2.93	3.32	3.74	4.15	4.58	5.00	5.64	6.18	6.72	8.93	11.20*	
	20	3.81	4.48	5.13	5.77	6.41	7.05	8.02	8.83	9.66	13.01	16.49*	
	40	5.30	6.42	7.46	8.48	9.49	10.50	12.02	13.30	14.59	19.89	25.39*	
	60	6.61	8.12	9.51	10.86	12.19	13.53	15.53	17.22	18.92	25.91	33.18*	
	80	7.81	9.68	11.39	13.04	14.68	16.30	18.76	20.82	22.90	31.44	40.35*	
	100	8.93	11.15	13.16	15.09	17.01	18.91	21.78	24.19	26.63	36.63	47.07*	
	120	10.00	12.55	14.84	17.04	19.22	21.39	24.66	27.40	30.18	41.57	53.46*	
25	140	11.03	13.88	16.45	18.91	21.35	23.77	27.42	30.48	33.58	46.31	59.59*	
	10	3.55	3.79	4.12	4.49	4.87	5.27	5.88	6.40	6.92	9.09	11.34*	
	20	4.40	4.89	5.46	6.05	6.66	7.28	8.22	9.02	9.83	13.15	16.61*	
	40	5.82	6.77	7.74	8.72	9.70	10.69	12.19	13.46	14.74	20.00	25.48*	
	60	7.08	8.44	9.77	11.08	12.39	13.70	15.69	17.36	19.05	26.01	33.27*	
	80	8.25	9.98	11.63	13.25	14.86	16.47	18.90	20.95	23.02	31.54	40.43*	
	100	9.35	11.43	13.38	15.29	17.18	19.06	21.92	24.32	26.74	36.73	47.15*	
50	120	10.40	12.82	15.05	17.23	19.38	21.54	24.79	27.52	30.29	41.66	53.54*	
	140	11.41	14.14	16.66	19.09	21.50	23.91	27.54	30.60	33.68	46.39	59.66*	
	10	3.94	4.15	4.46	4.79	5.15	5.53	6.11	6.61	7.12	9.25	11.48*	
	20	4.86	5.27	5.78	6.33	6.91	7.50	8.42	9.20	10.00	13.29	16.72*	
	40	6.29	7.12	8.02	8.96	9.91	10.88	12.36	13.61	14.88	20.11	25.58*	
	60	7.53	8.76	10.02	11.29	12.58	13.87	15.84	17.50	19.18	26.12	33.36*	
	80	8.68	10.28	11.87	13.45	15.03	16.63	19.04	21.08	23.14	31.63	40.51*	
100	100	9.76	11.71	13.61	15.48	17.34	19.22	22.05	24.44	26.86	36.82	47.23*	
	120	10.80	13.09	15.27	17.41	19.55	21.68	24.92	27.64	30.40	41.75	53.61*	
	140	11.79	14.40	16.86	19.27	21.66	24.05	27.67	30.71	33.79	46.48	59.74*	
	10	4.49	4.68	4.97	5.29	5.63	5.99	6.54	7.02	7.51	9.57	11.75*	
	20	5.52	5.88	6.34	6.84	7.38	7.94	8.81	9.56	10.33	13.56	16.96*	
	40	7.06	7.75	8.56	9.43	10.33	11.26	12.70	13.92	15.17	20.34	25.78*	
	60	8.33	9.37	10.52	11.72	12.96	14.22	16.14	17.78	19.44	26.32	33.54*	
150	80	9.47	10.86	12.34	13.85	15.39	16.95	19.32	21.34	23.38	31.83	40.68*	
	100	10.54	12.27	14.05	15.86	17.68	19.52	22.32	24.69	27.09	37.00	47.38*	
	120	11.56	13.62	15.69	17.78	19.87	21.97	25.17	27.88	30.61	41.92	53.76*	
	140	12.53	14.92	17.27	19.62	21.97	24.33	27.91	30.94	34.00	46.64	59.88*	
	10	4.89	5.07	5.36	5.68	6.02	6.37	6.92	7.38	7.86	9.88	12.02*	
	20	6.02	6.36	6.80	7.29	7.80	8.34	9.18	9.91	10.66	13.82	17.19*	
	40	7.66	8.29	9.05	9.87	10.73	11.63	13.03	14.22	15.45	20.57	25.97*	
200	60	8.99	9.92	11.00	12.14	13.33	14.56	16.44	18.06	19.70	26.53	33.72*	
	80	10.16	11.41	12.79	14.25	15.74	17.27	19.61	21.60	23.62	32.02	40.84*	
	100	11.24	12.80	14.49	16.24	18.01	19.82	22.59	24.93	27.31	37.18	47.54*	
	120	12.26	14.14	16.12	18.14	20.19	22.26	25.43	28.11	30.83	42.09	53.91*	
	140	13.23	15.42	17.68	19.97	22.28	24.61	28.16	31.16	34.21	46.81	60.02*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 32.0 Ft (RADIUS = 22.6 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60
200	10	5.22	5.40	5.69	6.01	6.35	6.70	7.25	7.71	8.19	8.75	10.17	12.29*
	20	6.44	6.76	7.19	7.67	8.18	8.71	9.53	10.25	10.98	11.58	14.09	17.42*
	40	8.18	8.77	9.50	10.29	11.12	11.99	13.35	14.52	15.73	16.28	20.80	26.17*
	60	9.55	10.43	11.45	12.55	13.70	14.89	16.74	18.33	19.95	21.25	26.73	33.89*
	80	10.76	11.92	13.24	14.63	16.09	17.58	19.89	21.85	23.86	25.66	32.21	41.01*
	100	11.86	13.32	14.92	16.61	18.35	20.12	22.85	25.18	27.54	30.21	37.36	47.69*
	120	12.89	14.64	16.53	18.49	20.50	22.55	25.68	28.34	31.05	34.42	42.27	54.06*
140	13.87	15.92	18.09	20.31	22.58	24.89	28.40	31.39	34.84	38.80	46.98	60.17*	
300	10	5.75	5.93	6.22	6.55	6.90	7.26	7.81	8.28	8.75	9.24	10.72	12.80*
	20	7.11	7.42	7.86	8.33	8.84	9.36	10.17	10.86	11.58	12.12	14.61	17.87*
	40	9.02	9.58	10.28	11.03	11.84	12.67	13.98	15.11	16.28	17.42	21.25	26.56*
	60	10.50	11.31	12.27	13.31	14.40	15.55	17.33	18.88	20.46	22.37	27.14	34.25*
	80	11.78	12.84	14.07	15.38	16.77	18.20	20.44	22.37	24.34	26.19	32.59	41.34*
	100	12.94	14.25	15.74	17.34	19.00	20.72	23.38	25.66	27.99	30.21	37.36	47.69*
	120	14.00	15.58	17.34	19.20	21.13	23.12	26.19	28.81	31.48	34.84	42.61	54.36*
140	15.01	16.85	18.87	21.00	23.19	25.44	28.89	31.84	34.84	38.80	46.98	60.45*	
400	10	6.18	6.36	6.67	7.00	7.36	7.73	8.29	8.76	9.24	9.72	11.21	13.28*
	20	7.66	7.97	8.41	8.89	9.39	9.92	10.72	11.42	12.12	12.82	15.10	18.32*
	40	9.72	10.26	10.94	11.69	12.47	13.29	14.57	15.68	16.82	17.83	21.69	26.94*
	60	11.29	12.06	12.99	14.00	15.06	16.17	17.91	19.41	20.97	22.87	27.55	34.60*
	80	12.64	13.64	14.82	16.08	17.42	18.81	20.99	22.87	24.81	26.15	32.97	41.66*
	100	13.85	15.08	16.50	18.03	19.63	21.30	23.90	26.15	28.44	30.21	37.36	47.69*
	120	14.96	16.43	18.10	19.88	21.75	23.69	26.69	29.27	31.91	34.42	42.27	54.36*
140	16.00	17.71	19.63	21.67	23.79	25.99	29.38	32.29	35.25	38.80	46.98	60.74*	
600	10	6.87	7.07	7.38	7.74	8.11	8.49	9.07	9.56	10.06	10.56	12.06	14.14*
	20	8.55	8.86	9.31	9.80	10.32	10.85	11.67	12.37	13.08	13.78	16.03	19.18*
	40	10.85	11.38	12.06	12.80	13.58	14.38	15.64	16.72	17.83	18.74	22.56	27.71*
	60	12.59	13.32	14.23	15.21	16.24	17.31	18.98	20.44	21.94	23.44	28.36	35.30*
	80	14.06	15.00	16.12	17.34	18.62	19.95	22.05	23.86	25.74	27.10	33.73	42.32*
	100	15.37	16.51	17.86	19.31	20.83	22.43	24.93	27.10	29.33	31.05	38.80	48.94*
	120	16.56	17.91	19.48	21.16	22.94	24.79	27.69	30.19	32.77	35.25	43.65	55.25*
140	17.66	19.23	21.02	22.94	24.96	27.06	30.34	33.17	36.08	38.80	46.98	61.31*	
800	10	7.44	7.64	7.96	8.33	8.72	9.12	9.72	10.23	10.74	11.24	12.79	14.90*
	20	9.28	9.59	10.05	10.56	11.09	11.64	12.47	13.18	13.90	14.61	16.85	19.99*
	40	11.78	12.30	12.98	13.73	14.51	15.32	16.57	17.64	18.74	19.75	23.40	28.46*
	60	13.66	14.37	15.27	16.24	17.26	18.32	19.97	21.40	22.87	24.81	29.15	35.99*
	80	15.23	16.14	17.24	18.44	19.69	21.00	23.04	24.81	26.64	28.02	34.48	42.97*
	100	16.62	17.72	19.03	20.44	21.93	23.48	25.91	28.02	30.21	32.61	39.52	49.55*
	120	17.89	19.18	20.69	22.32	24.04	25.84	28.65	31.09	33.61	36.90	44.33	55.84*
140	19.06	20.54	22.26	24.11	26.06	28.10	31.28	34.05	36.90	40.00	48.97	61.88*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 34.0 Ft (RADIUS = 24.0 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE °F	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
0	10	0.92	0.96	1.04	1.12	1.20	1.28	1.41	1.52	1.63	2.07	2.51
	20	1.03	1.12	1.22	1.33	1.44	1.55	1.72	1.86	2.01	2.59	3.18
	40	1.23	1.37	1.52	1.68	1.84	2.00	2.24	2.44	2.64	3.47	4.32
	60	1.40	1.59	1.79	1.99	2.19	2.39	2.69	2.94	3.20	4.24	5.31
	80	1.56	1.80	2.04	2.28	2.51	2.75	3.11	3.41	3.71	4.95	6.22
	100	1.71	1.99	2.27	2.54	2.82	3.09	3.50	3.84	4.19	5.61	7.08
	120	1.85	2.18	2.49	2.80	3.10	3.41	3.87	4.26	4.65	6.25	7.90
25	140	1.99	2.35	2.70	3.04	3.38	3.72	4.23	4.66	5.09	6.85	8.68
	10	1.21	1.23	1.29	1.35	1.43	1.50	1.62	1.72	1.82	2.23	2.65
	20	1.37	1.41	1.48	1.57	1.66	1.76	1.91	2.04	2.18	2.73	3.30
	40	1.60	1.67	1.78	1.91	2.05	2.19	2.41	2.60	2.79	3.59	4.42
	60	1.78	1.89	2.04	2.21	2.38	2.56	2.85	3.09	3.33	4.35	5.40
	80	1.94	2.09	2.27	2.48	2.69	2.91	3.25	3.54	3.84	5.05	6.31
	100	2.09	2.27	2.49	2.74	2.99	3.24	3.64	3.97	4.31	5.71	7.16
50	120	2.22	2.44	2.71	2.98	3.27	3.56	4.00	4.38	4.76	6.33	7.97
	140	2.35	2.61	2.91	3.22	3.54	3.86	4.35	4.77	5.20	6.94	8.75
	10	1.34	1.36	1.41	1.48	1.56	1.63	1.75	1.85	1.95	2.36	2.77
	20	1.53	1.57	1.64	1.73	1.82	1.92	2.07	2.19	2.32	2.86	3.41
	40	1.80	1.87	1.97	2.09	2.22	2.35	2.56	2.74	2.93	3.70	4.51
	60	2.01	2.10	2.24	2.39	2.56	2.73	2.99	3.22	3.46	4.45	5.49
	80	2.19	2.31	2.48	2.66	2.86	3.07	3.39	3.67	3.96	5.14	6.39
100	100	2.34	2.50	2.70	2.92	3.15	3.39	3.77	4.09	4.42	5.80	7.24
	120	2.49	2.67	2.91	3.16	3.43	3.70	4.13	4.50	4.87	6.42	8.05
	140	2.63	2.84	3.11	3.39	3.69	4.00	4.48	4.89	5.30	7.02	8.82
	10	1.50	1.52	1.58	1.65	1.73	1.81	1.93	2.04	2.14	2.56	2.98
	20	1.74	1.78	1.85	1.94	2.04	2.14	2.29	2.42	2.55	3.08	3.62
	40	2.07	2.13	2.23	2.35	2.48	2.61	2.82	2.99	3.17	3.92	4.71
	60	2.32	2.40	2.53	2.68	2.84	3.00	3.26	3.48	3.70	4.65	5.67
150	80	2.52	2.63	2.79	2.97	3.15	3.35	3.65	3.92	4.19	5.34	6.56
	100	2.70	2.84	3.02	3.23	3.45	3.67	4.03	4.33	4.65	5.98	7.40
	120	2.87	3.03	3.24	3.47	3.72	3.98	4.38	4.73	5.09	6.60	8.20
	140	3.02	3.21	3.44	3.71	3.98	4.27	4.72	5.11	5.51	7.19	8.97
	10	1.62	1.64	1.70	1.78	1.86	1.94	2.07	2.18	2.29	2.71	3.14
	20	1.90	1.93	2.01	2.10	2.20	2.30	2.46	2.59	2.72	3.26	3.81
	40	2.27	2.32	2.43	2.55	2.68	2.82	3.02	3.20	3.38	4.12	4.89
	60	2.54	2.62	2.76	2.90	3.06	3.23	3.48	3.70	3.92	4.85	5.84
	80	2.77	2.88	3.03	3.21	3.39	3.59	3.88	4.14	4.41	5.52	6.72
	100	2.97	3.10	3.28	3.48	3.69	3.91	4.26	4.56	4.86	6.16	7.55
	120	3.15	3.30	3.51	3.73	3.97	4.22	4.61	4.95	5.30	6.77	8.35
	140	3.32	3.49	3.72	3.97	4.24	4.52	4.95	5.33	5.72	7.36	9.11

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 34.0 Ft (RADIUS = 24.0 Ft)
FIRE GROWTH: ULTRAFAST ($\alpha = .178 \text{ BTU/s}^3$)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft												
		(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60	80
200	10		1.72	1.74	1.80	1.88	1.96	2.05	2.18	2.29	2.40	2.84	3.27	
	20		2.02	2.06	2.14	2.23	2.33	2.44	2.60	2.74	2.87	3.42	3.97	
	40		2.42	2.48	2.59	2.72	2.85	2.99	3.20	3.37	3.55	4.29	5.06	
	60		2.72	2.81	2.94	3.09	3.25	3.42	3.67	3.89	4.11	5.03	6.00	
	80		2.97	3.08	3.23	3.41	3.60	3.79	4.09	4.34	4.60	5.70	6.88	
	100		3.19	3.32	3.49	3.70	3.91	4.13	4.47	4.76	5.06	6.34	7.70	
	120		3.39	3.53	3.73	3.96	4.20	4.44	4.82	5.16	5.50	6.94	8.49	
300	140		3.57	3.73	3.96	4.20	4.47	4.74	5.16	5.53	5.91	7.52	9.25	
	10		1.87	1.89	1.96	2.04	2.13	2.22	2.36	2.48	2.59	3.05	3.50	
	20		2.22	2.26	2.34	2.44	2.55	2.66	2.83	2.97	3.11	3.68	4.24	
	40		2.68	2.74	2.85	2.98	3.12	3.26	3.48	3.67	3.85	4.60	5.37	
	60		3.02	3.10	3.24	3.40	3.56	3.73	3.99	4.21	4.44	5.36	6.32	
	80		3.30	3.40	3.56	3.74	3.93	4.13	4.43	4.69	4.95	6.03	7.19	
	100		3.55	3.67	3.85	4.05	4.27	4.49	4.83	5.12	5.42	6.67	8.00	
400	120		3.77	3.91	4.11	4.33	4.57	4.82	5.20	5.52	5.86	7.27	8.78	
	140		3.97	4.13	4.35	4.60	4.86	5.13	5.55	5.91	6.28	7.84	9.53	
	10		2.00	2.02	2.09	2.18	2.27	2.36	2.51	2.63	2.75	3.22	3.69	
	20		2.38	2.42	2.51	2.61	2.72	2.84	3.01	3.16	3.31	3.89	4.47	
	40		2.89	2.95	3.07	3.20	3.35	3.49	3.72	3.91	4.10	4.86	5.64	
	60		3.26	3.35	3.49	3.65	3.82	3.99	4.26	4.48	4.71	5.64	6.60	
	80		3.57	3.67	3.84	4.02	4.21	4.41	4.72	4.98	5.25	6.33	7.47	
600	100		3.84	3.96	4.14	4.35	4.57	4.79	5.14	5.43	5.73	6.97	8.29	
	120		4.07	4.21	4.42	4.65	4.89	5.14	5.52	5.84	6.18	7.57	9.06	
	140		4.29	4.45	4.67	4.92	5.19	5.46	5.88	6.24	6.60	8.15	9.81	
	10		2.20	2.22	2.30	2.39	2.49	2.59	2.74	2.87	3.00	3.50	3.99	
	20		2.64	2.68	2.78	2.89	3.01	3.13	3.32	3.47	3.63	4.25	4.85	
	40		3.22	3.29	3.41	3.56	3.71	3.86	4.10	4.30	4.50	5.30	6.10	
	60		3.65	3.74	3.89	4.05	4.23	4.42	4.70	4.93	5.17	6.13	7.10	
800	80		4.00	4.11	4.28	4.47	4.67	4.88	5.20	5.47	5.74	6.85	7.99	
	100		4.30	4.43	4.62	4.83	5.06	5.29	5.65	5.95	6.26	7.51	8.81	
	120		4.57	4.71	4.93	5.16	5.41	5.67	6.06	6.39	6.73	8.12	9.59	
	140		4.82	4.98	5.21	5.46	5.73	6.01	6.44	6.80	7.17	8.70	10.33	
	10		2.36	2.39	2.47	2.57	2.67	2.77	2.94	3.07	3.20	3.73	4.24	
	20		2.85	2.89	2.99	3.11	3.24	3.37	3.56	3.73	3.89	4.54	5.17	
	40		3.49	3.56	3.69	3.84	4.00	4.17	4.42	4.62	4.83	5.66	6.49	
	60		3.96	4.05	4.21	4.39	4.57	4.77	5.06	5.30	5.55	6.54	7.53	
	80		4.35	4.46	4.64	4.84	5.05	5.27	5.60	5.88	6.16	7.29	8.45	
	100		4.68	4.81	5.01	5.23	5.46	5.71	6.07	6.38	6.70	7.97	9.29	
	120		4.98	5.12	5.34	5.58	5.84	6.10	6.51	6.85	7.19	8.60	10.07	
	140		5.25	5.41	5.64	5.91	6.19	6.47	6.91	7.28	7.65	9.20	10.82	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 34.0 Ft (RADIUS = 24.0 Ft)
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft												
		(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60	80
0	10		1.42	1.33	1.68	1.55	1.68	1.82	1.96	2.17	2.35	2.53	3.25	3.98
	20		1.73	1.56	2.10	1.91	2.10	2.30	2.49	2.79	3.03	3.28	4.30	5.33
	40		2.24	1.95	2.81	2.52	2.81	3.10	3.39	3.82	4.19	4.55	6.05	7.60
	60		2.68	2.30	3.43	3.06	3.43	3.80	4.17	4.73	5.20	5.67	7.60	9.59
	80		3.10	2.62	4.00	3.55	4.00	4.45	4.89	5.56	6.13	6.69	9.01	11.42
	100		3.48	2.91	4.54	4.02	4.54	5.05	5.57	6.35	7.00	7.65	10.34	13.13
	120		3.85	3.20	5.05	4.46	5.05	5.63	6.21	7.09	7.83	8.57	11.61	14.76
25	140		4.20	3.47	5.53	4.88	5.53	6.18	6.83	7.80	8.62	9.45	12.82	16.32
	10		1.77	1.73	1.97	1.86	1.97	2.09	2.21	2.40	2.56	2.73	3.41	4.12
	20		2.09	2.00	2.38	2.22	2.38	2.54	2.72	2.99	3.22	3.46	4.43	5.45
	40		2.58	2.41	3.05	2.80	3.05	3.31	3.58	3.99	4.34	4.70	6.17	7.70
	60		3.00	2.74	3.65	3.32	3.65	4.00	4.35	4.88	5.34	5.80	7.70	9.68
	80		3.40	3.04	4.21	3.79	4.21	4.63	5.06	5.71	6.26	6.82	9.11	11.50
	100		3.77	3.32	4.73	4.24	4.73	5.23	5.72	6.48	7.12	7.77	10.44	13.21
50	120		4.12	3.59	5.23	4.67	5.23	5.79	6.36	7.22	7.95	8.68	11.70	14.84
	140		4.46	3.85	5.71	5.09	5.71	6.34	6.97	7.93	8.74	9.55	12.90	16.40
	10		1.96	1.92	2.16	2.05	2.16	2.27	2.40	2.58	2.74	2.90	3.57	4.26
	20		2.31	2.24	2.59	2.44	2.59	2.75	2.92	3.17	3.39	3.62	4.57	5.57
	40		2.84	2.70	3.27	3.05	3.27	3.51	3.77	4.16	4.50	4.84	6.29	7.80
	60		3.28	3.06	3.86	3.56	3.86	4.19	4.52	5.04	5.48	5.93	7.81	9.77
	80		3.67	3.37	4.41	4.02	4.41	4.81	5.22	5.85	6.39	6.94	9.21	11.58
100	100		4.03	3.66	4.92	4.47	4.92	5.40	5.88	6.62	7.25	7.89	10.53	13.29
	120		4.38	3.94	5.42	4.89	5.42	5.96	6.51	7.35	8.07	8.79	11.78	14.91
	140		4.72	4.20	5.89	5.29	5.89	6.50	7.12	8.06	8.85	9.66	12.99	16.47
	10		2.21	2.17	2.42	2.30	2.42	2.53	2.66	2.85	3.01	3.17	3.83	4.51
	20		2.63	2.56	2.90	2.76	2.90	3.06	3.23	3.48	3.69	3.91	4.83	5.79
	40		3.23	3.10	3.63	3.42	3.63	3.86	4.10	4.47	4.79	5.12	6.51	7.99
	60		3.70	3.51	4.23	3.95	4.23	4.53	4.85	5.33	5.76	6.19	8.02	9.95
150	80		4.11	3.86	4.78	4.43	4.78	5.15	5.53	6.13	6.65	7.18	9.40	11.75
	100		4.49	4.18	5.29	4.87	5.29	5.72	6.18	6.89	7.50	8.12	10.71	13.44
	120		4.84	4.47	5.77	5.29	5.77	6.28	6.80	7.61	8.30	9.01	11.96	15.06
	140		5.18	4.75	6.24	5.69	6.24	6.81	7.40	8.30	9.08	9.87	13.16	16.61
	10		2.39	2.35	2.60	2.49	2.60	2.73	2.85	3.05	3.21	3.38	4.05	4.73
	20		2.86	2.79	3.14	2.99	3.14	3.30	3.47	3.72	3.94	4.16	5.06	6.01
	40		3.52	3.39	3.92	3.71	3.92	4.14	4.38	4.74	5.06	5.38	6.74	8.19
	60		4.03	3.85	4.55	4.27	4.55	4.84	5.14	5.61	6.02	6.44	8.22	10.12
	80		4.46	4.23	5.10	4.77	5.10	5.45	5.82	6.40	6.90	7.42	9.60	11.91
	100		4.86	4.57	5.61	5.22	5.61	6.03	6.47	7.15	7.74	8.34	10.90	13.60
	120		5.23	4.89	6.10	5.64	6.10	6.58	7.08	7.86	8.54	9.23	12.14	15.21
	140		5.57	5.18	6.56	6.05	6.56	7.10	7.67	8.55	9.31	10.08	13.33	16.76

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 34.0 Ft (RADIUS = 24.0 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE °F	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
200 (Ft*s) ^{1/2}	10	2.50	2.54	2.64	2.76	2.89	3.02	3.22	3.39	3.55	4.23	4.92
	20	2.98	3.05	3.18	3.34	3.50	3.67	3.93	4.15	4.37	5.27	6.22
	40	3.63	3.76	3.95	4.16	4.39	4.62	4.98	5.30	5.61	6.95	8.38
	60	4.12	4.30	4.54	4.81	5.10	5.40	5.86	6.26	6.68	8.42	10.30
	80	4.54	4.76	5.06	5.38	5.73	6.09	6.66	7.15	7.65	9.79	12.08
	100	4.90	5.17	5.52	5.91	6.31	6.74	7.40	7.97	8.57	11.08	13.76
	120	5.23	5.55	5.96	6.40	6.86	7.35	8.11	8.77	9.44	12.31	15.36
300	140	5.54	5.91	6.37	6.86	7.39	7.93	8.79	9.53	10.29	13.50	16.90
	10	2.74	2.78	2.88	3.01	3.14	3.28	3.49	3.66	3.84	4.54	5.24
	20	3.28	3.36	3.49	3.65	3.82	4.00	4.27	4.49	4.72	5.64	6.58
	40	4.02	4.15	4.34	4.56	4.79	5.03	5.39	5.71	6.02	7.35	8.74
	60	4.57	4.74	4.99	5.26	5.55	5.84	6.31	6.70	7.11	8.81	10.64
	80	5.03	5.25	5.54	5.86	6.21	6.56	7.12	7.59	8.08	10.16	12.40
	100	5.44	5.69	6.04	6.41	6.81	7.22	7.86	8.42	8.99	11.44	14.07
400	120	5.80	6.10	6.49	6.92	7.37	7.84	8.57	9.21	9.86	12.66	15.66
	140	6.13	6.48	6.92	7.40	7.90	8.43	9.25	9.96	10.70	13.83	17.19
	10	2.93	2.97	3.08	3.21	3.35	3.49	3.71	3.89	4.07	4.80	5.52
	20	3.53	3.61	3.75	3.91	4.09	4.27	4.55	4.78	5.01	5.95	6.90
	40	4.34	4.46	4.66	4.89	5.12	5.37	5.74	6.06	6.38	7.70	9.09
	60	4.94	5.11	5.36	5.63	5.92	6.22	6.69	7.08	7.49	9.17	10.98
	80	5.44	5.65	5.94	6.27	6.61	6.97	7.52	7.99	8.48	10.52	12.72
600	100	5.87	6.13	6.47	6.84	7.24	7.64	8.28	8.83	9.39	11.79	14.37
	120	6.27	6.56	6.94	7.37	7.81	8.28	9.00	9.62	10.26	13.00	15.95
	140	6.63	6.96	7.39	7.86	8.36	8.87	9.68	10.37	11.09	14.16	17.47
	10	3.23	3.28	3.40	3.54	3.69	3.84	4.07	4.26	4.46	5.22	5.97
	20	3.93	4.01	4.16	4.33	4.52	4.71	5.00	5.25	5.49	6.47	7.45
	40	4.85	4.98	5.19	5.42	5.67	5.92	6.31	6.64	6.97	8.32	9.70
	60	5.53	5.70	5.96	6.24	6.54	6.85	7.33	7.73	8.14	9.83	11.60
800	80	6.10	6.30	6.60	6.94	7.29	7.65	8.21	8.68	9.17	11.18	13.34
	100	6.58	6.83	7.18	7.56	7.95	8.37	9.00	9.55	10.10	12.45	14.97
	120	7.02	7.31	7.70	8.12	8.57	9.03	9.74	10.35	10.98	13.65	16.53
	140	7.42	7.75	8.18	8.64	9.14	9.65	10.44	11.12	11.82	14.80	18.03
	10	3.48	3.54	3.66	3.81	3.96	4.12	4.36	4.56	4.77	5.56	6.34
	20	4.25	4.33	4.49	4.68	4.87	5.07	5.38	5.63	5.89	6.90	7.91
	40	5.27	5.40	5.61	5.86	6.11	6.38	6.78	7.12	7.46	8.84	10.24
	60	6.02	6.19	6.45	6.75	7.06	7.37	7.86	8.28	8.69	10.40	12.17
	80	6.63	6.84	7.15	7.49	7.85	8.22	8.79	9.27	9.76	11.78	13.91
	100	7.16	7.41	7.76	8.15	8.56	8.97	9.62	10.17	10.73	13.06	15.54
	120	7.64	7.92	8.32	8.75	9.20	9.66	10.38	11.00	11.63	14.26	17.09
	140	8.07	8.39	8.83	9.30	9.80	10.31	11.10	11.78	12.48	15.41	18.51

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 34.0 Ft (RADIUS = 24.0 Ft)³
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
0	°F											
	10	1.98	2.18	2.41	2.64	2.88	3.12	3.48	3.78	4.09	5.33	6.60
	20	2.45	2.79	3.13	3.48	3.83	4.18	4.71	5.15	5.60	7.42	9.30
	40	3.24	3.81	4.36	4.90	5.43	5.97	6.78	7.46	8.14	10.94	13.84
	60	3.93	4.70	5.43	6.14	6.84	7.54	8.60	9.48	10.37	14.03	17.81
	80	4.56	5.53	6.42	7.28	8.13	8.98	10.26	11.34	12.42	16.86	21.47
	100	5.16	6.30	7.34	8.35	9.35	10.34	11.83	13.08	14.34	19.52	24.89
25	120	5.72	7.03	8.22	9.37	10.50	11.62	13.32	14.74	16.17	22.05	28.16
	140	6.26	7.73	9.06	10.34	11.60	12.86	14.75	16.33	17.93	24.47	31.28
	10	2.51	2.61	2.77	2.97	3.17	3.38	3.72	4.00	4.29	5.50	6.74
	20	2.99	3.19	3.47	3.77	4.08	4.41	4.91	5.34	5.77	7.56	9.42
	40	3.74	4.17	4.64	5.14	5.65	6.17	6.95	7.62	8.29	11.06	13.94
	60	4.40	5.03	5.69	6.36	7.04	7.72	8.75	9.63	10.51	14.13	17.90
	80	5.01	5.83	6.66	7.49	8.32	9.15	10.41	11.47	12.55	16.96	21.55
50	100	5.58	6.59	7.57	8.55	9.52	10.49	11.97	13.21	14.46	19.61	24.97
	120	6.13	7.31	8.44	9.55	10.66	11.77	13.45	14.86	16.28	22.14	28.23
	140	6.66	8.00	9.28	10.52	11.76	13.00	14.87	16.44	18.03	24.56	31.35
	10	2.79	2.88	3.04	3.22	3.42	3.62	3.94	4.21	4.49	5.66	6.88
	20	3.33	3.51	3.75	4.03	4.33	4.63	5.11	5.52	5.95	7.70	9.53
	40	4.14	4.49	4.92	5.38	5.86	6.36	7.12	7.77	8.44	11.18	14.03
	60	4.81	5.34	5.94	6.58	7.23	7.89	8.91	9.77	10.64	14.24	17.99
100	80	5.41	6.13	6.90	7.69	8.50	9.31	10.55	11.60	12.67	17.06	21.63
	100	5.98	6.87	7.80	8.74	9.69	10.65	12.10	13.33	14.58	19.70	25.05
	120	6.52	7.58	8.66	9.74	10.83	11.92	13.58	14.98	16.40	22.22	28.31
	140	7.03	8.26	9.49	10.70	11.92	13.15	15.00	16.56	18.14	24.64	31.43
	10	3.17	3.25	3.41	3.59	3.79	3.99	4.30	4.57	4.84	5.97	7.15
	20	3.81	3.96	4.20	4.46	4.74	5.03	5.48	5.87	6.28	7.97	9.77
	40	4.72	5.02	5.40	5.82	6.27	6.73	7.46	8.08	8.72	11.41	14.23
150	60	5.45	5.89	6.42	7.00	7.61	8.24	9.21	10.05	10.90	14.45	18.17
	80	6.08	6.67	7.36	8.09	8.85	9.64	10.84	11.87	12.91	17.25	21.80
	100	6.66	7.40	8.24	9.12	10.03	10.96	12.38	13.58	14.81	19.89	25.21
	120	7.20	8.10	9.09	10.11	11.15	12.22	13.84	15.22	16.62	22.40	28.46
	140	7.72	8.77	9.90	11.06	12.23	13.43	15.25	16.79	18.35	24.81	31.57
	10	3.45	3.53	3.69	3.87	4.07	4.28	4.59	4.86	5.13	6.24	7.41
	20	4.16	4.31	4.54	4.80	5.07	5.36	5.81	6.19	6.58	8.24	10.00
	40	5.16	5.44	5.80	6.20	6.63	7.08	7.78	8.38	9.01	11.64	14.43
	60	5.94	6.34	6.84	7.39	7.97	8.57	9.51	10.33	11.16	14.66	18.35
	80	6.61	7.14	7.78	8.47	9.20	9.95	11.12	12.13	13.16	17.45	21.97
	100	7.22	7.88	8.66	9.49	10.36	11.26	12.65	13.83	15.04	20.07	25.37
	120	7.78	8.58	9.50	10.47	11.47	12.51	14.10	15.46	16.84	22.58	28.61
	140	8.31	9.25	10.30	11.41	12.54	13.71	15.50	17.02	18.57	24.98	31.72

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 34.0 Ft (RADIUS = 24.0 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX		TEMPERATURE RISE	CEILING HEIGHT, Ft										
(Ft*s) ^{1/2}		°F	4	8	12	16	20	24	30	35	40	60	80
200	10	10	3.67	3.76	3.92	4.11	4.31	4.52	4.83	5.10	5.38	6.50	7.65
	20	20	4.45	4.59	4.82	5.09	5.36	5.65	6.09	6.47	6.86	8.49	10.22
	40	40	5.52	5.79	6.14	6.54	6.96	7.40	8.08	8.67	9.28	11.86	14.62
	60	60	6.35	6.73	7.22	7.75	8.31	8.89	9.81	10.60	11.42	14.86	18.53
	80	80	7.06	7.56	8.17	8.83	9.53	10.26	11.40	12.39	13.40	17.64	22.13
	100	100	7.69	8.31	9.05	9.85	10.69	11.56	12.91	14.08	15.27	20.26	25.52
	120	120	8.27	9.02	9.89	10.82	11.79	12.80	14.36	15.69	17.06	22.75	28.76
300	140	140	8.82	9.69	10.69	11.75	12.85	13.99	15.75	17.25	18.78	25.15	31.86
	10	10	4.03	4.12	4.29	4.48	4.69	4.91	5.24	5.52	5.80	6.93	8.09
	20	20	4.91	5.06	5.29	5.56	5.84	6.13	6.58	6.96	7.35	8.96	10.66
	40	40	6.11	6.37	6.72	7.11	7.53	7.96	8.63	9.20	9.80	12.31	15.01
	60	60	7.03	7.38	7.85	8.37	8.91	9.47	10.36	11.12	11.91	15.27	18.88
	80	80	7.80	8.26	8.84	9.48	10.15	10.85	11.94	12.89	13.87	18.03	22.46
	100	100	8.48	9.05	9.75	10.50	11.30	12.13	13.44	14.56	15.72	20.62	25.84
400	120	120	9.10	9.79	10.60	11.47	12.40	13.36	14.86	16.16	17.49	23.10	29.06
	140	140	9.68	10.48	11.40	12.40	13.45	14.54	16.24	17.70	19.20	25.49	32.15
	10	10	4.33	4.42	4.59	4.79	5.01	5.23	5.57	5.86	6.14	7.30	8.47
	20	20	5.29	5.44	5.68	5.95	6.24	6.53	6.99	7.38	7.77	9.38	11.07
	40	40	6.60	6.85	7.20	7.59	8.01	8.44	9.11	9.68	10.26	12.73	15.39
	60	60	7.58	7.93	8.39	8.90	9.44	9.99	10.86	11.61	12.39	15.68	19.23
	80	80	8.40	8.85	9.42	10.04	10.70	11.38	12.45	13.38	14.33	18.41	22.79
600	100	100	9.13	9.68	10.35	11.09	11.86	12.67	13.94	15.04	16.17	20.99	26.15
	120	120	9.80	10.44	11.22	12.07	12.96	13.89	15.35	16.62	17.93	23.45	29.36
	140	140	10.41	11.15	12.04	13.00	14.01	15.07	16.72	18.15	19.62	25.83	32.44
	10	10	4.80	4.89	5.08	5.29	5.52	5.76	6.11	6.41	6.72	7.92	9.12
	20	20	5.90	6.05	6.30	6.58	6.89	7.20	7.67	8.07	8.47	10.11	11.80
	40	40	7.38	7.62	7.99	8.39	8.81	9.25	9.93	10.50	11.09	13.52	16.12
	60	60	8.48	8.82	9.28	9.79	10.33	10.89	11.75	12.49	13.25	16.46	19.92
800	80	80	9.40	9.83	10.39	11.01	11.65	12.32	13.37	14.27	15.20	19.15	23.44
	100	100	10.20	10.72	11.38	12.10	12.85	13.64	14.87	15.93	17.02	21.70	26.77
	120	120	10.93	11.54	12.29	13.11	13.98	14.88	16.28	17.50	18.76	24.14	29.95
	140	140	11.60	12.30	13.15	14.07	15.04	16.05	17.64	19.01	20.44	26.49	33.01
	10	10	5.18	5.28	5.47	5.70	5.94	6.19	6.56	6.87	7.19	8.43	9.67
	20	20	6.39	6.55	6.81	7.10	7.42	7.74	8.23	8.64	9.06	10.74	12.44
	40	40	8.01	8.26	8.63	9.05	9.48	9.93	10.62	11.20	11.79	14.23	16.81
	60	60	9.21	9.55	10.02	10.54	11.08	11.65	12.51	13.25	14.01	17.18	20.59
	80	80	10.21	10.63	11.20	11.82	12.46	13.14	14.18	15.07	15.99	19.87	24.08
	100	100	11.08	11.59	12.24	12.96	13.71	14.49	15.70	16.74	17.82	22.40	27.38
	120	120	11.86	12.45	13.20	14.01	14.86	15.75	17.13	18.32	19.56	24.82	30.54
	140	140	12.58	13.25	14.09	15.00	15.95	16.94	18.49	19.83	21.22	27.15	33.58

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 34.0 Ft (RADIUS = 24.0 Ft)³
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		°F	4	8	12	16	20	24	30	35	40	60	80
0 (Ft*s) ^{1/2}	10		3.09	3.48	3.90	4.32	4.75	5.17	5.82	6.36	6.90	9.12	11.40
	20		4.02	4.70	5.36	6.01	6.66	7.30	8.28	9.10	9.93	13.31	16.80
	40		5.59	6.74	7.80	8.84	9.86	10.89	12.42	13.72	15.02	20.34	25.87
	60		6.97	8.53	9.95	11.32	12.68	14.03	16.06	17.76	19.48	26.51	33.83
	80		8.24	10.17	11.92	13.60	15.26	16.91	19.39	21.47	23.57	32.18	41.13
	100		9.43	11.72	13.77	15.74	17.69	19.62	22.52	24.96	27.42	37.50	47.99
25	120		10.56	13.18	15.53	17.78	19.99	22.19	25.50	28.27	31.07	42.55	54.51
	140		11.65	14.59	17.22	19.73	22.20	24.66	28.35	31.45	34.58	47.40	60.76
	10		3.72	3.97	4.30	4.66	5.05	5.45	6.06	6.58	7.11	9.29	11.54
	20		4.62	5.12	5.70	6.30	6.91	7.54	8.49	9.29	10.10	13.45	16.92
	40		6.12	7.10	8.09	9.09	10.08	11.08	12.60	13.87	15.16	20.46	25.97
	60		7.46	8.86	10.21	11.55	12.87	14.20	16.21	17.90	19.61	26.62	33.92
50	80		8.69	10.48	12.16	13.81	15.44	17.08	19.54	21.61	23.70	32.28	41.22
	100		9.86	12.01	14.00	15.94	17.86	19.77	22.66	25.09	27.53	37.59	48.07
	120		10.97	13.46	15.75	17.97	20.16	22.34	25.63	28.39	31.18	42.64	54.59
	140		12.04	14.86	17.43	19.91	22.36	24.80	28.48	31.57	34.69	47.49	60.84
	10		4.13	4.34	4.64	4.98	5.34	5.71	6.30	6.80	7.31	9.45	11.68
	20		5.09	5.51	6.02	6.58	7.16	7.76	8.69	9.48	10.28	13.58	17.03
100	40		6.61	7.45	8.38	9.33	10.30	11.28	12.77	14.03	15.31	20.58	26.07
	60		7.92	9.18	10.47	11.77	13.07	14.38	16.37	18.04	19.74	26.72	34.01
	80		9.13	10.78	12.41	14.02	15.63	17.24	19.68	21.74	23.82	32.38	41.30
	100		10.28	12.29	14.23	16.14	18.03	19.93	22.80	25.21	27.65	37.68	48.15
	120		11.37	13.73	15.97	18.15	20.32	22.49	25.76	28.51	31.30	42.73	54.66
	140		12.43	15.12	17.64	20.09	22.52	24.95	28.61	31.68	34.79	47.57	60.91
150	10		4.70	4.88	5.17	5.49	5.83	6.18	6.74	7.22	7.71	9.77	11.96
	20		5.78	6.13	6.60	7.11	7.65	8.21	9.09	9.84	10.62	13.86	17.27
	40		7.40	8.10	8.92	9.80	10.72	11.66	13.11	14.34	15.60	20.81	26.27
	60		8.74	9.80	10.98	12.20	13.46	14.73	16.68	18.33	20.01	26.94	34.19
	80		9.94	11.37	12.88	14.42	15.99	17.57	19.97	22.00	24.07	32.57	41.47
	100		11.07	12.86	14.68	16.52	18.37	20.24	23.07	25.46	27.88	37.87	48.31
	120		12.15	14.28	16.40	18.52	20.65	22.79	26.02	28.75	31.52	42.91	54.81
	140		13.18	15.64	18.06	20.45	22.84	25.23	28.86	31.92	35.01	47.75	61.05
	10		5.12	5.29	5.57	5.89	6.23	6.58	7.12	7.59	8.07	10.09	12.23
	20		6.31	6.63	7.07	7.56	8.08	8.62	9.47	10.20	10.95	14.13	17.50
	40		8.03	8.66	9.43	10.26	11.13	12.04	13.45	14.65	15.89	21.04	26.47
	60		9.42	10.38	11.47	12.63	13.84	15.08	16.98	18.61	20.27	27.15	34.36
	80		10.65	11.94	13.35	14.83	16.34	17.89	20.26	22.27	24.31	32.77	41.63
	100		11.79	13.41	15.13	16.91	18.71	20.55	23.34	25.71	28.12	38.05	48.46
	120		12.87	14.81	16.83	18.89	20.98	23.08	26.28	28.99	31.74	43.09	54.96
	140		13.90	16.16	18.47	20.80	23.15	25.52	29.11	32.15	35.22	47.92	61.20

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 34.0 Ft (RADIUS = 24.0 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	TEMPERATURE RISE °F	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
200	10	5.46	5.63	5.91	6.23	6.57	6.92	7.46	7.93	8.40	10.39	12.50
	20	6.74	7.05	7.48	7.96	8.47	9.00	9.83	10.54	11.28	14.40	17.73
	40	8.56	9.16	9.89	10.69	11.53	12.41	13.78	14.96	16.18	21.27	26.66
	60	10.01	10.90	11.93	13.05	14.21	15.42	17.29	18.89	20.53	27.35	34.54
	80	11.28	12.46	13.80	15.23	16.70	18.21	20.54	22.53	24.55	32.96	41.80
	100	12.44	13.93	15.57	17.29	19.05	20.85	23.61	25.96	28.35	38.24	48.62
	120	13.52	15.32	17.26	19.26	21.30	23.37	26.54	29.23	31.96	43.26	55.11
300	140	14.56	16.67	18.89	21.16	23.46	25.80	29.36	32.38	35.44	48.09	61.34
	10	6.01	6.18	6.47	6.79	7.14	7.49	8.04	8.51	8.98	10.95	13.02
	20	7.44	7.74	8.17	8.64	9.14	9.67	10.48	11.18	11.89	14.93	18.19
	40	9.44	9.99	10.69	11.45	12.26	13.10	14.42	15.56	16.74	21.73	27.06
	60	11.00	11.80	12.77	13.83	14.93	16.09	17.89	19.45	21.05	27.77	34.90
	80	12.34	13.41	14.65	15.99	17.39	18.85	21.11	23.05	25.04	33.35	42.13
	100	13.55	14.89	16.41	18.03	19.72	21.46	24.15	26.46	28.81	38.61	48.94
400	120	14.68	16.29	18.08	19.98	21.94	23.96	27.06	29.71	32.40	43.62	55.41
	140	15.74	17.62	19.69	21.86	24.08	26.36	29.86	32.83	35.86	48.43	61.63
	10	6.46	6.63	6.92	7.26	7.61	7.97	8.53	9.00	9.48	11.45	13.51
	20	8.01	8.31	8.74	9.21	9.72	10.24	11.05	11.74	12.45	15.44	18.65
	40	10.16	10.69	11.38	12.13	12.92	13.74	15.02	16.14	17.29	22.18	27.45
	60	11.82	12.58	13.52	14.53	15.61	16.72	18.48	20.00	21.56	28.19	35.25
	80	13.23	14.24	15.43	16.71	18.06	19.47	21.67	23.57	25.52	33.74	42.46
600	100	14.50	15.75	17.19	18.74	20.37	22.06	24.69	26.95	29.27	38.98	49.25
	120	15.66	17.16	18.86	20.68	22.57	24.53	27.57	30.18	32.84	43.97	55.71
	140	16.76	18.51	20.46	22.54	24.70	26.92	30.35	33.29	36.28	48.77	61.92
	10	7.19	7.36	7.67	8.01	8.38	8.76	9.34	9.83	10.32	12.32	14.38
	20	8.94	9.24	9.67	10.16	10.68	11.21	12.02	12.72	13.43	16.38	19.52
	40	11.35	11.86	12.53	13.27	14.05	14.86	16.12	17.20	18.32	23.07	28.22
	60	13.17	13.89	14.79	15.78	16.81	17.89	19.58	21.04	22.56	29.01	35.96
800	80	14.71	15.64	16.77	18.00	19.29	20.64	22.75	24.58	26.47	34.51	43.12
	100	16.08	17.23	18.58	20.05	21.60	23.21	25.73	27.92	30.17	39.71	49.87
	120	17.32	18.69	20.28	21.99	23.79	25.66	28.59	31.12	33.72	44.67	56.31
	140	18.49	20.07	21.89	23.84	25.89	28.02	31.33	34.19	37.13	49.44	62.50
	10	7.77	7.95	8.27	8.63	9.01	9.41	10.00	10.51	11.02	13.06	15.14
	20	9.70	9.99	10.44	10.94	11.47	12.01	12.84	13.55	14.26	17.22	20.33
	40	12.31	12.81	13.49	14.23	15.02	15.82	17.08	18.15	19.26	23.93	28.98
	60	14.28	14.98	15.87	16.84	17.87	18.93	20.59	22.02	23.50	29.82	36.66
	80	15.93	16.82	17.93	19.13	20.39	21.71	23.76	25.55	27.39	35.27	43.78
	100	17.38	18.48	19.80	21.22	22.72	24.29	26.74	28.87	31.07	40.43	50.50
	120	18.71	20.00	21.53	23.18	24.92	26.73	29.57	32.04	34.58	45.37	56.91
	140	19.93	21.43	23.17	25.04	27.02	29.08	32.30	35.09	37.96	50.11	63.07

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 36.0 Ft (RADIUS = 25.5 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		(Ft*s) ^{1/2}	4	8	12	16	20	24	30	35	40	60	80
0	10		0.96	1.01	1.08	1.16	1.24	1.32	1.45	1.56	1.67	2.11	2.55
	20		1.09	1.17	1.27	1.38	1.49	1.60	1.77	1.91	2.06	2.64	3.24
	40		1.29	1.43	1.59	1.75	1.90	2.06	2.31	2.51	2.71	3.54	4.39
	60		1.48	1.67	1.87	2.07	2.27	2.47	2.77	3.03	3.29	4.33	5.41
	80		1.64	1.88	2.13	2.37	2.61	2.84	3.21	3.51	3.81	5.06	6.34
	100		1.80	2.09	2.37	2.64	2.92	3.20	3.61	3.96	4.31	5.74	7.21
	120		1.95	2.28	2.60	2.91	3.22	3.53	3.99	4.39	4.78	6.38	8.04
25	140		2.09	2.46	2.82	3.16	3.51	3.85	4.36	4.80	5.23	7.00	8.84
	10		1.27	1.28	1.34	1.40	1.47	1.55	1.66	1.76	1.86	2.27	2.69
	20		1.44	1.47	1.54	1.63	1.72	1.82	1.97	2.10	2.23	2.78	3.36
	40		1.68	1.74	1.85	1.98	2.12	2.26	2.48	2.67	2.86	3.66	4.49
	60		1.87	1.97	2.12	2.29	2.46	2.65	2.93	3.17	3.42	4.44	5.50
	80		2.03	2.18	2.37	2.57	2.79	3.01	3.35	3.64	3.94	5.16	6.42
	100		2.18	2.37	2.60	2.84	3.09	3.35	3.75	4.09	4.43	5.83	7.29
50	120		2.33	2.55	2.82	3.10	3.39	3.68	4.13	4.51	4.89	6.47	8.12
	140		2.46	2.73	3.03	3.35	3.67	3.99	4.49	4.91	5.34	7.09	8.91
	10		1.40	1.41	1.47	1.53	1.61	1.68	1.80	1.90	2.00	2.40	2.82
	20		1.60	1.63	1.70	1.79	1.88	1.98	2.12	2.25	2.38	2.91	3.47
	40		1.88	1.94	2.05	2.17	2.29	2.43	2.64	2.82	3.00	3.78	4.59
	60		2.10	2.19	2.33	2.48	2.64	2.81	3.08	3.31	3.55	4.54	5.59
	80		2.29	2.41	2.57	2.76	2.96	3.17	3.50	3.78	4.06	5.26	6.51
100	100		2.45	2.60	2.80	3.03	3.26	3.51	3.89	4.21	4.54	5.93	7.37
	120		2.60	2.79	3.02	3.28	3.55	3.83	4.26	4.63	5.00	6.56	8.20
	140		2.75	2.96	3.23	3.52	3.82	4.14	4.62	5.03	5.45	7.18	8.99
	10		1.57	1.59	1.64	1.71	1.79	1.87	1.99	2.09	2.19	2.61	3.02
	20		1.82	1.85	1.92	2.01	2.10	2.20	2.35	2.48	2.61	3.14	3.69
	40		2.16	2.22	2.32	2.44	2.56	2.70	2.90	3.07	3.25	4.00	4.79
	60		2.42	2.50	2.63	2.78	2.93	3.10	3.35	3.57	3.80	4.75	5.77
150	80		2.63	2.74	2.90	3.07	3.26	3.46	3.76	4.03	4.30	5.45	6.67
	100		2.83	2.96	3.14	3.34	3.56	3.79	4.15	4.46	4.77	6.11	7.53
	120		3.00	3.15	3.37	3.60	3.85	4.11	4.51	4.86	5.22	6.74	8.35
	140		3.16	3.34	3.58	3.84	4.12	4.41	4.87	5.26	5.66	7.35	9.13
	10		1.69	1.71	1.77	1.84	1.92	2.00	2.13	2.23	2.34	2.77	3.19
	20		1.98	2.01	2.08	2.17	2.27	2.37	2.53	2.66	2.79	3.33	3.87
	40		2.37	2.42	2.52	2.64	2.77	2.90	3.11	3.28	3.46	4.20	4.97
	60		2.65	2.73	2.86	3.01	3.16	3.33	3.58	3.80	4.02	4.95	5.94
	80		2.89	2.99	3.15	3.32	3.51	3.70	4.00	4.26	4.52	5.64	6.84
	100		3.10	3.23	3.40	3.60	3.82	4.04	4.38	4.68	4.99	6.29	7.69
	120		3.29	3.44	3.64	3.87	4.11	4.36	4.75	5.09	5.44	6.92	8.50
	140		3.47	3.64	3.86	4.12	4.38	4.66	5.10	5.48	5.87	7.52	9.28

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 36.0 Ft (RADIUS = 25.5 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
200 (Ft*s) ^{1/2}	10	1.79	1.81	1.87	1.95	2.03	2.11	2.24	2.35	2.46	2.90	3.33	
	20	2.11	2.14	2.22	2.31	2.41	2.51	2.67	2.81	2.94	3.49	4.04	
	40	2.53	2.58	2.69	2.81	2.94	3.08	3.29	3.46	3.64	4.38	5.15	
	60	2.84	2.92	3.05	3.20	3.36	3.52	3.78	3.99	4.21	5.14	6.11	
	80	3.10	3.20	3.35	3.53	3.71	3.91	4.20	4.46	4.72	5.82	7.00	
	100	3.33	3.45	3.63	3.83	4.04	4.26	4.60	4.89	5.19	6.47	7.84	
	120	3.53	3.68	3.88	4.10	4.34	4.58	4.97	5.30	5.64	7.09	8.65	
	140	3.72	3.88	4.11	4.36	4.62	4.89	5.32	5.69	6.07	7.69	9.42	
	300	10	1.95	1.97	2.04	2.11	2.20	2.29	2.43	2.54	2.66	3.11	3.56
		20	2.32	2.35	2.43	2.53	2.63	2.74	2.91	3.05	3.19	3.75	4.32
40		2.80	2.85	2.96	3.09	3.22	3.36	3.58	3.76	3.95	4.70	5.46	
60		3.15	3.23	3.36	3.51	3.68	3.85	4.10	4.32	4.55	5.47	6.43	
80		3.44	3.54	3.70	3.87	4.06	4.26	4.56	4.81	5.08	6.16	7.32	
100		3.70	3.82	3.99	4.19	4.41	4.63	4.97	5.26	5.56	6.81	8.15	
120		3.93	4.06	4.26	4.49	4.72	4.97	5.35	5.68	6.01	7.42	8.94	
140		4.14	4.29	4.51	4.76	5.02	5.29	5.71	6.07	6.44	8.01	9.71	
400		10	2.08	2.10	2.17	2.25	2.34	2.43	2.58	2.70	2.82	3.29	3.75
		20	2.48	2.52	2.60	2.70	2.81	2.93	3.10	3.24	3.39	3.97	4.55
	40	3.01	3.07	3.18	3.31	3.45	3.60	3.82	4.01	4.20	4.96	5.74	
	60	3.40	3.48	3.61	3.77	3.94	4.11	4.38	4.60	4.83	5.76	6.72	
	80	3.72	3.82	3.98	4.16	4.35	4.55	4.86	5.12	5.38	6.47	7.61	
	100	4.00	4.11	4.30	4.50	4.72	4.94	5.28	5.58	5.88	7.12	8.44	
	120	4.25	4.38	4.58	4.81	5.05	5.30	5.68	6.00	6.34	7.74	9.23	
	140	4.48	4.63	4.85	5.10	5.36	5.63	6.05	6.41	6.78	8.33	9.99	
	600	10	2.29	2.31	2.38	2.47	2.57	2.67	2.82	2.95	3.07	3.57	4.06
		20	2.75	2.79	2.88	2.99	3.10	3.22	3.41	3.56	3.72	4.33	4.94
40		3.36	3.42	3.54	3.68	3.83	3.98	4.22	4.41	4.61	5.41	6.21	
60		3.81	3.88	4.03	4.19	4.37	4.55	4.83	5.06	5.30	6.26	7.23	
80		4.17	4.27	4.43	4.62	4.82	5.03	5.35	5.62	5.89	7.00	8.14	
100		4.49	4.60	4.79	5.00	5.22	5.45	5.81	6.11	6.42	7.67	8.98	
120		4.77	4.90	5.11	5.34	5.59	5.84	6.23	6.56	6.90	8.30	9.77	
140		5.02	5.17	5.40	5.65	5.92	6.20	6.62	6.99	7.36	8.89	10.52	
800		10	2.46	2.48	2.56	2.65	2.75	2.86	3.02	3.15	3.28	3.80	4.31
		20	2.97	3.01	3.10	3.22	3.34	3.47	3.66	3.82	3.99	4.63	5.26
	40	3.64	3.70	3.83	3.97	4.13	4.29	4.54	4.75	4.95	5.78	6.60	
	60	4.13	4.21	4.36	4.54	4.72	4.91	5.20	5.44	5.69	6.67	7.67	
	80	4.53	4.63	4.80	5.00	5.21	5.43	5.76	6.03	6.31	7.45	8.60	
	100	4.88	5.00	5.19	5.41	5.64	5.88	6.25	6.56	6.87	8.14	9.46	
	120	5.19	5.32	5.53	5.78	6.03	6.29	6.69	7.03	7.38	8.79	10.26	
	140	5.47	5.62	5.85	6.11	6.39	6.67	7.11	7.48	7.85	9.40	11.02	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 36.0 Ft (RADIUS = 25.5 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE °F	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
0 (Ft*s) ^{1/2}	10	1.39	1.49	1.61	1.75	1.88	2.02	2.23	2.41	2.59	3.31	4.05
	20	1.64	1.81	1.99	2.18	2.38	2.57	2.87	3.12	3.37	4.39	5.42
	40	2.06	2.34	2.63	2.92	3.21	3.50	3.94	4.31	4.68	6.19	7.74
	60	2.42	2.81	3.19	3.57	3.94	4.32	4.88	5.35	5.83	7.76	9.76
	80	2.75	3.24	3.71	4.16	4.61	5.06	5.74	6.31	6.88	9.21	11.63
	100	3.07	3.65	4.19	4.72	5.24	5.77	6.55	7.21	7.87	10.57	13.37
	120	3.36	4.03	4.65	5.25	5.84	6.43	7.32	8.06	8.81	11.87	15.04
	140	3.65	4.40	5.09	5.76	6.42	7.07	8.06	8.88	9.71	13.11	16.63
25	10	1.81	1.85	1.94	2.04	2.16	2.28	2.47	2.63	2.80	3.48	4.19
	20	2.10	2.18	2.31	2.46	2.63	2.80	3.08	3.31	3.54	4.53	5.54
	40	2.52	2.69	2.92	3.17	3.43	3.70	4.12	4.47	4.83	6.30	7.84
	60	2.87	3.14	3.46	3.79	4.14	4.50	5.04	5.50	5.96	7.87	9.86
	80	3.19	3.55	3.95	4.37	4.80	5.23	5.89	6.44	7.01	9.31	11.71
	100	3.48	3.94	4.42	4.92	5.42	5.92	6.69	7.34	7.99	10.67	13.46
	120	3.77	4.31	4.87	5.44	6.01	6.58	7.45	8.18	8.92	11.96	15.11
	140	4.04	4.67	5.31	5.94	6.58	7.22	8.19	9.00	9.82	13.20	16.70
50	10	2.01	2.04	2.13	2.23	2.35	2.47	2.65	2.81	2.97	3.64	4.33
	20	2.34	2.41	2.54	2.68	2.84	3.01	3.26	3.49	3.71	4.66	5.66
	40	2.82	2.96	3.17	3.39	3.64	3.89	4.29	4.63	4.97	6.42	7.94
	60	3.20	3.42	3.70	4.01	4.33	4.67	5.19	5.64	6.09	7.98	9.95
	80	3.53	3.83	4.19	4.58	4.98	5.40	6.03	6.58	7.13	9.41	11.80
	100	3.84	4.21	4.65	5.11	5.59	6.08	6.83	7.46	8.11	10.76	13.54
	120	4.12	4.58	5.09	5.63	6.18	6.73	7.59	8.31	9.04	12.05	15.19
	140	4.39	4.93	5.52	6.12	6.74	7.36	8.31	9.12	9.93	13.28	16.78
100	10	2.27	2.30	2.39	2.50	2.62	2.74	2.93	3.09	3.25	3.91	4.58
	20	2.67	2.74	2.86	3.01	3.16	3.32	3.58	3.79	4.01	4.93	5.89
	40	3.24	3.36	3.55	3.76	3.99	4.23	4.60	4.93	5.26	6.65	8.14
	60	3.67	3.85	4.11	4.39	4.69	5.00	5.50	5.92	6.36	8.19	10.13
	80	4.04	4.28	4.60	4.96	5.33	5.72	6.32	6.84	7.38	9.61	11.97
	100	4.37	4.68	5.06	5.48	5.93	6.39	7.10	7.71	8.34	10.95	13.70
	120	4.67	5.05	5.50	5.99	6.50	7.03	7.85	8.55	9.26	12.23	15.34
	140	4.96	5.40	5.92	6.47	7.05	7.65	8.57	9.35	10.15	13.46	16.93
150	10	2.46	2.49	2.58	2.69	2.82	2.94	3.13	3.30	3.46	4.13	4.81
	20	2.92	2.98	3.10	3.25	3.41	3.57	3.83	4.04	4.26	5.17	6.12
	40	3.54	3.66	3.85	4.06	4.28	4.52	4.88	5.20	5.52	6.88	8.33
	60	4.02	4.19	4.44	4.71	5.00	5.30	5.78	6.19	6.61	8.40	10.31
	80	4.42	4.65	4.95	5.29	5.64	6.01	6.60	7.10	7.62	9.81	12.13
	100	4.78	5.06	5.42	5.82	6.24	6.68	7.37	7.96	8.57	11.14	13.85
	120	5.10	5.44	5.87	6.32	6.81	7.32	8.11	8.79	9.48	12.41	15.50
	140	5.41	5.81	6.29	6.81	7.36	7.93	8.82	9.58	10.36	13.63	17.07

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 36.0 Ft (RADIUS = 25.5 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		°F	4	8	12	16	20	24	30	35	40	60	80
200 (Ft*s) ^{1/2}	10		2.61	2.64	2.74	2.85	2.98	3.11	3.31	3.47	3.64	4.32	5.00
	20		3.11	3.17	3.30	3.45	3.61	3.78	4.04	4.25	4.48	5.38	6.32
	40		3.79	3.91	4.09	4.31	4.53	4.77	5.13	5.44	5.76	7.10	8.53
	60		4.31	4.47	4.71	4.98	5.27	5.57	6.04	6.44	6.85	8.60	10.49
	80		4.74	4.95	5.25	5.58	5.93	6.29	6.86	7.35	7.85	10.00	12.30
	100		5.12	5.38	5.74	6.12	6.53	6.96	7.62	8.20	8.80	11.32	14.01
	120		5.46	5.78	6.19	6.63	7.10	7.59	8.36	9.02	9.70	12.58	15.65
300	140		5.78	6.16	6.61	7.12	7.65	8.20	9.06	9.81	10.57	13.80	17.22
	10		2.86	2.89	2.99	3.11	3.24	3.38	3.58	3.76	3.93	4.63	5.33
	20		3.43	3.49	3.62	3.78	3.95	4.12	4.39	4.61	4.84	5.76	6.70
	40		4.20	4.31	4.50	4.72	4.95	5.18	5.55	5.86	6.18	7.50	8.90
	60		4.77	4.93	5.17	5.44	5.73	6.03	6.49	6.89	7.29	9.00	10.84
	80		5.25	5.46	5.75	6.07	6.42	6.77	7.33	7.80	8.30	10.38	12.63
	100		5.67	5.92	6.26	6.64	7.04	7.45	8.10	8.66	9.23	11.69	14.33
400	120		6.05	6.35	6.74	7.17	7.62	8.09	8.83	9.47	10.13	12.94	15.95
	140		6.40	6.75	7.18	7.66	8.17	8.70	9.53	10.25	10.99	14.14	17.51
	10		3.06	3.09	3.20	3.32	3.46	3.60	3.81	3.99	4.17	4.90	5.61
	20		3.69	3.75	3.89	4.05	4.22	4.40	4.67	4.90	5.14	6.07	7.03
	40		4.53	4.64	4.83	5.05	5.29	5.53	5.90	6.22	6.54	7.86	9.25
	60		5.15	5.31	5.55	5.83	6.12	6.42	6.88	7.28	7.68	9.37	11.18
	80		5.67	5.87	6.17	6.49	6.83	7.19	7.74	8.21	8.70	10.75	12.96
600	100		6.13	6.37	6.71	7.08	7.48	7.89	8.53	9.08	9.64	12.04	14.64
	120		6.54	6.82	7.21	7.63	8.08	8.54	9.26	9.89	10.53	13.28	16.25
	140		6.91	7.24	7.67	8.14	8.64	9.16	9.97	10.67	11.39	14.48	17.80
	10		3.38	3.42	3.53	3.66	3.81	3.95	4.18	4.37	4.57	5.32	6.07
	20		4.10	4.17	4.31	4.48	4.67	4.85	5.14	5.39	5.63	6.60	7.58
	40		5.06	5.17	5.38	5.61	5.85	6.10	6.49	6.82	7.15	8.49	9.88
	60		5.77	5.93	6.18	6.46	6.76	7.07	7.54	7.94	8.35	10.04	11.82
800	80		6.36	6.55	6.85	7.18	7.53	7.89	8.45	8.92	9.40	11.43	13.58
	100		6.87	7.10	7.44	7.82	8.22	8.63	9.27	9.81	10.37	12.72	15.25
	120		7.32	7.60	7.98	8.40	8.85	9.31	10.03	10.64	11.27	13.95	16.84
	140		7.74	8.06	8.48	8.95	9.44	9.95	10.75	11.43	12.14	15.13	18.37
	10		3.64	3.68	3.79	3.94	4.09	4.24	4.48	4.68	4.88	5.68	6.45
	20		4.43	4.50	4.66	4.84	5.03	5.23	5.53	5.78	6.03	7.04	8.05
	40		5.49	5.61	5.82	6.06	6.31	6.57	6.97	7.31	7.65	9.03	10.43
	60		6.27	6.43	6.69	6.98	7.28	7.60	8.09	8.50	8.91	10.62	12.40
	80		6.91	7.11	7.41	7.75	8.11	8.47	9.04	9.52	10.01	12.04	14.17
	100		7.47	7.70	8.05	8.43	8.84	9.25	9.90	10.45	11.00	13.34	15.83
	120		7.96	8.24	8.62	9.05	9.50	9.97	10.69	11.30	11.93	14.57	17.41
	140		8.42	8.73	9.15	9.62	10.12	10.63	11.43	12.11	12.80	15.75	18.93

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 36.0 Ft (RADIUS = 25.5 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		(Ft*s) ^{1/2}	4	8	12	16	20	24	30	35	40	60	80
0	10	2.09	2.28	2.51	2.74	2.98	3.22	3.58	3.89	4.20	5.44	6.72	
	20	2.58	2.92	3.27	3.62	3.97	4.32	4.86	5.30	5.75	7.58	9.47	
	40	3.41	3.99	4.55	5.09	5.64	6.18	7.00	7.68	8.37	11.18	14.09	
	60	4.14	4.93	5.67	6.39	7.10	7.81	8.87	9.77	10.67	14.34	18.15	
	80	4.80	5.79	6.70	7.58	8.44	9.30	10.60	11.68	12.77	17.24	21.87	
	100	5.43	6.60	7.67	8.69	9.70	10.71	12.22	13.48	14.75	19.96	25.37	
	120	6.02	7.37	8.58	9.75	10.90	12.04	13.75	15.19	16.63	22.55	28.69	
	140	6.60	8.11	9.47	10.77	12.05	13.32	15.23	16.83	18.44	25.03	31.88	
25	10	2.63	2.72	2.88	3.07	3.28	3.49	3.83	4.11	4.40	5.61	6.86	
	20	3.13	3.33	3.61	3.91	4.23	4.56	5.06	5.49	5.93	7.72	9.59	
	40	3.93	4.35	4.84	5.34	5.86	6.38	7.17	7.84	8.52	11.30	14.19	
	60	4.62	5.26	5.93	6.61	7.30	7.99	9.03	9.91	10.80	14.45	18.24	
	80	5.25	6.10	6.95	7.79	8.63	9.47	10.74	11.82	12.90	17.34	21.96	
	100	5.86	6.89	7.90	8.89	9.88	10.87	12.36	13.61	14.87	20.06	25.45	
	120	6.44	7.65	8.81	9.94	11.07	12.19	13.89	15.31	16.75	22.64	28.77	
	140	6.99	8.38	9.68	10.95	12.21	13.47	15.36	16.95	18.55	25.12	31.95	
50	10	2.92	3.00	3.16	3.34	3.53	3.73	4.05	4.32	4.60	5.77	7.00	
	20	3.49	3.66	3.90	4.18	4.47	4.78	5.27	5.68	6.10	7.86	9.71	
	40	4.33	4.69	5.12	5.59	6.07	6.57	7.35	8.00	8.67	11.42	14.29	
	60	5.04	5.58	6.19	6.84	7.50	8.17	9.19	10.06	10.94	14.56	18.33	
	80	5.67	6.40	7.19	7.99	8.81	9.64	10.89	11.95	13.03	17.44	22.04	
	100	6.27	7.18	8.13	9.09	10.05	11.02	12.49	13.74	14.99	20.15	25.53	
	120	6.83	7.93	9.03	10.13	11.23	12.34	14.02	15.43	16.86	22.73	28.85	
	140	7.38	8.64	9.89	11.13	12.37	13.61	15.49	17.06	18.66	25.21	32.03	
100	10	3.31	3.39	3.54	3.72	3.91	4.11	4.42	4.69	4.96	6.09	7.27	
	20	3.98	4.13	4.36	4.62	4.90	5.19	5.64	6.04	6.44	8.14	9.94	
	40	4.94	5.23	5.61	6.04	6.49	6.95	7.69	8.32	8.96	11.66	14.49	
	60	5.69	6.14	6.68	7.27	7.88	8.52	9.50	10.34	11.20	14.77	18.51	
	80	6.36	6.96	7.66	8.40	9.17	9.97	11.18	12.22	13.27	17.64	22.21	
	100	6.97	7.73	8.58	9.48	10.40	11.34	12.77	13.99	15.23	20.34	25.69	
	120	7.54	8.46	9.47	10.50	11.57	12.64	14.29	15.68	17.09	22.91	29.00	
	140	8.09	9.16	10.32	11.50	12.69	13.90	15.74	17.30	18.88	25.38	32.17	
150	10	3.60	3.67	3.83	4.01	4.20	4.41	4.72	4.99	5.26	6.37	7.54	
	20	4.35	4.49	4.71	4.97	5.24	5.53	5.98	6.36	6.75	8.41	10.18	
	40	5.39	5.66	6.03	6.43	6.86	7.31	8.01	8.62	9.25	11.89	14.69	
	60	6.21	6.61	7.11	7.67	8.25	8.86	9.81	10.63	11.47	14.98	18.69	
	80	6.91	7.45	8.09	8.79	9.53	10.29	11.47	12.49	13.52	17.84	22.38	
	100	7.54	8.22	9.01	9.86	10.74	11.64	13.05	14.24	15.46	20.53	25.85	
	120	8.13	8.95	9.89	10.87	11.89	12.94	14.55	15.92	17.31	23.09	29.15	
	140	8.69	9.66	10.73	11.85	13.01	14.19	16.00	17.53	19.09	25.55	32.32	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 36.0 Ft (RADIUS = 25.5 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		(Ft*s) ^{1/2}	4	8	12	16	20	24	30	35	40	60	80
200	10	3.84	3.91	4.06	4.25	4.45	4.65	4.97	5.24	5.51	6.63	7.79	
	20	4.64	4.78	5.01	5.26	5.54	5.82	6.27	6.65	7.04	8.67	10.41	
	40	5.77	6.02	6.38	6.78	7.20	7.64	8.32	8.92	9.53	12.12	14.89	
	60	6.63	7.01	7.50	8.03	8.59	9.18	10.11	10.91	11.73	15.19	18.87	
	80	7.37	7.87	8.49	9.16	9.87	10.61	11.76	12.75	13.77	18.04	22.55	
	100	8.03	8.66	9.41	10.22	11.07	11.95	13.32	14.49	15.70	20.72	26.01	
	120	8.65	9.40	10.29	11.23	12.21	13.23	14.81	16.16	17.54	23.27	29.30	
300	140	9.22	10.11	11.12	12.20	13.32	14.47	16.25	17.76	19.31	25.73	32.47	
	10	4.21	4.28	4.45	4.64	4.84	5.06	5.38	5.66	5.94	7.07	8.23	
	20	5.13	5.26	5.49	5.75	6.03	6.32	6.77	7.15	7.54	9.15	10.85	
	40	6.38	6.62	6.97	7.37	7.78	8.21	8.88	9.46	10.05	12.57	15.29	
	60	7.33	7.69	8.15	8.67	9.21	9.78	10.67	11.44	12.24	15.61	19.23	
	80	8.14	8.60	9.18	9.82	10.50	11.20	12.31	13.26	14.25	18.43	22.88	
	100	8.85	9.43	10.13	10.89	11.70	12.54	13.85	14.99	16.16	21.09	26.33	
400	120	9.51	10.19	11.01	11.90	12.83	13.81	15.33	16.64	17.98	23.63	29.61	
	140	10.11	10.92	11.85	12.87	13.93	15.03	16.75	18.22	19.74	26.07	32.76	
	10	4.52	4.59	4.76	4.96	5.17	5.39	5.73	6.01	6.30	7.45	8.62	
	20	5.52	5.65	5.89	6.15	6.44	6.73	7.19	7.57	7.97	9.58	11.27	
	40	6.88	7.12	7.47	7.86	8.28	8.71	9.37	9.95	10.53	13.01	15.67	
	60	7.91	8.25	8.71	9.22	9.75	10.31	11.19	11.94	12.72	16.02	19.59	
	80	8.77	9.21	9.78	10.40	11.06	11.75	12.83	13.76	14.72	18.82	23.22	
600	100	9.53	10.07	10.75	11.49	12.27	13.09	14.36	15.47	16.61	21.46	26.64	
	120	10.22	10.87	11.66	12.51	13.41	14.35	15.83	17.10	18.42	23.98	29.91	
	140	10.87	11.62	12.51	13.48	14.50	15.57	17.24	18.68	20.16	26.41	33.06	
	10	5.01	5.09	5.26	5.47	5.70	5.93	6.29	6.58	6.88	8.08	9.28	
	20	6.15	6.29	6.53	6.81	7.11	7.42	7.89	8.28	8.69	10.32	12.01	
	40	7.69	7.93	8.28	8.68	9.10	9.54	10.21	10.79	11.37	13.82	16.42	
	60	8.84	9.17	9.63	10.14	10.68	11.23	12.09	12.84	13.60	16.82	20.29	
800	80	9.80	10.22	10.78	11.40	12.04	12.72	13.77	14.67	15.60	19.58	23.88	
	100	10.64	11.15	11.81	12.53	13.29	14.08	15.31	16.38	17.48	22.19	27.27	
	120	11.40	12.01	12.76	13.59	14.45	15.36	16.78	18.00	19.27	24.69	30.52	
	140	12.10	12.80	13.65	14.58	15.56	16.58	18.18	19.56	21.00	27.09	33.64	
	10	5.41	5.49	5.67	5.89	6.13	6.37	6.74	7.05	7.36	8.60	9.84	
	20	6.67	6.80	7.06	7.35	7.66	7.97	8.46	8.87	9.29	10.96	12.67	
	40	8.35	8.59	8.95	9.36	9.79	10.24	10.92	11.50	12.09	14.54	17.12	
	60	9.61	9.93	10.39	10.91	11.45	12.01	12.88	13.62	14.38	17.56	20.97	
	80	10.64	11.05	11.61	12.23	12.88	13.55	14.59	15.49	16.41	20.31	24.53	
	100	11.55	12.05	12.70	13.42	14.17	14.95	16.17	17.22	18.30	22.90	27.90	
	120	12.37	12.95	13.70	14.51	15.37	16.25	17.64	18.84	20.08	25.38	31.12	
	140	13.12	13.79	14.62	15.53	16.49	17.49	19.05	20.40	21.80	27.76	34.22	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 36.0 Ft (RADIUS = 25.5 Ft)³
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		(Ft*s) ^{1/2}	4	8	12	16	20	24	30	35	40	60	80
0	°F												
	10	3.24	3.65	4.07	4.49	4.92	5.35	6.00	6.54	7.09	9.32	11.61	
	20	4.23	4.92	5.59	6.25	6.90	7.56	8.54	9.37	10.20	13.60	17.11	
	40	5.89	7.06	8.15	9.20	10.24	11.27	12.83	14.13	15.44	20.80	26.36	
	60	7.34	8.94	10.39	11.79	13.16	14.53	16.58	18.30	20.03	27.12	34.47	
	80	8.68	10.66	12.45	14.16	15.85	17.52	20.03	22.13	24.25	32.92	41.92	
	100	9.93	12.28	14.38	16.39	18.37	20.32	23.26	25.72	28.21	38.36	48.91	
	120	11.12	13.82	16.22	18.51	20.76	22.99	26.34	29.14	31.97	43.54	55.56	
	140	12.26	15.30	17.99	20.55	23.06	25.55	29.29	32.42	35.58	48.50	61.93	
	25	10	3.90	4.14	4.47	4.84	5.23	5.63	6.24	6.77	7.30	9.49	11.75
20		4.85	5.35	5.94	6.54	7.16	7.79	8.75	9.56	10.38	13.74	17.23	
40		6.43	7.43	8.44	9.45	10.46	11.47	13.00	14.29	15.59	20.92	26.46	
60		7.83	9.27	10.66	12.01	13.36	14.71	16.74	18.44	20.17	27.23	34.56	
80		9.13	10.97	12.70	14.37	16.03	17.69	20.17	22.27	24.37	33.02	42.00	
100		10.36	12.58	14.62	16.59	18.54	20.48	23.40	25.85	28.32	38.45	48.99	
120		11.54	14.10	16.45	18.71	20.93	23.15	26.47	29.27	32.08	43.63	55.64	
140		12.66	15.57	18.20	20.73	23.22	25.70	29.42	32.54	35.69	48.59	62.01	
50		10	4.32	4.52	4.82	5.16	5.52	5.90	6.49	6.99	7.51	9.65	11.89
		20	5.33	5.75	6.27	6.83	7.42	8.03	8.96	9.75	10.56	13.88	17.35
	40	6.92	7.79	8.73	9.70	10.68	11.67	13.18	14.45	15.74	21.04	26.56	
	60	8.30	9.60	10.92	12.24	13.56	14.89	16.90	18.59	20.30	27.33	34.65	
	80	9.58	11.28	12.94	14.58	16.22	17.85	20.32	22.40	24.50	33.12	42.09	
	100	10.79	12.87	14.85	16.79	18.72	20.64	23.54	25.98	28.44	38.55	49.07	
	120	11.95	14.38	16.67	18.90	21.10	23.30	26.61	29.39	32.20	43.72	55.71	
	140	13.06	15.84	18.42	20.91	23.38	25.84	29.55	32.66	35.80	48.67	62.08	
	100	10	4.91	5.08	5.36	5.68	6.02	6.38	6.94	7.42	7.91	9.98	12.17
		20	6.05	6.39	6.86	7.37	7.91	8.48	9.36	10.13	10.91	14.16	17.59
40		7.74	8.45	9.29	10.18	11.11	12.06	13.52	14.77	16.04	21.28	26.76	
60		9.15	10.24	11.44	12.68	13.95	15.24	17.21	18.88	20.57	27.55	34.83	
80		10.42	11.89	13.43	15.00	16.58	18.19	20.62	22.67	24.75	33.32	42.26	
100		11.61	13.44	15.31	17.19	19.07	20.96	23.82	26.24	28.68	38.74	49.23	
120		12.74	14.94	17.11	19.27	21.43	23.60	26.87	29.63	32.42	43.90	55.87	
140		13.83	16.37	18.84	21.28	23.71	26.14	29.80	32.89	36.01	48.85	62.23	
150		10	5.35	5.51	5.78	6.10	6.43	6.79	7.33	7.80	8.28	10.30	12.45
		20	6.59	6.91	7.35	7.84	8.36	8.90	9.75	10.49	11.25	14.44	17.82
	40	8.39	9.03	9.81	10.65	11.53	12.45	13.87	15.08	16.33	21.51	26.96	
	60	9.85	10.82	11.94	13.12	14.34	15.60	17.53	19.17	20.84	27.76	35.02	
	80	11.15	12.46	13.91	15.41	16.95	18.52	20.91	22.94	25.00	33.52	42.43	
	100	12.35	14.00	15.77	17.58	19.41	21.27	24.10	26.49	28.92	38.93	49.39	
	120	13.48	15.48	17.55	19.65	21.76	23.90	27.14	29.88	32.65	44.08	56.02	
	140	14.56	16.90	19.27	21.64	24.03	26.42	30.06	33.13	36.23	49.02	62.38	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 36.0 Ft (RADIUS = 25.5 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		°F	4	8	12	16	20	24	30	35	40	60	80
200	(Ft*s) ^{1/2}												
	10	5.70	5.86	6.13	6.45	6.79	7.14	7.68	8.14	8.62	10.61	12.72	
	20	7.04	7.34	7.77	8.25	8.76	9.29	10.12	10.84	11.58	14.71	18.06	
	40	8.94	9.54	10.28	11.08	11.93	12.82	14.20	15.40	16.62	21.75	27.16	
	60	10.46	11.36	12.41	13.54	14.72	15.95	17.84	19.45	21.10	27.97	35.20	
	80	11.79	13.00	14.37	15.82	17.31	18.84	21.20	23.21	25.25	33.71	42.60	
	100	13.01	14.54	16.22	17.96	19.76	21.58	24.37	26.75	29.15	39.12	49.55	
300	120	14.15	16.00	17.98	20.02	22.09	24.20	27.40	30.12	32.87	44.26	56.17	
	140	15.24	17.41	19.69	22.00	24.34	26.71	30.32	33.36	36.45	49.19	62.55	
	10	6.28	6.43	6.71	7.03	7.37	7.73	8.27	8.74	9.21	11.18	13.25	
	20	7.77	8.05	8.48	8.95	9.45	9.97	10.78	11.48	12.20	15.25	18.53	
	40	9.85	10.40	11.10	11.87	12.68	13.53	14.86	16.01	17.20	22.21	27.56	
	60	11.48	12.30	13.28	14.34	15.46	16.63	18.45	20.02	21.63	28.40	35.56	
	80	12.89	13.98	15.24	16.60	18.02	19.49	21.78	23.74	25.74	34.11	42.94	
400	100	14.16	15.53	17.08	18.72	20.44	22.20	24.92	27.25	29.62	39.49	49.87	
	120	15.34	16.99	18.83	20.75	22.75	24.79	27.93	30.60	33.32	44.62	56.48	
	140	16.46	18.39	20.51	22.71	24.98	27.29	30.82	33.83	36.88	49.54	62.82	
	10	6.74	6.90	7.18	7.51	7.86	8.22	8.77	9.24	9.72	11.69	13.75	
	20	8.36	8.64	9.06	9.54	10.04	10.56	11.37	12.06	12.77	15.77	18.99	
	40	10.61	11.13	11.81	12.56	13.36	14.18	15.48	16.60	17.76	22.68	27.96	
	60	12.34	13.10	14.04	15.07	16.15	17.28	19.05	20.58	22.15	28.82	35.92	
600	80	13.81	14.83	16.03	17.33	18.70	20.12	22.35	24.26	26.23	34.51	43.27	
	100	15.14	16.41	17.88	19.45	21.10	22.81	25.47	27.75	30.09	39.87	50.19	
	120	16.37	17.89	19.62	21.47	23.39	25.38	28.45	31.08	33.77	44.98	56.78	
	140	17.51	19.30	21.30	23.41	25.60	27.85	31.33	34.29	37.32	49.89	63.11	
	10	7.50	7.65	7.95	8.29	8.65	9.03	9.60	10.09	10.58	12.58	14.64	
	20	9.33	9.60	10.03	10.51	11.03	11.55	12.37	13.06	13.77	16.73	19.88	
	40	11.83	12.33	13.00	13.74	14.52	15.33	16.59	17.68	18.81	23.58	28.75	
800	60	13.74	14.45	15.36	16.35	17.39	18.47	20.17	21.65	23.17	29.66	36.64	
	80	15.35	16.28	17.42	18.66	19.96	21.32	23.45	25.30	27.20	35.29	43.94	
	100	16.78	17.94	19.31	20.79	22.35	23.98	26.53	28.74	31.01	40.61	50.83	
	120	18.08	19.47	21.08	22.81	24.63	26.53	29.48	32.04	34.66	45.69	57.39	
	140	19.30	20.91	22.76	24.74	26.82	28.97	32.33	35.21	38.17	50.57	63.70	
	10	8.11	8.27	8.57	8.93	9.30	9.69	10.29	10.79	11.29	13.33	15.41	
	20	10.11	10.39	10.82	11.32	11.84	12.38	13.21	13.92	14.63	17.59	20.71	
	40	12.84	13.32	13.99	14.73	15.51	16.32	17.58	18.66	19.76	24.45	29.52	
	60	14.89	15.58	16.47	17.44	18.47	19.54	21.20	22.65	24.13	30.48	37.35	
	80	16.61	17.50	18.61	19.82	21.09	22.41	24.49	26.28	28.14	36.07	44.61	
	100	18.13	19.23	20.56	21.99	23.51	25.09	27.56	29.71	31.92	41.35	51.46	
	120	19.52	20.82	22.37	24.03	25.79	27.62	30.49	32.98	35.54	46.40	58.00	
	140	20.80	22.31	24.08	25.97	27.97	30.05	33.31	36.12	39.02	51.26	64.29	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 38.0 Ft (RADIUS = 26.9 Ft)
 FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		$(Ft*s)^{1/2}$	°F	4	8	12	16	20	24	30	35	40	60
0	10		1.01	1.05	1.12	1.20	1.28	1.36	1.49	1.60	1.71	2.15	2.59
	20		1.14	1.22	1.32	1.43	1.54	1.65	1.82	1.96	2.11	2.69	3.29
	40		1.36	1.50	1.65	1.81	1.97	2.13	2.37	2.58	2.78	3.62	4.47
	60		1.55	1.74	1.95	2.15	2.35	2.55	2.86	3.11	3.37	4.42	5.50
	80		1.72	1.97	2.21	2.46	2.70	2.94	3.30	3.61	3.91	5.16	6.45
	100		1.89	2.18	2.47	2.75	3.02	3.30	3.72	4.07	4.42	5.86	7.34
	120		2.05	2.38	2.71	3.02	3.34	3.65	4.12	4.51	4.91	6.52	8.19
25	140		2.20	2.58	2.94	3.29	3.63	3.98	4.50	4.93	5.37	7.16	9.00
	10		1.33	1.34	1.39	1.45	1.52	1.59	1.71	1.80	1.90	2.31	2.73
	20		1.50	1.53	1.60	1.68	1.77	1.87	2.02	2.15	2.28	2.84	3.41
	40		1.75	1.82	1.92	2.05	2.19	2.33	2.55	2.74	2.93	3.74	4.57
	60		1.95	2.05	2.20	2.37	2.55	2.73	3.02	3.26	3.51	4.53	5.59
	80		2.12	2.27	2.46	2.67	2.88	3.11	3.45	3.74	4.04	5.27	6.54
	100		2.28	2.47	2.70	2.95	3.20	3.46	3.86	4.20	4.54	5.96	7.42
50	120		2.43	2.66	2.93	3.21	3.50	3.80	4.25	4.64	5.02	6.61	8.27
	140		2.58	2.85	3.15	3.47	3.80	4.13	4.63	5.05	5.48	7.25	9.08
	10		1.46	1.47	1.52	1.59	1.66	1.73	1.85	1.95	2.04	2.45	2.86
	20		1.67	1.70	1.76	1.85	1.94	2.03	2.18	2.31	2.44	2.97	3.53
	40		1.97	2.02	2.12	2.24	2.37	2.50	2.71	2.89	3.08	3.85	4.67
	60		2.19	2.28	2.41	2.57	2.73	2.90	3.17	3.40	3.64	4.64	5.69
	80		2.38	2.50	2.67	2.86	3.06	3.27	3.60	3.88	4.17	5.37	6.62
100	100		2.56	2.71	2.91	3.14	3.37	3.62	4.00	4.33	4.66	6.05	7.50
	120		2.72	2.90	3.14	3.40	3.67	3.95	4.39	4.76	5.14	6.71	8.34
	140		2.87	3.09	3.36	3.65	3.96	4.27	4.76	5.17	5.59	7.33	9.15
	10		1.64	1.65	1.70	1.77	1.84	1.92	2.04	2.14	2.25	2.66	3.07
	20		1.90	1.92	1.99	2.08	2.17	2.27	2.42	2.54	2.67	3.20	3.75
	40		2.25	2.30	2.40	2.52	2.64	2.78	2.98	3.15	3.33	4.08	4.87
	60		2.52	2.60	2.72	2.87	3.03	3.19	3.45	3.67	3.89	4.85	5.87
150	80		2.75	2.85	3.00	3.18	3.37	3.56	3.87	4.14	4.41	5.57	6.79
	100		2.95	3.07	3.26	3.46	3.68	3.91	4.27	4.58	4.90	6.24	7.67
	120		3.13	3.28	3.49	3.73	3.98	4.24	4.65	5.00	5.36	6.89	8.50
	140		3.29	3.47	3.71	3.98	4.26	4.55	5.01	5.40	5.81	7.51	9.30
	10		1.77	1.78	1.83	1.90	1.98	2.06	2.18	2.29	2.40	2.82	3.24
	20		2.06	2.09	2.16	2.25	2.34	2.44	2.60	2.73	2.86	3.39	3.94
	40		2.47	2.51	2.61	2.73	2.86	2.99	3.19	3.37	3.55	4.29	5.06
	60		2.76	2.84	2.96	3.11	3.26	3.43	3.68	3.90	4.12	5.05	6.05
	80		3.01	3.11	3.26	3.43	3.62	3.81	4.11	4.37	4.64	5.76	6.96
	100		3.23	3.35	3.53	3.73	3.94	4.16	4.51	4.81	5.12	6.43	7.83
	120		3.43	3.57	3.78	4.00	4.24	4.49	4.89	5.23	5.58	7.07	8.65
	140		3.61	3.78	4.01	4.26	4.53	4.81	5.25	5.63	6.02	7.68	9.45

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 38.0 Ft (RADIUS = 26.9 Ft)³
 FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		°F	4	8	12	16	20	24	30	35	40	60	80
200	(Ft*s) ^{1/2}												
	10	1.87	1.88	1.94	2.01	2.09	2.17	2.30	2.41	2.52	2.95	3.38	
	20	2.20	2.22	2.29	2.38	2.48	2.59	2.74	2.88	3.01	3.55	4.10	
	40	2.64	2.68	2.78	2.91	3.03	3.17	3.38	3.55	3.73	4.47	5.24	
	60	2.96	3.03	3.16	3.31	3.46	3.63	3.88	4.10	4.32	5.24	6.22	
	80	3.23	3.32	3.48	3.65	3.83	4.02	4.32	4.58	4.84	5.95	7.13	
	100	3.47	3.58	3.76	3.96	4.17	4.39	4.73	5.02	5.33	6.61	7.98	
300	120	3.68	3.82	4.02	4.24	4.48	4.72	5.11	5.44	5.79	7.24	8.80	
	140	3.88	4.03	4.26	4.50	4.77	5.04	5.47	5.84	6.23	7.85	9.66	
	10	2.04	2.05	2.11	2.18	2.27	2.36	2.49	2.60	2.72	3.17	3.62	
	20	2.41	2.44	2.51	2.61	2.71	2.82	2.98	3.12	3.26	3.83	4.39	
	40	2.91	2.96	3.06	3.19	3.32	3.46	3.68	3.86	4.04	4.79	5.56	
	60	3.28	3.35	3.48	3.63	3.79	3.96	4.22	4.44	4.66	5.58	6.54	
	80	3.59	3.68	3.83	4.00	4.19	4.38	4.68	4.94	5.20	6.29	7.45	
400	100	3.85	3.96	4.14	4.33	4.55	4.77	5.11	5.40	5.70	6.95	8.29	
	120	4.09	4.22	4.42	4.64	4.87	5.12	5.50	5.83	6.16	7.58	9.11	
	140	4.31	4.46	4.67	4.92	5.18	5.45	5.87	6.23	6.61	8.18	9.89	
	10	2.17	2.18	2.25	2.33	2.41	2.50	2.65	2.76	2.88	3.35	3.81	
	20	2.59	2.61	2.69	2.79	2.90	3.01	3.18	3.33	3.47	4.05	4.63	
	40	3.14	3.18	3.29	3.42	3.56	3.70	3.93	4.11	4.30	5.06	5.84	
	60	3.54	3.61	3.74	3.90	4.06	4.23	4.50	4.72	4.95	5.88	6.84	
600	80	3.87	3.96	4.12	4.30	4.49	4.69	4.99	5.25	5.51	6.60	7.75	
	100	4.16	4.27	4.45	4.65	4.86	5.09	5.43	5.72	6.02	7.27	8.59	
	120	4.42	4.55	4.75	4.97	5.21	5.45	5.84	6.16	6.50	7.90	9.40	
	140	4.66	4.80	5.02	5.27	5.53	5.80	6.22	6.58	6.95	8.50	10.17	
	10	2.39	2.40	2.47	2.55	2.65	2.74	2.89	3.02	3.14	3.64	4.13	
	20	2.87	2.89	2.98	3.08	3.20	3.32	3.50	3.65	3.81	4.42	5.02	
	40	3.50	3.55	3.66	3.80	3.95	4.10	4.33	4.53	4.72	5.52	6.32	
800	60	3.96	4.03	4.17	4.33	4.51	4.69	4.96	5.19	5.43	6.38	7.36	
	80	4.34	4.43	4.59	4.78	4.97	5.18	5.50	5.76	6.03	7.14	8.28	
	100	4.67	4.77	4.96	5.16	5.39	5.62	5.97	6.27	6.57	7.83	9.14	
	120	4.96	5.08	5.29	5.52	5.76	6.01	6.40	6.74	7.07	8.47	9.94	
	140	5.23	5.37	5.59	5.84	6.11	6.38	6.81	7.17	7.54	9.08	10.71	
	10	2.56	2.58	2.65	2.74	2.84	2.94	3.10	3.23	3.36	3.88	4.38	
	20	3.09	3.12	3.21	3.32	3.44	3.57	3.76	3.92	4.08	4.72	5.35	
	40	3.79	3.84	3.96	4.10	4.26	4.42	4.66	4.87	5.07	5.90	6.72	
	60	4.30	4.37	4.51	4.68	4.87	5.05	5.34	5.58	5.83	6.81	7.80	
	80	4.72	4.80	4.97	5.17	5.37	5.59	5.91	6.19	6.47	7.60	8.75	
	100	5.08	5.18	5.37	5.59	5.82	6.05	6.42	6.73	7.04	8.31	9.62	
	120	5.40	5.52	5.73	5.97	6.22	6.48	6.88	7.22	7.56	8.97	10.44	
	140	5.69	5.83	6.06	6.31	6.59	6.87	7.30	7.67	8.05	9.59	11.22	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 38.0 Ft (RADIUS = 26.9 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
0 (Ft*s) ^{1/2}	10	1.46	1.55	1.68	1.81	1.95	2.09	2.30	2.48	2.65	3.38	4.12
	20	1.72	1.89	2.07	2.27	2.46	2.66	2.95	3.20	3.46	4.47	5.52
	40	2.16	2.45	2.74	3.03	3.33	3.62	4.06	4.43	4.80	6.32	7.87
	60	2.54	2.94	3.33	3.71	4.08	4.46	5.03	5.50	5.98	7.93	9.94
	80	2.89	3.39	3.86	4.32	4.78	5.24	5.92	6.49	7.07	9.41	11.84
	100	3.22	3.81	4.37	4.90	5.43	5.96	6.75	7.42	8.08	10.81	13.62
	120	3.53	4.22	4.85	5.46	6.06	6.65	7.55	8.30	9.05	12.13	15.31
25	140	3.83	4.60	5.31	5.98	6.65	7.32	8.31	9.14	9.98	13.40	16.94
	10	1.89	1.92	2.01	2.11	2.23	2.35	2.54	2.70	2.86	3.55	4.26
	20	2.19	2.26	2.40	2.55	2.72	2.89	3.16	3.40	3.63	4.62	5.64
	40	2.63	2.80	3.03	3.28	3.55	3.82	4.24	4.59	4.95	6.44	7.98
	60	3.00	3.27	3.59	3.93	4.29	4.64	5.19	5.65	6.12	8.04	10.03
	80	3.33	3.70	4.11	4.54	4.97	5.41	6.07	6.63	7.19	9.52	11.93
	100	3.65	4.11	4.60	5.11	5.61	6.12	6.90	7.55	8.21	10.90	13.70
50	120	3.94	4.50	5.07	5.65	6.23	6.81	7.68	8.42	9.17	12.22	15.39
	140	4.23	4.88	5.52	6.17	6.82	7.46	8.44	9.26	10.09	13.49	17.01
	10	2.10	2.12	2.21	2.31	2.42	2.54	2.73	2.88	3.04	3.71	4.40
	20	2.44	2.51	2.63	2.78	2.93	3.10	3.36	3.58	3.81	4.76	5.76
	40	2.94	3.08	3.28	3.51	3.76	4.01	4.41	4.75	5.10	6.56	8.08
	60	3.34	3.56	3.84	4.15	4.48	4.82	5.35	5.80	6.26	8.15	10.13
	80	3.69	3.99	4.35	4.74	5.15	5.57	6.22	6.76	7.32	9.62	12.01
100	100	4.01	4.39	4.83	5.30	5.79	6.28	7.04	7.68	8.33	11.00	13.78
	120	4.31	4.77	5.29	5.84	6.39	6.96	7.82	8.55	9.28	12.31	15.47
	140	4.59	5.14	5.74	6.35	6.98	7.61	8.57	9.38	10.20	13.58	17.09
	10	2.37	2.39	2.48	2.58	2.70	2.82	3.01	3.17	3.33	3.98	4.66
	20	2.79	2.84	2.97	3.11	3.26	3.42	3.68	3.89	4.11	5.03	6.00
	40	3.37	3.49	3.68	3.89	4.12	4.36	4.73	5.06	5.39	6.79	8.28
	60	3.82	4.01	4.26	4.54	4.85	5.16	5.66	6.08	6.52	8.36	10.31
150	80	4.21	4.46	4.78	5.13	5.51	5.90	6.51	7.03	7.57	9.82	12.18
	100	4.56	4.87	5.26	5.68	6.13	6.59	7.31	7.93	8.56	11.19	13.95
	120	4.88	5.26	5.71	6.21	6.73	7.26	8.09	8.79	9.51	12.50	15.63
	140	5.18	5.62	6.15	6.71	7.30	7.90	8.83	9.62	10.42	13.75	17.24
	10	2.56	2.59	2.67	2.78	2.90	3.03	3.22	3.38	3.55	4.21	4.89
	20	3.04	3.09	3.21	3.36	3.52	3.68	3.93	4.15	4.37	5.27	6.22
	40	3.69	3.80	3.99	4.20	4.42	4.65	5.02	5.34	5.66	7.02	8.48
	60	4.19	4.35	4.60	4.87	5.16	5.47	5.94	6.36	6.78	8.58	10.49
	80	4.61	4.83	5.13	5.47	5.83	6.20	6.79	7.30	7.82	10.02	12.35
	100	4.98	5.26	5.63	6.03	6.45	6.89	7.59	8.18	8.80	11.38	14.11
	120	5.32	5.66	6.09	6.55	7.04	7.55	8.35	9.03	9.74	12.68	15.78
	140	5.64	6.04	6.53	7.05	7.61	8.19	9.08	9.85	10.64	13.93	17.39

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 38.0 Ft (RADIUS = 26.9 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
200 (Ft*s) ^{1/2}	°F											
	10	2.72	2.75	2.84	2.95	3.07	3.20	3.39	3.56	3.73	4.40	5.08
	20	3.24	3.30	3.42	3.57	3.73	3.89	4.15	4.36	4.58	5.49	6.43
	40	3.95	4.06	4.24	4.45	4.68	4.91	5.27	5.58	5.90	7.25	8.68
	60	4.49	4.64	4.88	5.15	5.44	5.74	6.21	6.61	7.03	8.79	10.67
	80	4.93	5.15	5.44	5.77	6.12	6.48	7.05	7.55	8.06	10.22	12.52
300	100	5.33	5.60	5.95	6.33	6.75	7.17	7.85	8.43	9.03	11.57	14.27
	120	5.69	6.01	6.42	6.86	7.34	7.83	8.60	9.27	9.96	12.86	15.94
	140	6.03	6.40	6.86	7.37	7.90	8.46	9.33	10.08	10.86	14.10	17.54
	10	2.98	3.00	3.10	3.21	3.34	3.48	3.68	3.85	4.03	4.72	5.42
	20	3.57	3.62	3.75	3.91	4.07	4.24	4.50	4.73	4.95	5.87	6.81
	40	4.37	4.48	4.66	4.87	5.10	5.34	5.70	6.01	6.33	7.66	9.06
400	60	4.97	5.12	5.36	5.63	5.91	6.21	6.67	7.07	7.47	9.19	11.03
	80	5.47	5.67	5.96	6.28	6.62	6.98	7.53	8.01	8.51	10.60	12.86
	100	5.91	6.15	6.49	6.87	7.27	7.68	8.33	8.89	9.47	11.94	14.59
	120	6.30	6.60	6.99	7.42	7.87	8.34	9.09	9.73	10.39	13.22	16.24
	140	6.67	7.01	7.45	7.93	8.44	8.98	9.81	10.53	11.28	14.45	17.83
	600	10	3.18	3.21	3.31	3.43	3.56	3.70	3.91	4.09	4.27	4.99
20		3.84	3.89	4.02	4.18	4.35	4.53	4.80	5.03	5.26	6.20	7.15
40		4.71	4.82	5.00	5.22	5.45	5.69	6.07	6.38	6.70	8.02	9.41
60		5.37	5.51	5.75	6.02	6.31	6.61	7.07	7.47	7.87	9.57	11.38
80		5.91	6.10	6.39	6.71	7.05	7.41	7.96	8.43	8.92	10.98	13.19
100		6.38	6.62	6.95	7.32	7.72	8.13	8.77	9.32	9.89	12.30	14.91
800	120	6.81	7.09	7.47	7.89	8.34	8.80	9.53	10.16	10.81	13.57	16.55
	140	7.20	7.52	7.95	8.42	8.92	9.44	10.26	10.96	11.69	14.79	18.13
	10	3.52	3.54	3.65	3.78	3.92	4.07	4.29	4.48	4.67	5.43	6.17
	20	4.27	4.32	4.46	4.63	4.81	5.00	5.28	5.52	5.76	6.74	7.71
	40	5.27	5.37	5.56	5.79	6.03	6.28	6.67	6.99	7.32	8.67	10.05
	60	6.01	6.15	6.39	6.67	6.97	7.28	7.75	8.15	8.56	10.25	12.03
	80	6.61	6.80	7.09	7.42	7.77	8.13	8.68	9.16	9.64	11.67	13.83
	100	7.15	7.37	7.71	8.08	8.48	8.89	9.53	10.07	10.63	12.99	15.53
	120	7.62	7.89	8.27	8.69	9.13	9.59	10.31	10.93	11.56	14.25	17.15
	140	8.06	8.36	8.79	9.25	9.74	10.26	11.05	11.74	12.45	15.46	18.71
	10	3.78	3.82	3.93	4.06	4.21	4.37	4.60	4.80	5.00	5.79	6.56
	20	4.61	4.67	4.82	4.99	5.18	5.38	5.68	5.93	6.18	7.19	8.19
	40	5.72	5.82	6.02	6.26	6.51	6.77	7.16	7.50	7.84	9.21	10.61
	60	6.52	6.67	6.92	7.21	7.51	7.83	8.31	8.72	9.14	10.84	12.62
	80	7.19	7.38	7.67	8.01	8.36	8.73	9.29	9.77	10.26	12.29	14.43
	100	7.77	7.99	8.33	8.71	9.11	9.53	10.17	10.72	11.28	13.62	16.12
	120	8.29	8.55	8.93	9.35	9.80	10.27	10.99	11.60	12.23	14.88	17.73
	140	8.76	9.06	9.48	9.95	10.44	10.95	11.75	12.43	13.13	16.09	19.28

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 38.0 Ft (RADIUS = 26.9 Ft)³
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
0 (Ft*s) ^{1/2}	10	2.19	2.38	2.61	2.84	3.08	3.32	3.69	3.99	4.30	5.55	6.83	
	20	2.71	3.05	3.40	3.76	4.11	4.47	5.00	5.45	5.90	7.74	9.63	
	40	3.58	4.17	4.74	5.29	5.84	6.39	7.21	7.90	8.60	11.43	14.35	
	60	4.34	5.15	5.91	6.64	7.36	8.07	9.15	10.05	10.96	14.66	18.48	
	80	5.04	6.06	6.98	7.87	8.75	9.62	10.93	12.02	13.13	17.62	22.28	
	100	5.70	6.90	7.99	9.03	10.06	11.08	12.60	13.88	15.16	20.41	25.84	
	120	6.33	7.71	8.95	10.14	11.30	12.46	14.19	15.64	17.10	23.05	29.23	
	140	6.93	8.48	9.87	11.19	12.49	13.78	15.71	17.33	18.95	25.59	32.44	
	25	10	2.74	2.83	2.99	3.18	3.39	3.60	3.94	4.22	4.51	5.72	6.97
		20	3.27	3.47	3.75	4.05	4.37	4.70	5.21	5.64	6.08	7.89	9.75
40		4.11	4.54	5.03	5.54	6.06	6.59	7.39	8.07	8.75	11.55	14.45	
60		4.83	5.49	6.18	6.87	7.56	8.26	9.31	10.20	11.09	14.77	18.57	
80		5.50	6.37	7.23	8.09	8.94	9.79	11.08	12.16	13.25	17.72	22.36	
100		6.14	7.20	8.23	9.24	10.24	11.24	12.74	14.01	15.28	20.50	25.92	
120		6.75	7.99	9.18	10.33	11.47	12.61	14.33	15.76	17.21	23.15	29.31	
140		7.33	8.76	10.09	11.38	12.66	13.93	15.84	17.45	19.06	25.68	32.55	
50		10	3.05	3.12	3.27	3.45	3.64	3.85	4.16	4.44	4.72	5.89	7.12
		20	3.64	3.80	4.05	4.33	4.62	4.93	5.42	5.83	6.26	8.03	9.88
	40	4.53	4.88	5.32	5.79	6.28	6.79	7.57	8.23	8.90	11.67	14.55	
	60	5.26	5.81	6.44	7.09	7.76	8.44	9.47	10.35	11.23	14.88	18.67	
	80	5.93	6.68	7.48	8.30	9.13	9.96	11.23	12.30	13.38	17.83	22.45	
	100	6.55	7.49	8.46	9.44	10.41	11.40	12.88	14.14	15.40	20.60	26.00	
	120	7.15	8.27	9.40	10.52	11.64	12.76	14.46	15.89	17.33	23.24	29.38	
	140	7.73	9.03	10.30	11.57	12.82	14.08	15.97	17.57	19.18	25.77	32.63	
	100	10	3.46	3.52	3.67	3.85	4.04	4.23	4.54	4.81	5.08	6.21	7.40
		20	4.15	4.29	4.52	4.78	5.06	5.35	5.80	6.20	6.60	8.31	10.12
40		5.15	5.44	5.82	6.25	6.70	7.18	7.91	8.55	9.20	11.91	14.76	
60		5.94	6.39	6.94	7.53	8.15	8.80	9.79	10.64	11.50	15.09	18.85	
80		6.64	7.25	7.96	8.71	9.50	10.30	11.53	12.57	13.63	18.03	22.62	
100		7.28	8.05	8.92	9.83	10.77	11.72	13.17	14.40	15.64	20.79	26.17	
120		7.88	8.82	9.84	10.90	11.98	13.07	14.73	16.13	17.56	23.42	29.54	
140		8.45	9.56	10.73	11.93	13.15	14.37	16.23	17.81	19.40	25.95	32.78	
150		10	3.75	3.82	3.97	4.14	4.34	4.54	4.85	5.11	5.38	6.50	7.67
		20	4.53	4.66	4.88	5.14	5.41	5.70	6.14	6.53	6.92	8.58	10.35
	40	5.62	5.88	6.25	6.65	7.09	7.54	8.25	8.86	9.49	12.14	14.96	
	60	6.47	6.87	7.38	7.94	8.53	9.14	10.10	10.93	11.77	15.31	19.04	
	80	7.20	7.75	8.40	9.11	9.86	10.63	11.82	12.84	13.89	18.23	22.79	
	100	7.87	8.56	9.36	10.22	11.11	12.03	13.45	14.65	15.88	20.98	26.33	
	120	8.49	9.33	10.27	11.28	12.31	13.37	15.00	16.38	17.79	23.60	29.70	
	140	9.07	10.06	11.15	12.30	13.47	14.66	16.49	18.04	19.62	26.12	32.93	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 38.0 Ft (RADIUS = 26.9 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		$(Ft*s)^{1/2}$	4	8	12	16	20	24	30	35	40	60	80
200	10	4.00	4.06	4.21	4.39	4.59	4.79	5.11	5.37	5.64	6.76	7.92	
	20	4.84	4.96	5.19	5.44	5.72	6.00	6.44	6.82	7.21	8.85	10.59	
	40	6.01	6.26	6.61	7.01	7.43	7.87	8.56	9.16	9.77	12.38	15.16	
	60	6.91	7.29	7.77	8.31	8.88	9.48	10.41	11.21	12.04	15.52	19.22	
	80	7.68	8.19	8.81	9.49	10.20	10.95	12.11	13.11	14.14	18.43	22.97	
	100	8.38	9.01	9.77	10.59	11.45	12.34	13.72	14.91	16.12	21.17	26.49	
	120	9.02	9.79	10.68	11.64	12.64	13.67	15.26	16.63	18.01	23.79	29.85	
	140	9.62	10.52	11.56	12.65	13.79	14.95	16.75	18.28	19.84	26.30	33.08	
	300	10	4.39	4.45	4.61	4.79	5.00	5.21	5.53	5.81	6.08	7.21	8.37
		20	5.34	5.46	5.68	5.94	6.22	6.51	6.95	7.34	7.72	9.34	11.04
40		6.65	6.88	7.23	7.62	8.03	8.46	9.13	9.71	10.31	12.84	15.56	
60		7.64	7.98	8.45	8.97	9.51	10.09	10.98	11.76	12.55	15.95	19.58	
80		8.48	8.94	9.52	10.17	10.85	11.56	12.67	13.64	14.63	18.83	23.31	
100		9.22	9.80	10.51	11.28	12.09	12.94	14.27	15.41	16.59	21.55	26.82	
120		9.91	10.60	11.43	12.33	13.27	14.25	15.79	17.11	18.47	24.15	30.16	
140		10.54	11.35	12.31	13.33	14.41	15.52	17.26	18.75	20.27	26.65	33.38	
400		10	4.70	4.77	4.93	5.12	5.33	5.55	5.88	6.16	6.45	7.60	8.77
		20	5.75	5.87	6.09	6.36	6.64	6.93	7.39	7.77	8.16	9.77	11.46
	40	7.17	7.39	7.74	8.13	8.54	8.97	9.64	10.21	10.80	13.28	15.96	
	60	8.23	8.56	9.02	9.53	10.07	10.63	11.51	12.27	13.05	16.37	19.95	
	80	9.13	9.57	10.14	10.76	11.43	12.12	13.20	14.14	15.11	19.23	23.65	
	100	9.93	10.47	11.15	11.89	12.68	13.50	14.79	15.90	17.05	21.93	27.14	
	120	10.65	11.30	12.09	12.95	13.86	14.81	16.30	17.59	18.91	24.51	30.47	
	140	11.32	12.07	12.98	13.96	15.00	16.07	17.76	19.21	20.71	27.00	33.67	
	600	10	5.22	5.28	5.45	5.65	5.87	6.10	6.45	6.75	7.05	8.24	9.44
		20	6.41	6.52	6.76	7.04	7.33	7.63	8.10	8.50	8.90	10.54	12.22
40		8.01	8.23	8.58	8.97	9.39	9.83	10.50	11.07	11.66	14.11	16.72	
60		9.20	9.52	9.97	10.48	11.02	11.57	12.44	13.18	13.94	17.17	20.66	
80		10.20	10.61	11.17	11.78	12.43	13.11	14.16	15.07	16.01	20.00	24.32	
100		11.08	11.58	12.24	12.96	13.72	14.52	15.76	16.83	17.94	22.67	27.78	
120		11.87	12.47	13.23	14.06	14.93	15.84	17.27	18.50	19.78	25.23	31.09	
140		12.60	13.29	14.15	15.09	16.07	17.10	18.71	20.11	21.55	27.69	34.27	
800		10	5.63	5.70	5.87	6.09	6.32	6.56	6.92	7.23	7.54	8.78	10.01
		20	6.94	7.06	7.30	7.59	7.89	8.21	8.69	9.10	9.51	11.18	12.89
	40	8.69	8.91	9.27	9.67	10.10	10.54	11.22	11.80	12.40	14.84	17.43	
	60	9.99	10.30	10.76	11.27	11.81	12.37	13.24	13.98	14.74	17.93	21.35	
	80	11.08	11.47	12.03	12.64	13.29	13.96	15.01	15.91	16.83	20.75	24.98	
	100	12.02	12.51	13.16	13.87	14.63	15.41	16.63	17.68	18.77	23.40	28.41	
	120	12.87	13.45	14.19	15.00	15.86	16.76	18.15	19.36	20.61	25.93	31.69	
	140	13.66	14.32	15.15	16.07	17.03	18.04	19.61	20.97	22.37	28.37	34.86	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 38.0 Ft (RADIUS = 26.9 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX		TEMPERATURE RISE	CEILING HEIGHT, Ft											
			4	8	12	16	20	24	30	35	40	60	80	
0	(Ft*s) ^{1/2}	10	3.40	3.81	4.23	4.66	5.09	5.52	6.18	6.72	7.27	9.51	11.81	
		20	4.44	5.14	5.82	6.49	7.15	7.81	8.81	9.64	10.48	13.89	17.42	
		40	6.18	7.38	8.49	9.56	10.61	11.66	13.23	14.54	15.86	21.26	26.85	
		60	7.71	9.35	10.83	12.25	13.64	15.03	17.10	18.84	20.59	27.72	35.11	
		80	9.11	11.15	12.98	14.72	16.43	18.12	20.66	22.79	24.92	33.65	42.70	
		100	10.43	12.85	15.00	17.04	19.05	21.03	24.00	26.49	28.99	39.22	49.83	
		120	11.68	14.46	16.91	19.25	21.53	23.79	27.18	30.01	32.86	44.52	56.61	
25		140	12.88	16.00	18.75	21.37	23.92	26.44	30.23	33.39	36.58	49.60	63.10	
		10	4.08	4.31	4.64	5.02	5.41	5.81	6.43	6.95	7.49	9.68	11.95	
		20	5.07	5.58	6.17	6.79	7.42	8.05	9.02	9.83	10.66	14.04	17.54	
		40	6.73	7.76	8.79	9.81	10.84	11.86	13.41	14.71	16.02	21.38	26.95	
		60	8.21	9.69	11.10	12.48	13.85	15.21	17.26	18.99	20.72	27.83	35.20	
		80	9.58	11.47	13.23	14.94	16.62	18.30	20.81	22.92	25.05	33.76	42.79	
		100	10.87	13.15	15.23	17.25	19.22	21.19	24.15	26.62	29.11	39.32	49.91	
50		120	12.10	14.75	17.14	19.44	21.70	23.95	27.32	30.14	32.98	44.61	56.68	
		140	13.29	16.28	18.97	21.55	24.08	26.59	30.36	33.51	36.69	49.68	63.18	
		10	4.52	4.71	5.00	5.34	5.70	6.08	6.67	7.18	7.70	9.85	12.10	
		20	5.57	5.99	6.51	7.08	7.68	8.29	9.23	10.03	10.84	14.18	17.66	
		40	7.24	8.12	9.08	10.06	11.06	12.06	13.58	14.87	16.17	21.50	27.05	
		60	8.69	10.02	11.37	12.71	14.05	15.39	17.43	19.14	20.86	27.94	35.30	
		80	10.03	11.78	13.48	15.15	16.81	18.47	20.96	23.06	25.18	33.86	42.88	
100		100	11.30	13.45	15.47	17.45	19.40	21.35	24.29	26.75	29.24	39.41	49.99	
		120	12.52	15.03	17.37	19.64	21.87	24.10	27.45	30.26	33.10	44.70	56.76	
		140	13.69	16.55	19.19	21.74	24.25	26.74	30.49	33.63	36.80	49.77	63.26	
		10	5.12	5.29	5.56	5.88	6.22	6.57	7.13	7.61	8.11	10.19	12.38	
		20	6.31	6.65	7.11	7.63	8.18	8.75	9.64	10.41	11.19	14.47	17.90	
		40	8.08	8.80	9.65	10.56	11.50	12.46	13.94	15.19	16.47	21.74	27.26	
		60	9.55	10.67	11.90	13.16	14.45	15.76	17.75	19.43	21.13	28.16	35.48	
150		80	10.89	12.40	13.98	15.57	17.18	18.80	21.26	23.34	25.43	34.06	43.05	
		100	12.14	14.03	15.94	17.85	19.76	21.67	24.57	27.01	29.48	39.61	50.16	
		120	13.33	15.59	17.82	20.02	22.21	24.41	27.72	30.51	33.33	44.89	56.92	
		140	14.48	17.10	19.63	22.11	24.57	27.04	30.75	33.87	37.02	49.95	63.41	
		10	5.57	5.72	5.99	6.31	6.64	6.99	7.54	8.00	8.49	10.51	12.67	
		20	6.87	7.18	7.62	8.11	8.63	9.18	10.04	10.78	11.54	14.75	18.14	
		40	8.75	9.40	10.18	11.03	11.93	12.85	14.29	15.51	16.77	21.98	27.46	
		60	10.28	11.27	12.41	13.61	14.85	16.12	18.06	19.72	21.41	28.38	35.67	
		80	11.64	12.99	14.46	15.99	17.55	19.14	21.56	23.61	25.69	34.26	43.22	
		100	12.90	14.60	16.41	18.25	20.11	21.99	24.85	27.27	29.72	39.80	50.32	
		120	14.09	16.15	18.27	20.40	22.55	24.72	27.99	30.76	33.56	45.07	57.08	
		140	15.23	17.63	20.06	22.48	24.90	27.33	31.01	34.11	37.24	50.13	63.56	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 38.0 Ft (RADIUS = 26.9 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		°F	4	8	12	16	20	24	30	35	40	60	80
200 (Ft*s) ^{1/2}	10	5.94	6.09	6.36	6.67	7.00	7.35	7.89	8.36	8.83	10.83	12.95	
	20	7.33	7.63	8.05	8.53	9.04	9.58	10.41	11.13	11.88	15.03	18.38	
	40	9.32	9.92	10.67	11.48	12.34	13.23	14.63	15.83	17.07	22.22	27.66	
	60	10.91	11.82	12.89	14.04	15.24	16.47	18.38	20.01	21.68	28.59	35.85	
	80	12.30	13.54	14.94	16.40	17.92	19.47	21.86	23.88	25.94	34.47	43.39	
	100	13.58	15.15	16.86	18.64	20.46	22.31	25.13	27.53	29.96	39.99	50.48	
	120	14.78	16.68	18.71	20.78	22.89	25.02	28.26	31.01	33.79	45.25	57.23	
300	140	15.92	18.16	20.48	22.84	25.22	27.62	31.27	34.35	37.46	50.30	63.71	
	10	6.54	6.68	6.95	7.26	7.60	7.96	8.50	8.97	9.44	11.41	13.48	
	20	8.09	8.36	8.78	9.25	9.75	10.28	11.09	11.79	12.52	15.58	18.86	
	40	10.27	10.81	11.51	12.29	13.11	13.96	15.30	16.46	17.65	22.70	28.07	
	60	11.97	12.79	13.78	14.85	15.99	17.17	19.01	20.59	22.21	29.02	36.22	
	80	13.44	14.54	15.83	17.20	18.64	20.13	22.44	24.42	26.44	34.87	43.74	
	100	14.77	16.16	17.74	19.41	21.15	22.94	25.69	28.04	30.44	40.37	50.81	
400	120	16.00	17.69	19.57	21.53	23.55	25.62	28.80	31.50	34.24	45.62	57.54	
	140	17.17	19.16	21.32	23.57	25.87	28.21	31.79	34.82	37.91	50.65	64.01	
	10	7.02	7.16	7.44	7.76	8.10	8.46	9.01	9.48	9.96	11.93	13.99	
	20	8.71	8.97	9.39	9.86	10.36	10.88	11.69	12.38	13.10	16.10	19.33	
	40	11.05	11.56	12.24	13.00	13.79	14.63	15.93	17.06	18.22	23.17	28.47	
	60	12.85	13.62	14.57	15.60	16.69	17.83	19.61	21.16	22.75	29.45	36.59	
	80	14.39	15.42	16.64	17.95	19.34	20.78	23.02	24.96	26.94	35.27	44.08	
600	100	15.78	17.07	18.56	20.16	21.83	23.56	26.25	28.55	30.91	40.75	51.14	
	120	17.06	18.62	20.38	22.26	24.21	26.22	29.33	31.99	34.70	45.98	57.85	
	140	18.26	20.09	22.13	24.28	26.50	28.79	32.30	35.30	38.34	51.01	64.31	
	10	7.80	7.94	8.23	8.56	8.92	9.29	9.86	10.35	10.84	12.83	14.89	
	20	9.71	9.97	10.39	10.87	11.37	11.90	12.71	13.41	14.12	17.08	20.23	
	40	12.32	12.80	13.47	14.21	14.99	15.80	17.07	18.16	19.29	24.09	29.28	
	60	14.30	15.01	15.92	16.91	17.96	19.05	20.76	22.25	23.78	30.31	37.32	
800	80	15.98	16.92	18.06	19.31	20.63	22.00	24.15	26.01	27.93	36.07	44.76	
	100	17.47	18.64	20.03	21.53	23.11	24.76	27.33	29.56	31.85	41.51	51.78	
	120	18.84	20.24	21.87	23.63	25.47	27.39	30.38	32.96	35.60	46.71	58.47	
	140	20.11	21.75	23.63	25.64	27.74	29.93	33.32	36.23	39.22	51.71	64.90	
	10	8.44	8.58	8.87	9.22	9.59	9.98	10.57	11.06	11.57	13.61	15.68	
	20	10.52	10.78	11.21	11.69	12.21	12.75	13.58	14.28	14.99	17.96	21.08	
	40	13.36	13.83	14.49	15.23	16.01	16.82	18.08	19.16	20.27	24.98	30.06	
	60	15.49	16.17	17.06	18.04	19.07	20.14	21.82	23.27	24.76	31.14	38.05	
	80	17.29	18.18	19.29	20.50	21.78	23.12	25.20	27.02	28.89	36.86	45.44	
	100	18.88	19.98	21.31	22.76	24.29	25.88	28.38	30.54	32.78	42.26	52.43	
	120	20.33	21.64	23.20	24.88	26.66	28.51	31.40	33.91	36.50	47.43	59.09	
	140	21.66	23.19	24.98	26.90	28.92	31.03	34.32	37.16	40.08	52.40	65.50	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 40.0 Ft (RADIUS = 28.3 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft	0	4	8	12	16	20	24	30	35	40	60	80
(Ft*s) ^{1/2}	°F													
0	10		1.06	1.10	1.16	1.24	1.32	1.40	1.53	1.64	1.75	1.85	2.19	2.63
	20		1.19	1.27	1.37	1.48	1.59	1.70	1.87	2.02	2.21	2.34	2.75	3.34
	40		1.42	1.56	1.72	1.88	2.04	2.20	2.44	2.65	2.81	3.01	3.69	4.54
	60		1.62	1.82	2.02	2.23	2.43	2.63	2.94	3.20	3.35	3.60	4.51	5.60
	80		1.81	2.05	2.30	2.55	2.79	3.03	3.40	3.71	3.85	4.15	5.27	6.56
	100		1.98	2.28	2.56	2.85	3.13	3.41	3.83	4.18	4.32	4.66	5.98	7.47
	120		2.14	2.49	2.81	3.13	3.45	3.77	4.24	4.64	4.76	5.15	6.66	8.33
25	140		2.30	2.69	3.05	3.41	3.76	4.11	4.63	5.07	5.19	5.63	7.31	9.16
	10		1.38	1.39	1.43	1.50	1.57	1.64	1.75	1.85	1.95	2.09	2.35	2.77
	20		1.57	1.59	1.65	1.74	1.83	1.93	2.08	2.21	2.34	2.49	2.89	3.47
	40		1.82	1.89	1.99	2.12	2.26	2.40	2.62	2.81	3.01	3.20	3.81	4.65
	60		2.03	2.13	2.28	2.45	2.63	2.82	3.10	3.35	3.60	3.85	4.62	5.69
	80		2.21	2.36	2.55	2.76	2.98	3.21	3.55	3.85	4.15	4.45	5.38	6.65
	100		2.38	2.57	2.80	3.05	3.31	3.57	3.97	4.32	4.66	5.02	6.08	7.55
50	120		2.54	2.77	3.04	3.33	3.62	3.92	4.38	4.76	5.15	5.57	6.75	8.41
	140		2.69	2.96	3.27	3.60	3.93	4.26	4.77	5.19	5.63	6.08	7.40	9.24
	10		1.52	1.53	1.57	1.64	1.71	1.78	1.89	1.99	2.09	2.20	2.49	2.91
	20		1.74	1.76	1.83	1.91	2.00	2.09	2.24	2.37	2.49	2.63	3.03	3.59
	40		2.05	2.10	2.20	2.31	2.44	2.58	2.79	2.97	3.15	3.33	3.93	4.75
	60		2.28	2.36	2.50	2.65	2.82	2.99	3.26	3.49	3.73	3.99	4.73	5.78
	80		2.48	2.60	2.77	2.96	3.16	3.37	3.70	3.98	4.27	4.58	5.48	6.74
100	100		2.66	2.81	3.02	3.24	3.48	3.73	4.12	4.45	4.78	5.15	6.18	7.64
	120		2.83	3.02	3.26	3.52	3.79	4.08	4.51	4.89	5.27	5.66	6.85	8.49
	140		2.99	3.21	3.48	3.78	4.09	4.41	4.90	5.31	5.74	6.18	7.49	9.31
	10		1.71	1.71	1.76	1.82	1.90	1.97	2.09	2.19	2.30	2.42	2.71	3.12
	20		1.98	1.99	2.06	2.14	2.24	2.33	2.48	2.61	2.74	2.87	3.26	3.81
	40		2.35	2.39	2.49	2.60	2.73	2.86	3.06	3.23	3.41	3.59	4.16	4.95
	60		2.62	2.69	2.82	2.97	3.12	3.29	3.54	3.76	3.99	4.25	4.95	5.97
150	80		2.86	2.95	3.11	3.28	3.47	3.67	3.98	4.25	4.52	4.82	5.68	6.91
	100		3.06	3.19	3.37	3.58	3.80	4.03	4.39	4.70	5.02	5.35	6.37	7.80
	120		3.25	3.40	3.62	3.85	4.10	4.37	4.78	5.13	5.50	5.87	7.03	8.65
	140		3.43	3.61	3.85	4.11	4.40	4.69	5.15	5.55	5.96	6.41	7.67	9.47
	10		1.84	1.84	1.89	1.96	2.04	2.12	2.24	2.34	2.45	2.57	2.87	3.29
	20		2.15	2.16	2.23	2.32	2.41	2.51	2.66	2.79	2.92	3.05	3.46	4.00
	40		2.56	2.61	2.70	2.82	2.94	3.08	3.28	3.45	3.63	3.81	4.37	5.15
	60		2.87	2.94	3.06	3.21	3.36	3.53	3.78	4.00	4.22	4.48	5.15	6.15
	80		3.13	3.22	3.37	3.55	3.73	3.92	4.22	4.48	4.75	5.02	5.88	7.08
	100		3.36	3.48	3.65	3.85	4.06	4.29	4.63	4.94	5.25	5.60	6.56	7.96
	120		3.57	3.71	3.91	4.13	4.38	4.63	5.02	5.37	5.72	6.11	7.21	8.81
	140		3.76	3.92	4.15	4.40	4.67	4.95	5.40	5.78	6.17	6.60	7.84	9.62

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 40.0 Ft (RADIUS = 28.3 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft													
		$(Ft \cdot s)^{1/2}$	°F	4	8	12	16	20	24	30	35	40	60	80	
200	10	1.95	1.95	2.00	2.07	2.15	2.23	2.36	2.47	2.58	3.01	3.44			
	20	2.29	2.30	2.37	2.46	2.56	2.66	2.81	2.95	3.08	3.62	4.17			
	40	2.74	2.78	2.88	3.00	3.13	3.26	3.47	3.64	3.82	4.56	5.33			
	60	3.08	3.14	3.27	3.41	3.57	3.73	3.98	4.20	4.42	5.35	6.33			
	80	3.36	3.45	3.60	3.77	3.95	4.14	4.44	4.70	4.96	6.07	7.25			
	100	3.61	3.71	3.89	4.08	4.30	4.52	4.86	5.15	5.46	6.74	8.12			
	120	3.83	3.96	4.16	4.38	4.62	4.86	5.25	5.59	5.93	7.39	8.96			
300	140	4.03	4.18	4.41	4.65	4.92	5.19	5.62	6.00	6.38	8.02	9.77			
	10	2.12	2.12	2.18	2.25	2.34	2.42	2.55	2.67	2.78	3.23	3.68			
	20	2.51	2.52	2.60	2.69	2.79	2.90	3.06	3.20	3.34	3.90	4.46			
	40	3.03	3.07	3.17	3.29	3.42	3.56	3.77	3.95	4.14	4.88	5.65			
	60	3.41	3.47	3.60	3.75	3.91	4.07	4.33	4.55	4.77	5.69	6.66			
	80	3.73	3.81	3.96	4.13	4.32	4.51	4.81	5.07	5.33	6.42	7.58			
	100	4.00	4.11	4.28	4.47	4.69	4.90	5.25	5.54	5.84	7.09	8.44			
400	120	4.25	4.37	4.57	4.79	5.02	5.27	5.65	5.98	6.31	7.74	9.27			
	140	4.48	4.62	4.84	5.08	5.34	5.61	6.03	6.40	6.77	8.35	10.06			
	10	2.26	2.26	2.32	2.40	2.48	2.57	2.71	2.83	2.95	3.41	3.87			
	20	2.69	2.71	2.78	2.88	2.98	3.09	3.26	3.41	3.55	4.13	4.70			
	40	3.26	3.30	3.40	3.53	3.67	3.81	4.03	4.21	4.40	5.16	5.94			
	60	3.68	3.74	3.87	4.02	4.19	4.36	4.62	4.84	5.07	6.00	6.96			
	80	4.03	4.11	4.26	4.43	4.62	4.82	5.12	5.38	5.64	6.73	7.88			
600	100	4.33	4.43	4.60	4.80	5.01	5.23	5.58	5.87	6.17	7.42	8.74			
	120	4.59	4.71	4.91	5.13	5.37	5.61	5.99	6.32	6.66	8.06	9.56			
	140	4.84	4.98	5.19	5.44	5.70	5.97	6.39	6.75	7.12	8.68	10.35			
	10	2.48	2.49	2.55	2.63	2.73	2.82	2.97	3.09	3.22	3.71	4.19			
	20	2.98	3.00	3.08	3.18	3.29	3.41	3.59	3.74	3.90	4.50	5.10			
	40	3.63	3.67	3.78	3.92	4.06	4.21	4.44	4.64	4.83	5.63	6.42			
	60	4.11	4.17	4.31	4.47	4.64	4.82	5.09	5.32	5.56	6.51	7.48			
800	80	4.51	4.59	4.74	4.93	5.12	5.33	5.64	5.91	6.18	7.28	8.43			
	100	4.85	4.94	5.12	5.33	5.55	5.78	6.13	6.43	6.73	7.98	9.30			
	120	5.15	5.27	5.46	5.69	5.94	6.19	6.58	6.91	7.24	8.64	10.12			
	140	5.43	5.56	5.78	6.03	6.29	6.57	6.99	7.35	7.72	9.26	10.90			
	10	2.66	2.67	2.74	2.82	2.92	3.02	3.18	3.31	3.44	3.95	4.45			
	20	3.21	3.23	3.32	3.43	3.54	3.67	3.86	4.02	4.18	4.81	5.43			
	40	3.94	3.98	4.09	4.23	4.38	4.54	4.78	4.99	5.19	6.01	6.83			
	60	4.46	4.53	4.67	4.83	5.01	5.20	5.48	5.72	5.96	6.94	7.94			
	80	4.90	4.98	5.14	5.33	5.53	5.74	6.07	6.34	6.62	7.75	8.91			
	100	5.27	5.37	5.55	5.76	5.99	6.23	6.59	6.89	7.21	8.48	9.79			
	120	5.60	5.72	5.92	6.15	6.40	6.66	7.06	7.40	7.74	9.15	10.62			
	140	5.91	6.04	6.26	6.51	6.79	7.07	7.50	7.87	8.24	9.79	11.41			

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 40.0 Ft (RADIUS = 28.3 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft												
		(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60	80
0	10		1.53	1.62	1.74	1.87	2.01	2.15	2.36	2.54	2.72	3.44	4.18	
	20		1.80	1.97	2.15	2.35	2.54	2.74	3.04	3.29	3.54	4.56	5.61	
	40		2.26	2.55	2.85	3.14	3.44	3.73	4.18	4.55	4.93	6.45	8.01	
	60		2.66	3.07	3.46	3.84	4.23	4.61	5.18	5.66	6.14	8.10	10.12	
	80		3.03	3.54	4.02	4.49	4.95	5.41	6.10	6.67	7.25	9.62	12.05	
	100		3.37	3.98	4.54	5.09	5.62	6.16	6.96	7.63	8.30	11.04	13.87	
	120		3.70	4.40	5.04	5.66	6.27	6.87	7.78	8.53	9.29	12.39	15.59	
25	140		4.01	4.80	5.52	6.21	6.89	7.56	8.56	9.40	10.25	13.69	17.25	
	10		1.97	2.00	2.08	2.18	2.30	2.42	2.60	2.77	2.93	3.62	4.33	
	20		2.28	2.35	2.48	2.64	2.80	2.98	3.25	3.48	3.72	4.71	5.73	
	40		2.74	2.91	3.14	3.40	3.66	3.94	4.36	4.72	5.08	6.57	8.12	
	60		3.13	3.40	3.73	4.07	4.43	4.79	5.34	5.81	6.28	8.21	10.21	
	80		3.48	3.85	4.27	4.70	5.14	5.58	6.25	6.81	7.38	9.72	12.14	
	100		3.81	4.28	4.78	5.29	5.81	6.32	7.10	7.76	8.42	11.14	13.95	
50	120		4.12	4.69	5.27	5.86	6.44	7.03	7.92	8.66	9.41	12.49	15.67	
	140		4.42	5.08	5.74	6.40	7.05	7.71	8.70	9.52	10.36	13.78	17.32	
	10		2.18	2.20	2.28	2.39	2.50	2.61	2.80	2.95	3.11	3.78	4.47	
	20		2.55	2.60	2.72	2.87	3.03	3.19	3.45	3.67	3.90	4.85	5.86	
	40		3.06	3.20	3.40	3.63	3.88	4.14	4.54	4.88	5.23	6.69	8.22	
	60		3.48	3.70	3.98	4.30	4.63	4.97	5.50	5.96	6.42	8.32	10.31	
	80		3.84	4.14	4.52	4.91	5.33	5.75	6.40	6.95	7.51	9.82	12.23	
100	100		4.18	4.57	5.02	5.49	5.98	6.48	7.25	7.89	8.54	11.23	14.03	
	120		4.49	4.97	5.50	6.05	6.61	7.18	8.05	8.79	9.53	12.58	15.75	
	140		4.79	5.35	5.96	6.59	7.22	7.86	8.83	9.65	10.47	13.87	17.40	
	10		2.46	2.48	2.56	2.67	2.78	2.90	3.08	3.24	3.40	4.06	4.73	
	20		2.90	2.95	3.07	3.21	3.36	3.52	3.77	3.99	4.21	5.13	6.10	
	40		3.51	3.62	3.81	4.02	4.25	4.49	4.87	5.19	5.52	6.93	8.43	
	60		3.98	4.16	4.41	4.70	5.00	5.32	5.82	6.25	6.69	8.54	10.49	
150	80		4.38	4.63	4.95	5.31	5.69	6.08	6.70	7.23	7.77	10.03	12.40	
	100		4.74	5.06	5.45	5.88	6.33	6.80	7.53	8.15	8.79	11.43	14.20	
	120		5.08	5.46	5.93	6.43	6.95	7.49	8.32	9.04	9.76	12.76	15.91	
	140		5.39	5.85	6.38	6.95	7.54	8.15	9.09	9.89	10.70	14.05	17.55	
	10		2.67	2.68	2.77	2.87	2.99	3.11	3.30	3.46	3.63	4.29	4.96	
	20		3.16	3.21	3.33	3.47	3.62	3.78	4.04	4.25	4.47	5.37	6.33	
	40		3.84	3.94	4.12	4.33	4.56	4.79	5.16	5.47	5.80	7.17	8.63	
	60		4.36	4.52	4.76	5.03	5.33	5.63	6.11	6.52	6.95	8.76	10.68	
	80		4.79	5.01	5.32	5.66	6.02	6.39	6.98	7.49	8.02	10.23	12.57	
	100		5.18	5.46	5.83	6.23	6.66	7.11	7.80	8.41	9.03	11.62	14.36	
	120		5.54	5.88	6.31	6.78	7.27	7.79	8.59	9.28	9.99	12.95	16.07	
	140		5.87	6.27	6.76	7.30	7.86	8.44	9.35	10.12	10.92	14.23	17.70	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 40.0 Ft (RADIUS = 28.3 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft												
		(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60	80
200	10	2.83	2.85	2.93	3.04	3.16	3.29	3.48	3.65	3.81	4.49	5.17		
	20	3.37	3.42	3.54	3.68	3.84	4.00	4.26	4.47	4.69	5.60	6.54		
	40	4.11	4.21	4.39	4.60	4.82	5.05	5.41	5.73	6.05	7.39	8.83		
	60	4.66	4.82	5.05	5.32	5.61	5.91	6.38	6.78	7.20	8.97	10.86		
	80	5.13	5.34	5.63	5.96	6.31	6.68	7.25	7.75	8.26	10.43	12.75		
	100	5.54	5.81	6.16	6.55	6.96	7.39	8.07	8.66	9.26	11.81	14.53		
	120	5.92	6.24	6.65	7.10	7.57	8.07	8.85	9.52	10.22	13.13	16.22		
	140	6.27	6.64	7.11	7.62	8.16	8.72	9.60	10.36	11.14	14.40	17.86		
300	10	3.10	3.11	3.20	3.32	3.44	3.57	3.78	3.95	4.12	4.81	5.51		
	20	3.71	3.76	3.88	4.03	4.19	4.36	4.62	4.84	5.07	5.99	6.93		
	40	4.54	4.64	4.82	5.03	5.26	5.49	5.86	6.17	6.48	7.81	9.21		
	60	5.17	5.31	5.54	5.81	6.10	6.39	6.85	7.25	7.66	9.38	11.23		
	80	5.68	5.88	6.16	6.48	6.83	7.18	7.74	8.22	8.72	10.82	13.09		
	100	6.14	6.38	6.72	7.09	7.49	7.91	8.56	9.13	9.71	12.19	14.85		
	120	6.55	6.84	7.23	7.66	8.12	8.60	9.34	9.99	10.66	13.50	16.54		
	140	6.93	7.27	7.71	8.20	8.71	9.25	10.09	10.82	11.57	14.76	18.16		
400	10	3.31	3.33	3.42	3.54	3.67	3.81	4.02	4.19	4.37	5.09	5.80		
	20	3.99	4.03	4.16	4.31	4.48	4.66	4.93	5.15	5.38	6.32	7.27		
	40	4.90	4.99	5.17	5.39	5.62	5.86	6.23	6.54	6.86	8.19	9.58		
	60	5.58	5.71	5.95	6.22	6.50	6.80	7.26	7.66	8.06	9.76	11.58		
	80	6.14	6.32	6.61	6.93	7.27	7.62	8.17	8.65	9.14	11.20	13.43		
	100	6.63	6.86	7.19	7.56	7.96	8.37	9.01	9.56	10.14	12.56	15.17		
	120	7.07	7.35	7.73	8.15	8.60	9.07	9.80	10.43	11.08	13.85	16.85		
	140	7.48	7.80	8.23	8.70	9.20	9.73	10.54	11.25	11.99	15.10	18.46		
600	10	3.65	3.67	3.77	3.90	4.04	4.18	4.41	4.59	4.78	5.53	6.28		
	20	4.43	4.48	4.61	4.78	4.95	5.14	5.42	5.66	5.90	6.87	7.84		
	40	5.47	5.56	5.75	5.97	6.21	6.46	6.84	7.17	7.49	8.84	10.23		
	60	6.24	6.37	6.61	6.89	7.18	7.48	7.95	8.36	8.76	10.45	12.24		
	80	6.87	7.05	7.33	7.66	8.00	8.36	8.92	9.39	9.88	11.91	14.08		
	100	7.42	7.64	7.97	8.34	8.74	9.15	9.79	10.33	10.89	13.26	15.80		
	120	7.92	8.17	8.55	8.97	9.41	9.88	10.59	11.21	11.85	14.54	17.46		
	140	8.37	8.67	9.09	9.55	10.05	10.56	11.36	12.05	12.76	15.78	19.05		
800	10	3.93	3.95	4.06	4.19	4.34	4.49	4.72	4.92	5.11	5.90	6.67		
	20	4.79	4.84	4.98	5.15	5.34	5.53	5.82	6.07	6.32	7.33	8.33		
	40	5.94	6.03	6.22	6.45	6.70	6.96	7.35	7.69	8.02	9.39	10.80		
	60	6.78	6.91	7.15	7.44	7.74	8.05	8.53	8.94	9.35	11.06	12.84		
	80	7.47	7.64	7.93	8.26	8.61	8.98	9.54	10.02	10.51	12.54	14.68		
	100	8.07	8.28	8.61	8.99	9.39	9.81	10.45	11.00	11.56	13.90	16.41		
	120	8.60	8.85	9.23	9.65	10.10	10.57	11.28	11.90	12.53	15.19	18.05		
	140	9.09	9.38	9.80	10.27	10.76	11.27	12.07	12.75	13.46	16.42	19.63		

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 40.0 Ft (RADIUS = 28.3 Ft)³
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		$(Ft*s)^{1/2}$	4	8	12	16	20	24	30	35	40	60	80
0	10		2.29	2.48	2.71	2.94	3.18	3.43	3.79	4.10	4.41	5.66	6.94
	20		2.83	3.18	3.54	3.89	4.25	4.61	5.15	5.60	6.05	7.90	9.80
	40		3.75	4.35	4.93	5.49	6.04	6.60	7.43	8.12	8.82	11.67	14.60
	60		4.55	5.38	6.14	6.89	7.61	8.34	9.43	10.34	11.25	14.97	18.81
	80		5.28	6.32	7.26	8.17	9.06	9.94	11.26	12.37	13.48	18.00	22.68
	100		5.97	7.20	8.31	9.37	10.41	11.44	12.99	14.27	15.57	20.85	26.31
25	120		6.63	8.05	9.31	10.52	11.70	12.87	14.62	16.09	17.56	23.56	29.76
	140		7.26	8.85	10.27	11.62	12.94	14.24	16.20	17.83	19.47	26.15	33.01
	10		2.86	2.94	3.10	3.29	3.49	3.71	4.04	4.33	4.62	5.84	7.09
	20		3.41	3.61	3.89	4.19	4.52	4.85	5.36	5.80	6.24	8.05	9.92
	40		4.28	4.73	5.23	5.74	6.27	6.80	7.61	8.29	8.98	11.79	14.71
	60		5.05	5.72	6.42	7.12	7.82	8.53	9.59	10.49	11.39	15.08	18.91
50	80		5.75	6.64	7.52	8.39	9.25	10.11	11.42	12.51	13.61	18.11	22.77
	100		6.42	7.51	8.56	9.58	10.60	11.61	13.13	14.41	15.69	20.95	26.40
	120		7.06	8.34	9.54	10.72	11.88	13.03	14.76	16.21	17.68	23.65	29.84
	140		7.67	9.13	10.49	11.81	13.11	14.39	16.33	17.95	19.58	26.24	33.15
	10		3.18	3.24	3.39	3.56	3.76	3.96	4.28	4.55	4.83	6.01	7.24
	20		3.79	3.95	4.20	4.47	4.77	5.08	5.57	5.99	6.42	8.19	10.05
100	40		4.72	5.07	5.52	6.00	6.49	7.00	7.79	8.45	9.13	11.91	14.81
	60		5.49	6.05	6.69	7.35	8.02	8.71	9.75	10.64	11.53	15.19	19.00
	80		6.19	6.95	7.77	8.60	9.44	10.29	11.57	12.65	13.74	18.21	22.86
	100		6.84	7.81	8.79	9.78	10.78	11.77	13.27	14.54	15.82	21.05	26.48
	120		7.47	8.62	9.77	10.91	12.05	13.19	14.90	16.34	17.79	23.75	29.92
	140		8.07	9.41	10.71	12.00	13.27	14.54	16.46	18.07	19.69	26.33	33.23
150	10		3.60	3.65	3.80	3.97	4.16	4.36	4.67	4.93	5.20	6.33	7.52
	20		4.32	4.45	4.68	4.94	5.21	5.51	5.96	6.36	6.77	8.48	10.29
	40		5.36	5.65	6.04	6.47	6.92	7.40	8.14	8.78	9.43	12.16	15.02
	60		6.19	6.64	7.19	7.79	8.42	9.07	10.08	10.93	11.80	15.41	19.19
	80		6.91	7.54	8.26	9.02	9.82	10.63	11.87	12.92	13.99	18.42	23.03
	100		7.58	8.38	9.26	10.19	11.13	12.09	13.56	14.80	16.06	21.24	26.64
200	120		8.21	9.18	10.22	11.30	12.39	13.50	15.17	16.59	18.03	23.93	30.08
	140		8.81	9.95	11.15	12.37	13.60	14.84	16.73	18.31	19.92	26.51	33.38
	10		3.91	3.96	4.10	4.28	4.47	4.67	4.98	5.24	5.51	6.63	7.79
	20		4.71	4.83	5.05	5.31	5.58	5.87	6.31	6.70	7.09	8.76	10.53
	40		5.85	6.11	6.47	6.88	7.31	7.77	8.48	9.10	9.73	12.40	15.23
	60		6.73	7.13	7.65	8.21	8.81	9.43	10.39	11.23	12.08	15.63	19.38
250	80		7.50	8.05	8.71	9.43	10.18	10.96	12.17	13.20	14.25	18.62	23.21
	100		8.89	9.71	10.58	11.49	12.41	13.40	15.06	16.34	17.62	23.21	28.81
	120		8.84	9.69	10.66	11.68	12.73	13.80	15.45	16.84	18.26	24.12	30.24
	140		9.45	10.46	11.58	12.74	13.93	15.14	16.99	18.55	20.14	26.69	33.53

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 40.0 Ft (RADIUS = 28.3 Ft)
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		$(Ft \cdot s)^{1/2}$	4	8	12	16	20	24	30	35	40	60	80
200	°F												
	10	4.16	4.21	4.35	4.53	4.72	4.93	5.24	5.51	5.78	6.89	8.05	
	20	5.03	5.15	5.37	5.62	5.89	6.17	6.62	7.00	7.39	9.03	10.77	
	40	6.25	6.49	6.85	7.24	7.67	8.11	8.80	9.40	10.02	12.64	15.43	
	60	7.19	7.56	8.05	8.59	9.17	9.77	10.70	11.51	12.35	15.85	19.56	
	80	7.99	8.50	9.13	9.81	10.54	11.29	12.46	13.47	14.50	18.83	23.38	
	100	8.72	9.36	10.13	10.96	11.83	12.73	14.13	15.32	16.54	21.63	26.98	
	120	9.38	10.17	11.08	12.05	13.06	14.11	15.72	17.09	18.49	24.30	30.40	
300	140	10.01	10.94	11.99	13.10	14.25	15.43	17.25	18.79	20.36	26.87	33.69	
	10	4.56	4.61	4.76	4.95	5.15	5.35	5.68	5.95	6.23	7.35	8.51	
	20	5.55	5.66	5.88	6.14	6.41	6.70	7.14	7.52	7.91	9.52	11.23	
	40	6.91	7.13	7.48	7.87	8.28	8.71	9.38	9.97	10.57	13.11	15.84	
	60	7.94	8.28	8.75	9.26	9.82	10.39	11.29	12.07	12.87	16.28	19.94	
	80	8.81	9.27	9.86	10.51	11.20	11.91	13.03	14.01	15.01	19.23	23.73	
	100	9.59	10.17	10.88	11.66	12.48	13.34	14.68	15.83	17.02	22.01	27.30	
	120	10.30	11.00	11.84	12.75	13.71	14.70	16.25	17.58	18.95	24.67	30.71	
400	140	10.97	11.79	12.75	13.79	14.88	16.01	17.77	19.27	20.81	27.23	33.99	
	10	4.89	4.94	5.09	5.28	5.49	5.70	6.04	6.32	6.60	7.75	8.91	
	20	5.97	6.08	6.30	6.56	6.84	7.13	7.58	7.97	8.36	9.97	11.66	
	40	7.45	7.66	8.00	8.39	8.80	9.23	9.90	10.47	11.06	13.56	16.24	
	60	8.56	8.88	9.34	9.84	10.38	10.95	11.83	12.59	13.37	16.71	20.30	
	80	9.49	9.92	10.49	11.12	11.79	12.48	13.57	14.52	15.49	19.63	24.07	
	100	10.32	10.86	11.54	12.29	13.09	13.91	15.21	16.33	17.49	22.40	27.63	
	120	11.07	11.72	12.52	13.39	14.31	15.27	16.77	18.07	19.41	25.04	31.03	
600	140	11.77	12.53	13.45	14.44	15.49	16.57	18.27	19.74	21.25	27.58	34.29	
	10	5.42	5.47	5.63	5.83	6.05	6.28	6.62	6.92	7.21	8.40	9.60	
	20	6.65	6.76	6.99	7.26	7.55	7.85	8.32	8.71	9.11	10.74	12.43	
	40	8.32	8.52	8.87	9.26	9.68	10.11	10.78	11.35	11.94	14.39	17.01	
	60	9.56	9.87	10.31	10.82	11.36	11.91	12.78	13.52	14.29	17.53	21.03	
	80	10.60	11.00	11.55	12.17	12.82	13.50	14.55	15.47	16.41	20.42	24.76	
	100	11.51	12.01	12.66	13.39	14.15	14.95	16.20	17.28	18.40	23.15	28.28	
	120	12.33	12.93	13.69	14.52	15.40	16.32	17.76	19.00	20.29	25.77	31.65	
800	140	13.09	13.79	14.65	15.59	16.59	17.62	19.25	20.66	22.11	28.28	34.89	
	10	5.85	5.90	6.07	6.28	6.50	6.74	7.10	7.41	7.72	8.95	10.18	
	20	7.21	7.31	7.55	7.83	8.13	8.44	8.92	9.33	9.74	11.41	13.11	
	40	9.03	9.23	9.58	9.98	10.40	10.84	11.52	12.10	12.69	15.15	17.73	
	60	10.38	10.67	11.13	11.63	12.17	12.73	13.60	14.34	15.10	18.30	21.74	
	80	11.50	11.89	12.44	13.05	13.70	14.37	15.42	16.32	17.25	21.18	25.43	
	100	12.49	12.96	13.61	14.32	15.08	15.87	17.09	18.15	19.24	23.89	28.93	
	120	13.37	13.94	14.68	15.50	16.36	17.26	18.66	19.88	21.13	26.48	32.27	
	140	14.19	14.84	15.68	16.60	17.57	18.58	20.16	21.53	22.94	28.98	35.49	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 40.0 Ft (RADIUS = 28.3 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft												
		(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60	80
0	10		3.56	3.97	4.40	4.83	5.26	5.70	6.36	6.91	7.46	9.71	12.01	
	20		4.65	5.36	6.05	6.73	7.40	8.07	9.07	9.91	10.75	14.19	17.72	
	40		6.48	7.71	8.83	9.92	10.98	12.04	13.63	14.95	16.29	21.72	27.33	
	60		8.08	9.76	11.27	12.71	14.13	15.53	17.63	19.38	21.14	28.33	35.75	
	80		9.55	11.64	13.51	15.28	17.02	18.73	21.30	23.44	25.60	34.39	43.49	
	100		10.93	13.41	15.61	17.69	19.73	21.74	24.74	27.26	29.78	40.08	50.75	
	120		12.24	15.10	17.61	19.98	22.30	24.60	28.02	30.88	33.76	45.50	57.65	
25	140		13.50	16.71	19.52	22.18	24.77	27.34	31.16	34.36	37.58	50.69	64.28	
	10		4.25	4.48	4.82	5.19	5.58	5.99	6.61	7.14	7.68	9.88	12.16	
	20		5.29	5.81	6.41	7.03	7.67	8.31	9.28	10.11	10.93	14.33	17.85	
	40		7.03	8.09	9.14	10.18	11.21	12.25	13.81	15.12	16.44	21.84	27.44	
	60		8.59	10.10	11.54	12.95	14.33	15.72	17.79	19.53	21.28	28.44	35.85	
	80		10.02	11.97	13.76	15.50	17.21	18.90	21.45	23.58	25.73	34.49	43.58	
	100		11.38	13.72	15.85	17.90	19.91	21.90	24.89	27.39	29.91	40.18	50.83	
50	120		12.67	15.39	17.84	20.18	22.48	24.75	28.16	31.01	33.88	45.59	57.73	
	140		13.91	16.99	19.75	22.37	24.94	27.49	31.30	34.48	37.69	50.78	64.35	
	10		4.70	4.89	5.18	5.52	5.89	6.27	6.86	7.37	7.89	10.05	12.31	
	20		5.80	6.22	6.76	7.33	7.93	8.55	9.50	10.30	11.12	14.48	17.97	
	40		7.55	8.46	9.44	10.43	11.44	12.45	13.99	15.29	16.60	21.97	27.54	
	60		9.08	10.44	11.82	13.18	14.54	15.90	17.95	19.68	21.42	28.55	35.94	
	80		10.49	12.28	14.02	15.72	17.40	19.08	21.60	23.72	25.86	34.60	43.67	
100	100		11.82	14.02	16.09	18.10	20.09	22.07	25.03	27.52	30.03	40.28	50.92	
	120		13.09	15.68	18.07	20.38	22.65	24.91	28.30	31.14	34.00	45.69	57.81	
	140		14.32	17.27	19.97	22.56	25.11	27.64	31.43	34.61	37.80	50.87	64.43	
	10		5.33	5.49	5.76	6.07	6.41	6.77	7.33	7.81	8.31	10.39	12.60	
	20		6.57	6.91	7.37	7.89	8.44	9.02	9.92	10.69	11.48	14.77	18.22	
	40		8.42	9.15	10.02	10.93	11.89	12.86	14.35	15.62	16.90	22.21	27.75	
	60		9.96	11.10	12.35	13.64	14.95	16.27	18.28	19.98	21.70	28.77	36.13	
150	80		11.36	12.91	14.52	16.15	17.78	19.42	21.91	24.00	26.12	34.80	43.84	
	100		12.67	14.62	16.57	18.51	20.45	22.39	25.32	27.79	30.27	40.48	51.08	
	120		13.92	16.25	18.53	20.77	23.00	25.22	28.57	31.39	34.23	45.87	57.97	
	140		15.12	17.82	20.41	22.94	25.44	27.94	31.70	34.85	38.03	51.05	64.58	
	10		5.80	5.94	6.20	6.51	6.85	7.20	7.74	8.21	8.69	10.72	12.88	
	20		7.15	7.45	7.89	8.38	8.91	9.46	10.32	11.07	11.83	15.05	18.46	
	40		9.11	9.76	10.56	11.42	12.32	13.26	14.70	15.94	17.21	22.46	27.96	
	60		10.71	11.72	12.87	14.09	15.35	16.63	18.60	20.28	21.97	28.99	36.32	
	80		12.13	13.51	15.02	16.57	18.16	19.76	22.21	24.28	26.38	35.01	44.02	
	100		13.45	15.20	17.04	18.92	20.81	22.72	25.61	28.05	30.52	40.67	51.25	
	120		14.69	16.81	18.98	21.16	23.34	25.53	28.85	31.64	34.46	46.06	58.13	
	140		15.89	18.37	20.85	23.31	25.77	28.24	31.96	35.09	38.25	51.23	64.73	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 40.0 Ft (RADIUS = 28.3 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		(Ft*s) ^{1/2}										
	°F	4	8	12	16	20	24	30	35	40	60	80
200	10	6.18	6.31	6.58	6.88	7.22	7.56	8.10	8.57	9.05	11.04	13.17
	20	7.63	7.91	8.34	8.82	9.33	9.86	10.70	11.43	12.18	15.34	18.71
	40	9.70	10.30	11.05	11.87	12.74	13.65	15.06	16.27	17.51	22.70	28.16
	60	11.36	12.28	13.37	14.53	15.75	17.00	18.93	20.57	22.25	29.21	36.51
	80	12.81	14.08	15.50	16.99	18.53	20.10	22.51	24.56	26.63	35.22	44.19
	100	14.15	15.76	17.51	19.32	21.16	23.04	25.89	28.31	30.76	40.87	51.42
	120	15.40	17.36	19.43	21.54	23.68	25.84	29.12	31.89	34.70	46.25	58.29
	140	16.60	18.90	21.28	23.68	26.10	28.54	32.22	35.33	38.48	51.41	64.88
300	10	6.80	6.92	7.19	7.50	7.83	8.18	8.73	9.19	9.66	11.63	13.71
	20	8.41	8.67	9.09	9.56	10.06	10.58	11.40	12.10	12.83	15.90	19.19
	40	10.68	11.22	11.92	12.70	13.52	14.39	15.73	16.90	18.10	23.18	28.58
	60	12.45	13.27	14.28	15.37	16.51	17.70	19.56	21.16	22.80	29.65	36.88
	80	13.98	15.10	16.41	17.81	19.27	20.77	23.11	25.11	27.14	35.63	44.54
	100	15.37	16.79	18.40	20.10	21.87	23.68	26.46	28.83	31.25	41.25	51.75
	120	16.66	18.39	20.30	22.30	24.36	26.46	29.67	32.39	35.16	46.62	58.61
	140	17.88	19.93	22.14	24.42	26.76	29.13	32.75	35.82	38.93	51.77	65.19
400	10	7.30	7.42	7.69	8.01	8.35	8.70	9.25	9.72	10.20	12.17	14.23
	20	9.05	9.30	9.71	10.18	10.68	11.20	12.01	12.70	13.42	16.43	19.67
	40	11.48	11.99	12.67	13.43	14.23	15.07	16.38	17.51	18.68	23.66	28.99
	60	13.36	14.13	15.09	16.13	17.23	18.38	20.18	21.74	23.34	30.09	37.26
	80	14.97	16.01	17.24	18.57	19.97	21.43	23.70	25.65	27.65	36.03	44.89
	100	16.42	17.73	19.24	20.86	22.56	24.31	27.02	29.35	31.73	41.64	52.08
	120	17.75	19.34	21.14	23.04	25.02	27.06	30.21	32.89	35.63	46.99	58.92
	140	19.01	20.88	22.96	25.14	27.40	29.72	33.27	36.30	39.37	52.12	65.50
600	10	8.11	8.23	8.51	8.83	9.19	9.56	10.12	10.61	11.09	13.09	15.15
	20	10.09	10.33	10.74	11.21	11.72	12.24	13.05	13.75	14.46	17.43	20.59
	40	12.80	13.27	13.93	14.67	15.46	16.27	17.54	18.64	19.78	24.60	29.80
	60	14.86	15.57	16.47	17.47	18.53	19.63	21.35	22.85	24.39	30.95	38.00
	80	16.61	17.55	18.70	19.96	21.29	22.67	24.84	26.72	28.65	36.85	45.58
	100	18.17	19.34	20.75	22.27	23.86	25.53	28.13	30.38	32.69	42.41	52.74
	120	19.59	21.01	22.66	24.44	26.31	28.25	31.27	33.88	36.54	47.73	59.55
	140	20.92	22.58	24.49	26.53	28.67	30.88	34.31	37.25	40.26	52.84	66.10
800	10	8.76	8.89	9.17	9.51	9.88	10.26	10.84	11.34	11.84	13.87	15.95
	20	10.93	11.17	11.58	12.07	12.58	13.12	13.94	14.64	15.36	18.32	21.45
	40	13.87	14.33	14.99	15.72	16.50	17.31	18.57	19.66	20.77	25.50	30.60
	60	16.10	16.76	17.65	18.63	19.67	20.74	22.43	23.89	25.39	31.80	38.74
	80	17.97	18.85	19.97	21.19	22.47	23.82	25.92	27.74	29.63	37.65	46.27
	100	19.62	20.72	22.07	23.53	25.07	26.68	29.19	31.38	33.63	43.18	53.39
	120	21.12	22.45	24.02	25.73	27.52	29.39	32.32	34.85	37.45	48.46	60.18
	140	22.52	24.07	25.88	27.82	29.87	32.00	35.32	38.19	41.14	53.54	66.71

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 42.0 Ft (RADIUS = 29.7 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		$(Ft*s)^{1/2}$	4	8	12	16	20	24	30	35	40	60	80
0	10		1.10	1.14	1.20	1.28	1.36	1.45	1.57	1.68	1.79	2.23	2.67
	20		1.25	1.32	1.42	1.53	1.64	1.75	1.92	2.07	2.21	2.80	3.40
	40		1.48	1.63	1.78	1.94	2.10	2.26	2.51	2.72	2.92	3.76	4.62
	60		1.69	1.89	2.10	2.30	2.51	2.71	3.02	3.28	3.55	4.61	5.69
	80		1.89	2.14	2.39	2.64	2.88	3.13	3.50	3.81	4.12	5.38	6.68
	100		2.07	2.37	2.66	2.95	3.23	3.52	3.94	4.30	4.65	6.11	7.60
	120		2.24	2.59	2.92	3.25	3.57	3.89	4.36	4.76	5.17	6.80	8.48
25	140		2.40	2.80	3.17	3.53	3.89	4.24	4.77	5.21	5.66	7.46	9.32
	10		1.44	1.44	1.48	1.54	1.61	1.68	1.80	1.89	1.99	2.40	2.82
	20		1.63	1.65	1.71	1.79	1.88	1.98	2.13	2.26	2.39	2.95	3.52
	40		1.90	1.96	2.06	2.19	2.33	2.47	2.69	2.88	3.08	3.89	4.72
	60		2.11	2.21	2.37	2.53	2.71	2.90	3.19	3.44	3.69	4.72	5.79
	80		2.30	2.45	2.64	2.85	3.08	3.30	3.65	3.95	4.25	5.48	6.77
	100		2.48	2.67	2.90	3.16	3.42	3.68	4.09	4.43	4.78	6.21	7.69
50	120		2.64	2.88	3.15	3.44	3.74	4.04	4.50	4.89	5.28	6.89	8.56
	140		2.80	3.08	3.39	3.72	4.06	4.39	4.90	5.33	5.77	7.55	9.40
	10		1.59	1.58	1.63	1.69	1.76	1.83	1.94	2.04	2.14	2.54	2.95
	20		1.81	1.83	1.89	1.97	2.06	2.15	2.30	2.42	2.55	3.08	3.64
	40		2.13	2.17	2.27	2.39	2.52	2.65	2.86	3.04	3.23	4.01	4.83
	60		2.37	2.45	2.58	2.74	2.90	3.08	3.35	3.58	3.82	4.83	5.88
	80		2.58	2.70	2.86	3.05	3.26	3.47	3.80	4.09	4.38	5.59	6.85
100	100		2.77	2.92	3.12	3.35	3.59	3.84	4.23	4.56	4.90	6.30	7.77
	120		2.94	3.13	3.37	3.63	3.91	4.20	4.64	5.02	5.40	6.99	8.64
	140		3.11	3.33	3.61	3.91	4.22	4.54	5.04	5.46	5.88	7.64	9.48
	10		1.77	1.77	1.82	1.88	1.95	2.03	2.15	2.25	2.35	2.76	3.17
	20		2.06	2.07	2.13	2.21	2.30	2.40	2.54	2.67	2.80	3.32	3.87
	40		2.44	2.48	2.57	2.68	2.81	2.94	3.14	3.31	3.49	4.24	5.03
	60		2.73	2.79	2.91	3.06	3.22	3.38	3.64	3.86	4.09	5.05	6.07
150	80		2.97	3.06	3.21	3.39	3.58	3.78	4.09	4.35	4.63	5.79	7.03
	100		3.18	3.30	3.49	3.69	3.91	4.14	4.51	4.82	5.14	6.50	7.94
	120		3.38	3.53	3.74	3.98	4.23	4.50	4.91	5.27	5.63	7.17	8.80
	140		3.56	3.74	3.98	4.25	4.53	4.83	5.30	5.70	6.11	7.82	9.63
	10		1.91	1.91	1.96	2.02	2.10	2.17	2.30	2.40	2.50	2.92	3.34
	20		2.23	2.24	2.31	2.39	2.48	2.58	2.73	2.86	2.99	3.52	4.07
	40		2.66	2.70	2.79	2.91	3.03	3.16	3.36	3.54	3.72	4.45	5.23
	60		2.98	3.04	3.17	3.31	3.46	3.63	3.88	4.10	4.32	5.26	6.25
	80		3.25	3.34	3.49	3.66	3.84	4.03	4.34	4.60	4.86	5.99	7.20
	100		3.49	3.60	3.77	3.97	4.19	4.41	4.76	5.06	5.37	6.69	8.10
	120		3.70	3.84	4.04	4.27	4.51	4.76	5.16	5.50	5.86	7.36	8.96
	140		3.90	4.06	4.29	4.54	4.82	5.10	5.54	5.93	6.33	8.00	9.78

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 42.0 Ft (RADIUS = 29.7 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		°F	4	8	12	16	20	24	30	35	40	60	80
200 (Ft*s) ^{1/2}	10		2.02	2.02	2.07	2.14	2.21	2.29	2.42	2.53	2.63	3.06	3.49
	20		2.37	2.38	2.45	2.54	2.63	2.73	2.89	3.02	3.15	3.69	4.24
	40		2.85	2.88	2.97	3.09	3.22	3.35	3.55	3.73	3.91	4.64	5.41
	60		3.20	3.25	3.37	3.52	3.67	3.84	4.09	4.30	4.53	5.45	6.43
	80		3.49	3.57	3.71	3.88	4.07	4.26	4.56	4.81	5.08	6.19	7.37
	100		3.74	3.85	4.02	4.21	4.42	4.64	4.99	5.28	5.59	6.88	8.26
	120		3.97	4.10	4.29	4.52	4.75	5.00	5.39	5.73	6.07	7.54	9.12
300	140		4.18	4.33	4.55	4.80	5.07	5.34	5.78	6.15	6.54	8.18	9.94
	10		2.20	2.20	2.25	2.32	2.40	2.49	2.62	2.73	2.84	3.29	3.73
	20		2.60	2.61	2.68	2.77	2.87	2.98	3.14	3.28	3.41	3.97	4.53
	40		3.14	3.17	3.27	3.39	3.52	3.66	3.87	4.05	4.23	4.98	5.74
	60		3.54	3.59	3.72	3.86	4.02	4.19	4.44	4.66	4.88	5.80	6.77
	80		3.87	3.94	4.09	4.26	4.44	4.64	4.94	5.19	5.45	6.54	7.70
	100		4.15	4.25	4.42	4.61	4.82	5.04	5.38	5.68	5.97	7.24	8.58
400	120		4.41	4.53	4.72	4.94	5.17	5.42	5.80	6.13	6.47	7.89	9.43
	140		4.64	4.78	5.00	5.24	5.50	5.77	6.19	6.56	6.93	8.52	10.24
	10		2.34	2.34	2.40	2.47	2.56	2.64	2.78	2.90	3.01	3.48	3.93
	20		2.79	2.80	2.87	2.97	3.07	3.18	3.35	3.49	3.63	4.20	4.78
	40		3.38	3.41	3.51	3.64	3.77	3.91	4.13	4.32	4.50	5.26	6.03
	60		3.82	3.87	3.99	4.14	4.31	4.48	4.74	4.96	5.18	6.11	7.07
	80		4.18	4.25	4.40	4.57	4.76	4.95	5.26	5.51	5.78	6.87	8.01
600	100		4.49	4.58	4.75	4.95	5.16	5.38	5.72	6.01	6.31	7.56	8.89
	120		4.76	4.88	5.07	5.29	5.52	5.77	6.15	6.48	6.81	8.22	9.73
	140		5.02	5.15	5.36	5.61	5.87	6.14	6.56	6.92	7.29	8.85	10.53
	10		2.58	2.57	2.63	2.71	2.80	2.90	3.04	3.16	3.29	3.78	4.26
	20		3.09	3.10	3.18	3.28	3.39	3.50	3.68	3.83	3.98	4.59	5.19
	40		3.77	3.80	3.91	4.04	4.18	4.33	4.56	4.75	4.94	5.73	6.53
	60		4.27	4.32	4.45	4.60	4.77	4.95	5.22	5.45	5.69	6.64	7.61
800	80		4.67	4.74	4.90	5.08	5.27	5.47	5.79	6.05	6.32	7.42	8.57
	100		5.03	5.11	5.29	5.49	5.71	5.94	6.29	6.59	6.89	8.14	9.46
	120		5.34	5.45	5.64	5.87	6.11	6.36	6.75	7.08	7.41	8.81	10.29
	140		5.63	5.75	5.97	6.21	6.48	6.75	7.17	7.54	7.91	9.45	11.09
	10		2.76	2.76	2.83	2.91	3.00	3.10	3.25	3.38	3.51	4.02	4.53
	20		3.33	3.34	3.42	3.53	3.65	3.77	3.95	4.11	4.27	4.90	5.52
	40		4.08	4.11	4.22	4.36	4.51	4.66	4.90	5.11	5.31	6.13	6.94
	60		4.63	4.68	4.81	4.98	5.15	5.34	5.62	5.86	6.10	7.08	8.07
	80		5.08	5.15	5.30	5.49	5.69	5.90	6.22	6.50	6.77	7.90	9.06
	100		5.46	5.55	5.73	5.94	6.16	6.40	6.76	7.06	7.37	8.64	9.96
	120		5.81	5.91	6.11	6.34	6.59	6.85	7.24	7.58	7.92	9.33	10.81
	140		6.12	6.24	6.46	6.71	6.98	7.26	7.69	8.06	8.43	9.98	11.61

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 42.0 Ft (RADIUS = 29.7 Ft)
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE °F	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
0	10	1.60	1.68	1.80	1.94	2.07	2.21	2.42	2.60	2.78	3.51	4.25	
	20	1.88	2.05	2.23	2.43	2.62	2.82	3.12	3.37	3.63	4.65	5.70	
	40	2.36	2.66	2.96	3.26	3.55	3.85	4.30	4.67	5.05	6.58	8.15	
	60	2.78	3.19	3.59	3.98	4.37	4.75	5.33	5.81	6.30	8.27	10.29	
	80	3.16	3.68	4.17	4.65	5.11	5.58	6.27	6.86	7.44	9.82	12.26	
	100	3.52	4.15	4.72	5.27	5.81	6.35	7.16	7.84	8.51	11.27	14.11	
	120	3.87	4.58	5.24	5.87	6.48	7.09	8.01	8.77	9.54	12.65	15.87	
	140	4.20	5.00	5.74	6.44	7.12	7.80	8.82	9.66	10.52	13.98	17.56	
	25	10	2.05	2.07	2.15	2.25	2.37	2.48	2.67	2.83	3.00	3.68	4.40
		20	2.37	2.44	2.57	2.72	2.89	3.07	3.34	3.57	3.81	4.80	5.83
40		2.86	3.03	3.26	3.51	3.78	4.06	4.48	4.84	5.21	6.70	8.25	
60		3.26	3.53	3.87	4.22	4.57	4.94	5.49	5.96	6.44	8.38	10.39	
80		3.62	4.01	4.43	4.87	5.31	5.75	6.43	7.00	7.57	9.92	12.35	
100		3.97	4.45	4.96	5.48	6.00	6.52	7.31	7.97	8.64	11.37	14.20	
120		4.29	4.88	5.47	6.06	6.66	7.25	8.15	8.90	9.65	12.75	15.95	
140		4.61	5.29	5.96	6.63	7.29	7.95	8.95	9.79	10.63	14.07	17.63	
50		10	2.27	2.28	2.36	2.46	2.57	2.69	2.87	3.03	3.19	3.85	4.54
		20	2.65	2.70	2.82	2.96	3.12	3.28	3.54	3.76	3.99	4.95	5.95
	40	3.19	3.32	3.52	3.75	4.00	4.26	4.66	5.01	5.36	6.83	8.36	
	60	3.62	3.84	4.12	4.44	4.78	5.12	5.66	6.11	6.58	8.49	10.48	
	80	4.00	4.30	4.68	5.08	5.50	5.93	6.58	7.14	7.70	10.03	12.44	
	100	4.35	4.74	5.20	5.68	6.18	6.68	7.45	8.10	8.76	11.47	14.28	
	120	4.67	5.16	5.70	6.26	6.83	7.41	8.29	9.03	9.77	12.84	16.03	
	140	4.99	5.56	6.18	6.82	7.46	8.11	9.08	9.91	10.74	14.16	17.71	
	100	10	2.56	2.57	2.65	2.75	2.86	2.98	3.16	3.32	3.48	4.13	4.81
		20	3.01	3.06	3.17	3.31	3.46	3.62	3.87	4.09	4.31	5.22	6.20
40		3.65	3.75	3.94	4.15	4.38	4.62	5.00	5.32	5.66	7.07	8.57	
60		4.13	4.31	4.56	4.85	5.16	5.48	5.98	6.41	6.85	8.71	10.67	
80		4.55	4.80	5.12	5.48	5.87	6.26	6.88	7.42	7.96	10.23	12.62	
100		4.93	5.25	5.64	6.08	6.53	7.01	7.74	8.37	9.01	11.67	14.45	
120		5.28	5.67	6.14	6.64	7.17	7.72	8.56	9.28	10.01	13.03	16.19	
140		5.60	6.07	6.61	7.19	7.79	8.41	9.35	10.15	10.97	14.34	17.87	
150		10	2.77	2.78	2.86	2.96	3.08	3.20	3.39	3.55	3.71	4.37	5.04
		20	3.28	3.32	3.44	3.58	3.73	3.89	4.14	4.35	4.57	5.48	6.43
	40	3.99	4.08	4.26	4.47	4.69	4.93	5.29	5.61	5.94	7.31	8.78	
	60	4.52	4.68	4.92	5.19	5.49	5.79	6.27	6.69	7.12	8.93	10.86	
	80	4.98	5.19	5.50	5.84	6.20	6.58	7.17	7.69	8.22	10.44	12.79	
	100	5.38	5.66	6.03	6.44	6.87	7.32	8.02	8.63	9.25	11.86	14.62	
	120	5.75	6.09	6.53	7.00	7.50	8.02	8.83	9.53	10.24	13.22	16.35	
	140	6.10	6.50	7.00	7.54	8.11	8.70	9.61	10.40	11.20	14.53	18.02	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 42.0 Ft (RADIUS = 29.7 Ft)
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
200	(Ft*s) ^{1/2}											
	10	2.94	2.95	3.03	3.14	3.25	3.38	3.57	3.73	3.90	4.57	5.25
	20	3.50	3.54	3.65	3.80	3.95	4.11	4.37	4.58	4.80	5.70	6.65
	40	4.26	4.36	4.53	4.74	4.96	5.19	5.56	5.87	6.19	7.54	8.98
	60	4.84	4.99	5.22	5.49	5.78	6.08	6.55	6.96	7.37	9.15	11.05
	80	5.33	5.53	5.82	6.15	6.50	6.87	7.45	7.95	8.46	10.64	12.97
	100	5.76	6.01	6.37	6.76	7.18	7.61	8.29	8.88	9.49	12.06	14.78
300	120	6.15	6.46	6.87	7.33	7.81	8.31	9.10	9.78	10.47	13.41	16.51
	140	6.51	6.88	7.36	7.87	8.42	8.98	9.87	10.64	11.42	14.70	18.11
	10	3.21	3.22	3.31	3.42	3.54	3.67	3.87	4.04	4.21	4.90	5.60
	20	3.85	3.89	4.01	4.15	4.31	4.48	4.74	4.96	5.18	6.10	7.04
	40	4.72	4.80	4.98	5.19	5.41	5.64	6.01	6.32	6.64	7.96	9.37
	60	5.36	5.50	5.73	5.99	6.28	6.57	7.03	7.43	7.84	9.57	11.42
	80	5.90	6.08	6.37	6.69	7.03	7.39	7.95	8.43	8.93	11.04	13.32
400	100	6.37	6.61	6.94	7.32	7.72	8.14	8.80	9.36	9.95	12.44	15.11
	120	6.80	7.08	7.47	7.91	8.37	8.85	9.60	10.25	10.92	13.78	16.83
	140	7.19	7.53	7.97	8.46	8.98	9.52	10.37	11.10	11.86	15.06	18.48
	10	3.43	3.44	3.53	3.65	3.78	3.91	4.12	4.29	4.47	5.18	5.89
	20	4.14	4.17	4.29	4.45	4.61	4.78	5.05	5.28	5.51	6.44	7.39
	40	5.08	5.17	5.34	5.55	5.78	6.02	6.39	6.70	7.02	8.35	9.74
	60	5.78	5.91	6.14	6.41	6.70	6.99	7.45	7.85	8.26	9.96	11.78
600	80	6.37	6.54	6.82	7.14	7.48	7.84	8.39	8.87	9.36	11.43	13.66
	100	6.88	7.10	7.43	7.80	8.20	8.61	9.25	9.81	10.38	12.81	15.44
	120	7.34	7.60	7.98	8.41	8.86	9.33	10.06	10.70	11.35	14.14	17.14
	140	7.76	8.07	8.50	8.98	9.48	10.01	10.83	11.55	12.28	15.42	18.78
	10	3.79	3.80	3.89	4.02	4.15	4.30	4.52	4.70	4.89	5.64	6.38
	20	4.60	4.63	4.76	4.92	5.09	5.28	5.56	5.79	6.03	7.00	7.97
	40	5.67	5.75	5.94	6.16	6.39	6.64	7.02	7.34	7.67	9.01	10.40
800	60	6.47	6.59	6.83	7.10	7.39	7.69	8.16	8.56	8.97	10.66	12.45
	80	7.12	7.29	7.57	7.89	8.24	8.59	9.15	9.62	10.11	12.14	14.32
	100	7.70	7.90	8.23	8.60	9.00	9.41	10.04	10.59	11.15	13.53	16.08
	120	8.21	8.46	8.83	9.25	9.69	10.16	10.88	11.50	12.13	14.84	17.76
	140	8.68	8.97	9.39	9.85	10.35	10.86	11.66	12.36	13.07	16.10	19.38
	10	4.08	4.09	4.19	4.32	4.46	4.61	4.84	5.03	5.23	6.01	6.78
	20	4.97	5.01	5.14	5.31	5.49	5.68	5.97	6.22	6.47	7.47	8.47
	40	6.15	6.23	6.42	6.65	6.89	7.15	7.54	7.87	8.21	9.58	10.98
	60	7.02	7.15	7.38	7.66	7.96	8.27	8.75	9.16	9.57	11.28	13.06
	80	7.74	7.90	8.19	8.51	8.86	9.23	9.79	10.27	10.76	12.79	14.94
	100	8.36	8.56	8.89	9.27	9.67	10.08	10.72	11.27	11.83	14.18	16.69
	120	8.92	9.16	9.53	9.95	10.40	10.86	11.58	12.20	12.83	15.50	18.36
	140	9.43	9.71	10.12	10.59	11.08	11.59	12.39	13.08	13.78	16.76	19.97

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 42.0 Ft (RADIUS = 29.7 Ft)
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE
 TIME INDEX

TEMPERATURE
 RISE

CEILING HEIGHT, Ft

(Ft*s)^{1/2}

°F

		4	8	12	16	20	24	30	35	40	60	80
0	10	2.39	2.58	2.81	3.05	3.29	3.53	3.90	4.20	4.51	5.77	7.06
	20	2.96	3.31	3.67	4.03	4.39	4.75	5.29	5.75	6.21	8.06	9.97
	40	3.92	4.53	5.11	5.68	6.25	6.80	7.64	8.34	9.05	11.91	14.86
	60	4.75	5.60	6.38	7.13	7.87	8.61	9.70	10.62	11.54	15.29	19.15
	80	5.52	6.58	7.55	8.47	9.37	10.26	11.60	12.71	13.83	18.39	23.09
	100	6.24	7.51	8.64	9.72	10.77	11.81	13.37	14.67	15.98	21.30	26.78
	120	6.93	8.38	9.68	10.90	12.10	13.29	15.06	16.54	18.02	24.06	30.30
25	140	7.59	9.23	10.67	12.04	13.38	14.71	16.68	18.33	19.98	26.72	33.67
	10	2.98	3.05	3.21	3.40	3.60	3.82	4.15	4.44	4.73	5.95	7.21
	20	3.55	3.75	4.03	4.34	4.66	5.00	5.51	5.95	6.39	8.21	10.09
	40	4.46	4.91	5.42	5.94	6.48	7.01	7.83	8.51	9.20	12.04	14.96
	60	5.26	5.95	6.66	7.37	8.08	8.79	9.87	10.77	11.68	15.40	19.24
	80	6.00	6.91	7.80	8.69	9.56	10.44	11.75	12.85	13.96	18.49	23.18
	100	6.70	7.82	8.88	9.92	10.95	11.98	13.52	14.81	16.10	21.40	26.87
50	120	7.36	8.68	9.91	11.10	12.28	13.45	15.20	16.67	18.14	24.16	30.38
	140	8.01	9.51	10.90	12.24	13.55	14.86	16.81	18.45	20.10	26.81	33.75
	10	3.30	3.36	3.50	3.68	3.87	4.07	4.39	4.66	4.95	6.12	7.35
	20	3.94	4.10	4.34	4.62	4.92	5.24	5.72	6.14	6.57	8.36	10.22
	40	4.91	5.27	5.72	6.20	6.70	7.22	8.01	8.68	9.36	12.16	15.07
	60	5.71	6.29	6.93	7.60	8.29	8.98	10.04	10.92	11.82	15.51	19.34
	80	6.44	7.23	8.06	8.91	9.76	10.61	11.90	12.99	14.09	18.60	23.27
100	100	7.13	8.12	9.13	10.13	11.14	12.14	13.66	14.94	16.23	21.49	26.95
	120	7.78	8.97	10.14	11.30	12.46	13.61	15.34	16.79	18.26	24.25	30.46
	140	8.41	9.79	11.12	12.43	13.72	15.01	16.95	18.57	20.21	26.90	33.83
	10	3.74	3.79	3.92	4.10	4.28	4.48	4.79	5.05	5.32	6.45	7.64
	20	4.49	4.61	4.84	5.09	5.37	5.67	6.12	6.52	6.93	8.65	10.47
	40	5.57	5.86	6.25	6.68	7.14	7.62	8.37	9.01	9.67	12.41	15.28
	60	6.43	6.89	7.45	8.06	8.69	9.35	10.36	11.23	12.10	15.74	19.53
150	80	7.19	7.82	8.56	9.33	10.14	10.96	12.21	13.28	14.35	18.81	23.44
	100	7.89	8.70	9.60	10.54	11.50	12.47	13.95	15.21	16.48	21.69	27.12
	120	8.54	9.53	10.60	11.70	12.80	13.92	15.62	17.05	18.50	24.44	30.62
	140	9.17	10.34	11.57	12.81	14.06	15.31	17.22	18.82	20.44	27.08	33.98
	10	4.06	4.10	4.24	4.41	4.60	4.80	5.10	5.37	5.64	6.75	7.92
	20	4.89	5.01	5.22	5.47	5.75	6.03	6.48	6.86	7.26	8.93	10.71
	40	6.07	6.33	6.69	7.10	7.54	8.00	8.71	9.33	9.97	12.65	15.49
	60	6.99	7.40	7.91	8.48	9.08	9.71	10.69	11.52	12.38	15.96	19.72
	80	7.79	8.35	9.02	9.75	10.51	11.30	12.51	13.55	14.61	19.01	23.62
	100	8.52	9.23	10.06	10.94	11.86	12.80	14.24	15.47	16.72	21.89	27.29
	120	9.19	10.06	11.05	12.08	13.15	14.23	15.89	17.30	18.73	24.63	30.78
	140	9.83	10.86	12.00	13.18	14.39	15.62	17.48	19.06	20.67	27.26	34.14

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 42.0 Ft (RADIUS = 29.7 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
(Ft*s) ^{1/2}	°F												
	10	4.32	4.36	4.50	4.67	4.86	5.06	5.37	5.64	5.91	7.02	8.18	
	20	5.23	5.33	5.54	5.79	6.07	6.35	6.79	7.17	7.56	9.20	10.95	
	40	6.49	6.73	7.08	7.47	7.90	8.34	9.04	9.64	10.27	12.90	15.70	
	60	7.46	7.84	8.33	8.87	9.45	10.06	11.00	11.82	12.66	16.18	19.91	
	80	8.30	8.81	9.45	10.14	10.87	11.63	12.81	13.83	14.87	19.22	23.80	
	100	9.05	9.71	10.49	11.33	12.21	13.12	14.53	15.74	16.97	22.09	27.46	
	120	9.75	10.55	11.47	12.46	13.49	14.54	16.17	17.56	18.97	24.82	30.94	
	140	10.41	11.35	12.42	13.55	14.72	15.91	17.75	19.31	20.89	27.44	34.22	
300	10	4.74	4.77	4.92	5.10	5.29	5.50	5.82	6.09	6.37	7.49	8.65	
	20	5.76	5.86	6.07	6.33	6.60	6.88	7.33	7.71	8.09	9.71	11.42	
	40	7.17	7.38	7.73	8.11	8.53	8.96	9.64	10.22	10.82	13.37	16.11	
	60	8.24	8.58	9.04	9.56	10.11	10.69	11.60	12.38	13.19	16.62	20.29	
	80	9.15	9.60	10.20	10.85	11.54	12.26	13.40	14.37	15.38	19.63	24.15	
	100	9.96	10.54	11.26	12.04	12.87	13.74	15.09	16.26	17.45	22.48	27.79	
	120	10.70	11.40	12.25	13.17	14.14	15.15	16.71	18.06	19.43	25.19	31.26	
	140	11.39	12.22	13.20	14.26	15.36	16.50	18.27	19.79	21.34	27.80	34.60	
400	10	5.08	5.11	5.26	5.45	5.65	5.86	6.19	6.47	6.75	7.89	9.06	
	20	6.20	6.29	6.51	6.76	7.04	7.33	7.78	8.16	8.55	10.16	11.86	
	40	7.72	7.93	8.27	8.65	9.06	9.49	10.16	10.74	11.33	13.83	16.52	
	60	8.88	9.19	9.65	10.16	10.70	11.26	12.15	12.91	13.70	17.05	20.66	
	80	9.85	10.27	10.85	11.48	12.15	12.85	13.95	14.90	15.88	20.04	24.50	
	100	10.71	11.25	11.93	12.69	13.49	14.33	15.63	16.76	17.93	22.87	28.12	
	120	11.49	12.14	12.95	13.83	14.76	15.73	17.24	18.55	19.90	25.57	31.58	
	140	12.22	12.98	13.91	14.92	15.97	17.07	18.79	20.27	21.79	28.16	34.91	
600	10	5.62	5.66	5.81	6.01	6.22	6.45	6.79	7.08	7.38	8.56	9.76	
	20	6.90	6.99	7.21	7.48	7.77	8.07	8.53	8.92	9.32	10.95	12.64	
	40	8.63	8.82	9.16	9.55	9.96	10.39	11.06	11.64	12.22	14.68	17.30	
	60	9.92	10.21	10.65	11.16	11.69	12.25	13.12	13.86	14.63	17.89	21.40	
	80	10.99	11.38	11.94	12.55	13.20	13.88	14.95	15.86	16.81	20.84	25.20	
	100	11.94	12.43	13.09	13.81	14.58	15.39	16.64	17.73	18.85	23.63	28.79	
	120	12.79	13.39	14.15	14.99	15.87	16.80	18.25	19.50	20.80	26.30	32.22	
	140	13.58	14.28	15.15	16.10	17.10	18.15	19.78	21.20	22.67	28.88	35.52	
800	10	6.07	6.10	6.26	6.47	6.69	6.92	7.28	7.58	7.89	9.12	10.34	
	20	7.47	7.56	7.79	8.07	8.36	8.67	9.15	9.55	9.96	11.63	13.33	
	40	9.36	9.55	9.89	10.28	10.71	11.14	11.82	12.40	12.99	15.45	18.04	
	60	10.76	11.04	11.49	11.99	12.53	13.09	13.96	14.70	15.46	18.67	22.11	
	80	11.93	12.30	12.85	13.46	14.11	14.78	15.83	16.74	17.67	21.61	25.88	
	100	12.95	13.41	14.06	14.77	15.53	16.32	17.55	18.62	19.71	24.38	29.44	
	120	13.87	14.42	15.17	15.99	16.85	17.76	19.17	20.39	21.65	27.03	32.85	
	140	14.71	15.36	16.20	17.13	18.10	19.12	20.71	22.09	23.51	29.58	36.13	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 42.0 Ft (RADIUS = 29.7 Ft)³
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft													
		(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60	80	
0	10		3.72	4.13	4.57	5.00	5.44	5.88	6.32	6.76	7.20	7.64	9.90	12.21	
	20		4.86	5.59	6.28	6.97	7.64	8.32	9.00	9.68	10.36	11.04	14.48	18.03	
	40		6.77	8.03	9.17	10.28	11.36	12.43	13.51	14.58	15.66	16.73	22.18	27.82	
	60		8.45	10.17	11.71	13.18	14.61	16.03	17.45	18.87	20.29	21.71	28.93	36.40	
	80		9.98	12.14	14.04	15.84	17.60	19.34	21.08	22.82	24.56	26.30	35.13	44.28	
	100		11.43	13.98	16.22	18.34	20.41	22.44	24.47	26.50	28.53	30.56	40.95	51.67	
	120		12.80	15.74	18.30	20.72	23.07	25.40	27.72	30.04	32.36	34.68	46.48	58.70	
	140		14.12	17.42	20.29	23.00	25.63	28.23	30.80	33.36	35.92	38.48	51.79	65.45	
25	10		4.43	4.65	4.99	5.37	5.76	6.17	6.57	6.97	7.37	7.76	10.08	12.36	
	20		5.51	6.04	6.65	7.28	7.92	8.57	9.21	9.85	10.49	11.13	14.63	18.16	
	40		7.34	8.41	9.48	10.54	11.59	12.64	13.69	14.74	15.79	16.84	22.30	27.92	
	60		8.96	10.52	11.99	13.41	14.82	16.22	17.63	19.04	20.45	21.86	29.04	36.49	
	80		10.46	12.46	14.30	16.06	17.80	19.51	21.22	22.93	24.64	26.35	35.23	44.36	
	100		11.88	14.29	16.47	18.55	20.59	22.61	24.63	26.65	28.67	30.69	41.05	51.76	
	120		13.24	16.03	18.53	20.92	23.25	25.56	27.87	30.18	32.49	34.80	46.58	58.78	
	140		14.54	17.70	20.52	23.19	25.80	28.38	30.95	33.52	36.09	38.66	51.88	65.52	
50	10		4.89	5.07	5.36	5.70	6.07	6.45	6.82	7.20	7.57	7.94	10.25	12.51	
	20		6.04	6.46	7.00	7.58	8.19	8.81	9.42	10.03	10.64	11.25	14.78	18.28	
	40		7.87	8.79	9.79	10.80	11.82	12.84	13.86	14.87	15.89	16.90	22.43	28.03	
	60		9.46	10.86	12.27	13.65	15.03	16.41	17.79	19.17	20.55	21.93	29.16	36.59	
	80		10.94	12.79	14.56	16.28	17.99	19.69	21.39	23.09	24.79	26.49	35.34	44.45	
	100		12.33	14.60	16.71	18.76	20.77	22.78	24.78	26.78	28.78	30.78	41.15	51.84	
	120		13.67	16.32	18.77	21.12	23.43	25.71	28.00	30.28	32.56	34.84	46.67	58.86	
	140		14.95	17.99	20.74	23.38	25.97	28.53	31.09	33.65	36.21	38.77	51.97	65.60	
100	10		5.54	5.69	5.95	6.27	6.61	6.96	7.30	7.64	7.98	8.32	10.60	12.81	
	20		6.83	7.16	7.63	8.15	8.71	9.29	9.86	10.44	11.02	11.60	15.07	18.54	
	40		8.75	9.50	10.38	11.31	12.27	13.26	14.24	15.22	16.20	17.18	22.68	28.24	
	60		10.36	11.54	12.81	14.12	15.44	16.78	18.11	19.44	20.77	22.10	29.38	36.78	
	80		11.82	13.42	15.07	16.72	18.38	20.04	21.70	23.36	25.02	26.68	35.55	44.63	
	100		13.20	15.20	17.20	19.17	21.14	23.11	25.08	27.05	29.02	30.99	41.34	52.01	
	120		14.51	16.91	19.23	21.52	23.78	26.03	28.28	30.53	32.78	35.03	46.86	59.03	
	140		15.77	18.55	21.19	23.77	26.31	28.84	31.37	33.90	36.43	38.96	52.15	65.76	
150	10		6.02	6.15	6.41	6.72	7.05	7.40	7.74	8.08	8.42	8.76	10.93	13.10	
	20		7.42	7.72	8.16	8.65	9.18	9.74	10.29	10.84	11.39	11.94	15.36	18.78	
	40		9.47	10.13	10.93	11.80	12.72	13.66	14.60	15.54	16.48	17.42	22.93	28.45	
	60		11.13	12.16	13.34	14.58	15.85	17.15	18.44	19.73	21.02	22.31	29.60	36.97	
	80		12.62	14.03	15.57	17.15	18.76	20.39	22.00	23.61	25.22	26.83	35.76	44.81	
	100		13.99	15.79	17.68	19.58	21.50	23.44	25.38	27.32	29.26	31.20	41.54	52.18	
	120		15.30	17.48	19.69	21.91	24.13	26.35	28.57	30.79	33.01	35.23	47.05	59.19	
	140		16.55	19.10	21.64	24.15	26.64	29.14	31.63	34.12	36.61	39.10	52.33	65.91	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 42.0 Ft (RADIUS = 29.7 Ft)³
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft												
		$(Ft*s)^{1/2}$	°F	4	8	12	16	20	24	30	35	40	60	80
200	10		6.42	6.54	6.79	7.10	7.43	7.78	8.32	8.78	9.26	11.26	13.39	
	20		7.92	8.20	8.62	9.10	9.61	10.15	10.99	11.72	12.47	15.65	19.03	
	40		10.08	10.68	11.44	12.27	13.15	14.06	15.48	16.70	17.95	23.17	28.66	
	60		11.80	12.74	13.85	15.03	16.26	17.52	19.47	21.13	22.82	29.83	37.16	
	80		13.32	14.61	16.06	17.58	19.14	20.73	23.17	25.23	27.32	35.97	44.99	
	100		14.71	16.36	18.15	19.99	21.87	23.77	26.65	29.09	31.57	41.74	52.35	
	120		16.03	18.04	20.15	22.30	24.47	26.66	29.98	32.78	35.61	47.24	59.35	
300	140		17.28	19.65	22.08	24.52	26.98	29.45	33.18	36.32	39.49	52.52	66.07	
	10		7.05	7.17	7.42	7.73	8.06	8.41	8.95	9.42	9.89	11.86	13.94	
	20		8.73	8.98	9.39	9.86	10.36	10.88	11.70	12.41	13.13	16.22	19.52	
	40		11.08	11.62	12.33	13.11	13.94	14.81	16.17	17.35	18.56	23.66	29.08	
	60		12.93	13.76	14.77	15.88	17.04	18.24	20.11	21.73	23.38	30.27	37.54	
	80		14.52	15.66	16.99	18.41	19.89	21.41	23.77	25.79	27.84	36.38	45.34	
	100		15.97	17.42	19.06	20.79	22.58	24.42	27.23	29.62	32.06	42.14	52.68	
400	120		17.32	19.09	21.04	23.07	25.16	27.29	30.53	33.29	36.08	47.62	59.67	
	140		18.59	20.69	22.95	25.27	27.64	30.05	33.71	36.81	39.95	52.88	66.38	
	10		7.57	7.68	7.94	8.25	8.59	8.94	9.49	9.96	10.43	12.40	14.46	
	20		9.39	9.63	10.03	10.50	11.00	11.51	12.32	13.02	13.74	16.76	20.01	
	40		11.91	12.42	13.10	13.86	14.66	15.51	16.82	17.97	19.15	24.15	29.50	
	60		13.87	14.64	15.60	16.66	17.77	18.93	20.74	22.31	23.93	30.72	37.92	
	80		15.54	16.59	17.84	19.19	20.61	22.08	24.37	26.34	28.36	36.80	45.70	
600	100		17.05	18.38	19.92	21.56	23.28	25.06	27.80	30.15	32.55	42.53	53.02	
	120		18.44	20.06	21.89	23.83	25.84	27.90	31.08	33.79	36.55	47.99	59.99	
	140		19.75	21.66	23.79	26.01	28.30	30.65	34.24	37.30	40.40	53.24	66.69	
	10		8.41	8.51	8.78	9.10	9.45	9.82	10.38	10.86	11.35	13.34	15.40	
	20		10.46	10.69	11.09	11.56	12.06	12.58	13.40	14.09	14.80	17.77	20.94	
	40		13.27	13.74	14.40	15.13	15.92	16.74	18.01	19.12	20.26	25.10	30.33	
	60		15.42	16.12	17.03	18.03	19.09	20.20	21.94	23.44	25.00	31.60	38.68	
800	80		17.23	18.18	19.34	20.61	21.95	23.35	25.53	27.43	29.38	37.62	46.40	
	100		18.85	20.04	21.46	23.00	24.62	26.30	28.92	31.19	33.52	43.31	53.69	
	120		20.33	21.77	23.45	25.26	27.15	29.11	32.17	34.79	37.48	48.74	60.63	
	140		21.72	23.41	25.35	27.42	29.59	31.82	35.29	38.26	41.30	53.97	67.30	
	10		9.09	9.19	9.47	9.80	10.16	10.54	11.12	11.61	12.11	14.14	16.22	
	20		11.33	11.55	11.96	12.44	12.95	13.48	14.30	15.00	15.72	18.68	21.81	
	40		14.39	14.83	15.48	16.21	16.99	17.80	19.07	20.15	21.27	26.02	31.14	
	60		16.69	17.35	18.24	19.22	20.26	21.34	23.04	24.50	26.01	32.46	39.43	
	80		18.64	19.52	20.64	21.86	23.16	24.52	26.63	28.47	30.37	38.44	47.10	
	100		20.35	21.46	22.82	24.29	25.85	27.47	30.01	32.21	34.48	44.09	54.35	
	120		21.92	23.25	24.85	26.57	28.38	30.27	33.23	35.78	38.41	49.49	61.27	
	140		23.37	24.93	26.77	28.74	30.81	32.97	36.32	39.22	42.19	54.68	67.92	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 44.0 Ft (RADIUS = 31.1 Ft)
 FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60
0	10	1.15	1.18	1.25	1.32	1.40	1.49	1.61	1.72	1.83	2.27	2.71	
	20	1.30	1.37	1.47	1.58	1.69	1.80	1.97	2.12	2.26	2.85	3.45	
	40	1.55	1.69	1.85	2.01	2.17	2.33	2.58	2.78	2.99	3.83	4.69	
	60	1.77	1.97	2.17	2.38	2.59	2.80	3.11	3.37	3.63	4.70	5.79	
	80	1.97	2.22	2.48	2.73	2.98	3.22	3.60	3.91	4.22	5.49	6.79	
	100	2.16	2.46	2.76	3.05	3.34	3.62	4.05	4.41	4.77	6.23	7.73	
	120	2.34	2.69	3.03	3.36	3.68	4.00	4.49	4.89	5.29	6.94	8.63	
	140	2.51	2.91	3.29	3.65	4.01	4.37	4.90	5.35	5.80	7.61	9.48	
25	10	1.50	1.49	1.53	1.59	1.66	1.73	1.84	1.94	2.03	2.44	2.86	
	20	1.69	1.70	1.77	1.85	1.94	2.03	2.18	2.31	2.45	3.00	3.58	
	40	1.97	2.03	2.13	2.26	2.40	2.54	2.76	2.95	3.15	3.96	4.80	
	60	2.20	2.30	2.45	2.62	2.80	2.99	3.28	3.52	3.77	4.81	5.88	
	80	2.39	2.54	2.73	2.95	3.17	3.40	3.75	4.05	4.35	5.59	6.88	
	100	2.57	2.77	3.01	3.26	3.52	3.79	4.20	4.55	4.90	6.33	7.82	
	120	2.75	2.98	3.26	3.56	3.86	4.16	4.63	5.02	5.42	7.03	8.71	
	140	2.91	3.19	3.52	3.85	4.18	4.52	5.04	5.47	5.91	7.71	9.56	
50	10	1.65	1.64	1.68	1.74	1.81	1.88	1.99	2.09	2.18	2.58	2.99	
	20	1.88	1.89	1.95	2.03	2.12	2.21	2.35	2.48	2.61	3.14	3.70	
	40	2.21	2.25	2.35	2.46	2.59	2.72	2.93	3.11	3.30	4.08	4.91	
	60	2.46	2.54	2.67	2.82	2.99	3.16	3.44	3.67	3.91	4.92	5.98	
	80	2.68	2.79	2.96	3.15	3.36	3.57	3.90	4.19	4.48	5.70	6.97	
	100	2.87	3.02	3.23	3.46	3.70	3.96	4.35	4.68	5.02	6.43	7.90	
	120	3.06	3.24	3.49	3.75	4.03	4.32	4.77	5.15	5.53	7.13	8.79	
	140	3.23	3.45	3.73	4.04	4.35	4.68	5.18	5.60	6.03	7.80	9.64	
100	10	1.84	1.83	1.88	1.94	2.01	2.08	2.20	2.30	2.40	2.81	3.22	
	20	2.13	2.14	2.20	2.28	2.37	2.46	2.61	2.73	2.86	3.38	3.93	
	40	2.53	2.56	2.65	2.76	2.89	3.02	3.22	3.39	3.57	4.32	5.12	
	60	2.83	2.89	3.01	3.15	3.31	3.47	3.73	3.95	4.18	5.14	6.17	
	80	3.08	3.17	3.32	3.49	3.68	3.88	4.19	4.46	4.74	5.91	7.15	
	100	3.30	3.42	3.60	3.81	4.03	4.26	4.63	4.94	5.27	6.63	8.07	
	120	3.50	3.65	3.86	4.10	4.36	4.62	5.04	5.40	5.77	7.32	8.95	
	140	3.69	3.87	4.11	4.38	4.67	4.97	5.44	5.84	6.26	7.98	9.80	
150	10	1.98	1.97	2.02	2.08	2.15	2.23	2.35	2.45	2.56	2.98	3.39	
	20	2.31	2.32	2.38	2.46	2.55	2.65	2.80	2.93	3.06	3.59	4.13	
	40	2.76	2.79	2.88	2.99	3.12	3.25	3.45	3.62	3.80	4.54	5.32	
	60	3.09	3.15	3.27	3.41	3.56	3.72	3.98	4.19	4.42	5.36	6.36	
	80	3.37	3.45	3.60	3.77	3.95	4.15	4.45	4.71	4.98	6.11	7.32	
	100	3.62	3.72	3.90	4.10	4.31	4.53	4.88	5.19	5.50	6.82	8.24	
	120	3.84	3.97	4.17	4.40	4.64	4.90	5.30	5.64	6.00	7.51	9.11	
	140	4.04	4.20	4.43	4.69	4.96	5.24	5.69	6.08	6.48	8.16	9.95	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 44.0 Ft (RADIUS = 31.1 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		(Ft*s) ^{1/2}	4	8	12	16	20	24	30	35	40	60
200	10	2.10	2.09	2.13	2.20	2.28	2.35	2.48	2.58	2.69	3.12	3.54
	20	2.46	2.46	2.53	2.61	2.70	2.80	2.96	3.09	3.22	3.76	4.30
	40	2.95	2.98	3.07	3.18	3.31	3.44	3.64	3.82	4.00	4.73	5.50
	60	3.31	3.36	3.48	3.62	3.78	3.94	4.19	4.41	4.63	5.55	6.54
	80	3.61	3.69	3.83	4.00	4.18	4.37	4.67	4.93	5.19	6.31	7.50
	100	3.88	3.98	4.15	4.34	4.55	4.77	5.12	5.41	5.72	7.01	8.40
	120	4.12	4.24	4.43	4.65	4.89	5.14	5.53	5.87	6.22	7.69	9.27
300	140	4.34	4.48	4.70	4.95	5.21	5.49	5.93	6.31	6.69	8.34	10.11
	10	2.28	2.27	2.32	2.39	2.47	2.55	2.68	2.79	2.90	3.35	3.79
	20	2.70	2.70	2.77	2.86	2.95	3.06	3.22	3.35	3.49	4.04	4.60
	40	3.26	3.28	3.37	3.49	3.62	3.76	3.97	4.14	4.33	5.07	5.84
	60	3.67	3.71	3.83	3.98	4.13	4.30	4.55	4.77	4.99	5.91	6.88
	80	4.01	4.07	4.22	4.39	4.57	4.76	5.06	5.32	5.58	6.67	7.83
	100	4.30	4.39	4.56	4.75	4.96	5.18	5.52	5.81	6.11	7.38	8.73
400	120	4.57	4.68	4.87	5.09	5.32	5.57	5.95	6.28	6.62	8.05	9.59
	140	4.81	4.94	5.16	5.40	5.66	5.93	6.35	6.72	7.09	8.69	10.41
	10	2.43	2.42	2.47	2.54	2.63	2.71	2.85	2.96	3.08	3.54	3.99
	20	2.89	2.89	2.96	3.05	3.15	3.26	3.43	3.57	3.71	4.28	4.85
	40	3.50	3.53	3.62	3.74	3.88	4.02	4.23	4.42	4.60	5.36	6.13
	60	3.95	4.00	4.12	4.27	4.43	4.59	4.85	5.08	5.30	6.23	7.19
	80	4.32	4.39	4.53	4.71	4.89	5.09	5.39	5.64	5.91	7.00	8.15
600	100	4.65	4.73	4.90	5.09	5.30	5.52	5.87	6.16	6.46	7.71	9.04
	120	4.93	5.04	5.23	5.45	5.68	5.93	6.31	6.64	6.97	8.38	9.89
	140	5.20	5.32	5.53	5.77	6.03	6.30	6.72	7.09	7.46	9.02	10.71
	10	2.67	2.66	2.72	2.79	2.88	2.97	3.12	3.24	3.36	3.85	4.33
	20	3.20	3.20	3.28	3.37	3.48	3.59	3.77	3.92	4.07	4.67	5.27
	40	3.90	3.93	4.03	4.15	4.29	4.44	4.67	4.86	5.05	5.84	6.63
	60	4.42	4.46	4.58	4.74	4.91	5.08	5.35	5.58	5.81	6.76	7.74
800	80	4.84	4.90	5.05	5.23	5.42	5.62	5.93	6.19	6.46	7.57	8.71
	100	5.20	5.28	5.45	5.65	5.87	6.10	6.44	6.74	7.04	8.30	9.61
	120	5.53	5.63	5.82	6.04	6.28	6.53	6.92	7.25	7.58	8.98	10.47
	140	5.83	5.94	6.15	6.40	6.66	6.93	7.35	7.72	8.09	9.63	11.28
	10	2.86	2.85	2.91	2.99	3.09	3.18	3.33	3.46	3.59	4.10	4.60
	20	3.45	3.45	3.53	3.63	3.75	3.86	4.05	4.21	4.36	4.99	5.61
	40	4.23	4.25	4.35	4.49	4.63	4.79	5.02	5.22	5.43	6.24	7.06
	60	4.79	4.83	4.96	5.12	5.30	5.48	5.76	6.00	6.24	7.21	8.20
	80	5.25	5.31	5.47	5.65	5.85	6.06	6.38	6.65	6.93	8.05	9.21
	100	5.65	5.73	5.91	6.11	6.33	6.57	6.92	7.23	7.54	8.81	10.13
	120	6.01	6.11	6.30	6.53	6.77	7.03	7.42	7.76	8.10	9.51	10.99
	140	6.34	6.45	6.66	6.91	7.18	7.46	7.88	8.25	8.63	10.17	11.81

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 44.0 Ft (RADIUS = 31.1 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
			TIME TO ACTUATE HEAT DETECTOR, MINUTES										
(Ft*s) ^{1/2}	°F		4	8	12	16	20	24	30	35	40	60	80
0	10		1.67	1.75	1.87	2.00	2.14	2.28	2.49	2.67	2.85	3.57	4.31
	20		1.96	2.13	2.31	2.51	2.71	2.91	3.21	3.46	3.71	4.74	5.79
	40		2.46	2.76	3.06	3.37	3.67	3.97	4.42	4.79	5.17	6.71	8.29
	60		2.90	3.32	3.72	4.12	4.51	4.90	5.48	5.96	6.45	8.43	10.47
	80		3.30	3.83	4.33	4.81	5.28	5.75	6.45	7.04	7.63	10.02	12.47
	100		3.68	4.31	4.89	5.45	6.01	6.55	7.37	8.05	8.73	11.50	14.36
	120		4.04	4.77	5.43	6.07	6.69	7.31	8.24	9.00	9.78	12.92	16.15
25	140		4.38	5.21	5.95	6.66	7.36	8.04	9.07	9.92	10.78	14.27	17.86
	10		2.13	2.15	2.22	2.32	2.43	2.55	2.74	2.90	3.06	3.75	4.46
	20		2.47	2.53	2.66	2.81	2.98	3.15	3.43	3.66	3.90	4.89	5.92
	40		2.97	3.14	3.37	3.63	3.90	4.18	4.60	4.96	5.33	6.84	8.39
	60		3.39	3.67	4.00	4.36	4.72	5.09	5.65	6.12	6.60	8.55	10.57
	80		3.77	4.16	4.59	5.03	5.48	5.93	6.61	7.18	7.76	10.12	12.56
	100		4.13	4.62	5.14	5.67	6.19	6.72	7.51	8.18	8.86	11.60	14.44
50	120		4.47	5.06	5.67	6.27	6.87	7.47	8.38	9.13	9.90	13.01	16.23
	140		4.80	5.49	6.18	6.86	7.53	8.20	9.21	10.05	10.90	14.36	17.94
	10		2.36	2.36	2.44	2.54	2.64	2.76	2.94	3.10	3.26	3.92	4.61
	20		2.75	2.79	2.91	3.05	3.21	3.37	3.63	3.85	4.08	5.04	6.05
	40		3.31	3.44	3.64	3.87	4.12	4.38	4.78	5.13	5.49	6.96	8.50
	60		3.76	3.97	4.27	4.59	4.92	5.27	5.81	6.27	6.74	8.66	10.66
	80		4.15	4.46	4.84	5.25	5.67	6.10	6.76	7.32	7.89	10.23	12.66
100	100		4.51	4.92	5.38	5.87	6.38	6.89	7.66	8.32	8.98	11.70	14.53
	120		4.86	5.35	5.90	6.47	7.05	7.63	8.52	9.26	10.02	13.11	16.31
	140		5.18	5.77	6.40	7.05	7.70	8.35	9.34	10.17	11.01	14.46	18.02
	10		2.66	2.66	2.73	2.83	2.94	3.06	3.24	3.40	3.56	4.21	4.88
	20		3.13	3.16	3.27	3.41	3.56	3.72	3.97	4.18	4.40	5.32	6.30
	40		3.78	3.88	4.07	4.28	4.51	4.75	5.13	5.45	5.79	7.21	8.71
	60		4.29	4.46	4.71	5.00	5.31	5.63	6.14	6.57	7.02	8.89	10.86
150	80		4.72	4.97	5.29	5.66	6.04	6.45	7.07	7.61	8.16	10.44	12.84
	100		5.11	5.43	5.83	6.27	6.74	7.21	7.95	8.59	9.23	11.90	14.70
	120		5.48	5.87	6.35	6.86	7.40	7.95	8.80	9.52	10.26	13.30	16.47
	140		5.82	6.29	6.84	7.43	8.03	8.66	9.61	10.42	11.25	14.64	18.18
	10		2.87	2.87	2.95	3.05	3.16	3.28	3.47	3.63	3.79	4.45	5.12
	20		3.40	3.44	3.55	3.68	3.83	3.99	4.24	4.46	4.67	5.58	6.53
	40		4.13	4.22	4.40	4.61	4.83	5.06	5.43	5.75	6.07	7.45	8.92
	60		4.69	4.84	5.08	5.35	5.65	5.96	6.44	6.86	7.29	9.11	11.05
	80		5.16	5.37	5.68	6.02	6.39	6.77	7.37	7.88	8.41	10.65	13.01
	100		5.58	5.86	6.23	6.64	7.07	7.53	8.24	8.85	9.48	12.10	14.87
	120		5.96	6.31	6.75	7.22	7.73	8.26	9.07	9.78	10.49	13.49	16.64
	140		6.32	6.73	7.24	7.79	8.36	8.96	9.88	10.67	11.47	14.82	18.33

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 44.0 Ft (RADIUS = 31.1 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		°F	4	8	12	16	20	24	30	35	40	60	80
200	(Ft*s) ^{1/2}												
	10		3.05	3.05	3.13	3.23	3.34	3.47	3.66	3.82	3.98	4.65	5.33
	20		3.63	3.66	3.77	3.91	4.06	4.22	4.47	4.69	4.91	5.81	6.75
	40		4.42	4.50	4.68	4.88	5.10	5.34	5.70	6.01	6.33	7.68	9.13
	60		5.02	5.16	5.39	5.66	5.95	6.25	6.72	7.13	7.55	9.33	11.24
	80		5.52	5.72	6.01	6.34	6.70	7.07	7.65	8.15	8.67	10.86	13.19
	100		5.97	6.22	6.58	6.97	7.39	7.83	8.51	9.11	9.72	12.30	15.04
300	120		6.37	6.69	7.10	7.56	8.04	8.55	9.34	10.03	10.73	13.68	16.80
	140		6.75	7.12	7.60	8.12	8.67	9.25	10.14	10.91	11.70	15.01	18.44
	10		3.33	3.33	3.41	3.52	3.64	3.77	3.97	4.13	4.30	4.99	5.68
	20		3.99	4.02	4.13	4.28	4.43	4.60	4.86	5.08	5.30	6.21	7.15
	40		4.88	4.96	5.14	5.34	5.56	5.80	6.16	6.47	6.79	8.12	9.53
	60		5.55	5.68	5.91	6.17	6.46	6.75	7.21	7.61	8.02	9.75	11.61
	80		6.11	6.29	6.57	6.89	7.24	7.59	8.16	8.64	9.14	11.26	13.54
400	100		6.60	6.83	7.17	7.54	7.95	8.37	9.03	9.60	10.19	12.69	15.37
	120		7.04	7.33	7.72	8.15	8.61	9.10	9.85	10.51	11.19	14.05	17.12
	140		7.45	7.79	8.23	8.72	9.25	9.79	10.65	11.38	12.15	15.37	18.80
	10		3.56	3.56	3.64	3.75	3.88	4.01	4.22	4.39	4.57	5.28	5.98
	20		4.29	4.31	4.43	4.58	4.74	4.91	5.17	5.40	5.63	6.56	7.50
	40		5.26	5.34	5.51	5.72	5.95	6.18	6.55	6.86	7.18	8.50	9.90
	60		5.99	6.11	6.34	6.60	6.89	7.18	7.64	8.04	8.45	10.15	11.97
600	80		6.59	6.76	7.04	7.36	7.70	8.05	8.61	9.08	9.58	11.65	13.89
	100		7.12	7.34	7.67	8.04	8.43	8.85	9.49	10.05	10.63	13.07	15.70
	120		7.60	7.86	8.24	8.66	9.11	9.59	10.32	10.96	11.62	14.42	17.44
	140		8.04	8.35	8.78	9.25	9.76	10.29	11.12	11.84	12.58	15.73	19.11
	10		3.93	3.93	4.02	4.14	4.27	4.41	4.63	4.81	4.99	5.74	6.48
	20		4.76	4.79	4.91	5.06	5.24	5.41	5.69	5.93	6.17	7.13	8.10
	40		5.87	5.94	6.12	6.34	6.57	6.82	7.19	7.51	7.84	9.18	10.57
800	60		6.70	6.81	7.04	7.31	7.60	7.90	8.37	8.76	9.17	10.87	12.66
	80		7.38	7.53	7.81	8.13	8.47	8.83	9.38	9.86	10.34	12.38	14.56
	100		7.97	8.17	8.49	8.86	9.25	9.66	10.30	10.85	11.41	13.79	16.35
	120		8.50	8.74	9.11	9.53	9.97	10.43	11.16	11.78	12.42	15.14	18.07
	140		8.98	9.27	9.68	10.15	10.64	11.16	11.97	12.66	13.38	16.43	19.72
	10		4.23	4.23	4.32	4.44	4.58	4.73	4.96	5.15	5.34	6.12	6.88
	20		5.15	5.17	5.30	5.46	5.64	5.83	6.12	6.36	6.61	7.60	8.60
	40		6.37	6.44	6.62	6.84	7.08	7.34	7.73	8.06	8.39	9.76	11.16
	60		7.27	7.38	7.61	7.89	8.18	8.49	8.97	9.38	9.79	11.49	13.28
	80		8.01	8.16	8.44	8.77	9.11	9.47	10.03	10.51	11.00	13.04	15.19
	100		8.66	8.85	9.17	9.54	9.94	10.35	10.99	11.54	12.10	14.46	16.98
	120		9.23	9.46	9.83	10.25	10.69	11.16	11.88	12.50	13.13	15.80	18.68
	140		9.76	10.03	10.44	10.90	11.40	11.91	12.71	13.40	14.10	17.09	20.33

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 44.0 Ft (RADIUS = 31.1 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
0 (Ft*s) ^{1/2}	°F											
	10	2.50	2.68	2.91	3.15	3.39	3.63	4.00	4.31	4.62	5.88	7.17
	20	3.09	3.44	3.80	4.17	4.53	4.89	5.44	5.90	6.36	8.22	10.13
	40	4.09	4.71	5.30	5.88	6.45	7.01	7.86	8.56	9.27	12.15	15.11
	60	4.96	5.83	6.62	7.38	8.13	8.87	9.98	10.90	11.83	15.60	19.48
	80	5.76	6.85	7.83	8.76	9.68	10.58	11.93	13.05	14.18	18.77	23.49
	100	6.52	7.81	8.96	10.06	11.13	12.18	13.76	15.07	16.39	21.74	27.26
	120	7.23	8.72	10.04	11.29	12.51	13.71	15.50	16.99	18.48	24.57	30.84
25	140	7.92	9.60	11.07	12.47	13.83	15.17	17.16	18.83	20.49	27.28	34.22
	10	3.09	3.16	3.32	3.51	3.71	3.92	4.26	4.55	4.84	6.06	7.32
	20	3.69	3.89	4.17	4.48	4.81	5.14	5.66	6.10	6.54	8.37	10.26
	40	4.64	5.10	5.61	6.15	6.68	7.22	8.05	8.74	9.43	12.28	15.22
	60	5.47	6.18	6.90	7.62	8.34	9.06	10.15	11.06	11.98	15.72	19.58
	80	6.25	7.18	8.09	8.99	9.87	10.76	12.09	13.20	14.32	18.87	23.58
	100	6.98	8.12	9.21	10.27	11.31	12.35	13.91	15.21	16.51	21.84	27.34
	120	7.67	9.02	10.28	11.49	12.68	13.87	15.64	17.12	18.60	24.66	30.92
50	140	8.34	9.89	11.30	12.67	14.00	15.32	17.30	18.95	20.61	27.37	34.35
	10	3.43	3.48	3.62	3.79	3.98	4.19	4.50	4.78	5.06	6.24	7.47
	20	4.09	4.24	4.49	4.77	5.07	5.38	5.88	6.30	6.73	8.52	10.39
	40	5.10	5.46	5.91	6.40	6.91	7.43	8.23	8.91	9.59	12.41	15.33
	60	5.94	6.52	7.18	7.86	8.55	9.25	10.32	11.21	12.12	15.83	19.68
	80	6.70	7.50	8.35	9.21	10.07	10.94	12.24	13.34	14.45	18.98	23.67
	100	7.42	8.43	9.46	10.48	11.50	12.52	14.05	15.34	16.64	21.94	27.43
	120	8.10	9.32	10.51	11.69	12.86	14.03	15.78	17.25	18.73	24.76	31.00
100	140	8.76	10.17	11.53	12.86	14.17	15.48	17.44	19.08	20.73	27.46	34.43
	10	3.88	3.92	4.05	4.22	4.40	4.60	4.91	5.17	5.44	6.57	7.77
	20	4.66	4.78	4.99	5.25	5.53	5.82	6.28	6.68	7.09	8.82	10.64
	40	5.78	6.06	6.45	6.89	7.36	7.84	8.59	9.24	9.90	12.66	15.54
	60	6.67	7.14	7.71	8.32	8.97	9.63	10.65	11.52	12.40	16.06	19.87
	80	7.46	8.11	8.86	9.64	10.46	11.29	12.55	13.63	14.71	19.19	23.85
	100	8.19	9.02	9.94	10.90	11.87	12.85	14.35	15.61	16.89	22.14	27.60
	120	8.88	9.89	10.98	12.09	13.22	14.35	16.06	17.51	18.97	24.95	31.16
150	140	9.53	10.73	11.98	13.24	14.51	15.78	17.71	19.33	20.96	27.65	34.59
	10	4.21	4.24	4.37	4.54	4.73	4.93	5.23	5.49	5.76	6.88	8.05
	20	5.07	5.18	5.39	5.64	5.91	6.20	6.64	7.03	7.43	9.10	10.89
	40	6.30	6.55	6.91	7.32	7.76	8.22	8.95	9.57	10.21	12.91	15.76
	60	7.25	7.66	8.18	8.75	9.36	9.99	10.98	11.82	12.69	16.28	20.06
	80	8.08	8.65	9.33	10.07	10.84	11.63	12.86	13.91	14.98	19.40	24.03
	100	8.84	9.56	10.41	11.30	12.23	13.18	14.64	15.88	17.14	22.34	27.77
	120	9.54	10.43	11.43	12.48	13.56	14.66	16.34	17.76	19.21	25.14	31.33
140	10.20	11.26	12.42	13.62	14.85	16.09	17.98	19.57	21.19	27.83	34.74	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 44.0 Ft (RADIUS = 31.1 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	(Ft*s) ^{1/2}	CEILING HEIGHT, Ft											
			°F	4	8	12	16	20	24	30	35	40	60	80
200	10	4.48	4.51	4.64	4.81	5.00	5.20	5.51	5.77	6.04	7.15	8.31		
	20	5.42	5.51	5.72	5.97	6.24	6.52	6.96	7.34	7.73	9.38	11.13		
	40	6.73	6.96	7.31	7.71	8.13	8.58	9.28	9.89	10.51	13.15	15.97		
	60	7.74	8.11	8.60	9.15	9.74	10.34	11.30	12.12	12.96	16.51	20.25		
	80	8.61	9.12	9.76	10.46	11.20	11.97	13.17	14.19	15.24	19.61	24.21		
	100	9.39	10.05	10.84	11.69	12.59	13.51	14.93	16.15	17.39	22.54	27.94		
	120	10.12	10.93	11.87	12.87	13.91	14.98	16.62	18.02	19.44	25.33	31.49		
300	140	10.80	11.76	12.85	14.00	15.18	16.39	18.25	19.82	21.42	28.01	34.90		
	10	4.91	4.94	5.07	5.25	5.44	5.65	5.96	6.23	6.51	7.63	8.79		
	20	5.97	6.06	6.26	6.51	6.79	7.07	7.51	7.89	8.28	9.89	11.61		
	40	7.43	7.64	7.97	8.36	8.77	9.21	9.89	10.47	11.08	13.64	16.39		
	60	8.54	8.87	9.33	9.86	10.41	10.99	11.90	12.69	13.51	16.95	20.64		
	80	9.48	9.94	10.53	11.19	11.89	12.62	13.76	14.74	15.76	20.03	24.57		
	100	10.32	10.90	11.63	12.43	13.27	14.14	15.50	16.68	17.88	22.94	28.28		
400	120	11.09	11.80	12.66	13.60	14.58	15.59	17.17	18.53	19.92	25.71	31.81		
	140	11.81	12.65	13.65	14.72	15.84	16.99	18.78	20.31	21.88	28.38	35.21		
	10	5.26	5.28	5.43	5.61	5.81	6.02	6.34	6.62	6.90	8.04	9.20		
	20	6.42	6.50	6.71	6.96	7.24	7.53	7.97	8.35	8.74	10.36	12.05		
	40	8.00	8.20	8.53	8.91	9.32	9.75	10.42	11.00	11.59	14.10	16.80		
	60	9.20	9.50	9.96	10.47	11.01	11.58	12.46	13.23	14.03	17.39	21.02		
	80	10.20	10.62	11.20	11.83	12.51	13.21	14.32	15.27	16.26	20.45	24.93		
600	100	11.09	11.63	12.32	13.09	13.89	14.74	16.05	17.19	18.37	23.33	28.62		
	120	11.91	12.56	13.38	14.27	15.20	16.18	17.71	19.03	20.39	26.09	32.14		
	140	12.66	13.44	14.37	15.39	16.46	17.57	19.31	20.80	22.33	28.75	35.52		
	10	5.82	5.85	6.00	6.19	6.40	6.62	6.96	7.25	7.54	8.72	9.91		
	20	7.15	7.23	7.44	7.70	7.98	8.28	8.74	9.13	9.53	11.16	12.85		
	40	8.93	9.11	9.44	9.83	10.24	10.67	11.34	11.92	12.50	14.97	17.60		
	60	10.27	10.55	10.99	11.49	12.03	12.58	13.45	14.20	14.97	18.24	21.77		
800	80	11.38	11.77	12.32	12.93	13.59	14.27	15.34	16.26	17.21	21.26	25.63		
	100	12.36	12.85	13.51	14.24	15.01	15.82	17.08	18.18	19.30	24.11	29.29		
	120	13.25	13.84	14.61	15.45	16.34	17.27	18.73	20.00	21.30	26.84	32.78		
	140	14.07	14.76	15.64	16.60	17.61	18.66	20.32	21.75	23.22	29.47	36.14		
	10	6.28	6.31	6.46	6.66	6.88	7.10	7.46	7.76	8.06	9.28	10.51		
	20	7.74	7.81	8.03	8.30	8.59	8.90	9.37	9.78	10.18	11.85	13.55		
	40	9.69	9.86	10.20	10.59	11.01	11.44	12.12	12.70	13.29	15.74	18.34		
	60	11.14	11.41	11.85	12.35	12.89	13.44	14.31	15.06	15.82	19.04	22.49		
	80	12.35	12.71	13.25	13.86	14.51	15.19	16.24	17.15	18.08	22.04	26.33		
	100	13.40	13.86	14.50	15.22	15.98	16.77	18.01	19.08	20.18	24.87	29.95		
	120	14.36	14.91	15.65	16.47	17.35	18.25	19.67	20.90	22.17	27.58	33.42		
	140	15.23	15.88	16.72	17.65	18.63	19.66	21.26	22.65	24.08	30.19	36.70		

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 44.0 Ft (RADIUS = 31.1 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	(Ft*s) ^{1/2}	°F	CEILING HEIGHT, Ft										
				4	8	12	16	20	24	30	35	40	60	80
0	10	3.88	4.30	4.73	5.17	5.61	6.05	6.51	6.98	7.51	8.05	8.61	10.10	12.42
	20	5.07	5.81	6.52	7.21	7.89	8.57	9.25	9.93	10.61	11.29	11.97	14.77	18.34
	40	7.06	8.35	9.52	10.64	11.73	12.81	13.89	14.97	16.05	17.13	18.21	22.64	28.30
	60	8.81	10.58	12.15	13.64	15.09	16.53	17.98	19.42	20.87	22.31	23.75	29.53	37.04
	80	10.42	12.63	14.57	16.40	18.18	19.95	21.72	23.50	25.27	27.04	28.81	35.87	45.06
	100	11.93	14.55	16.83	18.99	21.09	23.15	25.20	27.25	29.30	31.35	33.40	41.81	52.59
	120	13.36	16.37	18.99	21.45	23.84	26.20	28.56	30.92	33.28	35.64	38.00	47.46	59.75
	140	14.73	18.13	21.06	23.82	26.49	29.12	31.75	34.38	36.99	39.60	42.21	52.88	66.62
25	10	4.60	4.83	5.16	5.54	5.94	6.35	6.75	7.15	7.55	7.95	8.35	10.28	12.57
	20	5.73	6.27	6.89	7.52	8.17	8.82	9.47	10.12	10.77	11.42	12.07	14.92	18.47
	40	7.64	8.74	9.83	10.90	11.96	13.03	14.09	15.16	16.22	17.29	18.35	22.77	28.41
	60	9.34	10.93	12.43	13.88	15.31	16.72	18.13	19.54	20.95	22.36	23.77	29.65	37.14
	80	10.91	12.96	14.83	16.62	18.38	20.12	21.87	23.61	25.35	27.09	28.83	35.97	45.15
	100	12.39	14.86	17.08	19.20	21.27	23.32	25.37	27.42	29.47	31.52	33.57	41.91	52.68
	120	13.80	16.67	19.23	21.66	24.02	26.36	28.71	31.05	33.40	35.75	38.10	47.56	59.83
	140	15.16	18.41	21.29	24.01	26.66	29.28	31.89	34.50	37.11	39.72	42.33	52.98	66.70
50	10	5.08	5.25	5.55	5.89	6.25	6.64	7.03	7.42	7.81	8.20	8.59	10.45	12.72
	20	6.27	6.70	7.24	7.83	8.44	9.07	9.70	10.33	10.96	11.59	12.22	15.07	18.60
	40	8.18	9.13	10.14	11.17	12.20	13.24	14.28	15.32	16.36	17.40	18.44	22.89	28.52
	60	9.84	11.29	12.71	14.12	15.52	16.91	18.31	19.71	21.11	22.51	23.91	29.76	37.23
	80	11.39	13.29	15.09	16.85	18.58	20.30	22.02	23.74	25.46	27.18	28.90	36.08	45.24
	100	12.85	15.17	17.33	19.41	21.46	23.49	25.52	27.55	29.58	31.61	33.64	42.01	52.76
	120	14.24	16.97	19.47	21.86	24.20	26.52	28.85	31.17	33.50	35.82	38.15	47.66	59.92
	140	15.58	18.70	21.52	24.21	26.83	29.43	32.03	34.63	37.23	39.83	42.43	53.07	66.78
100	10	5.75	5.88	6.15	6.46	6.80	7.16	7.52	7.88	8.24	8.60	8.96	10.80	13.02
	20	7.08	7.41	7.88	8.41	8.97	9.56	10.14	10.72	11.30	11.88	12.46	15.37	18.85
	40	9.09	9.85	10.74	11.68	12.66	13.65	14.63	15.61	16.59	17.57	18.55	23.14	28.73
	60	10.77	11.97	13.27	14.60	15.94	17.29	18.62	19.95	21.28	22.61	23.94	29.99	37.42
	80	12.29	13.93	15.61	17.29	18.97	20.66	22.34	24.02	25.70	27.38	29.06	36.29	45.42
	100	13.73	15.79	17.83	19.84	21.83	23.82	25.81	27.80	29.79	31.78	33.77	42.21	52.93
	120	15.09	17.56	19.94	22.26	24.56	26.84	29.12	31.40	33.68	35.96	38.24	47.85	60.08
	140	16.41	19.27	21.97	24.59	27.18	29.74	32.31	34.88	37.45	39.99	42.56	53.25	66.93
150	10	6.25	6.36	6.62	6.92	7.25	7.60	7.94	8.28	8.62	8.96	9.30	11.14	13.32
	20	7.70	7.99	8.43	8.92	9.46	10.01	10.55	11.09	11.63	12.17	12.71	15.67	19.10
	40	9.82	10.49	11.30	12.19	13.11	14.07	15.04	16.00	16.96	17.92	18.88	23.40	28.95
	60	11.56	12.61	13.81	15.06	16.35	17.67	18.98	20.29	21.60	22.91	24.22	30.22	37.62
	80	13.10	14.55	16.12	17.73	19.36	21.01	22.64	24.27	25.90	27.53	29.16	36.50	45.60
	100	14.54	16.39	18.31	20.25	22.20	24.16	26.11	28.06	29.99	31.92	33.85	42.41	53.11
	120	15.90	18.14	20.41	22.66	24.91	27.16	29.41	31.66	33.90	36.15	38.40	48.04	60.24
	140	17.20	19.83	22.43	24.98	27.52	30.05	32.58	35.11	37.64	40.17	42.70	53.44	67.09

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 44.0 Ft (RADIUS = 31.1 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
200	°F												
	10	6.65	6.76	7.01	7.31	7.64	7.99	8.53	8.99	9.47	11.47	13.61	
	20	8.21	8.48	8.90	9.38	9.89	10.43	11.28	12.01	12.77	15.96	19.36	
	40	10.45	11.05	11.82	12.66	13.55	14.47	15.90	17.13	18.39	23.65	29.16	
	60	12.24	13.20	14.32	15.52	16.76	18.04	20.01	21.69	23.39	30.45	37.82	
	80	13.82	15.14	16.62	18.16	19.75	21.36	23.82	25.90	28.02	36.72	45.78	
	100	15.28	16.97	18.79	20.67	22.57	24.49	27.41	29.88	32.37	42.61	53.28	
	120	16.64	18.71	20.87	23.06	25.26	27.48	30.84	33.66	36.52	48.23	60.41	
	140	17.95	20.39	22.87	25.36	27.86	30.36	34.13	37.30	40.50	53.62	67.25	
	300	10	7.31	7.41	7.66	7.96	8.29	8.64	9.18	9.64	10.11	12.09	14.17
20		9.04	9.29	9.69	10.16	10.66	11.18	12.00	12.71	13.44	16.54	19.85	
40		11.49	12.02	12.73	13.52	14.36	15.24	16.61	17.79	19.01	24.14	29.59	
60		13.40	14.24	15.27	16.38	17.56	18.77	20.67	22.29	23.96	30.90	38.20	
80		15.06	16.22	17.57	19.01	20.51	22.05	24.44	26.47	28.54	37.14	46.15	
100		16.57	18.05	19.72	21.48	23.29	25.15	28.00	30.41	32.87	43.02	53.62	
120		17.97	19.79	21.78	23.85	25.96	28.11	31.40	34.18	37.00	48.61	60.73	
140		19.30	21.45	23.76	26.12	28.53	30.97	34.67	37.80	40.97	53.99	67.56	
400		10	7.85	7.94	8.19	8.50	8.83	9.18	9.73	10.19	10.67	12.64	14.70
		20	9.73	9.95	10.35	10.81	11.31	11.83	12.64	13.34	14.06	17.09	20.35
	40	12.34	12.84	13.52	14.29	15.10	15.94	17.27	18.42	19.61	24.64	30.01	
	60	14.37	15.14	16.12	17.18	18.30	19.48	21.31	22.89	24.51	31.35	38.59	
	80	16.11	17.17	18.44	19.80	21.24	22.73	25.04	27.03	29.07	37.56	46.50	
	100	17.68	19.03	20.60	22.27	24.01	25.80	28.58	30.95	33.37	43.41	53.96	
	120	19.12	20.78	22.64	24.61	26.65	28.74	31.96	34.69	37.48	49.00	61.06	
	140	20.49	22.45	24.61	26.87	29.20	31.57	35.21	38.30	41.43	54.36	67.88	
	600	10	8.71	8.80	9.06	9.37	9.72	10.08	10.64	11.12	11.60	13.59	15.65
		20	10.83	11.04	11.44	11.90	12.40	12.92	13.73	14.43	15.14	18.12	21.29
40		13.75	14.20	14.86	15.59	16.38	17.20	18.48	19.59	20.74	25.60	30.85	
60		15.97	16.66	17.58	18.59	19.66	20.77	22.52	24.04	25.60	32.24	39.35	
80		17.85	18.80	19.97	21.26	22.61	24.02	26.23	28.13	30.10	38.40	47.22	
100		19.53	20.73	22.17	23.73	25.36	27.07	29.72	32.01	34.35	44.21	54.64	
120		21.07	22.53	24.24	26.07	27.98	29.97	33.06	35.71	38.42	49.76	61.71	
140		22.51	24.23	26.21	28.31	30.51	32.77	36.28	39.28	42.34	55.09	68.50	
800		10	9.41	9.50	9.76	10.09	10.44	10.82	11.39	11.88	12.38	14.41	16.48
		20	11.73	11.93	12.33	12.81	13.31	13.84	14.66	15.36	16.07	19.04	22.18
	40	14.90	15.32	15.97	16.70	17.48	18.29	19.56	20.65	21.77	26.53	31.68	
	60	17.29	17.94	18.82	19.81	20.85	21.94	23.64	25.12	26.64	33.12	40.11	
	80	19.30	20.18	21.30	22.54	23.85	25.21	27.35	29.20	31.11	39.22	47.93	
	100	21.08	22.19	23.56	25.05	26.62	28.26	30.82	33.04	35.32	45.00	55.31	
	120	22.71	24.05	25.66	27.41	29.24	31.15	34.13	36.71	39.36	50.51	62.35	
	140	24.21	25.80	27.66	29.66	31.75	33.93	37.33	40.25	43.25	55.82	69.13	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 46.0 Ft (RADIUS = 32.5 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE °F	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
0 (Ft*s) ^{1/2}	10	1.20	1.23	1.29	1.36	1.44	1.53	1.65	1.76	1.87	2.31	2.75
	20	1.35	1.42	1.52	1.63	1.74	1.85	2.02	2.17	2.31	2.90	3.50
	40	1.61	1.75	1.91	2.07	2.23	2.40	2.65	2.85	3.06	3.91	4.77
	60	1.84	2.04	2.25	2.46	2.67	2.88	3.19	3.45	3.72	4.79	5.88
	80	2.05	2.31	2.56	2.82	3.07	3.32	3.69	4.01	4.32	5.60	6.90
	100	2.25	2.56	2.86	3.15	3.44	3.73	4.16	4.52	4.89	6.35	7.86
	120	2.43	2.80	3.14	3.47	3.80	4.12	4.61	5.02	5.42	7.08	8.77
25	140	2.61	3.02	3.41	3.78	4.14	4.50	5.04	5.49	5.94	7.77	9.64
	10	1.55	1.54	1.58	1.64	1.70	1.77	1.88	1.98	2.08	2.48	2.90
	20	1.75	1.76	1.82	1.90	1.99	2.09	2.24	2.37	2.50	3.05	3.63
	40	2.04	2.10	2.20	2.33	2.46	2.61	2.83	3.03	3.22	4.03	4.88
	60	2.28	2.38	2.53	2.70	2.88	3.07	3.36	3.61	3.86	4.90	5.98
	80	2.48	2.63	2.82	3.04	3.27	3.50	3.85	4.15	4.46	5.70	6.99
	100	2.67	2.87	3.11	3.36	3.63	3.90	4.31	4.66	5.01	6.46	7.95
50	120	2.85	3.09	3.38	3.67	3.98	4.29	4.75	5.15	5.55	7.17	8.85
	140	3.02	3.31	3.64	3.97	4.31	4.66	5.18	5.62	6.06	7.86	9.72
	10	1.71	1.69	1.73	1.79	1.86	1.93	2.04	2.13	2.23	2.63	3.04
	20	1.95	1.95	2.01	2.09	2.17	2.27	2.41	2.54	2.66	3.20	3.76
	40	2.29	2.33	2.42	2.54	2.66	2.80	3.01	3.19	3.38	4.16	4.99
	60	2.55	2.62	2.76	2.91	3.08	3.25	3.53	3.76	4.00	5.02	6.08
	80	2.78	2.89	3.06	3.25	3.46	3.67	4.01	4.29	4.59	5.81	7.09
100	100	2.98	3.13	3.34	3.57	3.81	4.07	4.46	4.80	5.14	6.56	8.03
	120	3.17	3.36	3.60	3.87	4.15	4.45	4.90	5.28	5.67	7.27	8.94
	140	3.34	3.57	3.86	4.16	4.48	4.81	5.31	5.74	6.17	7.95	9.80
	10	1.91	1.89	1.93	1.99	2.06	2.14	2.25	2.35	2.45	2.85	3.26
	20	2.21	2.21	2.27	2.34	2.43	2.52	2.67	2.79	2.92	3.45	3.99
	40	2.62	2.65	2.73	2.84	2.97	3.10	3.30	3.47	3.65	4.40	5.20
	60	2.93	2.98	3.10	3.25	3.40	3.57	3.82	4.05	4.27	5.24	6.27
150	80	3.19	3.27	3.42	3.60	3.79	3.99	4.30	4.57	4.85	6.02	7.27
	100	3.42	3.53	3.71	3.92	4.15	4.38	4.75	5.06	5.39	6.76	8.21
	120	3.63	3.77	3.99	4.23	4.48	4.75	5.17	5.53	5.91	7.46	9.10
	140	3.82	4.00	4.25	4.52	4.81	5.11	5.58	5.99	6.40	8.14	9.96
	10	2.05	2.04	2.08	2.14	2.21	2.29	2.41	2.51	2.61	3.03	3.44
	20	2.40	2.39	2.45	2.53	2.62	2.72	2.86	2.99	3.12	3.65	4.19
	40	2.86	2.88	2.97	3.08	3.20	3.33	3.53	3.71	3.88	4.62	5.40
	60	3.20	3.25	3.37	3.51	3.66	3.82	4.07	4.29	4.52	5.46	6.46
	80	3.49	3.57	3.71	3.88	4.06	4.26	4.56	4.82	5.09	6.23	7.44
	100	3.74	3.85	4.02	4.22	4.43	4.65	5.01	5.31	5.63	6.96	8.38
	120	3.97	4.10	4.30	4.53	4.77	5.03	5.43	5.78	6.14	7.65	9.26
	140	4.19	4.34	4.57	4.83	5.10	5.39	5.84	6.23	6.63	8.32	10.12

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 46.0 Ft (RADIUS = 32.5 Ft)
 FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft													
		$(Ft \cdot s)^{1/2}$	°F	4	8	12	16	20	24	30	35	40	60	80	
200	10	2.17	2.16	2.20	2.26	2.34	2.41	2.54	2.64	2.75	3.17	3.60			
	20	2.55	2.54	2.60	2.69	2.78	2.88	3.03	3.16	3.29	3.82	4.37			
	40	3.05	3.07	3.16	3.27	3.40	3.53	3.73	3.91	4.08	4.82	5.59			
	60	3.43	3.47	3.59	3.73	3.88	4.04	4.29	4.51	4.73	5.66	6.65			
	80	3.74	3.81	3.95	4.12	4.30	4.49	4.79	5.05	5.31	6.43	7.62			
	100	4.01	4.11	4.27	4.47	4.68	4.90	5.24	5.54	5.85	7.15	8.54			
	120	4.26	4.38	4.57	4.79	5.03	5.28	5.67	6.01	6.36	7.84	9.43			
300	140	4.49	4.63	4.85	5.10	5.36	5.64	6.08	6.46	6.85	8.51	10.28			
	10	2.36	2.35	2.39	2.46	2.54	2.62	2.75	2.85	2.96	3.41	3.85			
	20	2.79	2.79	2.85	2.94	3.03	3.13	3.29	3.43	3.56	4.12	4.67			
	40	3.37	3.39	3.48	3.59	3.72	3.85	4.06	4.24	4.42	5.16	5.93			
	60	3.79	3.83	3.95	4.09	4.25	4.41	4.66	4.88	5.10	6.02	6.99			
	80	4.14	4.21	4.35	4.51	4.70	4.89	5.18	5.44	5.70	6.80	7.96			
	100	4.45	4.53	4.70	4.89	5.10	5.32	5.66	5.95	6.25	7.52	8.87			
400	120	4.72	4.83	5.02	5.23	5.47	5.71	6.10	6.43	6.77	8.20	9.75			
	140	4.98	5.10	5.31	5.56	5.81	6.09	6.51	6.88	7.26	8.86	10.59			
	10	2.52	2.50	2.55	2.62	2.70	2.78	2.91	3.03	3.14	3.60	4.05			
	20	2.99	2.99	3.05	3.14	3.24	3.34	3.51	3.65	3.79	4.36	4.93			
	40	3.62	3.64	3.73	3.85	3.98	4.12	4.33	4.52	4.70	5.46	6.23			
	60	4.09	4.13	4.24	4.39	4.55	4.71	4.97	5.19	5.42	6.34	7.31			
	80	4.47	4.53	4.67	4.84	5.02	5.22	5.52	5.77	6.04	7.13	8.28			
600	100	4.80	4.88	5.05	5.24	5.45	5.67	6.01	6.30	6.60	7.85	9.19			
	120	5.10	5.20	5.39	5.60	5.84	6.08	6.46	6.79	7.13	8.54	10.06			
	140	5.37	5.49	5.70	5.94	6.20	6.47	6.89	7.25	7.63	9.20	10.89			
	10	2.76	2.75	2.80	2.87	2.96	3.05	3.19	3.31	3.43	3.91	4.39			
	20	3.31	3.31	3.37	3.47	3.57	3.69	3.86	4.01	4.16	4.75	5.35			
	40	4.04	4.05	4.15	4.27	4.41	4.55	4.78	4.97	5.16	5.95	6.74			
	60	4.57	4.60	4.72	4.87	5.04	5.21	5.48	5.71	5.94	6.89	7.86			
800	80	5.00	5.06	5.20	5.37	5.56	5.76	6.07	6.34	6.60	7.71	8.85			
	100	5.38	5.45	5.62	5.81	6.03	6.25	6.60	6.90	7.20	8.45	9.77			
	120	5.72	5.81	5.99	6.21	6.45	6.70	7.08	7.41	7.75	9.15	10.64			
	140	6.02	6.13	6.34	6.58	6.84	7.11	7.53	7.90	8.27	9.82	11.47			
	10	2.96	2.95	3.00	3.08	3.17	3.26	3.41	3.54	3.66	4.17	4.67			
	20	3.57	3.56	3.64	3.73	3.85	3.96	4.14	4.30	4.45	5.08	5.70			
	40	4.37	4.38	4.48	4.61	4.76	4.91	5.14	5.34	5.54	6.35	7.17			
	60	4.95	4.99	5.11	5.27	5.44	5.62	5.90	6.13	6.37	7.34	8.33			
	80	5.43	5.48	5.63	5.81	6.01	6.21	6.53	6.80	7.08	8.20	9.36			
	100	5.84	5.91	6.08	6.29	6.51	6.74	7.09	7.40	7.70	8.97	10.29			
	120	6.21	6.30	6.49	6.71	6.96	7.21	7.60	7.94	8.28	9.69	11.17			
	140	6.55	6.65	6.86	7.11	7.37	7.65	8.08	8.44	8.82	10.37	12.00			

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 46.0 Ft (RADIUS = 32.5 Ft)
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX		TEMPERATURE RISE		CEILING HEIGHT, Ft										
(Ft*s) ^{1/2}		°F		4	8	12	16	20	24	30	35	40	60	80
0	10	10	1.73	1.81	1.93	2.06	2.20	2.34	2.55	2.73	2.91	3.13	3.64	4.38
	20		2.04	2.21	2.40	2.59	2.79	2.99	3.29	3.54	3.80	4.07	4.83	5.89
	40		2.56	2.87	3.17	3.48	3.78	4.08	4.54	4.92	5.30	5.67	6.84	8.42
	60		3.02	3.45	3.86	4.25	4.65	5.04	5.63	6.12	6.61	7.10	8.60	10.64
	80		3.44	3.98	4.48	4.97	5.45	5.92	6.63	7.22	7.81	8.40	10.22	12.69
	100		3.83	4.48	5.07	5.64	6.20	6.75	7.57	8.26	8.94	9.62	11.73	14.60
	120		4.20	4.95	5.63	6.28	6.91	7.53	8.46	9.24	10.02	10.80	13.18	16.42
25	140	10	4.56	5.41	6.17	6.89	7.59	8.29	9.32	10.18	11.05	11.92	14.56	18.17
	10		2.21	2.22	2.29	2.39	2.50	2.62	2.81	2.97	3.13	3.32	3.82	4.53
	20		2.56	2.62	2.74	2.90	3.06	3.24	3.51	3.75	3.99	4.28	4.98	6.02
	40		3.08	3.25	3.48	3.74	4.02	4.30	4.72	5.09	5.46	5.83	6.97	8.53
	60		3.52	3.80	4.14	4.50	4.86	5.23	5.80	6.27	6.75	7.23	8.72	10.74
	80		3.91	4.31	4.75	5.19	5.65	6.10	6.79	7.37	7.95	8.53	10.33	12.78
	100		4.29	4.79	5.32	5.85	6.38	6.92	7.72	8.39	9.07	9.75	11.84	14.69
50	120	10	4.64	5.25	5.87	6.48	7.09	7.70	8.61	9.37	10.14	10.91	13.28	16.51
	140		4.99	5.70	6.40	7.08	7.76	8.44	9.46	10.31	11.17	12.04	14.65	18.25
	10		2.45	2.44	2.52	2.61	2.72	2.83	3.01	3.17	3.33	3.50	3.99	4.68
	20		2.85	2.89	3.00	3.14	3.30	3.46	3.72	3.94	4.17	4.40	5.13	6.14
	40		3.43	3.56	3.76	3.99	4.24	4.50	4.91	5.26	5.62	5.98	7.10	8.64
	60		3.89	4.11	4.41	4.73	5.07	5.42	5.97	6.43	6.90	7.37	8.83	10.84
	80		4.30	4.62	5.00	5.42	5.84	6.28	6.95	7.51	8.08	8.65	10.43	12.87
100	100	10	4.68	5.09	5.57	6.06	6.57	7.09	7.87	8.53	9.20	9.87	11.94	14.78
	120		5.04	5.54	6.11	6.68	7.27	7.86	8.75	9.50	10.26	11.02	13.37	16.59
	140		5.38	5.98	6.63	7.28	7.94	8.60	9.60	10.44	11.29	12.14	14.75	18.33
	10		2.75	2.75	2.82	2.91	3.02	3.14	3.32	3.47	3.63	3.79	4.28	4.96
	20		3.24	3.27	3.38	3.51	3.66	3.82	4.07	4.28	4.50	4.72	5.42	6.40
	40		3.92	4.01	4.19	4.41	4.64	4.88	5.26	5.59	5.92	6.25	7.35	8.85
	60		4.44	4.61	4.87	5.15	5.46	5.79	6.30	6.73	7.18	7.63	9.06	11.04
150	80	10	4.89	5.14	5.47	5.83	6.22	6.63	7.26	7.80	8.35	8.90	10.65	13.05
	100		5.30	5.62	6.03	6.47	6.94	7.42	8.17	8.80	9.45	10.10	12.14	14.95
	120		5.67	6.07	6.56	7.08	7.62	8.18	9.04	9.76	10.51	11.26	13.57	16.76
	140		6.03	6.51	7.07	7.66	8.28	8.91	9.87	10.69	11.52	12.37	14.94	18.49
	10		2.98	2.97	3.04	3.14	3.25	3.37	3.55	3.71	3.87	4.03	4.53	5.20
	20		3.52	3.55	3.65	3.79	3.94	4.10	4.35	4.56	4.78	4.99	5.68	6.64
	40		4.28	4.36	4.54	4.74	4.96	5.20	5.57	5.88	6.21	6.54	7.59	9.07
	60	10	4.85	5.00	5.24	5.51	5.81	6.12	6.60	7.02	7.46	7.90	9.29	11.23
	80		5.34	5.55	5.86	6.20	6.57	6.95	7.56	8.08	8.61	9.14	10.86	13.23
	100		5.78	6.05	6.43	6.84	7.28	7.74	8.46	9.07	9.70	10.33	12.34	15.12
	120		6.18	6.52	6.96	7.45	7.96	8.49	9.31	10.02	10.75	11.48	13.76	16.92
	140		6.55	6.96	7.47	8.03	8.61	9.21	10.14	10.94	11.75	12.57	15.12	18.65

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 46.0 Ft (RADIUS = 32.5 Ft)
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft												
		(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60	80
200	10	3.16	3.15	3.22	3.32	3.44	3.56	3.74	3.91	4.07	4.23	4.40	4.73	5.41
	20	3.76	3.78	3.88	4.02	4.17	4.33	4.58	4.80	5.01	5.26	5.51	5.92	6.86
	40	4.57	4.65	4.82	5.02	5.25	5.48	5.84	6.15	6.47	6.83	7.22	7.83	9.28
	60	5.19	5.33	5.56	5.83	6.11	6.42	6.89	7.30	7.72	8.17	8.64	9.31	11.42
	80	5.71	5.91	6.20	6.53	6.89	7.26	7.84	8.35	8.87	9.42	9.95	11.07	13.41
	100	6.17	6.43	6.78	7.18	7.60	8.04	8.74	9.33	9.95	10.58	11.25	12.54	15.29
	120	6.60	6.91	7.33	7.79	8.28	8.79	9.59	10.28	10.98	11.71	12.43	13.95	17.08
300	140	6.99	7.36	7.84	8.37	8.93	9.51	10.41	11.19	11.98	12.81	13.69	15.31	18.81
	10	3.45	3.44	3.51	3.62	3.74	3.86	4.06	4.23	4.40	4.58	4.77	5.08	5.77
	20	4.13	4.15	4.26	4.40	4.55	4.72	4.97	5.19	5.41	5.67	5.94	6.33	7.27
	40	5.05	5.12	5.29	5.49	5.72	5.95	6.31	6.62	6.94	7.29	7.64	8.27	9.68
	60	5.74	5.87	6.09	6.35	6.63	6.93	7.39	7.79	8.20	8.64	9.05	9.94	11.80
	80	6.32	6.49	6.77	7.09	7.44	7.80	8.36	8.85	9.35	9.87	10.42	11.48	13.77
	100	6.83	7.05	7.39	7.77	8.17	8.60	9.26	9.83	10.42	11.04	11.67	12.94	15.63
400	120	7.29	7.57	7.96	8.39	8.86	9.35	10.11	10.77	11.45	12.13	12.87	14.33	17.41
	140	7.71	8.05	8.49	8.99	9.51	10.06	10.92	11.67	12.43	13.28	14.12	15.67	19.12
	10	3.68	3.67	3.75	3.86	3.98	4.11	4.32	4.49	4.66	4.87	5.04	5.37	6.07
	20	4.44	4.45	4.56	4.71	4.87	5.04	5.30	5.52	5.75	6.02	6.26	6.67	7.62
	40	5.44	5.51	5.68	5.88	6.11	6.34	6.71	7.02	7.34	7.69	8.01	8.66	10.06
	60	6.19	6.31	6.53	6.79	7.07	7.37	7.83	8.23	8.63	9.05	9.42	10.34	12.17
	80	6.82	6.98	7.25	7.57	7.91	8.27	8.82	9.30	9.79	10.29	10.87	11.88	14.12
600	100	7.37	7.57	7.90	8.27	8.67	9.08	9.73	10.29	10.87	11.45	12.04	13.32	15.97
	120	7.86	8.12	8.49	8.92	9.37	9.85	10.59	11.23	11.89	12.57	13.28	14.71	17.73
	140	8.31	8.62	9.05	9.53	10.04	10.57	11.40	12.13	12.87	13.69	14.54	16.04	19.44
	10	4.06	4.05	4.14	4.25	4.38	4.52	4.73	4.92	5.10	5.26	5.46	5.84	6.58
	20	4.93	4.94	5.06	5.21	5.38	5.55	5.83	6.06	6.30	6.58	6.86	7.26	8.23
	40	6.07	6.13	6.31	6.52	6.75	6.99	7.37	7.69	8.01	8.35	8.67	9.35	10.74
	60	6.92	7.03	7.25	7.52	7.80	8.10	8.57	8.97	9.38	9.81	10.22	11.07	12.86
800	80	7.63	7.77	8.04	8.36	8.70	9.06	9.61	10.09	10.57	11.04	11.52	12.62	14.80
	100	8.24	8.43	8.75	9.11	9.51	9.92	10.56	11.11	11.67	12.25	12.81	14.06	16.63
	120	8.79	9.02	9.39	9.80	10.25	10.71	11.44	12.06	12.70	13.37	14.04	15.43	18.37
	140	9.29	9.57	9.98	10.45	10.94	11.46	12.27	12.97	13.69	14.42	15.15	16.75	20.05
	10	4.37	4.36	4.45	4.57	4.70	4.85	5.07	5.26	5.46	5.67	5.88	6.23	6.99
	20	5.32	5.33	5.46	5.61	5.79	5.97	6.26	6.50	6.75	7.02	7.26	7.74	8.74
	40	6.59	6.64	6.82	7.04	7.28	7.52	7.91	8.24	8.57	8.91	9.24	9.94	11.34
	60	7.52	7.61	7.84	8.11	8.40	8.71	9.19	9.59	10.00	10.42	10.84	11.71	13.50
	80	8.28	8.42	8.69	9.01	9.36	9.72	10.28	10.76	11.25	11.71	12.25	13.28	15.44
	100	8.95	9.13	9.45	9.81	10.21	10.62	11.26	11.81	12.38	12.94	13.52	14.74	17.26
	120	9.54	9.76	10.13	10.54	10.99	11.45	12.17	12.79	13.43	14.04	14.71	16.11	18.99
	140	10.09	10.35	10.76	11.22	11.71	12.22	13.02	13.71	14.42	15.15	15.88	17.42	20.66

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 46.0 Ft (RADIUS = 32.5 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
0 (Ft*s) ^{1/2}	10	2.60	2.79	3.01	3.25	3.49	3.74	4.11	4.42	4.73	5.99	7.28	
	20	3.22	3.57	3.94	4.30	4.67	5.04	5.59	6.05	6.51	8.38	10.30	
	40	4.25	4.89	5.49	6.08	6.65	7.22	8.07	8.79	9.50	12.40	15.37	
	60	5.17	6.05	6.86	7.63	8.39	9.14	10.26	11.19	12.12	15.92	19.81	
	80	6.00	7.11	8.11	9.06	9.98	10.90	12.26	13.40	14.53	19.15	23.90	
	100	6.79	8.11	9.29	10.40	11.48	12.55	14.14	15.47	16.79	22.18	27.73	
	120	7.54	9.06	10.40	11.67	12.91	14.12	15.93	17.44	18.95	25.07	31.37	
	140	8.25	9.97	11.48	12.90	14.27	15.63	17.65	19.32	21.01	27.84	34.88	
25	10	3.21	3.27	3.43	3.61	3.82	4.03	4.37	4.66	4.95	6.17	7.44	
	20	3.83	4.02	4.31	4.62	4.95	5.29	5.81	6.25	6.70	8.53	10.43	
	40	4.82	5.29	5.81	6.35	6.89	7.44	8.26	8.96	9.66	12.52	15.48	
	60	5.69	6.41	7.14	7.87	8.60	9.33	10.43	11.35	12.27	16.03	19.91	
	80	6.49	7.45	8.38	9.29	10.18	11.08	12.42	13.54	14.67	19.26	23.99	
	100	7.25	8.43	9.54	10.61	11.67	12.72	14.29	15.60	16.92	22.29	27.82	
	120	7.98	9.36	10.65	11.88	13.09	14.29	16.07	17.57	19.07	25.17	31.46	
	140	8.68	10.26	11.71	13.09	14.45	15.79	17.78	19.45	21.13	27.93	34.95	
50	10	3.55	3.60	3.73	3.91	4.10	4.30	4.61	4.89	5.17	6.35	7.59	
	20	4.24	4.39	4.63	4.91	5.22	5.53	6.03	6.45	6.89	8.68	10.56	
	40	5.29	5.65	6.11	6.61	7.12	7.65	8.45	9.13	9.82	12.65	15.59	
	60	6.16	6.76	7.42	8.12	8.82	9.52	10.60	11.50	12.41	16.15	20.01	
	80	6.95	7.78	8.64	9.51	10.38	11.26	12.58	13.69	14.80	19.37	24.08	
	100	7.70	8.74	9.79	10.83	11.86	12.89	14.44	15.74	17.05	22.39	27.90	
	120	8.41	9.66	10.89	12.08	13.27	14.45	16.22	17.70	19.19	25.27	31.54	
	140	9.10	10.55	11.94	13.29	14.62	15.94	17.92	19.58	21.24	28.02	35.03	
100	10	4.02	4.05	4.18	4.34	4.53	4.72	5.03	5.29	5.56	6.69	7.89	
	20	4.82	4.94	5.15	5.41	5.69	5.98	6.44	6.84	7.25	8.98	10.81	
	40	5.99	6.27	6.66	7.10	7.57	8.06	8.82	9.47	10.14	12.91	15.80	
	60	6.92	7.38	7.96	8.58	9.24	9.91	10.94	11.81	12.70	16.38	20.21	
	80	7.74	8.39	9.15	9.95	10.78	11.62	12.89	13.98	15.07	19.58	24.26	
	100	8.49	9.34	10.28	11.25	12.23	13.23	14.74	16.02	17.31	22.59	28.08	
	120	9.21	10.25	11.36	12.49	13.63	14.77	16.51	17.96	19.43	25.46	31.71	
	140	9.89	11.12	12.40	13.68	14.97	16.26	18.20	19.83	21.48	28.21	35.19	
150	10	4.36	4.38	4.51	4.68	4.86	5.05	5.36	5.62	5.89	7.00	8.17	
	20	5.25	5.35	5.56	5.81	6.08	6.36	6.81	7.20	7.59	9.27	11.07	
	40	6.52	6.77	7.13	7.55	7.99	8.45	9.18	9.81	10.45	13.16	16.02	
	60	7.51	7.92	8.44	9.02	9.64	10.28	11.27	12.12	12.99	16.61	20.40	
	80	8.37	8.94	9.64	10.38	11.16	11.97	13.21	14.26	15.34	19.79	24.45	
	100	9.16	9.89	10.75	11.66	12.60	13.57	15.04	16.29	17.56	22.80	28.25	
	120	9.89	10.80	11.82	12.89	13.98	15.09	16.79	18.23	19.68	25.65	31.87	
	140	10.58	11.66	12.85	14.07	15.31	16.57	18.47	20.08	21.71	28.40	35.35	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 46.0 ft (RADIUS = 32.5 ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		(Ft*s) ^{1/2}	4	8	12	16	20	24	30	35	40	60	80
200	10	4.63	4.65	4.78	4.95	5.14	5.33	5.64	5.90	6.17	7.28	8.44	
	20	5.61	5.69	5.90	6.14	6.41	6.69	7.14	7.52	7.91	9.56	11.31	
	40	6.96	7.19	7.54	7.94	8.36	8.81	9.52	10.13	10.75	13.41	16.23	
	60	8.01	8.38	8.88	9.43	10.02	10.63	11.59	12.42	13.27	16.84	20.60	
	80	8.91	9.43	10.08	10.79	11.54	12.31	13.52	14.55	15.61	20.01	24.63	
	100	9.73	10.39	11.20	12.06	12.96	13.90	15.33	16.56	17.81	23.00	28.42	
	120	10.48	11.30	12.26	13.28	14.33	15.41	17.07	18.49	19.92	25.85	32.04	
300	140	11.19	12.17	13.28	14.45	15.65	16.87	18.75	20.34	21.95	28.59	35.51	
	10	5.08	5.10	5.23	5.40	5.59	5.79	6.11	6.37	6.65	7.77	8.92	
	20	6.18	6.25	6.46	6.70	6.97	7.25	7.69	8.07	8.46	10.08	11.80	
	40	7.68	7.88	8.22	8.60	9.02	9.45	10.13	10.72	11.33	13.90	16.66	
	60	8.83	9.16	9.63	10.15	10.71	11.29	12.21	13.01	13.82	17.29	20.99	
	80	9.81	10.27	10.87	11.53	12.23	12.97	14.12	15.11	16.13	20.43	24.99	
	100	10.68	11.27	12.00	12.81	13.65	14.54	15.91	17.10	18.31	23.40	28.77	
400	120	11.48	12.20	13.07	14.02	15.01	16.04	17.63	19.00	20.40	26.23	32.37	
	140	12.22	13.08	14.09	15.18	16.31	17.48	19.29	20.83	22.41	28.96	35.82	
	10	5.44	5.45	5.59	5.77	5.96	6.17	6.49	6.77	7.05	8.18	9.35	
	20	6.64	6.71	6.92	7.16	7.44	7.72	8.17	8.55	8.94	10.55	12.25	
	40	8.28	8.46	8.79	9.17	9.58	10.01	10.68	11.26	11.85	14.37	17.08	
	60	9.51	9.81	10.26	10.77	11.32	11.89	12.78	13.55	14.35	17.73	21.37	
	80	10.55	10.97	11.55	12.19	12.86	13.57	14.69	15.65	16.64	20.85	25.35	
600	100	11.48	12.02	12.71	13.48	14.30	15.14	16.47	17.62	18.81	23.80	29.11	
	120	12.32	12.98	13.80	14.70	15.65	16.64	18.18	19.51	20.88	26.62	32.69	
	140	13.10	13.88	14.83	15.86	16.95	18.07	19.82	21.33	22.87	29.33	36.14	
	10	6.02	6.03	6.18	6.36	6.57	6.78	7.12	7.41	7.70	8.88	10.07	
	20	7.39	7.46	7.66	7.92	8.20	8.49	8.95	9.34	9.74	11.37	13.06	
	40	9.23	9.40	9.73	10.11	10.52	10.95	11.62	12.20	12.78	15.25	17.89	
	60	10.62	10.89	11.33	11.83	12.36	12.92	13.79	14.54	15.32	18.59	22.13	
800	80	11.77	12.15	12.69	13.31	13.97	14.65	15.72	16.65	17.61	21.68	26.07	
	100	12.79	13.27	13.93	14.66	15.44	16.25	17.52	18.62	19.76	24.59	29.79	
	120	13.70	14.29	15.06	15.91	16.81	17.75	19.22	20.49	21.80	27.38	33.35	
	140	14.55	15.25	16.13	17.10	18.12	19.18	20.85	22.29	23.78	30.06	36.77	
	10	6.50	6.51	6.65	6.84	7.06	7.29	7.64	7.93	8.24	9.45	10.67	
	20	8.00	8.06	8.27	8.54	8.83	9.13	9.60	10.00	10.41	12.06	13.77	
	40	10.02	10.18	10.50	10.89	11.30	11.74	12.42	12.99	13.58	16.04	18.64	
	60	11.52	11.77	12.21	12.71	13.24	13.80	14.66	15.41	16.18	19.40	22.87	
	80	12.76	13.12	13.65	14.26	14.91	15.59	16.65	17.56	18.49	22.47	26.77	
	100	13.86	14.31	14.95	15.67	16.43	17.22	18.46	19.54	20.65	25.36	30.46	
	120	14.84	15.39	16.13	16.96	17.83	18.75	20.18	21.41	22.69	28.13	33.99	
	140	15.75	16.40	17.24	18.18	19.16	20.19	21.81	23.21	24.65	30.79	37.39	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 46.0 Ft (RADIUS = 32.5 Ft)³
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft												
		$(Ft \cdot s)^{1/2}$	4	8	12	16	20	24	30	35	40	60	80	
0	10		4.04	4.46	4.90	5.34	5.78	6.23	6.89	7.45	8.01	10.29	12.62	
	20		5.28	6.03	6.75	7.45	8.14	8.83	9.85	10.71	11.57	15.07	18.65	
	40		7.36	8.67	9.86	10.99	12.10	13.20	14.83	16.19	17.56	23.10	28.79	
	60		9.18	10.99	12.59	14.10	15.58	17.03	19.20	21.00	22.81	30.14	37.68	
	80		10.85	13.12	15.09	16.96	18.77	20.55	23.20	25.41	27.62	36.60	45.85	
	100		12.43	15.11	17.45	19.64	21.76	23.86	26.97	29.55	32.15	42.67	53.51	
	120		13.92	17.01	19.68	22.19	24.61	27.00	30.54	33.49	36.45	48.44	60.80	
	140		15.35	18.83	21.83	24.63	27.35	30.01	33.98	37.27	40.57	53.98	67.79	
	25	10		4.77	5.00	5.34	5.72	6.12	6.53	7.16	7.70	8.24	10.47	12.77
		20		5.95	6.50	7.12	7.77	8.42	9.08	10.08	10.92	11.77	15.22	18.78
40			7.94	9.07	10.18	11.26	12.34	13.41	15.02	16.37	17.72	23.23	28.90	
60			9.71	11.35	12.88	14.35	15.79	17.23	19.37	21.16	22.95	30.25	37.78	
80			11.35	13.45	15.36	17.19	18.97	20.73	23.36	25.56	27.76	36.71	45.94	
100			12.90	15.43	17.70	19.86	21.96	24.03	27.12	29.69	32.28	42.78	53.60	
120			14.37	17.32	19.93	22.39	24.80	27.16	30.69	33.63	36.57	48.54	60.88	
140			15.78	19.13	22.06	24.83	27.52	30.17	34.11	37.40	40.69	54.07	67.87	
50		10		5.27	5.43	5.73	6.07	6.43	6.82	7.42	7.94	8.47	10.65	12.93
		20		6.51	6.94	7.49	8.08	8.70	9.33	10.30	11.12	11.96	15.37	18.91
	40		8.49	9.46	10.49	11.53	12.58	13.63	15.21	16.54	17.88	23.35	29.01	
	60		10.23	11.71	13.16	14.59	16.01	17.42	19.54	21.31	23.10	30.37	37.88	
	80		11.84	13.79	15.63	17.41	19.17	20.91	23.52	25.70	27.90	36.82	46.03	
	100		13.36	15.75	17.95	20.07	22.14	24.20	27.27	29.83	32.41	42.88	53.69	
	120		14.81	17.62	20.17	22.60	24.98	27.33	30.83	33.76	36.69	48.64	60.97	
	140		16.21	19.42	22.29	25.03	27.69	30.33	34.25	37.53	40.81	54.17	67.95	
	100	10		5.96	6.08	6.34	6.65	6.99	7.35	7.91	8.40	8.90	11.01	13.23
		20		7.34	7.67	8.14	8.67	9.24	9.82	10.74	11.53	12.33	15.67	19.17
40			9.42	10.19	11.10	12.06	13.05	14.05	15.59	16.89	18.20	23.61	29.23	
60			11.17	12.40	13.72	15.07	16.43	17.81	19.88	21.63	23.39	30.60	38.08	
80			12.76	14.44	16.15	17.86	19.57	21.27	23.84	26.00	28.17	37.04	46.21	
100			14.25	16.37	18.45	20.50	22.52	24.54	27.57	30.11	32.66	43.08	53.86	
120			15.68	18.22	20.65	23.01	25.34	27.65	31.12	34.02	36.94	48.83	61.13	
140			17.05	19.99	22.76	25.42	28.04	30.64	34.53	37.78	41.05	54.35	68.11	
150		10		6.47	6.58	6.82	7.13	7.46	7.80	8.35	8.82	9.31	11.35	13.53
		20		7.97	8.26	8.70	9.19	9.73	10.29	11.17	11.92	12.70	15.97	19.42
	40		10.18	10.85	11.67	12.57	13.50	14.47	15.96	17.23	18.52	23.86	29.44	
	60		11.98	13.05	14.27	15.55	16.86	18.19	20.22	21.94	23.68	30.83	38.27	
	80		13.59	15.07	16.67	18.31	19.96	21.63	24.16	26.29	28.44	37.25	46.40	
	100		15.08	16.98	18.95	20.92	22.90	24.88	27.87	30.38	32.92	43.29	54.03	
	120		16.50	18.81	21.12	23.41	25.70	27.98	31.41	34.29	37.18	49.03	61.30	
	140		17.86	20.57	23.21	25.81	28.39	30.95	34.81	38.03	41.28	54.54	68.27	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 46.0 Ft (RADIUS = 32.5 Ft)³
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		°F	4	8	12	16	20	24	30	35	40	60	80
200	(Ft*s) ^{1/2}												
	10	6.89	6.98	7.23	7.53	7.85	8.20	8.74	9.20	9.68	11.69	13.83	
	20	8.50	8.76	9.18	9.66	10.18	10.72	11.57	12.31	13.06	16.27	19.68	
	40	10.82	11.43	12.20	13.05	13.95	14.88	16.32	17.57	18.84	24.12	29.66	
	60	12.68	13.65	14.79	16.01	17.27	18.57	20.56	22.55	23.96	31.06	38.47	
	80	14.32	15.68	17.18	18.75	20.35	21.99	24.47	26.58	28.71	37.47	46.58	
	100	15.84	17.57	19.43	21.34	23.27	25.22	28.17	30.66	33.17	43.49	54.21	
	120	17.26	19.38	21.59	23.82	26.05	28.30	31.69	34.55	37.43	49.22	61.46	
	140	18.62	21.13	23.67	26.20	28.73	31.27	35.08	38.29	41.52	54.73	68.43	
	300	10	7.57	7.65	7.89	8.19	8.52	8.86	9.40	9.86	10.34	12.31	14.40
20		9.36	9.59	9.99	10.45	10.96	11.48	12.30	13.02	13.75	16.85	20.18	
40		11.89	12.42	13.14	13.93	14.78	15.66	17.04	18.23	19.46	24.62	30.09	
60		13.87	14.72	15.76	16.89	18.08	19.31	21.22	22.86	24.54	31.52	38.86	
80		15.60	16.77	18.14	19.61	21.13	22.69	25.10	27.15	29.24	37.89	46.95	
100		17.16	18.68	20.38	22.17	24.01	25.89	28.76	31.20	33.68	43.89	54.55	
120		18.62	20.48	22.51	24.61	26.76	28.94	32.26	35.07	37.91	49.61	61.79	
140		20.00	22.21	24.56	26.97	29.42	31.89	35.63	38.79	41.99	55.10	68.75	
400		10	8.12	8.20	8.44	8.74	9.07	9.42	9.96	10.43	10.90	12.87	14.94
		20	10.06	10.28	10.67	11.13	11.62	12.14	12.95	13.65	14.37	17.42	20.68
	40	12.77	13.26	13.95	14.71	15.53	16.38	17.72	18.87	20.07	25.12	30.52	
	60	14.87	15.65	16.63	17.70	18.84	20.02	21.87	23.46	25.10	31.98	39.25	
	80	16.68	17.75	19.03	20.42	21.87	23.38	25.72	27.72	29.77	38.32	47.31	
	100	18.30	19.68	21.27	22.96	24.73	26.55	29.35	31.75	34.18	44.30	54.90	
	120	19.81	21.49	23.39	25.39	27.46	29.58	32.83	35.59	38.40	50.00	62.12	
	140	21.22	23.23	25.43	27.73	30.10	32.50	36.18	39.29	42.45	55.48	69.06	
	600	10	9.01	9.08	9.33	9.64	9.98	10.34	10.90	11.37	11.85	13.84	15.90
		20	11.20	11.40	11.79	12.25	12.74	13.26	14.07	14.77	15.48	18.46	21.64
40		14.22	14.66	15.31	16.05	16.84	17.66	18.95	20.07	21.22	26.10	31.37	
60		16.52	17.21	18.13	19.14	20.22	21.34	23.11	24.63	26.21	32.88	40.03	
80		18.47	19.42	20.61	21.90	23.27	24.69	26.92	28.84	30.82	39.17	48.04	
100		20.21	21.42	22.88	24.46	26.11	27.83	30.51	32.82	35.19	45.10	55.59	
120		21.81	23.29	25.02	26.88	28.82	30.83	33.95	36.62	39.36	50.77	62.78	
140		23.30	25.05	27.06	29.20	31.42	33.72	37.26	40.29	43.38	56.22	69.70	
800		10	9.73	9.80	10.05	10.37	10.72	11.09	11.67	12.16	12.65	14.67	16.75
		20	12.13	12.31	12.70	13.17	13.67	14.20	15.02	15.72	16.43	19.40	22.54
	40	15.40	15.81	16.45	17.18	17.96	18.78	20.05	21.14	22.27	27.05	32.21	
	60	17.87	18.51	19.40	20.39	21.44	22.53	24.24	25.73	27.26	33.77	40.80	
	80	19.96	20.83	21.97	23.21	24.53	25.90	28.05	29.92	31.84	40.01	48.76	
	100	21.80	22.92	24.30	25.80	27.39	29.04	31.63	33.87	36.17	45.90	56.27	
	120	23.49	24.85	26.48	28.24	30.10	32.03	35.04	37.64	40.31	51.54	63.44	
	140	25.05	26.66	28.54	30.57	32.69	34.90	38.33	41.28	44.30	56.96	70.33	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 48.0 Ft (RADIUS = 33.9 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
0 (Ft*s) ^{1/2}	10	1.24	1.27	1.33	1.41	1.49	1.57	1.69	1.80	1.91	2.35	2.79	
	20	1.41	1.47	1.57	1.68	1.79	1.90	2.07	2.22	2.37	2.96	3.56	
	40	1.68	1.82	1.97	2.14	2.30	2.47	2.71	2.92	3.13	3.98	4.85	
	60	1.91	2.12	2.33	2.54	2.75	2.96	3.27	3.54	3.80	4.88	5.98	
	80	2.13	2.39	2.65	2.91	3.16	3.41	3.79	4.11	4.42	5.70	7.02	
	100	2.33	2.65	2.96	3.25	3.55	3.84	4.27	4.64	5.00	6.48	7.99	
	120	2.53	2.90	3.25	3.58	3.91	4.24	4.73	5.14	5.55	7.21	8.92	
	140	2.72	3.13	3.52	3.90	4.27	4.63	5.17	5.63	6.08	7.92	9.88	
	25	10	1.61	1.59	1.63	1.68	1.75	1.82	1.93	2.02	2.12	2.52	2.94
		20	1.82	1.82	1.88	1.96	2.05	2.14	2.29	2.42	2.55	3.11	3.69
40		2.12	2.17	2.27	2.40	2.53	2.68	2.90	3.10	3.29	4.11	4.96	
60		2.36	2.46	2.61	2.78	2.96	3.15	3.45	3.70	3.95	5.00	6.08	
80		2.57	2.72	2.92	3.13	3.36	3.59	3.95	4.25	4.56	5.81	7.11	
100		2.77	2.96	3.21	3.47	3.74	4.01	4.43	4.78	5.13	6.58	8.08	
120		2.95	3.20	3.49	3.79	4.10	4.41	4.88	5.28	5.68	7.31	9.00	
140		3.13	3.43	3.76	4.10	4.44	4.79	5.31	5.76	6.20	8.02	9.89	
50		10	1.77	1.75	1.78	1.84	1.90	1.97	2.08	2.18	2.28	2.67	3.08
		20	2.02	2.02	2.07	2.15	2.23	2.32	2.47	2.59	2.72	3.25	3.81
	40	2.37	2.40	2.49	2.61	2.74	2.87	3.08	3.26	3.45	4.24	5.06	
	60	2.64	2.71	2.84	3.00	3.16	3.34	3.61	3.85	4.10	5.11	6.18	
	80	2.87	2.98	3.15	3.35	3.55	3.77	4.11	4.40	4.69	5.92	7.20	
	100	3.08	3.23	3.44	3.68	3.92	4.18	4.58	4.91	5.26	6.68	8.17	
	120	3.28	3.47	3.72	3.99	4.27	4.57	5.02	5.41	5.80	7.41	9.08	
	140	3.46	3.69	3.98	4.29	4.61	4.95	5.45	5.88	6.32	8.11	9.97	
	100	10	1.98	1.95	1.99	2.05	2.12	2.19	2.30	2.40	2.50	2.90	3.31
		20	2.28	2.28	2.33	2.41	2.50	2.59	2.73	2.86	2.98	3.51	4.05
40		2.71	2.73	2.82	2.93	3.05	3.17	3.38	3.55	3.73	4.48	5.28	
60		3.03	3.08	3.20	3.34	3.49	3.66	3.92	4.14	4.37	5.34	6.37	
80		3.30	3.38	3.53	3.70	3.89	4.09	4.41	4.68	4.96	6.13	7.38	
100		3.53	3.65	3.83	4.04	4.26	4.50	4.86	5.18	5.51	6.89	8.34	
120		3.75	3.90	4.11	4.35	4.61	4.88	5.30	5.67	6.04	7.61	9.25	
140		3.95	4.13	4.38	4.65	4.94	5.25	5.73	6.13	6.55	8.30	10.13	
150		10	2.13	2.10	2.14	2.20	2.27	2.35	2.46	2.56	2.67	3.08	3.50
		20	2.48	2.47	2.52	2.60	2.69	2.78	2.93	3.06	3.19	3.71	4.26
	40	2.95	2.97	3.06	3.17	3.29	3.42	3.62	3.79	3.97	4.70	5.48	
	60	3.31	3.35	3.47	3.61	3.76	3.92	4.17	4.39	4.61	5.56	6.56	
	80	3.61	3.68	3.82	3.99	4.17	4.37	4.67	4.93	5.20	6.34	7.57	
	100	3.87	3.97	4.14	4.34	4.55	4.78	5.13	5.44	5.75	7.09	8.51	
	120	4.11	4.23	4.43	4.66	4.91	5.16	5.57	5.92	6.28	7.80	9.42	
	140	4.33	4.48	4.71	4.97	5.24	5.53	5.99	6.38	6.78	8.48	10.29	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 48.0 Ft (RADIUS = 33.9 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft												
		(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60	80
200	10		2.25	2.22	2.26	2.33	2.40	2.47	2.59	2.70	2.80	3.23	3.65	
	20		2.63	2.62	2.68	2.76	2.85	2.95	3.10	3.23	3.36	3.89	4.44	
	40		3.15	3.17	3.26	3.37	3.49	3.62	3.82	3.99	4.17	4.90	5.68	
	60		3.54	3.58	3.69	3.83	3.98	4.15	4.40	4.61	4.83	5.76	6.75	
	80		3.86	3.93	4.07	4.23	4.42	4.61	4.90	5.16	5.43	6.55	7.74	
	100		4.15	4.24	4.40	4.60	4.80	5.03	5.37	5.67	5.98	7.28	8.68	
	120		4.40	4.52	4.71	4.93	5.17	5.42	5.81	6.15	6.50	7.99	9.58	
300	140		4.64	4.77	4.99	5.24	5.51	5.79	6.23	6.61	7.00	8.67	10.45	
	10		2.44	2.42	2.46	2.53	2.60	2.68	2.81	2.92	3.02	3.47	3.90	
	20		2.89	2.88	2.93	3.02	3.11	3.21	3.37	3.50	3.64	4.19	4.74	
	40		3.48	3.49	3.58	3.69	3.82	3.95	4.16	4.33	4.51	5.25	6.02	
	60		3.92	3.95	4.06	4.20	4.36	4.52	4.77	4.99	5.21	6.13	7.10	
	80		4.28	4.34	4.47	4.64	4.82	5.01	5.31	5.56	5.82	6.92	8.09	
	100		4.60	4.67	4.83	5.03	5.23	5.45	5.79	6.09	6.39	7.66	9.02	
400	120		4.88	4.98	5.16	5.38	5.61	5.86	6.24	6.57	6.91	8.36	9.90	
	140		5.14	5.26	5.47	5.71	5.97	6.24	6.67	7.04	7.42	9.03	10.76	
	10		2.60	2.58	2.62	2.69	2.77	2.85	2.98	3.09	3.21	3.66	4.11	
	20		3.09	3.08	3.14	3.23	3.32	3.43	3.59	3.73	3.87	4.43	5.00	
	40		3.74	3.75	3.84	3.96	4.09	4.22	4.43	4.62	4.80	5.55	6.33	
	60		4.22	4.25	4.37	4.51	4.67	4.83	5.09	5.31	5.53	6.46	7.42	
	80		4.62	4.67	4.81	4.97	5.16	5.35	5.65	5.90	6.17	7.26	8.41	
600	100		4.96	5.03	5.19	5.39	5.59	5.81	6.15	6.45	6.74	8.00	9.34	
	120		5.27	5.36	5.54	5.76	5.99	6.24	6.62	6.95	7.28	8.70	10.22	
	140		5.55	5.66	5.87	6.11	6.37	6.64	7.06	7.42	7.79	9.37	11.07	
	10		2.85	2.83	2.88	2.95	3.03	3.12	3.26	3.38	3.50	3.98	4.46	
	20		3.42	3.41	3.47	3.56	3.67	3.78	3.95	4.09	4.24	4.84	5.43	
	40		4.17	4.17	4.27	4.39	4.52	4.67	4.89	5.08	5.27	6.05	6.84	
	60		4.71	4.74	4.86	5.01	5.17	5.34	5.61	5.83	6.06	7.01	7.98	
800	80		5.16	5.21	5.35	5.52	5.71	5.91	6.21	6.48	6.74	7.85	8.99	
	100		5.55	5.62	5.78	5.97	6.19	6.41	6.76	7.05	7.35	8.61	9.93	
	120		5.90	5.98	6.17	6.38	6.62	6.87	7.25	7.58	7.92	9.32	10.81	
	140		6.22	6.32	6.52	6.76	7.02	7.29	7.71	8.08	8.45	10.00	11.65	
	10		3.06	3.04	3.09	3.16	3.25	3.34	3.49	3.61	3.74	4.24	4.74	
	20		3.69	3.67	3.74	3.84	3.94	4.06	4.24	4.39	4.55	5.17	5.78	
	40		4.51	4.52	4.61	4.74	4.88	5.03	5.26	5.46	5.66	6.47	7.28	
	60		5.11	5.14	5.26	5.41	5.58	5.76	6.03	6.27	6.51	7.48	8.47	
	80		5.61	5.65	5.79	5.97	6.16	6.37	6.68	6.95	7.23	8.35	9.50	
	100		6.03	6.09	6.26	6.46	6.67	6.90	7.26	7.56	7.87	9.14	10.46	
	120		6.41	6.49	6.67	6.90	7.14	7.39	7.78	8.12	8.46	9.87	11.35	
	140		6.76	6.85	7.06	7.30	7.56	7.84	8.27	8.63	9.01	10.56	12.20	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 48.0 Ft (RADIUS = 33.9 Ft)
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
0 (Ft*s) ^{1/2}	10	1.80	1.88	2.00	2.13	2.26	2.40	2.61	2.79	2.97	3.70	4.45	
	20	2.12	2.29	2.48	2.67	2.87	3.07	3.38	3.63	3.89	4.92	5.98	
	40	2.66	2.97	3.28	3.59	3.89	4.20	4.65	5.04	5.42	6.97	8.56	
	60	3.14	3.57	3.99	4.39	4.79	5.19	5.78	6.27	6.76	8.77	10.82	
	80	3.57	4.12	4.64	5.13	5.61	6.09	6.81	7.40	8.00	10.42	12.90	
	100	3.98	4.64	5.25	5.82	6.39	6.94	7.77	8.47	9.16	11.97	14.85	
	120	4.37	5.14	5.82	6.48	7.12	7.75	8.69	9.48	10.26	13.44	16.70	
25	140	4.74	5.61	6.38	7.11	7.83	8.53	9.57	10.45	11.32	14.85	18.44	
	10	2.29	2.29	2.36	2.46	2.57	2.69	2.87	3.03	3.20	3.89	4.60	
	20	2.65	2.70	2.83	2.98	3.15	3.33	3.60	3.84	4.08	5.08	6.11	
	40	3.19	3.36	3.60	3.86	4.13	4.41	4.85	5.21	5.58	7.10	8.67	
	60	3.64	3.93	4.28	4.64	5.01	5.38	5.95	6.43	6.91	8.89	10.92	
	80	4.06	4.46	4.91	5.36	5.82	6.27	6.97	7.55	8.14	10.53	12.99	
	100	4.45	4.96	5.50	6.04	6.58	7.12	7.93	8.61	9.29	12.07	14.94	
50	120	4.82	5.44	6.07	6.69	7.30	7.92	8.84	9.61	10.38	13.54	16.79	
	140	5.18	5.90	6.61	7.31	8.00	8.69	9.72	10.57	11.44	14.95	18.56	
	10	2.53	2.52	2.59	2.68	2.79	2.90	3.08	3.24	3.40	4.06	4.75	
	20	2.95	2.98	3.09	3.23	3.39	3.55	3.81	4.03	4.26	5.23	6.24	
	40	3.55	3.67	3.88	4.11	4.36	4.62	5.03	5.38	5.74	7.23	8.78	
	60	4.03	4.25	4.55	4.87	5.22	5.57	6.12	6.59	7.06	9.00	11.02	
	80	4.46	4.77	5.17	5.58	6.01	6.46	7.13	7.70	8.27	10.64	13.08	
100	100	4.85	5.27	5.75	6.25	6.77	7.29	8.08	8.74	9.42	12.17	15.02	
	120	5.22	5.74	6.31	6.89	7.49	8.08	8.98	9.74	10.51	13.64	16.87	
	140	5.58	6.19	6.85	7.51	8.18	8.85	9.86	10.70	11.56	15.04	18.64	
	10	2.85	2.84	2.90	3.00	3.10	3.22	3.40	3.55	3.71	4.36	5.03	
	20	3.35	3.37	3.48	3.61	3.76	3.92	4.16	4.38	4.60	5.52	6.49	
	40	4.05	4.14	4.32	4.53	4.76	5.01	5.39	5.72	6.06	7.48	9.00	
	60	4.59	4.76	5.02	5.31	5.62	5.94	6.45	6.89	7.35	9.23	11.22	
150	80	5.06	5.30	5.64	6.01	6.40	6.81	7.44	7.99	8.54	10.85	13.27	
	100	5.48	5.80	6.22	6.67	7.14	7.62	8.38	9.02	9.67	12.38	15.20	
	120	5.87	6.27	6.77	7.29	7.84	8.41	9.27	10.01	10.75	13.83	17.04	
	140	6.24	6.72	7.29	7.90	8.52	9.16	10.13	10.96	11.79	15.23	18.80	
	10	3.08	3.06	3.13	3.23	3.33	3.45	3.63	3.79	3.95	4.61	5.28	
	20	3.64	3.66	3.76	3.90	4.04	4.20	4.45	4.66	4.88	5.78	6.74	
	40	4.42	4.50	4.67	4.88	5.10	5.33	5.70	6.02	6.35	7.73	9.21	
	60	5.02	5.16	5.40	5.67	5.97	6.28	6.77	7.19	7.63	9.46	11.42	
	80	5.52	5.73	6.04	6.38	6.75	7.14	7.75	8.27	8.81	11.07	13.45	
	100	5.97	6.25	6.63	7.04	7.49	7.95	8.67	9.29	9.93	12.58	15.37	
	120	6.39	6.73	7.18	7.67	8.19	8.72	9.56	10.27	11.00	14.03	17.20	
	140	6.77	7.19	7.71	8.27	8.86	9.47	10.41	11.21	12.03	15.42	18.96	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 48.0 Ft (RADIUS = 33.9 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE °F	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
200 (Ft*s) ^{1/2}	10	3.26	3.25	3.32	3.41	3.53	3.64	3.83	3.99	4.15	4.82	5.49
	20	3.88	3.90	4.00	4.13	4.28	4.44	4.69	4.90	5.12	6.02	6.97
	40	4.73	4.80	4.96	5.17	5.39	5.62	5.98	6.29	6.62	7.97	9.43
	60	5.37	5.50	5.73	5.99	6.28	6.58	7.06	7.47	7.89	9.69	11.61
	80	5.90	6.10	6.39	6.72	7.08	7.45	8.04	8.55	9.07	11.28	13.64
	100	6.38	6.63	6.99	7.39	7.81	8.26	8.96	9.56	10.18	12.79	15.55
	120	6.82	7.13	7.55	8.02	8.51	9.03	9.83	10.53	11.24	14.22	17.37
300	140	7.22	7.60	8.09	8.62	9.18	9.77	10.68	11.46	12.26	15.61	19.11
	10	3.56	3.55	3.62	3.72	3.84	3.96	4.15	4.32	4.49	5.17	5.86
	20	4.27	4.28	4.38	4.52	4.67	4.84	5.09	5.31	5.53	6.44	7.38
	40	5.22	5.28	5.45	5.65	5.87	6.10	6.46	6.77	7.09	8.42	9.84
	60	5.93	6.05	6.27	6.53	6.81	7.11	7.57	7.97	8.38	10.13	12.00
	80	6.53	6.70	6.98	7.30	7.64	8.00	8.57	9.06	9.56	11.70	14.00
	100	7.05	7.28	7.61	7.99	8.40	8.82	9.49	10.06	10.66	13.19	15.89
400	120	7.53	7.81	8.20	8.64	9.10	9.59	10.36	11.03	11.71	14.61	17.70
	140	7.97	8.30	8.75	9.25	9.78	10.33	11.20	11.95	12.72	15.98	19.44
	10	3.81	3.79	3.86	3.97	4.09	4.22	4.42	4.59	4.76	5.46	6.17
	20	4.58	4.59	4.70	4.84	4.99	5.16	5.42	5.64	5.87	6.79	7.74
	40	5.62	5.68	5.84	6.05	6.27	6.50	6.86	7.18	7.50	8.82	10.22
	60	6.40	6.50	6.72	6.98	7.26	7.56	8.02	8.42	8.82	10.54	12.37
	80	7.04	7.20	7.47	7.78	8.12	8.48	9.03	9.52	10.01	12.10	14.36
600	100	7.61	7.81	8.13	8.51	8.90	9.32	9.97	10.53	11.11	13.58	16.23
	120	8.12	8.37	8.75	9.17	9.63	10.10	10.85	11.49	12.16	14.99	18.03
	140	8.59	8.89	9.32	9.80	10.31	10.85	11.69	12.41	13.16	16.35	19.76
	10	4.20	4.18	4.26	4.37	4.49	4.63	4.84	5.02	5.21	5.94	6.68
	20	5.09	5.09	5.20	5.35	5.51	5.69	5.96	6.19	6.43	7.39	8.36
	40	6.27	6.32	6.49	6.70	6.92	7.16	7.54	7.86	8.18	9.52	10.91
	60	7.15	7.24	7.46	7.72	8.01	8.31	8.77	9.17	9.58	11.27	13.07
800	80	7.87	8.01	8.28	8.59	8.93	9.29	9.84	10.32	10.80	12.85	15.04
	100	8.50	8.69	9.00	9.37	9.76	10.17	10.81	11.36	11.93	14.32	16.90
	120	9.07	9.30	9.66	10.08	10.52	10.99	11.71	12.34	12.99	15.72	18.68
	140	9.59	9.86	10.27	10.74	11.24	11.76	12.57	13.27	13.99	17.07	20.39
	10	4.51	4.49	4.58	4.69	4.83	4.97	5.19	5.38	5.57	6.33	7.10
	20	5.50	5.50	5.61	5.77	5.94	6.12	6.40	6.65	6.89	7.88	8.87
	40	6.80	6.84	7.01	7.23	7.46	7.71	8.10	8.42	8.76	10.12	11.52
	60	7.76	7.85	8.07	8.33	8.62	8.93	9.40	9.81	10.22	11.92	13.71
	80	8.55	8.68	8.95	9.26	9.61	9.96	10.52	11.00	11.49	13.53	15.69
	100	9.24	9.41	9.72	10.09	10.48	10.89	11.53	12.08	12.65	15.01	17.54
	120	9.85	10.06	10.42	10.84	11.28	11.74	12.46	13.08	13.72	16.41	19.31
	140	10.41	10.67	11.07	11.53	12.02	12.54	13.34	14.03	14.74	17.75	21.00

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 48.0 Ft (RADIUS = 33.9 Ft)³
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
(Ft*s) ^{1/2}	°F												
0	10	2.70	2.89	3.11	3.35	3.59	3.84	4.21	4.52	4.83	6.10	7.40	
	20	3.34	3.70	4.07	4.44	4.81	5.18	5.73	6.19	6.66	8.54	10.46	
	40	4.42	5.07	5.68	6.27	6.85	7.43	8.29	9.01	9.73	12.64	15.62	
	60	5.37	6.27	7.09	7.88	8.65	9.40	10.53	11.47	12.42	16.23	20.15	
	80	6.24	7.38	8.39	9.36	10.29	11.22	12.59	13.74	14.88	19.53	24.30	
	100	7.06	8.41	9.61	10.74	11.84	12.92	14.53	15.86	17.20	22.63	28.20	
	120	7.84	9.40	10.77	12.06	13.31	14.54	16.37	17.89	19.41	25.57	31.91	
	140	8.58	10.34	11.88	13.32	14.72	16.09	18.13	19.82	21.52	28.40	35.47	
25	10	3.32	3.38	3.53	3.72	3.92	4.14	4.48	4.77	5.06	6.29	7.55	
	20	3.97	4.16	4.44	4.76	5.09	5.43	5.96	6.40	6.85	8.70	10.60	
	40	5.00	5.47	6.00	6.55	7.09	7.65	8.48	9.18	9.89	12.77	15.74	
	60	5.90	6.64	7.39	8.13	8.86	9.60	10.71	11.63	12.56	16.35	20.25	
	80	6.74	7.72	8.66	9.59	10.50	11.40	12.76	13.89	15.02	19.64	24.40	
	100	7.53	8.74	9.87	10.96	12.03	13.09	14.68	16.00	17.33	22.73	28.29	
	120	8.29	9.71	11.01	12.27	13.49	14.70	16.51	18.02	19.53	25.67	31.99	
	140	9.02	10.64	12.11	13.52	14.89	16.25	18.27	19.95	21.64	28.49	35.55	
50	10	3.68	3.71	3.85	4.02	4.21	4.41	4.73	5.00	5.28	6.47	7.71	
	20	4.39	4.53	4.78	5.06	5.37	5.68	6.18	6.61	7.04	8.85	10.73	
	40	5.47	5.85	6.31	6.81	7.33	7.86	8.67	9.36	10.05	12.90	15.85	
	60	6.38	6.99	7.67	8.37	9.08	9.80	10.88	11.79	12.71	16.47	20.35	
	80	7.21	8.05	8.93	9.81	10.70	11.58	12.92	14.03	15.16	19.75	24.49	
	100	7.99	9.05	10.12	11.17	12.22	13.27	14.83	16.14	17.46	22.84	28.38	
	120	8.73	10.01	11.26	12.47	13.67	14.87	16.66	18.15	19.66	25.77	32.08	
	140	9.45	10.93	12.35	13.72	15.07	16.41	18.41	20.08	21.76	28.59	35.63	
100	10	4.16	4.18	4.30	4.47	4.65	4.84	5.15	5.41	5.68	6.81	8.01	
	20	4.99	5.09	5.31	5.56	5.84	6.14	6.60	7.00	7.41	9.15	10.99	
	40	6.19	6.47	6.87	7.32	7.79	8.28	9.05	9.70	10.37	13.16	16.07	
	60	7.16	7.63	8.21	8.85	9.51	10.18	11.22	12.11	13.00	16.70	20.55	
	80	8.01	8.68	9.45	10.26	11.10	11.94	13.24	14.33	15.43	19.97	24.67	
	100	8.80	9.66	10.62	11.60	12.60	13.61	15.14	16.42	17.72	23.04	28.55	
	120	9.54	10.60	11.74	12.88	14.04	15.20	16.95	18.42	19.90	25.97	32.25	
	140	10.24	11.51	12.81	14.12	15.42	16.73	18.69	20.34	22.00	28.78	35.79	
150	10	4.51	4.52	4.64	4.81	4.99	5.18	5.49	5.75	6.01	7.13	8.30	
	20	5.43	5.52	5.72	5.97	6.24	6.53	6.97	7.36	7.76	9.45	11.24	
	40	6.74	6.98	7.35	7.77	8.21	8.68	9.41	10.04	10.69	13.41	16.28	
	60	7.77	8.18	8.71	9.29	9.91	10.56	11.56	12.42	13.29	16.93	20.75	
	80	8.66	9.24	9.94	10.70	11.49	12.30	13.55	14.62	15.70	20.19	24.86	
	100	9.47	10.23	11.10	12.02	12.97	13.95	15.44	16.70	17.98	23.25	28.73	
	120	10.23	11.16	12.20	13.29	14.40	15.52	17.24	18.69	20.15	26.17	32.41	
	140	10.95	12.06	13.27	14.51	15.77	17.04	18.97	20.59	22.24	28.97	35.95	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 48.0 Ft (RADIUS = 33.9 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		(Ft*s) ^{1/2}	4	8	12	16	20	24	30	35	40	60	80
200	°F												
	10	4.79	4.80	4.92	5.09	5.27	5.47	5.77	6.03	6.30	7.41	8.57	
	20	5.79	5.87	6.07	6.32	6.58	6.87	7.31	7.69	8.08	9.73	11.50	
	40	7.20	7.42	7.76	8.16	8.59	9.05	9.75	10.37	11.00	13.67	16.50	
	60	8.28	8.65	9.15	9.71	10.30	10.92	11.89	12.72	13.58	17.16	20.94	
	80	9.22	9.74	10.39	11.11	11.87	12.65	13.87	14.91	15.97	20.40	25.04	
	100	10.06	10.74	11.55	12.43	13.34	14.28	15.74	16.97	18.24	23.45	28.90	
	120	10.84	11.68	12.65	13.68	14.75	15.85	17.52	18.95	20.40	26.36	32.58	
	140	11.57	12.58	13.71	14.89	16.11	17.35	19.25	20.85	22.47	29.16	36.11	
	300	10	5.25	5.25	5.38	5.55	5.74	5.94	6.25	6.52	6.79	7.91	9.06
20		6.38	6.45	6.65	6.89	7.16	7.44	7.88	8.25	8.64	10.26	11.98	
40		7.94	8.13	8.46	8.85	9.26	9.70	10.38	10.97	11.58	14.16	16.93	
60		9.13	9.45	9.92	10.44	11.01	11.59	12.52	13.32	14.14	17.62	21.34	
80		10.14	10.59	11.20	11.87	12.58	13.32	14.48	15.48	16.50	20.83	25.41	
100		11.04	11.63	12.37	13.19	14.04	14.93	16.32	17.52	18.74	23.86	29.25	
120		11.87	12.60	13.48	14.44	15.44	16.48	18.09	19.47	20.88	26.75	32.91	
140		12.64	13.51	14.54	15.64	16.78	17.97	19.79	21.35	22.94	29.53	36.43	
400		10	5.62	5.62	5.75	5.92	6.12	6.32	6.64	6.92	7.19	8.33	9.49
		20	6.86	6.92	7.12	7.36	7.63	7.92	8.36	8.74	9.13	10.74	12.44
	40	8.55	8.72	9.05	9.43	9.84	10.27	10.94	11.52	12.12	14.64	17.36	
	60	9.83	10.12	10.57	11.08	11.63	12.20	13.10	13.87	14.67	18.07	21.73	
	80	10.90	11.32	11.89	12.54	13.22	13.93	15.05	16.02	17.02	21.26	25.78	
	100	11.86	12.40	13.10	13.87	14.70	15.55	16.89	18.05	19.24	24.27	29.60	
	120	12.73	13.39	14.23	15.13	16.09	17.09	18.65	19.99	21.36	27.14	33.25	
	140	13.54	14.33	15.29	16.33	17.43	18.57	20.33	21.85	23.41	29.91	36.75	
	600	10	6.22	6.22	6.35	6.53	6.74	6.95	7.29	7.57	7.86	9.03	10.22
		20	7.63	7.68	7.88	8.14	8.41	8.71	9.16	9.55	9.94	11.57	13.26
40		9.54	9.69	10.01	10.39	10.80	11.23	11.90	12.47	13.06	15.53	18.18	
60		10.96	11.22	11.66	12.16	12.69	13.25	14.12	14.88	15.66	18.95	22.50	
80		12.15	12.52	13.07	13.69	14.35	15.03	16.11	17.04	18.00	22.09	26.50	
100		13.20	13.68	14.34	15.08	15.86	16.68	17.95	19.06	20.21	25.07	30.29	
120		14.15	14.74	15.52	16.37	17.28	18.22	19.70	20.98	22.31	27.91	33.91	
140		15.03	15.73	16.62	17.59	18.62	19.70	21.38	22.83	24.33	30.65	37.39	
800		10	6.71	6.70	6.84	7.03	7.24	7.46	7.81	8.11	8.41	9.62	10.84
		20	8.26	8.31	8.51	8.77	9.05	9.36	9.82	10.22	10.63	12.28	13.99
	40	10.34	10.49	10.81	11.19	11.60	12.04	12.71	13.29	13.88	16.34	18.95	
	60	11.89	12.13	12.56	13.06	13.59	14.15	15.02	15.76	16.53	19.77	23.24	
	80	13.18	13.52	14.06	14.66	15.31	15.99	17.05	17.96	18.91	22.90	27.22	
	100	14.31	14.75	15.39	16.11	16.87	17.67	18.92	20.00	21.11	25.85	30.97	
	120	15.33	15.87	16.61	17.44	18.32	19.24	20.68	21.92	23.20	28.67	34.57	
	140	16.27	16.91	17.76	18.70	19.69	20.73	22.35	23.76	25.21	31.39	38.03	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 48.0 Ft (RADIUS = 33.9 Ft)³
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
(Ft*s) ^{1/2}	°F												
	0	4.20	4.62	5.06	5.51	5.95	6.40	7.07	7.64	8.20	10.49	12.82	
	10	5.49	6.25	6.98	7.69	8.39	9.08	10.12	10.98	11.85	15.36	18.96	
	20	7.65	8.99	10.20	11.35	12.48	13.58	15.23	16.61	17.98	23.56	29.28	
	40	9.55	11.40	13.03	14.57	16.06	17.53	19.72	21.54	23.36	30.74	38.32	
	60	11.29	13.61	15.62	17.52	19.35	21.16	23.84	26.07	28.30	37.34	46.63	
	80	12.93	15.68	18.06	20.29	22.44	24.56	27.71	30.32	32.94	43.54	54.43	
	100	14.48	17.65	20.38	22.92	25.38	27.80	31.39	34.36	37.35	49.43	61.85	
	120	15.97	19.54	22.60	25.45	28.20	30.90	34.91	38.24	41.57	55.07	68.96	
	140												
25	10	4.95	5.17	5.51	5.89	6.29	6.71	7.34	7.88	8.43	10.67	12.98	
	20	6.17	6.73	7.36	8.01	8.67	9.34	10.34	11.19	12.04	15.51	19.09	
	40	8.24	9.40	10.52	11.63	12.72	13.80	15.43	16.78	18.15	23.69	29.39	
	60	10.09	11.76	13.32	14.82	16.28	17.73	19.89	21.70	23.51	30.86	38.42	
	80	11.79	13.95	15.89	17.75	19.56	21.34	24.00	26.22	28.44	37.45	46.73	
	100	13.40	16.00	18.32	20.51	22.64	24.74	27.86	30.46	33.07	43.64	54.52	
	120	14.93	17.96	20.62	23.13	25.57	27.97	31.53	34.50	37.47	49.52	61.93	
	140	16.41	19.84	22.83	25.65	28.38	31.06	35.05	38.37	41.69	55.17	69.04	
	10	5.45	5.61	5.90	6.25	6.62	7.00	7.61	8.13	8.66	10.85	13.13	
	20	6.74	7.17	7.73	8.33	8.95	9.59	10.57	11.40	12.23	15.67	19.22	
50	40	8.80	9.79	10.84	11.90	12.96	14.02	15.62	16.96	18.31	23.82	29.50	
	60	10.61	12.13	13.61	15.06	16.50	17.93	20.07	21.86	23.66	30.98	38.52	
	80	12.29	14.28	16.16	17.98	19.76	21.53	24.16	26.37	28.58	37.56	46.82	
	100	13.87	16.32	18.57	20.72	22.83	24.91	28.01	30.60	33.20	43.74	54.61	
	120	15.38	18.26	20.87	23.34	25.75	28.13	31.68	34.63	37.59	49.62	62.02	
	140	16.84	20.13	23.07	25.85	28.56	31.22	35.19	38.50	41.81	55.26	69.12	
	10	6.16	6.28	6.54	6.85	7.19	7.54	8.11	8.60	9.10	11.21	13.44	
	20	7.59	7.92	8.39	8.93	9.50	10.09	11.02	11.81	12.62	15.98	19.48	
	40	9.75	10.54	11.46	12.43	13.43	14.45	16.00	17.31	18.63	24.08	29.72	
	60	11.57	12.83	14.18	15.55	16.93	18.32	20.41	22.17	23.95	31.21	38.72	
100	80	13.22	14.95	16.70	18.44	20.16	21.89	24.49	26.66	28.85	37.78	47.01	
	100	14.78	16.95	19.08	21.16	23.21	25.26	28.32	30.88	33.46	43.95	54.78	
	120	16.26	18.87	21.35	23.75	26.12	28.46	31.97	34.90	37.84	49.82	62.18	
	140	17.69	20.72	23.54	26.25	28.91	31.54	35.48	38.76	42.05	55.46	69.28	
	10	6.69	6.79	7.03	7.33	7.66	8.01	8.55	9.03	9.51	11.56	13.75	
	20	8.24	8.53	8.96	9.46	10.00	10.56	11.45	12.21	12.99	16.28	19.74	
	40	10.53	11.21	12.04	12.95	13.90	14.87	16.37	17.65	18.96	24.33	29.94	
	60	12.40	13.49	14.73	16.03	17.36	18.70	20.76	22.49	24.24	31.45	38.92	
	80	14.07	15.59	17.22	18.89	20.56	22.25	24.81	26.96	29.12	38.00	47.19	
	100	15.62	17.58	19.58	21.59	23.59	25.60	28.62	31.16	33.72	44.16	54.96	
150	120	17.10	19.47	21.83	24.17	26.48	28.79	32.26	35.17	38.09	50.02	62.35	
	140	18.52	21.30	24.00	26.65	29.26	31.86	35.76	39.01	42.29	55.65	69.45	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 48.0 Ft (RADIUS = 33.9 Ft)³
 FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		$(Ft \cdot s)^{1/2}$	°F	4	8	12	16	20	24	30	35	40	60
200	10	7.12	7.20	7.44	7.74	8.07	8.41	8.95	9.41	9.89	11.90	14.05	
	20	8.79	9.04	9.46	9.94	10.46	11.00	11.86	12.60	13.36	16.58	20.00	
	40	11.19	11.80	12.58	13.44	14.35	15.29	16.75	18.00	19.28	24.59	30.16	
	60	13.12	14.11	15.27	16.50	17.78	19.09	21.10	22.80	24.54	31.68	39.12	
	80	14.82	16.21	17.74	19.33	20.96	22.61	25.13	27.25	29.40	38.21	47.38	
	100	16.40	18.18	20.08	22.01	23.97	25.94	28.93	31.44	33.97	44.36	55.14	
	120	17.88	20.06	22.31	24.57	26.84	29.12	32.55	35.43	38.34	50.22	62.52	
300	140	19.29	21.87	24.46	27.04	29.61	32.18	36.03	39.27	42.53	55.84	69.66	
	10	7.82	7.89	8.13	8.42	8.75	9.09	9.62	10.09	10.56	12.53	14.63	
	20	9.67	9.89	10.29	10.75	11.25	11.78	12.60	13.32	14.05	17.17	20.51	
	40	12.29	12.82	13.54	14.34	15.19	16.08	17.47	18.67	19.91	25.10	30.60	
	60	14.34	15.20	16.25	17.40	18.60	19.84	21.77	23.43	25.11	32.14	39.52	
	80	16.13	17.33	18.72	20.20	21.74	23.33	25.76	27.83	29.94	38.65	47.75	
	100	17.75	19.30	21.04	22.85	24.72	26.62	29.53	31.99	34.49	44.77	55.49	
400	120	19.27	21.17	23.24	25.38	27.56	29.77	33.13	35.96	38.83	50.61	62.86	
	140	20.70	22.97	25.37	27.82	30.30	32.80	36.59	39.78	43.00	56.21	69.93	
	10	8.39	8.45	8.69	8.98	9.31	9.66	10.20	10.66	11.14	13.10	15.17	
	20	10.39	10.60	10.98	11.44	11.94	12.46	13.27	13.97	14.69	17.74	21.02	
	40	13.20	13.68	14.37	15.14	15.96	16.82	18.16	19.33	20.53	25.61	31.03	
	60	15.37	16.15	17.14	18.23	19.37	20.57	22.43	24.04	25.69	32.61	39.92	
	80	17.24	18.32	19.63	21.03	22.50	24.02	26.39	28.41	30.48	39.08	48.12	
600	100	18.92	20.32	21.94	23.66	25.45	27.29	30.13	32.54	35.00	45.18	55.84	
	120	20.48	22.21	24.14	26.17	28.27	30.42	33.70	36.49	39.32	51.00	63.19	
	140	21.95	24.00	26.25	28.59	30.99	33.43	37.14	40.29	43.48	56.59	70.25	
	10	9.31	9.36	9.60	9.90	10.24	10.60	11.15	11.62	12.11	14.09	16.15	
	20	11.57	11.75	12.13	12.59	13.08	13.60	14.41	15.10	15.81	18.80	21.99	
	40	14.68	15.11	15.77	16.51	17.30	18.12	19.42	20.54	21.69	26.60	31.89	
	60	17.06	17.75	18.67	19.69	20.78	21.91	23.69	25.22	26.81	33.52	40.70	
800	80	19.08	20.04	21.23	22.54	23.92	25.36	27.60	29.55	31.54	39.94	48.85	
	100	20.89	22.11	23.59	25.18	26.86	28.59	31.30	33.63	36.02	46.00	56.53	
	120	22.54	24.04	25.80	27.68	29.65	31.68	34.84	37.54	40.30	51.78	63.86	
	140	24.08	25.87	27.91	30.08	32.34	34.66	38.24	41.30	44.42	57.35	70.90	
	10	10.05	10.10	10.34	10.66	11.00	11.37	11.94	12.42	12.92	14.93	17.01	
	20	12.53	12.69	13.07	13.53	14.03	14.56	15.37	16.07	16.78	19.76	22.91	
	40	15.90	16.30	16.94	17.67	18.45	19.26	20.53	21.63	22.76	27.56	32.74	
	60	18.46	19.09	19.98	20.97	22.02	23.12	24.85	26.34	27.88	34.43	41.48	
	80	20.61	21.49	22.63	23.88	25.21	26.59	28.76	30.64	32.58	40.79	49.58	
	100	22.52	23.64	25.04	26.56	28.16	29.83	32.44	34.69	37.01	46.81	57.23	
	120	24.27	25.64	27.29	29.07	30.95	32.90	35.94	38.57	41.26	52.56	64.52	
	140	25.89	27.51	29.43	31.48	33.63	35.86	39.32	42.30	45.35	58.10	71.54	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 50.0 Ft (RADIUS = 35.4 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TEMPERATURE
TIME INDEX RISE

CEILING HEIGHT, Ft

(Ft*s)^{1/2}

°F

	0	4	8	12	16	20	24	30	35	40	60	80
10	1.29	1.31	1.37	1.45	1.53	1.61	1.73	1.84	1.95	2.16	2.39	2.83
20	1.46	1.52	1.62	1.73	1.84	1.95	2.12	2.27	2.42	2.61	3.01	3.61
40	1.74	1.88	2.04	2.20	2.37	2.53	2.78	2.99	3.20	3.37	4.05	4.92
60	1.99	2.19	2.40	2.62	2.83	3.04	3.36	3.62	3.89	4.04	4.97	6.07
80	2.21	2.48	2.74	3.00	3.25	3.51	3.89	4.20	4.52	4.75	5.81	7.13
100	2.42	2.75	3.05	3.35	3.65	3.94	4.38	4.75	5.12	5.31	6.60	8.12
120	2.63	3.00	3.35	3.69	4.03	4.36	4.86	5.27	5.68	5.81	7.35	9.06
140	2.82	3.25	3.64	4.02	4.39	4.76	5.31	5.77	6.22	6.34	8.07	9.97
25	1.66	1.64	1.68	1.73	1.79	1.86	1.97	2.07	2.16	2.27	2.57	2.98
40	1.88	1.88	1.94	2.01	2.10	2.20	2.35	2.47	2.61	2.72	3.16	3.74
60	2.19	2.24	2.34	2.47	2.60	2.75	2.97	3.17	3.37	3.52	4.18	5.03
80	2.44	2.54	2.69	2.86	3.05	3.24	3.53	3.78	4.04	4.26	5.09	6.17
100	2.66	2.81	3.01	3.23	3.46	3.69	4.05	4.35	4.66	4.89	5.92	7.22
120	2.86	3.06	3.31	3.57	3.84	4.12	4.54	4.89	5.25	5.40	6.71	8.21
140	3.06	3.31	3.60	3.90	4.21	4.53	5.00	5.40	5.81	5.90	7.45	9.15
50	3.24	3.54	3.88	4.22	4.57	4.92	5.45	5.90	6.34	6.46	8.17	10.05
10	1.83	1.80	1.84	1.89	1.95	2.02	2.13	2.23	2.32	2.45	2.72	3.13
20	2.09	2.08	2.13	2.21	2.29	2.38	2.53	2.65	2.78	2.92	3.31	3.87
40	2.45	2.48	2.57	2.68	2.81	2.94	3.15	3.34	3.52	3.70	4.31	5.14
60	2.73	2.80	2.93	3.08	3.25	3.42	3.70	3.94	4.19	4.46	5.21	6.27
80	2.97	3.08	3.25	3.44	3.65	3.87	4.21	4.50	4.80	5.06	6.03	7.32
100	3.19	3.34	3.55	3.78	4.03	4.29	4.69	5.03	5.38	5.63	6.81	8.30
120	3.39	3.58	3.83	4.11	4.40	4.69	5.15	5.54	5.93	6.18	7.55	9.23
140	3.58	3.81	4.10	4.42	4.75	5.08	5.59	6.02	6.46	6.70	8.26	10.13
100	2.04	2.01	2.05	2.10	2.17	2.24	2.35	2.45	2.55	2.68	2.95	3.36
20	2.36	2.35	2.40	2.47	2.56	2.65	2.79	2.92	3.04	3.17	3.57	4.11
40	2.80	2.81	2.90	3.01	3.13	3.25	3.46	3.63	3.81	3.99	4.56	5.36
60	3.13	3.17	3.29	3.43	3.59	3.75	4.01	4.23	4.46	4.66	5.44	6.47
80	3.40	3.48	3.63	3.81	4.00	4.20	4.51	4.78	5.06	5.31	6.25	7.50
100	3.65	3.76	3.94	4.15	4.38	4.61	4.98	5.30	5.63	5.93	7.02	8.47
120	3.88	4.02	4.23	4.48	4.74	5.01	5.43	5.80	6.18	6.54	7.75	9.40
140	4.08	4.26	4.51	4.79	5.08	5.39	5.87	6.28	6.70	7.02	8.46	10.29
150	2.20	2.17	2.20	2.26	2.33	2.40	2.52	2.62	2.72	2.85	3.13	3.55
20	2.56	2.54	2.60	2.67	2.76	2.85	3.00	3.12	3.25	3.37	3.78	4.32
40	3.05	3.06	3.14	3.25	3.37	3.50	3.70	3.87	4.05	4.23	4.79	5.57
60	3.42	3.46	3.57	3.71	3.86	4.02	4.27	4.49	4.71	4.94	5.66	6.67
80	3.73	3.79	3.93	4.10	4.28	4.48	4.78	5.04	5.31	5.58	6.46	7.69
100	4.00	4.09	4.26	4.46	4.67	4.90	5.25	5.56	5.88	6.22	7.22	8.65
120	4.24	4.36	4.56	4.79	5.04	5.30	5.70	6.05	6.42	6.74	7.94	9.57
140	4.47	4.62	4.85	5.11	5.38	5.68	6.13	6.53	6.93	7.26	8.64	10.46

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 50.0 Ft (RADIUS = 35.4 Ft)
 FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	TEMPERATURE RISE °F	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
200	10	2.32	2.29	2.33	2.39	2.46	2.53	2.65	2.75	2.86	3.28	3.70
	20	2.72	2.70	2.76	2.83	2.92	3.02	3.17	3.29	3.42	3.96	4.50
	40	3.26	3.27	3.35	3.46	3.58	3.71	3.91	4.08	4.26	4.99	5.76
	60	3.66	3.69	3.80	3.94	4.09	4.25	4.50	4.71	4.94	5.87	6.86
	80	3.99	4.05	4.18	4.35	4.53	4.72	5.02	5.28	5.54	6.66	7.87
	100	4.28	4.36	4.53	4.72	4.93	5.15	5.50	5.80	6.11	7.42	8.82
	120	4.54	4.65	4.84	5.06	5.30	5.56	5.95	6.29	6.64	8.14	9.74
	140	4.79	4.92	5.14	5.39	5.66	5.94	6.38	6.76	7.16	8.83	10.62
300	10	2.52	2.49	2.53	2.59	2.67	2.75	2.87	2.98	3.09	3.52	3.96
	20	2.98	2.96	3.02	3.10	3.19	3.29	3.44	3.58	3.71	4.26	4.81
	40	3.59	3.60	3.68	3.79	3.91	4.04	4.25	4.43	4.61	5.35	6.11
	60	4.04	4.07	4.18	4.32	4.47	4.63	4.88	5.10	5.32	6.24	7.21
	80	4.42	4.47	4.60	4.76	4.94	5.13	5.43	5.69	5.95	7.05	8.22
	100	4.74	4.81	4.97	5.16	5.37	5.59	5.93	6.22	6.52	7.80	9.16
	120	5.03	5.13	5.31	5.53	5.76	6.01	6.39	6.72	7.06	8.51	10.06
	140	5.30	5.42	5.63	5.87	6.13	6.40	6.83	7.20	7.58	9.20	10.93
400	10	2.68	2.65	2.70	2.76	2.84	2.92	3.05	3.16	3.27	3.72	4.17
	20	3.19	3.17	3.23	3.31	3.41	3.51	3.67	3.81	3.95	4.51	5.08
	40	3.86	3.86	3.95	4.06	4.19	4.32	4.53	4.71	4.90	5.65	6.42
	60	4.36	4.38	4.49	4.63	4.78	4.95	5.20	5.42	5.65	6.57	7.54
	80	4.76	4.81	4.94	5.11	5.29	5.48	5.78	6.03	6.30	7.39	8.54
	100	5.12	5.18	5.34	5.53	5.74	5.95	6.29	6.59	6.89	8.14	9.48
	120	5.44	5.52	5.70	5.92	6.15	6.39	6.77	7.10	7.44	8.86	10.38
	140	5.73	5.83	6.04	6.27	6.53	6.80	7.22	7.59	7.96	9.54	11.24
600	10	2.95	2.92	2.96	3.03	3.11	3.20	3.33	3.45	3.57	4.05	4.52
	20	3.53	3.51	3.57	3.66	3.76	3.87	4.04	4.18	4.33	4.92	5.51
	40	4.30	4.30	4.39	4.50	4.64	4.78	5.00	5.19	5.38	6.16	6.95
	60	4.86	4.88	4.99	5.14	5.30	5.47	5.73	5.96	6.19	7.13	8.11
	80	5.32	5.36	5.50	5.67	5.85	6.05	6.36	6.62	6.88	7.99	9.13
	100	5.73	5.78	5.94	6.13	6.34	6.57	6.91	7.21	7.51	8.76	10.08
	120	6.08	6.16	6.34	6.55	6.79	7.03	7.42	7.75	8.08	9.49	10.98
	140	6.41	6.51	6.70	6.94	7.20	7.47	7.89	8.25	8.63	10.18	11.84
800	10	3.16	3.13	3.17	3.25	3.33	3.42	3.57	3.69	3.81	4.31	4.81
	20	3.80	3.78	3.84	3.94	4.04	4.16	4.33	4.49	4.64	5.26	5.87
	40	4.65	4.65	4.74	4.86	5.00	5.15	5.38	5.57	5.77	6.58	7.39
	60	5.27	5.29	5.40	5.55	5.72	5.89	6.17	6.40	6.64	7.61	8.60
	80	5.78	5.81	5.95	6.13	6.32	6.52	6.83	7.10	7.38	8.50	9.65
	100	6.22	6.27	6.43	6.63	6.84	7.07	7.42	7.72	8.03	9.30	10.62
	120	6.61	6.68	6.86	7.08	7.32	7.57	7.96	8.29	8.63	10.04	11.53
	140	6.97	7.05	7.25	7.50	7.76	8.03	8.46	8.82	9.20	10.75	12.39

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 50.0 Ft (RADIUS = 35.4 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
0 (Ft*s) ^{1/2}	°F											
	10	1.87	1.94	2.06	2.19	2.33	2.47	2.68	2.86	3.04	3.77	4.51
	20	2.20	2.37	2.56	2.75	2.95	3.15	3.46	3.72	3.97	5.01	6.07
	40	2.77	3.08	3.39	3.70	4.01	4.31	4.77	5.16	5.54	7.10	8.70
	60	3.26	3.70	4.12	4.53	4.93	5.33	5.93	6.42	6.92	8.94	11.00
	80	3.71	4.27	4.79	5.29	5.78	6.26	6.98	7.58	8.19	10.62	13.11
	100	4.14	4.81	5.42	6.01	6.58	7.14	7.98	8.67	9.37	12.20	15.09
25	120	4.54	5.32	6.02	6.69	7.33	7.97	8.92	9.71	10.50	13.70	16.98
	140	4.93	5.81	6.59	7.34	8.06	8.77	9.83	10.71	11.58	15.14	18.79
	10	2.37	2.37	2.44	2.53	2.64	2.76	2.94	3.10	3.27	3.95	4.67
	20	2.74	2.79	2.92	3.07	3.24	3.41	3.69	3.93	4.17	5.17	6.20
	40	3.30	3.47	3.71	3.97	4.25	4.53	4.97	5.34	5.71	7.23	8.81
	60	3.77	4.06	4.41	4.78	5.15	5.53	6.10	6.58	7.07	9.05	11.10
	80	4.20	4.61	5.06	5.52	5.98	6.45	7.15	7.73	8.32	10.73	13.20
50	100	4.61	5.13	5.68	6.23	6.77	7.31	8.13	8.82	9.50	12.30	15.18
	120	4.99	5.63	6.27	6.90	7.52	8.14	9.07	9.85	10.63	13.80	17.06
	140	5.36	6.11	6.83	7.54	8.24	8.93	9.97	10.84	11.71	15.24	18.87
	10	2.62	2.60	2.67	2.76	2.86	2.98	3.15	3.31	3.47	4.13	4.82
	20	3.05	3.08	3.19	3.32	3.48	3.64	3.90	4.13	4.36	5.32	6.34
	40	3.67	3.79	3.99	4.23	4.48	4.75	5.16	5.51	5.87	7.36	8.92
	60	4.17	4.39	4.69	5.02	5.37	5.72	6.27	6.74	7.22	9.17	11.20
100	80	4.61	4.93	5.33	5.75	6.19	6.63	7.31	7.88	8.46	10.84	13.30
	100	5.02	5.44	5.93	6.44	6.96	7.49	8.29	8.96	9.64	12.41	15.27
	120	5.40	5.93	6.51	7.10	7.70	8.31	9.22	9.98	10.75	13.90	17.15
	140	5.77	6.40	7.07	7.74	8.42	9.09	10.11	10.97	11.83	15.33	18.95
	10	2.94	2.92	2.99	3.08	3.18	3.30	3.47	3.63	3.78	4.43	5.11
	20	3.46	3.48	3.58	3.71	3.86	4.01	4.26	4.47	4.69	5.62	6.59
	40	4.18	4.27	4.45	4.66	4.89	5.13	5.52	5.85	6.19	7.62	9.14
150	60	4.75	4.91	5.17	5.46	5.77	6.10	6.61	7.06	7.51	9.41	11.40
	80	5.23	5.47	5.81	6.18	6.58	6.99	7.63	8.18	8.74	11.06	13.49
	100	5.66	5.99	6.41	6.86	7.34	7.83	8.59	9.24	9.90	12.62	15.45
	120	6.07	6.48	6.98	7.51	8.07	8.63	9.51	10.25	11.00	14.10	17.32
	140	6.45	6.94	7.52	8.13	8.77	9.41	10.39	11.22	12.07	15.53	19.12
	10	3.18	3.16	3.22	3.31	3.42	3.54	3.72	3.87	4.03	4.68	5.35
	20	3.76	3.77	3.87	4.00	4.15	4.31	4.55	4.76	4.98	5.88	6.84
	40	4.57	4.64	4.81	5.01	5.23	5.47	5.84	6.16	6.48	7.87	9.36
	60	5.18	5.32	5.56	5.83	6.13	6.44	6.93	7.36	7.79	9.64	11.60
	80	5.70	5.91	6.22	6.57	6.94	7.33	7.94	8.47	9.01	11.28	13.67
	100	6.17	6.45	6.83	7.25	7.69	8.16	8.89	9.51	10.15	12.82	15.63
	120	6.60	6.95	7.40	7.89	8.41	8.96	9.80	10.52	11.25	14.30	17.49
	140	7.00	7.42	7.94	8.51	9.11	9.72	10.67	11.48	12.31	15.72	19.28

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 50.0 Ft (RADIUS = 35.4 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s²)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
200	(Ft*s) ^{1/2}											
	10	3.37	3.35	3.41	3.51	3.62	3.73	3.92	4.08	4.24	4.90	5.57
	20	4.01	4.01	4.11	4.24	4.39	4.55	4.80	5.01	5.23	6.13	7.07
	40	4.88	4.94	5.11	5.31	5.53	5.76	6.12	6.43	6.76	8.12	9.57
	60	5.54	5.66	5.89	6.16	6.45	6.75	7.23	7.64	8.07	9.87	11.80
	80	6.10	6.28	6.57	6.91	7.27	7.64	8.23	8.74	9.27	11.49	13.86
	100	6.59	6.84	7.20	7.60	8.03	8.47	9.18	9.78	10.41	13.03	15.80
300	120	7.04	7.35	7.78	8.25	8.75	9.27	10.08	10.78	11.49	14.50	17.66
	140	7.46	7.84	8.33	8.87	9.44	10.03	10.94	11.73	12.54	15.91	19.44
	10	3.68	3.65	3.72	3.82	3.93	4.05	4.25	4.41	4.58	5.26	5.94
	20	4.41	4.41	4.51	4.64	4.79	4.95	5.21	5.42	5.64	6.55	7.49
	40	5.39	5.44	5.60	5.80	6.02	6.25	6.61	6.92	7.24	8.57	9.99
	60	6.12	6.23	6.45	6.71	6.99	7.29	7.75	8.15	8.56	10.31	12.19
	80	6.74	6.90	7.18	7.50	7.84	8.20	8.77	9.26	9.77	11.92	14.22
400	100	7.28	7.50	7.83	8.21	8.62	9.05	9.72	10.30	10.90	13.43	16.15
	120	7.77	8.04	8.44	8.88	9.35	9.84	10.61	11.28	11.97	14.89	17.99
	140	8.22	8.55	9.01	9.51	10.04	10.60	11.47	12.23	13.01	16.28	19.76
	10	3.93	3.90	3.97	4.07	4.19	4.32	4.51	4.68	4.86	5.55	6.26
	20	4.73	4.73	4.83	4.97	5.12	5.29	5.54	5.76	5.99	6.91	7.86
	40	5.80	5.85	6.01	6.21	6.43	6.66	7.02	7.33	7.65	8.98	10.38
	60	6.60	6.70	6.91	7.17	7.45	7.74	8.21	8.60	9.01	10.73	12.57
600	80	7.26	7.41	7.68	8.00	8.33	8.69	9.25	9.73	10.23	12.33	14.59
	100	7.85	8.05	8.37	8.74	9.14	9.55	10.21	10.77	11.36	13.83	16.50
	120	8.37	8.62	9.00	9.43	9.88	10.36	11.11	11.76	12.43	15.27	18.32
	140	8.86	9.16	9.59	10.07	10.59	11.13	11.97	12.70	13.46	16.66	20.09
	10	4.33	4.30	4.38	4.48	4.61	4.74	4.95	5.13	5.31	6.04	6.77
	20	5.25	5.24	5.35	5.49	5.65	5.83	6.10	6.33	6.56	7.51	8.48
	40	6.47	6.51	6.67	6.87	7.10	7.34	7.71	8.03	8.35	9.69	11.08
800	60	7.37	7.46	7.67	7.93	8.21	8.51	8.97	9.37	9.78	11.48	13.28
	80	8.12	8.25	8.51	8.82	9.16	9.52	10.07	10.55	11.03	13.09	15.28
	100	8.77	8.94	9.26	9.62	10.01	10.42	11.06	11.62	12.18	14.59	17.17
	120	9.36	9.58	9.94	10.35	10.80	11.26	11.99	12.62	13.27	16.01	18.98
	140	9.89	10.16	10.57	11.03	11.53	12.05	12.87	13.57	14.30	17.39	20.72
	10	4.66	4.63	4.70	4.82	4.95	5.09	5.30	5.49	5.68	6.44	7.20
	20	5.67	5.66	5.77	5.92	6.09	6.27	6.55	6.79	7.03	8.01	9.01
	40	7.01	7.04	7.21	7.42	7.65	7.90	8.28	8.60	8.94	10.30	11.70
	60	8.00	8.08	8.29	8.55	8.84	9.14	9.62	10.02	10.43	12.14	13.93
	80	8.81	8.93	9.19	9.51	9.85	10.21	10.77	11.24	11.73	13.77	15.94
	100	9.52	9.68	9.99	10.36	10.75	11.16	11.80	12.35	12.91	15.29	17.82
	120	10.16	10.36	10.71	11.13	11.57	12.03	12.75	13.38	14.02	16.71	19.62
140	10.74	10.98	11.38	11.84	12.33	12.85	13.65	14.35	15.06	18.08	21.34	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 50.0 Ft (RADIUS = 35.4 Ft)³
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	TEMPERATURE RISE °F	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
0	10	2.80	2.99	3.21	3.45	3.70	3.94	4.31	4.63	4.94	6.21	7.51
	20	3.47	3.83	4.20	4.58	4.95	5.32	5.88	6.34	6.81	8.70	10.63
	40	4.59	5.25	5.87	6.47	7.06	7.64	8.51	9.23	9.95	12.88	15.88
	60	5.58	6.50	7.33	8.13	8.90	9.67	10.81	11.76	12.71	16.55	20.48
	80	6.48	7.64	8.67	9.65	10.60	11.54	12.93	14.08	15.24	19.91	24.71
	100	7.33	8.72	9.93	11.08	12.19	13.29	14.91	16.26	17.61	23.07	28.67
	120	8.14	9.74	11.13	12.44	13.71	14.95	16.80	18.33	19.87	26.08	32.45
25	140	8.91	10.72	12.28	13.75	15.16	16.55	18.61	20.32	22.04	28.96	36.06
	10	3.44	3.49	3.64	3.83	4.03	4.25	4.59	4.88	5.17	6.40	7.67
	20	4.11	4.30	4.58	4.90	5.24	5.58	6.11	6.55	7.01	8.86	10.76
	40	5.18	5.66	6.20	6.75	7.30	7.86	8.70	9.41	10.12	13.01	15.99
	60	6.12	6.87	7.63	8.38	9.13	9.87	10.99	11.92	12.86	16.67	20.58
	80	6.99	7.99	8.95	9.89	10.81	11.72	13.09	14.23	15.38	20.02	24.80
	100	7.81	9.04	10.19	11.30	12.39	13.46	15.07	16.40	17.74	23.18	28.76
50	120	8.60	10.05	11.38	12.65	13.90	15.12	16.95	18.47	20.00	26.18	32.53
	140	9.36	11.02	12.52	13.95	15.34	16.71	18.76	20.45	22.16	29.06	36.15
	10	3.80	3.83	3.96	4.13	4.32	4.52	4.84	5.11	5.40	6.58	7.82
	20	4.54	4.68	4.92	5.21	5.51	5.83	6.33	6.76	7.20	9.01	10.90
	40	5.66	6.04	6.51	7.02	7.54	8.08	8.89	9.58	10.28	13.14	16.10
	60	6.60	7.22	7.92	8.63	9.34	10.07	11.16	12.08	13.01	16.78	20.68
	80	7.46	8.32	9.22	10.12	11.01	11.91	13.25	14.38	15.51	20.13	24.90
100	100	8.27	9.36	10.45	11.52	12.58	13.64	15.22	16.55	17.87	23.28	28.85
	120	9.04	10.36	11.63	12.86	14.08	15.29	17.10	18.61	20.12	26.28	32.62
	140	9.79	11.31	12.76	14.15	15.52	16.87	18.90	20.58	22.28	29.15	36.23
	10	4.30	4.31	4.43	4.59	4.77	4.96	5.27	5.53	5.80	6.93	8.13
	20	5.16	5.25	5.47	5.72	6.00	6.29	6.76	7.16	7.58	9.32	11.16
	40	6.40	6.68	7.08	7.53	8.00	8.50	9.27	9.93	10.61	13.41	16.33
	60	7.40	7.88	8.47	9.11	9.77	10.46	11.51	12.40	13.30	17.02	20.89
150	80	8.28	8.96	9.75	10.57	11.42	12.27	13.58	14.68	15.79	20.36	25.08
	100	9.10	9.98	10.96	11.96	12.97	13.99	15.53	16.83	18.14	23.49	29.03
	120	9.87	10.96	12.11	13.28	14.45	15.62	17.39	18.88	20.37	26.48	32.79
	140	10.60	11.90	13.23	14.55	15.87	17.19	19.18	20.84	22.52	29.34	36.39
	10	4.65	4.66	4.78	4.94	5.12	5.31	5.61	5.87	6.14	7.25	8.42
	20	5.61	5.69	5.89	6.14	6.41	6.69	7.14	7.53	7.93	9.62	11.42
	40	6.96	7.20	7.57	7.99	8.43	8.90	9.64	10.28	10.93	13.66	16.55
	60	8.02	8.43	8.97	9.56	10.19	10.84	11.85	12.71	13.60	17.26	21.09
	80	8.95	9.53	10.25	11.01	11.81	12.63	13.90	14.97	16.07	20.58	25.27
	100	9.79	10.56	11.44	12.38	13.35	14.33	15.83	17.11	18.40	23.70	29.21
	120	10.58	11.53	12.59	13.69	14.81	15.95	17.68	19.14	20.62	26.68	32.96
	140	11.32	12.46	13.69	14.95	16.23	17.51	19.46	21.10	22.76	29.54	36.55

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 50.0 Ft (RADIUS = 35.4 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft													
		(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60	80	
200	10		4.95	4.95	5.06	5.23	5.41	5.60	5.90	6.17	6.43	7.54	8.70		
	20		5.98	6.05	6.25	6.49	6.76	7.04	7.48	7.86	8.25	9.91	11.68		
	40		7.43	7.64	7.99	8.39	8.82	9.28	9.99	10.61	11.24	13.92	16.77		
	60		8.55	8.92	9.42	9.99	10.58	11.21	12.18	13.02	13.89	17.49	21.29		
	80		9.52	10.04	10.71	11.43	12.20	12.99	14.22	15.27	16.34	20.79	25.46		
	100		10.39	11.08	11.90	12.79	13.72	14.67	16.14	17.39	18.66	23.91	29.39		
	120		11.20	12.05	13.04	14.09	15.17	16.28	17.97	19.41	20.87	26.88	33.13		
	140		11.96	12.98	14.14	15.34	16.57	17.83	19.74	21.36	23.00	29.73	36.72		
300	10		5.42	5.41	5.53	5.70	5.88	6.08	6.39	6.66	6.93	8.04	9.20		
	20		6.59	6.64	6.84	7.08	7.34	7.62	8.06	8.44	8.82	10.45	12.17		
	40		8.19	8.38	8.71	9.09	9.51	9.94	10.63	11.22	11.83	14.43	17.21		
	60		9.42	9.74	10.21	10.74	11.30	11.89	12.82	13.63	14.45	17.96	21.69		
	80		10.47	10.92	11.53	12.20	12.92	13.67	14.83	15.84	16.88	21.23	25.83		
	100		11.40	11.99	12.74	13.56	14.43	15.33	16.73	17.94	19.17	24.32	29.74		
	120		12.25	12.99	13.89	14.86	15.87	16.92	18.55	19.94	21.36	27.27	33.46		
	140		13.05	13.94	14.98	16.10	17.26	18.45	20.30	21.87	23.48	30.11	37.04		
400	10		5.80	5.79	5.91	6.08	6.27	6.47	6.79	7.06	7.34	8.47	9.63		
	20		7.08	7.13	7.32	7.56	7.83	8.11	8.55	8.93	9.32	10.93	12.63		
	40		8.82	8.99	9.31	9.69	10.09	10.52	11.20	11.78	12.38	14.91	17.64		
	60		10.14	10.43	10.88	11.39	11.94	12.51	13.41	14.19	15.00	18.41	22.08		
	80		11.25	11.66	12.24	12.89	13.57	14.29	15.42	16.40	17.40	21.66	26.20		
	100		12.24	12.78	13.49	14.27	15.09	15.96	17.31	18.48	19.68	24.73	30.09		
	120		13.14	13.81	14.65	15.57	16.53	17.54	19.11	20.46	21.85	27.67	33.80		
	140		13.98	14.78	15.75	16.81	17.91	19.06	20.85	22.38	23.95	30.49	37.37		
600	10		6.42	6.41	6.53	6.71	6.91	7.12	7.45	7.73	8.02	9.19	10.38		
	20		7.87	7.91	8.11	8.35	8.63	8.92	9.37	9.76	10.15	11.78	13.47		
	40		9.84	9.98	10.30	10.67	11.08	11.51	12.17	12.75	13.34	15.82	18.47		
	60		11.31	11.56	11.99	12.49	13.02	13.58	14.46	15.22	15.99	19.30	22.86		
	80		12.54	12.90	13.45	14.06	14.72	15.42	16.50	17.43	18.40	22.51	26.94		
	100		13.62	14.09	14.75	15.49	16.28	17.10	18.39	19.51	20.66	25.54	30.79		
	120		14.60	15.19	15.97	16.83	17.74	18.69	20.18	21.48	22.81	28.45	34.47		
	140		15.51	16.21	17.10	18.09	19.13	20.21	21.90	23.37	24.88	31.24	38.02		
800	10		6.92	6.90	7.03	7.22	7.42	7.64	7.99	8.28	8.58	9.78	11.00		
	20		8.52	8.55	8.75	9.00	9.28	9.58	10.04	10.44	10.84	12.50	14.20		
	40		10.66	10.80	11.11	11.49	11.90	12.33	13.00	13.58	14.17	16.63	19.25		
	60		12.26	12.49	12.92	13.41	13.94	14.50	15.37	16.12	16.89	20.13	23.62		
	80		13.59	13.92	14.45	15.06	15.71	16.39	17.45	18.37	19.32	23.33	27.66		
	100		14.76	15.19	15.83	16.55	17.31	18.12	19.37	20.46	21.58	26.34	31.48		
	120		15.81	16.34	17.09	17.92	18.81	19.73	21.18	22.43	23.72	29.22	35.14		
	140		16.78	17.42	18.27	19.21	20.22	21.26	22.90	24.32	25.78	31.99	38.66		

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 50.0 Ft (RADIUS = 35.4 Ft)³
 FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	(Ft*s) ^{1/2}	CEILING HEIGHT, Ft											
			°F	4	8	12	16	20	24	30	35	40	60	80
0	10	4.36	4.78	5.23	5.68	6.13	6.58	7.03	7.48	7.93	8.38	10.68	13.02	
	20	5.70	6.47	7.21	7.93	8.63	9.33	10.03	10.73	11.43	12.13	15.65	19.27	
	40	7.95	9.32	10.55	11.71	12.85	13.97	15.03	16.13	17.23	18.41	24.02	29.76	
	60	9.92	11.81	13.47	15.03	16.54	18.03	19.54	21.03	22.53	24.03	31.35	38.97	
	80	11.73	14.10	16.15	18.08	19.94	21.77	24.48	26.72	28.98	31.09	38.08	47.42	
	100	13.42	16.25	18.67	20.94	23.12	25.27	28.45	31.09	33.73	36.40	44.40	55.35	
	120	15.04	18.29	21.07	23.66	26.15	28.60	32.23	35.23	38.24	41.24	50.41	62.90	
	140	16.59	20.25	23.36	26.27	29.06	31.80	35.85	39.21	42.57	45.82	56.17	70.13	
25	10	5.12	5.34	5.68	6.06	6.47	6.89	7.31	7.73	8.15	8.62	10.87	13.18	
	20	6.39	6.96	7.60	8.26	8.92	9.60	10.27	10.93	11.60	12.32	15.81	19.40	
	40	8.55	9.73	10.87	11.99	13.09	14.19	15.27	16.35	17.43	18.57	24.15	29.88	
	60	10.46	12.18	13.76	15.28	16.77	18.23	19.69	21.15	22.61	24.07	31.47	39.07	
	80	12.23	14.44	16.43	18.31	20.15	21.95	24.64	26.88	29.12	31.36	38.19	47.51	
	100	13.91	16.57	18.93	21.16	23.32	25.45	28.60	31.23	33.86	36.49	44.50	55.44	
	120	15.50	18.60	21.32	23.87	26.34	28.77	32.37	35.37	38.37	41.37	50.51	62.98	
	140	17.03	20.55	23.60	26.47	29.24	31.96	35.99	39.34	42.69	46.04	56.27	70.21	
50	10	5.64	5.79	6.08	6.43	6.80	7.19	7.58	7.97	8.36	8.85	11.05	13.34	
	20	6.97	7.41	7.97	8.58	9.21	9.85	10.48	11.11	11.74	12.51	15.97	19.53	
	40	9.11	10.13	11.19	12.26	13.34	14.41	15.48	16.55	17.62	18.74	24.28	29.99	
	60	10.99	12.54	14.06	15.53	16.99	18.43	19.87	21.31	22.75	24.22	31.58	39.17	
	80	12.73	14.78	16.70	18.54	20.35	22.14	24.80	27.03	29.25	31.47	38.30	47.61	
	100	14.38	16.90	19.19	21.38	23.51	25.62	28.76	31.37	33.99	36.61	44.61	55.53	
	120	15.96	18.91	21.56	24.08	26.53	28.94	32.52	35.51	38.49	41.47	50.61	63.07	
	140	17.47	20.85	23.84	26.67	29.42	32.12	36.13	39.47	42.82	46.17	56.36	70.29	
100	10	6.37	6.47	6.73	7.04	7.38	7.74	8.09	8.45	8.81	9.30	11.42	13.65	
	20	7.85	8.17	8.65	9.19	9.76	10.36	10.95	11.55	12.15	12.90	16.28	19.80	
	40	10.08	10.89	11.82	12.81	13.82	14.84	15.85	16.87	17.90	19.07	24.54	30.21	
	60	11.97	13.26	14.63	16.03	17.42	18.83	20.23	21.63	23.03	24.51	31.82	39.37	
	80	13.69	15.46	17.24	19.01	20.76	22.51	25.13	27.33	29.53	31.73	38.52	47.80	
	100	15.30	17.54	19.70	21.82	23.90	25.97	29.07	31.65	34.25	36.85	44.82	55.71	
	120	16.85	19.53	22.06	24.50	26.90	29.27	32.82	35.78	38.75	41.72	50.81	63.24	
	140	18.34	21.44	24.32	27.08	29.78	32.44	36.42	39.73	43.06	46.39	56.56	70.46	
150	10	6.91	6.99	7.23	7.53	7.86	8.21	8.56	8.91	9.26	9.71	11.77	13.96	
	20	8.52	8.79	9.23	9.73	10.27	10.84	11.41	11.98	12.55	13.28	16.58	20.06	
	40	10.88	11.57	12.41	13.33	14.29	15.27	16.23	17.20	18.17	19.39	24.80	30.44	
	60	12.81	13.93	15.20	16.51	17.86	19.22	21.29	23.04	24.81	26.58	32.06	39.57	
	80	14.55	16.11	17.78	19.46	21.16	22.87	25.45	27.62	29.81	32.00	38.74	47.98	
	100	16.16	18.17	20.21	22.25	24.29	26.32	29.38	31.94	34.51	37.08	45.03	55.89	
	120	17.70	20.13	22.54	24.92	27.27	29.61	33.11	36.05	39.00	41.95	51.01	63.41	
	140	19.17	22.03	24.79	27.48	30.13	32.76	36.70	39.99	43.30	46.61	56.75	70.62	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 50.0 Ft (RADIUS = 35.4 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	(Ft*s) ^{1/2}	CEILING HEIGHT, Ft											
			°F	4	8	12	16	20	24	30	35	40	60	80
200	10	7.35	7.42	7.66	7.95	8.28	8.62	9.16	9.62	10.10	12.12	14.27		
	20	9.07	9.32	9.73	10.22	10.74	11.28	12.14	12.89	13.65	16.89	20.32		
	40	11.56	12.17	12.96	13.83	14.75	15.70	17.17	18.43	19.72	25.06	30.66		
	60	13.55	14.56	15.74	16.99	18.29	19.61	21.64	23.36	25.11	32.30	39.78		
	80	15.32	16.74	18.30	19.92	21.57	23.24	25.78	27.92	30.09	38.96	48.17		
	100	16.95	18.78	20.72	22.68	24.67	26.67	29.68	32.22	34.78	45.24	56.07		
	120	18.49	20.73	23.03	25.33	27.63	29.94	33.41	36.32	39.25	51.21	63.58		
300	140	19.96	22.61	25.26	27.88	30.48	33.08	36.99	40.25	43.54	56.94	70.79		
	10	8.07	8.13	8.36	8.65	8.97	9.31	9.85	10.31	10.78	12.76	14.85		
	20	9.98	10.19	10.58	11.05	11.55	12.08	12.90	13.62	14.36	17.49	20.84		
	40	12.68	13.21	13.94	14.75	15.60	16.50	17.90	19.11	20.36	25.58	31.10		
	60	14.81	15.68	16.74	17.90	19.12	20.37	22.32	23.99	25.69	32.77	40.18		
	80	16.66	17.88	19.30	20.80	22.36	23.96	26.42	28.51	30.63	39.40	48.55		
	100	18.34	19.92	21.69	23.54	25.43	27.35	30.29	32.78	35.30	45.65	56.42		
400	120	19.91	21.86	23.98	26.15	28.36	30.60	33.99	36.85	39.75	51.61	63.92		
	140	21.40	23.73	26.18	28.67	31.19	33.72	37.55	40.77	44.02	57.32	71.11		
	10	8.65	8.70	8.93	9.23	9.55	9.89	10.43	10.89	11.37	13.33	15.40		
	20	10.73	10.91	11.30	11.75	12.25	12.77	13.58	14.28	15.01	18.07	21.35		
	40	13.62	14.10	14.79	15.56	16.39	17.25	18.60	19.78	20.98	26.09	31.54		
	60	15.86	16.65	17.65	18.74	19.90	21.11	22.99	24.61	26.27	33.24	40.58		
	80	17.80	18.90	20.22	21.64	23.13	24.67	27.05	29.10	31.18	39.84	48.92		
600	100	19.54	20.97	22.61	24.36	26.17	28.03	30.90	33.34	35.82	46.07	56.78		
	120	21.16	22.92	24.89	26.95	29.08	31.25	34.57	37.39	40.24	52.00	64.26		
	140	22.68	24.78	27.07	29.45	31.89	34.35	38.11	41.29	44.50	57.71	71.44		
	10	9.60	9.64	9.87	10.17	10.50	10.85	11.40	11.88	12.36	14.34	16.40		
	20	11.93	12.10	12.47	12.92	13.42	13.93	14.74	15.44	16.15	19.14	22.34		
	40	15.15	15.57	16.22	16.96	17.75	18.58	19.88	21.01	22.17	27.10	32.41		
	60	17.60	18.29	19.22	20.24	21.34	22.48	24.27	25.81	27.41	34.16	41.38		
800	80	19.69	20.65	21.86	23.18	24.57	26.02	28.29	30.25	32.26	40.71	49.67		
	100	21.56	22.80	24.29	25.90	27.60	29.36	32.09	34.44	36.84	46.90	57.48		
	120	23.27	24.79	26.58	28.49	30.48	32.54	35.72	38.45	41.23	52.80	64.93		
	140	24.86	26.69	28.76	30.96	33.25	35.60	39.22	42.31	45.45	58.47	72.09		
	10	10.37	10.40	10.63	10.94	11.28	11.64	12.21	12.69	13.18	15.20	17.27		
	20	12.92	13.07	13.44	13.89	14.39	14.91	15.73	16.42	17.14	20.11	23.27		
	40	16.40	16.78	17.42	18.15	18.93	19.74	21.02	22.12	23.26	28.08	33.28		
	60	19.04	19.66	20.55	21.55	22.61	23.71	25.45	26.95	28.49	35.08	42.17		
	80	21.26	22.14	23.28	24.55	25.89	27.28	29.47	31.36	33.31	41.58	50.41		
	100	23.24	24.37	25.77	27.31	28.93	30.61	33.24	35.52	37.86	47.72	58.19		
	120	25.04	26.43	28.10	29.90	31.80	33.78	36.85	39.49	42.21	53.58	65.61		
	140	26.71	28.36	30.30	32.38	34.56	36.82	40.32	43.32	46.40	59.23	72.74		

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 52.0 Ft (RADIUS = 36.8 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60
0	10	1.34	1.36	1.42	1.49	1.57	1.65	1.77	1.88	1.99	2.43	2.87	
	20	1.51	1.58	1.67	1.78	1.89	2.00	2.18	2.32	2.47	3.06	3.66	
	40	1.80	1.94	2.10	2.27	2.43	2.60	2.85	3.06	3.27	4.13	5.00	
	60	2.06	2.27	2.48	2.69	2.91	3.12	3.44	3.71	3.98	5.06	6.17	
	80	2.29	2.56	2.83	3.09	3.35	3.60	3.98	4.30	4.62	5.92	7.24	
	100	2.51	2.84	3.15	3.46	3.76	4.05	4.49	4.86	5.23	6.72	8.25	
	120	2.72	3.10	3.46	3.81	4.15	4.48	4.98	5.39	5.81	7.49	9.21	
	140	2.92	3.36	3.76	4.14	4.52	4.89	5.44	5.90	6.36	8.23	10.13	
	25	10	1.72	1.69	1.73	1.78	1.84	1.91	2.02	2.11	2.21	2.61	3.03
		20	1.94	1.94	1.99	2.07	2.16	2.25	2.40	2.53	2.66	3.22	3.80
40		2.26	2.31	2.41	2.54	2.67	2.82	3.04	3.24	3.44	4.26	5.11	
60		2.52	2.62	2.77	2.94	3.13	3.32	3.62	3.87	4.13	5.18	6.27	
80		2.75	2.90	3.10	3.32	3.55	3.79	4.15	4.46	4.76	6.03	7.34	
100		2.96	3.16	3.41	3.68	3.95	4.23	4.65	5.01	5.37	6.83	8.34	
120		3.16	3.41	3.71	4.02	4.33	4.65	5.13	5.53	5.94	7.59	9.29	
140		3.35	3.66	4.00	4.35	4.70	5.05	5.59	6.04	6.49	8.32	10.21	
50		10	1.89	1.86	1.89	1.94	2.00	2.07	2.18	2.27	2.37	2.76	3.17
		20	2.15	2.14	2.19	2.27	2.35	2.44	2.58	2.71	2.83	3.37	3.93
	40	2.53	2.55	2.64	2.76	2.88	3.01	3.23	3.41	3.60	4.39	5.22	
	60	2.82	2.88	3.01	3.17	3.33	3.51	3.79	4.03	4.28	5.30	6.37	
	80	3.07	3.17	3.34	3.54	3.75	3.97	4.31	4.60	4.90	6.14	7.43	
	100	3.29	3.44	3.65	3.89	4.14	4.40	4.80	5.15	5.50	6.94	8.43	
	120	3.50	3.69	3.95	4.22	4.52	4.82	5.28	5.67	6.06	7.69	9.38	
	140	3.70	3.93	4.23	4.55	4.88	5.21	5.73	6.17	6.61	8.42	10.29	
	100	10	2.11	2.08	2.11	2.16	2.22	2.29	2.41	2.50	2.60	3.00	3.41
		20	2.44	2.42	2.47	2.54	2.62	2.71	2.86	2.98	3.10	3.63	4.17
40		2.88	2.90	2.98	3.09	3.21	3.33	3.53	3.71	3.89	4.64	5.44	
60		3.22	3.27	3.38	3.52	3.68	3.84	4.10	4.33	4.56	5.53	6.57	
80		3.51	3.59	3.73	3.91	4.10	4.30	4.62	4.89	5.17	6.36	7.62	
100		3.77	3.87	4.05	4.26	4.49	4.73	5.10	5.42	5.76	7.14	8.61	
120		4.00	4.14	4.35	4.60	4.86	5.14	5.56	5.93	6.31	7.89	9.55	
140		4.21	4.39	4.64	4.92	5.22	5.53	6.01	6.42	6.85	8.61	10.46	
150		10	2.27	2.23	2.26	2.32	2.39	2.46	2.57	2.67	2.77	3.18	3.60
		20	2.64	2.62	2.67	2.74	2.83	2.92	3.06	3.19	3.32	3.84	4.38
	40	3.15	3.15	3.23	3.34	3.46	3.58	3.78	3.95	4.13	4.87	5.65	
	60	3.52	3.56	3.67	3.80	3.96	4.12	4.37	4.59	4.81	5.76	6.77	
	80	3.84	3.90	4.04	4.21	4.39	4.59	4.89	5.15	5.43	6.58	7.81	
	100	4.12	4.21	4.38	4.58	4.79	5.02	5.38	5.68	6.00	7.35	8.78	
	120	4.37	4.49	4.69	4.92	5.17	5.43	5.84	6.19	6.55	8.09	9.72	
	140	4.61	4.76	4.98	5.25	5.53	5.82	6.28	6.68	7.08	8.80	10.62	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 52.0 Ft (RADIUS = 36.8 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60
200	10	2.39	2.36	2.39	2.45	2.52	2.59	2.71	2.81	2.91	3.33	3.75	
	20	2.81	2.78	2.83	2.91	3.00	3.09	3.24	3.36	3.49	4.02	4.57	
	40	3.36	3.36	3.44	3.55	3.67	3.79	3.99	4.17	4.34	5.08	5.85	
	60	3.77	3.80	3.90	4.04	4.19	4.35	4.60	4.82	5.04	5.97	6.96	
	80	4.11	4.17	4.30	4.46	4.64	4.83	5.13	5.39	5.66	6.78	7.99	
	100	4.41	4.49	4.65	4.85	5.06	5.28	5.63	5.93	6.24	7.55	8.96	
	120	4.68	4.79	4.98	5.20	5.44	5.69	6.09	6.43	6.79	8.29	9.89	
300	140	4.93	5.07	5.28	5.53	5.80	6.09	6.53	6.92	7.31	8.99	10.78	
	10	2.60	2.57	2.60	2.66	2.73	2.81	2.93	3.04	3.15	3.58	4.02	
	20	3.07	3.05	3.10	3.18	3.27	3.36	3.52	3.65	3.78	4.33	4.88	
	40	3.70	3.70	3.78	3.89	4.01	4.14	4.34	4.52	4.70	5.44	6.21	
	60	4.17	4.19	4.29	4.43	4.58	4.74	4.99	5.21	5.43	6.35	7.32	
	80	4.55	4.59	4.73	4.89	5.07	5.26	5.55	5.81	6.07	7.17	8.34	
	100	4.89	4.95	5.11	5.30	5.50	5.72	6.06	6.36	6.66	7.93	9.30	
400	120	5.19	5.28	5.46	5.67	5.91	6.15	6.54	6.87	7.21	8.66	10.22	
	140	5.46	5.58	5.78	6.02	6.28	6.56	6.99	7.36	7.74	9.36	11.11	
	10	2.77	2.73	2.77	2.83	2.91	2.99	3.11	3.22	3.33	3.78	4.23	
	20	3.29	3.26	3.32	3.40	3.49	3.59	3.75	3.88	4.02	4.58	5.15	
	40	3.98	3.97	4.06	4.17	4.29	4.42	4.63	4.81	5.00	5.75	6.52	
	60	4.49	4.50	4.61	4.75	4.90	5.06	5.32	5.54	5.76	6.68	7.65	
	80	4.91	4.95	5.08	5.24	5.42	5.61	5.91	6.16	6.42	7.52	8.67	
600	100	5.27	5.33	5.49	5.67	5.88	6.10	6.44	6.73	7.03	8.29	9.63	
	120	5.60	5.68	5.86	6.07	6.30	6.54	6.93	7.25	7.59	9.02	10.54	
	140	5.90	6.00	6.20	6.44	6.69	6.96	7.39	7.75	8.13	9.71	11.42	
	10	3.04	3.00	3.04	3.11	3.18	3.27	3.41	3.52	3.64	4.11	4.59	
	20	3.64	3.61	3.66	3.75	3.85	3.96	4.12	4.27	4.41	5.00	5.59	
	40	4.43	4.42	4.50	4.62	4.75	4.89	5.11	5.30	5.49	6.26	7.05	
	60	5.01	5.02	5.13	5.27	5.43	5.60	5.86	6.08	6.31	7.26	8.23	
800	80	5.48	5.51	5.65	5.81	6.00	6.19	6.50	6.76	7.02	8.12	9.27	
	100	5.90	5.95	6.10	6.29	6.50	6.72	7.06	7.36	7.66	8.92	10.24	
	120	6.27	6.33	6.51	6.72	6.96	7.20	7.58	7.91	8.25	9.66	11.15	
	140	6.60	6.69	6.89	7.12	7.38	7.65	8.07	8.43	8.80	10.36	12.02	
	10	3.26	3.22	3.26	3.33	3.41	3.50	3.64	3.76	3.89	4.38	4.87	
	20	3.92	3.89	3.95	4.04	4.14	4.25	4.43	4.58	4.73	5.34	5.96	
	40	4.79	4.78	4.87	4.99	5.12	5.27	5.50	5.69	5.89	6.69	7.50	
	60	5.43	5.44	5.55	5.69	5.86	6.03	6.30	6.54	6.77	7.74	8.73	
	80	5.95	5.98	6.11	6.28	6.47	6.67	6.98	7.25	7.52	8.64	9.80	
	100	6.41	6.45	6.60	6.80	7.01	7.24	7.59	7.89	8.19	9.46	10.78	
	120	6.81	6.87	7.04	7.26	7.50	7.75	8.14	8.47	8.81	10.22	11.70	
	140	7.18	7.25	7.45	7.69	7.95	8.22	8.65	9.01	9.38	10.94	12.58	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 52.0 Ft. (RADIUS = 36.8 Ft.)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
0 													

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 52.0 Ft (RADIUS = 36.8 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
200 (Ft*s) ^{1/2}	°F												
	10	3.48	3.44	3.51	3.60	3.70	3.82	4.00	4.16	4.32	4.98	5.65	
	20	4.13	4.13	4.23	4.36	4.50	4.66	4.90	5.12	5.33	6.23	7.18	
	40	5.03	5.09	5.25	5.45	5.67	5.90	6.26	6.57	6.90	8.26	9.72	
	60	5.71	5.83	6.06	6.32	6.61	6.92	7.39	7.81	8.24	10.05	11.98	
	80	6.28	6.47	6.76	7.10	7.46	7.83	8.43	8.94	9.47	11.70	14.08	
	100	6.79	7.04	7.40	7.81	8.24	8.69	9.40	10.01	10.63	13.27	16.06	
300	120	7.26	7.57	8.00	8.48	8.98	9.50	10.32	11.03	11.75	14.77	17.94	
	140	7.69	8.08	8.57	9.11	9.69	10.29	11.21	12.01	12.82	16.21	19.76	
	10	3.79	3.76	3.82	3.92	4.03	4.15	4.34	4.50	4.67	5.34	6.03	
	20	4.54	4.53	4.63	4.76	4.91	5.07	5.32	5.54	5.76	6.66	7.60	
	40	5.55	5.60	5.76	5.95	6.17	6.40	6.76	7.07	7.39	8.72	10.14	
	60	6.31	6.41	6.63	6.89	7.17	7.46	7.93	8.33	8.74	10.50	12.38	
	80	6.95	7.10	7.38	7.70	8.04	8.40	8.97	9.47	9.98	12.13	14.45	
400	100	7.50	7.72	8.05	8.43	8.84	9.27	9.94	10.53	11.13	13.68	16.41	
	120	8.01	8.28	8.67	9.12	9.59	10.09	10.87	11.54	12.23	15.16	18.28	
	140	8.48	8.81	9.26	9.77	10.31	10.87	11.75	12.51	13.29	16.59	20.08	
	10	4.05	4.01	4.08	4.18	4.29	4.42	4.61	4.78	4.95	5.65	6.35	
	20	4.87	4.86	4.96	5.09	5.25	5.41	5.67	5.89	6.11	7.03	7.97	
	40	5.98	6.02	6.17	6.37	6.59	6.82	7.18	7.49	7.81	9.14	10.54	
	60	6.80	6.89	7.10	7.36	7.64	7.93	8.39	8.79	9.20	10.92	12.76	
600	80	7.49	7.63	7.89	8.21	8.54	8.90	9.46	9.94	10.44	12.55	14.82	
	100	8.09	8.28	8.60	8.97	9.37	9.79	10.44	11.01	11.60	14.08	16.76	
	120	8.63	8.87	9.25	9.68	10.14	10.62	11.37	12.02	12.69	15.55	18.62	
	140	9.13	9.43	9.86	10.34	10.86	11.40	12.25	12.99	13.75	16.97	20.41	
	10	4.47	4.43	4.49	4.60	4.72	4.85	5.06	5.23	5.41	6.14	6.87	
	20	5.41	5.39	5.49	5.63	5.79	5.96	6.23	6.46	6.69	7.64	8.61	
	40	6.66	6.69	6.85	7.05	7.27	7.51	7.88	8.20	8.52	9.86	11.25	
800	60	7.59	7.67	7.88	8.13	8.42	8.71	9.17	9.57	9.98	11.68	13.48	
	80	8.36	8.48	8.74	9.05	9.39	9.74	10.30	10.77	11.26	13.32	15.52	
	100	9.03	9.20	9.51	9.87	10.26	10.67	11.32	11.87	12.44	14.85	17.45	
	120	9.64	9.85	10.21	10.62	11.07	11.54	12.27	12.90	13.55	16.31	19.28	
	140	10.19	10.45	10.86	11.32	11.82	12.35	13.16	13.87	14.60	17.71	21.05	
	10	4.80	4.76	4.83	4.94	5.07	5.20	5.42	5.60	5.79	6.55	7.30	
	20	5.84	5.82	5.92	6.07	6.24	6.41	6.69	6.93	7.17	8.15	9.14	
	40	7.22	7.24	7.40	7.61	7.84	8.08	8.46	8.79	9.12	10.47	11.88	
	60	8.24	8.30	8.51	8.77	9.06	9.36	9.83	10.23	10.64	12.35	14.14	
	80	9.08	9.19	9.44	9.75	10.09	10.45	11.01	11.48	11.97	14.02	16.19	
	100	9.81	9.96	10.26	10.62	11.02	11.43	12.07	12.62	13.18	15.56	18.10	
	120	10.46	10.65	11.01	11.42	11.86	12.32	13.04	13.67	14.31	17.02	19.93	
	140	11.06	11.30	11.69	12.15	12.64	13.16	13.97	14.66	15.38	18.41	21.68	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 52.0 Ft (RADIUS = 36.8 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
0 (Ft*s) ^{1/2}	10	2.90	3.09	3.31	3.55	3.80	4.04	4.42	4.73	5.05	6.32	7.62	
	20	3.60	3.96	4.34	4.71	5.09	5.46	6.02	6.49	6.96	8.86	10.80	
	40	4.76	5.43	6.06	6.67	7.26	7.85	8.72	9.45	10.18	13.12	16.14	
	60	5.78	6.72	7.57	8.38	9.16	9.94	11.09	12.04	13.00	16.86	20.81	
	80	6.72	7.91	8.96	9.95	10.91	11.86	13.26	14.42	15.59	20.29	25.11	
	100	7.60	9.02	10.26	11.42	12.55	13.66	15.30	16.66	18.02	23.52	29.15	
	120	8.44	10.08	11.50	12.83	14.11	15.37	17.24	18.78	20.33	26.58	32.98	
	140	9.24	11.09	12.68	14.17	15.61	17.01	19.10	20.82	22.55	29.52	36.66	
	25	10	3.55	3.60	3.75	3.93	4.14	4.35	4.69	4.98	5.28	6.51	7.78
		20	4.24	4.43	4.72	5.04	5.38	5.73	6.26	6.70	7.16	9.02	10.93
40		5.35	5.84	6.39	6.95	7.51	8.07	8.92	9.63	10.35	13.26	16.25	
60		6.33	7.10	7.87	8.63	9.39	10.14	11.26	12.21	13.15	16.98	20.92	
80		7.23	8.26	9.23	10.18	11.12	12.04	13.42	14.58	15.73	20.41	25.21	
100		8.09	9.35	10.52	11.65	12.75	13.83	15.45	16.80	18.15	23.62	29.24	
120		8.91	10.39	11.75	13.04	14.30	15.54	17.39	18.92	20.46	26.68	33.07	
140		9.69	11.39	12.93	14.38	15.79	17.18	19.24	20.95	22.67	29.62	36.74	
50		10	3.93	3.95	4.08	4.24	4.43	4.63	4.95	5.23	5.51	6.70	7.94
		20	4.69	4.82	5.07	5.35	5.66	5.98	6.48	6.92	7.36	9.18	11.07
	40	5.85	6.23	6.71	7.22	7.75	8.29	9.11	9.81	10.51	13.39	16.36	
	60	6.83	7.46	8.16	8.88	9.61	10.34	11.44	12.37	13.30	17.10	21.02	
	80	7.72	8.60	9.51	10.42	11.33	12.23	13.59	14.73	15.87	20.52	25.30	
	100	8.56	9.67	10.78	11.87	12.94	14.01	15.61	16.95	18.29	23.73	29.33	
	120	9.36	10.70	12.00	13.25	14.49	15.71	17.54	19.06	20.59	26.78	33.16	
	140	10.13	11.69	13.17	14.58	15.97	17.34	19.38	21.09	22.79	29.71	36.83	
	100	10	4.43	4.44	4.55	4.71	4.89	5.08	5.38	5.65	5.92	7.05	8.25
		20	5.32	5.41	5.62	5.88	6.16	6.45	6.92	7.32	7.74	9.49	11.33
40		6.60	6.88	7.29	7.74	8.22	8.72	9.50	10.16	10.84	13.65	16.59	
60		7.64	8.12	8.72	9.37	10.04	10.73	11.79	12.69	13.60	17.34	21.22	
80		8.55	9.25	10.04	10.88	11.73	12.60	13.92	15.03	16.15	20.74	25.49	
100		9.40	10.30	11.29	12.31	13.33	14.36	15.92	17.23	18.55	23.94	29.51	
120		10.19	11.31	12.49	13.67	14.86	16.05	17.83	19.33	20.84	26.99	33.33	
140		10.96	12.29	13.64	14.99	16.33	17.66	19.67	21.35	23.04	29.91	36.99	
150		10	4.80	4.80	4.91	5.07	5.25	5.44	5.74	6.00	6.26	7.38	8.55
		20	5.79	5.86	6.06	6.30	6.57	6.85	7.30	7.69	8.09	9.79	11.60
	40	7.18	7.42	7.79	8.21	8.66	9.13	9.87	10.51	11.17	13.92	16.81	
	60	8.28	8.69	9.23	9.83	10.47	11.12	12.14	13.01	13.90	17.58	21.43	
	80	9.24	9.83	10.55	11.33	12.14	12.97	14.24	15.33	16.43	20.97	25.68	
	100	10.11	10.89	11.79	12.74	13.72	14.71	16.23	17.52	18.82	24.15	29.69	
	120	10.92	11.89	12.97	14.09	15.23	16.38	18.13	19.60	21.09	27.19	33.50	
	140	11.69	12.85	14.11	15.39	16.68	17.99	19.96	21.61	23.28	30.10	37.16	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 52.0 Ft (RADIUS = 36.8 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	(Ft*s) ^{1/2}	CEILING HEIGHT, Ft											
			°F	4	8	12	16	20	24	30	35	40	60	80
200	10	5.10	5.09	5.21	5.36	5.54	5.73	6.03	6.30	6.56	7.67	8.83		
	20	6.17	6.23	6.42	6.66	6.93	7.21	7.65	8.03	8.42	10.08	11.85		
	40	7.66	7.87	8.22	8.62	9.05	9.51	10.22	10.84	11.48	14.18	17.04		
	60	8.82	9.19	9.69	10.26	10.87	11.49	12.48	13.32	14.19	17.82	21.63		
	80	9.82	10.35	11.02	11.75	12.53	13.33	14.56	15.62	16.70	21.19	25.87		
	100	10.72	11.42	12.26	13.16	14.09	15.06	16.54	17.80	19.08	24.36	29.87		
	120	11.56	12.43	13.43	14.50	15.59	16.71	18.42	19.88	21.34	27.39	33.67		
300	140	12.34	13.39	14.56	15.79	17.04	18.31	20.24	21.87	23.52	30.30	37.32		
	10	5.59	5.57	5.68	5.84	6.03	6.22	6.53	6.80	7.07	8.18	9.33		
	20	6.79	6.84	7.02	7.26	7.52	7.80	8.24	8.62	9.00	10.63	12.35		
	40	8.45	8.62	8.95	9.33	9.75	10.19	10.88	11.47	12.08	14.69	17.48		
	60	9.71	10.03	10.49	11.03	11.59	12.19	13.12	13.93	14.77	18.29	22.03		
	80	10.79	11.24	11.86	12.54	13.26	14.01	15.19	16.21	17.25	21.63	26.25		
	100	11.75	12.35	13.11	13.94	14.82	15.73	17.14	18.36	19.60	24.78	30.22		
400	120	12.64	13.38	14.29	15.27	16.30	17.36	19.01	20.41	21.84	27.79	34.01		
	140	13.46	14.36	15.42	16.55	17.73	18.94	20.80	22.39	24.01	30.68	37.65		
	10	5.98	5.96	6.08	6.24	6.43	6.63	6.94	7.21	7.49	8.61	9.77		
	20	7.30	7.33	7.52	7.76	8.02	8.30	8.74	9.12	9.51	11.12	12.82		
	40	9.09	9.25	9.56	9.94	10.35	10.78	11.45	12.04	12.64	15.18	17.91		
	60	10.45	10.73	11.18	11.69	12.24	12.82	13.72	14.51	15.32	18.75	22.43		
	80	11.60	12.01	12.59	13.24	13.93	14.65	15.79	16.77	17.78	22.07	26.63		
600	100	12.62	13.16	13.87	14.66	15.49	16.36	17.73	18.90	20.11	25.20	30.58		
	120	13.55	14.22	15.07	16.00	16.97	17.99	19.58	20.94	22.34	28.19	34.35		
	140	14.41	15.22	16.21	17.27	18.40	19.56	21.36	22.91	24.49	31.07	37.98		
	10	6.62	6.59	6.71	6.88	7.07	7.28	7.61	7.89	8.18	9.34	10.53		
	20	8.11	8.14	8.32	8.57	8.84	9.13	9.58	9.96	10.35	11.98	13.67		
	40	10.13	10.27	10.58	10.95	11.35	11.78	12.45	13.02	13.61	16.10	18.75		
	60	11.65	11.89	12.32	12.82	13.35	13.91	14.79	15.55	16.33	19.65	23.22		
800	80	12.92	13.27	13.82	14.44	15.10	15.79	16.88	17.82	18.79	22.92	27.37		
	100	14.03	14.50	15.17	15.91	16.70	17.53	18.82	19.95	21.10	26.02	31.29		
	120	15.05	15.63	16.41	17.28	18.20	19.16	20.67	21.97	23.31	28.98	35.03		
	140	15.98	16.69	17.59	18.58	19.63	20.72	22.43	23.91	25.43	31.83	38.64		
	10	7.13	7.10	7.22	7.40	7.60	7.82	8.16	8.45	8.75	9.95	11.16		
	20	8.77	8.79	8.98	9.23	9.51	9.80	10.27	10.66	11.06	12.71	14.42		
	40	10.98	11.10	11.41	11.78	12.19	12.62	13.29	13.87	14.46	16.93	19.54		
	60	12.63	12.85	13.27	13.76	14.29	14.85	15.72	16.47	17.24	20.49	23.99		
	80	14.00	14.32	14.85	15.46	16.11	16.79	17.85	18.78	19.72	23.75	28.10		
	100	15.20	15.63	16.26	16.99	17.76	18.56	19.82	20.91	22.04	26.82	31.99		
	120	16.29	16.82	17.56	18.40	19.29	20.22	21.67	22.93	24.23	29.76	35.71		
	140	17.28	17.92	18.78	19.73	20.74	21.79	23.44	24.87	26.34	32.59	39.29		

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 52.0 Ft (RADIUS = 36.8 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		$(Ft \cdot s)^{1/2}$	4	8	12	16	20	24	30	35	40	60	80
0	10	4.52	4.95	5.40	5.85	6.30	6.75	7.43	8.00	8.57	10.88	13.23	
	20	5.91	6.70	7.44	8.17	8.88	9.59	10.64	11.52	12.40	15.95	19.58	
	40	8.24	9.64	10.89	12.07	13.22	14.35	16.04	17.43	18.83	24.47	30.25	
	60	10.28	12.22	13.91	15.49	17.03	18.53	20.77	22.62	24.47	31.95	39.61	
	80	12.16	14.59	16.68	18.64	20.52	22.37	25.11	27.38	29.65	38.82	48.20	
	100	13.92	16.81	19.28	21.59	23.80	25.98	29.19	31.85	34.51	45.26	56.27	
	120	15.60	18.93	21.76	24.39	26.92	29.40	33.07	36.10	39.14	51.39	63.94	
	140	17.21	20.95	24.13	27.08	29.92	32.69	36.79	40.18	43.57	57.27	71.33	
	25	10	5.29	5.51	5.85	6.24	6.65	7.07	7.71	8.25	8.81	11.06	13.39
		20	6.61	7.18	7.83	8.50	9.17	9.85	10.87	11.73	12.59	16.11	19.71
40		8.85	10.05	11.22	12.35	13.47	14.58	16.23	17.61	19.00	24.61	30.36	
60		10.84	12.59	14.21	15.75	17.25	18.74	20.95	22.78	24.62	32.07	39.71	
80		12.68	14.94	16.96	18.87	20.73	22.56	25.28	27.53	29.79	38.93	48.30	
100		14.41	17.14	19.55	21.81	24.00	26.15	29.35	32.00	34.65	45.37	56.36	
120		16.07	19.24	22.01	24.61	27.11	29.57	33.22	36.24	39.27	51.49	64.03	
140		17.65	21.26	24.38	27.29	30.10	32.85	36.93	40.31	43.69	57.36	71.38	
50		10	5.82	5.97	6.26	6.61	6.98	7.37	7.98	8.50	9.04	11.25	13.55
		20	7.20	7.64	8.21	8.83	9.46	10.11	11.11	11.95	12.79	16.26	19.84
	40	9.42	10.46	11.54	12.63	13.72	14.80	16.43	17.79	19.17	24.74	30.48	
	60	11.37	12.96	14.50	16.00	17.48	18.94	21.12	22.95	24.77	32.19	39.81	
	80	13.18	15.28	17.24	19.11	20.94	22.75	25.44	27.69	29.93	39.04	48.40	
	100	14.89	17.47	19.81	22.03	24.20	26.33	29.50	32.14	34.78	45.47	56.45	
	120	16.53	19.56	22.26	24.82	27.30	29.74	33.37	36.38	39.39	51.59	64.12	
	140	18.10	21.56	24.62	27.49	30.28	33.02	37.08	40.44	43.82	57.46	71.47	
	100	10	6.57	6.67	6.92	7.23	7.57	7.93	8.50	8.99	9.49	11.62	13.86
		20	8.10	8.42	8.90	9.45	10.02	10.63	11.56	12.37	13.19	16.58	20.11
40		10.42	11.23	12.18	13.18	14.20	15.24	16.82	18.15	19.50	25.01	30.70	
60		12.37	13.69	15.09	16.50	17.92	19.34	21.48	23.27	25.08	32.43	40.02	
80		14.15	15.97	17.78	19.58	21.35	23.12	25.77	27.99	30.21	39.26	48.59	
100		15.83	18.12	20.33	22.48	24.59	26.69	29.82	32.43	35.05	45.69	56.63	
120		17.43	20.18	22.76	25.25	27.68	30.08	33.67	36.65	39.65	51.79	64.29	
140		18.98	22.16	25.10	27.90	30.64	33.34	37.36	40.71	44.06	57.66	71.63	
150		10	7.13	7.20	7.44	7.73	8.06	8.41	8.95	9.43	9.92	11.98	14.18
		20	8.79	9.06	9.49	10.00	10.54	11.11	12.01	12.78	13.57	16.89	20.38
	40	11.23	11.92	12.78	13.71	14.68	15.68	17.21	18.51	19.83	25.27	30.93	
	60	13.23	14.37	15.66	17.00	18.36	19.74	21.83	23.59	25.38	32.67	40.22	
	80	15.03	16.63	18.32	20.04	21.77	23.49	26.10	28.29	30.50	39.49	48.78	
	100	16.70	18.76	20.85	22.92	24.98	27.04	30.13	32.71	35.31	45.90	56.81	
	120	18.30	20.79	23.25	25.67	28.05	30.42	33.97	36.93	39.90	52.00	64.46	
	140	19.82	22.76	25.57	28.31	31.00	33.67	37.65	40.97	44.31	57.85	71.80	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 52.0 Ft (RADIUS = 36.8 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		°F	4	8	12	16	20	24	30	35	40	60	80
200 (Ft*s) ^{1/2}	10	7.58	7.64	7.87	8.16	8.48	8.83	9.36	9.83	10.31	12.33	14.48	
	20	9.36	9.59	10.01	10.49	11.01	11.56	12.43	13.18	13.95	17.20	20.65	
	40	11.92	12.54	13.34	14.22	15.14	16.10	17.59	18.86	20.16	25.54	31.16	
	60	13.99	15.01	16.21	17.48	18.79	20.13	22.18	23.92	25.68	32.91	40.43	
	80	15.82	17.26	18.86	20.50	22.17	23.86	26.43	28.59	30.77	39.71	48.97	
	100	17.51	19.38	21.35	23.36	25.37	27.39	30.44	33.00	35.58	46.11	56.99	
	120	19.10	21.40	23.74	26.09	28.42	30.76	34.26	37.20	40.16	52.20	64.63	
	140	20.63	23.34	26.05	28.72	31.36	33.99	37.94	41.24	44.55	58.05	71.99	
	300	10	8.32	8.36	8.59	8.88	9.20	9.53	10.07	10.53	11.00	12.98	15.08
		20	10.29	10.49	10.88	11.34	11.84	12.37	13.20	13.92	14.66	17.81	21.17
40		13.08	13.61	14.34	15.15	16.02	16.92	18.33	19.55	20.81	26.06	31.60	
60		15.27	16.15	17.23	18.41	19.63	20.90	22.87	24.55	26.27	33.39	40.84	
80		17.19	18.43	19.87	21.40	22.98	24.60	27.08	29.19	31.33	40.16	49.35	
100		18.93	20.54	22.34	24.22	26.14	28.09	31.06	33.57	36.11	46.53	57.35	
120		20.56	22.55	24.71	26.92	29.16	31.42	34.85	37.74	40.66	52.60	64.98	
140		22.10	24.48	26.98	29.52	32.07	34.64	38.51	41.76	45.04	58.44	72.30	
400		10	8.92	8.95	9.18	9.47	9.79	10.13	10.66	11.13	11.60	13.56	15.64
		20	11.05	11.23	11.61	12.06	12.56	13.08	13.89	14.59	15.32	18.39	21.69
	40	14.04	14.51	15.20	15.98	16.81	17.68	19.04	20.22	21.44	26.58	32.05	
	60	16.35	17.14	18.16	19.26	20.43	21.65	23.55	25.18	26.86	33.86	41.24	
	80	18.35	19.47	20.81	22.25	23.76	25.31	27.72	29.78	31.88	40.60	49.73	
	100	20.16	21.61	23.28	25.05	26.89	28.78	31.67	34.13	36.63	46.95	57.71	
	120	21.83	23.63	25.63	27.73	29.89	32.09	35.44	38.29	41.16	53.01	65.32	
	140	23.40	25.55	27.89	30.31	32.78	35.28	39.08	42.28	45.52	58.82	72.63	
	600	10	9.89	9.91	10.14	10.43	10.76	11.11	11.66	12.13	12.61	14.58	16.65
		20	12.30	12.44	12.81	13.26	13.75	14.27	15.07	15.77	16.48	19.48	22.69
40		15.61	16.02	16.67	17.41	18.21	19.04	20.34	21.48	22.64	27.60	32.93	
60		18.14	18.82	19.76	20.79	21.89	23.04	24.84	26.40	28.01	34.80	42.05	
80		20.30	21.26	22.48	23.82	25.22	26.69	28.98	30.95	32.98	41.48	50.48	
100		22.22	23.48	24.99	26.62	28.34	30.12	32.88	35.25	37.67	47.79	58.43	
120		23.99	25.54	27.35	29.29	31.31	33.39	36.61	39.36	42.16	53.81	66.01	
140		25.64	27.50	29.61	31.85	34.16	36.54	40.20	43.32	46.49	59.60	73.29	
800		10	10.68	10.69	10.92	11.22	11.56	11.92	12.48	12.96	13.45	15.46	17.53
		20	13.31	13.44	13.80	14.25	14.75	15.27	16.08	16.77	17.49	20.47	23.63
	40	16.89	17.27	17.90	18.62	19.40	20.22	21.50	22.61	23.75	28.59	33.81	
	60	19.61	20.23	21.12	22.12	23.19	24.30	26.04	27.55	29.11	35.73	42.85	
	80	21.91	22.78	23.94	25.21	26.56	27.97	30.17	32.08	34.04	42.36	51.23	
	100	23.95	25.08	26.50	28.05	29.69	31.39	34.05	36.34	38.70	48.62	59.14	
	120	25.81	27.21	28.90	30.73	32.65	34.65	37.75	40.42	43.15	54.61	66.69	
	140	27.54	29.21	31.18	33.29	35.49	37.78	41.31	44.35	47.45	60.37	73.94	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 54.0 Ft (RADIUS = 38.2 Ft)
 FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		°F	4	8	12	16	20	24	30	35	40	60	80
(Ft*s) ^{1/2}	0	10	1.38	1.40	1.46	1.53	1.61	1.69	1.81	1.92	2.03	2.47	2.91
		20	1.56	1.63	1.72	1.83	1.94	2.05	2.23	2.37	2.52	3.11	3.72
		40	1.87	2.01	2.17	2.33	2.50	2.67	2.92	3.13	3.34	4.20	5.07
		60	2.13	2.34	2.56	2.77	2.99	3.20	3.52	3.79	4.06	5.15	6.26
		80	2.37	2.65	2.91	3.18	3.44	3.70	4.08	4.40	4.73	6.03	7.35
		100	2.60	2.93	3.25	3.56	3.86	4.16	4.60	4.98	5.35	6.85	8.38
		120	2.82	3.21	3.57	3.92	4.26	4.60	5.10	5.52	5.94	7.63	9.35
25	140	3.03	3.47	3.88	4.27	4.65	5.02	5.58	6.04	6.51	8.38	10.25	
	10	1.78	1.74	1.77	1.82	1.89	1.95	2.06	2.15	2.25	2.65	3.07	
	20	2.00	2.00	2.05	2.12	2.21	2.30	2.45	2.58	2.71	3.27	3.85	
	40	2.34	2.38	2.48	2.60	2.74	2.89	3.11	3.31	3.51	4.33	5.19	
	60	2.60	2.69	2.85	3.02	3.21	3.40	3.70	3.96	4.22	5.27	6.37	
	80	2.84	2.99	3.19	3.41	3.65	3.88	4.25	4.56	4.87	6.14	7.45	
	100	3.06	3.26	3.51	3.78	4.06	4.34	4.76	5.12	5.48	6.96	8.47	
50	120	3.26	3.52	3.82	4.13	4.45	4.77	5.25	5.66	6.07	7.73	9.44	
	140	3.46	3.77	4.12	4.47	4.83	5.19	5.72	6.18	6.63	8.48	10.37	
	10	1.95	1.91	1.94	1.99	2.05	2.12	2.23	2.32	2.41	2.81	3.21	
	20	2.22	2.21	2.25	2.32	2.41	2.50	2.64	2.76	2.89	3.42	3.98	
	40	2.61	2.63	2.72	2.83	2.95	3.09	3.30	3.48	3.67	4.47	5.30	
	60	2.90	2.97	3.10	3.25	3.42	3.60	3.88	4.12	4.37	5.39	6.47	
	80	3.16	3.27	3.44	3.64	3.85	4.07	4.41	4.71	5.01	6.25	7.55	
100	100	3.40	3.54	3.76	4.00	4.25	4.51	4.92	5.26	5.62	7.06	8.56	
	120	3.61	3.80	4.06	4.34	4.64	4.94	5.40	5.80	6.20	7.83	9.53	
	140	3.81	4.05	4.35	4.67	5.01	5.35	5.87	6.31	6.75	8.57	10.46	
	10	2.17	2.14	2.16	2.22	2.28	2.35	2.46	2.55	2.65	3.05	3.45	
	20	2.51	2.49	2.53	2.60	2.69	2.78	2.92	3.04	3.16	3.69	4.23	
	40	2.97	2.98	3.06	3.17	3.28	3.41	3.61	3.79	3.96	4.72	5.52	
	60	3.32	3.36	3.47	3.62	3.77	3.93	4.19	4.42	4.65	5.63	6.67	
150	80	3.62	3.69	3.84	4.01	4.20	4.41	4.72	5.00	5.28	6.47	7.74	
	100	3.88	3.99	4.17	4.38	4.61	4.84	5.22	5.54	5.88	7.27	8.74	
	120	4.12	4.26	4.48	4.72	4.99	5.26	5.69	6.07	6.45	8.04	9.70	
	140	4.34	4.52	4.77	5.05	5.35	5.66	6.15	6.57	7.00	8.77	10.62	
	10	2.34	2.30	2.33	2.38	2.44	2.51	2.63	2.73	2.82	3.23	3.64	
	20	2.72	2.69	2.74	2.81	2.90	2.99	3.13	3.25	3.38	3.90	4.44	
	40	3.24	3.24	3.32	3.42	3.54	3.67	3.86	4.04	4.21	4.95	5.74	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 54.0 Ft (RADIUS = 38.2 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		(Ft*s) ^{1/2}	4	8	12	16	20	24	30	35	40	60	80
200	°F												
	10	2.47	2.43	2.46	2.51	2.58	2.65	2.77	2.87	2.97	3.39	3.81	
	20	2.89	2.86	2.91	2.98	3.07	3.16	3.31	3.43	3.56	4.09	4.63	
	40	3.46	3.46	3.53	3.64	3.75	3.88	4.08	4.25	4.43	5.16	5.94	
	60	3.88	3.90	4.01	4.14	4.29	4.45	4.70	4.92	5.14	6.07	7.07	
	80	4.23	4.28	4.42	4.58	4.76	4.95	5.25	5.51	5.77	6.90	8.11	
	100	4.54	4.62	4.78	4.97	5.18	5.40	5.75	6.05	6.37	7.69	9.10	
	120	4.82	4.93	5.11	5.34	5.58	5.83	6.23	6.57	6.93	8.43	10.04	
300	140	5.08	5.21	5.43	5.68	5.95	6.23	6.68	7.07	7.47	9.15	10.95	
	10	2.68	2.64	2.67	2.73	2.80	2.87	2.99	3.10	3.21	3.64	4.07	
	20	3.16	3.13	3.18	3.26	3.35	3.44	3.59	3.72	3.86	4.40	4.95	
	40	3.81	3.80	3.88	3.98	4.11	4.23	4.44	4.61	4.79	5.53	6.30	
	60	4.29	4.30	4.41	4.54	4.69	4.85	5.10	5.31	5.54	6.46	7.43	
	80	4.68	4.72	4.85	5.01	5.19	5.38	5.67	5.93	6.19	7.29	8.47	
	100	5.03	5.09	5.25	5.43	5.64	5.86	6.20	6.49	6.79	8.07	9.45	
	120	5.34	5.43	5.60	5.82	6.05	6.30	6.68	7.02	7.36	8.82	10.38	
400	140	5.63	5.73	5.94	6.18	6.44	6.71	7.14	7.52	7.90	9.53	11.28	
	10	2.85	2.81	2.84	2.90	2.97	3.05	3.18	3.29	3.40	3.84	4.29	
	20	3.39	3.35	3.40	3.48	3.57	3.67	3.83	3.96	4.10	4.66	5.22	
	40	4.10	4.08	4.16	4.27	4.39	4.53	4.73	4.91	5.09	5.84	6.61	
	60	4.62	4.63	4.73	4.87	5.02	5.18	5.43	5.65	5.87	6.80	7.76	
	80	5.05	5.08	5.21	5.37	5.55	5.74	6.04	6.29	6.55	7.65	8.80	
	100	5.43	5.48	5.63	5.82	6.02	6.24	6.58	6.87	7.17	8.43	9.78	
	120	5.76	5.84	6.01	6.22	6.45	6.70	7.08	7.41	7.75	9.17	10.71	
600	140	6.07	6.17	6.37	6.60	6.86	7.13	7.55	7.92	8.29	9.89	11.60	
	10	3.13	3.08	3.12	3.18	3.26	3.34	3.48	3.59	3.71	4.18	4.65	
	20	3.74	3.71	3.76	3.84	3.94	4.04	4.21	4.35	4.50	5.08	5.67	
	40	4.56	4.54	4.62	4.73	4.86	5.00	5.22	5.40	5.59	6.36	7.15	
	60	5.15	5.16	5.26	5.40	5.56	5.72	5.98	6.21	6.44	7.38	8.35	
	80	5.64	5.67	5.79	5.96	6.14	6.33	6.64	6.90	7.16	8.26	9.41	
	100	6.07	6.11	6.26	6.45	6.66	6.87	7.22	7.51	7.81	9.07	10.39	
	120	6.45	6.51	6.68	6.89	7.12	7.37	7.75	8.08	8.42	9.82	11.32	
800	140	6.79	6.87	7.07	7.30	7.56	7.83	8.25	8.61	8.98	10.54	12.21	
	10	3.35	3.31	3.34	3.41	3.49	3.58	3.72	3.84	3.96	4.45	4.94	
	20	4.03	4.00	4.05	4.14	4.24	4.35	4.52	4.67	4.82	5.43	6.04	
	40	4.93	4.91	4.99	5.11	5.24	5.39	5.61	5.81	6.00	6.80	7.61	
	60	5.59	5.59	5.69	5.83	6.00	6.17	6.44	6.67	6.90	7.87	8.85	
	80	6.12	6.14	6.27	6.44	6.62	6.82	7.13	7.40	7.67	8.79	9.95	
	100	6.59	6.62	6.77	6.97	7.18	7.40	7.75	8.05	8.36	9.62	10.94	
	120	7.00	7.06	7.23	7.44	7.68	7.92	8.31	8.65	8.98	10.40	11.88	
140	7.38	7.45	7.64	7.88	8.14	8.41	8.83	9.20	9.57	11.13	12.77		

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 54.0 Ft (RADIUS = 38.2 Ft)
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft														
		4	8	12	16	20	24	30	35	40	60	80				
(Ft*s) ^{1/2}	°F															
0	10	2.01	2.07	2.19	2.32	2.45	2.59	2.81	2.98	3.17	3.90	4.64				
	20	2.37	2.53	2.72	2.92	3.12	3.32	3.63	3.89	4.14	5.19	6.26				
	40	2.97	3.29	3.61	3.92	4.23	4.55	5.01	5.40	5.79	7.36	8.97				
	60	3.50	3.95	4.38	4.80	5.21	5.62	6.23	6.73	7.23	9.27	11.35				
	80	3.98	4.57	5.10	5.61	6.11	6.61	7.34	7.95	8.56	11.02	13.53				
	100	4.44	5.14	5.77	6.37	6.96	7.53	8.39	9.09	9.80	12.66	15.58				
	120	4.88	5.69	6.41	7.10	7.76	8.41	9.38	10.18	10.99	14.22	17.53				
25	140	5.29	6.21	7.02	7.79	8.53	9.26	10.33	11.23	12.12	15.72	19.40				
	10	2.53	2.51	2.58	2.67	2.78	2.89	3.07	3.23	3.40	4.09	4.80				
	20	2.92	2.96	3.09	3.24	3.41	3.58	3.86	4.10	4.34	5.35	6.39				
	40	3.52	3.69	3.93	4.20	4.48	4.77	5.21	5.58	5.96	7.50	9.08				
	60	4.03	4.33	4.68	5.06	5.44	5.82	6.41	6.89	7.39	9.39	11.45				
	80	4.49	4.91	5.38	5.85	6.32	6.80	7.51	8.10	8.70	11.13	13.63				
	100	4.92	5.47	6.04	6.60	7.16	7.71	8.54	9.24	9.94	12.77	15.68				
50	120	5.34	6.00	6.66	7.31	7.95	8.58	9.53	10.32	11.11	14.33	17.62				
	140	5.74	6.52	7.27	8.00	8.71	9.42	10.48	11.36	12.24	15.82	19.49				
	10	2.79	2.76	2.82	2.91	3.01	3.12	3.30	3.45	3.61	4.27	4.96				
	20	3.25	3.26	3.37	3.51	3.66	3.82	4.08	4.31	4.54	5.51	6.53				
	40	3.91	4.02	4.23	4.47	4.72	4.99	5.41	5.76	6.13	7.63	9.20				
	60	4.44	4.66	4.97	5.31	5.66	6.02	6.58	7.06	7.54	9.51	11.56				
	80	4.91	5.24	5.65	6.08	6.53	6.98	7.67	8.26	8.84	11.25	13.73				
100	100	5.35	5.79	6.30	6.82	7.35	7.89	8.70	9.38	10.07	12.88	15.77				
	120	5.76	6.31	6.91	7.52	8.14	8.75	9.68	10.46	11.24	14.43	17.71				
	140	6.16	6.82	7.51	8.20	8.89	9.59	10.62	11.49	12.37	15.92	19.57				
	10	3.13	3.10	3.15	3.24	3.34	3.45	3.63	3.78	3.93	4.58	5.25				
	20	3.68	3.68	3.78	3.91	4.05	4.21	4.45	4.67	4.89	5.81	6.79				
	40	4.45	4.53	4.70	4.91	5.14	5.39	5.77	6.11	6.45	7.90	9.43				
	60	5.05	5.21	5.46	5.76	6.08	6.41	6.93	7.38	7.84	9.75	11.76				
150	80	5.56	5.81	6.15	6.53	6.93	7.35	8.00	8.56	9.12	11.47	13.92				
	100	6.03	6.36	6.79	7.25	7.74	8.24	9.01	9.67	10.34	13.09	15.95				
	120	6.46	6.88	7.39	7.94	8.51	9.09	9.98	10.73	11.50	14.63	17.88				
	140	6.87	7.38	7.98	8.61	9.25	9.91	10.91	11.76	12.61	16.12	19.74				
	10	3.38	3.34	3.40	3.49	3.59	3.70	3.88	4.03	4.19	4.84	5.51				
	20	4.00	3.99	4.09	4.21	4.36	4.51	4.75	4.96	5.18	6.09	7.04				
	40	4.85	4.91	5.08	5.28	5.50	5.73	6.10	6.43	6.76	8.16	9.65				
	60	5.50	5.64	5.87	6.15	6.45	6.76	7.26	7.69	8.13	9.99	11.97				
	80	6.06	6.26	6.57	6.93	7.30	7.70	8.32	8.85	9.40	11.69	14.11				
	100	6.56	6.84	7.22	7.65	8.11	8.58	9.32	9.95	10.60	13.30	16.13				
	120	7.01	7.37	7.83	8.34	8.87	9.42	10.28	11.01	11.75	14.84	18.06				
	140	7.44	7.87	8.41	8.99	9.60	10.23	11.20	12.02	12.86	16.31	19.91				

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 54.0 Ft (RADIUS = 38.2 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
200 (Ft*s) ^{1/2}	°F												
	10	3.58	3.54	3.60	3.69	3.79	3.91	4.09	4.25	4.40	5.06	5.73	
	20	4.26	4.25	4.34	4.47	4.61	4.77	5.01	5.22	5.44	6.34	7.28	
	40	5.18	5.23	5.39	5.59	5.81	6.04	6.40	6.71	7.04	8.41	9.87	
	60	5.88	6.00	6.22	6.49	6.78	7.08	7.56	7.98	8.41	10.23	12.17	
	80	6.47	6.65	6.95	7.28	7.64	8.02	8.62	9.14	9.67	11.92	14.30	
	100	7.00	7.25	7.61	8.01	8.45	8.90	9.62	10.23	10.86	13.51	16.31	
	120	7.48	7.79	8.22	8.70	9.21	9.74	10.56	11.27	12.00	15.04	18.23	
	140	7.92	8.31	8.81	9.36	9.94	10.54	11.48	12.28	13.10	16.51	20.07	
	300	10	3.91	3.87	3.92	4.02	4.12	4.24	4.43	4.59	4.76	5.43	6.12
20		4.68	4.66	4.75	4.88	5.03	5.19	5.43	5.65	5.87	6.77	7.71	
40		5.72	5.76	5.91	6.10	6.32	6.55	6.91	7.22	7.53	8.87	10.30	
60		6.50	6.59	6.80	7.06	7.34	7.64	8.10	8.51	8.92	10.68	12.57	
80		7.15	7.30	7.57	7.89	8.24	8.60	9.18	9.67	10.18	12.35	14.68	
100		7.73	7.94	8.27	8.65	9.06	9.49	10.17	10.76	11.36	13.93	16.67	
120		8.25	8.52	8.91	9.36	9.83	10.33	11.12	11.79	12.49	15.44	18.57	
140		8.73	9.06	9.52	10.03	10.57	11.14	12.02	12.79	13.58	16.89	20.40	
400		10	4.17	4.13	4.19	4.28	4.39	4.52	4.71	4.88	5.05	5.74	6.44
		20	5.02	5.00	5.09	5.22	5.37	5.53	5.79	6.01	6.23	7.14	8.09
	40	6.15	6.18	6.33	6.53	6.75	6.98	7.34	7.65	7.96	9.29	10.70	
	60	7.00	7.08	7.29	7.54	7.82	8.12	8.58	8.97	9.38	11.11	12.96	
	80	7.71	7.84	8.10	8.42	8.75	9.11	9.67	10.16	10.65	12.77	15.05	
	100	8.32	8.51	8.83	9.20	9.60	10.02	10.68	11.25	11.84	14.34	17.02	
	120	8.88	9.12	9.50	9.93	10.39	10.87	11.63	12.28	12.96	15.83	18.91	
	140	9.40	9.69	10.12	10.61	11.13	11.68	12.53	13.28	14.04	17.28	20.73	
	600	10	4.60	4.55	4.61	4.71	4.83	4.96	5.16	5.34	5.52	6.24	6.97
		20	5.57	5.54	5.63	5.77	5.93	6.10	6.36	6.59	6.82	7.77	8.73
40		6.86	6.88	7.03	7.23	7.45	7.68	8.05	8.37	8.69	10.02	11.42	
60		7.81	7.88	8.08	8.34	8.62	8.91	9.37	9.77	10.18	11.88	13.69	
80		8.61	8.72	8.97	9.28	9.62	9.97	10.52	11.00	11.49	13.55	15.76	
100		9.30	9.46	9.76	10.12	10.51	10.92	11.57	12.12	12.69	15.11	17.72	
120		9.92	10.12	10.48	10.89	11.34	11.81	12.54	13.17	13.83	16.60	19.58	
140		10.49	10.74	11.15	11.61	12.12	12.64	13.46	14.17	14.91	18.02	21.38	
800		10	4.94	4.89	4.96	5.06	5.19	5.32	5.53	5.72	5.90	6.66	7.41
		20	6.01	5.98	6.08	6.22	6.38	6.56	6.83	7.07	7.31	8.28	9.27
	40	7.43	7.44	7.60	7.80	8.02	8.27	8.64	8.97	9.29	10.65	12.05	
	60	8.48	8.53	8.73	8.99	9.28	9.57	10.04	10.45	10.86	12.56	14.35	
	80	9.34	9.44	9.69	10.00	10.34	10.69	11.25	11.72	12.21	14.26	16.44	
	100	10.09	10.23	10.53	10.89	11.28	11.69	12.33	12.88	13.45	15.83	18.38	
	120	10.76	10.95	11.30	11.70	12.15	12.61	13.33	13.96	14.60	17.32	20.24	
	140	11.38	11.61	12.00	12.46	12.95	13.47	14.28	14.98	15.69	18.74	22.02	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 54.0 Ft (RADIUS = 38.2 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		°F	4	8	12	16	20	24	30	35	40	60	80
0 (Ft*s) ^{1/2}	10		3.01	3.19	3.41	3.65	3.90	4.15	4.52	4.84	5.15	6.43	7.74
	20		3.72	4.09	4.47	4.85	5.23	5.60	6.17	6.64	7.11	9.02	10.96
	40		4.93	5.61	6.25	6.86	7.46	8.05	8.94	9.67	10.40	13.37	16.39
	60		5.99	6.95	7.81	8.63	9.42	10.20	11.36	12.33	13.29	17.18	21.15
	80		6.96	8.17	9.24	10.24	11.22	12.17	13.59	14.77	15.94	20.68	25.52
	100		7.88	9.32	10.58	11.76	12.91	14.03	15.68	17.06	18.43	23.96	29.62
	120		8.74	10.42	11.86	13.21	14.51	15.79	17.67	19.23	20.79	27.08	33.52
25	140		9.58	11.46	13.09	14.60	16.05	17.47	19.58	21.32	23.06	30.08	37.26
	10		3.67	3.71	3.86	4.04	4.24	4.46	4.80	5.09	5.39	6.62	7.90
	20		4.38	4.57	4.86	5.18	5.52	5.87	6.40	6.86	7.31	9.18	11.10
	40		5.53	6.03	6.58	7.15	7.71	8.28	9.14	9.85	10.57	13.50	16.51
	60		6.54	7.32	8.11	8.88	9.65	10.41	11.54	12.49	13.44	17.30	21.25
	80		7.48	8.52	9.52	10.48	11.43	12.36	13.76	14.92	16.08	20.79	25.61
	100		8.37	9.66	10.85	11.99	13.11	14.21	15.84	17.20	18.56	24.07	29.71
50	120		9.21	10.73	12.11	13.43	14.70	15.96	17.82	19.37	20.92	27.19	33.61
	140		10.03	11.77	13.33	14.80	16.23	17.64	19.73	21.46	23.19	30.18	37.34
	10		4.05	4.07	4.19	4.36	4.54	4.74	5.06	5.34	5.62	6.81	8.06
	20		4.84	4.97	5.21	5.50	5.81	6.13	6.64	7.07	7.51	9.34	11.24
	40		6.04	6.42	6.90	7.42	7.96	8.50	9.33	10.03	10.74	13.64	16.62
	60		7.05	7.69	8.41	9.14	9.87	10.61	11.72	12.66	13.60	17.42	21.36
	80		7.97	8.87	9.80	10.72	11.64	12.55	13.93	15.07	16.23	20.90	25.71
100	100		8.84	9.98	11.11	12.22	13.30	14.39	16.00	17.35	18.70	24.18	29.80
	120		9.67	11.05	12.37	13.64	14.89	16.13	17.98	19.51	21.05	27.29	33.69
	140		10.47	12.08	13.57	15.01	16.42	17.81	19.87	21.59	23.31	30.28	37.43
	10		4.57	4.56	4.68	4.83	5.01	5.20	5.50	5.77	6.04	7.17	8.37
	20		5.48	5.57	5.78	6.03	6.31	6.61	7.07	7.48	7.90	9.65	11.51
	40		6.81	7.09	7.49	7.95	8.44	8.94	9.72	10.39	11.08	13.90	16.85
	60		7.87	8.36	8.97	9.63	10.31	11.01	12.08	12.98	13.90	17.66	21.56
150	80		8.82	9.53	10.34	11.19	12.05	12.93	14.26	15.38	16.51	21.13	25.90
	100		9.70	10.62	11.63	12.66	13.70	14.74	16.32	17.64	18.97	24.39	29.98
	120		10.52	11.67	12.87	14.07	15.27	16.47	18.28	19.79	21.31	27.50	33.87
	140		11.31	12.67	14.05	15.42	16.78	18.13	20.16	21.86	23.56	30.48	37.59
	10		4.95	4.93	5.04	5.20	5.37	5.56	5.86	6.12	6.39	7.50	8.67
	20		5.96	6.03	6.22	6.46	6.73	7.02	7.47	7.86	8.26	9.96	11.77
	40		7.40	7.63	8.00	8.42	8.88	9.35	10.10	10.74	11.40	14.17	17.08
	60		8.53	8.95	9.50	10.10	10.74	11.40	12.43	13.31	14.20	17.90	21.77
	80		9.52	10.12	10.85	11.64	12.46	13.30	14.59	15.68	16.79	21.36	26.10
	100		10.42	11.22	12.13	13.10	14.09	15.09	16.63	17.92	19.23	24.60	30.17
	120		11.26	12.25	13.35	14.49	15.64	16.81	18.58	20.06	21.56	27.70	34.04
	140		12.06	13.25	14.53	15.83	17.14	18.46	20.45	22.12	23.80	30.67	37.76

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 54.0 Ft (RADIUS = 38.2 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
200	°F												
	10	5.26	5.24	5.34	5.50	5.68	5.87	6.17	6.43	6.69	7.80	8.96	
	20	6.36	6.41	6.59	6.83	7.10	7.38	7.82	8.20	8.59	10.26	12.03	
	40	7.89	8.10	8.44	8.85	9.28	9.74	10.46	11.08	11.73	14.43	17.30	
	60	9.09	9.45	9.96	10.54	11.15	11.78	12.77	13.62	14.50	18.14	21.97	
	80	10.12	10.65	11.33	12.08	12.86	13.66	14.91	15.98	17.07	21.58	26.29	
	100	11.05	11.76	12.61	13.52	14.47	15.44	16.94	18.21	19.50	24.82	30.35	
300	120	11.91	12.80	13.82	14.90	16.01	17.14	18.87	20.34	21.82	27.90	34.22	
	140	12.73	13.80	14.99	16.23	17.50	18.78	20.74	22.39	24.05	30.87	37.93	
	10	5.76	5.73	5.84	5.99	6.17	6.37	6.67	6.93	7.20	8.31	9.47	
	20	6.99	7.03	7.21	7.45	7.71	7.98	8.42	8.80	9.18	10.81	12.54	
	40	8.70	8.87	9.19	9.58	9.99	10.43	11.12	11.72	12.33	14.95	17.75	
	60	10.00	10.31	10.78	11.32	11.89	12.43	13.43	14.24	15.08	18.62	22.38	
	80	11.11	11.57	12.19	12.87	13.60	14.36	15.55	16.57	17.62	22.03	26.67	
400	100	12.11	12.71	13.48	14.32	15.20	16.12	17.55	18.77	20.03	25.24	30.71	
	120	13.02	13.78	14.70	15.69	16.73	17.80	19.46	20.88	22.33	28.31	34.56	
	140	13.87	14.79	15.86	17.01	18.20	19.43	21.31	22.91	24.54	31.26	38.26	
	10	6.16	6.13	6.24	6.40	6.58	6.78	7.09	7.36	7.63	8.76	9.92	
	20	7.51	7.54	7.72	7.95	8.21	8.49	8.93	9.31	9.70	11.31	13.02	
	40	9.36	9.51	9.82	10.20	10.60	11.03	11.71	12.29	12.90	15.45	18.19	
	60	10.76	11.03	11.48	11.99	12.55	13.13	14.04	14.83	15.64	19.09	22.79	
600	80	11.94	12.35	12.93	13.58	14.28	15.01	16.15	17.14	18.16	22.47	27.05	
	100	12.99	13.53	14.25	15.05	15.89	16.77	18.14	19.33	20.55	25.66	31.07	
	120	13.95	14.63	15.49	16.43	17.41	18.44	20.04	21.42	22.83	28.71	34.91	
	140	14.84	15.66	16.66	17.74	18.88	20.05	21.87	23.43	25.02	31.65	38.60	
	10	6.81	6.77	6.88	7.05	7.24	7.45	7.77	8.05	8.34	9.50	10.68	
	20	8.35	8.36	8.54	8.78	9.05	9.33	9.78	10.17	10.56	12.18	13.87	
	40	10.43	10.55	10.86	11.23	11.63	12.06	12.72	13.30	13.89	16.38	19.04	
800	60	11.99	12.22	12.65	13.14	13.68	14.24	15.12	15.88	16.67	20.00	23.59	
	80	13.29	13.64	14.19	14.81	15.47	16.17	17.26	18.21	19.19	23.34	27.80	
	100	14.45	14.91	15.58	16.32	17.12	17.95	19.26	20.39	21.55	26.49	31.79	
	120	15.49	16.07	16.86	17.73	18.66	19.63	21.15	22.46	23.81	29.51	35.59	
	140	16.45	17.16	18.07	19.07	20.13	21.23	22.96	24.45	25.98	32.42	39.26	
	10	7.34	7.29	7.41	7.58	7.78	8.00	8.33	8.62	8.92	10.11	11.32	
	20	9.03	9.03	9.22	9.46	9.74	10.03	10.49	10.88	11.28	12.93	14.63	
	40	11.30	11.41	11.71	12.08	12.48	12.91	13.58	14.16	14.75	17.22	19.84	
	60	12.99	13.20	13.62	14.11	14.64	15.19	16.06	16.82	17.59	20.85	24.36	
	80	14.40	14.72	15.24	15.85	16.50	17.19	18.25	19.18	20.13	24.18	28.54	
	100	15.64	16.06	16.70	17.42	18.19	19.00	20.27	21.37	22.50	27.31	32.50	
	120	16.76	17.29	18.04	18.88	19.77	20.71	22.17	23.44	24.74	30.30	36.28	
	140	17.79	18.42	19.29	20.24	21.26	22.32	23.98	25.42	26.90	33.19	39.92	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 54.0 Ft (RADIUS = 38.2 Ft)³
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		$(Ft \times s)^{1/2}$											
		4	8	12	16	20	24	30	35	40	60	80	
0	10	4.68	5.11	5.56	6.02	6.47	6.93	7.61	8.18	8.75	11.07	13.43	
	20	6.12	6.92	7.68	8.41	9.13	9.84	10.90	11.79	12.67	16.24	19.88	
	40	8.53	9.96	11.23	12.43	13.60	14.74	16.44	17.85	19.25	24.93	30.74	
	60	10.65	12.63	14.35	15.96	17.51	19.03	21.29	23.16	25.03	32.55	40.25	
	80	12.60	15.08	17.21	19.20	21.11	22.98	25.75	28.04	30.33	39.55	48.99	
	100	14.42	17.38	19.90	22.24	24.48	26.68	29.93	32.62	35.30	46.12	57.19	
	120	16.16	19.56	22.45	25.13	27.69	30.20	33.91	36.97	40.03	52.37	64.99	
25	140	17.82	21.66	24.90	27.90	30.77	33.58	37.72	41.15	44.57	58.36	72.47	
	10	5.46	5.68	6.02	6.41	6.82	7.24	7.89	8.44	8.99	11.26	13.59	
	20	6.83	7.41	8.07	8.74	9.43	10.11	11.14	12.00	12.87	16.40	20.02	
	40	9.15	10.38	11.56	12.72	13.85	14.97	16.64	18.03	19.42	25.07	30.85	
	60	11.21	13.01	14.65	16.21	17.74	19.24	21.47	23.32	25.18	32.68	40.36	
	80	13.12	15.43	17.49	19.44	21.32	23.17	25.92	28.19	30.47	39.67	49.09	
	100	14.92	17.71	20.16	22.46	24.68	26.86	30.09	32.76	35.44	46.23	57.28	
50	120	16.63	19.88	22.71	25.34	27.89	30.38	34.06	37.11	40.16	52.47	65.08	
	140	18.28	21.97	25.15	28.11	30.96	33.75	37.87	41.28	44.70	58.46	72.56	
	10	6.01	6.15	6.44	6.79	7.16	7.55	8.17	8.69	9.23	11.45	13.75	
	20	7.43	7.88	8.45	9.08	9.72	10.37	11.37	12.22	13.07	16.56	20.16	
	40	9.73	10.79	11.89	13.00	14.10	15.19	16.84	18.21	19.59	25.20	30.97	
	60	11.76	13.38	14.95	16.47	17.96	19.44	21.65	23.49	25.33	32.80	40.46	
	80	13.63	15.78	17.77	19.67	21.53	23.36	26.08	28.35	30.61	39.78	49.18	
100	100	15.40	18.04	20.43	22.69	24.88	27.04	30.25	32.91	35.57	46.34	57.38	
	120	17.10	20.20	22.96	25.56	28.08	30.55	34.21	37.25	40.29	52.58	65.17	
	140	18.73	22.28	25.39	28.32	31.14	33.91	38.02	41.42	44.82	58.56	72.64	
	10	6.78	6.86	7.11	7.42	7.76	8.12	8.69	9.18	9.69	11.82	14.07	
	20	8.35	8.67	9.16	9.70	10.29	10.89	11.84	12.64	13.47	16.88	20.43	
	40	10.74	11.57	12.54	13.55	14.59	15.64	17.23	18.57	19.93	25.47	31.20	
	60	12.77	14.12	15.54	16.98	18.41	19.85	22.01	23.82	25.64	33.04	40.67	
150	80	14.61	16.47	18.33	20.15	21.95	23.74	26.42	28.65	30.90	40.01	49.38	
	100	16.35	18.70	20.96	23.14	25.28	27.40	30.57	33.20	35.84	46.55	57.56	
	120	18.01	20.83	23.46	25.99	28.46	30.89	34.52	37.53	40.55	52.78	65.34	
	140	19.62	22.88	25.88	28.73	31.51	34.24	38.31	41.69	45.07	58.76	72.81	
	10	7.35	7.41	7.64	7.94	8.26	8.61	9.16	9.63	10.12	12.19	14.39	
	20	9.05	9.32	9.76	10.27	10.81	11.39	12.29	13.06	13.86	17.19	20.70	
	40	11.58	12.28	13.15	14.09	15.07	16.08	17.62	18.93	20.26	25.74	31.42	
	60	13.65	14.81	16.12	17.48	18.86	20.25	22.37	24.15	25.94	33.29	40.87	
	80	15.51	17.15	18.87	20.62	22.36	24.12	26.75	28.96	31.18	40.23	49.57	
	100	17.24	19.35	21.48	23.58	25.68	27.76	30.88	33.49	36.11	46.77	57.74	
	120	18.89	21.46	23.97	26.42	28.83	31.23	34.82	37.81	40.81	52.99	65.52	
	140	20.48	23.49	26.36	29.14	31.87	34.57	38.60	41.95	45.32	58.95	72.98	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 54.0 Ft (RADIUS = 38.2 Ft)³,
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³;

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		°F	4	8	12	16	20	24	30	35	40	60	80
200 (Ft*s) ^{1/2}	10	7.81	7.86	8.09	8.37	8.69	9.03	9.57	10.04	10.52	12.54	14.70	
	20	9.64	9.87	10.28	10.77	11.29	11.85	12.71	13.47	14.24	17.51	20.97	
	40	12.29	12.91	13.72	14.61	15.54	16.51	18.01	19.29	20.60	26.01	31.65	
	60	14.42	15.46	16.68	17.97	19.30	20.65	22.72	24.47	26.25	33.53	41.08	
	80	16.31	17.79	19.41	21.08	22.78	24.49	27.08	29.26	31.46	40.46	49.76	
	100	18.06	19.98	21.99	24.03	26.07	28.11	31.20	33.78	36.38	46.98	57.92	
	120	19.71	22.07	24.46	26.84	29.21	31.57	35.12	38.08	41.06	53.19	65.69	
	140	21.29	24.08	26.84	29.55	32.23	34.90	38.89	42.22	45.56	59.15	73.14	
	300	10	8.57	8.60	8.82	9.10	9.42	9.76	10.29	10.75	11.22	13.20	15.30
		20	10.60	10.79	11.17	11.64	12.14	12.67	13.50	14.22	14.97	18.12	21.50
40		13.47	14.00	14.73	15.56	16.43	17.34	18.76	19.99	21.25	26.54	32.11	
60		15.74	16.63	17.72	18.91	20.15	21.44	23.42	25.12	26.85	34.01	41.49	
80		17.71	18.98	20.44	21.99	23.59	25.23	27.74	29.87	32.03	40.91	50.15	
100		19.51	21.16	23.00	24.90	26.85	28.82	31.82	34.35	36.91	47.41	58.29	
120		21.20	23.24	25.44	27.68	29.96	32.25	35.72	38.63	41.58	53.60	66.04	
140		22.79	25.23	27.79	30.37	32.96	35.55	39.47	42.75	46.06	59.55	73.48	
400		10	9.19	9.21	9.42	9.70	10.02	10.36	10.90	11.36	11.83	13.79	15.87
		20	11.38	11.55	11.92	12.37	12.86	13.38	14.20	14.91	15.63	18.72	22.02
	40	14.45	14.93	15.62	16.40	17.24	18.11	19.49	20.67	21.90	27.06	32.56	
	60	16.84	17.64	18.66	19.78	20.96	22.19	24.11	25.76	27.44	34.49	41.90	
	80	18.91	20.04	21.40	22.86	24.38	25.96	28.39	30.47	32.59	41.36	50.53	
	100	20.77	22.25	23.95	25.75	27.61	29.52	32.44	34.92	37.45	47.83	58.65	
	120	22.50	24.33	26.38	28.51	30.70	32.92	36.31	39.18	42.08	54.01	66.39	
	140	24.12	26.32	28.71	31.17	33.67	36.20	40.04	43.28	46.55	59.94	73.81	
	600	10	10.18	10.19	10.40	10.69	11.02	11.36	11.91	12.38	12.85	14.83	16.89
		20	12.66	12.79	13.15	13.60	14.08	14.60	15.41	16.10	16.82	19.82	23.04
40		16.06	16.47	17.12	17.86	18.66	19.49	20.81	21.94	23.12	28.10	33.45	
60		18.67	19.36	20.29	21.34	22.45	23.61	25.42	26.99	28.61	35.44	42.72	
80		20.90	21.87	23.10	24.45	25.87	27.35	29.66	31.65	33.69	42.25	51.29	
100		22.88	24.15	25.69	27.34	29.08	30.88	33.66	36.06	38.50	48.68	59.37	
120		24.71	26.29	28.13	30.09	32.13	34.24	37.49	40.27	43.10	54.82	67.08	
140		26.42	28.31	30.45	32.72	35.07	37.48	41.18	44.33	47.52	60.72	74.48	
800		10	10.99	10.99	11.20	11.50	11.83	12.19	12.74	13.22	13.71	15.72	17.79
		20	13.69	13.81	14.17	14.61	15.10	15.62	16.43	17.12	17.84	20.82	23.99
	40	17.38	17.75	18.37	19.10	19.88	20.70	21.98	23.09	24.24	29.10	34.34	
	60	20.19	20.80	21.69	22.70	23.77	24.88	26.64	28.16	29.72	36.38	43.53	
	80	22.55	23.43	24.59	25.87	27.23	28.65	30.87	32.79	34.77	43.14	52.05	
	100	24.65	25.80	27.23	28.80	30.45	32.17	34.85	37.16	39.54	49.52	60.10	
	120	26.57	27.99	29.71	31.56	33.50	35.51	38.65	41.34	44.10	55.63	67.77	
	140	28.36	30.06	32.05	34.19	36.42	38.73	42.31	45.37	48.49	61.50	75.15	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 56.0 Ft (RADIUS = 39.6 Ft)
FIRE GROWTH: ULTRAFast (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60	80
0	10	1.43	1.44	1.50	1.57	1.65	1.73	1.86	1.96	2.07	2.51	2.95
	20	1.62	1.68	1.77	1.88	1.99	2.10	2.28	2.42	2.57	3.16	3.77
	40	1.93	2.07	2.23	2.40	2.56	2.73	2.99	3.20	3.41	4.27	5.15
	60	2.20	2.41	2.63	2.85	3.07	3.28	3.61	3.88	4.15	5.24	6.36
	80	2.46	2.73	3.00	3.27	3.53	3.79	4.18	4.50	4.83	6.13	7.47
	100	2.69	3.03	3.35	3.66	3.96	4.27	4.72	5.09	5.46	6.97	8.51
	120	2.92	3.31	3.68	4.03	4.38	4.72	5.23	5.65	6.07	7.77	9.50
	140	3.13	3.58	3.99	4.39	4.77	5.15	5.71	6.18	6.65	8.53	10.45
	10	1.83	1.80	1.82	1.87	1.93	2.00	2.10	2.20	2.29	2.69	3.11
	20	2.07	2.05	2.10	2.18	2.26	2.36	2.51	2.64	2.77	3.32	3.91
25	40	2.41	2.44	2.55	2.67	2.81	2.96	3.19	3.38	3.58	4.41	5.26
	60	2.68	2.77	2.93	3.11	3.29	3.49	3.79	4.04	4.30	5.37	6.46
	80	2.93	3.07	3.28	3.51	3.74	3.98	4.35	4.66	4.97	6.25	7.56
	100	3.15	3.36	3.61	3.89	4.16	4.45	4.88	5.24	5.60	7.08	8.60
	120	3.37	3.63	3.93	4.25	4.57	4.89	5.38	5.79	6.20	7.87	9.59
	140	3.57	3.89	4.24	4.60	4.96	5.32	5.86	6.32	6.77	8.63	10.54
	10	2.01	1.97	1.99	2.04	2.10	2.17	2.27	2.36	2.46	2.85	3.26
	20	2.29	2.27	2.31	2.38	2.46	2.55	2.69	2.82	2.95	3.48	4.04
	40	2.68	2.70	2.79	2.90	3.03	3.16	3.37	3.56	3.75	4.54	5.38
	60	2.99	3.05	3.18	3.34	3.50	3.68	3.96	4.21	4.45	5.49	6.57
50	80	3.26	3.36	3.53	3.73	3.94	4.17	4.51	4.81	5.11	6.36	7.66
	100	3.50	3.65	3.86	4.10	4.36	4.62	5.03	5.38	5.73	7.19	8.69
	120	3.72	3.91	4.17	4.46	4.76	5.06	5.53	5.93	6.33	7.97	9.68
	140	3.93	4.17	4.48	4.80	5.14	5.48	6.01	6.45	6.90	8.73	10.62
	10	2.24	2.20	2.22	2.27	2.33	2.40	2.51	2.60	2.70	3.09	3.50
	20	2.59	2.56	2.60	2.67	2.75	2.84	2.98	3.10	3.23	3.74	4.29
	40	3.06	3.06	3.14	3.24	3.36	3.49	3.69	3.86	4.04	4.80	5.60
	60	3.42	3.46	3.57	3.71	3.86	4.03	4.29	4.51	4.74	5.73	6.77
	80	3.72	3.79	3.94	4.11	4.31	4.51	4.83	5.10	5.39	6.59	7.85
	100	4.00	4.10	4.28	4.49	4.72	4.96	5.34	5.66	6.00	7.40	8.88
100	120	4.24	4.38	4.60	4.85	5.11	5.39	5.82	6.20	6.58	8.18	9.85
	140	4.47	4.65	4.90	5.18	5.49	5.80	6.29	6.71	7.14	8.93	10.79
	10	2.41	2.36	2.39	2.44	2.50	2.57	2.68	2.78	2.88	3.28	3.69
	20	2.80	2.77	2.81	2.88	2.96	3.05	3.20	3.32	3.44	3.97	4.51
	40	3.33	3.33	3.41	3.51	3.62	3.75	3.95	4.12	4.29	5.03	5.82
	60	3.74	3.76	3.87	4.00	4.15	4.31	4.56	4.78	5.00	5.96	6.97
	80	4.07	4.13	4.26	4.43	4.61	4.80	5.11	5.38	5.65	6.81	8.04
	100	4.37	4.45	4.62	4.82	5.03	5.26	5.62	5.93	6.25	7.61	9.06
	120	4.64	4.75	4.95	5.18	5.43	5.69	6.10	6.46	6.83	8.38	10.02
	140	4.89	5.03	5.26	5.52	5.81	6.10	6.57	6.97	7.39	9.12	10.96
150	10	2.41	2.36	2.39	2.44	2.50	2.57	2.68	2.78	2.88	3.28	3.69
	20	2.80	2.77	2.81	2.88	2.96	3.05	3.20	3.32	3.44	3.97	4.51
	40	3.33	3.33	3.41	3.51	3.62	3.75	3.95	4.12	4.29	5.03	5.82
	60	3.74	3.76	3.87	4.00	4.15	4.31	4.56	4.78	5.00	5.96	6.97
	80	4.07	4.13	4.26	4.43	4.61	4.80	5.11	5.38	5.65	6.81	8.04
	100	4.37	4.45	4.62	4.82	5.03	5.26	5.62	5.93	6.25	7.61	9.06
	120	4.64	4.75	4.95	5.18	5.43	5.69	6.10	6.46	6.83	8.38	10.02
	140	4.89	5.03	5.26	5.52	5.81	6.10	6.57	6.97	7.39	9.12	10.96

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 56.0 Ft
 FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)
 (RADIUS = 39.6 Ft)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		(Ft*s) ^{1/2}	4	8	12	16	20	24	30	35	40	60	80
200	10		2.54	2.49	2.52	2.57	2.64	2.71	2.82	2.92	3.03	3.44	3.86
	20		2.97	2.94	2.98	3.05	3.14	3.23	3.37	3.50	3.63	4.15	4.70
	40		3.56	3.55	3.62	3.73	3.84	3.97	4.17	4.34	4.51	5.25	6.02
	60		3.99	4.01	4.11	4.25	4.39	4.55	4.80	5.02	5.24	6.17	7.17
	80		4.36	4.40	4.53	4.69	4.87	5.06	5.36	5.62	5.89	7.02	8.23
	100		4.67	4.75	4.90	5.10	5.31	5.53	5.88	6.18	6.49	7.82	9.24
	120		4.96	5.06	5.25	5.47	5.71	5.96	6.36	6.71	7.07	8.58	10.20
300	140		5.23	5.35	5.57	5.82	6.09	6.38	6.83	7.22	7.62	9.32	11.17
	10		2.76	2.71	2.74	2.79	2.86	2.94	3.06	3.16	3.27	3.70	4.13
	20		3.26	3.22	3.26	3.34	3.42	3.52	3.67	3.80	3.93	4.47	5.02
	40		3.92	3.91	3.98	4.08	4.20	4.33	4.53	4.70	4.88	5.62	6.39
	60		4.41	4.42	4.52	4.65	4.80	4.96	5.21	5.42	5.64	6.57	7.54
	80		4.82	4.85	4.98	5.14	5.31	5.50	5.80	6.05	6.31	7.42	8.59
	100		5.17	5.23	5.38	5.57	5.77	5.99	6.33	6.62	6.93	8.21	9.59
400	120		5.49	5.57	5.75	5.96	6.20	6.44	6.83	7.16	7.51	8.97	10.54
	140		5.79	5.89	6.09	6.33	6.59	6.87	7.30	7.67	8.06	9.69	11.45
	10		2.94	2.89	2.91	2.97	3.04	3.12	3.24	3.35	3.46	3.91	4.35
	20		3.48	3.44	3.49	3.57	3.65	3.75	3.91	4.04	4.18	4.73	5.30
	40		4.21	4.19	4.27	4.37	4.50	4.63	4.83	5.01	5.19	5.94	6.71
	60		4.75	4.75	4.85	4.99	5.14	5.30	5.55	5.77	5.99	6.91	7.88
	80		5.19	5.22	5.34	5.50	5.68	5.87	6.16	6.42	6.68	7.78	8.94
600	100		5.58	5.63	5.77	5.96	6.16	6.38	6.72	7.01	7.31	8.58	9.92
	120		5.93	5.99	6.17	6.38	6.61	6.85	7.23	7.56	7.90	9.33	10.87
	140		6.24	6.33	6.53	6.76	7.02	7.29	7.71	8.08	8.46	10.06	11.78
	10		3.22	3.17	3.20	3.26	3.33	3.42	3.55	3.66	3.78	4.25	4.71
	20		3.85	3.81	3.86	3.93	4.03	4.13	4.30	4.44	4.58	5.16	5.75
	40		4.69	4.66	4.74	4.85	4.97	5.11	5.32	5.51	5.70	6.47	7.26
	60		5.30	5.29	5.39	5.53	5.68	5.85	6.11	6.33	6.56	7.50	8.47
800	80		5.80	5.82	5.94	6.10	6.28	6.47	6.78	7.04	7.30	8.40	9.55
	100		6.24	6.27	6.42	6.60	6.81	7.03	7.37	7.66	7.97	9.22	10.55
	120		6.63	6.68	6.85	7.06	7.29	7.53	7.91	8.24	8.58	9.99	11.49
	140		6.98	7.06	7.25	7.48	7.73	8.00	8.42	8.79	9.16	10.72	12.39
	10		3.45	3.39	3.43	3.49	3.57	3.66	3.80	3.91	4.03	4.52	5.01
	20		4.15	4.10	4.15	4.24	4.33	4.44	4.61	4.76	4.91	5.52	6.13
	40		5.07	5.04	5.12	5.23	5.36	5.51	5.73	5.92	6.11	6.91	7.72
	60		5.74	5.73	5.83	5.97	6.13	6.30	6.57	6.80	7.04	8.00	8.98
	80		6.30	6.30	6.43	6.59	6.78	6.97	7.28	7.55	7.82	8.93	10.09
	100		6.77	6.80	6.94	7.13	7.34	7.56	7.91	8.21	8.52	9.78	11.11
	120		7.20	7.24	7.41	7.62	7.85	8.10	8.49	8.82	9.16	10.57	12.06
	140		7.59	7.65	7.84	8.07	8.33	8.60	9.02	9.39	9.76	11.32	12.97

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 56.0 Ft (RADIUS = 39.6 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE °F	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
0	(Ft*s) ^{1/2}											
	10	2.07	2.14	2.25	2.38	2.52	2.66	2.87	3.05	3.23	3.96	4.71
	20	2.45	2.61	2.80	3.00	3.20	3.40	3.71	3.97	4.23	5.28	6.35
	40	3.07	3.39	3.71	4.03	4.35	4.66	5.13	5.52	5.91	7.50	9.11
	60	3.62	4.08	4.52	4.94	5.35	5.76	6.37	6.88	7.39	9.44	11.53
	80	4.12	4.71	5.26	5.77	6.28	6.78	7.52	8.13	8.75	11.22	13.75
	100	4.59	5.31	5.95	6.56	7.15	7.73	8.59	9.30	10.02	12.89	15.83
25	120	5.04	5.87	6.61	7.30	7.97	8.63	9.61	10.42	11.23	14.49	17.81
	140	5.47	6.41	7.24	8.01	8.76	9.50	10.59	11.49	12.39	16.01	19.71
	10	2.61	2.59	2.65	2.74	2.84	2.96	3.14	3.30	3.47	4.15	4.87
	20	3.01	3.05	3.17	3.32	3.49	3.67	3.95	4.19	4.43	5.44	6.49
	40	3.63	3.80	4.05	4.32	4.60	4.89	5.33	5.71	6.09	7.63	9.22
	60	4.15	4.46	4.82	5.20	5.58	5.97	6.56	7.05	7.54	9.56	11.63
	80	4.63	5.07	5.54	6.01	6.49	6.97	7.69	8.29	8.89	11.34	13.84
50	100	5.08	5.64	6.22	6.78	7.35	7.91	8.75	9.45	10.15	13.00	15.92
	120	5.51	6.19	6.86	7.52	8.16	8.81	9.76	10.56	11.36	14.59	17.90
	140	5.93	6.72	7.48	8.22	8.95	9.67	10.73	11.62	12.51	16.11	19.80
	10	2.87	2.84	2.89	2.98	3.08	3.19	3.37	3.52	3.68	4.34	5.03
	20	3.34	3.36	3.46	3.60	3.75	3.91	4.17	4.40	4.63	5.60	6.62
	40	4.03	4.14	4.34	4.58	4.84	5.11	5.53	5.89	6.25	7.77	9.34
	60	4.58	4.80	5.11	5.45	5.81	6.17	6.74	7.21	7.70	9.68	11.73
100	80	5.07	5.40	5.81	6.25	6.70	7.16	7.85	8.44	9.03	11.45	13.94
	100	5.52	5.96	6.48	7.01	7.55	8.09	8.91	9.60	10.29	13.11	16.01
	120	5.94	6.50	7.11	7.73	8.36	8.98	9.91	10.70	11.49	14.69	17.99
	140	6.35	7.02	7.73	8.43	9.13	9.83	10.88	11.76	12.64	16.21	19.88
	10	3.23	3.18	3.24	3.32	3.42	3.53	3.70	3.85	4.01	4.65	5.33
	20	3.79	3.79	3.88	4.00	4.15	4.30	4.55	4.76	4.98	5.91	6.89
	40	4.58	4.65	4.83	5.04	5.27	5.52	5.90	6.24	6.58	8.03	9.57
150	60	5.20	5.35	5.61	5.91	6.23	6.56	7.09	7.54	8.00	9.93	11.94
	80	5.73	5.97	6.32	6.70	7.11	7.53	8.19	8.75	9.32	11.68	14.13
	100	6.21	6.54	6.97	7.44	7.94	8.44	9.22	9.89	10.56	13.33	16.20
	120	6.65	7.08	7.60	8.16	8.73	9.32	10.22	10.98	11.75	14.90	18.16
	140	7.07	7.59	8.20	8.84	9.50	10.16	11.17	12.03	12.89	16.41	20.05
	10	3.48	3.44	3.49	3.57	3.67	3.78	3.96	4.11	4.27	4.92	5.59
	20	4.12	4.10	4.19	4.32	4.46	4.61	4.86	5.07	5.28	6.19	7.15
	40	4.99	5.05	5.21	5.41	5.63	5.87	6.24	6.56	6.89	8.30	9.79
	60	5.67	5.79	6.03	6.31	6.61	6.92	7.42	7.85	8.30	10.17	12.15
	80	6.24	6.44	6.75	7.11	7.49	7.88	8.51	9.05	9.60	11.90	14.33
	100	6.75	7.03	7.42	7.85	8.31	8.79	9.53	10.17	10.83	13.54	16.38
	120	7.22	7.58	8.04	8.56	9.10	9.65	10.52	11.25	12.00	15.11	18.34
	140	7.66	8.10	8.64	9.24	9.85	10.49	11.46	12.29	13.13	16.61	20.22

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 56.0 Ft (RADIUS = 39.6 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft												
		(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60	80
200	10	3.69	3.64	3.69	3.78	3.88	3.99	4.17	4.33	4.49	5.14	5.81		
	20	4.38	4.36	4.45	4.58	4.72	4.87	5.12	5.33	5.54	6.44	7.39		
	40	5.33	5.38	5.53	5.73	5.94	6.17	6.54	6.85	7.18	8.55	10.02		
	60	6.05	6.16	6.38	6.65	6.94	7.25	7.73	8.15	8.58	10.41	12.35		
	80	6.66	6.84	7.13	7.47	7.83	8.21	8.81	9.33	9.87	12.13	14.52		
	100	7.20	7.45	7.81	8.22	8.66	9.12	9.83	10.45	11.09	13.75	16.56		
	120	7.70	8.01	8.45	8.93	9.44	9.98	10.81	11.52	12.26	15.31	18.51		
300	140	8.16	8.55	9.05	9.61	10.19	10.80	11.75	12.55	13.38	16.81	20.39		
	10	4.02	3.97	4.02	4.11	4.22	4.34	4.52	4.68	4.85	5.52	6.20		
	20	4.81	4.79	4.87	5.00	5.15	5.30	5.55	5.76	5.98	6.88	7.82		
	40	5.88	5.91	6.06	6.25	6.47	6.69	7.05	7.36	7.68	9.02	10.45		
	60	6.68	6.77	6.98	7.24	7.52	7.81	8.28	8.69	9.10	10.87	12.76		
	80	7.36	7.50	7.77	8.09	8.44	8.80	9.38	9.88	10.39	12.57	14.90		
	100	7.95	8.15	8.49	8.87	9.28	9.72	10.40	10.99	11.60	14.18	16.93		
400	120	8.49	8.75	9.15	9.60	10.08	10.58	11.37	12.05	12.75	15.71	18.86		
	140	8.98	9.31	9.77	10.28	10.83	11.40	12.30	13.07	13.86	17.20	20.72		
	10	4.29	4.24	4.29	4.39	4.50	4.62	4.81	4.97	5.14	5.83	6.53		
	20	5.16	5.13	5.22	5.35	5.50	5.66	5.91	6.12	6.35	7.26	8.20		
	40	6.33	6.35	6.50	6.69	6.90	7.13	7.49	7.80	8.12	9.45	10.85		
	60	7.20	7.27	7.48	7.73	8.01	8.30	8.76	9.16	9.57	11.30	13.15		
	80	7.92	8.05	8.31	8.62	8.96	9.32	9.88	10.37	10.87	12.99	15.28		
600	100	8.56	8.74	9.06	9.43	9.83	10.25	10.91	11.49	12.08	14.59	17.28		
	120	9.14	9.37	9.75	10.18	10.64	11.13	11.89	12.55	13.23	16.11	19.21		
	140	9.67	9.96	10.39	10.88	11.41	11.96	12.82	13.56	14.33	17.58	21.06		
	10	4.73	4.67	4.73	4.83	4.94	5.07	5.27	5.44	5.62	6.34	7.07		
	20	5.72	5.69	5.78	5.91	6.06	6.23	6.49	6.72	6.95	7.89	8.86		
	40	7.05	7.06	7.21	7.40	7.62	7.85	8.22	8.53	8.86	10.19	11.58		
	60	8.03	8.09	8.29	8.54	8.82	9.11	9.57	9.97	10.38	12.08	13.89		
800	80	8.85	8.95	9.20	9.51	9.84	10.20	10.75	11.23	11.72	13.79	16.00		
	100	9.56	9.71	10.01	10.37	10.76	11.17	11.82	12.38	12.95	15.37	17.99		
	120	10.20	10.40	10.75	11.16	11.61	12.08	12.81	13.45	14.11	16.89	19.89		
	140	10.78	11.03	11.44	11.90	12.41	12.93	13.76	14.47	15.21	18.34	21.72		
	10	5.08	5.02	5.08	5.18	5.30	5.44	5.65	5.83	6.01	6.76	7.51		
	20	6.18	6.14	6.23	6.37	6.53	6.70	6.97	7.21	7.45	8.42	9.41		
	40	7.64	7.64	7.79	7.99	8.21	8.45	8.82	9.14	9.47	10.83	12.23		
	60	8.71	8.76	8.96	9.21	9.49	9.79	10.25	10.66	11.07	12.77	14.57		
	80	9.60	9.69	9.94	10.24	10.58	10.93	11.49	11.96	12.45	14.50	16.68		
	100	10.37	10.50	10.80	11.16	11.55	11.95	12.59	13.15	13.71	16.10	18.66		
	120	11.06	11.24	11.58	11.99	12.43	12.90	13.62	14.25	14.89	17.62	20.55		
	140	11.70	11.92	12.31	12.77	13.26	13.78	14.59	15.29	16.01	19.06	22.36		

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 56.0 Ft (RADIUS = 39.6 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
0 (Ft*s) ^{1/2}	10	3.11	3.29	3.52	3.76	4.00	4.25	4.63	4.94	5.26	6.55	7.85
	20	3.85	4.22	4.61	4.99	5.37	5.75	6.31	6.79	7.26	9.18	11.13
	40	5.10	5.79	6.44	7.06	7.66	8.26	9.15	9.89	10.63	13.61	16.65
	60	6.20	7.17	8.05	8.87	9.68	10.47	11.64	12.61	13.58	17.49	21.48
	80	7.20	8.44	9.52	10.54	11.53	12.49	13.92	15.11	16.29	21.06	25.92
	100	8.15	9.62	10.91	12.11	13.26	14.39	16.07	17.45	18.84	24.41	30.09
	120	9.05	10.75	12.22	13.59	14.91	16.20	18.11	19.68	21.26	27.59	34.06
25	140	9.91	11.84	13.49	15.02	16.50	17.94	20.06	21.82	23.58	30.64	37.86
	10	3.78	3.82	3.96	4.15	4.35	4.57	4.91	5.20	5.50	6.74	8.01
	20	4.52	4.71	5.00	5.33	5.67	6.02	6.55	7.01	7.47	9.34	11.27
	40	5.71	6.21	6.77	7.34	7.92	8.49	9.35	10.08	10.80	13.75	16.76
	60	6.76	7.55	8.35	9.13	9.91	10.67	11.82	12.78	13.74	17.62	21.59
	80	7.73	8.79	9.81	10.78	11.74	12.69	14.09	15.26	16.44	21.17	26.02
	100	8.64	9.96	11.18	12.34	13.46	14.58	16.23	17.60	18.97	24.51	30.18
50	120	9.52	11.08	12.48	13.81	15.11	16.38	18.26	19.82	21.39	27.69	34.14
	140	10.37	12.15	13.74	15.23	16.68	18.10	20.21	21.96	23.70	30.74	37.94
	10	4.18	4.18	4.30	4.47	4.66	4.86	5.17	5.45	5.73	6.93	8.18
	20	4.99	5.11	5.36	5.64	5.95	6.28	6.79	7.22	7.67	9.50	11.41
	40	6.22	6.61	7.10	7.63	8.17	8.72	9.55	10.26	10.97	13.88	16.88
	60	7.27	7.92	8.65	9.39	10.13	10.88	12.00	12.94	13.89	17.74	21.69
	80	8.22	9.14	10.09	11.02	11.95	12.88	14.26	15.42	16.58	21.29	26.12
100	100	9.12	10.29	11.44	12.56	13.67	14.76	16.39	17.75	19.11	24.62	30.28
	120	9.99	11.40	12.74	14.03	15.30	16.55	18.41	19.96	21.52	27.80	34.23
	140	10.81	12.46	13.98	15.44	16.87	18.27	20.36	22.09	23.83	30.84	38.03
	10	4.71	4.69	4.80	4.95	5.13	5.32	5.62	5.88	6.15	7.29	8.49
	20	5.65	5.73	5.93	6.19	6.47	6.76	7.23	7.64	8.06	9.82	11.68
	40	7.01	7.29	7.70	8.16	8.65	9.16	9.95	10.62	11.31	14.15	17.11
	60	8.11	8.61	9.23	9.89	10.58	11.29	12.36	13.27	14.20	17.98	21.90
150	80	9.09	9.81	10.64	11.50	12.37	13.26	14.60	15.73	16.87	21.52	26.31
	100	9.99	10.94	11.97	13.01	14.06	15.12	16.71	18.04	19.38	24.84	30.46
	120	10.85	12.02	13.24	14.46	15.68	16.89	18.72	20.24	21.78	28.00	34.41
	140	11.67	13.06	14.47	15.86	17.23	18.60	20.65	22.36	24.08	31.04	38.20
	10	5.10	5.07	5.18	5.33	5.50	5.69	5.99	6.24	6.51	7.62	8.80
	20	6.14	6.19	6.39	6.63	6.90	7.18	7.63	8.02	8.43	10.13	11.95
	40	7.62	7.85	8.22	8.64	9.10	9.58	10.33	10.98	11.64	14.42	17.34
	60	8.79	9.20	9.76	10.37	11.01	11.68	12.72	13.60	14.50	18.23	22.11
	80	9.80	10.41	11.16	11.96	12.78	13.63	14.93	16.03	17.15	21.74	26.51
	100	10.73	11.54	12.48	13.45	14.46	15.48	17.02	18.33	19.65	25.06	30.64
	120	11.60	12.62	13.73	14.89	16.06	17.24	19.02	20.52	22.04	28.21	34.58
	140	12.43	13.65	14.95	16.27	17.60	18.93	20.94	22.63	24.33	31.24	38.37

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 56.0 Ft (RADIUS = 39.6 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		(Ft*s) ^{1/2}	4	8	12	16	20	24	30	35	40	60	80
200	10	5.41	5.38	5.48	5.63	5.81	6.00	6.30	6.55	6.82	7.92	9.09	
	20	6.54	6.58	6.77	7.00	7.27	7.55	7.99	8.37	8.76	10.43	12.21	
	40	8.12	8.32	8.67	9.07	9.51	9.97	10.69	11.32	11.97	14.69	17.57	
	60	9.35	9.72	10.23	10.81	11.43	12.07	13.07	13.92	14.80	18.47	22.32	
	80	10.41	10.95	11.64	12.40	13.18	14.00	15.26	16.34	17.43	21.97	26.70	
	100	11.38	12.10	12.96	13.88	14.84	15.83	17.34	18.62	19.92	25.27	30.83	
	120	12.27	13.17	14.21	15.31	16.43	17.58	19.32	20.80	22.29	28.42	34.76	
300	140	13.11	14.20	15.42	16.68	17.96	19.26	21.23	22.90	24.58	31.44	38.55	
	10	5.92	5.88	5.99	6.14	6.32	6.51	6.81	7.07	7.34	8.45	9.60	
	20	7.19	7.22	7.40	7.63	7.89	8.16	8.60	8.98	9.36	10.99	12.73	
	40	8.95	9.11	9.43	9.82	10.23	10.67	11.37	11.97	12.58	15.21	18.02	
	60	10.29	10.60	11.07	11.60	12.18	12.78	13.73	14.55	15.39	18.95	22.73	
	80	11.43	11.89	12.51	13.21	13.94	14.71	15.90	16.94	17.99	22.42	27.09	
	100	12.46	13.07	13.85	14.69	15.59	16.52	17.96	19.19	20.45	25.70	31.19	
400	120	13.40	14.17	15.10	16.11	17.16	18.24	19.92	21.35	22.81	28.83	35.11	
	140	14.28	15.21	16.30	17.46	18.67	19.91	21.81	23.43	25.07	31.83	38.87	
	10	6.34	6.29	6.40	6.55	6.73	6.93	7.24	7.50	7.78	8.90	10.06	
	20	7.72	7.74	7.92	8.15	8.41	8.68	9.12	9.50	9.88	11.50	13.21	
	40	9.62	9.76	10.07	10.45	10.86	11.29	11.96	12.55	13.15	15.72	18.47	
	60	11.06	11.33	11.78	12.30	12.85	13.43	14.35	15.14	15.96	19.43	23.14	
	80	12.28	12.69	13.27	13.93	14.63	15.37	16.52	17.52	18.54	22.87	27.47	
600	100	13.36	13.91	14.63	15.43	16.29	17.17	18.56	19.75	20.98	26.13	31.56	
	120	14.35	15.04	15.91	16.85	17.85	18.89	20.51	21.89	23.31	29.24	35.46	
	140	15.27	16.10	17.11	18.21	19.36	20.54	22.38	23.95	25.56	32.23	39.21	
	10	7.01	6.95	7.06	7.22	7.41	7.61	7.93	8.21	8.49	9.65	10.83	
	20	8.58	8.59	8.76	8.99	9.26	9.54	9.99	10.37	10.76	12.38	14.08	
	40	10.72	10.83	11.13	11.50	11.90	12.33	13.00	13.57	14.16	16.66	19.33	
	60	12.33	12.55	12.97	13.47	14.00	14.57	15.45	16.22	17.00	20.35	23.95	
800	80	13.67	14.01	14.56	15.18	15.85	16.55	17.65	18.60	19.58	23.75	28.23	
	100	14.85	15.32	15.98	16.74	17.54	18.38	19.69	20.83	22.00	26.97	32.28	
	120	15.93	16.51	17.31	18.19	19.12	20.10	21.62	22.95	24.30	30.05	36.15	
	140	16.92	17.63	18.55	19.56	20.63	21.74	23.48	24.98	26.53	33.01	39.88	
	10	7.55	7.49	7.60	7.77	7.96	8.17	8.51	8.79	9.08	10.28	11.49	
	20	9.28	9.27	9.45	9.69	9.96	10.25	10.70	11.10	11.49	13.14	14.84	
	40	11.62	11.71	12.00	12.37	12.78	13.20	13.87	14.45	15.04	17.51	20.14	
	60	13.36	13.56	13.96	14.45	14.98	15.54	16.41	17.16	17.94	21.21	24.74	
	80	14.81	15.11	15.64	16.24	16.90	17.58	18.65	19.58	20.54	24.60	28.98	
	100	16.08	16.49	17.13	17.86	18.63	19.45	20.72	21.82	22.96	27.79	33.00	
	120	17.23	17.75	18.51	19.35	20.25	21.19	22.66	23.94	25.26	30.85	36.84	
	140	18.29	18.93	19.79	20.76	21.78	22.85	24.52	25.97	27.46	33.79	40.55	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 56.0 Ft (RADIUS = 39.6 Ft)³
 FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60
0	10	4.84	5.27	5.73	6.19	6.64	7.10	7.79	8.36	8.94	11.27	13.63	
	20	6.33	7.14	7.91	8.65	9.38	10.09	11.16	12.05	12.94	16.53	20.19	
	40	8.83	10.28	11.57	12.79	13.97	15.12	16.84	18.26	19.68	25.39	31.22	
	60	11.02	13.04	14.79	16.42	17.99	19.54	21.81	23.70	25.58	33.16	40.89	
	80	13.03	15.57	17.74	19.76	21.69	23.59	26.38	28.69	31.00	40.29	49.78	
	100	14.92	17.94	20.51	22.89	25.16	27.39	30.67	33.38	36.09	46.99	58.11	
	120	16.72	20.20	23.14	25.86	28.47	31.00	34.75	37.84	40.93	53.35	66.04	
25	140	18.44	22.37	25.67	28.72	31.63	34.47	38.66	42.12	45.57	59.46	73.64	
	10	5.64	5.85	6.20	6.59	7.00	7.42	8.07	8.62	9.18	11.46	13.80	
	20	7.05	7.64	8.31	8.99	9.68	10.37	11.40	12.27	13.15	16.70	20.33	
	40	9.45	10.71	11.91	13.08	14.22	15.35	17.04	18.44	19.85	25.53	31.34	
	60	11.59	13.42	15.09	16.68	18.22	19.74	22.00	23.87	25.74	33.28	41.00	
	80	13.56	15.93	18.02	20.00	21.91	23.78	26.55	28.85	31.15	40.41	49.87	
	100	15.42	18.28	20.78	23.11	25.37	27.57	30.83	33.53	36.23	47.09	58.21	
50	120	17.20	20.53	23.40	26.08	28.66	31.18	34.90	37.98	41.06	53.46	66.13	
	140	18.90	22.68	25.92	28.93	31.82	34.64	38.81	42.26	45.70	59.56	73.73	
	10	6.19	6.33	6.62	6.96	7.34	7.74	8.35	8.88	9.42	11.65	13.96	
	20	7.66	8.11	8.69	9.32	9.97	10.63	11.64	12.49	13.35	16.86	20.47	
	40	10.04	11.12	12.24	13.36	14.47	15.58	17.24	18.63	20.02	25.66	31.46	
	60	12.14	13.80	15.40	16.94	18.45	19.95	22.18	24.03	25.89	33.41	41.10	
	80	14.08	16.28	18.31	20.24	22.12	23.97	26.72	29.01	31.29	40.52	49.97	
100	100	15.91	18.62	21.05	23.34	25.57	27.75	30.99	33.68	36.36	47.20	58.30	
	120	17.67	20.85	23.66	26.30	28.85	31.35	35.06	38.12	41.19	53.56	66.22	
	140	19.36	22.99	26.17	29.14	32.00	34.81	38.96	42.39	45.82	59.66	73.81	
	10	6.98	7.06	7.30	7.61	7.95	8.31	8.88	9.38	9.89	12.03	14.28	
	20	8.60	8.92	9.41	9.96	10.55	11.16	12.11	12.92	13.75	17.18	20.74	
	40	11.07	11.92	12.90	13.92	14.97	16.03	17.64	19.00	20.36	25.94	31.69	
	60	13.16	14.54	16.00	17.45	18.91	20.36	22.54	24.37	26.20	33.65	41.31	
150	80	15.08	16.98	18.87	20.72	22.54	24.35	27.06	29.32	31.58	40.75	50.17	
	100	16.88	19.28	21.58	23.80	25.97	28.12	31.31	33.97	36.64	47.42	58.48	
	120	18.60	21.49	24.17	26.73	29.24	31.70	35.36	38.41	41.45	53.77	66.39	
	140	20.26	23.61	26.66	29.56	32.37	35.14	39.25	42.66	46.07	59.86	73.98	
	10	7.56	7.62	7.84	8.14	8.46	8.81	9.36	9.83	10.32	12.40	14.60	
	20	9.32	9.58	10.02	10.53	11.08	11.66	12.56	13.35	14.15	17.50	21.02	
	40	11.92	12.63	13.52	14.47	15.46	16.48	18.04	19.36	20.70	26.21	31.92	
	60	14.06	15.25	16.58	17.96	19.36	20.77	22.90	24.70	26.51	33.90	41.52	
	80	15.99	17.66	19.42	21.19	22.96	24.74	27.40	29.63	31.87	40.98	50.36	
	100	17.78	19.94	22.11	24.25	26.37	28.48	31.63	34.27	36.91	47.64	58.67	
	120	19.49	22.12	24.68	27.17	29.62	32.05	35.67	38.69	41.71	53.98	66.57	
	140	21.13	24.21	27.15	29.97	32.74	35.47	39.55	42.93	46.32	60.06	74.15	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 56.0 Ft (RADIUS = 39.6 Ft)³
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
(Ft*s) ^{1/2}	°F											
200	10	8.04	8.08	8.30	8.58	8.90	9.24	9.78	10.24	10.73	12.75	14.92
	20	9.92	10.15	10.56	11.04	11.57	12.13	13.00	13.76	14.53	17.81	21.29
	40	12.65	13.28	14.10	14.99	15.94	16.92	18.43	19.72	21.04	26.48	32.15
	60	14.85	15.91	17.15	18.46	19.80	21.17	23.26	25.03	26.81	34.14	41.73
	80	16.81	18.32	19.97	21.66	23.38	25.11	27.73	29.93	32.15	41.21	50.56
	100	18.61	20.58	22.63	24.70	26.77	28.84	31.95	34.56	37.18	47.85	58.85
	120	20.32	22.74	25.18	27.60	30.00	32.39	35.97	38.97	41.97	54.18	66.75
	140	21.96	24.82	27.63	30.39	33.11	35.81	39.84	43.20	46.57	60.26	74.32
300	10	8.82	8.84	9.05	9.33	9.64	9.98	10.51	10.97	11.44	13.42	15.53
	20	10.90	11.08	11.47	11.93	12.43	12.96	13.80	14.52	15.27	18.44	21.83
	40	13.86	14.39	15.13	15.96	16.84	17.76	19.19	20.43	21.70	27.02	32.61
	60	16.20	17.10	18.21	19.41	20.67	21.97	23.97	25.68	27.42	34.63	42.15
	80	18.24	19.52	21.01	22.58	24.21	25.86	28.40	30.55	32.72	41.66	50.95
	100	20.09	21.78	23.65	25.58	27.55	29.55	32.58	35.14	37.72	48.29	59.22
	120	21.83	23.93	26.16	28.45	30.75	33.07	36.58	39.52	42.49	54.60	67.10
	140	23.48	25.99	28.59	31.21	33.84	36.47	40.42	43.74	47.07	60.65	74.66
400	10	9.45	9.45	9.66	9.94	10.26	10.60	11.13	11.59	12.06	14.02	16.10
	20	11.71	11.86	12.23	12.68	13.17	13.69	14.51	15.22	15.95	19.04	22.36
	40	14.87	15.34	16.03	16.82	17.66	18.54	19.92	21.12	22.35	27.55	33.07
	60	17.33	18.13	19.16	20.30	21.49	22.73	24.67	26.33	28.03	35.12	42.57
	80	19.46	20.60	21.98	23.46	25.01	26.60	29.06	31.15	33.29	42.12	51.33
	100	21.38	22.89	24.62	26.44	28.33	30.26	33.21	35.72	38.26	48.72	59.59
	120	23.16	25.04	27.12	29.29	31.50	33.75	37.18	40.08	43.00	55.01	67.45
	140	24.84	27.09	29.53	32.03	34.56	37.12	41.00	44.27	47.57	61.05	75.00
600	10	10.47	10.46	10.67	10.95	11.27	11.62	12.16	12.62	13.10	15.08	17.14
	20	13.01	13.13	13.49	13.93	14.42	14.93	15.74	16.43	17.15	20.16	23.38
	40	16.52	16.91	17.56	18.31	19.11	19.95	21.27	22.41	23.59	28.59	33.97
	60	19.21	19.89	20.83	21.88	23.00	24.17	26.00	27.58	29.21	36.08	43.39
	80	21.50	22.48	23.72	25.08	26.52	28.02	30.34	32.35	34.41	43.02	52.11
	100	23.54	24.83	26.39	28.06	29.82	31.63	34.45	36.86	39.33	49.57	60.32
	120	25.42	27.03	28.90	30.89	32.96	35.09	38.37	41.18	44.03	55.83	68.15
	140	27.19	29.11	31.30	33.60	35.98	38.42	42.16	45.33	48.56	61.84	75.68
800	10	11.30	11.28	11.49	11.78	12.10	12.46	13.01	13.49	13.97	15.97	18.05
	20	14.08	14.18	14.53	14.97	15.45	15.97	16.78	17.47	18.19	21.17	24.35
	40	17.87	18.22	18.84	19.57	20.35	21.17	22.46	23.58	24.73	29.61	34.86
	60	20.75	21.36	22.26	23.27	24.34	25.47	27.23	28.76	30.34	37.03	44.21
	80	23.19	24.07	25.24	26.53	27.90	29.33	31.57	33.51	35.50	43.92	52.87
	100	25.35	26.51	27.96	29.54	31.21	32.95	35.65	37.98	40.38	50.43	61.05
	120	27.33	28.77	30.51	32.38	34.35	36.38	39.55	42.26	45.04	56.65	68.85
	140	29.17	30.90	32.92	35.09	37.35	39.69	43.30	46.39	49.54	62.63	76.35

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 58.0 Ft (RADIUS = 41.0 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60	80	
0	10	1.48	1.49	1.54	1.61	1.69	1.77	1.90	2.00	2.11	2.55	2.99	
	20	1.67	1.73	1.82	1.93	2.04	2.15	2.33	2.47	2.62	3.22	3.82	
	40	1.99	2.13	2.30	2.46	2.63	2.80	3.05	3.27	3.48	4.34	5.22	
	60	2.28	2.49	2.71	2.93	3.15	3.37	3.69	3.96	4.24	5.33	6.45	
	80	2.54	2.82	3.09	3.36	3.62	3.89	4.28	4.60	4.93	6.24	7.58	
	100	2.78	3.12	3.45	3.76	4.07	4.37	4.83	5.20	5.58	7.09	8.64	
	120	3.01	3.41	3.79	4.14	4.49	4.84	5.35	5.77	6.20	7.91	9.65	
	140	3.24	3.69	4.11	4.51	4.90	5.28	5.85	6.32	6.79	8.68	10.61	
25	10	1.89	1.85	1.87	1.92	1.98	2.04	2.15	2.24	2.34	2.73	3.15	
	20	2.13	2.11	2.16	2.23	2.32	2.41	2.56	2.69	2.82	3.38	3.96	
	40	2.48	2.51	2.62	2.74	2.88	3.03	3.26	3.45	3.65	4.48	5.34	
	60	2.76	2.85	3.01	3.19	3.38	3.57	3.87	4.13	4.39	5.46	6.56	
	80	3.02	3.16	3.37	3.60	3.84	4.08	4.45	4.76	5.07	6.36	7.68	
	100	3.25	3.46	3.71	3.99	4.27	4.56	4.99	5.35	5.72	7.20	8.73	
	120	3.47	3.73	4.04	4.36	4.69	5.01	5.50	5.91	6.33	8.01	9.74	
	140	3.68	4.00	4.36	4.72	5.09	5.45	6.00	6.46	6.92	8.78	10.70	
50	10	2.07	2.02	2.04	2.09	2.15	2.21	2.32	2.41	2.50	2.90	3.30	
	20	2.36	2.33	2.37	2.44	2.52	2.61	2.75	2.87	3.00	3.53	4.10	
	40	2.76	2.78	2.86	2.97	3.10	3.23	3.44	3.63	3.82	4.62	5.46	
	60	3.08	3.14	3.26	3.42	3.59	3.77	4.05	4.30	4.54	5.58	6.66	
	80	3.35	3.45	3.63	3.83	4.04	4.27	4.61	4.91	5.22	6.47	7.78	
	100	3.60	3.75	3.97	4.21	4.47	4.74	5.15	5.50	5.85	7.31	8.83	
	120	3.83	4.03	4.29	4.58	4.88	5.18	5.66	6.05	6.46	8.11	9.82	
	140	4.05	4.29	4.60	4.93	5.27	5.62	6.15	6.59	7.04	8.88	10.78	
100	10	2.30	2.25	2.28	2.33	2.39	2.45	2.56	2.65	2.75	3.14	3.55	
	20	2.66	2.63	2.67	2.73	2.81	2.90	3.04	3.16	3.29	3.80	4.35	
	40	3.15	3.15	3.22	3.32	3.44	3.57	3.77	3.94	4.12	4.88	5.68	
	60	3.52	3.55	3.66	3.80	3.95	4.12	4.38	4.60	4.84	5.82	6.87	
	80	3.83	3.90	4.04	4.22	4.41	4.61	4.93	5.21	5.50	6.70	7.97	
	100	4.11	4.21	4.39	4.60	4.83	5.08	5.46	5.78	6.12	7.53	9.01	
	120	4.36	4.50	4.72	4.97	5.24	5.52	5.95	6.33	6.72	8.32	10.00	
	140	4.60	4.78	5.03	5.32	5.62	5.94	6.44	6.86	7.29	9.08	10.95	
150	10	2.48	2.42	2.45	2.50	2.56	2.63	2.74	2.83	2.93	3.33	3.74	
	20	2.88	2.84	2.88	2.95	3.03	3.12	3.26	3.38	3.51	4.03	4.57	
	40	3.43	3.42	3.49	3.59	3.71	3.83	4.03	4.20	4.38	5.12	5.90	
	60	3.84	3.86	3.96	4.10	4.25	4.41	4.66	4.88	5.10	6.06	7.08	
	80	4.19	4.24	4.37	4.54	4.72	4.91	5.22	5.49	5.76	6.92	8.16	
	100	4.49	4.57	4.74	4.94	5.15	5.38	5.74	6.06	6.38	7.74	9.19	
	120	4.77	4.88	5.08	5.31	5.56	5.82	6.24	6.60	6.97	8.53	10.18	
	140	5.02	5.17	5.40	5.66	5.95	6.25	6.71	7.12	7.54	9.28	11.12	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 58.0 Ft (RADIUS = 41.0 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
200	(Ft*s) ^{1/2}	10	2.61	2.56	2.58	2.64	2.70	2.77	2.88	2.98	3.08	3.49	3.91
		20	3.06	3.02	3.06	3.13	3.21	3.30	3.44	3.57	3.69	4.22	4.76
		40	3.66	3.64	3.71	3.81	3.93	4.05	4.25	4.42	4.60	5.33	6.11
		60	4.11	4.12	4.22	4.35	4.50	4.65	4.90	5.12	5.34	6.28	7.27
		80	4.48	4.52	4.65	4.81	4.99	5.18	5.48	5.74	6.00	7.14	8.35
		100	4.81	4.87	5.03	5.22	5.43	5.65	6.00	6.31	6.62	7.95	9.37
300	(Ft*s) ^{1/2}	120	5.10	5.20	5.38	5.60	5.85	6.10	6.50	6.85	7.21	8.73	10.35
		140	5.37	5.50	5.71	5.97	6.24	6.53	6.98	7.37	7.77	9.48	11.24
		10	2.84	2.78	2.81	2.86	2.93	3.00	3.12	3.22	3.32	3.75	4.18
		20	3.35	3.30	3.34	3.41	3.50	3.59	3.74	3.87	4.00	4.54	5.09
		40	4.03	4.01	4.08	4.18	4.30	4.42	4.62	4.80	4.97	5.71	6.48
		60	4.53	4.54	4.63	4.76	4.91	5.07	5.32	5.53	5.75	6.67	7.65
400	(Ft*s) ^{1/2}	80	4.95	4.98	5.10	5.26	5.43	5.62	5.92	6.17	6.43	7.54	8.72
		100	5.32	5.37	5.52	5.70	5.91	6.12	6.46	6.76	7.06	8.35	9.73
		120	5.64	5.72	5.89	6.11	6.34	6.59	6.97	7.31	7.65	9.12	10.69
		140	5.95	6.04	6.25	6.49	6.75	7.02	7.46	7.83	8.22	9.86	11.62
		10	3.02	2.96	2.99	3.04	3.11	3.19	3.31	3.42	3.52	3.97	4.41
		20	3.58	3.53	3.58	3.65	3.74	3.83	3.99	4.12	4.25	4.81	5.37
600	(Ft*s) ^{1/2}	40	4.33	4.30	4.37	4.48	4.60	4.73	4.93	5.11	5.29	6.03	6.80
		60	4.88	4.88	4.97	5.10	5.25	5.41	5.66	5.88	6.10	7.02	7.99
		80	5.34	5.35	5.47	5.63	5.81	6.00	6.29	6.55	6.81	7.90	9.07
		100	5.73	5.77	5.92	6.10	6.30	6.52	6.86	7.15	7.45	8.72	10.07
		120	6.09	6.15	6.32	6.53	6.76	7.00	7.38	7.71	8.05	9.49	11.03
		140	6.41	6.50	6.69	6.93	7.18	7.45	7.88	8.25	8.62	10.23	11.95
800	(Ft*s) ^{1/2}	10	3.31	3.25	3.28	3.34	3.41	3.49	3.62	3.73	3.85	4.31	4.78
		20	3.96	3.91	3.95	4.03	4.12	4.22	4.38	4.52	4.66	5.24	5.83
		40	4.81	4.78	4.85	4.96	5.08	5.22	5.43	5.62	5.80	6.57	7.36
		60	5.44	5.43	5.53	5.66	5.81	5.98	6.23	6.46	6.68	7.62	8.59
		80	5.96	5.97	6.09	6.24	6.42	6.61	6.91	7.17	7.44	8.54	9.69
		100	6.41	6.43	6.58	6.76	6.96	7.18	7.52	7.82	8.12	9.37	10.70
	(Ft*s) ^{1/2}	120	6.81	6.85	7.02	7.23	7.45	7.70	8.08	8.41	8.74	10.16	11.66
		140	7.17	7.24	7.43	7.66	7.91	8.18	8.60	8.96	9.33	10.90	12.58
		10	3.54	3.48	3.51	3.57	3.65	3.74	3.87	3.99	4.11	4.59	5.08
		20	4.26	4.21	4.25	4.33	4.43	4.54	4.71	4.85	5.00	5.60	6.21
		40	5.21	5.17	5.24	5.35	5.48	5.62	5.84	6.03	6.23	7.02	7.83
		60	5.90	5.88	5.98	6.11	6.27	6.44	6.71	6.93	7.17	8.12	9.11
	(Ft*s) ^{1/2}	80	6.46	6.46	6.58	6.75	6.93	7.12	7.43	7.70	7.97	9.08	10.24
		100	6.96	6.97	7.11	7.30	7.51	7.73	8.07	8.37	8.68	9.94	11.27
		120	7.39	7.43	7.59	7.80	8.03	8.28	8.66	8.99	9.33	10.75	12.23
		140	7.79	7.85	8.03	8.26	8.51	8.78	9.21	9.57	9.94	11.50	13.16

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 58.0 Ft (RADIUS = 41.0 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
0 (Ft*s) ^{1/2}	10	2.14	2.20	2.32	2.44	2.58	2.72	2.93	3.11	3.29	4.03	4.78
	20	2.53	2.69	2.88	3.08	3.28	3.49	3.80	4.06	4.32	5.37	6.44
	40	3.17	3.50	3.82	4.14	4.46	4.78	5.25	5.64	6.04	7.63	9.24
	60	3.74	4.21	4.65	5.08	5.50	5.91	6.52	7.04	7.55	9.60	11.70
	80	4.26	4.86	5.41	5.93	6.45	6.95	7.69	8.31	8.93	11.42	13.96
	100	4.75	5.47	6.12	6.74	7.34	7.92	8.79	9.51	10.23	13.13	16.08
	120	5.21	6.06	6.80	7.51	8.18	8.85	9.84	10.65	11.47	14.75	18.09
25	140	5.66	6.61	7.45	8.24	9.00	9.74	10.84	11.75	12.65	16.30	20.02
	10	2.69	2.66	2.72	2.81	2.91	3.03	3.21	3.37	3.53	4.22	4.94
	20	3.10	3.14	3.26	3.41	3.58	3.76	4.04	4.28	4.52	5.53	6.58
	40	3.74	3.91	4.16	4.43	4.72	5.01	5.45	5.83	6.21	7.76	9.36
	60	4.28	4.59	4.96	5.34	5.73	6.12	6.71	7.20	7.70	9.73	11.81
	80	4.78	5.22	5.70	6.18	6.66	7.14	7.87	8.47	9.08	11.54	14.06
	100	5.24	5.81	6.39	6.97	7.54	8.11	8.96	9.66	10.37	13.24	16.17
50	120	5.69	6.38	7.06	7.73	8.38	9.03	9.99	10.80	11.60	14.85	18.18
	140	6.12	6.93	7.70	8.45	9.19	9.91	10.99	11.89	12.78	16.40	20.11
	10	2.96	2.92	2.97	3.05	3.15	3.26	3.44	3.59	3.75	4.41	5.10
	20	3.44	3.45	3.55	3.69	3.84	4.00	4.26	4.49	4.72	5.69	6.72
	40	4.14	4.26	4.46	4.70	4.96	5.23	5.65	6.01	6.38	7.90	9.48
	60	4.71	4.94	5.25	5.59	5.95	6.32	6.89	7.37	7.86	9.85	11.91
	80	5.22	5.56	5.97	6.42	6.87	7.33	8.04	8.63	9.22	11.65	14.15
100	100	5.68	6.14	6.66	7.20	7.74	8.29	9.12	9.81	10.51	13.35	16.26
	120	6.12	6.70	7.32	7.94	8.57	9.20	10.15	10.94	11.73	14.96	18.27
	140	6.55	7.23	7.95	8.66	9.37	10.08	11.14	12.02	12.91	16.50	20.19
	10	3.32	3.27	3.32	3.40	3.50	3.61	3.78	3.93	4.08	4.73	5.40
	20	3.90	3.89	3.98	4.10	4.25	4.40	4.64	4.86	5.08	6.00	6.99
	40	4.71	4.78	4.95	5.16	5.40	5.64	6.03	6.37	6.71	8.17	9.71
	60	5.35	5.50	5.76	6.06	6.38	6.72	7.25	7.70	8.16	10.10	12.12
150	80	5.89	6.14	6.49	6.87	7.28	7.71	8.37	8.94	9.51	11.88	14.35
	100	6.39	6.73	7.16	7.64	8.14	8.65	9.44	10.10	10.78	13.56	16.45
	120	6.85	7.28	7.81	8.37	8.95	9.55	10.45	11.22	11.99	15.17	18.45
	140	7.28	7.81	8.43	9.08	9.74	10.41	11.43	12.29	13.16	16.71	20.36
	10	3.58	3.53	3.58	3.66	3.76	3.87	4.04	4.19	4.35	4.99	5.66
	20	4.23	4.21	4.30	4.42	4.56	4.71	4.96	5.17	5.38	6.29	7.25
	40	5.13	5.18	5.34	5.54	5.76	6.00	6.37	6.69	7.03	8.44	9.94
	60	5.83	5.95	6.18	6.46	6.76	7.08	7.58	8.02	8.46	10.34	12.33
	80	6.41	6.61	6.93	7.28	7.67	8.07	8.70	9.24	9.79	12.11	14.55
	100	6.94	7.22	7.61	8.05	8.51	9.00	9.75	10.39	11.05	13.78	16.63
	120	7.43	7.79	8.26	8.78	9.32	9.88	10.75	11.50	12.25	15.37	18.62
	140	7.88	8.32	8.88	9.48	10.10	10.74	11.72	12.56	13.41	16.91	20.53

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 58.0 Ft (RADIUS = 41.0 Ft)
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft												
		(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60	80
200	10	3.79	3.74	3.79	3.87	3.97	4.08	4.26	4.41	4.57	5.22	5.89		
	20	4.51	4.48	4.56	4.69	4.83	4.98	5.22	5.43	5.65	6.55	7.49		
	40	5.48	5.52	5.67	5.87	6.08	6.31	6.68	6.99	7.32	8.69	10.16		
	60	6.22	6.33	6.55	6.81	7.10	7.41	7.90	8.32	8.75	10.58	12.54		
	80	6.85	7.02	7.31	7.65	8.02	8.40	9.01	9.53	10.07	12.34	14.74		
	100	7.40	7.65	8.01	8.43	8.87	9.33	10.05	10.68	11.32	14.00	16.82		
	120	7.91	8.23	8.67	9.16	9.67	10.21	11.05	11.77	12.51	15.58	18.80		
	140	8.39	8.78	9.29	9.85	10.45	11.06	12.01	12.83	13.66	17.10	20.70		
	300	10	4.14	4.08	4.12	4.21	4.32	4.43	4.61	4.77	4.94	5.60	6.29	
		20	4.95	4.91	5.00	5.12	5.26	5.42	5.66	5.87	6.09	6.99	7.93	
40		6.04	6.07	6.21	6.40	6.62	6.84	7.20	7.51	7.83	9.17	10.60		
60		6.87	6.95	7.16	7.41	7.69	7.99	8.46	8.86	9.28	11.05	12.95		
80		7.56	7.70	7.97	8.29	8.64	9.00	9.58	10.08	10.60	12.78	15.13		
100		8.17	8.37	8.70	9.09	9.50	9.94	10.63	11.22	11.83	14.42	17.18		
120		8.72	8.98	9.38	9.83	10.32	10.82	11.62	12.30	13.01	15.99	19.15		
140		9.23	9.56	10.02	10.54	11.09	11.67	12.57	13.35	14.15	17.50	21.04		
400		10	4.41	4.35	4.40	4.49	4.60	4.72	4.90	5.07	5.24	5.92	6.62	
		20	5.30	5.27	5.35	5.47	5.62	5.78	6.03	6.24	6.46	7.38	8.32	
	40	6.50	6.52	6.66	6.85	7.06	7.29	7.65	7.96	8.27	9.60	11.01		
	60	7.40	7.46	7.66	7.91	8.19	8.48	8.94	9.34	9.75	11.49	13.35		
	80	8.14	8.26	8.52	8.83	9.17	9.53	10.09	10.58	11.08	13.21	15.51		
	100	8.80	8.97	9.29	9.66	10.06	10.48	11.15	11.72	12.32	14.84	17.55		
	120	9.39	9.62	9.99	10.43	10.89	11.38	12.14	12.81	13.49	16.39	19.50		
	140	9.93	10.22	10.66	11.15	11.68	12.23	13.10	13.85	14.62	17.89	21.38		
	600	10	4.86	4.79	4.84	4.94	5.05	5.18	5.38	5.55	5.72	6.44	7.16	
		20	5.88	5.83	5.92	6.05	6.20	6.36	6.62	6.85	7.08	8.02	8.98	
40		7.24	7.24	7.38	7.58	7.79	8.02	8.39	8.70	9.02	10.36	11.75		
60		8.25	8.30	8.49	8.74	9.02	9.31	9.77	10.17	10.58	12.28	14.10		
80		9.09	9.18	9.43	9.73	10.07	10.42	10.97	11.45	11.94	14.02	16.24		
100		9.82	9.96	10.26	10.62	11.01	11.42	12.07	12.63	13.20	15.64	18.26		
120		10.47	10.67	11.02	11.43	11.88	12.35	13.09	13.73	14.38	17.18	20.19		
140		11.08	11.32	11.72	12.19	12.69	13.22	14.05	14.77	15.51	18.66	22.05		
800		10	5.22	5.15	5.21	5.30	5.42	5.55	5.76	5.94	6.12	6.87	7.62	
		20	6.35	6.30	6.38	6.52	6.67	6.84	7.11	7.35	7.58	8.55	9.54	
	40	7.84	7.83	7.98	8.17	8.39	8.63	9.00	9.32	9.65	11.00	12.40		
	60	8.95	8.98	9.17	9.43	9.70	10.00	10.47	10.87	11.28	12.98	14.78		
	80	9.86	9.94	10.18	10.48	10.82	11.17	11.72	12.20	12.69	14.74	16.93		
	100	10.65	10.77	11.07	11.42	11.81	12.22	12.86	13.41	13.98	16.37	18.94		
	120	11.36	11.53	11.87	12.28	12.72	13.18	13.91	14.54	15.18	17.91	20.86		
	140	12.01	12.22	12.61	13.07	13.57	14.08	14.90	15.60	16.32	19.39	22.70		

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 58.0 Ft (RADIUS = 41.0 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
(Ft*s) ^{1/2}	°F											
0	10	3.21	3.39	3.62	3.86	4.10	4.35	4.73	5.05	5.37	6.66	7.96
	20	3.98	4.35	4.74	5.12	5.51	5.89	6.46	6.94	7.41	9.34	11.30
	40	5.27	5.97	6.63	7.25	7.87	8.47	9.37	10.11	10.86	13.85	16.90
	60	6.40	7.40	8.28	9.12	9.94	10.73	11.92	12.90	13.87	17.81	21.82
	80	7.44	8.70	9.80	10.84	11.84	12.81	14.26	15.45	16.64	21.44	26.33
	100	8.42	9.93	11.23	12.45	13.62	14.76	16.45	17.85	19.24	24.85	30.56
25	120	9.35	11.09	12.59	13.98	15.31	16.62	18.54	20.13	21.72	28.09	34.59
	140	10.24	12.21	13.89	15.45	16.94	18.40	20.55	22.32	24.09	31.20	38.45
	10	3.90	3.93	4.07	4.25	4.46	4.67	5.02	5.31	5.61	6.85	8.13
	20	4.66	4.84	5.14	5.47	5.81	6.16	6.70	7.16	7.62	9.50	11.44
	40	5.89	6.40	6.97	7.54	8.12	8.70	9.57	10.30	11.03	13.99	17.02
	60	6.97	7.78	8.59	9.39	10.17	10.94	12.10	13.06	14.03	17.93	21.92
50	80	7.97	9.06	10.09	11.08	12.05	13.01	14.43	15.61	16.79	21.56	26.43
	100	8.92	10.27	11.50	12.68	13.82	14.95	16.62	18.00	19.38	24.96	30.66
	120	9.83	11.42	12.85	14.20	15.51	16.79	18.70	20.27	21.85	28.20	34.68
	140	10.70	12.52	14.14	15.66	17.13	18.57	20.70	22.46	24.22	31.30	38.54
	10	4.30	4.30	4.42	4.58	4.77	4.97	5.28	5.56	5.85	7.04	8.29
	20	5.13	5.26	5.50	5.79	6.10	6.43	6.94	7.38	7.82	9.67	11.58
100	40	6.41	6.80	7.30	7.83	8.37	8.93	9.77	10.48	11.20	14.13	17.14
	60	7.49	8.16	8.90	9.64	10.40	11.15	12.28	13.23	14.19	18.06	22.03
	80	8.48	9.42	10.38	11.32	12.27	13.20	14.60	15.77	16.94	21.67	26.53
	100	9.41	10.60	11.77	12.91	14.03	15.13	16.78	18.15	19.52	25.07	30.75
	120	10.30	11.74	13.11	14.42	15.70	16.97	18.85	20.42	21.98	28.30	34.77
	140	11.16	12.83	14.39	15.87	17.32	18.74	20.84	22.59	24.34	31.40	38.63
150	10	4.84	4.82	4.92	5.08	5.25	5.44	5.74	6.00	6.27	7.41	8.62
	20	5.81	5.88	6.09	6.34	6.62	6.92	7.39	7.80	8.22	9.99	11.85
	40	7.21	7.49	7.91	8.37	8.86	9.38	10.17	10.85	11.54	14.40	17.37
	60	8.35	8.85	9.48	10.15	10.85	11.56	12.65	13.57	14.50	18.30	22.24
	80	9.36	10.09	10.93	11.80	12.69	13.58	14.94	16.08	17.23	21.90	26.72
	100	10.29	11.26	12.30	13.36	14.43	15.50	17.10	18.44	19.80	25.29	30.94
200	120	11.17	12.37	13.62	14.86	16.09	17.32	19.16	20.70	22.24	28.51	34.95
	140	12.02	13.45	14.88	16.29	17.69	19.07	21.14	22.87	24.60	31.61	38.80
	10	5.24	5.21	5.31	5.46	5.63	5.81	6.11	6.37	6.63	7.75	8.92
	20	6.31	6.36	6.55	6.79	7.06	7.34	7.79	8.19	8.59	10.30	12.12
	40	7.83	8.06	8.43	8.86	9.32	9.80	10.56	11.21	11.88	14.67	17.60
	60	9.04	9.46	10.02	10.64	11.29	11.96	13.01	13.90	14.80	18.55	22.45
250	80	10.09	10.71	11.46	12.27	13.11	13.96	15.28	16.39	17.51	22.13	26.92
	100	11.05	11.87	12.82	13.81	14.83	15.86	17.42	18.74	20.07	25.51	31.12
	120	11.94	12.98	14.12	15.29	16.47	17.67	19.47	20.98	22.51	28.72	35.13
	140	12.80	14.04	15.37	16.71	18.06	19.41	21.44	23.14	24.85	31.81	38.97

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 58.0 Ft (RADIUS = 41.0 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft										
		(Ft*s) ^{1/2}	4	8	12	16	20	24	30	35	40	60
200	10	5.56	5.52	5.62	5.77	5.94	6.13	6.43	6.68	6.95	8.05	9.21
	20	6.72	6.76	6.94	7.17	7.43	7.71	8.16	8.54	8.93	10.61	12.39
	40	8.35	8.55	8.89	9.30	9.74	10.20	10.93	11.56	12.21	14.94	17.83
	60	9.62	9.98	10.50	11.09	11.71	12.35	13.36	14.22	15.11	18.80	22.66
	80	10.71	11.26	11.95	12.71	13.51	14.34	15.61	16.70	17.80	22.36	27.12
	100	11.70	12.43	13.31	14.25	15.22	16.21	17.74	19.03	20.34	25.72	31.31
	120	12.62	13.54	14.60	15.71	16.85	18.01	19.77	21.26	22.77	28.93	35.30
	140	13.49	14.60	15.84	17.12	18.42	19.74	21.73	23.41	25.10	32.01	39.14
300	10	6.09	6.04	6.14	6.28	6.46	6.65	6.95	7.21	7.48	8.59	9.74
	20	7.39	7.41	7.58	7.81	8.07	8.34	8.78	9.16	9.54	11.17	12.91
	40	9.19	9.35	9.67	10.06	10.47	10.92	11.61	12.21	12.83	15.47	18.29
	60	10.58	10.88	11.35	11.89	12.47	13.08	14.03	14.86	15.71	19.28	23.08
	80	11.75	12.21	12.84	13.54	14.28	15.05	16.26	17.30	18.37	22.82	27.51
	100	12.81	13.42	14.21	15.07	15.97	16.91	18.36	19.61	20.88	26.16	31.68
	120	13.78	14.56	15.50	16.52	17.59	18.68	20.38	21.82	23.28	29.34	35.66
	140	14.68	15.63	16.74	17.92	19.14	20.39	22.32	23.95	25.60	32.41	39.48
400	10	6.51	6.46	6.55	6.71	6.88	7.08	7.38	7.65	7.92	9.04	10.20
	20	7.94	7.94	8.11	8.34	8.60	8.87	9.31	9.69	10.07	11.69	13.40
	40	9.89	10.02	10.33	10.70	11.11	11.54	12.22	12.81	13.41	15.98	18.74
	60	11.37	11.63	12.08	12.60	13.15	13.74	14.66	15.46	16.28	19.76	23.49
	80	12.62	13.02	13.61	14.27	14.98	15.72	16.88	17.89	18.92	23.27	27.89
	100	13.73	14.28	15.01	15.82	16.68	17.58	18.97	20.18	21.41	26.59	32.05
	120	14.75	15.44	16.32	17.28	18.29	19.34	20.97	22.37	23.80	29.76	36.01
	140	15.70	16.54	17.57	18.68	19.84	21.04	22.89	24.48	26.10	32.81	39.82
600	10	7.20	7.13	7.23	7.39	7.58	7.78	8.10	8.37	8.65	9.80	10.98
	20	8.82	8.81	8.98	9.21	9.47	9.75	10.19	10.57	10.96	12.58	14.28
	40	11.01	11.11	11.41	11.77	12.18	12.60	13.27	13.84	14.44	16.94	19.61
	60	12.66	12.88	13.30	13.79	14.33	14.89	15.78	16.55	17.34	20.70	24.31
	80	14.04	14.38	14.92	15.55	16.22	16.92	18.03	18.99	19.97	24.16	28.66
	100	15.26	15.72	16.39	17.15	17.95	18.80	20.12	21.26	22.44	27.44	32.78
	120	16.37	16.95	17.75	18.64	19.58	20.56	22.10	23.43	24.80	30.58	36.71
	140	17.39	18.10	19.03	20.05	21.13	22.25	24.01	25.52	27.07	33.60	40.50
800	10	7.75	7.68	7.78	7.95	8.14	8.35	8.68	8.96	9.25	10.44	11.65
	20	9.53	9.51	9.68	9.92	10.18	10.47	10.92	11.31	11.71	13.35	15.05
	40	11.93	12.01	12.30	12.66	13.07	13.49	14.16	14.73	15.33	17.80	20.44
	60	13.72	13.91	14.31	14.80	15.33	15.88	16.76	17.51	18.29	21.57	25.11
	80	15.21	15.51	16.03	16.63	17.29	17.97	19.05	19.98	20.94	25.02	29.42
	100	16.52	16.92	17.56	18.29	19.07	19.88	21.16	22.27	23.42	28.28	33.51
	120	17.70	18.22	18.97	19.82	20.73	21.67	23.16	24.44	25.77	31.39	37.41
	140	18.79	19.42	20.30	21.27	22.30	23.38	25.06	26.52	28.02	34.38	41.17

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 58.0 Ft (RADIUS = 41.0 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		°F	4	8	12	16	20	24	30	35	40	60	80
0	(Ft*s) ^{1/2}												
	10	5.00	5.43	5.89	6.35	6.82	7.28	7.97	8.55	9.12	11.46	13.84	
	20	6.54	7.36	8.14	8.89	9.62	10.35	11.43	12.32	13.22	16.83	20.50	
	40	9.12	10.60	11.92	13.15	14.34	15.51	17.24	18.67	20.10	25.85	31.71	
	60	11.39	13.45	15.23	16.88	18.48	20.04	22.34	24.24	26.14	33.76	41.54	
	80	13.47	16.06	18.27	20.31	22.28	24.19	27.02	29.35	31.68	41.03	50.56	
	100	15.42	18.51	21.12	23.53	25.84	28.09	31.41	34.15	36.88	47.85	59.03	
25	120	17.28	20.84	23.84	26.60	29.24	31.81	35.59	38.71	41.83	54.33	67.09	
	140	19.06	23.07	26.44	29.53	32.49	35.36	39.60	43.09	46.57	60.55	74.88	
	10	5.81	6.02	6.37	6.76	7.18	7.60	8.26	8.81	9.37	11.65	14.00	
	20	7.27	7.87	8.54	9.23	9.93	10.62	11.67	12.54	13.42	16.99	20.64	
	40	9.75	11.03	12.26	13.44	14.60	15.74	17.44	18.86	20.27	25.99	31.83	
	60	11.96	13.84	15.54	17.15	18.71	20.25	22.52	24.41	26.29	33.89	41.64	
	80	14.00	16.42	18.56	20.56	22.49	24.39	27.19	29.51	31.82	41.14	50.66	
50	100	15.93	18.85	21.39	23.77	26.05	28.28	31.57	34.30	37.02	47.96	59.13	
	120	17.76	21.17	24.10	26.82	29.43	31.98	35.75	38.86	41.96	54.44	67.18	
	140	19.52	23.39	26.69	29.75	32.68	35.53	39.75	43.23	46.70	60.65	74.90	
	10	6.38	6.51	6.80	7.14	7.52	7.92	8.54	9.07	9.61	11.85	14.17	
	20	7.89	8.35	8.94	9.57	10.23	10.89	11.91	12.77	13.63	17.15	20.78	
	40	10.35	11.45	12.59	13.73	14.85	15.97	17.65	19.05	20.45	26.13	31.95	
	60	12.52	14.22	15.84	17.41	18.94	20.45	22.71	24.58	26.45	34.01	41.75	
100	80	14.53	16.78	18.84	20.80	22.71	24.58	27.36	29.67	31.97	41.26	50.76	
	100	16.43	19.19	21.67	24.00	26.25	28.46	31.74	34.45	37.16	48.07	59.22	
	120	18.24	21.49	24.36	27.04	29.63	32.16	35.90	39.00	42.09	54.54	67.27	
	140	19.98	23.70	26.94	29.96	32.86	35.70	39.90	43.36	46.82	60.76	74.99	
	10	7.18	7.25	7.49	7.80	8.14	8.50	9.07	9.57	10.08	12.23	14.49	
	20	8.85	9.17	9.66	10.22	10.81	11.43	12.38	13.20	14.04	17.48	21.06	
	40	11.40	12.26	13.26	14.30	15.36	16.43	18.05	19.42	20.79	26.40	32.18	
150	60	13.56	14.97	16.45	17.93	19.40	20.87	23.07	24.91	26.76	34.26	41.96	
	80	15.54	17.49	19.41	21.29	23.14	24.97	27.70	29.98	32.26	41.49	50.96	
	100	17.40	19.87	22.21	24.46	26.66	28.83	32.06	34.75	37.43	48.29	59.41	
	120	19.18	22.14	24.87	27.48	30.01	32.51	36.21	39.28	42.35	54.75	67.45	
	140	20.89	24.33	27.44	30.38	33.24	36.04	40.19	43.64	47.08	60.96	75.16	
	10	7.78	7.82	8.05	8.34	8.66	9.01	9.55	10.03	10.52	12.61	14.82	
	20	9.59	9.84	10.28	10.80	11.35	11.93	12.84	13.63	14.44	17.80	21.33	
	40	12.27	12.99	13.89	14.85	15.85	16.88	18.45	19.79	21.14	26.68	32.41	
	60	14.47	15.69	17.04	18.44	19.86	21.28	23.44	25.25	27.07	34.51	42.17	
	80	16.46	18.18	19.97	21.77	23.56	25.36	28.04	30.29	32.55	41.72	51.15	
	100	18.32	20.53	22.74	24.91	27.06	29.20	32.38	35.04	37.71	48.51	59.59	
	120	20.08	22.78	25.38	27.92	30.40	32.86	36.52	39.57	42.62	54.96	67.63	
	140	21.78	24.94	27.93	30.80	33.61	36.38	40.49	43.91	47.33	61.16	75.33	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 58.0 Ft (RADIUS = 41.0 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		°F	4	8	12	16	20	24	30	35	40	60	80
200 (Ft*s) ^{1/2}	10	8.27	8.29	8.51	8.79	9.11	9.45	9.98	10.45	10.93	12.97	15.14	
	20	10.20	10.42	10.83	11.32	11.85	12.41	13.28	14.04	14.83	18.12	21.61	
	40	13.01	13.64	14.47	15.38	16.34	17.32	18.85	20.15	21.48	26.95	32.65	
	60	15.28	16.36	17.62	18.94	20.30	21.69	23.80	25.58	27.38	34.76	42.38	
	80	17.30	18.84	20.52	22.25	23.99	25.74	28.38	30.60	32.84	41.96	51.35	
	100	19.17	21.17	23.27	25.37	27.46	29.56	32.71	35.34	37.98	48.73	59.78	
	120	20.93	23.40	25.89	28.35	30.79	33.21	36.83	39.85	42.88	55.17	67.80	
300	140	22.62	25.55	28.42	31.22	33.98	36.71	40.79	44.18	47.58	61.36	75.50	
	10	9.06	9.07	9.27	9.55	9.86	10.20	10.73	11.19	11.66	13.64	15.75	
	20	11.21	11.38	11.76	12.22	12.72	13.25	14.09	14.82	15.57	18.75	22.15	
	40	14.25	14.78	15.53	16.36	17.25	18.18	19.62	20.87	22.15	27.49	33.11	
	60	16.66	17.57	18.69	19.91	21.18	22.49	24.52	26.24	28.00	35.25	42.81	
	80	18.76	20.07	21.58	23.18	24.82	26.50	29.06	31.22	33.42	42.42	51.74	
	100	20.67	22.40	24.30	26.26	28.26	30.28	33.35	35.93	38.53	49.16	60.15	
400	120	22.47	24.61	26.89	29.21	31.55	33.90	37.44	40.41	43.40	55.59	68.16	
	140	24.17	26.74	29.39	32.06	34.72	37.38	41.38	44.73	48.09	61.76	75.84	
	10	9.71	9.70	9.90	10.18	10.49	10.83	11.36	11.82	12.29	14.25	16.33	
	20	12.03	12.17	12.54	12.99	13.48	14.00	14.82	15.53	16.26	19.36	22.69	
	40	15.28	15.75	16.44	17.24	18.08	18.97	20.36	21.57	22.81	28.03	33.57	
	60	17.82	18.62	19.67	20.81	22.02	23.27	25.22	26.90	28.61	35.74	43.23	
	80	20.00	21.17	22.57	24.07	25.63	27.24	29.72	31.84	33.99	42.88	52.14	
600	100	21.99	23.52	25.28	27.13	29.04	31.00	33.98	36.51	39.07	49.60	60.52	
	120	23.82	25.74	27.86	30.06	32.31	34.59	38.05	40.97	43.92	56.01	68.51	
	140	25.56	27.86	30.34	32.88	35.45	38.05	41.97	45.27	48.59	62.17	76.19	
	10	10.76	10.73	10.93	11.21	11.53	11.87	12.41	12.87	13.35	15.32	17.38	
	20	13.37	13.48	13.82	14.26	14.75	15.26	16.06	16.76	17.48	20.50	23.73	
	40	16.97	17.36	18.00	18.75	19.56	20.40	21.73	22.87	24.06	29.09	34.49	
	60	19.74	20.42	21.37	22.42	23.55	24.73	26.57	28.16	29.80	36.72	44.06	
800	80	22.09	23.08	24.34	25.71	27.17	28.68	31.03	33.05	35.12	43.79	52.92	
	100	24.20	25.50	27.08	28.78	30.55	32.39	35.23	37.67	40.15	50.47	61.27	
	120	26.14	27.77	29.67	31.68	33.78	35.94	39.26	42.08	44.96	56.84	69.22	
	140	27.95	29.92	32.14	34.48	36.89	39.36	43.14	46.34	49.59	62.97	76.87	
	10	11.61	11.57	11.77	12.05	12.38	12.72	13.27	13.75	14.23	16.23	18.30	
	20	14.46	14.54	14.88	15.32	15.80	16.32	17.12	17.82	18.53	21.52	24.70	
	40	18.36	18.70	19.31	20.04	20.82	21.65	22.94	24.06	25.21	30.11	35.39	
	60	21.32	21.92	22.82	23.83	24.92	26.05	27.82	29.36	30.95	37.68	44.89	
	80	23.83	24.70	25.88	27.19	28.57	30.02	32.27	34.22	36.23	44.69	53.69	
	100	26.05	27.22	28.68	30.28	31.97	33.72	36.45	38.80	41.21	51.33	62.00	
	120	28.09	29.54	31.30	33.20	35.19	37.25	40.44	43.18	45.99	57.66	69.93	
	140	29.98	31.74	33.79	35.99	38.28	40.64	44.29	47.40	50.58	63.76	77.55	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 60.0 Ft (RADIUS = 42.4 Ft)
 FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE
 TIME INDEX

TEMPERATURE
 RISE

(Ft*s)^{1/2}

°F

4

8

12

16

20

24

30

35

40

60

80

0

10

1.53

1.53

1.59

1.65

1.73

1.81

1.94

2.04

2.15

2.59

3.03

20

1.72

1.78

1.87

1.98

2.09

2.20

2.38

2.52

2.67

3.27

3.88

40

2.06

2.20

2.36

2.53

2.70

2.87

3.12

3.34

3.55

4.42

5.30

60

2.35

2.56

2.79

3.01

3.23

3.45

3.77

4.05

4.32

5.43

6.55

80

2.62

2.90

3.18

3.45

3.72

3.98

4.37

4.70

5.03

6.35

7.69

100

2.87

3.22

3.54

3.86

4.17

4.48

4.94

5.32

5.69

7.22

8.77

120

3.11

3.52

3.89

4.26

4.61

4.96

5.47

5.90

6.33

8.04

9.79

140

3.34

3.80

4.23

4.63

5.03

5.41

5.98

6.46

6.93

8.84

10.77

25

10

1.94

1.90

1.92

1.96

2.02

2.09

2.19

2.28

2.38

2.78

3.19

20

2.19

2.17

2.22

2.29

2.37

2.47

2.61

2.74

2.88

3.43

4.02

40

2.55

2.58

2.68

2.81

2.95

3.10

3.33

3.52

3.72

4.56

5.42

60

2.84

2.93

3.09

3.27

3.46

3.66

3.96

4.22

4.48

5.55

6.65

80

3.10

3.25

3.46

3.69

3.93

4.17

4.55

4.86

5.18

6.47

7.79

100

3.34

3.55

3.82

4.09

4.38

4.66

5.10

5.47

5.83

7.33

8.86

120

3.57

3.84

4.15

4.48

4.80

5.13

5.63

6.04

6.46

8.15

9.88

140

3.79

4.12

4.48

4.85

5.21

5.58

6.13

6.60

7.06

8.94

10.86

50

10

2.13

2.08

2.10

2.14

2.20

2.26

2.37

2.46

2.55

2.94

3.34

20

2.42

2.39

2.43

2.50

2.58

2.67

2.81

2.93

3.06

3.59

4.15

40

2.84

2.85

2.93

3.05

3.17

3.30

3.52

3.70

3.89

4.69

5.53

60

3.17

3.22

3.35

3.50

3.68

3.86

4.14

4.38

4.63

5.68

6.76

80

3.45

3.55

3.72

3.92

4.14

4.37

4.72

5.02

5.32

6.58

7.89

100

3.70

3.85

4.07

4.32

4.58

4.85

5.26

5.61

5.97

7.44

8.96

120

3.94

4.14

4.40

4.69

5.00

5.31

5.78

6.18

6.59

8.26

9.97

140

4.16

4.41

4.72

5.06

5.40</

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 60.0 Ft (RADIUS = 42.4 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		°F	4	8	12	16	20	24	30	35	40	60	80
200	(Ft*s) ^{1/2}	10	2.69	2.63	2.65	2.70	2.76	2.83	2.94	3.04	3.14	3.54	3.96
		20	3.14	3.10	3.13	3.20	3.28	3.37	3.51	3.63	3.76	4.29	4.83
		40	3.76	3.74	3.80	3.90	4.02	4.14	4.34	4.51	4.68	5.42	6.19
		60	4.22	4.22	4.32	4.45	4.60	4.75	5.00	5.22	5.44	6.38	7.38
		80	4.60	4.63	4.76	4.92	5.10	5.29	5.59	5.85	6.12	7.26	8.48
		100	4.93	5.00	5.15	5.34	5.55	5.78	6.13	6.43	6.75	8.08	9.51
		120	5.24	5.33	5.52	5.74	5.98	6.24	6.64	6.99	7.35	8.88	10.50
300	(Ft*s) ^{1/2}	140	5.52	5.64	5.86	6.11	6.38	6.67	7.13	7.52	7.93	9.64	11.46
		10	2.92	2.85	2.88	2.93	2.99	3.06	3.18	3.28	3.38	3.81	4.24
		20	3.44	3.39	3.43	3.49	3.58	3.67	3.82	3.94	4.07	4.61	5.16
		40	4.14	4.11	4.18	4.27	4.39	4.52	4.72	4.89	5.06	5.80	6.57
		60	4.65	4.65	4.74	4.87	5.02	5.17	5.42	5.64	5.86	6.78	7.76
		80	5.08	5.10	5.22	5.38	5.56	5.74	6.04	6.29	6.56	7.66	8.85
		100	5.46	5.50	5.65	5.83	6.04	6.25	6.60	6.89	7.20	8.49	9.87
400	(Ft*s) ^{1/2}	120	5.79	5.86	6.04	6.25	6.48	6.73	7.12	7.45	7.80	9.27	10.85
		140	6.10	6.20	6.40	6.64	6.90	7.18	7.61	7.99	8.38	10.03	11.80
		10	3.10	3.04	3.06	3.11	3.18	3.25	3.37	3.48	3.59	4.03	4.47
		20	3.68	3.62	3.66	3.73	3.82	3.91	4.06	4.20	4.33	4.88	5.44
		40	4.44	4.41	4.48	4.58	4.70	4.83	5.03	5.20	5.38	6.13	6.90
		60	5.01	5.00	5.09	5.22	5.37	5.53	5.78	5.99	6.21	7.13	8.10
		80	5.48	5.49	5.61	5.76	5.94	6.12	6.42	6.67	6.93	8.03	9.20
600	(Ft*s) ^{1/2}	100	5.88	5.92	6.06	6.24	6.44	6.66	7.00	7.29	7.59	8.86	10.22
		120	6.25	6.31	6.47	6.68	6.91	7.15	7.53	7.87	8.21	9.65	11.19
		140	6.58	6.66	6.85	7.09	7.34	7.61	8.04	8.41	8.79	10.40	12.13
		10	3.40	3.33	3.36	3.41	3.48	3.56	3.69	3.80	3.91	4.38	4.84
		20	4.06	4.00	4.04	4.12	4.21	4.31	4.47	4.61	4.75	5.33	5.91
		40	4.94	4.90	4.97	5.07	5.20	5.33	5.54	5.72	5.91	6.67	7.46
		60	5.59	5.57	5.66	5.79	5.94	6.10	6.36	6.58	6.81	7.74	8.71
800	(Ft*s) ^{1/2}	80	6.12	6.11	6.23	6.39	6.56	6.75	7.05	7.31	7.58	8.67	9.83
		100	6.58	6.59	6.73	6.91	7.12	7.33	7.67	7.97	8.27	9.53	10.85
		120	6.99	7.03	7.19	7.39	7.62	7.86	8.24	8.57	8.91	10.32	11.83
		140	7.36	7.42	7.60	7.83	8.09	8.35	8.77	9.14	9.51	11.08	12.76
		10	3.64	3.57	3.60	3.66	3.73	3.81	3.95	4.06	4.18	4.66	5.15
		20	4.37	4.31	4.35	4.43	4.53	4.63	4.80	4.94	5.09	5.69	6.29
		40	5.34	5.30	5.37	5.47	5.60	5.74	5.96	6.15	6.34	7.13	7.93
	(Ft*s) ^{1/2}	60	6.05	6.02	6.12	6.25	6.41	6.57	6.84	7.06	7.30	8.25	9.24
		80	6.63	6.62	6.74	6.90	7.08	7.27	7.58	7.84	8.11	9.22	10.38
		100	7.14	7.15	7.28	7.47	7.67	7.89	8.24	8.53	8.84	10.10	11.43
		120	7.58	7.61	7.77	7.98	8.21	8.45	8.84	9.17	9.51	10.92	12.41
		140	7.99	8.04	8.22	8.45	8.70	8.97	9.39	9.76	10.13	11.69	13.35

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 60.0 Ft (RADIUS = 42.4 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX		TEMPERATURE RISE		CEILING HEIGHT, Ft										
(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60	80		
0	10	2.21	2.27	2.38	2.51	2.64	2.78	3.00	3.18	3.36	4.09	4.84		
	20	2.61	2.77	2.96	3.16	3.36	3.57	3.88	4.14	4.40	5.46	6.53		
	40	3.27	3.60	3.93	4.25	4.57	4.89	5.37	5.77	6.16	7.76	9.38		
	60	3.86	4.33	4.78	5.21	5.64	6.05	6.67	7.19	7.70	9.77	11.88		
	80	4.40	5.01	5.56	6.10	6.61	7.12	7.87	8.50	9.12	11.62	14.17		
	100	4.90	5.64	6.30	6.92	7.53	8.12	9.00	9.72	10.45	13.36	16.32		
	120	5.38	6.24	7.00	7.71	8.40	9.07	10.07	10.89	11.71	15.01	18.37		
	140	5.84	6.81	7.67	8.46	9.23	9.98	11.09	12.01	12.92	16.59	20.33		
25	10	2.76	2.73	2.79	2.87	2.98	3.09	3.28	3.43	3.60	4.29	5.01		
	20	3.19	3.22	3.34	3.49	3.66	3.84	4.12	4.36	4.61	5.63	6.68		
	40	3.85	4.02	4.27	4.54	4.83	5.13	5.57	5.95	6.34	7.90	9.50		
	60	4.41	4.72	5.09	5.48	5.87	6.26	6.86	7.36	7.86	9.90	11.98		
	80	4.92	5.37	5.85	6.34	6.83	7.32	8.05	8.65	9.27	11.74	14.27		
	100	5.40	5.98	6.57	7.16	7.73	8.31	9.16	9.87	10.59	13.47	16.42		
	120	5.86	6.57	7.26	7.93	8.59	9.25	10.22	11.03	11.84	15.12	18.46		
	140	6.30	7.13	7.92	8.68	9.42	10.15	11.24	12.15	13.05	16.69	20.42		
50	10	3.04	3.00	3.05	3.13	3.23	3.33	3.51	3.66	3.82	4.48	5.17		
	20	3.54	3.54	3.64	3.78	3.93	4.09	4.35	4.58	4.81	5.79	6.81		
	40	4.26	4.37	4.58	4.82	5.08	5.35	5.78	6.14	6.51	8.04	9.62		
	60	4.85	5.07	5.39	5.73	6.10	6.47	7.04	7.53	8.02	10.02	12.09		
	80	5.37	5.71	6.13	6.58	7.04	7.51	8.22	8.81	9.41	11.86	14.37		
	100	5.85	6.31	6.84	7.39	7.94	8.49	9.32	10.02	10.73	13.58	16.51		
	120	6.30	6.89	7.52	8.15	8.79	9.43	10.38	11.18	11.98	15.22	18.55		
	140	6.74	7.44	8.17	8.89	9.61	10.32	11.39	12.28	13.18	16.80	20.50		
100	10	3.41	3.36	3.40	3.48	3.58	3.68	3.86	4.00	4.16	4.80	5.47		
	20	4.01	3.99	4.08	4.20	4.34	4.50	4.74	4.95	5.17	6.10	7.09		
	40	4.84	4.91	5.08	5.29	5.52	5.77	6.16	6.50	6.85	8.31	9.85		
	60	5.49	5.65	5.91	6.21	6.53	6.87	7.40	7.86	8.33	10.27	12.30		
	80	6.06	6.30	6.65	7.05	7.46	7.89	8.56	9.12	9.70	12.09	14.57		
	100	6.57	6.91	7.35	7.83	8.34	8.85	9.65	10.32	11.00	13.80	16.70		
	120	7.04	7.48	8.02	8.59	9.17	9.77	10.69	11.46	12.24	15.43	18.73		
	140	7.49	8.03	8.65	9.31	9.98	10.66	11.69	12.56	13.43	17.00	20.68		
150	10	3.68	3.62	3.66	3.74	3.84	3.95	4.12	4.27	4.43	5.07	5.74		
	20	4.35	4.32	4.41	4.53	4.66	4.82	5.06	5.27	5.48	6.39	7.35		
	40	5.28	5.32	5.48	5.68	5.90	6.13	6.50	6.83	7.16	8.58	10.08		
	60	5.98	6.11	6.34	6.62	6.92	7.24	7.74	8.18	8.63	10.52	12.52		
	80	6.59	6.79	7.10	7.46	7.85	8.25	8.89	9.43	9.99	12.32	14.76		
	100	7.13	7.41	7.81	8.25	8.72	9.21	9.96	10.61	11.27	14.02	16.88		
	120	7.63	8.00	8.47	9.00	9.55	10.12	10.99	11.74	12.50	15.64	18.91		
	140	8.10	8.55	9.11	9.72	10.35	10.99	11.99	12.83	13.69	17.20	20.85		

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 60.0 Ft (RADIUS = 42.4 Ft)
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	TEMPERATURE RISE °F	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
200	10	3.90	3.83	3.88	3.96	4.06	4.17	4.34	4.50	4.65	5.30	5.97	
	20	4.63	4.60	4.68	4.80	4.93	5.09	5.33	5.54	5.75	6.65	7.60	
	40	5.63	5.66	5.81	6.00	6.22	6.45	6.81	7.13	7.46	8.84	10.31	
	60	6.39	6.49	6.71	6.98	7.27	7.58	8.06	8.48	8.92	10.76	12.72	
	80	7.03	7.20	7.50	7.84	8.21	8.59	9.20	9.73	10.27	12.55	14.96	
	100	7.61	7.85	8.22	8.63	9.08	9.54	10.27	10.90	11.54	14.24	17.07	
	120	8.13	8.45	8.89	9.38	9.90	10.45	11.29	12.02	12.76	15.85	19.08	
	140	8.62	9.01	9.53	10.10	10.70	11.32	12.28	13.10	13.94	17.40	21.00	
300	10	4.25	4.18	4.22	4.31	4.41	4.52	4.71	4.86	5.02	5.69	6.37	
	20	5.08	5.04	5.12	5.24	5.38	5.53	5.78	5.99	6.20	7.10	8.04	
	40	6.21	6.22	6.36	6.55	6.76	6.99	7.35	7.66	7.98	9.32	10.75	
	60	7.05	7.13	7.33	7.59	7.87	8.16	8.63	9.04	9.46	11.23	13.14	
	80	7.76	7.90	8.17	8.49	8.84	9.20	9.78	10.28	10.80	13.00	15.35	
	100	8.39	8.59	8.92	9.31	9.72	10.16	10.85	11.45	12.06	14.67	17.44	
	120	8.96	9.22	9.62	10.07	10.56	11.07	11.87	12.56	13.27	16.27	19.44	
	140	9.48	9.81	10.28	10.80	11.35	11.93	12.84	13.63	14.43	17.80	21.36	
400	10	4.53	4.46	4.51	4.59	4.70	4.81	5.00	5.16	5.33	6.01	6.70	
	20	5.45	5.40	5.48	5.60	5.74	5.90	6.15	6.36	6.58	7.49	8.43	
	40	6.68	6.68	6.82	7.01	7.22	7.44	7.80	8.11	8.43	9.76	11.17	
	60	7.59	7.65	7.85	8.10	8.37	8.67	9.13	9.53	9.94	11.68	13.54	
	80	8.36	8.47	8.73	9.04	9.38	9.74	10.30	10.79	11.29	13.43	15.73	
	100	9.03	9.20	9.52	9.89	10.29	10.72	11.38	11.96	12.56	15.09	17.81	
	120	9.64	9.87	10.24	10.67	11.14	11.63	12.40	13.07	13.76	16.67	19.79	
	140	10.20	10.48	10.92	11.42	11.95	12.50	13.38	14.13	14.91	18.20	21.70	
600	10	4.99	4.91	4.96	5.05	5.16	5.29	5.48	5.65	5.83	6.54	7.26	
	20	6.04	5.98	6.06	6.19	6.34	6.50	6.76	6.98	7.21	8.14	9.10	
	40	7.43	7.42	7.56	7.75	7.96	8.19	8.56	8.87	9.19	10.52	11.92	
	60	8.47	8.51	8.70	8.94	9.22	9.51	9.97	10.37	10.77	12.48	14.30	
	80	9.33	9.41	9.66	9.96	10.29	10.64	11.20	11.68	12.17	14.25	16.48	
	100	10.08	10.21	10.51	10.87	11.26	11.67	12.32	12.88	13.45	15.90	18.53	
	120	10.75	10.94	11.29	11.70	12.15	12.62	13.36	14.00	14.66	17.47	20.49	
	140	11.37	11.60	12.01	12.48	12.98	13.51	14.35	15.07	15.81	18.97	22.38	
800	10	5.36	5.28	5.33	5.42	5.54	5.67	5.87	6.05	6.23	6.97	7.72	
	20	6.51	6.45	6.53	6.66	6.82	6.99	7.25	7.48	7.72	8.68	9.67	
	40	8.05	8.03	8.17	8.36	8.58	8.81	9.18	9.50	9.83	11.18	12.58	
	60	9.18	9.20	9.39	9.64	9.92	10.21	10.68	11.07	11.48	13.19	14.99	
	80	10.12	10.18	10.42	10.72	11.06	11.41	11.96	12.44	12.93	14.98	17.17	
	100	10.93	11.04	11.33	11.68	12.07	12.48	13.12	13.67	14.24	16.64	19.22	
	120	11.66	11.82	12.16	12.56	13.00	13.47	14.19	14.82	15.47	18.21	21.16	
	140	12.33	12.53	12.92	13.38	13.87	14.39	15.20	15.91	16.64	19.72	23.04	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 60.0 Ft (RADIUS = 42.4 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
(Ft*s) ^{1/2}	0	10	3.31	3.49	3.72	3.96	4.21	4.46	4.84	5.15	5.47	6.77	8.08
		20	4.11	4.48	4.87	5.26	5.65	6.03	6.61	7.09	7.56	9.50	11.46
		40	5.44	6.15	6.82	7.45	8.07	8.68	9.58	10.33	11.08	14.09	17.16
		60	6.61	7.62	8.52	9.37	10.19	11.00	12.19	13.18	14.16	18.12	22.15
		80	7.68	8.97	10.09	11.13	12.14	13.13	14.59	15.79	17.00	21.82	26.73
		100	8.69	10.23	11.56	12.79	13.97	15.13	16.84	18.25	19.65	25.29	31.04
		120	9.65	11.43	12.95	14.36	15.72	17.03	18.98	20.58	22.18	28.60	35.13
		140	10.57	12.58	14.29	15.87	17.38	18.86	21.03	22.82	24.60	31.76	39.05
25	10	10	4.01	4.03	4.18	4.36	4.56	4.78	5.12	5.42	5.72	6.96	8.25
		20	4.79	4.98	5.28	5.61	5.95	6.31	6.85	7.31	7.77	9.66	11.60
		40	6.06	6.58	7.16	7.74	8.33	8.91	9.79	10.52	11.26	14.23	17.28
		60	7.18	8.01	8.83	9.64	10.43	11.21	12.38	13.35	14.32	18.25	22.26
		80	8.22	9.33	10.38	11.38	12.36	13.33	14.76	15.95	17.14	21.94	26.83
		100	9.20	10.57	11.83	13.02	14.18	15.32	17.00	18.40	19.79	25.41	31.13
		120	10.14	11.76	13.22	14.59	15.91	17.21	19.13	20.73	22.31	28.70	35.22
		140	11.04	12.90	14.55	16.09	17.57	19.03	21.18	22.96	24.73	31.87	39.14
50	10	10	4.42	4.41	4.53	4.69	4.88	5.08	5.40	5.67	5.96	7.16	8.41
		20	5.28	5.40	5.64	5.93	6.25	6.58	7.09	7.53	7.98	9.83	11.75
		40	6.59	6.99	7.50	8.03	8.58	9.14	9.99	10.71	11.43	14.37	17.39
		60	7.71	8.39	9.14	9.90	10.66	11.42	12.56	13.52	14.48	18.37	22.36
		80	8.73	9.69	10.66	11.63	12.58	13.52	14.94	16.11	17.29	22.06	26.93
		100	9.69	10.91	12.10	13.26	14.39	15.50	17.17	18.55	19.93	25.52	31.23
		120	10.61	12.09	13.48	14.81	16.11	17.39	19.29	20.87	22.45	28.81	35.31
		140	11.50	13.21	14.80	16.30	17.76	19.20	21.33	23.10	24.86	31.97	39.23
100	10	10	4.98	4.95	5.05	5.20	5.37	5.56	5.86	6.12	6.39	7.53	8.74
		20	5.97	6.04	6.24	6.49	6.77	7.07	7.55	7.96	8.38	10.15	12.02
		40	7.42	7.70	8.11	8.58	9.08	9.60	10.40	11.08	11.78	14.65	17.63
		60	8.59	9.10	9.73	10.41	11.12	11.84	12.93	13.86	14.79	18.62	22.58
		80	9.63	10.37	11.23	12.11	13.01	13.91	15.28	16.43	17.58	22.29	27.13
		100	10.59	11.58	12.64	13.72	14.79	15.87	17.49	18.85	20.21	25.74	31.41
		120	11.50	12.73	13.99	15.25	16.50	17.74	19.60	21.16	22.71	29.02	35.49
		140	12.37	13.83	15.29	16.73	18.14	19.54	21.63	23.37	25.12	32.17	39.40
150	10	10	5.39	5.34	5.44	5.58	5.75	5.94	6.23	6.49	6.76	7.87	9.05
		20	6.49	6.53	6.71	6.95	7.22	7.50	7.96	8.35	8.76	10.47	12.30
		40	8.05	8.27	8.65	9.08	9.54	10.03	10.79	11.44	12.12	14.92	17.87
		60	9.29	9.71	10.28	10.90	11.56	12.24	13.29	14.19	15.11	18.87	22.79
		80	10.37	11.00	11.76	12.58	13.43	14.30	15.62	16.74	17.87	22.52	27.33
		100	11.36	12.20	13.16	14.17	15.20	16.24	17.82	19.15	20.49	25.96	31.60
		120	12.28	13.34	14.50	15.69	16.89	18.09	19.91	21.44	22.98	29.23	35.67
		140	13.16	14.44	15.79	17.15	18.51	19.88	21.93	23.65	25.37	32.37	39.57

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 60.0 Ft (RADIUS = 42.4 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		(Ft*s) ^{1/2}	°F	4	8	12	16	20	24	30	35	40	60
200	10	5.72	5.67	5.76	5.90	6.08	6.26	6.56	6.81	7.08	8.18	9.34	
	20	6.91	6.93	7.11	7.34	7.60	7.88	8.32	8.71	9.10	10.78	12.57	
	40	8.58	8.77	9.12	9.52	9.97	10.43	11.16	11.80	12.45	15.20	18.10	
	60	9.88	10.25	10.77	11.36	11.98	12.64	13.65	14.52	15.41	19.12	23.00	
	80	11.01	11.56	12.26	13.03	13.84	14.67	15.96	17.05	18.16	22.76	27.53	
	100	12.03	12.77	13.66	14.61	15.59	16.60	18.14	19.44	20.76	26.18	31.79	
	120	12.97	13.91	14.99	16.11	17.27	18.44	20.22	21.72	23.24	29.44	35.85	
300	140	13.87	15.01	16.26	17.56	18.88	20.21	22.23	23.92	25.62	32.58	39.75	
	10	6.25	6.19	6.28	6.43	6.60	6.79	7.09	7.35	7.61	8.72	9.87	
	20	7.59	7.60	7.77	7.99	8.25	8.52	8.96	9.33	9.72	11.35	13.09	
	40	9.44	9.59	9.91	10.29	10.71	11.16	11.85	12.46	13.08	15.73	18.56	
	60	10.86	11.16	11.64	12.18	12.76	13.37	14.33	15.16	16.02	19.62	23.42	
	80	12.07	12.53	13.16	13.87	14.62	15.40	16.62	17.66	18.74	23.22	27.92	
	100	13.16	13.78	14.57	15.44	16.36	17.30	18.77	20.03	21.31	26.62	32.16	
400	120	14.15	14.94	15.90	16.94	18.02	19.12	20.83	22.29	23.76	29.86	36.21	
	140	15.09	16.05	17.18	18.37	19.61	20.88	22.82	24.46	26.13	32.98	40.09	
	10	6.69	6.62	6.71	6.86	7.04	7.23	7.53	7.80	8.07	9.18	10.34	
	20	8.15	8.14	8.31	8.53	8.79	9.06	9.50	9.87	10.26	11.88	13.59	
	40	10.15	10.28	10.58	10.95	11.36	11.79	12.47	13.06	13.67	16.25	19.02	
	60	11.67	11.93	12.38	12.90	13.46	14.05	14.97	15.77	16.60	20.10	23.84	
	80	12.96	13.36	13.95	14.62	15.33	16.08	17.25	18.26	19.30	23.67	28.32	
600	100	14.10	14.65	15.39	16.21	17.07	17.98	19.39	20.60	21.84	27.05	32.54	
	120	15.15	15.85	16.74	17.71	18.73	19.79	21.43	22.84	24.28	30.28	36.56	
	140	16.13	16.98	18.02	19.14	20.31	21.53	23.40	25.00	26.63	33.39	40.43	
	10	7.39	7.31	7.41	7.56	7.74	7.94	8.26	8.53	8.81	9.96	11.13	
	20	9.05	9.03	9.19	9.42	9.68	9.96	10.40	10.78	11.16	12.78	14.48	
	40	11.30	11.39	11.68	12.05	12.45	12.87	13.54	14.12	14.71	17.22	19.90	
	60	13.00	13.20	13.62	14.12	14.65	15.22	16.11	16.88	17.67	21.04	24.67	
800	80	14.41	14.75	15.29	15.92	16.59	17.30	18.41	19.37	20.36	24.57	29.09	
	100	15.67	16.12	16.80	17.56	18.37	19.22	20.55	21.70	22.89	27.91	33.28	
	120	16.80	17.39	18.19	19.09	20.04	21.03	22.58	23.92	25.30	31.11	37.27	
	140	17.85	18.57	19.51	20.54	21.63	22.76	24.53	26.06	27.62	34.19	41.12	
	10	7.96	7.87	7.97	8.13	8.32	8.52	8.85	9.13	9.42	10.60	11.80	
	20	9.78	9.75	9.91	10.14	10.41	10.69	11.14	11.53	11.92	13.56	15.26	
	40	12.24	12.31	12.59	12.95	13.35	13.78	14.45	15.02	15.61	18.09	20.73	
	60	14.08	14.25	14.66	15.14	15.67	16.23	17.10	17.86	18.64	21.93	25.48	
	80	15.61	15.90	16.41	17.02	17.68	18.37	19.45	20.38	21.35	25.45	29.86	
	100	16.95	17.35	17.99	18.72	19.50	20.32	21.61	22.73	23.87	28.76	34.01	
	120	18.17	18.68	19.44	20.29	21.20	22.16	23.65	24.94	26.27	31.93	37.98	
	140	19.28	19.92	20.80	21.78	22.81	23.90	25.60	27.07	28.58	34.98	41.80	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 60.0 Ft (RADIUS = 42.4 Ft)³
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
0	10	5.16	5.60	6.06	6.52	6.99	7.45	8.15	8.73	9.31	11.65	14.04	
	20	6.75	7.58	8.37	9.13	9.87	10.60	11.69	12.59	13.49	17.12	20.81	
	40	9.42	10.93	12.26	13.51	14.71	15.90	17.64	19.08	20.52	26.31	32.20	
	60	11.76	13.86	15.67	17.35	18.96	20.54	22.86	24.78	26.69	34.37	42.18	
	80	13.90	16.55	18.80	20.87	22.86	24.80	27.65	30.01	32.35	41.77	51.35	
	100	15.92	19.08	21.73	24.18	26.52	28.80	32.15	34.92	37.67	48.71	59.95	
	120	17.84	21.48	24.53	27.33	30.01	32.61	36.43	39.58	42.72	55.32	68.14	
25	140	19.68	23.78	27.21	30.35	33.34	36.25	40.53	44.06	47.57	61.65	75.99	
	10	5.98	6.19	6.54	6.93	7.35	7.78	8.44	8.99	9.56	11.85	14.21	
	20	7.49	8.09	8.78	9.48	10.18	10.88	11.93	12.82	13.70	17.29	20.95	
	40	10.05	11.36	12.60	13.80	14.97	16.13	17.85	19.27	20.70	26.45	32.32	
	60	12.33	14.25	15.98	17.61	19.20	20.75	23.05	24.95	26.85	34.49	42.29	
	80	14.44	16.91	19.09	21.12	23.08	25.00	27.83	30.17	32.50	41.88	51.45	
	100	16.43	19.42	22.01	24.42	26.73	28.99	32.32	35.07	37.81	48.82	60.05	
50	120	18.33	21.81	24.79	27.56	30.20	32.78	36.59	39.73	42.86	55.42	68.23	
	140	20.15	24.10	27.46	30.57	33.53	36.43	40.69	44.20	47.70	61.75	76.07	
	10	6.56	6.69	6.97	7.32	7.70	8.10	8.72	9.26	9.80	12.05	14.37	
	20	8.12	8.58	9.18	9.82	10.48	11.15	12.18	13.04	13.91	17.45	21.09	
	40	10.66	11.79	12.95	14.09	15.23	16.36	18.05	19.46	20.88	26.59	32.43	
	60	12.90	14.64	16.29	17.88	19.43	20.96	23.23	25.12	27.01	34.62	42.39	
	80	14.97	17.28	19.38	21.37	23.30	25.19	28.00	30.33	32.65	42.00	51.55	
100	100	16.94	19.77	22.28	24.65	26.94	29.17	32.48	35.22	37.95	48.93	60.14	
	120	18.81	22.14	25.05	27.78	30.40	32.96	36.75	39.87	42.99	55.53	68.32	
	140	20.61	24.42	27.71	30.78	33.72	36.60	40.84	44.34	47.83	61.85	76.16	
	10	7.38	7.44	7.68	7.99	8.33	8.69	9.27	9.76	10.28	12.43	14.70	
	20	9.10	9.42	9.91	10.47	11.07	11.69	12.66	13.48	14.32	17.78	21.37	
	40	11.73	12.60	13.61	14.67	15.74	16.82	18.46	19.84	21.22	26.87	32.67	
	60	13.96	15.40	16.90	18.40	19.89	21.38	23.60	25.46	27.32	34.87	42.61	
150	80	16.00	17.99	19.95	21.86	23.73	25.59	28.35	30.64	32.94	42.24	51.75	
	100	17.92	20.45	22.83	25.12	27.35	29.54	32.81	35.52	38.23	49.16	60.33	
	120	19.76	22.79	25.58	28.22	30.79	33.32	37.06	40.16	43.26	55.74	68.50	
	140	21.53	25.05	28.22	31.21	34.10	36.94	41.14	44.61	48.08	62.06	76.33	
	10	7.99	8.03	8.25	8.53	8.86	9.20	9.75	10.23	10.73	12.81	15.03	
	20	9.85	10.11	10.55	11.06	11.62	12.20	13.12	13.91	14.72	18.11	21.65	
	40	12.61	13.34	14.25	15.23	16.24	17.28	18.87	20.21	21.57	27.14	32.91	
	60	14.89	16.13	17.50	18.92	20.35	21.80	23.97	25.80	27.64	35.12	42.82	
	80	16.94	18.69	20.52	22.34	24.16	25.97	28.69	30.96	33.24	42.47	51.95	
	100	18.85	21.12	23.37	25.58	27.76	29.91	33.14	35.82	38.50	49.38	60.52	
	120	20.67	23.44	26.09	28.67	31.18	33.67	37.37	40.44	43.52	55.95	68.68	
	140	22.43	25.67	28.72	31.64	34.48	37.28	41.44	44.89	48.34	62.26	76.51	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 60.0 Ft (RADIUS = 42.4 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	TEMPERATURE RISE	CEILING HEIGHT, Ft											
		°F	4	8	12	16	20	24	30	35	40	60	80
200	(Ft*s) ^{1/2}												
	10	8.49	8.51	8.72	9.00	9.32	9.65	10.19	10.66	11.14	13.18	15.35	
	20	10.48	10.69	11.10	11.59	12.12	12.68	13.57	14.33	15.12	18.43	21.93	
	40	13.37	14.01	14.85	15.77	16.73	17.73	19.27	20.58	21.91	27.42	33.14	
	60	15.71	16.81	18.09	19.43	20.81	22.21	24.34	26.14	27.95	35.37	43.04	
	80	17.79	19.37	21.08	22.83	24.59	26.36	29.03	31.27	33.53	42.70	52.15	
	100	19.72	21.77	23.90	26.04	28.16	30.28	33.46	36.12	38.78	49.60	60.71	
	120	21.54	24.07	26.61	29.11	31.57	34.02	37.68	40.73	43.79	56.16	68.86	
	140	23.28	26.29	29.21	32.06	34.85	37.62	41.74	45.16	48.59	62.47	76.68	
300	10	9.31	9.30	9.50	9.77	10.08	10.42	10.95	11.40	11.88	13.86	15.98	
	20	11.51	11.67	12.05	12.51	13.01	13.55	14.39	15.12	15.87	19.07	22.48	
	40	14.64	15.17	15.92	16.76	17.66	18.59	20.05	21.31	22.59	27.97	33.61	
	60	17.11	18.04	19.18	20.41	21.70	23.02	25.06	26.81	28.57	35.87	43.46	
	80	19.28	20.61	22.15	23.77	25.43	27.13	29.71	31.90	34.11	43.17	52.54	
	100	21.25	23.01	24.95	26.94	28.97	31.01	34.11	36.71	39.33	50.04	61.09	
	120	23.10	25.29	27.62	29.98	32.35	34.72	38.30	41.30	44.32	56.59	69.22	
	140	24.86	27.49	30.19	32.90	35.60	38.30	42.34	45.71	49.10	62.87	77.03	
400	10	9.97	9.95	10.14	10.42	10.73	11.06	11.59	12.04	12.51	14.48	16.56	
	20	12.35	12.48	12.85	13.29	13.78	14.30	15.12	15.84	16.57	19.68	23.02	
	40	15.69	16.15	16.86	17.65	18.51	19.40	20.80	22.01	23.26	28.51	34.08	
	60	18.30	19.11	20.17	21.32	22.54	23.81	25.78	27.47	29.19	36.37	43.89	
	80	20.55	21.73	23.15	24.67	26.26	27.88	30.39	32.52	34.69	43.63	52.94	
	100	22.59	24.16	25.94	27.82	29.76	31.73	34.75	37.30	39.88	50.48	61.46	
	120	24.49	26.44	28.60	30.83	33.11	35.42	38.92	41.87	44.84	57.01	69.58	
	140	26.27	28.63	31.15	33.73	36.34	38.97	42.93	46.26	49.61	63.28	77.37	
600	10	11.04	11.00	11.19	11.47	11.78	12.12	12.65	13.12	13.59	15.56	17.63	
	20	13.72	13.82	14.16	14.59	15.07	15.59	16.39	17.09	17.81	20.83	24.07	
	40	17.42	17.80	18.45	19.19	20.00	20.85	22.18	23.34	24.53	29.58	35.01	
	60	20.26	20.94	21.90	22.96	24.10	25.29	27.14	28.75	30.40	37.35	44.73	
	80	22.68	23.68	24.95	26.34	27.81	29.34	31.71	33.75	35.83	44.56	53.73	
	100	24.85	26.17	27.77	29.49	31.29	33.15	36.02	38.47	40.97	51.36	62.21	
	120	26.85	28.51	30.43	32.48	34.60	36.79	40.14	42.99	45.89	57.85	70.29	
	140	28.71	30.72	32.98	35.35	37.80	40.29	44.11	47.35	50.62	64.09	78.06	
800	10	11.92	11.86	12.05	12.33	12.65	12.99	13.54	14.01	14.49	16.49	18.56	
	20	14.84	14.91	15.24	15.67	16.15	16.67	17.47	18.17	18.88	21.87	25.06	
	40	18.84	19.17	19.78	20.51	21.29	22.12	23.42	24.54	25.70	30.62	35.92	
	60	21.88	22.48	23.38	24.40	25.49	26.63	28.42	29.96	31.56	38.33	45.57	
	80	24.46	25.34	26.53	27.84	29.24	30.69	32.97	34.93	36.95	45.47	54.51	
	100	26.75	27.92	29.40	31.02	32.72	34.49	37.25	39.62	42.05	52.23	62.96	
	120	28.84	30.31	32.10	34.02	36.03	38.11	41.34	44.10	46.93	58.68	71.01	
	140	30.79	32.57	34.66	36.89	39.20	41.59	45.28	48.42	51.62	64.89	78.75	

This page intentionally left blank.

APPENDIX D.

DETECTOR ACTIVATION TIME TABLES:
RATE OF TEMPERATURE RISE

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.0 Ft (RADIUS = 0.0 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	0.13*	0.23*	0.33*	0.43*	0.52*	0.61*	0.75*	0.86*	0.98*	1.45*	1.98*
	20	0.13*	0.24*	0.35*	0.45*	0.55*	0.65*	0.79*	0.92*	1.05*	1.59*	2.28*
	25	0.14*	0.25*	0.36*	0.47*	0.57*	0.68*	0.84*	0.97*	1.11*	1.75*	2.70*
200	15	0.14*	0.26*	0.37*	0.48*	0.59*	0.70*	0.86*	0.99*	1.13*	1.70*	2.34*
	20	0.15*	0.27*	0.39*	0.51*	0.63*	0.75*	0.92*	1.08*	1.23*	1.89*	2.70*
	25	0.15*	0.28*	0.41*	0.54*	0.67*	0.79*	0.99*	1.15*	1.33*	2.10*	3.16*
300	15	0.15*	0.28*	0.40*	0.52*	0.64*	0.76*	0.94*	1.10*	1.25*	1.90*	2.62*
	20	0.16*	0.29*	0.43*	0.56*	0.69*	0.83*	1.03*	1.20*	1.38*	2.13*	3.05*
	25	0.16*	0.31*	0.45*	0.60*	0.74*	0.89*	1.11*	1.30*	1.50*	2.38*	3.55*
400	15	0.16*	0.29*	0.43*	0.56*	0.69*	0.82*	1.02*	1.19*	1.36*	2.07*	2.86*
	20	0.17*	0.32*	0.46*	0.61*	0.75*	0.90*	1.12*	1.31*	1.50*	2.34*	3.35*
	25	0.18*	0.33*	0.49*	0.65*	0.81*	0.97*	1.21*	1.43*	1.64*	2.62*	3.89*
500	15	0.16*	0.31*	0.45*	0.59*	0.73*	0.87*	1.09*	1.27*	1.45*	2.22*	3.08*
	20	0.18*	0.33*	0.49*	0.65*	0.80*	0.96*	1.20*	1.41*	1.62*	2.53*	3.61*
	25	0.19*	0.36*	0.52*	0.69*	0.87*	1.04*	1.31*	1.54*	1.78*	2.84*	4.20*
600	15	0.17*	0.32*	0.47*	0.62*	0.77*	0.92*	1.15*	1.34*	1.54*	2.36*	3.28*
	20	0.18*	0.35*	0.52*	0.68*	0.85*	1.02*	1.28*	1.50*	1.72*	2.70*	3.86*
	25	0.19*	0.37*	0.55*	0.74*	0.92*	1.11*	1.40*	1.64*	1.90*	3.04*	4.49*
700	15	0.18*	0.34*	0.50*	0.65*	0.81*	0.97*	1.21*	1.41*	1.62*	2.50*	3.47*
	20	0.19*	0.37*	0.54*	0.72*	0.89*	1.07*	1.35*	1.58*	1.82*	2.86*	4.09*
	25	0.20*	0.39*	0.58*	0.78*	0.97*	1.17*	1.48*	1.74*	2.01*	3.23*	4.76*
800	15	0.18*	0.35*	0.52*	0.68*	0.85*	1.01*	1.27*	1.48*	1.70*	2.62*	3.65*
	20	0.20*	0.38*	0.57*	0.75*	0.94*	1.13*	1.41*	1.66*	1.92*	3.01*	4.30*
	25	0.21*	0.41*	0.61*	0.81*	1.02*	1.23*	1.55*	1.83*	2.12*	3.40*	5.01*
900	15	0.19*	0.36*	0.53*	0.71*	0.88*	1.05*	1.32*	1.54*	1.77*	2.74*	3.81*
	20	0.20*	0.40*	0.59*	0.78*	0.98*	1.17*	1.48*	1.74*	2.00*	3.16*	4.51*
	25	0.22*	0.43*	0.64*	0.85*	1.07*	1.29*	1.63*	1.92*	2.22*	3.57*	5.25*
1000	15	0.19*	0.37*	0.55*	0.73*	0.91*	1.09*	1.37*	1.60*	1.84*	2.85*	3.97*
	20	0.21*	0.41*	0.61*	0.81*	1.01*	1.22*	1.54*	1.81*	2.09*	3.29*	4.70*
	25	0.23*	0.44*	0.66*	0.88*	1.11*	1.34*	1.70*	2.00*	2.32*	3.73*	5.47*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.0 Ft (RADIUS = 0.0 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	0.20*	0.38*	0.57*	0.76*	0.94*	1.13*	1.42*	1.66*	1.91*	2.96*	4.13*
	20	0.22*	0.42*	0.63*	0.84*	1.05*	1.27*	1.60*	1.88*	2.17*	3.42*	4.89*
	25	0.23*	0.46*	0.68*	0.92*	1.15*	1.39*	1.76*	2.08*	2.41*	3.88*	5.69*
1200	15	0.20*	0.40*	0.59*	0.78*	0.97*	1.17*	1.46*	1.72*	1.97*	3.06*	4.28*
	20	0.22*	0.44*	0.65*	0.87*	1.09*	1.31*	1.65*	1.95*	2.25*	3.55*	5.07*
	25	0.24*	0.47*	0.71*	0.95*	1.19*	1.44*	1.83*	2.16*	2.50*	4.03*	5.90*
1300	15	0.21*	0.41*	0.60*	0.80*	1.00*	1.20*	1.51*	1.77*	2.04*	3.16*	4.42*
	20	0.23*	0.45*	0.67*	0.89*	1.12*	1.35*	1.71*	2.01*	2.32*	3.67*	5.24*
	25	0.25*	0.49*	0.73*	0.98*	1.23*	1.49*	1.89*	2.23*	2.59*	4.17*	6.10*
1400	15	0.21*	0.42*	0.62*	0.82*	1.03*	1.24*	1.55*	1.82*	2.10*	3.26*	4.56*
	20	0.23*	0.46*	0.69*	0.92*	1.15*	1.39*	1.76*	2.07*	2.40*	3.79*	5.41*
	25	0.25*	0.50*	0.75*	1.01*	1.27*	1.54*	1.95*	2.31*	2.67*	4.31*	6.30*
1500	15	0.22*	0.43*	0.63*	0.84*	1.05*	1.27*	1.60*	1.87*	2.16*	3.36*	4.69*
	20	0.24*	0.47*	0.71*	0.94*	1.19*	1.43*	1.81*	2.13*	2.47*	3.90*	5.57*
	25	0.26*	0.51*	0.77*	1.04*	1.31*	1.58*	2.01*	2.38*	2.76*	4.44*	6.49*
1600	15	0.22*	0.44*	0.65*	0.86*	1.08*	1.30*	1.64*	1.92*	2.21*	3.45*	4.82*
	20	0.24*	0.48*	0.72*	0.97*	1.22*	1.47*	1.86*	2.19*	2.54*	4.02*	5.73*
	25	0.26*	0.53*	0.79*	1.06*	1.34*	1.63*	2.06*	2.44*	2.84*	4.57*	6.68*
1700	15	0.23*	0.44*	0.66*	0.88*	1.11*	1.33*	1.68*	1.97*	2.27*	3.54*	4.95*
	20	0.25*	0.49*	0.74*	0.99*	1.25*	1.51*	1.91*	2.25*	2.60*	4.12*	5.89*
	25	0.27*	0.54*	0.81*	1.09*	1.38*	1.67*	2.12*	2.51*	2.91*	4.69*	6.86*
1800	15	0.23*	0.45*	0.68*	0.90*	1.13*	1.36*	1.72*	2.02*	2.33*	3.63*	5.07*
	20	0.25*	0.50*	0.76*	1.02*	1.28*	1.54*	1.95*	2.31*	2.67*	4.23*	6.04*
	25	0.28*	0.55*	0.83*	1.12*	1.41*	1.71*	2.17*	2.58*	2.99*	4.82*	7.03*
1900	15	0.24*	0.46*	0.69*	0.92*	1.16*	1.39*	1.76*	2.06*	2.38*	3.71*	5.19*
	20	0.26*	0.51*	0.77*	1.04*	1.31*	1.58*	2.00*	2.36*	2.73*	4.33*	6.19*
	25	0.28*	0.56*	0.85*	1.14*	1.44*	1.75*	2.23*	2.64*	3.06*	4.94*	7.20*
2000	15	0.24*	0.47*	0.70*	0.94*	1.18*	1.42*	1.79*	2.11*	2.43*	3.80*	5.31*
	20	0.26*	0.53*	0.79*	1.06*	1.33*	1.62*	2.05*	2.42*	2.80*	4.43*	6.33*
	25	0.29*	0.57*	0.87*	1.17*	1.48*	1.79*	2.28*	2.70*	3.14*	5.05*	7.37*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.0 Ft (RADIUS = 0.0 Ft)
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	0.18*	0.34*	0.49*	0.64*	0.79*	0.94*	1.17*	1.37*	1.59*	2.70*	5.85*
	20	0.19*	0.36*	0.52*	0.68*	0.85*	1.02*	1.29*	1.53*	1.80*	3.74*	11.74*
	25	0.20*	0.38*	0.55*	0.73*	0.91*	1.10*	1.41*	1.70*	2.04*	5.95*	21.47*
200	15	0.21*	0.39*	0.57*	0.75*	0.93*	1.11*	1.40*	1.65*	1.91*	3.22*	5.99*
	20	0.22*	0.42*	0.61*	0.81*	1.02*	1.23*	1.56*	1.86*	2.19*	4.19*	11.74*
	25	0.23*	0.44*	0.66*	0.88*	1.10*	1.34*	1.73*	2.09*	2.50*	6.03*	21.47*
300	15	0.23*	0.43*	0.63*	0.83*	1.04*	1.25*	1.58*	1.86*	2.17*	3.64*	6.35*
	20	0.24*	0.47*	0.69*	0.92*	1.15*	1.40*	1.78*	2.13*	2.50*	4.65*	11.75*
	25	0.26*	0.50*	0.74*	1.00*	1.26*	1.53*	1.98*	2.40*	2.86*	6.30*	21.47*
400	15	0.24*	0.46*	0.69*	0.91*	1.14*	1.37*	1.74*	2.05*	2.39*	4.01*	6.76*
	20	0.26*	0.51*	0.76*	1.01*	1.27*	1.54*	1.97*	2.36*	2.77*	5.08*	11.78*
	25	0.28*	0.55*	0.82*	1.10*	1.39*	1.70*	2.20*	2.66*	3.18*	6.67*	21.47*
500	15	0.26*	0.50*	0.74*	0.98*	1.23*	1.48*	1.88*	2.22*	2.59*	4.34*	7.17*
	20	0.28*	0.54*	0.81*	1.09*	1.38*	1.67*	2.14*	2.56*	3.02*	5.47*	11.87*
	25	0.30*	0.59*	0.89*	1.19*	1.52*	1.85*	2.40*	2.90*	3.47*	7.05*	21.47*
600	15	0.27*	0.52*	0.78*	1.04*	1.31*	1.58*	2.01*	2.38*	2.77*	4.64*	7.57*
	20	0.29*	0.58*	0.87*	1.17*	1.47*	1.79*	2.30*	2.75*	3.24*	5.83*	12.03*
	25	0.32*	0.63*	0.95*	1.28*	1.63*	1.99*	2.58*	3.13*	3.73*	7.43*	21.47*
700	15	0.28*	0.55*	0.82*	1.10*	1.38*	1.67*	2.13*	2.53*	2.94*	4.93*	7.95*
	20	0.31*	0.61*	0.92*	1.24*	1.56*	1.91*	2.45*	2.93*	3.45*	6.17*	12.25*
	25	0.33*	0.67*	1.01*	1.36*	1.73*	2.12*	2.75*	3.33*	3.97*	7.80*	21.47*
800	15	0.29*	0.58*	0.86*	1.16*	1.46*	1.76*	2.24*	2.66*	3.11*	5.19*	8.31*
	20	0.32*	0.64*	0.97*	1.30*	1.65*	2.01*	2.58*	3.10*	3.65*	6.50*	12.51*
	25	0.35*	0.70*	1.06*	1.44*	1.83*	2.25*	2.92*	3.53*	4.20*	8.15*	21.48*
900	15	0.31*	0.60*	0.90*	1.21*	1.52*	1.85*	2.35*	2.79*	3.26*	5.45*	8.66*
	20	0.34*	0.67*	1.01*	1.37*	1.73*	2.11*	2.72*	3.26*	3.83*	6.80*	12.79*
	25	0.37*	0.73*	1.11*	1.51*	1.93*	2.36*	3.07*	3.71*	4.42*	8.49*	21.50*
1000	15	0.32*	0.62*	0.94*	1.26*	1.59*	1.93*	2.46*	2.92*	3.41*	5.69*	9.00*
	20	0.35*	0.70*	1.06*	1.43*	1.81*	2.21*	2.84*	3.41*	4.01*	7.10*	13.09*
	25	0.38*	0.76*	1.16*	1.58*	2.02*	2.47*	3.21*	3.89*	4.62*	8.82*	21.54*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.0 Ft (RADIUS = 0.0 Ft)
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	0.33*	0.65*	0.97*	1.31*	1.65*	2.00*	2.56*	3.04*	3.55*	5.92*	9.32*
	20	0.36*	0.72*	1.10*	1.48*	1.88*	2.30*	2.96*	3.55*	4.18*	7.38*	13.40*
	25	0.39*	0.80*	1.21*	1.65*	2.10*	2.58*	3.35*	4.05*	4.82*	9.14*	21.60*
1200	15	0.34*	0.67*	1.01*	1.35*	1.71*	2.08*	2.65*	3.15*	3.68*	6.14*	9.64*
	20	0.37*	0.75*	1.14*	1.54*	1.96*	2.39*	3.08*	3.69*	4.35*	7.65*	13.71*
	25	0.41*	0.82*	1.26*	1.71*	2.19*	2.68*	3.49*	4.22*	5.01*	9.45*	21.69*
1300	15	0.35*	0.69*	1.04*	1.40*	1.77*	2.15*	2.74*	3.27*	3.81*	6.36*	9.94*
	20	0.39*	0.77*	1.18*	1.59*	2.03*	2.48*	3.19*	3.82*	4.50*	7.91*	14.02*
	25	0.42*	0.85*	1.30*	1.77*	2.27*	2.78*	3.62*	4.37*	5.20*	9.75*	21.80*
1400	15	0.36*	0.71*	1.07*	1.44*	1.82*	2.22*	2.83*	3.37*	3.94*	6.57*	10.23*
	20	0.40*	0.80*	1.21*	1.65*	2.09*	2.56*	3.30*	3.96*	4.66*	8.17*	14.33*
	25	0.43*	0.88*	1.35*	1.83*	2.34*	2.88*	3.74*	4.52*	5.38*	10.04*	21.93*
1500	15	0.36*	0.73*	1.10*	1.49*	1.88*	2.29*	2.92*	3.48*	4.06*	6.77*	10.52*
	20	0.41*	0.82*	1.25*	1.70*	2.16*	2.64*	3.40*	4.08*	4.81*	8.41*	14.64*
	25	0.45*	0.91*	1.39*	1.89*	2.42*	2.97*	3.86*	4.67*	5.55*	10.32*	22.08*
1600	15	0.37*	0.75*	1.13*	1.53*	1.93*	2.35*	3.01*	3.58*	4.18*	6.96*	10.80*
	20	0.42*	0.84*	1.29*	1.75*	2.22*	2.72*	3.51*	4.20*	4.95*	8.65*	14.95*
	25	0.46*	0.93*	1.43*	1.95*	2.49*	3.06*	3.98*	4.81*	5.72*	10.60*	22.25*
1700	15	0.38*	0.77*	1.16*	1.57*	1.98*	2.42*	3.09*	3.68*	4.30*	7.16*	11.07*
	20	0.43*	0.87*	1.32*	1.79*	2.28*	2.80*	3.61*	4.32*	5.09*	8.88*	15.25*
	25	0.47*	0.96*	1.47*	2.00*	2.56*	3.15*	4.10*	4.95*	5.88*	10.87*	22.44*
1800	15	0.39*	0.78*	1.19*	1.61*	2.04*	2.48*	3.17*	3.78*	4.41*	7.34*	11.34*
	20	0.44*	0.89*	1.36*	1.84*	2.35*	2.87*	3.70*	4.44*	5.23*	9.11*	15.55*
	25	0.48*	0.98*	1.51*	2.06*	2.63*	3.24*	4.21*	5.09*	6.04*	11.13*	22.64*
1900	15	0.40*	0.80*	1.22*	1.64*	2.09*	2.54*	3.25*	3.87*	4.52*	7.52*	11.60*
	20	0.45*	0.91*	1.39*	1.89*	2.40*	2.94*	3.80*	4.56*	5.36*	9.33*	15.84*
	25	0.49*	1.01*	1.55*	2.11*	2.70*	3.32*	4.32*	5.22*	6.20*	11.39*	22.85*
2000	15	0.41*	0.82*	1.24*	1.68*	2.13*	2.60*	3.33*	3.96*	4.63*	7.70*	11.85*
	20	0.46*	0.93*	1.42*	1.93*	2.46*	3.02*	3.89*	4.67*	5.50*	9.55*	16.13*
	25	0.50*	1.03*	1.58*	2.16*	2.77*	3.41*	4.43*	5.35*	6.35*	11.64*	23.07*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.0 Ft (RADIUS = 0.0 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	0.27*	0.52*	0.77*	1.02*	1.29*	1.58*	2.10*	2.67*	3.54*	17.96*	70.90*
	20	0.29*	0.56*	0.84*	1.13*	1.45*	1.83*	2.60*	3.78*	6.27*	40.35*	165.27*
	25	0.31*	0.60*	0.90*	1.24*	1.63*	2.13*	3.44*	6.16*	11.13*	77.27*	320.85*
200	15	0.32*	0.62*	0.93*	1.24*	1.58*	1.95*	2.59*	3.24*	4.11*	17.96*	70.90*
	20	0.35*	0.68*	1.03*	1.40*	1.81*	2.28*	3.17*	4.29*	6.38*	40.35*	165.27*
	25	0.37*	0.74*	1.13*	1.56*	2.05*	2.64*	3.97*	6.26*	11.13*	77.27*	320.85*
300	15	0.36*	0.70*	1.05*	1.42*	1.82*	2.25*	2.97*	3.71*	4.64*	17.96*	70.90*
	20	0.39*	0.78*	1.18*	1.62*	2.10*	2.64*	3.64*	4.81*	6.72*	40.35*	165.27*
	25	0.42*	0.85*	1.30*	1.81*	2.38*	3.06*	4.48*	6.58*	11.14*	77.27*	320.85*
400	15	0.39*	0.77*	1.17*	1.58*	2.02*	2.50*	3.31*	4.11*	5.11*	17.96*	70.90*
	20	0.43*	0.86*	1.32*	1.81*	2.35*	2.95*	4.05*	5.28*	7.15*	40.35*	165.27*
	25	0.47*	0.94*	1.46*	2.03*	2.67*	3.42*	4.94*	7.00*	11.21*	77.27*	320.85*
500	15	0.42*	0.83*	1.27*	1.72*	2.21*	2.73*	3.61*	4.48*	5.53*	17.97*	70.90*
	20	0.46*	0.94*	1.44*	1.98*	2.57*	3.23*	4.42*	5.71*	7.59*	40.35*	165.27*
	25	0.51*	1.03*	1.60*	2.22*	2.93*	3.75*	5.36*	7.43*	11.37*	77.27*	320.85*
600	15	0.45*	0.89*	1.36*	1.85*	2.38*	2.94*	3.89*	4.82*	5.93*	18.00*	70.90*
	20	0.50*	1.01*	1.55*	2.13*	2.77*	3.48*	4.75*	6.12*	8.02*	40.35*	165.27*
	25	0.54*	1.11*	1.73*	2.40*	3.17*	4.05*	5.75*	7.85*	11.61*	77.27*	320.85*
700	15	0.47*	0.95*	1.45*	1.97*	2.53*	3.14*	4.15*	5.13*	6.30*	18.07*	70.90*
	20	0.53*	1.07*	1.65*	2.28*	2.96*	3.72*	5.07*	6.49*	8.43*	40.35*	165.27*
	25	0.58*	1.19*	1.85*	2.57*	3.39*	4.33*	6.11*	8.26*	11.91*	77.27*	320.85*
800	15	0.49*	1.00*	1.53*	2.09*	2.68*	3.32*	4.39*	5.42*	6.64*	18.18*	70.90*
	20	0.55*	1.13*	1.75*	2.42*	3.14*	3.95*	5.37*	6.85*	8.83*	40.35*	165.27*
	25	0.61*	1.26*	1.96*	2.73*	3.60*	4.59*	6.45*	8.65*	12.23*	77.27*	320.85*
900	15	0.52*	1.05*	1.60*	2.19*	2.82*	3.50*	4.62*	5.70*	6.97*	18.35*	70.90*
	20	0.58*	1.19*	1.84*	2.55*	3.31*	4.16*	5.65*	7.19*	9.22*	40.35*	165.27*
	25	0.64*	1.32*	2.07*	2.88*	3.80*	4.84*	6.78*	9.03*	12.58*	77.27*	320.85*
1000	15	0.54*	1.09*	1.68*	2.30*	2.96*	3.66*	4.84*	5.97*	7.29*	18.55*	70.90*
	20	0.61*	1.25*	1.93*	2.67*	3.48*	4.36*	5.92*	7.51*	9.59*	40.35*	165.27*
	25	0.67*	1.39*	2.17*	3.03*	3.99*	5.08*	7.09*	9.40*	12.93*	77.27*	320.85*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.0 Ft (RADIUS = 0.0 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	0.56*	1.14*	1.75*	2.40*	3.09*	3.82*	5.05*	6.23*	7.59*	18.79*	70.90*
	20	0.63*	1.30*	2.02*	2.79*	3.63*	4.56*	6.17*	7.83*	9.95*	40.35*	165.27*
	25	0.70*	1.45*	2.27*	3.17*	4.17*	5.30*	7.39*	9.75*	13.28*	77.27*	320.85*
1200	15	0.58*	1.18*	1.82*	2.49*	3.21*	3.98*	5.26*	6.47*	7.88*	19.05*	70.90*
	20	0.66*	1.35*	2.10*	2.91*	3.78*	4.75*	6.42*	8.13*	10.29*	40.35*	165.27*
	25	0.72*	1.51*	2.36*	3.30*	4.34*	5.52*	7.68*	10.09*	13.63*	77.27*	320.85*
1300	15	0.60*	1.22*	1.88*	2.58*	3.33*	4.13*	5.45*	6.71*	8.16*	19.33*	70.90*
	20	0.68*	1.40*	2.18*	3.02*	3.93*	4.93*	6.66*	8.41*	10.63*	40.36*	165.27*
	25	0.75*	1.57*	2.45*	3.43*	4.51*	5.73*	7.96*	10.42*	13.98*	77.27*	320.85*
1400	15	0.62*	1.27*	1.95*	2.67*	3.45*	4.27*	5.64*	6.94*	8.43*	19.63*	70.90*
	20	0.70*	1.45*	2.26*	3.12*	4.07*	5.10*	6.89*	8.70*	10.95*	40.36*	165.27*
	25	0.78*	1.62*	2.54*	3.55*	4.67*	5.94*	8.23*	10.74*	14.32*	77.27*	320.85*
1500	15	0.64*	1.30*	2.01*	2.76*	3.56*	4.41*	5.83*	7.16*	8.70*	19.93*	70.90*
	20	0.72*	1.50*	2.33*	3.23*	4.20*	5.27*	7.12*	8.97*	11.27*	40.37*	165.27*
	25	0.80*	1.68*	2.63*	3.67*	4.83*	6.14*	8.49*	11.05*	14.66*	77.27*	320.85*
1600	15	0.65*	1.34*	2.07*	2.85*	3.67*	4.55*	6.01*	7.38*	8.95*	20.24*	70.90*
	20	0.74*	1.54*	2.40*	3.33*	4.34*	5.44*	7.34*	9.23*	11.58*	40.38*	165.27*
	25	0.83*	1.73*	2.71*	3.79*	4.98*	6.33*	8.75*	11.36*	15.00*	77.27*	320.85*
1700	15	0.67*	1.38*	2.13*	2.93*	3.78*	4.68*	6.18*	7.59*	9.20*	20.56*	70.90*
	20	0.76*	1.59*	2.48*	3.43*	4.47*	5.60*	7.55*	9.49*	11.88*	40.40*	165.27*
	25	0.85*	1.78*	2.80*	3.91*	5.13*	6.52*	9.00*	11.66*	15.33*	77.27*	320.85*
1800	15	0.69*	1.42*	2.19*	3.01*	3.88*	4.81*	6.35*	7.80*	9.45*	20.88*	70.90*
	20	0.78*	1.63*	2.54*	3.53*	4.59*	5.76*	7.76*	9.74*	12.18*	40.42*	165.27*
	25	0.87*	1.83*	2.88*	4.02*	5.28*	6.70*	9.24*	11.95*	15.65*	77.27*	320.85*
1900	15	0.70*	1.45*	2.25*	3.09*	3.98*	4.94*	6.52*	8.00*	9.68*	21.20*	70.90*
	20	0.80*	1.68*	2.61*	3.62*	4.72*	5.91*	7.96*	9.99*	12.46*	40.45*	165.27*
	25	0.89*	1.88*	2.95*	4.13*	5.42*	6.88*	9.47*	12.23*	15.97*	77.27*	320.85*
2000	15	0.72*	1.49*	2.30*	3.16*	4.08*	5.06*	6.68*	8.20*	9.92*	21.52*	70.90*
	20	0.82*	1.72*	2.68*	3.71*	4.84*	6.06*	8.16*	10.23*	12.74*	40.49*	165.27*
	25	0.92*	1.93*	3.03*	4.23*	5.56*	7.05*	9.71*	12.51*	16.28*	77.27*	320.85*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.0 Ft (RADIUS = 0.0 Ft)
 FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE
 TIME INDEX
 (Ft*s)^{1/2}

CEILING HEIGHT, Ft

RATE
 OF RISE
 °F/min

	4	8	12	16	20	24	30	35	40	60	80
100	0.43* 0.46* 0.50*	0.84* 0.94* 1.03*	1.30* 1.49* 1.70*	1.84* 2.24* 2.79*	2.58* 3.63* 5.87*	3.88* 7.37* 13.42*	9.40* 20.59* 39.05*	19.05* 43.25* 83.15*	35.97* 83.16* 160.95*	263.60* 621.91* 1212.6*	1104.5* 2614.4* 5103.8*
200	0.52* 0.57* 0.63*	1.05* 1.19* 1.32*	1.64* 1.90* 2.17*	2.32* 2.82* 3.42*	3.20* 4.24* 6.06*	4.50* 7.44* 13.42*	9.41* 20.59* 39.05*	19.05* 43.25* 83.15*	35.97* 83.16* 160.95*	263.60* 621.91* 1212.6*	1104.5* 2614.4* 5103.8*
300	0.59* 0.66* 0.73*	1.21* 1.38* 1.55*	1.90* 2.23* 2.56*	2.71* 3.29* 3.96*	3.70* 4.81* 6.50*	5.09* 7.74* 13.42*	9.54* 20.59* 39.05*	19.05* 43.25* 83.15*	35.97* 83.16* 160.95*	263.60* 621.91* 1212.6*	1104.5* 2614.4* 5103.8*
400	0.66* 0.74* 0.82*	1.36* 1.56* 1.75*	2.14* 2.51* 2.89*	3.04* 3.69* 4.42*	4.14* 5.33* 7.00*	5.62* 8.17* 13.46*	9.85* 20.59* 39.05*	19.05* 43.25* 83.15*	35.97* 83.16* 160.95*	263.60* 621.91* 1212.6*	1104.5* 2614.4* 5103.8*
500	0.72* 0.81* 0.90*	1.49* 1.71* 1.93*	2.35* 2.76* 3.18*	3.34* 4.06* 4.85*	4.54* 5.80* 7.49*	6.10* 8.64* 13.57*	10.25* 20.60* 39.05*	19.06* 43.25* 83.15*	35.97* 83.16* 160.95*	263.60* 621.91* 1212.6*	1104.5* 2614.4* 5103.8*
600	0.77* 0.88* 0.97*	1.61* 1.86* 2.10*	2.54* 3.00* 3.46*	3.61* 4.39* 5.24*	4.90* 6.24* 7.96*	6.55* 9.11* 13.77*	10.69* 20.61* 39.05*	19.10* 43.25* 83.15*	35.97* 83.16* 160.95*	263.60* 621.91* 1212.6*	1104.5* 2614.4* 5103.8*
700	0.82* 0.94* 1.04*	1.72* 1.99* 2.25*	2.72* 3.22* 3.71*	3.87* 4.70* 5.60*	5.24* 6.65* 8.41*	6.97* 9.57* 14.04*	11.14* 20.66* 39.05*	19.19* 43.25* 83.15*	35.97* 83.16* 160.95*	263.60* 621.91* 1212.6*	1104.5* 2614.4* 5103.8*
800	0.87* 0.99* 1.11*	1.82* 2.12* 2.40*	2.89* 3.42* 3.95*	4.11* 4.99* 5.94*	5.55* 7.03* 8.84*	7.37* 10.02* 14.35*	11.59* 20.74* 39.05*	19.34* 43.25* 83.15*	35.97* 83.16* 160.95*	263.60* 621.91* 1212.6*	1104.5* 2614.4* 5103.8*
900	0.92* 1.05* 1.17*	1.92* 2.24* 2.54*	3.05* 3.62* 4.17*	4.34* 5.27* 6.27*	5.85* 7.40* 9.26*	7.75* 10.45* 14.70*	12.04* 20.87* 39.05*	19.54* 43.25* 83.15*	35.98* 83.16* 160.95*	263.60* 621.91* 1212.6*	1104.5* 2614.4* 5103.8*
1000	0.96* 1.10* 1.23*	2.02* 2.35* 2.67*	3.20* 3.80* 4.39*	4.55* 5.54* 6.57*	6.14* 7.75* 9.66*	8.10* 10.87* 15.07*	12.47* 21.04* 39.05*	19.78* 43.25* 83.15*	35.98* 83.16* 160.95*	263.60* 621.91* 1212.6*	1104.5* 2614.4* 5103.8*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 0.0 Ft (RADIUS = 0.0 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	1.00*	2.11*	3.35*	4.76*	6.42*	8.45*	12.89*	20.06*	35.99*	263.60*	1104.5*
	20	1.15*	2.46*	3.98*	5.79*	8.08*	11.28*	21.25*	43.25*	83.16*	621.91*	2614.4*
	25	1.29*	2.80*	4.60*	6.87*	10.04*	15.44*	39.06*	83.15*	160.95*	1212.6*	5103.8*
1200	15	1.04*	2.20*	3.49*	4.96*	6.68*	8.78*	13.30*	20.36*	36.00*	263.60*	1104.5*
	20	1.20*	2.57*	4.15*	6.04*	8.40*	11.67*	21.50*	43.25*	83.16*	621.91*	2614.4*
	25	1.34*	2.92*	4.80*	7.16*	10.41*	15.82*	39.06*	83.15*	160.95*	1212.6*	5103.8*
1300	15	1.08*	2.29*	3.63*	5.16*	6.94*	9.10*	13.71*	20.69*	36.03*	263.60*	1104.5*
	20	1.25*	2.67*	4.32*	6.27*	8.72*	12.05*	21.77*	43.25*	83.16*	621.91*	2614.4*
	25	1.40*	3.04*	4.99*	7.43*	10.77*	16.20*	39.07*	83.15*	160.95*	1212.6*	5103.8*
1400	15	1.12*	2.37*	3.76*	5.34*	7.19*	9.41*	14.10*	21.03*	36.07*	263.60*	1104.5*
	20	1.29*	2.77*	4.48*	6.50*	9.02*	12.42*	22.06*	43.26*	83.16*	621.91*	2614.4*
	25	1.45*	3.15*	5.18*	7.70*	11.12*	16.58*	39.08*	83.15*	160.95*	1212.6*	5103.8*
1500	15	1.16*	2.45*	3.89*	5.53*	7.43*	9.72*	14.48*	21.37*	36.13*	263.60*	1104.5*
	20	1.33*	2.87*	4.63*	6.72*	9.31*	12.78*	22.37*	43.27*	83.16*	621.91*	2614.4*
	25	1.50*	3.26*	5.36*	7.96*	11.46*	16.95*	39.10*	83.15*	160.95*	1212.6*	5103.8*
1600	15	1.19*	2.53*	4.02*	5.70*	7.66*	10.01*	14.86*	21.73*	36.20*	263.60*	1104.5*
	20	1.38*	2.96*	4.79*	6.94*	9.60*	13.13*	22.69*	43.29*	83.16*	621.91*	2614.4*
	25	1.55*	3.37*	5.53*	8.21*	11.79*	17.32*	39.13*	83.15*	160.95*	1212.6*	5103.8*
1700	15	1.23*	2.60*	4.14*	5.88*	7.89*	10.29*	15.22*	22.08*	36.29*	263.60*	1104.5*
	20	1.42*	3.05*	4.93*	7.15*	9.87*	13.48*	23.01*	43.31*	83.16*	621.91*	2614.4*
	25	1.59*	3.48*	5.71*	8.45*	12.11*	17.69*	39.18*	83.15*	160.95*	1212.6*	5103.8*
1800	15	1.26*	2.68*	4.26*	6.04*	8.11*	10.57*	15.58*	22.44*	36.40*	263.60*	1104.5*
	20	1.46*	3.14*	5.08*	7.35*	10.14*	13.81*	23.34*	43.34*	83.16*	621.91*	2614.4*
	25	1.64*	3.58*	5.87*	8.69*	12.42*	18.05*	39.23*	83.15*	160.95*	1212.6*	5103.8*
1900	15	1.29*	2.75*	4.38*	6.21*	8.32*	10.84*	15.93*	22.80*	36.54*	263.60*	1104.5*
	20	1.50*	3.23*	5.22*	7.55*	10.41*	14.14*	23.68*	43.39*	83.16*	621.91*	2614.4*
	25	1.69*	3.68*	6.04*	8.93*	12.73*	18.41*	39.30*	83.15*	160.95*	1212.6*	5103.8*
2000	15	1.33*	2.82*	4.49*	6.37*	8.54*	11.11*	16.28*	23.16*	36.68*	263.60*	1104.5*
	20	1.54*	3.32*	5.36*	7.75*	10.67*	14.46*	24.02*	43.44*	83.16*	621.91*	2614.4*
	25	1.73*	3.78*	6.20*	9.16*	13.03*	18.76*	39.38*	83.15*	160.95*	1212.6*	5103.8*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.0 Ft (RADIUS = 1.4 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	0.18	0.28*	0.38*	0.47*	0.56*	0.66*	0.79*	0.91*	1.02*	1.50*	2.04*
	20	0.19	0.29*	0.39*	0.49*	0.59*	0.69*	0.84*	0.97*	1.10*	1.65*	2.36*
	25	0.19	0.30*	0.41*	0.52*	0.62*	0.73*	0.89*	1.03*	1.17*	1.82*	2.83*
200	15	0.20	0.31*	0.42*	0.53*	0.64*	0.75*	0.91*	1.05*	1.18*	1.76*	2.40*
	20	0.21	0.33*	0.45*	0.57*	0.69*	0.80*	0.98*	1.14*	1.29*	1.97*	2.80*
	25	0.22	0.35*	0.47*	0.60*	0.73*	0.86*	1.05*	1.22*	1.40*	2.18*	3.29*
300	15	0.21	0.34*	0.46*	0.58*	0.70*	0.82*	1.00*	1.16*	1.31*	1.96*	2.69*
	20	0.23	0.36*	0.49*	0.63*	0.76*	0.89*	1.10*	1.27*	1.45*	2.22*	3.15*
	25	0.24	0.38*	0.52*	0.67*	0.81*	0.96*	1.18*	1.38*	1.58*	2.48*	3.69*
400	15	0.23	0.36*	0.49*	0.62*	0.75*	0.89*	1.09*	1.25*	1.42*	2.14*	2.95*
	20	0.24	0.39*	0.53*	0.68*	0.82*	0.97*	1.19*	1.39*	1.58*	2.43*	3.46*
	25	0.26	0.41*	0.57*	0.73*	0.89*	1.05*	1.30*	1.51*	1.73*	2.73*	4.05*
500	15	0.24	0.38*	0.52*	0.66*	0.80*	0.94*	1.16*	1.34*	1.53*	2.30*	3.17*
	20	0.26	0.41*	0.57*	0.72*	0.88*	1.04*	1.28*	1.49*	1.70*	2.63*	3.74*
	25	0.27	0.44*	0.61*	0.78*	0.95*	1.13*	1.40*	1.63*	1.88*	2.96*	4.37*
600	15	0.25	0.40*	0.55*	0.70*	0.85*	1.00*	1.23*	1.42*	1.62*	2.45*	3.38*
	20	0.27	0.43*	0.60*	0.77*	0.93*	1.10*	1.37*	1.59*	1.82*	2.81*	3.99*
	25	0.29	0.46*	0.65*	0.83*	1.01*	1.20*	1.49*	1.75*	2.01*	3.17*	4.66*
700	15	0.26	0.42*	0.57*	0.73*	0.89*	1.05*	1.29*	1.50*	1.71*	2.59*	3.58*
	20	0.28	0.45*	0.63*	0.81*	0.98*	1.16*	1.44*	1.68*	1.92*	2.97*	4.23*
	25	0.30	0.49*	0.68*	0.87*	1.07*	1.27*	1.58*	1.85*	2.13*	3.36*	4.94*
800	15	0.27	0.43*	0.60*	0.76*	0.93*	1.10*	1.35*	1.57*	1.79*	2.72*	3.76*
	20	0.29	0.47*	0.66*	0.84*	1.03*	1.22*	1.51*	1.76*	2.02*	3.13*	4.45*
	25	0.32	0.51*	0.71*	0.92*	1.13*	1.34*	1.66*	1.95*	2.24*	3.55*	5.20*
900	15	0.28	0.45*	0.62*	0.79*	0.97*	1.14*	1.41*	1.64*	1.87*	2.84*	3.93*
	20	0.31	0.49*	0.68*	0.88*	1.08*	1.28*	1.58*	1.84*	2.11*	3.28*	4.66*
	25	0.33	0.53*	0.74*	0.96*	1.18*	1.40*	1.74*	2.04*	2.35*	3.72*	5.44*
1000	15	0.29	0.46*	0.64*	0.82*	1.00*	1.19*	1.46*	1.70*	1.94*	2.96*	4.10*
	20	0.32	0.51*	0.71*	0.91*	1.12*	1.33*	1.65*	1.92*	2.20*	3.42*	4.86*
	25	0.34	0.55*	0.77*	1.00*	1.23*	1.46*	1.82*	2.13*	2.45*	3.89*	5.68*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.0 Ft (RADIUS = 1.4 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
1100	15	0.30	0.48*	0.66*	0.85*	1.04*	1.23*	1.52*	1.76*	2.01*	3.07*	4.25*	
	20	0.33	0.53*	0.73*	0.95*	1.16*	1.38*	1.71*	2.00*	2.29*	3.56*	5.05*	
	25	0.35	0.57*	0.80*	1.03*	1.27*	1.52*	1.89*	2.22*	2.55*	4.04*	5.90*	
1200	15	0.31	0.49*	0.68*	0.88*	1.07*	1.27*	1.57*	1.82*	2.08*	3.18*	4.41*	
	20	0.34	0.54*	0.76*	0.98*	1.20*	1.42*	1.77*	2.07*	2.37*	3.69*	5.24*	
	25	0.36	0.59*	0.83*	1.07*	1.32*	1.57*	1.96*	2.30*	2.65*	4.20*	6.12*	
1300	15	0.31	0.50*	0.70*	0.90*	1.10*	1.31*	1.61*	1.88*	2.15*	3.28*	4.55*	
	20	0.35	0.56*	0.78*	1.01*	1.24*	1.47*	1.83*	2.14*	2.45*	3.82*	5.42*	
	25	0.37	0.61*	0.85*	1.11*	1.36*	1.62*	2.03*	2.38*	2.74*	4.34*	6.33*	
1400	15	0.32	0.52*	0.72*	0.93*	1.13*	1.34*	1.66*	1.93*	2.21*	3.39*	4.70*	
	20	0.35	0.57*	0.80*	1.04*	1.27*	1.52*	1.89*	2.20*	2.53*	3.94*	5.59*	
	25	0.38	0.63*	0.88*	1.14*	1.40*	1.68*	2.09*	2.45*	2.83*	4.49*	6.53*	
1500	15	0.33	0.53*	0.74*	0.95*	1.16*	1.38*	1.71*	1.99*	2.27*	3.49*	4.83*	
	20	0.36	0.59*	0.83*	1.07*	1.31*	1.56*	1.94*	2.27*	2.60*	4.06*	5.76*	
	25	0.39	0.64*	0.91*	1.17*	1.45*	1.73*	2.16*	2.53*	2.92*	4.63*	6.73*	
1600	15	0.34	0.54*	0.76*	0.97*	1.19*	1.41*	1.75*	2.04*	2.34*	3.58*	4.97*	
	20	0.37	0.60*	0.85*	1.09*	1.35*	1.60*	1.99*	2.33*	2.68*	4.18*	5.92*	
	25	0.40	0.66*	0.93*	1.20*	1.49*	1.77*	2.22*	2.60*	3.00*	4.76*	6.92*	
1700	15	0.34	0.55*	0.77*	1.00*	1.22*	1.45*	1.80*	2.09*	2.39*	3.67*	5.10*	
	20	0.38	0.62*	0.87*	1.12*	1.38*	1.64*	2.05*	2.39*	2.75*	4.29*	6.08*	
	25	0.41	0.68*	0.95*	1.24*	1.53*	1.82*	2.28*	2.67*	3.08*	4.89*	7.10*	
1800	15	0.35	0.57*	0.79*	1.02*	1.25*	1.48*	1.84*	2.14*	2.45*	3.77*	5.23*	
	20	0.39	0.63*	0.89*	1.15*	1.41*	1.68*	2.10*	2.45*	2.82*	4.40*	6.24*	
	25	0.42	0.69*	0.98*	1.27*	1.56*	1.87*	2.34*	2.74*	3.16*	5.02*	7.29*	
1900	15	0.36	0.58*	0.81*	1.04*	1.28*	1.52*	1.88*	2.19*	2.51*	3.86*	5.35*	
	20	0.40	0.65*	0.91*	1.17*	1.45*	1.72*	2.15*	2.51*	2.89*	4.51*	6.39*	
	25	0.43	0.71*	1.00*	1.30*	1.60*	1.91*	2.39*	2.81*	3.24*	5.15*	7.46*	
2000	15	0.36	0.59*	0.82*	1.06*	1.30*	1.55*	1.92*	2.24*	2.57*	3.94*	5.47*	
	20	0.40	0.66*	0.93*	1.20*	1.48*	1.76*	2.20*	2.57*	2.95*	4.61*	6.54*	
	25	0.44	0.72*	1.02*	1.33*	1.64*	1.96*	2.45*	2.88*	3.32*	5.27*	7.64*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.0 Ft (RADIUS = 1.4 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	0.26	0.41*	0.56*	0.71*	0.86*	1.01*	1.25*	1.45*	1.67*	2.85*	6.40*
	20	0.28	0.44*	0.60*	0.76*	0.93*	1.10*	1.38*	1.63*	1.91*	4.13*	13.03*
	25	0.29	0.46*	0.64*	0.81*	1.00*	1.19*	1.52*	1.82*	2.20*	6.77*	23.95*
200	15	0.30	0.48*	0.66*	0.84*	1.02*	1.20*	1.49*	1.75*	2.02*	3.38*	6.49*
	20	0.32	0.51*	0.71*	0.91*	1.12*	1.33*	1.68*	1.99*	2.33*	4.51*	13.03*
	25	0.34	0.55*	0.76*	0.99*	1.22*	1.46*	1.86*	2.24*	2.68*	6.80*	23.95*
300	15	0.33	0.53*	0.73*	0.94*	1.14*	1.36*	1.69*	1.98*	2.29*	3.82*	6.79*
	20	0.36	0.58*	0.80*	1.03*	1.27*	1.52*	1.92*	2.27*	2.66*	4.97*	13.03*
	25	0.38	0.62*	0.87*	1.13*	1.39*	1.68*	2.14*	2.57*	3.07*	6.99*	23.95*
400	15	0.36	0.57*	0.80*	1.02*	1.25*	1.49*	1.86*	2.18*	2.53*	4.20*	7.18*
	20	0.39	0.63*	0.88*	1.14*	1.40*	1.68*	2.12*	2.52*	2.95*	5.40*	13.04*
	25	0.42	0.68*	0.96*	1.25*	1.55*	1.86*	2.38*	2.86*	3.41*	7.30*	23.95*
500	15	0.38	0.61*	0.86*	1.10*	1.35*	1.61*	2.01*	2.37*	2.74*	4.55*	7.58*
	20	0.42	0.68*	0.95*	1.23*	1.52*	1.83*	2.31*	2.74*	3.21*	5.80*	13.09*
	25	0.45	0.74*	1.04*	1.35*	1.68*	2.03*	2.60*	3.12*	3.71*	7.66*	23.95*
600	15	0.40	0.65*	0.91*	1.17*	1.44*	1.72*	2.16*	2.54*	2.94*	4.87*	7.98*
	20	0.45	0.72*	1.02*	1.32*	1.63*	1.96*	2.48*	2.95*	3.45*	6.18*	13.19*
	25	0.48	0.79*	1.11*	1.45*	1.81*	2.19*	2.80*	3.36*	3.99*	8.03*	23.95*
700	15	0.42	0.69*	0.96*	1.24*	1.53*	1.82*	2.29*	2.69*	3.12*	5.16*	8.36*
	20	0.47	0.76*	1.08*	1.40*	1.74*	2.08*	2.64*	3.14*	3.67*	6.53*	13.36*
	25	0.51	0.84*	1.19*	1.55*	1.93*	2.33*	2.98*	3.58*	4.25*	8.39*	23.95*
800	15	0.44	0.72*	1.01*	1.31*	1.61*	1.92*	2.41*	2.84*	3.29*	5.44*	8.73*
	20	0.49	0.80*	1.14*	1.48*	1.83*	2.20*	2.79*	3.31*	3.88*	6.87*	13.57*
	25	0.54	0.88*	1.25*	1.64*	2.04*	2.47*	3.16*	3.79*	4.49*	8.75*	23.95*
900	15	0.46	0.75*	1.06*	1.37*	1.69*	2.01*	2.53*	2.98*	3.46*	5.71*	9.09*
	20	0.51	0.84*	1.19*	1.55*	1.92*	2.31*	2.93*	3.48*	4.08*	7.19*	13.82*
	25	0.56	0.92*	1.31*	1.72*	2.15*	2.60*	3.32*	3.99*	4.72*	9.10*	23.96*
1000	15	0.48	0.78*	1.10*	1.42*	1.76*	2.10*	2.64*	3.11*	3.61*	5.96*	9.43*
	20	0.54	0.88*	1.24*	1.62*	2.01*	2.42*	3.07*	3.65*	4.27*	7.49*	14.09*
	25	0.59	0.97*	1.37*	1.80*	2.25*	2.72*	3.48*	4.18*	4.94*	9.43*	23.98*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.0 Ft (RADIUS = 1.4 Ft)
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE
TIME INDEX

CEILING HEIGHT, Ft

RATE
OF RISE

(Ft*s)^{1/2}

°F/min

4

8

12

16

20

24

30

35

40

60

80

1100	15	0.50	0.81*	1.14*	1.48*	1.83*	2.19*	2.75*	3.24*	3.76*	6.20*	9.76*
	20	0.56	0.91*	1.29*	1.69*	2.09*	2.52*	3.20*	3.80*	4.45*	7.79*	14.38*
	25	0.61	1.01*	1.43*	1.88*	2.34*	2.84*	3.63*	4.36*	5.16*	9.76*	24.01*
1200	15	0.51	0.84*	1.18*	1.53*	1.90*	2.27*	2.85*	3.37*	3.90*	6.43*	10.08*
	20	0.58	0.95*	1.34*	1.75*	2.18*	2.62*	3.32*	3.95*	4.63*	8.07*	14.67*
	25	0.63	1.04*	1.49*	1.95*	2.44*	2.95*	3.78*	4.53*	5.36*	10.08*	24.06*
1300	15	0.53	0.87*	1.22*	1.59*	1.96*	2.35*	2.95*	3.48*	4.04*	6.66*	10.39*
	20	0.59	0.98*	1.39*	1.81*	2.25*	2.71*	3.44*	4.10*	4.80*	8.34*	14.97*
	25	0.65	1.08*	1.54*	2.02*	2.53*	3.06*	3.92*	4.70*	5.56*	10.39*	24.12*
1400	15	0.55	0.89*	1.26*	1.64*	2.02*	2.43*	3.05*	3.60*	4.18*	6.87*	10.70*
	20	0.61	1.01*	1.43*	1.87*	2.33*	2.81*	3.56*	4.24*	4.96*	8.61*	15.28*
	25	0.67	1.12*	1.59*	2.09*	2.62*	3.17*	4.05*	4.86*	5.75*	10.69*	24.21*
1500	15	0.56	0.92*	1.30*	1.69*	2.09*	2.50*	3.15*	3.71*	4.31*	7.08*	10.99*
	20	0.63	1.04*	1.48*	1.93*	2.40*	2.89*	3.68*	4.37*	5.12*	8.86*	15.58*
	25	0.70	1.15*	1.64*	2.16*	2.70*	3.27*	4.19*	5.02*	5.93*	10.98*	24.31*
1600	15	0.57	0.94*	1.33*	1.73*	2.15*	2.57*	3.24*	3.82*	4.44*	7.29*	11.28*
	20	0.65	1.07*	1.52*	1.99*	2.47*	2.98*	3.79*	4.50*	5.27*	9.11*	15.88*
	25	0.72	1.18*	1.69*	2.22*	2.78*	3.37*	4.31*	5.17*	6.11*	11.27*	24.44*
1700	15	0.59	0.97*	1.37*	1.78*	2.20*	2.64*	3.33*	3.93*	4.56*	7.49*	11.56*
	20	0.67	1.10*	1.56*	2.04*	2.54*	3.07*	3.89*	4.63*	5.42*	9.36*	16.18*
	25	0.73	1.22*	1.74*	2.29*	2.86*	3.47*	4.44*	5.32*	6.29*	11.54*	24.58*
1800	15	0.60	0.99*	1.40*	1.82*	2.26*	2.71*	3.42*	4.03*	4.68*	7.68*	11.83*
	20	0.68	1.13*	1.60*	2.10*	2.61*	3.15*	4.00*	4.76*	5.57*	9.59*	16.48*
	25	0.75	1.25*	1.79*	2.35*	2.94*	3.56*	4.56*	5.47*	6.46*	11.82*	24.74*
1900	15	0.62	1.01*	1.43*	1.87*	2.32*	2.78*	3.50*	4.13*	4.80*	7.87*	12.10*
	20	0.70	1.15*	1.64*	2.15*	2.68*	3.23*	4.10*	4.88*	5.71*	9.83*	16.77*
	25	0.77	1.28*	1.83*	2.41*	3.02*	3.66*	4.68*	5.61*	6.62*	12.08*	24.91*
2000	15	0.63	1.03*	1.47*	1.91*	2.37*	2.84*	3.58*	4.23*	4.91*	8.06*	12.36*
	20	0.71	1.18*	1.68*	2.20*	2.74*	3.31*	4.20*	5.00*	5.85*	10.05*	17.06*
	25	0.79	1.31*	1.88*	2.47*	3.09*	3.75*	4.80*	5.75*	6.79*	12.34*	25.10*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.0 ft (RADIUS = 1.4 ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	0.40	0.64*	0.89*	1.15*	1.43*	1.74*	2.30*	2.95*	4.03*	20.72*	79.41*
	20	0.43	0.69*	0.98*	1.28*	1.63*	2.04*	2.95*	4.52*	7.62*	46.84*	185.39*
	25	0.46	0.75*	1.06*	1.42*	1.85*	2.44*	4.22*	7.72*	13.73*	89.90*	360.11*
200	15	0.48	0.77*	1.08*	1.41*	1.76*	2.15*	2.82*	3.54*	4.56*	20.72*	79.41*
	20	0.52	0.85*	1.21*	1.60*	2.04*	2.54*	3.54*	4.91*	7.65*	46.84*	185.39*
	25	0.56	0.93*	1.33*	1.79*	2.33*	3.00*	4.62*	7.74*	13.73*	89.90*	360.11*
300	15	0.54	0.87*	1.24*	1.62*	2.03*	2.47*	3.25*	4.04*	5.09*	20.72*	79.41*
	20	0.59	0.98*	1.40*	1.85*	2.36*	2.94*	4.04*	5.41*	7.85*	46.84*	185.39*
	25	0.64	1.07*	1.55*	2.08*	2.70*	3.46*	5.12*	7.91*	13.73*	89.90*	360.11*
400	15	0.59	0.97*	1.37*	1.80*	2.26*	2.76*	3.61*	4.48*	5.58*	20.72*	79.41*
	20	0.66	1.09*	1.56*	2.07*	2.64*	3.28*	4.49*	5.89*	8.19*	46.84*	185.39*
	25	0.72	1.20*	1.74*	2.34*	3.03*	3.86*	5.60*	8.22*	13.75*	89.90*	360.11*
500	15	0.64	1.05*	1.49*	1.96*	2.46*	3.01*	3.94*	4.87*	6.02*	20.72*	79.41*
	20	0.71	1.18*	1.70*	2.27*	2.89*	3.59*	4.88*	6.35*	8.59*	46.84*	185.39*
	25	0.78	1.31*	1.91*	2.57*	3.32*	4.22*	6.04*	8.59*	13.80*	89.90*	360.11*
600	15	0.68	1.12*	1.60*	2.11*	2.65*	3.24*	4.24*	5.23*	6.44*	20.73*	79.41*
	20	0.77	1.28*	1.84*	2.45*	3.12*	3.88*	5.25*	6.77*	9.01*	46.84*	185.39*
	25	0.85	1.42*	2.06*	2.78*	3.59*	4.55*	6.46*	8.99*	13.92*	89.90*	360.11*
700	15	0.72	1.20*	1.71*	2.25*	2.83*	3.46*	4.52*	5.57*	6.83*	20.75*	79.41*
	20	0.82	1.36*	1.96*	2.62*	3.34*	4.14*	5.59*	7.17*	9.42*	46.84*	185.39*
	25	0.90	1.51*	2.21*	2.97*	3.84*	4.86*	6.85*	9.40*	14.11*	89.90*	360.11*
800	15	0.76	1.26*	1.81*	2.38*	3.00*	3.67*	4.79*	5.88*	7.20*	20.81*	79.41*
	20	0.86	1.44*	2.08*	2.78*	3.54*	4.39*	5.92*	7.55*	9.82*	46.84*	185.39*
	25	0.96	1.61*	2.34*	3.16*	4.08*	5.15*	7.22*	9.79*	14.34*	89.90*	360.11*
900	15	0.80	1.33*	1.90*	2.51*	3.16*	3.86*	5.04*	6.19*	7.55*	20.89*	79.41*
	20	0.91	1.52*	2.19*	2.93*	3.73*	4.63*	6.22*	7.91*	10.22*	46.84*	185.39*
	25	1.01	1.69*	2.47*	3.33*	4.30*	5.43*	7.57*	10.18*	14.62*	89.90*	360.11*
1000	15	0.84	1.39*	1.99*	2.63*	3.31*	4.05*	5.28*	6.47*	7.88*	21.02*	79.41*
	20	0.95	1.59*	2.30*	3.07*	3.92*	4.85*	6.51*	8.26*	10.60*	46.84*	185.39*
	25	1.06	1.78*	2.60*	3.50*	4.52*	5.69*	7.91*	10.56*	14.92*	89.90*	360.11*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.0 Ft (RADIUS = 1.4 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	0.87	1.45*	2.08*	2.74*	3.45*	4.22*	5.51*	6.75*	8.20*	21.18*	79.41*
	20	0.99	1.66*	2.41*	3.21*	4.09*	5.07*	6.79*	8.59*	10.97*	46.84*	185.39*
	25	1.10	1.86*	2.72*	3.66*	4.72*	5.94*	8.24*	10.93*	15.23*	89.90*	360.11*
1200	15	0.90	1.50*	2.16*	2.85*	3.59*	4.39*	5.73*	7.01*	8.51*	21.38*	79.41*
	20	1.03	1.73*	2.50*	3.34*	4.26*	5.28*	7.06*	8.91*	11.33*	46.84*	185.39*
	25	1.15	1.94*	2.83*	3.82*	4.92*	6.19*	8.55*	11.28*	15.56*	89.90*	360.11*
1300	15	0.94	1.56*	2.24*	2.96*	3.73*	4.56*	5.94*	7.27*	8.81*	21.60*	79.41*
	20	1.07	1.79*	2.60*	3.47*	4.42*	5.48*	7.32*	9.22*	11.69*	46.84*	185.39*
	25	1.19	2.01*	2.94*	3.97*	5.11*	6.42*	8.85*	11.63*	15.89*	89.90*	360.11*
1400	15	0.97	1.61*	2.32*	3.06*	3.86*	4.72*	6.15*	7.51*	9.10*	21.85*	79.41*
	20	1.11	1.86*	2.69*	3.60*	4.58*	5.67*	7.58*	9.53*	12.03*	46.84*	185.39*
	25	1.23	2.08*	3.05*	4.11*	5.29*	6.65*	9.14*	11.97*	16.22*	89.90*	360.11*
1500	15	1.00	1.66*	2.39*	3.16*	3.99*	4.87*	6.35*	7.75*	9.38*	22.11*	79.41*
	20	1.14	1.92*	2.78*	3.72*	4.74*	5.86*	7.82*	9.82*	12.36*	46.84*	185.39*
	25	1.28	2.16*	3.15*	4.25*	5.47*	6.87*	9.43*	12.30*	16.56*	89.90*	360.11*
1600	15	1.03	1.71*	2.46*	3.26*	4.11*	5.03*	6.54*	7.99*	9.66*	22.39*	79.41*
	20	1.18	1.98*	2.87*	3.84*	4.89*	6.05*	8.06*	10.10*	12.69*	46.84*	185.39*
	25	1.32	2.22*	3.25*	4.39*	5.65*	7.08*	9.71*	12.63*	16.89*	89.90*	360.11*
1700	15	1.06	1.76*	2.53*	3.36*	4.23*	5.17*	6.73*	8.21*	9.92*	22.67*	79.41*
	20	1.21	2.04*	2.96*	3.95*	5.03*	6.22*	8.29*	10.38*	13.00*	46.85*	185.39*
	25	1.35	2.29*	3.35*	4.52*	5.82*	7.29*	9.98*	12.94*	17.22*	89.90*	360.11*
1800	15	1.08	1.81*	2.60*	3.45*	4.35*	5.32*	6.92*	8.44*	10.18*	22.97*	79.41*
	20	1.24	2.09*	3.04*	4.06*	5.17*	6.40*	8.51*	10.65*	13.32*	46.85*	185.39*
	25	1.39	2.36*	3.45*	4.65*	5.98*	7.49*	10.24*	13.25*	17.54*	89.90*	360.11*
1900	15	1.11	1.85*	2.67*	3.54*	4.46*	5.46*	7.10*	8.65*	10.43*	23.26*	79.41*
	20	1.28	2.15*	3.12*	4.17*	5.31*	6.57*	8.74*	10.91*	13.62*	46.86*	185.39*
	25	1.43	2.42*	3.54*	4.78*	6.14*	7.69*	10.49*	13.55*	17.87*	89.90*	360.11*
2000	15	1.14	1.90*	2.74*	3.63*	4.58*	5.59*	7.28*	8.86*	10.68*	23.57*	79.41*
	20	1.31	2.20*	3.20*	4.28*	5.45*	6.74*	8.95*	11.17*	13.92*	46.88*	185.39*
	25	1.47	2.48*	3.64*	4.90*	6.30*	7.88*	10.75*	13.85*	18.19*	89.90*	360.11*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.0 Ft (RADIUS = 1.4 Ft)
 FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	RATE OF RISE °F/min	CEILING HEIGHT, Ft									
		4	8	12	16	20	24	30	35	40	80
(Ft*s) ^{1/2} 100	15	0.64	1.06*	1.55*	2.16*	3.08*	5.02*	12.34*	24.36*	44.88*	307.17*
	20	0.70	1.19*	1.82*	2.76*	4.96*	10.31*	27.48*	55.76*	104.19*	725.12*
	25	0.76	1.33*	2.13*	3.78*	8.72*	19.11*	52.46*	107.53*	201.98*	1414.2*
200	15	0.79	1.33*	1.96*	2.72*	3.75*	5.46*	12.34*	24.36*	44.88*	307.17*
	20	0.89	1.52*	2.32*	3.41*	5.36*	10.32*	27.48*	55.76*	104.19*	725.12*
	25	0.98	1.71*	2.71*	4.36*	8.74*	19.11*	52.46*	107.53*	201.98*	1414.2*
300	15	0.92	1.55*	2.29*	3.17*	4.31*	6.03*	12.36*	24.36*	44.88*	307.17*
	20	1.04	1.79*	2.72*	3.95*	5.91*	10.38*	27.48*	55.76*	104.19*	725.12*
	25	1.15	2.02*	3.18*	4.94*	8.89*	19.11*	52.46*	107.53*	201.98*	1414.2*
400	15	1.03	1.74*	2.57*	3.56*	4.80*	6.58*	12.47*	24.36*	44.88*	307.17*
	20	1.17	2.02*	3.06*	4.42*	6.45*	10.59*	27.48*	55.76*	104.19*	725.12*
	25	1.30	2.29*	3.58*	5.46*	9.21*	19.11*	52.46*	107.53*	201.98*	1414.2*
500	15	1.13	1.91*	2.83*	3.90*	5.25*	7.10*	12.69*	24.36*	44.88*	307.17*
	20	1.29	2.22*	3.37*	4.84*	6.96*	10.92*	27.48*	55.76*	104.19*	725.12*
	25	1.44	2.53*	3.94*	5.94*	9.61*	19.12*	52.46*	107.53*	201.98*	1414.2*
600	15	1.22	2.07*	3.06*	4.22*	5.66*	7.58*	13.01*	24.36*	44.88*	307.17*
	20	1.39	2.41*	3.66*	5.23*	7.44*	11.31*	27.49*	55.76*	104.19*	725.12*
	25	1.56	2.75*	4.27*	6.39*	10.05*	19.15*	52.46*	107.53*	201.98*	1414.2*
700	15	1.30	2.21*	3.28*	4.52*	6.04*	8.04*	13.38*	24.38*	44.88*	307.17*
	20	1.50	2.59*	3.92*	5.59*	7.89*	11.74*	27.49*	55.76*	104.19*	725.12*
	25	1.68	2.95*	4.58*	6.81*	10.50*	19.22*	52.46*	107.53*	201.98*	1414.2*
800	15	1.38	2.35*	3.48*	4.80*	6.40*	8.48*	13.78*	24.41*	44.88*	307.17*
	20	1.59	2.75*	4.17*	5.93*	8.32*	12.17*	27.50*	55.76*	104.19*	725.12*
	25	1.79	3.14*	4.88*	7.21*	10.94*	19.33*	52.46*	107.53*	201.98*	1414.2*
900	15	1.46	2.48*	3.68*	5.07*	6.74*	8.89*	14.19*	24.48*	44.88*	307.17*
	20	1.68	2.91*	4.41*	6.26*	8.73*	12.60*	27.52*	55.76*	104.19*	725.12*
	25	1.89	3.33*	5.15*	7.58*	11.37*	19.50*	52.46*	107.53*	201.98*	1414.2*
1000	15	1.53	2.61*	3.87*	5.32*	7.07*	9.29*	14.61*	24.58*	44.88*	307.17*
	20	1.77	3.06*	4.64*	6.57*	9.12*	13.02*	27.56*	55.76*	104.19*	725.12*
	25	1.99	3.50*	5.42*	7.94*	11.80*	19.71*	52.46*	107.53*	201.98*	1414.2*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 2.0 Ft (RADIUS = 1.4 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	1.60	2.73*	4.04*	5.56*	7.38*	9.67*	15.03*	24.72*	44.88*	307.17*	1240.1*
	20	1.85	3.21*	4.85*	6.86*	9.50*	13.44*	27.63*	55.76*	104.19*	725.12*	2935.8*
	25	2.09	3.67*	5.67*	8.29*	12.21*	19.96*	52.46*	107.53*	201.98*	1414.2*	5731.4*
1200	15	1.66	2.84*	4.22*	5.80*	7.68*	10.03*	15.45*	24.90*	44.88*	307.17*	1240.1*
	20	1.93	3.35*	5.06*	7.15*	9.86*	13.85*	27.72*	55.76*	104.19*	725.12*	2935.8*
	25	2.18	3.83*	5.91*	8.62*	12.61*	20.24*	52.46*	107.53*	201.98*	1414.2*	5731.4*
1300	15	1.73	2.95*	4.38*	6.02*	7.97*	10.39*	15.86*	25.11*	44.89*	307.17*	1240.1*
	20	2.01	3.48*	5.26*	7.42*	10.21*	14.26*	27.84*	55.76*	104.19*	725.12*	2935.8*
	25	2.27	3.99*	6.15*	8.94*	13.00*	20.54*	52.46*	107.53*	201.98*	1414.2*	5731.4*
1400	15	1.79	3.06*	4.54*	6.24*	8.25*	10.73*	16.26*	25.35*	44.89*	307.17*	1240.1*
	20	2.08	3.61*	5.46*	7.69*	10.55*	14.65*	27.99*	55.76*	104.19*	725.12*	2935.8*
	25	2.35	4.14*	6.37*	9.25*	13.39*	20.85*	52.46*	107.53*	201.98*	1414.2*	5731.4*
1500	15	1.85	3.17*	4.70*	6.45*	8.52*	11.07*	16.66*	25.61*	44.90*	307.17*	1240.1*
	20	2.16	3.74*	5.65*	7.95*	10.88*	15.04*	28.17*	55.76*	104.19*	725.12*	2935.8*
	25	2.44	4.28*	6.59*	9.55*	13.76*	21.18*	52.46*	107.53*	201.98*	1414.2*	5731.4*
1600	15	1.91	3.27*	4.85*	6.66*	8.78*	11.39*	17.05*	25.89*	44.92*	307.17*	1240.1*
	20	2.23	3.86*	5.83*	8.20*	11.21*	15.42*	28.37*	55.76*	104.19*	725.12*	2935.8*
	25	2.52	4.43*	6.81*	9.84*	14.12*	21.52*	52.46*	107.53*	201.98*	1414.2*	5731.4*
1700	15	1.97	3.37*	5.00*	6.86*	9.04*	11.71*	17.43*	26.18*	44.94*	307.17*	1240.1*
	20	2.30	3.98*	6.01*	8.44*	11.52*	15.79*	28.59*	55.76*	104.19*	725.12*	2935.8*
	25	2.60	4.57*	7.02*	10.13*	14.48*	21.86*	52.47*	107.53*	201.98*	1414.2*	5731.4*
1800	15	2.03	3.47*	5.14*	7.05*	9.29*	12.02*	17.81*	26.49*	44.98*	307.17*	1240.1*
	20	2.36	4.10*	6.19*	8.68*	11.83*	16.15*	28.83*	55.76*	104.19*	725.12*	2935.8*
	25	2.68	4.70*	7.22*	10.41*	14.83*	22.20*	52.47*	107.53*	201.98*	1414.2*	5731.4*
1900	15	2.08	3.56*	5.29*	7.25*	9.54*	12.32*	18.18*	26.80*	45.02*	307.17*	1240.1*
	20	2.43	4.21*	6.36*	8.92*	12.12*	16.51*	29.09*	55.77*	104.19*	725.12*	2935.8*
	25	2.75	4.83*	7.42*	10.68*	15.17*	22.54*	52.48*	107.53*	201.98*	1414.2*	5731.4*
2000	15	2.14	3.66*	5.42*	7.43*	9.78*	12.61*	18.55*	27.12*	45.07*	307.17*	1240.1*
	20	2.49	4.33*	6.53*	9.14*	12.42*	16.86*	29.35*	55.78*	104.19*	725.12*	2935.8*
	25	2.83	4.96*	7.62*	10.95*	15.51*	22.89*	52.49*	107.53*	201.98*	1414.2*	5731.4*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.0 Ft (RADIUS = 2.8 Ft)
FIRE GROWTH: ULTRAFast (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	0.24	0.33	0.42*	0.51*	0.61*	0.70*	0.84*	0.95*	1.07*	1.55*	2.10*
	20	0.25	0.34	0.44*	0.54*	0.64*	0.74*	0.89*	1.02*	1.15*	1.71*	2.44*
	25	0.26	0.36	0.46*	0.57*	0.67*	0.78*	0.94*	1.08*	1.23*	1.89*	2.98*
200	15	0.27	0.37	0.48*	0.58*	0.69*	0.80*	0.96*	1.10*	1.24*	1.82*	2.47*
	20	0.28	0.39	0.51*	0.62*	0.74*	0.86*	1.04*	1.20*	1.35*	2.04*	2.89*
	25	0.30	0.41	0.54*	0.66*	0.79*	0.92*	1.12*	1.29*	1.47*	2.27*	3.43*
300	15	0.29	0.40	0.52*	0.64*	0.76*	0.88*	1.06*	1.22*	1.37*	2.03*	2.77*
	20	0.31	0.43	0.56*	0.69*	0.82*	0.96*	1.16*	1.34*	1.52*	2.30*	3.26*
	25	0.33	0.46	0.59*	0.74*	0.88*	1.03*	1.26*	1.46*	1.66*	2.58*	3.84*
400	15	0.31	0.43	0.56*	0.69*	0.82*	0.95*	1.15*	1.32*	1.49*	2.22*	3.03*
	20	0.34	0.47	0.60*	0.75*	0.90*	1.04*	1.27*	1.46*	1.66*	2.53*	3.57*
	25	0.36	0.50	0.65*	0.81*	0.97*	1.13*	1.38*	1.60*	1.82*	2.84*	4.21*
500	15	0.33	0.46	0.59*	0.73*	0.87*	1.02*	1.23*	1.41*	1.60*	2.38*	3.27*
	20	0.36	0.50	0.64*	0.80*	0.96*	1.12*	1.37*	1.58*	1.79*	2.73*	3.86*
	25	0.39	0.53	0.69*	0.87*	1.04*	1.22*	1.49*	1.73*	1.97*	3.08*	4.53*
600	15	0.35	0.48	0.62*	0.77*	0.92*	1.07*	1.30*	1.50*	1.70*	2.54*	3.48*
	20	0.38	0.52	0.68*	0.85*	1.02*	1.19*	1.45*	1.68*	1.91*	2.92*	4.12*
	25	0.41	0.57	0.74*	0.92*	1.11*	1.30*	1.59*	1.85*	2.11*	3.30*	4.84*
700	15	0.36	0.50	0.65*	0.81*	0.97*	1.13*	1.37*	1.58*	1.79*	2.68*	3.68*
	20	0.40	0.55	0.72*	0.89*	1.07*	1.26*	1.54*	1.78*	2.02*	3.09*	4.37*
	25	0.43	0.60	0.78*	0.97*	1.17*	1.37*	1.69*	1.96*	2.24*	3.50*	5.12*
800	15	0.38	0.52	0.68*	0.85*	1.01*	1.18*	1.44*	1.66*	1.88*	2.82*	3.87*
	20	0.42	0.58	0.75*	0.94*	1.13*	1.32*	1.61*	1.87*	2.13*	3.25*	4.60*
	25	0.45	0.62	0.81*	1.02*	1.23*	1.45*	1.78*	2.06*	2.36*	3.69*	5.39*
900	15	0.39	0.54	0.71*	0.88*	1.05*	1.23*	1.50*	1.73*	1.96*	2.94*	4.05*
	20	0.43	0.60	0.78*	0.98*	1.18*	1.38*	1.69*	1.95*	2.22*	3.41*	4.81*
	25	0.47	0.65	0.85*	1.07*	1.29*	1.51*	1.86*	2.16*	2.48*	3.87*	5.64*
1000	15	0.41	0.56	0.73*	0.91*	1.09*	1.28*	1.56*	1.80*	2.04*	3.07*	4.22*
	20	0.45	0.62	0.81*	1.02*	1.22*	1.43*	1.76*	2.03*	2.32*	3.56*	5.02*
	25	0.49	0.68	0.88*	1.11*	1.34*	1.58*	1.94*	2.26*	2.59*	4.05*	5.88*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.0 Ft (RADIUS = 2.8 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
1100	15	0.42	0.58	0.76*	0.94*	1.13*	1.32*	1.61*	1.86*	2.11*	3.18*	4.38*	
	20	0.47	0.64	0.84*	1.05*	1.27*	1.49*	1.82*	2.11*	2.41*	3.70*	5.22*	
	25	0.51	0.70	0.92*	1.15*	1.39*	1.64*	2.02*	2.35*	2.69*	4.21*	6.12*	
1200	15	0.43	0.60	0.78*	0.97*	1.17*	1.37*	1.67*	1.93*	2.19*	3.30*	4.54*	
	20	0.48	0.67	0.87*	1.09*	1.31*	1.54*	1.89*	2.19*	2.50*	3.84*	5.41*	
	25	0.53	0.73	0.95*	1.19*	1.45*	1.70*	2.10*	2.44*	2.79*	4.37*	6.34*	
1300	15	0.45	0.62	0.80*	1.00*	1.20*	1.41*	1.72*	1.99*	2.26*	3.41*	4.69*	
	20	0.50	0.69	0.90*	1.12*	1.35*	1.59*	1.95*	2.26*	2.58*	3.97*	5.60*	
	25	0.54	0.75	0.98*	1.23*	1.49*	1.76*	2.17*	2.52*	2.89*	4.52*	6.56*	
1400	15	0.46	0.63	0.82*	1.03*	1.24*	1.45*	1.77*	2.05*	2.33*	3.51*	4.84*	
	20	0.51	0.71	0.92*	1.16*	1.40*	1.64*	2.01*	2.33*	2.66*	4.10*	5.78*	
	25	0.56	0.77	1.01*	1.27*	1.54*	1.81*	2.24*	2.61*	2.99*	4.67*	6.77*	
1500	15	0.47	0.65	0.84*	1.06*	1.27*	1.49*	1.82*	2.10*	2.39*	3.61*	4.98*	
	20	0.52	0.72	0.95*	1.19*	1.44*	1.69*	2.07*	2.40*	2.74*	4.22*	5.95*	
	25	0.57	0.79	1.04*	1.31*	1.59*	1.87*	2.31*	2.69*	3.08*	4.82*	6.97*	
1600	15	0.48	0.66	0.87*	1.08*	1.30*	1.53*	1.87*	2.16*	2.46*	3.71*	5.12*	
	20	0.54	0.74	0.97*	1.22*	1.47*	1.73*	2.13*	2.47*	2.82*	4.34*	6.12*	
	25	0.59	0.82	1.07*	1.35*	1.63*	1.92*	2.37*	2.76*	3.17*	4.96*	7.17*	
1700	15	0.49	0.68	0.89*	1.11*	1.34*	1.57*	1.92*	2.21*	2.52*	3.81*	5.25*	
	20	0.55	0.76	1.00*	1.25*	1.51*	1.78*	2.19*	2.54*	2.90*	4.46*	6.28*	
	25	0.61	0.84	1.10*	1.38*	1.67*	1.97*	2.44*	2.84*	3.25*	5.10*	7.36*	
1800	15	0.50	0.69	0.91*	1.13*	1.37*	1.60*	1.96*	2.27*	2.58*	3.91*	5.39*	
	20	0.56	0.78	1.02*	1.28*	1.55*	1.82*	2.24*	2.60*	2.97*	4.57*	6.44*	
	25	0.62	0.86	1.12*	1.42*	1.72*	2.02*	2.50*	2.91*	3.34*	5.23*	7.54*	
1900	15	0.51	0.71	0.92*	1.16*	1.40*	1.64*	2.01*	2.32*	2.64*	4.00*	5.52*	
	20	0.58	0.80	1.04*	1.31*	1.59*	1.86*	2.29*	2.66*	3.04*	4.69*	6.60*	
	25	0.63	0.88	1.15*	1.45*	1.76*	2.07*	2.56*	2.99*	3.42*	5.36*	7.73*	
2000	15	0.52	0.72	0.94*	1.18*	1.43*	1.67*	2.05*	2.37*	2.70*	4.09*	5.64*	
	20	0.59	0.81	1.06*	1.34*	1.62*	1.91*	2.35*	2.73*	3.11*	4.80*	6.75*	
	25	0.65	0.90	1.17*	1.48*	1.80*	2.12*	2.62*	3.06*	3.50*	5.49*	7.91*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.0 Ft (RADIUS = 2.8 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	0.35	0.49	0.63*	0.78*	0.93*	1.09*	1.33*	1.54*	1.76*	3.02*	7.01*
	20	0.38	0.52	0.68*	0.84*	1.01*	1.19*	1.47*	1.73*	2.03*	4.58*	14.42*
	25	0.40	0.55	0.72*	0.90*	1.09*	1.29*	1.63*	1.96*	2.37*	7.68*	26.64*
200	15	0.41	0.57	0.74*	0.92*	1.11*	1.30*	1.59*	1.85*	2.13*	3.56*	7.06*
	20	0.45	0.62	0.81*	1.01*	1.22*	1.44*	1.80*	2.12*	2.47*	4.88*	14.42*
	25	0.48	0.67	0.87*	1.10*	1.34*	1.59*	2.01*	2.40*	2.87*	7.69*	26.64*
300	15	0.46	0.64	0.83*	1.04*	1.25*	1.47*	1.80*	2.10*	2.42*	4.01*	7.29*
	20	0.50	0.70	0.92*	1.15*	1.39*	1.65*	2.05*	2.42*	2.83*	5.32*	14.42*
	25	0.54	0.76	0.99*	1.26*	1.53*	1.83*	2.31*	2.76*	3.29*	7.80*	26.64*
400	15	0.50	0.70	0.91*	1.14*	1.37*	1.61*	1.99*	2.32*	2.67*	4.41*	7.64*
	20	0.55	0.77	1.01*	1.27*	1.54*	1.82*	2.28*	2.69*	3.14*	5.76*	14.43*
	25	0.60	0.84	1.10*	1.39*	1.70*	2.03*	2.57*	3.07*	3.64*	8.04*	26.64*
500	15	0.54	0.75	0.98*	1.23*	1.48*	1.74*	2.15*	2.51*	2.90*	4.77*	8.03*
	20	0.60	0.83	1.09*	1.38*	1.67*	1.98*	2.48*	2.92*	3.41*	6.17*	14.45*
	25	0.65	0.91	1.20*	1.52*	1.86*	2.21*	2.80*	3.35*	3.96*	8.36*	26.64*
600	15	0.58	0.80	1.04*	1.31*	1.58*	1.86*	2.31*	2.69*	3.10*	5.10*	8.42*
	20	0.64	0.89	1.17*	1.48*	1.79*	2.13*	2.66*	3.14*	3.67*	6.55*	14.51*
	25	0.70	0.97	1.28*	1.63*	2.00*	2.38*	3.01*	3.60*	4.26*	8.71*	26.64*
700	15	0.61	0.84	1.10*	1.38*	1.68*	1.98*	2.45*	2.86*	3.30*	5.41*	8.80*
	20	0.68	0.94	1.24*	1.57*	1.91*	2.27*	2.83*	3.35*	3.90*	6.92*	14.62*
	25	0.74	1.03	1.37*	1.74*	2.13*	2.54*	3.21*	3.84*	4.54*	9.06*	26.64*
800	15	0.64	0.88	1.16*	1.46*	1.77*	2.08*	2.58*	3.02*	3.48*	5.70*	9.18*
	20	0.71	0.99	1.31*	1.65*	2.02*	2.39*	3.00*	3.54*	4.12*	7.27*	14.78*
	25	0.78	1.09	1.44*	1.84*	2.25*	2.69*	3.40*	4.06*	4.80*	9.41*	26.65*
900	15	0.67	0.92	1.21*	1.53*	1.85*	2.18*	2.71*	3.17*	3.65*	5.97*	9.54*
	20	0.75	1.04	1.37*	1.74*	2.12*	2.52*	3.15*	3.72*	4.34*	7.60*	14.98*
	25	0.82	1.15	1.52*	1.93*	2.37*	2.83*	3.58*	4.27*	5.04*	9.76*	26.65*
1000	15	0.69	0.96	1.26*	1.59*	1.93*	2.28*	2.83*	3.31*	3.82*	6.24*	9.89*
	20	0.78	1.09	1.43*	1.82*	2.21*	2.63*	3.30*	3.89*	4.54*	7.91*	15.22*
	25	0.86	1.20	1.59*	2.02*	2.48*	2.97*	3.75*	4.47*	5.28*	10.10*	26.66*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.0 Ft (RADIUS = 2.8 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	KATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	0.72	1.00	1.31*	1.65*	2.01*	2.37*	2.95*	3.45*	3.98*	6.49*	10.23*
	20	0.81	1.13	1.49*	1.89*	2.31*	2.74*	3.44*	4.06*	4.73*	8.22*	15.48*
	25	0.90	1.25	1.65*	2.11*	2.59*	3.10*	3.92*	4.67*	5.50*	10.43*	26.67*
1200	15	0.75	1.03	1.36*	1.72*	2.08*	2.46*	3.06*	3.58*	4.13*	6.73*	10.55*
	20	0.84	1.17	1.55*	1.96*	2.40*	2.85*	3.57*	4.22*	4.91*	8.51*	15.75*
	25	0.93	1.30	1.72*	2.19*	2.69*	3.22*	4.07*	4.85*	5.72*	10.76*	26.69*
1300	15	0.77	1.07	1.40*	1.77*	2.16*	2.55*	3.17*	3.71*	4.28*	6.96*	10.87*
	20	0.87	1.21	1.60*	2.03*	2.48*	2.95*	3.70*	4.37*	5.09*	8.79*	16.03*
	25	0.97	1.35	1.78*	2.28*	2.79*	3.34*	4.22*	5.03*	5.93*	11.07*	26.73*
1400	15	0.80	1.10	1.45*	1.83*	2.23*	2.63*	3.27*	3.83*	4.42*	7.19*	11.18*
	20	0.90	1.25	1.65*	2.10*	2.57*	3.06*	3.83*	4.52*	5.27*	9.07*	16.32*
	25	1.00	1.39	1.84*	2.35*	2.89*	3.46*	4.37*	5.21*	6.13*	11.38*	26.78*
1500	15	0.82	1.13	1.49*	1.89*	2.29*	2.71*	3.37*	3.95*	4.56*	7.41*	11.48*
	20	0.93	1.29	1.70*	2.17*	2.65*	3.15*	3.95*	4.67*	5.44*	9.34*	16.61*
	25	1.03	1.44	1.90*	2.43*	2.99*	3.57*	4.51*	5.38*	6.33*	11.68*	26.84*
1600	15	0.84	1.17	1.53*	1.94*	2.36*	2.79*	3.47*	4.07*	4.69*	7.62*	11.78*
	20	0.96	1.33	1.76*	2.23*	2.73*	3.25*	4.07*	4.81*	5.60*	9.60*	16.90*
	25	1.06	1.48	1.96*	2.50*	3.08*	3.68*	4.65*	5.54*	6.52*	11.98*	26.93*
1700	15	0.86	1.20	1.57*	1.99*	2.43*	2.87*	3.57*	4.18*	4.82*	7.83*	12.07*
	20	0.98	1.37	1.80*	2.30*	2.81*	3.34*	4.19*	4.95*	5.76*	9.85*	17.20*
	25	1.09	1.52	2.02*	2.58*	3.17*	3.79*	4.79*	5.70*	6.70*	12.27*	27.03*
1800	15	0.89	1.23	1.61*	2.04*	2.49*	2.95*	3.66*	4.29*	4.95*	8.03*	12.35*
	20	1.01	1.40	1.85*	2.36*	2.88*	3.43*	4.30*	5.08*	5.91*	10.10*	17.49*
	25	1.12	1.56	2.07*	2.65*	3.25*	3.89*	4.92*	5.86*	6.88*	12.55*	27.14*
1900	15	0.91	1.26	1.65*	2.09*	2.55*	3.02*	3.76*	4.40*	5.08*	8.23*	12.62*
	20	1.04	1.44	1.90*	2.42*	2.96*	3.52*	4.41*	5.21*	6.07*	10.34*	17.78*
	25	1.15	1.60	2.12*	2.72*	3.34*	3.99*	5.05*	6.01*	7.06*	12.82*	27.27*
2000	15	0.93	1.29	1.69*	2.14*	2.61*	3.09*	3.85*	4.51*	5.20*	8.43*	12.89*
	20	1.06	1.47	1.94*	2.48*	3.03*	3.61*	4.52*	5.34*	6.21*	10.57*	18.07*
	25	1.18	1.64	2.18*	2.78*	3.42*	4.09*	5.18*	6.16*	7.23*	13.09*	27.42*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.0 Ft (RADIUS = 2.8 Ft)
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	0.55	0.77	1.01*	1.28*	1.58*	1.90*	2.52*	3.28*	4.66*	23.80*	88.67*
	20	0.60	0.84	1.12*	1.45*	1.82*	2.28*	3.40*	5.48*	9.21*	54.10*	207.30*
	25	0.64	0.91	1.23*	1.62*	2.11*	2.81*	5.26*	9.60*	16.80*	104.05*	402.88*
200	15	0.67	0.94	1.24*	1.58*	1.95*	2.35*	3.08*	3.88*	5.08*	23.80*	88.67*
	20	0.74	1.05	1.40*	1.81*	2.27*	2.82*	3.97*	5.70*	9.22*	54.10*	207.30*
	25	0.81	1.15	1.55*	2.04*	2.63*	3.40*	5.49*	9.60*	16.80*	104.05*	402.88*
300	15	0.77	1.07	1.42*	1.82*	2.24*	2.71*	3.54*	4.41*	5.60*	23.80*	88.67*
	20	0.86	1.21	1.62*	2.10*	2.63*	3.26*	4.50*	6.14*	9.30*	54.10*	207.30*
	25	0.94	1.33	1.81*	2.38*	3.05*	3.90*	5.92*	9.65*	16.80*	104.05*	402.88*
400	15	0.85	1.19	1.58*	2.02*	2.50*	3.02*	3.93*	4.87*	6.10*	23.80*	88.67*
	20	0.96	1.35	1.81*	2.35*	2.95*	3.64*	4.97*	6.61*	9.51*	54.10*	207.30*
	25	1.05	1.50	2.03*	2.67*	3.42*	4.34*	6.39*	9.82*	16.80*	104.05*	402.88*
500	15	0.93	1.30	1.72*	2.21*	2.73*	3.30*	4.29*	5.29*	6.56*	23.80*	88.67*
	20	1.05	1.48	1.98*	2.57*	3.23*	3.98*	5.40*	7.08*	9.83*	54.10*	207.30*
	25	1.16	1.64	2.23*	2.93*	3.74*	4.73*	6.85*	10.09*	16.81*	104.05*	402.88*
600	15	1.00	1.39	1.85*	2.38*	2.94*	3.56*	4.61*	5.67*	7.00*	23.80*	88.67*
	20	1.13	1.59	2.14*	2.78*	3.49*	4.29*	5.79*	7.51*	10.20*	54.10*	207.30*
	25	1.25	1.78	2.41*	3.17*	4.05*	5.10*	7.28*	10.43*	16.85*	104.05*	402.88*
700	15	1.06	1.49	1.98*	2.54*	3.14*	3.80*	4.92*	6.03*	7.41*	23.81*	88.67*
	20	1.21	1.70	2.28*	2.97*	3.73*	4.58*	6.16*	7.93*	10.59*	54.10*	207.30*
	25	1.34	1.90	2.58*	3.39*	4.33*	5.44*	7.69*	10.79*	16.93*	104.05*	402.88*
800	15	1.12	1.57	2.09*	2.69*	3.33*	4.02*	5.20*	6.37*	7.80*	23.83*	88.67*
	20	1.28	1.80	2.42*	3.15*	3.95*	4.86*	6.51*	8.33*	10.99*	54.10*	207.30*
	25	1.43	2.02	2.74*	3.60*	4.59*	5.76*	8.08*	11.17*	17.06*	104.05*	402.88*
900	15	1.18	1.65	2.20*	2.83*	3.50*	4.24*	5.48*	6.69*	8.17*	23.87*	88.67*
	20	1.35	1.90	2.56*	3.32*	4.17*	5.12*	6.84*	8.71*	11.38*	54.10*	207.30*
	25	1.51	2.13	2.89*	3.80*	4.84*	6.06*	8.46*	11.55*	17.23*	104.05*	402.88*
1000	15	1.24	1.73	2.31*	2.97*	3.67*	4.44*	5.73*	7.00*	8.52*	23.93*	88.67*
	20	1.42	2.00	2.68*	3.49*	4.37*	5.37*	7.15*	9.08*	11.76*	54.10*	207.30*
	25	1.59	2.24	3.04*	3.99*	5.08*	6.35*	8.82*	11.93*	17.44*	104.05*	402.88*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.0 Ft (RADIUS = 2.8 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	1.29	1.81	2.41*	3.10*	3.83*	4.63*	5.98*	7.29*	8.86*	24.02*	88.67*
	20	1.48	2.09	2.80*	3.64*	4.57*	5.61*	7.46*	9.43*	12.14*	54.10*	207.30*
	25	1.66	2.35	3.18*	4.18*	5.31*	6.63*	9.17*	12.30*	17.69*	104.05*	402.88*
1200	15	1.34	1.88	2.50*	3.22*	3.99*	4.82*	6.22*	7.58*	9.19*	24.15*	88.67*
	20	1.55	2.17	2.92*	3.80*	4.76*	5.83*	7.75*	9.77*	12.51*	54.10*	207.30*
	25	1.73	2.45	3.31*	4.35*	5.53*	6.89*	9.50*	12.66*	17.95*	104.05*	402.88*
1300	15	1.39	1.95	2.60*	3.34*	4.14*	5.00*	6.45*	7.85*	9.50*	24.30*	88.67*
	20	1.61	2.26	3.03*	3.94*	4.94*	6.05*	8.03*	10.10*	12.87*	54.10*	207.30*
	25	1.80	2.54	3.44*	4.52*	5.74*	7.15*	9.83*	13.02*	18.24*	104.05*	402.88*
1400	15	1.44	2.02	2.69*	3.46*	4.29*	5.18*	6.68*	8.12*	9.81*	24.48*	88.67*
	20	1.66	2.34	3.14*	4.08*	5.12*	6.27*	8.30*	10.42*	13.23*	54.10*	207.30*
	25	1.87	2.64	3.57*	4.69*	5.95*	7.40*	10.14*	13.37*	18.54*	104.05*	402.88*
1500	15	1.49	2.08	2.78*	3.57*	4.43*	5.35*	6.89*	8.37*	10.11*	24.69*	88.67*
	20	1.72	2.42	3.25*	4.22*	5.29*	6.48*	8.56*	10.74*	13.57*	54.10*	207.30*
	25	1.93	2.73	3.69*	4.85*	6.15*	7.64*	10.45*	13.72*	18.84*	104.05*	402.88*
1600	15	1.54	2.15	2.86*	3.69*	4.57*	5.52*	7.10*	8.62*	10.40*	24.91*	88.67*
	20	1.77	2.49	3.35*	4.36*	5.46*	6.68*	8.82*	11.04*	13.91*	54.10*	207.30*
	25	1.99	2.81	3.81*	5.00*	6.34*	7.88*	10.75*	14.05*	19.15*	104.05*	402.88*
1700	15	1.58	2.21	2.94*	3.79*	4.70*	5.68*	7.31*	8.87*	10.68*	25.15*	88.67*
	20	1.83	2.57	3.45*	4.49*	5.62*	6.87*	9.07*	11.33*	14.25*	54.10*	207.30*
	25	2.05	2.90	3.93*	5.16*	6.53*	8.11*	11.04*	14.38*	19.47*	104.05*	402.88*
1800	15	1.62	2.27	3.03*	3.90*	4.83*	5.83*	7.51*	9.10*	10.96*	25.40*	88.67*
	20	1.88	2.64	3.55*	4.61*	5.78*	7.07*	9.32*	11.62*	14.57*	54.10*	207.30*
	25	2.11	2.98	4.04*	5.30*	6.72*	8.33*	11.32*	14.71*	19.78*	104.05*	402.88*
1900	15	1.67	2.33	3.11*	4.00*	4.96*	5.99*	7.70*	9.33*	11.22*	25.67*	88.67*
	20	1.93	2.71	3.64*	4.74*	5.93*	7.25*	9.55*	11.90*	14.89*	54.10*	207.30*
	25	2.17	3.07	4.15*	5.45*	6.90*	8.55*	11.60*	15.03*	20.10*	104.05*	402.88*
2000	15	1.71	2.39	3.18*	4.10*	5.08*	6.14*	7.89*	9.56*	11.49*	25.94*	88.67*
	20	1.98	2.78	3.74*	4.86*	6.08*	7.44*	9.79*	12.18*	15.20*	54.11*	207.30*
	25	2.23	3.15	4.26*	5.59*	7.07*	8.76*	11.87*	15.34*	20.41*	104.05*	402.88*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.0 Ft (RADIUS = 2.8 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	0.91	1.31	1.83*	2.54*	3.76*	6.63*	15.98*	30.76*	55.39*	355.96*	1387.9*
	20	1.02	1.50	2.20*	3.49*	6.95*	14.14*	36.04*	70.86*	129.04*	840.71*	3285.9*
	25	1.12	1.71	2.70*	5.46*	12.62*	26.53*	69.12*	136.97*	250.45*	1639.9*	6415.2*
200	15	1.15	1.66	2.31*	3.17*	4.42*	6.81*	15.98*	30.76*	55.39*	355.96*	1387.9*
	20	1.31	1.93	2.79*	4.14*	7.07*	14.14*	36.04*	70.86*	129.04*	840.71*	3285.9*
	25	1.46	2.21	3.36*	5.76*	12.62*	26.53*	69.12*	136.97*	250.45*	1639.9*	6415.2*
300	15	1.35	1.95	2.70*	3.68*	5.02*	7.27*	15.98*	30.76*	55.39*	355.96*	1387.9*
	20	1.55	2.27	3.26*	4.74*	7.45*	14.14*	36.04*	70.86*	129.04*	840.71*	3285.9*
	25	1.73	2.60	3.90*	6.27*	12.63*	26.53*	69.12*	136.97*	250.45*	1639.9*	6415.2*
400	15	1.52	2.19	3.03*	4.12*	5.56*	7.79*	16.00*	30.76*	55.39*	355.96*	1387.9*
	20	1.75	2.57	3.67*	5.26*	7.94*	14.18*	36.04*	70.86*	129.04*	840.71*	3285.9*
	25	1.97	2.95	4.37*	6.81*	12.70*	26.53*	69.12*	136.97*	250.45*	1639.9*	6415.2*
500	15	1.68	2.41	3.33*	4.52*	6.06*	8.31*	16.07*	30.76*	55.39*	355.96*	1387.9*
	20	1.94	2.84	4.04*	5.74*	8.44*	14.30*	36.04*	70.86*	129.04*	840.71*	3285.9*
	25	2.19	3.26	4.80*	7.32*	12.88*	26.53*	69.12*	136.97*	250.45*	1639.9*	6415.2*
600	15	1.82	2.61	3.61*	4.89*	6.51*	8.82*	16.21*	30.76*	55.39*	355.96*	1387.9*
	20	2.11	3.08	4.38*	6.19*	8.94*	14.50*	36.04*	70.86*	129.04*	840.71*	3285.9*
	25	2.38	3.54	5.20*	7.81*	13.14*	26.53*	69.12*	136.97*	250.45*	1639.9*	6415.2*
700	15	1.95	2.80	3.87*	5.23*	6.93*	9.30*	16.42*	30.76*	55.39*	355.96*	1387.9*
	20	2.27	3.31	4.69*	6.60*	9.41*	14.78*	36.04*	70.86*	129.04*	840.71*	3285.9*
	25	2.57	3.81	5.56*	8.27*	13.48*	26.53*	69.12*	136.97*	250.45*	1639.9*	6415.2*
800	15	2.08	2.98	4.11*	5.55*	7.33*	9.77*	16.70*	30.76*	55.39*	355.96*	1387.9*
	20	2.42	3.52	4.99*	6.99*	9.87*	15.11*	36.04*	70.86*	129.04*	840.71*	3285.9*
	25	2.74	4.06	5.91*	8.72*	13.85*	26.54*	69.12*	136.97*	250.45*	1639.9*	6415.2*
900	15	2.20	3.15	4.34*	5.85*	7.71*	10.21*	17.03*	30.78*	55.39*	355.96*	1387.9*
	20	2.56	3.73	5.27*	7.36*	10.32*	15.47*	36.05*	70.86*	129.04*	840.71*	3285.9*
	25	2.91	4.30	6.24*	9.14*	14.24*	26.57*	69.12*	136.97*	250.45*	1639.9*	6415.2*
1000	15	2.31	3.31	4.56*	6.14*	8.08*	10.64*	17.38*	30.80*	55.39*	355.96*	1387.9*
	20	2.70	3.92	5.54*	7.71*	10.74*	15.85*	36.05*	70.86*	129.04*	840.71*	3285.9*
	25	3.06	4.52	6.55*	9.54*	14.64*	26.62*	69.12*	136.97*	250.45*	1639.9*	6415.2*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 4.0 Ft (RADIUS = 2.8 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	2.42	3.46	4.77*	6.42*	8.43*	11.05*	17.75*	30.84*	55.39*	355.96*	1387.9*
	20	2.83	4.11	5.79*	8.05*	11.16*	16.25*	36.06*	70.86*	129.04*	840.71*	3285.9*
	25	3.22	4.74	6.85*	9.93*	15.04*	26.70*	69.12*	136.97*	250.45*	1639.9*	6415.2*
1200	15	2.53	3.61	4.98*	6.69*	8.76*	11.45*	18.13*	30.90*	55.39*	355.96*	1387.9*
	20	2.96	4.29	6.04*	8.38*	11.56*	16.64*	36.07*	70.86*	129.04*	840.71*	3285.9*
	25	3.36	4.95	7.14*	10.31*	15.44*	26.81*	69.12*	136.97*	250.45*	1639.9*	6415.2*
1300	15	2.63	3.76	5.17*	6.94*	9.08*	11.83*	18.52*	30.99*	55.39*	355.96*	1387.9*
	20	3.08	4.46	6.28*	8.69*	11.94*	17.04*	36.10*	70.86*	129.04*	840.71*	3285.9*
	25	3.50	5.15	7.41*	10.67*	15.84*	26.94*	69.12*	136.97*	250.45*	1639.9*	6415.2*
1400	15	2.73	3.90	5.36*	7.19*	9.40*	12.21*	18.91*	31.10*	55.39*	355.96*	1387.9*
	20	3.20	4.63	6.51*	8.99*	12.32*	17.43*	36.14*	70.86*	129.04*	840.71*	3285.9*
	25	3.64	5.35	7.68*	11.03*	16.24*	27.11*	69.12*	136.97*	250.45*	1639.9*	6415.2*
1500	15	2.82	4.03	5.55*	7.44*	9.70*	12.57*	19.30*	31.24*	55.39*	355.96*	1387.9*
	20	3.31	4.80	6.73*	9.29*	12.68*	17.82*	36.19*	70.86*	129.04*	840.71*	3285.9*
	25	3.77	5.54	7.95*	11.37*	16.63*	27.30*	69.12*	136.97*	250.45*	1639.9*	6415.2*
1600	15	2.92	4.16	5.73*	7.67*	10.00*	12.93*	19.69*	31.40*	55.40*	355.96*	1387.9*
	20	3.43	4.95	6.95*	9.58*	13.04*	18.21*	36.26*	70.86*	129.04*	840.71*	3285.9*
	25	3.90	5.72	8.20*	11.70*	17.01*	27.52*	69.12*	136.97*	250.45*	1639.9*	6415.2*
1700	15	3.01	4.29	5.90*	7.90*	10.28*	13.27*	20.08*	31.59*	55.40*	355.96*	1387.9*
	20	3.53	5.11	7.16*	9.86*	13.39*	18.59*	36.35*	70.86*	129.04*	840.71*	3285.9*
	25	4.03	5.90	8.45*	12.03*	17.39*	27.75*	69.12*	136.97*	250.45*	1639.9*	6415.2*
1800	15	3.10	4.42	6.07*	8.12*	10.57*	13.61*	20.46*	31.79*	55.40*	355.96*	1387.9*
	20	3.64	5.26	7.37*	10.13*	13.73*	18.97*	36.46*	70.86*	129.04*	840.71*	3285.9*
	25	4.15	6.07	8.69*	12.35*	17.76*	28.01*	69.12*	136.97*	250.45*	1639.9*	6415.2*
1900	15	3.18	4.54	6.24*	8.34*	10.84*	13.94*	20.84*	32.02*	55.41*	355.96*	1387.9*
	20	3.74	5.41	7.57*	10.40*	14.06*	19.35*	36.58*	70.86*	129.04*	840.71*	3285.9*
	25	4.27	6.25	8.92*	12.66*	18.13*	28.28*	69.12*	136.97*	250.45*	1639.9*	6415.2*
2000	15	3.27	4.66	6.40*	8.56*	11.11*	14.27*	21.22*	32.26*	55.43*	355.96*	1387.9*
	20	3.85	5.55	7.77*	10.66*	14.38*	19.71*	36.73*	70.86*	129.04*	840.71*	3285.9*
	25	4.38	6.41	9.15*	12.96*	18.49*	28.55*	69.12*	136.97*	250.45*	1639.9*	6415.2*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.0 Ft (RADIUS = 4.2 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	0.30	0.38	0.47	0.56*	0.65*	0.74*	0.88*	0.99*	1.11*	1.60*	2.15*
	20	0.31	0.40	0.50	0.59*	0.69*	0.79*	0.94*	1.07*	1.20*	1.77*	2.53*
	25	0.33	0.42	0.52	0.62*	0.72*	0.83*	1.00*	1.14*	1.28*	1.97*	3.14*
200	15	0.34	0.44	0.54	0.64*	0.74*	0.85*	1.01*	1.15*	1.29*	1.88*	2.54*
	20	0.36	0.47	0.57	0.68*	0.80*	0.92*	1.10*	1.26*	1.42*	2.11*	2.99*
	25	0.38	0.49	0.61	0.72*	0.85*	0.98*	1.18*	1.36*	1.54*	2.36*	3.59*
300	15	0.37	0.48	0.59	0.70*	0.82*	0.94*	1.12*	1.28*	1.44*	2.10*	2.85*
	20	0.40	0.52	0.63	0.76*	0.89*	1.03*	1.23*	1.41*	1.59*	2.38*	3.37*
	25	0.43	0.55	0.68	0.81*	0.96*	1.11*	1.34*	1.53*	1.74*	2.68*	4.00*
400	15	0.40	0.51	0.63	0.75*	0.88*	1.02*	1.22*	1.39*	1.56*	2.29*	3.12*
	20	0.43	0.56	0.69	0.82*	0.97*	1.12*	1.35*	1.54*	1.74*	2.62*	3.69*
	25	0.46	0.60	0.74	0.88*	1.05*	1.21*	1.47*	1.69*	1.92*	2.96*	4.37*
500	15	0.42	0.55	0.67	0.80*	0.94*	1.09*	1.30*	1.49*	1.67*	2.47*	3.36*
	20	0.46	0.60	0.74	0.88*	1.04*	1.20*	1.45*	1.66*	1.88*	2.83*	3.99*
	25	0.50	0.65	0.79	0.95*	1.13*	1.31*	1.59*	1.83*	2.07*	3.20*	4.71*
600	15	0.45	0.58	0.71	0.85*	1.00*	1.15*	1.38*	1.58*	1.78*	2.63*	3.58*
	20	0.49	0.64	0.78	0.93*	1.10*	1.28*	1.54*	1.77*	2.00*	3.02*	4.26*
	25	0.53	0.69	0.84	1.01*	1.20*	1.40*	1.69*	1.95*	2.22*	3.43*	5.02*
700	15	0.47	0.61	0.74	0.89*	1.05*	1.21*	1.45*	1.66*	1.88*	2.77*	3.79*
	20	0.52	0.67	0.82	0.98*	1.16*	1.35*	1.63*	1.87*	2.12*	3.21*	4.51*
	25	0.56	0.73	0.89	1.07*	1.27*	1.48*	1.80*	2.07*	2.36*	3.64*	5.31*
800	15	0.49	0.63	0.78	0.93*	1.10*	1.27*	1.52*	1.74*	1.97*	2.92*	3.98*
	20	0.54	0.70	0.86	1.03*	1.22*	1.42*	1.71*	1.97*	2.23*	3.38*	4.75*
	25	0.59	0.76	0.94	1.13*	1.34*	1.56*	1.89*	2.18*	2.48*	3.84*	5.59*
900	15	0.51	0.66	0.81	0.97*	1.14*	1.32*	1.59*	1.82*	2.05*	3.05*	4.17*
	20	0.57	0.73	0.90	1.08*	1.28*	1.48*	1.79*	2.06*	2.34*	3.54*	4.97*
	25	0.62	0.80	0.98	1.18*	1.40*	1.63*	1.98*	2.29*	2.61*	4.03*	5.85*
1000	15	0.53	0.68	0.84	1.00*	1.19*	1.37*	1.65*	1.89*	2.14*	3.18*	4.34*
	20	0.59	0.76	0.93	1.12*	1.33*	1.54*	1.87*	2.15*	2.44*	3.69*	5.18*
	25	0.64	0.83	1.02	1.23*	1.46*	1.70*	2.07*	2.39*	2.72*	4.21*	6.10*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.0 Ft (RADIUS = 4.2 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	0.55	0.71	0.87	1.04*	1.23*	1.42*	1.71*	1.96*	2.22*	3.30*	4.51*
	20	0.61	0.79	0.97	1.16*	1.38*	1.60*	1.94*	2.23*	2.53*	3.84*	5.39*
	25	0.67	0.86	1.06	1.27*	1.52*	1.77*	2.15*	2.49*	2.83*	4.38*	6.34*
1200	15	0.57	0.73	0.89	1.07*	1.27*	1.47*	1.77*	2.03*	2.29*	3.42*	4.67*
	20	0.63	0.82	1.00	1.20*	1.43*	1.66*	2.01*	2.31*	2.63*	3.98*	5.59*
	25	0.69	0.89	1.10	1.32*	1.57*	1.83*	2.23*	2.58*	2.94*	4.55*	6.57*
1300	15	0.58	0.75	0.92	1.10*	1.31*	1.51*	1.83*	2.10*	2.37*	3.53*	4.83*
	20	0.65	0.84	1.03	1.24*	1.47*	1.71*	2.08*	2.39*	2.71*	4.12*	5.78*
	25	0.71	0.92	1.14	1.36*	1.63*	1.90*	2.31*	2.67*	3.04*	4.71*	6.79*
1400	15	0.60	0.77	0.95	1.13*	1.34*	1.56*	1.88*	2.16*	2.44*	3.64*	4.98*
	20	0.67	0.87	1.06	1.28*	1.52*	1.76*	2.14*	2.47*	2.80*	4.25*	5.96*
	25	0.74	0.95	1.17	1.41*	1.68*	1.96*	2.39*	2.76*	3.14*	4.86*	7.01*
1500	15	0.62	0.79	0.97	1.16*	1.38*	1.60*	1.93*	2.22*	2.51*	3.75*	5.13*
	20	0.69	0.89	1.09	1.31*	1.56*	1.82*	2.21*	2.54*	2.89*	4.38*	6.14*
	25	0.76	0.98	1.21	1.45*	1.73*	2.02*	2.46*	2.84*	3.24*	5.01*	7.22*
1600	15	0.63	0.81	1.00	1.19*	1.42*	1.64*	1.99*	2.28*	2.58*	3.85*	5.27*
	20	0.71	0.91	1.12	1.35*	1.60*	1.87*	2.27*	2.61*	2.97*	4.51*	6.32*
	25	0.78	1.01	1.24	1.49*	1.78*	2.07*	2.53*	2.93*	3.33*	5.16*	7.42*
1700	15	0.65	0.83	1.02	1.22*	1.45*	1.68*	2.04*	2.34*	2.64*	3.95*	5.41*
	20	0.73	0.94	1.15	1.38*	1.65*	1.91*	2.33*	2.68*	3.05*	4.63*	6.49*
	25	0.80	1.03	1.27	1.53*	1.83*	2.13*	2.60*	3.01*	3.43*	5.30*	7.62*
1800	15	0.66	0.85	1.04	1.25*	1.48*	1.72*	2.09*	2.39*	2.71*	4.05*	5.55*
	20	0.75	0.96	1.18	1.42*	1.69*	1.96*	2.39*	2.75*	3.12*	4.75*	6.65*
	25	0.82	1.06	1.30	1.57*	1.87*	2.18*	2.67*	3.08*	3.52*	5.44*	7.81*
1900	15	0.68	0.87	1.07	1.28*	1.52*	1.76*	2.13*	2.45*	2.77*	4.15*	5.68*
	20	0.76	0.98	1.21	1.45*	1.73*	2.01*	2.44*	2.82*	3.20*	4.87*	6.81*
	25	0.84	1.09	1.33	1.61*	1.92*	2.24*	2.73*	3.16*	3.61*	5.58*	8.00*
2000	15	0.69	0.89	1.09	1.31*	1.55*	1.80*	2.18*	2.50*	2.83*	4.24*	5.81*
	20	0.78	1.00	1.23	1.48*	1.76*	2.05*	2.50*	2.88*	3.28*	4.98*	6.97*
	25	0.86	1.11	1.37	1.64*	1.96*	2.29*	2.80*	3.24*	3.69*	5.71*	8.18*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.0 Ft (RADIUS = 4.2 Ft)
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	0.45	0.58	0.72	0.86*	1.01*	1.16*	1.41*	1.62*	1.86*	3.20*	7.66*
	20	0.48	0.62	0.77	0.93*	1.10*	1.28*	1.57*	1.84*	2.16*	5.10*	15.93*
	25	0.51	0.66	0.82	0.99*	1.19*	1.40*	1.75*	2.10*	2.56*	8.69*	29.57*
200	15	0.53	0.69	0.85	1.01*	1.20*	1.39*	1.69*	1.96*	2.24*	3.74*	7.69*
	20	0.58	0.75	0.93	1.12*	1.33*	1.56*	1.92*	2.25*	2.63*	5.32*	15.93*
	25	0.62	0.81	1.00	1.21*	1.46*	1.72*	2.15*	2.57*	3.08*	8.69*	29.57*
300	15	0.59	0.77	0.95	1.14*	1.35*	1.57*	1.92*	2.22*	2.55*	4.21*	7.85*
	20	0.65	0.85	1.05	1.27*	1.52*	1.78*	2.19*	2.58*	3.00*	5.72*	15.93*
	25	0.71	0.92	1.15	1.39*	1.67*	1.98*	2.48*	2.95*	3.52*	8.75*	29.57*
400	15	0.65	0.84	1.04	1.25*	1.49*	1.73*	2.12*	2.46*	2.82*	4.62*	8.16*
	20	0.72	0.94	1.16	1.40*	1.68*	1.97*	2.43*	2.86*	3.33*	6.15*	15.94*
	25	0.79	1.02	1.27	1.55*	1.86*	2.20*	2.76*	3.28*	3.89*	8.91*	29.57*
500	15	0.70	0.91	1.12	1.35*	1.61*	1.88*	2.29*	2.66*	3.06*	5.00*	8.52*
	20	0.78	1.02	1.26	1.52*	1.83*	2.14*	2.65*	3.11*	3.62*	6.56*	15.95*
	25	0.86	1.12	1.39	1.68*	2.03*	2.40*	3.01*	3.58*	4.23*	9.17*	29.57*
600	15	0.75	0.97	1.20	1.44*	1.72*	2.01*	2.46*	2.85*	3.28*	5.34*	8.90*
	20	0.84	1.09	1.35	1.63*	1.96*	2.30*	2.85*	3.34*	3.89*	6.96*	15.98*
	25	0.92	1.20	1.49	1.81*	2.19*	2.59*	3.24*	3.85*	4.55*	9.48*	29.57*
700	15	0.80	1.03	1.27	1.53*	1.83*	2.13*	2.61*	3.03*	3.48*	5.66*	9.28*
	20	0.89	1.16	1.43	1.74*	2.08*	2.45*	3.03*	3.56*	4.14*	7.33*	16.04*
	25	0.98	1.28	1.59	1.93*	2.33*	2.76*	3.45*	4.10*	4.84*	9.82*	29.57*
800	15	0.84	1.08	1.34	1.61*	1.92*	2.25*	2.75*	3.20*	3.67*	5.96*	9.66*
	20	0.94	1.22	1.51	1.83*	2.20*	2.59*	3.21*	3.77*	4.37*	7.69*	16.15*
	25	1.04	1.35	1.68	2.04*	2.47*	2.92*	3.66*	4.34*	5.11*	10.16*	29.57*
900	15	0.88	1.14	1.40	1.69*	2.02*	2.36*	2.89*	3.36*	3.86*	6.25*	10.02*
	20	0.99	1.29	1.59	1.93*	2.31*	2.72*	3.37*	3.96*	4.60*	8.03*	16.31*
	25	1.09	1.42	1.77	2.15*	2.60*	3.07*	3.85*	4.57*	5.37*	10.50*	29.58*
1000	15	0.92	1.19	1.46	1.76*	2.11*	2.46*	3.02*	3.51*	4.03*	6.52*	10.37*
	20	1.04	1.35	1.66	2.01*	2.42*	2.85*	3.53*	4.14*	4.81*	8.35*	16.50*
	25	1.15	1.49	1.85	2.25*	2.72*	3.22*	4.03*	4.78*	5.62*	10.84*	29.58*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.0 Ft (RADIUS = 4.2 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	0.95	1.23	1.52	1.83*	2.19*	2.56*	3.15*	3.66*	4.20*	6.78*	10.72*
	20	1.08	1.40	1.73	2.10*	2.52*	2.97*	3.68*	4.32*	5.01*	8.67*	16.71*
	25	1.20	1.56	1.93	2.35*	2.84*	3.36*	4.21*	4.99*	5.86*	11.17*	29.58*
1200	15	0.99	1.28	1.58	1.90*	2.27*	2.66*	3.27*	3.80*	4.36*	7.04*	11.05*
	20	1.12	1.46	1.80	2.18*	2.62*	3.09*	3.83*	4.49*	5.21*	8.97*	16.95*
	25	1.25	1.62	2.01	2.44*	2.95*	3.50*	4.38*	5.19*	6.09*	11.50*	29.59*
1300	15	1.02	1.32	1.63	1.96*	2.35*	2.75*	3.38*	3.93*	4.52*	7.28*	11.38*
	20	1.16	1.51	1.87	2.26*	2.72*	3.20*	3.97*	4.66*	5.40*	9.27*	17.21*
	25	1.29	1.68	2.08	2.53*	3.07*	3.63*	4.54*	5.38*	6.31*	11.82*	29.61*
1400	15	1.05	1.36	1.68	2.03*	2.43*	2.84*	3.49*	4.06*	4.67*	7.52*	11.69*
	20	1.20	1.56	1.93	2.33*	2.81*	3.31*	4.10*	4.82*	5.58*	9.55*	17.48*
	25	1.34	1.74	2.16	2.62*	3.17*	3.75*	4.70*	5.57*	6.52*	12.14*	29.63*
1500	15	1.09	1.41	1.73	2.09*	2.50*	2.93*	3.60*	4.19*	4.81*	7.74*	12.00*
	20	1.24	1.61	1.99	2.41*	2.90*	3.42*	4.24*	4.97*	5.76*	9.83*	17.75*
	25	1.38	1.80	2.23	2.71*	3.28*	3.88*	4.85*	5.75*	6.73*	12.44*	29.67*
1600	15	1.12	1.45	1.78	2.15*	2.58*	3.02*	3.71*	4.32*	4.96*	7.97*	12.30*
	20	1.28	1.66	2.05	2.48*	2.99*	3.52*	4.36*	5.12*	5.93*	10.10*	18.04*
	25	1.42	1.85	2.29	2.79*	3.38*	4.00*	5.00*	5.92*	6.93*	12.75*	29.72*
1700	15	1.15	1.49	1.83	2.21*	2.65*	3.10*	3.81*	4.44*	5.09*	8.18*	12.60*
	20	1.31	1.70	2.11	2.55*	3.07*	3.62*	4.49*	5.27*	6.10*	10.36*	18.32*
	25	1.47	1.90	2.36	2.87*	3.48*	4.11*	5.15*	6.09*	7.13*	13.04*	29.78*
1800	15	1.18	1.52	1.88	2.27*	2.72*	3.18*	3.91*	4.56*	5.23*	8.39*	12.89*
	20	1.35	1.75	2.16	2.62*	3.16*	3.72*	4.61*	5.41*	6.27*	10.62*	18.61*
	25	1.51	1.96	2.43	2.95*	3.57*	4.23*	5.29*	6.26*	7.32*	13.33*	29.86*
1900	15	1.21	1.56	1.93	2.32*	2.79*	3.26*	4.01*	4.67*	5.36*	8.60*	13.17*
	20	1.38	1.80	2.22	2.69*	3.24*	3.81*	4.73*	5.55*	6.43*	10.87*	18.89*
	25	1.55	2.01	2.49	3.03*	3.67*	4.34*	5.43*	6.42*	7.51*	13.61*	29.95*
2000	15	1.24	1.60	1.97	2.38*	2.85*	3.34*	4.11*	4.78*	5.49*	8.80*	13.45*
	20	1.42	1.84	2.27	2.75*	3.32*	3.91*	4.85*	5.69*	6.59*	11.11*	19.18*
	25	1.59	2.06	2.55	3.10*	3.76*	4.45*	5.56*	6.58*	7.69*	13.89*	30.05*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.0 Ft (RADIUS = 4.2 Ft)³
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	0.71	0.93	1.16	1.42*	1.73*	2.08*	2.77*	3.68*	5.43*	27.24*	98.74*
	20	0.77	1.02	1.30	1.62*	2.02*	2.55*	3.98*	6.64*	11.07*	62.19*	231.12*
	25	0.84	1.12	1.44	1.83*	2.40*	3.30*	6.57*	11.84*	20.39*	119.81*	449.37*
200	15	0.87	1.14	1.43	1.76*	2.14*	2.57*	3.36*	4.27*	5.72*	27.24*	98.74*
	20	0.97	1.28	1.63	2.02*	2.52*	3.13*	4.49*	6.73*	11.07*	62.19*	231.12*
	25	1.06	1.42	1.82	2.31*	2.97*	3.88*	6.65*	11.84*	20.39*	119.81*	449.37*
300	15	1.01	1.32	1.65	2.02*	2.47*	2.96*	3.85*	4.81*	6.20*	27.24*	98.74*
	20	1.13	1.49	1.89	2.35*	2.92*	3.61*	5.02*	7.05*	11.09*	62.19*	231.12*
	25	1.25	1.66	2.12	2.69*	3.43*	4.40*	6.96*	11.85*	20.39*	119.81*	449.37*
400	15	1.12	1.47	1.84	2.25*	2.75*	3.30*	4.27*	5.30*	6.69*	27.24*	98.74*
	20	1.27	1.68	2.12	2.63*	3.27*	4.02*	5.51*	7.48*	11.19*	62.19*	231.12*
	25	1.41	1.87	2.39	3.02*	3.83*	4.87*	7.37*	11.90*	20.39*	119.81*	449.37*
500	15	1.23	1.61	2.01	2.46*	3.01*	3.61*	4.65*	5.74*	7.17*	27.24*	98.74*
	20	1.39	1.84	2.32	2.88*	3.58*	4.39*	5.96*	7.93*	11.39*	62.19*	231.12*
	25	1.55	2.06	2.63	3.31*	4.20*	5.30*	7.81*	12.04*	20.39*	119.81*	449.37*
600	15	1.32	1.73	2.16	2.65*	3.24*	3.89*	5.00*	6.15*	7.62*	27.24*	98.74*
	20	1.51	1.99	2.51	3.12*	3.87*	4.74*	6.38*	8.37*	11.68*	62.19*	231.12*
	25	1.68	2.23	2.85	3.58*	4.53*	5.69*	8.24*	12.27*	20.39*	119.81*	449.37*
700	15	1.41	1.85	2.31	2.83*	3.46*	4.15*	5.33*	6.53*	8.04*	27.24*	98.74*
	20	1.62	2.13	2.69	3.33*	4.13*	5.05*	6.78*	8.80*	12.01*	62.19*	231.12*
	25	1.81	2.40	3.05	3.83*	4.84*	6.06*	8.66*	12.55*	20.42*	119.81*	449.37*
800	15	1.50	1.96	2.45	3.00*	3.67*	4.39*	5.64*	6.89*	8.45*	27.24*	98.74*
	20	1.72	2.26	2.85	3.54*	4.39*	5.35*	7.15*	9.21*	12.37*	62.19*	231.12*
	25	1.92	2.55	3.24	4.07*	5.13*	6.41*	9.07*	12.88*	20.46*	119.81*	449.37*
900	15	1.58	2.06	2.58	3.16*	3.86*	4.63*	5.93*	7.23*	8.84*	27.26*	98.74*
	20	1.81	2.39	3.01	3.73*	4.62*	5.64*	7.50*	9.61*	12.74*	62.19*	231.12*
	25	2.03	2.70	3.42	4.30*	5.41*	6.74*	9.47*	13.22*	20.54*	119.81*	449.37*
1000	15	1.65	2.16	2.70	3.31*	4.05*	4.85*	6.21*	7.56*	9.21*	27.28*	98.74*
	20	1.91	2.51	3.16	3.91*	4.85*	5.91*	7.84*	9.99*	13.12*	62.19*	231.12*
	25	2.14	2.83	3.60	4.51*	5.67*	7.06*	9.84*	13.57*	20.65*	119.81*	449.37*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.0 Ft (RADIUS = 4.2 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	1.73	2.26	2.82	3.46*	4.23*	5.06*	6.48*	7.87*	9.56*	27.33*	98.74*
	20	2.00	2.63	3.30	4.09*	5.07*	6.17*	8.17*	10.36*	13.49*	62.19*	231.12*
	25	2.24	2.97	3.77	4.72*	5.93*	7.36*	10.21*	13.93*	20.80*	119.81*	449.37*
1200	15	1.80	2.35	2.94	3.60*	4.40*	5.27*	6.73*	8.17*	9.91*	27.39*	98.74*
	20	2.08	2.74	3.44	4.26*	5.28*	6.42*	8.48*	10.72*	13.86*	62.19*	231.12*
	25	2.34	3.10	3.93	4.92*	6.17*	7.65*	10.57*	14.29*	20.98*	119.81*	449.37*
1300	15	1.87	2.44	3.05	3.73*	4.56*	5.46*	6.98*	8.47*	10.24*	27.48*	98.74*
	20	2.16	2.84	3.58	4.43*	5.48*	6.66*	8.78*	11.07*	14.23*	62.19*	231.12*
	25	2.43	3.22	4.08	5.11*	6.41*	7.93*	10.91*	14.65*	21.19*	119.81*	449.37*
1400	15	1.94	2.53	3.16	3.87*	4.72*	5.65*	7.22*	8.75*	10.57*	27.59*	98.74*
	20	2.24	2.95	3.71	4.59*	5.67*	6.89*	9.07*	11.40*	14.59*	62.19*	231.12*
	25	2.53	3.34	4.23	5.29*	6.64*	8.21*	11.25*	15.00*	21.42*	119.81*	449.37*
1500	15	2.00	2.61	3.26	3.99*	4.88*	5.84*	7.46*	9.02*	10.88*	27.73*	98.74*
	20	2.32	3.05	3.83	4.74*	5.86*	7.12*	9.36*	11.73*	14.94*	62.19*	231.12*
	25	2.62	3.46	4.38	5.47*	6.86*	8.47*	11.57*	15.35*	21.67*	119.81*	449.37*
1600	15	2.06	2.70	3.36	4.12*	5.03*	6.02*	7.68*	9.29*	11.19*	27.89*	98.74*
	20	2.40	3.15	3.95	4.89*	6.05*	7.34*	9.63*	12.05*	15.29*	62.19*	231.12*
	25	2.70	3.57	4.52	5.65*	7.07*	8.73*	11.89*	15.69*	21.93*	119.81*	449.37*
1700	15	2.13	2.78	3.46	4.24*	5.18*	6.20*	7.90*	9.55*	11.48*	28.07*	98.74*
	20	2.47	3.24	4.07	5.04*	6.23*	7.55*	9.90*	12.37*	15.63*	62.19*	231.12*
	25	2.79	3.68	4.66	5.82*	7.28*	8.98*	12.20*	16.03*	22.21*	119.81*	449.37*
1800	15	2.19	2.85	3.56	4.36*	5.33*	6.37*	8.12*	9.80*	11.78*	28.27*	98.74*
	20	2.54	3.34	4.19	5.18*	6.40*	7.76*	10.16*	12.67*	15.97*	62.19*	231.12*
	25	2.87	3.79	4.79	5.98*	7.49*	9.22*	12.50*	16.36*	22.49*	119.81*	449.37*
1900	15	2.24	2.93	3.65	4.47*	5.47*	6.54*	8.33*	10.05*	12.06*	28.49*	98.74*
	20	2.61	3.43	4.31	5.32*	6.57*	7.97*	10.42*	12.97*	16.30*	62.19*	231.12*
	25	2.95	3.89	4.93	6.15*	7.69*	9.46*	12.80*	16.69*	22.78*	119.81*	449.37*
2000	15	2.30	3.01	3.75	4.59*	5.60*	6.70*	8.53*	10.29*	12.34*	28.72*	98.74*
	20	2.68	3.52	4.42	5.46*	6.74*	8.17*	10.67*	13.26*	16.62*	62.19*	231.12*
	25	3.03	4.00	5.05	6.30*	7.88*	9.69*	13.09*	17.02*	23.07*	119.81*	449.37*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.0 Ft (RADIUS = 4.2 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	1.19	1.63	2.17	3.00*	4.75*	8.72*	20.43*	38.40*	67.69*	410.38*	1548.4*
	20	1.35	1.90	2.72	4.61*	9.62*	19.02*	46.52*	88.89*	158.12*	969.62*	3666.5*
	25	1.50	2.20	3.56	7.98*	17.78*	35.99*	89.53*	172.12*	307.20*	1891.6*	7158.4*
200	15	1.53	2.08	2.75	3.69*	5.28*	8.76*	20.43*	38.40*	67.69*	410.38*	1548.4*
	20	1.76	2.46	3.41	5.13*	9.64*	19.02*	46.52*	88.89*	158.12*	969.62*	3666.5*
	25	1.98	2.85	4.26	8.03*	17.78*	35.99*	89.53*	172.12*	307.20*	1891.6*	7158.4*
300	15	1.81	2.45	3.22	4.25*	5.89*	8.99*	20.43*	38.40*	67.69*	410.38*	1548.4*
	20	2.09	2.90	3.97	5.73*	9.76*	19.02*	46.52*	88.89*	158.12*	969.62*	3666.5*
	25	2.36	3.37	4.89	8.29*	17.78*	35.99*	89.53*	172.12*	307.20*	1891.6*	7158.4*
400	15	2.04	2.76	3.62	4.75*	6.46*	9.39*	20.43*	38.40*	67.69*	410.38*	1548.4*
	20	2.38	3.29	4.46	6.29*	10.06*	19.02*	46.52*	88.89*	158.12*	969.62*	3666.5*
	25	2.69	3.82	5.44	8.71*	17.78*	35.99*	89.53*	172.12*	307.20*	1891.6*	7158.4*
500	15	2.26	3.05	3.98	5.20*	6.99*	9.86*	20.44*	38.40*	67.69*	410.38*	1548.4*
	20	2.63	3.63	4.90	6.81*	10.46*	19.03*	46.52*	88.89*	158.12*	969.62*	3666.5*
	25	2.99	4.22	5.95	9.18*	17.80*	35.99*	89.53*	172.12*	307.20*	1891.6*	7158.4*
600	15	2.46	3.31	4.31	5.61*	7.48*	10.35*	20.48*	38.40*	67.69*	410.38*	1548.4*
	20	2.87	3.95	5.31	7.30*	10.91*	19.08*	46.52*	88.89*	158.12*	969.62*	3666.5*
	25	3.27	4.59	6.42	9.66*	17.87*	35.99*	89.53*	172.12*	307.20*	1891.6*	7158.4*
700	15	2.64	3.55	4.62	5.99*	7.95*	10.83*	20.55*	38.40*	67.69*	410.38*	1548.4*
	20	3.09	4.24	5.68	7.76*	11.37*	19.18*	46.52*	88.89*	158.12*	969.62*	3666.5*
	25	3.52	4.94	6.86	10.14*	17.99*	35.99*	89.53*	172.12*	307.20*	1891.6*	7158.4*
800	15	2.81	3.78	4.91	6.35*	8.38*	11.31*	20.67*	38.40*	67.69*	410.38*	1548.4*
	20	3.30	4.52	6.04	8.19*	11.82*	19.33*	46.52*	88.89*	158.12*	969.62*	3666.5*
	25	3.76	5.26	7.27	10.60*	18.17*	35.99*	89.53*	172.12*	307.20*	1891.6*	7158.4*
900	15	2.98	4.00	5.19	6.70*	8.80*	11.77*	20.85*	38.40*	67.69*	410.38*	1548.4*
	20	3.50	4.79	6.38	8.61*	12.28*	19.54*	46.52*	88.89*	158.12*	969.62*	3666.5*
	25	3.99	5.57	7.66	11.06*	18.41*	36.00*	89.53*	172.12*	307.20*	1891.6*	7158.4*
1000	15	3.14	4.21	5.45	7.02*	9.20*	12.22*	21.08*	38.40*	67.69*	410.38*	1548.4*
	20	3.69	5.04	6.70	9.00*	12.72*	19.79*	46.52*	88.89*	158.12*	969.62*	3666.5*
	25	4.21	5.86	8.04	11.49*	18.69*	36.00*	89.53*	172.12*	307.20*	1891.6*	7158.4*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 6.0 Ft (RADIUS = 4.2 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	3.29	4.41	5.70	7.34*	9.59*	12.65*	21.34*	38.41*	67.69*	410.38*	1548.4*
	20	3.87	5.28	7.00	9.38*	13.15*	20.08*	46.52*	88.89*	158.12*	969.62*	3666.5*
	25	4.42	6.15	8.40	11.92*	19.00*	36.01*	89.53*	172.12*	307.20*	1891.6*	7158.4*
1200	15	3.43	4.60	5.95	7.64*	9.95*	13.08*	21.64*	38.42*	67.69*	410.38*	1548.4*
	20	4.05	5.52	7.30	9.75*	13.58*	20.39*	46.52*	88.89*	158.12*	969.62*	3666.5*
	25	4.62	6.42	8.74	12.33*	19.34*	36.02*	89.53*	172.12*	307.20*	1891.6*	7158.4*
1300	15	3.57	4.79	6.18	7.93*	10.31*	13.49*	21.96*	38.44*	67.69*	410.38*	1548.4*
	20	4.21	5.74	7.59	10.10*	13.99*	20.73*	46.52*	88.89*	158.12*	969.62*	3666.5*
	25	4.82	6.68	9.08	12.73*	19.68*	36.05*	89.53*	172.12*	307.20*	1891.6*	7158.4*
1400	15	3.71	4.97	6.41	8.21*	10.66*	13.89*	22.29*	38.47*	67.69*	410.38*	1548.4*
	20	4.38	5.96	7.86	10.45*	14.39*	21.07*	46.53*	88.89*	158.12*	969.62*	3666.5*
	25	5.01	6.93	9.40	13.12*	20.04*	36.08*	89.53*	172.12*	307.20*	1891.6*	7158.4*
1500	15	3.84	5.14	6.63	8.48*	10.99*	14.28*	22.64*	38.51*	67.69*	410.38*	1548.4*
	20	4.54	6.17	8.13	10.78*	14.79*	21.43*	46.54*	88.89*	158.12*	969.62*	3666.5*
	25	5.19	7.18	9.71	13.50*	20.41*	36.14*	89.53*	172.12*	307.20*	1891.6*	7158.4*
1600	15	3.97	5.31	6.84	8.75*	11.32*	14.66*	23.00*	38.57*	67.69*	410.38*	1548.4*
	20	4.69	6.38	8.39	11.10*	15.17*	21.79*	46.55*	88.89*	158.12*	969.62*	3666.5*
	25	5.37	7.42	10.02	13.87*	20.77*	36.21*	89.53*	172.12*	307.20*	1891.6*	7158.4*
1700	15	4.10	5.48	7.05	9.01*	11.64*	15.04*	23.36*	38.65*	67.69*	410.38*	1548.4*
	20	4.84	6.58	8.65	11.42*	15.55*	22.15*	46.56*	88.89*	158.12*	969.62*	3666.5*
	25	5.55	7.65	10.32	14.23*	21.14*	36.29*	89.53*	172.12*	307.20*	1891.6*	7158.4*
1800	15	4.22	5.64	7.26	9.26*	11.95*	15.40*	23.72*	38.75*	67.69*	410.38*	1548.4*
	20	4.99	6.77	8.90	11.72*	15.92*	22.52*	46.59*	88.89*	158.12*	969.62*	3666.5*
	25	5.72	7.88	10.60	14.58*	21.51*	36.40*	89.53*	172.12*	307.20*	1891.6*	7158.4*
1900	15	4.34	5.80	7.45	9.51*	12.25*	15.76*	24.09*	38.86*	67.70*	410.38*	1548.4*
	20	5.14	6.96	9.14	12.03*	16.28*	22.89*	46.62*	88.89*	158.12*	969.62*	3666.5*
	25	5.88	8.10	10.89	14.93*	21.88*	36.53*	89.53*	172.12*	307.20*	1891.6*	7158.4*
2000	15	4.46	5.95	7.65	9.75*	12.55*	16.11*	24.45*	39.00*	67.70*	410.38*	1548.4*
	20	5.28	7.15	9.37	12.32*	16.63*	23.25*	46.66*	88.89*	158.12*	969.62*	3666.5*
	25	6.04	8.32	11.16	15.27*	22.24*	36.67*	89.53*	172.12*	307.20*	1891.6*	7158.4*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.0 Ft (RADIUS = 5.7 Ft)
 FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	0.36	0.44	0.53	0.61	0.70*	0.79*	0.92*	1.04*	1.16*	1.65*	2.21*
	20	0.38	0.46	0.56	0.65	0.74*	0.84*	0.99*	1.12*	1.25*	1.83*	2.63*
	25	0.39	0.49	0.58	0.68	0.78*	0.88*	1.05*	1.19*	1.34*	2.05*	3.32*
200	15	0.41	0.50	0.60	0.70	0.80*	0.90*	1.07*	1.21*	1.35*	1.94*	2.61*
	20	0.44	0.54	0.65	0.75	0.86*	0.98*	1.16*	1.32*	1.48*	2.19*	3.09*
	25	0.46	0.57	0.69	0.80	0.92*	1.05*	1.25*	1.43*	1.61*	2.46*	3.75*
300	15	0.45	0.55	0.66	0.77	0.88*	1.00*	1.18*	1.34*	1.50*	2.17*	2.93*
	20	0.49	0.60	0.72	0.84	0.96*	1.09*	1.30*	1.48*	1.66*	2.47*	3.48*
	25	0.52	0.64	0.77	0.90	1.03*	1.18*	1.41*	1.61*	1.82*	2.79*	4.17*
400	15	0.49	0.60	0.72	0.83	0.95*	1.08*	1.28*	1.46*	1.63*	2.37*	3.21*
	20	0.53	0.65	0.78	0.91	1.04*	1.19*	1.42*	1.62*	1.82*	2.71*	3.82*
	25	0.57	0.70	0.84	0.98	1.13*	1.30*	1.55*	1.78*	2.01*	3.07*	4.54*
500	15	0.52	0.64	0.76	0.89	1.01*	1.16*	1.38*	1.56*	1.75*	2.55*	3.46*
	20	0.57	0.70	0.84	0.98	1.12*	1.28*	1.53*	1.75*	1.97*	2.93*	4.12*
	25	0.62	0.76	0.91	1.06	1.22*	1.40*	1.68*	1.92*	2.18*	3.33*	4.89*
600	15	0.55	0.68	0.81	0.94	1.07*	1.23*	1.46*	1.66*	1.86*	2.72*	3.69*
	20	0.61	0.75	0.89	1.04	1.19*	1.36*	1.63*	1.86*	2.10*	3.14*	4.40*
	25	0.66	0.81	0.97	1.13	1.30*	1.49*	1.80*	2.06*	2.33*	3.57*	5.21*
700	15	0.58	0.71	0.85	0.99	1.13*	1.29*	1.54*	1.75*	1.96*	2.87*	3.90*
	20	0.64	0.79	0.94	1.10	1.26*	1.44*	1.73*	1.97*	2.22*	3.32*	4.66*
	25	0.70	0.86	1.03	1.20	1.37*	1.58*	1.90*	2.18*	2.47*	3.79*	5.51*
800	15	0.61	0.74	0.89	1.03	1.18*	1.35*	1.61*	1.83*	2.06*	3.02*	4.10*
	20	0.67	0.83	0.99	1.15	1.32*	1.51*	1.81*	2.07*	2.34*	3.50*	4.90*
	25	0.73	0.90	1.08	1.26	1.45*	1.67*	2.01*	2.30*	2.61*	3.99*	5.79*
900	15	0.63	0.78	0.93	1.08	1.23*	1.41*	1.68*	1.91*	2.15*	3.15*	4.29*
	20	0.70	0.86	1.03	1.20	1.38*	1.58*	1.90*	2.17*	2.45*	3.67*	5.13*
	25	0.77	0.95	1.13	1.32	1.51*	1.75*	2.10*	2.41*	2.74*	4.19*	6.06*
1000	15	0.66	0.81	0.96	1.12	1.28*	1.46*	1.75*	1.99*	2.24*	3.29*	4.47*
	20	0.73	0.90	1.08	1.25	1.43*	1.65*	1.98*	2.26*	2.55*	3.83*	5.35*
	25	0.80	0.99	1.18	1.38	1.58*	1.82*	2.20*	2.52*	2.86*	4.37*	6.32*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.0 Ft (RADIUS = 5.7 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	0.68	0.83	1.00	1.16	1.32*	1.52*	1.81*	2.06*	2.32*	3.41*	4.64*
	20	0.76	0.93	1.12	1.30	1.49*	1.71*	2.06*	2.35*	2.66*	3.98*	5.56*
	25	0.83	1.03	1.23	1.43	1.64*	1.89*	2.29*	2.62*	2.98*	4.55*	6.57*
1200	15	0.70	0.86	1.03	1.20	1.37*	1.57*	1.87*	2.14*	2.40*	3.53*	4.81*
	20	0.79	0.97	1.16	1.34	1.54*	1.77*	2.13*	2.44*	2.75*	4.13*	5.77*
	25	0.86	1.06	1.27	1.48	1.70*	1.96*	2.37*	2.72*	3.09*	4.73*	6.80*
1300	15	0.72	0.89	1.06	1.23	1.41*	1.62*	1.93*	2.20*	2.48*	3.65*	4.97*
	20	0.81	1.00	1.19	1.39	1.59*	1.83*	2.20*	2.52*	2.85*	4.27*	5.96*
	25	0.89	1.10	1.32	1.53	1.76*	2.03*	2.45*	2.82*	3.20*	4.89*	7.03*
1400	15	0.74	0.91	1.09	1.27	1.45*	1.66*	1.99*	2.27*	2.56*	3.77*	5.13*
	20	0.84	1.03	1.23	1.43	1.64*	1.89*	2.27*	2.60*	2.94*	4.41*	6.15*
	25	0.92	1.13	1.36	1.58	1.82*	2.10*	2.53*	2.91*	3.30*	5.05*	7.25*
1500	15	0.76	0.94	1.12	1.30	1.49*	1.71*	2.05*	2.34*	2.63*	3.88*	5.28*
	20	0.86	1.06	1.27	1.47	1.69*	1.94*	2.34*	2.68*	3.03*	4.55*	6.34*
	25	0.95	1.17	1.40	1.63	1.87*	2.16*	2.61*	3.00*	3.41*	5.21*	7.47*
1600	15	0.78	0.96	1.15	1.34	1.53*	1.76*	2.10*	2.40*	2.70*	3.99*	5.42*
	20	0.89	1.09	1.30	1.51	1.73*	2.00*	2.41*	2.75*	3.11*	4.68*	6.52*
	25	0.98	1.20	1.44	1.68	1.93*	2.22*	2.69*	3.09*	3.50*	5.36*	7.68*
1700	15	0.80	0.99	1.18	1.37	1.57*	1.80*	2.16*	2.46*	2.77*	4.09*	5.57*
	20	0.91	1.12	1.33	1.55	1.78*	2.05*	2.47*	2.83*	3.20*	4.80*	6.69*
	25	1.00	1.24	1.48	1.72	1.98*	2.28*	2.76*	3.17*	3.60*	5.51*	7.88*
1800	15	0.82	1.01	1.21	1.40	1.60*	1.84*	2.21*	2.52*	2.84*	4.19*	5.71*
	20	0.93	1.15	1.37	1.59	1.82*	2.10*	2.53*	2.90*	3.28*	4.93*	6.86*
	25	1.03	1.27	1.52	1.77	2.03*	2.34*	2.83*	3.26*	3.70*	5.65*	8.08*
1900	15	0.84	1.03	1.23	1.43	1.64*	1.89*	2.26*	2.58*	2.91*	4.29*	5.84*
	20	0.95	1.17	1.40	1.63	1.87*	2.15*	2.59*	2.97*	3.36*	5.05*	7.03*
	25	1.05	1.30	1.55	1.81	2.08*	2.40*	2.90*	3.34*	3.79*	5.79*	8.28*
2000	15	0.86	1.06	1.26	1.46	1.68*	1.93*	2.31*	2.64*	2.97*	4.39*	5.98*
	20	0.98	1.20	1.43	1.67	1.91*	2.20*	2.65*	3.04*	3.44*	5.17*	7.19*
	25	1.08	1.33	1.59	1.85	2.13*	2.46*	2.97*	3.42*	3.88*	5.93*	8.47*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.0 Ft (RADIUS = 5.7 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	0.54	0.67	0.81	0.94	1.08*	1.24*	1.49*	1.71*	1.95*	3.41*	8.37*
	20	0.58	0.72	0.87	1.02	1.19*	1.37*	1.67*	1.96*	2.29*	5.68*	17.57*
	25	0.62	0.77	0.93	1.10	1.29*	1.50*	1.88*	2.26*	2.78*	9.81*	32.75*
200	15	0.65	0.80	0.96	1.12	1.29*	1.49*	1.79*	2.06*	2.36*	3.95*	8.38*
	20	0.71	0.88	1.06	1.24	1.44*	1.67*	2.04*	2.39*	2.79*	5.82*	17.57*
	25	0.76	0.95	1.15	1.36	1.58*	1.85*	2.31*	2.76*	3.31*	9.81*	32.75*
300	15	0.73	0.90	1.09	1.27	1.46*	1.69*	2.04*	2.35*	2.68*	4.42*	8.49*
	20	0.81	1.00	1.21	1.42	1.64*	1.91*	2.34*	2.74*	3.18*	6.17*	17.57*
	25	0.88	1.09	1.32	1.56	1.82*	2.13*	2.65*	3.16*	3.76*	9.83*	32.75*
400	15	0.80	0.99	1.19	1.40	1.61*	1.86*	2.25*	2.59*	2.96*	4.85*	8.74*
	20	0.90	1.11	1.34	1.57	1.82*	2.12*	2.60*	3.04*	3.52*	6.58*	17.57*
	25	0.98	1.22	1.47	1.74	2.03*	2.38*	2.95*	3.51*	4.16*	9.93*	32.75*
500	15	0.87	1.08	1.29	1.51	1.74*	2.01*	2.44*	2.82*	3.22*	5.23*	9.07*
	20	0.97	1.21	1.46	1.71	1.98*	2.30*	2.83*	3.31*	3.83*	6.99*	17.58*
	25	1.07	1.33	1.61	1.90	2.21*	2.59*	3.22*	3.82*	4.52*	10.12*	32.75*
600	15	0.93	1.15	1.38	1.62	1.86*	2.15*	2.61*	3.02*	3.45*	5.59*	9.43*
	20	1.05	1.30	1.56	1.84	2.13*	2.48*	3.04*	3.55*	4.12*	7.39*	17.59*
	25	1.15	1.43	1.73	2.04	2.38*	2.79*	3.47*	4.11*	4.85*	10.38*	32.75*
700	15	0.99	1.22	1.47	1.71	1.98*	2.29*	2.78*	3.21*	3.67*	5.92*	9.80*
	20	1.12	1.38	1.66	1.95	2.26*	2.64*	3.24*	3.78*	4.38*	7.77*	17.63*
	25	1.23	1.53	1.85	2.18	2.54*	2.98*	3.70*	4.38*	5.15*	10.68*	32.75*
800	15	1.04	1.29	1.55	1.81	2.08*	2.41*	2.93*	3.39*	3.87*	6.24*	10.17*
	20	1.18	1.46	1.76	2.07	2.39*	2.79*	3.42*	4.00*	4.63*	8.14*	17.70*
	25	1.31	1.62	1.96	2.31	2.69*	3.15*	3.92*	4.63*	5.44*	11.00*	32.75*
900	15	1.09	1.35	1.62	1.90	2.18*	2.53*	3.07*	3.55*	4.06*	6.53*	10.54*
	20	1.24	1.54	1.85	2.17	2.51*	2.93*	3.60*	4.21*	4.87*	8.49*	17.80*
	25	1.38	1.71	2.06	2.43	2.83*	3.32*	4.12*	4.87*	5.72*	11.33*	32.75*
1000	15	1.14	1.41	1.69	1.98	2.28*	2.64*	3.21*	3.72*	4.25*	6.82*	10.89*
	20	1.30	1.61	1.94	2.27	2.63*	3.07*	3.77*	4.40*	5.09*	8.82*	17.94*
	25	1.44	1.79	2.16	2.55	2.97*	3.48*	4.32*	5.10*	5.98*	11.66*	32.75*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.0 Ft (RADIUS = 5.7 Ft)₃
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	1.19	1.47	1.76	2.06	2.37*	2.75*	3.35*	3.87*	4.42*	7.09*	11.24*
	20	1.36	1.68	2.02	2.37	2.74*	3.20*	3.93*	4.59*	5.31*	9.15*	18.12*
	25	1.51	1.87	2.26	2.66	3.10*	3.63*	4.51*	5.32*	6.23*	11.99*	32.75*
1200	15	1.24	1.53	1.83	2.14	2.46*	2.86*	3.48*	4.02*	4.59*	7.35*	11.58*
	20	1.41	1.74	2.10	2.46	2.85*	3.33*	4.09*	4.77*	5.51*	9.46*	18.32*
	25	1.57	1.95	2.35	2.77	3.22*	3.78*	4.69*	5.53*	6.47*	12.32*	32.76*
1300	15	1.28	1.58	1.89	2.21	2.55*	2.96*	3.60*	4.16*	4.76*	7.61*	11.91*
	20	1.46	1.81	2.18	2.55	2.96*	3.45*	4.24*	4.95*	5.71*	9.77*	18.54*
	25	1.63	2.02	2.44	2.87	3.34*	3.92*	4.86*	5.74*	6.71*	12.64*	32.76*
1400	15	1.32	1.63	1.96	2.29	2.64*	3.06*	3.72*	4.30*	4.92*	7.85*	12.23*
	20	1.51	1.87	2.25	2.64	3.06*	3.57*	4.38*	5.11*	5.91*	10.06*	18.78*
	25	1.69	2.09	2.52	2.97	3.46*	4.06*	5.03*	5.93*	6.93*	12.96*	32.77*
1500	15	1.36	1.68	2.02	2.36	2.72*	3.15*	3.84*	4.44*	5.07*	8.09*	12.55*
	20	1.56	1.93	2.32	2.73	3.16*	3.68*	4.52*	5.28*	6.09*	10.35*	19.03*
	25	1.74	2.16	2.61	3.07	3.57*	4.19*	5.20*	6.12*	7.15*	13.27*	32.79*
1600	15	1.40	1.73	2.08	2.43	2.80*	3.25*	3.95*	4.57*	5.22*	8.32*	12.86*
	20	1.61	1.99	2.39	2.81	3.25*	3.79*	4.66*	5.44*	6.28*	10.63*	19.29*
	25	1.80	2.23	2.69	3.17	3.68*	4.32*	5.36*	6.31*	7.37*	13.58*	32.82*
1700	15	1.44	1.78	2.13	2.49	2.87*	3.34*	4.06*	4.70*	5.37*	8.54*	13.16*
	20	1.66	2.05	2.46	2.89	3.34*	3.90*	4.79*	5.59*	6.46*	10.90*	19.56*
	25	1.85	2.30	2.77	3.26	3.79*	4.45*	5.51*	6.49*	7.57*	13.88*	32.85*
1800	15	1.48	1.83	2.19	2.56	2.95*	3.42*	4.17*	4.82*	5.51*	8.76*	13.45*
	20	1.70	2.10	2.53	2.97	3.44*	4.01*	4.92*	5.75*	6.63*	11.16*	19.83*
	25	1.90	2.36	2.85	3.35	3.89*	4.57*	5.66*	6.67*	7.78*	14.17*	32.90*
1900	15	1.52	1.87	2.24	2.62	3.02*	3.51*	4.27*	4.94*	5.65*	8.98*	13.74*
	20	1.75	2.16	2.60	3.05	3.52*	4.11*	5.05*	5.89*	6.80*	11.43*	20.11*
	25	1.96	2.42	2.92	3.44	4.00*	4.69*	5.81*	6.84*	7.98*	14.46*	32.95*
2000	15	1.56	1.92	2.30	2.69	3.10*	3.59*	4.38*	5.06*	5.79*	9.19*	14.02*
	20	1.79	2.21	2.66	3.12	3.61*	4.22*	5.18*	6.04*	6.96*	11.68*	20.39*
	25	2.01	2.49	3.00	3.53	4.10*	4.81*	5.96*	7.01*	8.17*	14.75*	33.02*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.0 Ft (RADIUS = 5.7 Ft)³
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
100	15	0.87	1.09	1.33	1.59	1.89*	2.27*	3.05*	4.19*	6.35*	31.05*	109.66*	
	20	0.96	1.21	1.50	1.83	2.25*	2.87*	4.74*	8.01*	13.22*	71.17*	256.95*	
	25	1.04	1.33	1.68	2.11	2.74*	3.96*	8.15*	14.48*	24.54*	137.33*	499.78*	
200	15	1.08	1.35	1.65	1.98	2.34*	2.80*	3.67*	4.72*	6.51*	31.05*	109.66*	
	20	1.21	1.53	1.89	2.30	2.80*	3.48*	5.12*	8.03*	13.22*	71.17*	256.95*	
	25	1.33	1.70	2.14	2.65	3.35*	4.46*	8.17*	14.48*	24.54*	137.33*	499.78*	
300	15	1.25	1.57	1.91	2.28	2.70*	3.22*	4.18*	5.27*	6.91*	31.05*	109.66*	
	20	1.42	1.79	2.21	2.68	3.24*	3.99*	5.63*	8.21*	13.22*	71.17*	256.95*	
	25	1.57	2.00	2.50	3.09	3.85*	4.99*	8.32*	14.48*	24.54*	137.33*	499.78*	
400	15	1.40	1.75	2.14	2.55	3.01*	3.59*	4.64*	5.77*	7.38*	31.05*	109.66*	
	20	1.59	2.01	2.48	3.00	3.62*	4.44*	6.13*	8.55*	13.25*	71.17*	256.95*	
	25	1.78	2.26	2.82	3.47	4.29*	5.48*	8.62*	14.49*	24.54*	137.33*	499.78*	
500	15	1.54	1.92	2.34	2.79	3.29*	3.92*	5.04*	6.23*	7.85*	31.05*	109.66*	
	20	1.76	2.21	2.73	3.29	3.96*	4.84*	6.60*	8.95*	13.35*	71.17*	256.95*	
	25	1.96	2.49	3.10	3.81	4.69*	5.94*	9.00*	14.53*	24.54*	137.33*	499.78*	
600	15	1.66	2.07	2.53	3.01	3.55*	4.23*	5.42*	6.66*	8.31*	31.05*	109.66*	
	20	1.90	2.40	2.95	3.56	4.27*	5.21*	7.04*	9.37*	13.53*	71.17*	256.95*	
	25	2.13	2.71	3.37	4.12	5.05*	6.36*	9.41*	14.64*	24.55*	137.33*	499.78*	
700	15	1.77	2.22	2.70	3.22	3.79*	4.51*	5.77*	7.06*	8.74*	31.05*	109.66*	
	20	2.04	2.57	3.16	3.81	4.56*	5.55*	7.46*	9.80*	13.77*	71.17*	256.95*	
	25	2.29	2.91	3.61	4.41	5.39*	6.75*	9.82*	14.81*	24.55*	137.33*	499.78*	
800	15	1.88	2.35	2.86	3.41	4.01*	4.78*	6.10*	7.45*	9.16*	31.05*	109.66*	
	20	2.17	2.74	3.36	4.05	4.84*	5.88*	7.85*	10.21*	14.07*	71.17*	256.95*	
	25	2.44	3.10	3.84	4.69	5.71*	7.13*	10.23*	15.04*	24.56*	137.33*	499.78*	
900	15	1.99	2.48	3.02	3.59	4.23*	5.03*	6.41*	7.81*	9.57*	31.05*	109.66*	
	20	2.30	2.89	3.55	4.27	5.10*	6.19*	8.23*	10.62*	14.39*	71.17*	256.95*	
	25	2.58	3.28	4.06	4.95	6.02*	7.49*	10.63*	15.31*	24.58*	137.33*	499.78*	
1000	15	2.09	2.61	3.17	3.77	4.43*	5.27*	6.71*	8.15*	9.95*	31.06*	109.66*	
	20	2.42	3.04	3.73	4.48	5.35*	6.48*	8.59*	11.01*	14.73*	71.17*	256.95*	
	25	2.72	3.45	4.27	5.20	6.31*	7.83*	11.02*	15.61*	24.62*	137.33*	499.78*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.0 Ft (RADIUS = 5.7 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	2.18	2.72	3.31	3.94	4.63*	5.50*	7.00*	8.49*	10.33*	31.08*	109.66*
	20	2.53	3.18	3.90	4.69	5.59*	6.76*	8.93*	11.40*	15.08*	71.17*	256.95*
	25	2.85	3.61	4.47	5.43	6.59*	8.15*	11.40*	15.93*	24.69*	137.33*	499.78*
1200	15	2.27	2.84	3.45	4.10	4.82*	5.72*	7.27*	8.81*	10.69*	31.11*	109.66*
	20	2.64	3.32	4.07	4.88	5.82*	7.03*	9.27*	11.77*	15.44*	71.17*	256.95*
	25	2.98	3.77	4.66	5.66	6.85*	8.47*	11.77*	16.25*	24.78*	137.33*	499.78*
1300	15	2.36	2.95	3.58	4.26	5.00*	5.94*	7.54*	9.12*	11.04*	31.15*	109.66*
	20	2.75	3.45	4.23	5.07	6.04*	7.29*	9.59*	12.13*	15.79*	71.17*	256.95*
	25	3.10	3.92	4.85	5.88	7.11*	8.77*	12.13*	16.59*	24.90*	137.33*	499.78*
1400	15	2.45	3.05	3.71	4.41	5.17*	6.14*	7.79*	9.42*	11.38*	31.21*	109.66*
	20	2.85	3.58	4.38	5.26	6.25*	7.55*	9.90*	12.48*	16.15*	71.17*	256.95*
	25	3.22	4.07	5.03	6.10	7.36*	9.07*	12.48*	16.93*	25.04*	137.33*	499.78*
1500	15	2.53	3.16	3.84	4.55	5.35*	6.35*	8.04*	9.71*	11.71*	31.29*	109.66*
	20	2.95	3.70	4.53	5.43	6.46*	7.79*	10.21*	12.83*	16.50*	71.17*	256.95*
	25	3.33	4.21	5.20	6.30	7.61*	9.36*	12.82*	17.27*	25.21*	137.33*	499.78*
1600	15	2.61	3.26	3.96	4.70	5.51*	6.54*	8.29*	9.99*	12.03*	31.39*	109.66*
	20	3.05	3.82	4.68	5.61	6.66*	8.03*	10.50*	13.17*	16.85*	71.17*	256.95*
	25	3.44	4.35	5.37	6.51	7.84*	9.63*	13.16*	17.61*	25.40*	137.33*	499.78*
1700	15	2.69	3.36	4.08	4.84	5.67*	6.73*	8.52*	10.26*	12.34*	31.50*	109.66*
	20	3.14	3.94	4.82	5.78	6.86*	8.26*	10.79*	13.49*	17.20*	71.17*	256.95*
	25	3.55	4.49	5.54	6.70	8.07*	9.91*	13.49*	17.94*	25.61*	137.33*	499.78*
1800	15	2.77	3.45	4.19	4.97	5.83*	6.92*	8.75*	10.53*	12.65*	31.64*	109.66*
	20	3.23	4.06	4.96	5.94	7.05*	8.49*	11.07*	13.82*	17.54*	71.17*	256.95*
	25	3.66	4.62	5.70	6.89	8.30*	10.17*	13.81*	18.28*	25.83*	137.33*	499.78*
1900	15	2.85	3.55	4.30	5.11	5.99*	7.10*	8.98*	10.80*	12.95*	31.80*	109.66*
	20	3.32	4.17	5.10	6.10	7.24*	8.71*	11.34*	14.13*	17.88*	71.17*	256.95*
	25	3.76	4.75	5.85	7.08	8.51*	10.43*	14.12*	18.61*	26.07*	137.33*	499.78*
2000	15	2.92	3.64	4.41	5.24	6.14*	7.28*	9.20*	11.05*	13.24*	31.97*	109.66*
	20	3.41	4.28	5.23	6.26	7.42*	8.93*	11.61*	14.44*	18.21*	71.18*	256.95*
	25	3.87	4.88	6.01	7.26	8.73*	10.68*	14.43*	18.94*	26.32*	137.33*	499.78*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.0 Ft (RADIUS = 5.7 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	1.49	1.96	2.59	3.64	6.18*	11.33*	25.81*	47.42*	81.98*	470.83*	1722.6*
	20	1.71	2.34	3.40	6.33	13.07*	25.12*	59.18*	110.20*	191.91*	1112.8*	4079.2*
	25	1.93	2.78	4.89	11.40	24.45*	47.86*	114.20*	213.70*	373.14*	2171.3*	7964.5*
200	15	1.93	2.53	3.29	4.38	6.46*	11.33*	25.81*	47.42*	81.98*	470.83*	1722.6*
	20	2.24	3.03	4.19	6.61	13.07*	25.12*	59.18*	110.20*	191.91*	1112.8*	4079.2*
	25	2.55	3.58	5.51	11.40	24.45*	47.86*	114.20*	213.70*	373.14*	2171.3*	7964.5*
300	15	2.29	2.98	3.84	5.02	6.99*	11.39*	25.81*	47.42*	81.98*	470.83*	1722.6*
	20	2.67	3.58	4.86	7.15	13.09*	25.12*	59.18*	110.20*	191.91*	1112.8*	4079.2*
	25	3.04	4.22	6.20	11.46	24.45*	47.86*	114.20*	213.70*	373.14*	2171.3*	7964.5*
400	15	2.60	3.37	4.33	5.59	7.56*	11.59*	25.81*	47.42*	81.98*	470.83*	1722.6*
	20	3.04	4.05	5.44	7.73	13.17*	25.12*	59.18*	110.20*	191.91*	1112.8*	4079.2*
	25	3.47	4.78	6.84	11.66	24.45*	47.86*	114.20*	213.70*	373.14*	2171.3*	7964.5*
500	15	2.87	3.72	4.76	6.10	8.10*	11.92*	25.81*	47.42*	81.98*	470.83*	1722.6*
	20	3.38	4.48	5.97	8.30	13.37*	25.12*	59.18*	110.20*	191.91*	1112.8*	4079.2*
	25	3.86	5.28	7.44	12.00	24.45*	47.86*	114.20*	213.70*	373.14*	2171.3*	7964.5*
600	15	3.13	4.04	5.16	6.57	8.62*	12.33*	25.81*	47.42*	81.98*	470.83*	1722.6*
	20	3.68	4.88	6.46	8.83	13.66*	25.13*	59.18*	110.20*	191.91*	1112.8*	4079.2*
	25	4.22	5.73	7.99	12.41	24.46*	47.86*	114.20*	213.70*	373.14*	2171.3*	7964.5*
700	15	3.37	4.35	5.53	7.02	9.12*	12.76*	25.83*	47.42*	81.98*	470.83*	1722.6*
	20	3.97	5.24	6.91	9.35	14.01*	25.14*	59.18*	110.20*	191.91*	1112.8*	4079.2*
	25	4.55	6.16	8.51	12.86	24.47*	47.86*	114.20*	213.70*	373.14*	2171.3*	7964.5*
800	15	3.59	4.63	5.88	7.43	9.59*	13.22*	25.86*	47.42*	81.98*	470.83*	1722.6*
	20	4.24	5.59	7.33	9.84	14.41*	25.17*	59.18*	110.20*	191.91*	1112.8*	4079.2*
	25	4.86	6.56	9.00	13.32	24.51*	47.86*	114.20*	213.70*	373.14*	2171.3*	7964.5*
900	15	3.80	4.90	6.21	7.83	10.04*	13.67*	25.91*	47.42*	81.98*	470.83*	1722.6*
	20	4.50	5.91	7.74	10.31	14.82*	25.23*	59.18*	110.20*	191.91*	1112.8*	4079.2*
	25	5.16	6.95	9.47	13.79	24.57*	47.86*	114.20*	213.70*	373.14*	2171.3*	7964.5*
1000	15	4.01	5.16	6.53	8.20	10.47*	14.12*	26.00*	47.42*	81.98*	470.83*	1722.6*
	20	4.74	6.23	8.12	10.76	15.24*	25.32*	59.18*	110.20*	191.91*	1112.8*	4079.2*
	25	5.44	7.31	9.91	14.25	24.67*	47.86*	114.20*	213.70*	373.14*	2171.3*	7964.5*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 8.0 Ft (RADIUS = 5.7 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	4.20	5.40	6.83	8.56	10.89*	14.56*	26.13*	47.42*	81.98*	470.83*	1722.6*
	20	4.98	6.53	8.49	11.19	15.66*	25.46*	59.18*	110.20*	191.91*	1112.8*	4079.2*
	25	5.72	7.66	10.34	14.71	24.81*	47.86*	114.20*	213.70*	373.14*	2171.3*	7964.5*
1200	15	4.39	5.64	7.12	8.91	11.29*	15.00*	26.30*	47.42*	81.98*	470.83*	1722.6*
	20	5.20	6.81	8.85	11.61	16.09*	25.62*	59.18*	110.20*	191.91*	1112.8*	4079.2*
	25	5.98	8.00	10.75	15.16	24.98*	47.86*	114.20*	213.70*	373.14*	2171.3*	7964.5*
1300	15	4.57	5.87	7.40	9.25	11.68*	15.43*	26.50*	47.42*	81.98*	470.83*	1722.6*
	20	5.42	7.09	9.19	12.01	16.50*	25.82*	59.18*	110.20*	191.91*	1112.8*	4079.2*
	25	6.23	8.32	11.15	15.59	25.19*	47.86*	114.20*	213.70*	373.14*	2171.3*	7964.5*
1400	15	4.75	6.09	7.67	9.57	12.05*	15.85*	26.73*	47.43*	81.98*	470.83*	1722.6*
	20	5.63	7.36	9.52	12.41	16.92*	26.05*	59.18*	110.20*	191.91*	1112.8*	4079.2*
	25	6.48	8.63	11.54	16.03	25.43*	47.87*	114.20*	213.70*	373.14*	2171.3*	7964.5*
1500	15	4.92	6.31	7.94	9.89	12.42*	16.26*	26.98*	47.44*	81.98*	470.83*	1722.6*
	20	5.84	7.62	9.85	12.79	17.33*	26.31*	59.18*	110.20*	191.91*	1112.8*	4079.2*
	25	6.72	8.94	11.92	16.45	25.69*	47.87*	114.20*	213.70*	373.14*	2171.3*	7964.5*
1600	15	5.08	6.52	8.19	10.19	12.78*	16.66*	27.26*	47.45*	81.98*	470.83*	1722.6*
	20	6.04	7.88	10.16	13.16	17.73*	26.59*	59.18*	110.20*	191.91*	1112.8*	4079.2*
	25	6.95	9.23	12.28	16.86	25.97*	47.88*	114.20*	213.70*	373.14*	2171.3*	7964.5*
1700	15	5.25	6.72	8.44	10.49	13.13*	17.05*	27.55*	47.47*	81.98*	470.83*	1722.6*
	20	6.24	8.12	10.46	13.52	18.12*	26.88*	59.19*	110.20*	191.91*	1112.8*	4079.2*
	25	7.17	9.52	12.64	17.27	26.26*	47.89*	114.20*	213.70*	373.14*	2171.3*	7964.5*
1800	15	5.41	6.92	8.69	10.78	13.47*	17.44*	27.86*	47.50*	81.98*	470.83*	1722.6*
	20	6.43	8.37	10.76	13.88	18.51*	27.18*	59.19*	110.20*	191.91*	1112.8*	4079.2*
	25	7.39	9.80	12.98	17.67	26.57*	47.91*	114.20*	213.70*	373.14*	2171.3*	7964.5*
1900	15	5.56	7.11	8.93	11.07	13.80*	17.82*	28.17*	47.53*	81.98*	470.83*	1722.6*
	20	6.61	8.60	11.05	14.22	18.89*	27.50*	59.19*	110.20*	191.91*	1112.8*	4079.2*
	25	7.61	10.08	13.32	18.06	26.88*	47.94*	114.20*	213.70*	373.14*	2171.3*	7964.5*
2000	15	5.71	7.30	9.16	11.35	14.12*	18.19*	28.50*	47.58*	81.98*	470.83*	1722.6*
	20	6.79	8.83	11.34	14.56	19.27*	27.82*	59.20*	110.20*	191.91*	1112.8*	4079.2*
	25	7.82	10.35	13.65	18.44	27.21*	47.98*	114.20*	213.70*	373.14*	2171.3*	7964.5*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.0 Ft (RADIUS = 7.1 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
100	15	0.42	0.50	0.58	0.66	0.75	0.83*	0.97*	1.08*	1.20*	1.70*	2.28*	
	20	0.44	0.53	0.61	0.70	0.80	0.89*	1.04*	1.17*	1.30*	1.90*	2.73*	
	25	0.46	0.55	0.65	0.74	0.84	0.94*	1.11*	1.25*	1.40*	2.13*	3.52*	
200	15	0.48	0.57	0.67	0.76	0.86	0.96*	1.12*	1.26*	1.40*	2.00*	2.69*	
	20	0.52	0.61	0.72	0.83	0.93	1.04*	1.22*	1.38*	1.54*	2.26*	3.20*	
	25	0.55	0.65	0.77	0.88	1.00	1.11*	1.32*	1.50*	1.68*	2.55*	3.92*	
300	15	0.53	0.63	0.74	0.85	0.95	1.06*	1.24*	1.40*	1.56*	2.24*	3.02*	
	20	0.58	0.69	0.80	0.92	1.04	1.16*	1.37*	1.55*	1.74*	2.56*	3.60*	
	25	0.62	0.74	0.86	0.99	1.12	1.26*	1.49*	1.70*	1.91*	2.90*	4.34*	
400	15	0.58	0.69	0.80	0.92	1.03	1.15*	1.35*	1.52*	1.70*	2.45*	3.30*	
	20	0.63	0.75	0.88	1.01	1.14	1.27*	1.50*	1.70*	1.90*	2.81*	3.94*	
	25	0.68	0.81	0.95	1.09	1.23	1.38*	1.64*	1.87*	2.10*	3.19*	4.73*	
500	15	0.62	0.73	0.86	0.98	1.11	1.23*	1.45*	1.63*	1.82*	2.63*	3.56*	
	20	0.68	0.81	0.94	1.08	1.22	1.36*	1.62*	1.83*	2.06*	3.04*	4.25*	
	25	0.74	0.88	1.03	1.18	1.33	1.49*	1.78*	2.02*	2.28*	3.46*	5.08*	
600	15	0.65	0.78	0.91	1.04	1.17	1.30*	1.54*	1.74*	1.94*	2.81*	3.79*	
	20	0.72	0.86	1.01	1.15	1.30	1.45*	1.72*	1.96*	2.19*	3.25*	4.54*	
	25	0.79	0.94	1.10	1.26	1.43	1.59*	1.90*	2.16*	2.44*	3.70*	5.41*	
700	15	0.69	0.82	0.96	1.09	1.23	1.37*	1.62*	1.83*	2.05*	2.97*	4.01*	
	20	0.77	0.91	1.06	1.22	1.38	1.53*	1.82*	2.07*	2.32*	3.44*	4.80*	
	25	0.83	0.99	1.16	1.34	1.51	1.69*	2.01*	2.30*	2.59*	3.93*	5.72*	
800	15	0.72	0.86	1.00	1.15	1.29	1.44*	1.70*	1.92*	2.15*	3.12*	4.21*	
	20	0.80	0.96	1.12	1.28	1.45	1.61*	1.92*	2.18*	2.45*	3.63*	5.06*	
	25	0.88	1.05	1.22	1.41	1.59	1.78*	2.12*	2.42*	2.73*	4.15*	6.01*	
900	15	0.75	0.89	1.04	1.20	1.35	1.50*	1.77*	2.01*	2.25*	3.26*	4.41*	
	20	0.84	1.00	1.17	1.34	1.51	1.69*	2.01*	2.28*	2.56*	3.80*	5.29*	
	25	0.92	1.10	1.28	1.47	1.67	1.86*	2.23*	2.54*	2.87*	4.35*	6.28*	
1000	15	0.78	0.93	1.08	1.24	1.40	1.56*	1.84*	2.09*	2.34*	3.40*	4.60*	
	20	0.88	1.04	1.22	1.40	1.58	1.76*	2.09*	2.38*	2.67*	3.97*	5.52*	
	25	0.96	1.14	1.34	1.54	1.74	1.94*	2.32*	2.65*	3.00*	4.54*	6.55*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.0 Ft (RADIUS = 7.1 Ft)
FIRE GROWTH: ULTRAFast (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	0.81	0.96	1.12	1.29	1.45	1.61*	1.91*	2.17*	2.43*	3.53*	4.77*
	20	0.91	1.08	1.27	1.45	1.64	1.83*	2.17*	2.47*	2.78*	4.13*	5.74*
	25	1.00	1.19	1.39	1.60	1.81	2.02*	2.42*	2.76*	3.12*	4.73*	6.80*
1200	15	0.84	1.00	1.16	1.33	1.50	1.67*	1.98*	2.24*	2.51*	3.66*	4.95*
	20	0.94	1.12	1.31	1.50	1.70	1.89*	2.25*	2.56*	2.88*	4.28*	5.95*
	25	1.04	1.24	1.45	1.66	1.88	2.10*	2.51*	2.87*	3.24*	4.91*	7.04*
1300	15	0.87	1.03	1.20	1.37	1.55	1.72*	2.04*	2.31*	2.59*	3.78*	5.11*
	20	0.98	1.16	1.35	1.55	1.75	1.95*	2.33*	2.65*	2.98*	4.43*	6.15*
	25	1.08	1.28	1.50	1.72	1.94	2.17*	2.60*	2.97*	3.35*	5.08*	7.28*
1400	15	0.89	1.06	1.24	1.41	1.59	1.77*	2.10*	2.38*	2.67*	3.90*	5.27*
	20	1.01	1.20	1.40	1.60	1.81	2.02*	2.40*	2.73*	3.08*	4.57*	6.35*
	25	1.11	1.32	1.55	1.78	2.01	2.24*	2.68*	3.07*	3.46*	5.25*	7.51*
1500	15	0.92	1.09	1.27	1.45	1.64	1.82*	2.16*	2.45*	2.75*	4.01*	5.43*
	20	1.04	1.23	1.44	1.65	1.86	2.08*	2.47*	2.82*	3.17*	4.71*	6.54*
	25	1.15	1.36	1.59	1.83	2.07	2.31*	2.77*	3.16*	3.57*	5.41*	7.73*
1600	15	0.94	1.12	1.30	1.49	1.68	1.87*	2.22*	2.52*	2.82*	4.12*	5.58*
	20	1.07	1.27	1.48	1.70	1.92	2.13*	2.54*	2.90*	3.26*	4.85*	6.72*
	25	1.18	1.40	1.64	1.88	2.13	2.38*	2.85*	3.25*	3.68*	5.57*	7.94*
1700	15	0.97	1.15	1.34	1.53	1.73	1.92*	2.28*	2.58*	2.90*	4.23*	5.73*
	20	1.10	1.30	1.52	1.74	1.97	2.19*	2.61*	2.98*	3.35*	4.98*	6.90*
	25	1.21	1.44	1.68	1.93	2.19	2.44*	2.93*	3.34*	3.78*	5.72*	8.15*
1800	15	0.99	1.17	1.37	1.57	1.77	1.96*	2.33*	2.65*	2.97*	4.34*	5.87*
	20	1.12	1.33	1.56	1.78	2.02	2.24*	2.68*	3.05*	3.44*	5.11*	7.08*
	25	1.24	1.48	1.73	1.99	2.25	2.51*	3.00*	3.43*	3.88*	5.87*	8.36*
1900	15	1.01	1.20	1.40	1.60	1.81	2.01*	2.39*	2.71*	3.04*	4.44*	6.01*
	20	1.15	1.36	1.59	1.83	2.06	2.30*	2.74*	3.13*	3.52*	5.23*	7.25*
	25	1.27	1.51	1.77	2.03	2.30	2.57*	3.08*	3.52*	3.98*	6.02*	8.56*
2000	15	1.04	1.23	1.43	1.64	1.85	2.05*	2.44*	2.77*	3.11*	4.54*	6.15*
	20	1.18	1.40	1.63	1.87	2.11	2.35*	2.81*	3.20*	3.60*	5.36*	7.42*
	25	1.31	1.55	1.81	2.08	2.36	2.63*	3.15*	3.60*	4.07*	6.16*	8.75*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.0 Ft (RADIUS = 7.1 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	0.64	0.76	0.90	1.04	1.18	1.32*	1.57*	1.80*	2.05*	3.64*	9.13*
	20	0.69	0.83	0.98	1.13	1.29	1.46*	1.78*	2.08*	2.44*	6.33*	19.35*
	25	0.74	0.89	1.05	1.23	1.41	1.61*	2.01*	2.43*	3.03*	11.05*	36.19*
200	15	0.77	0.92	1.08	1.24	1.41	1.58*	1.90*	2.18*	2.48*	4.16*	9.14*
	20	0.84	1.01	1.19	1.38	1.58	1.79*	2.17*	2.54*	2.95*	6.41*	19.35*
	25	0.91	1.10	1.30	1.52	1.75	1.99*	2.47*	2.95*	3.56*	11.05*	36.19*
300	15	0.87	1.04	1.22	1.41	1.60	1.80*	2.16*	2.48*	2.82*	4.65*	9.20*
	20	0.97	1.16	1.37	1.58	1.81	2.05*	2.49*	2.90*	3.37*	6.69*	19.35*
	25	1.05	1.27	1.50	1.75	2.01	2.29*	2.84*	3.38*	4.03*	11.06*	36.19*
400	15	0.96	1.15	1.35	1.55	1.77	1.98*	2.38*	2.74*	3.12*	5.09*	9.39*
	20	1.07	1.29	1.52	1.76	2.01	2.27*	2.76*	3.22*	3.73*	7.07*	19.35*
	25	1.18	1.42	1.68	1.95	2.25	2.55*	3.16*	3.75*	4.44*	11.10*	36.19*
500	15	1.04	1.24	1.46	1.69	1.92	2.15*	2.58*	2.97*	3.38*	5.48*	9.68*
	20	1.17	1.40	1.65	1.92	2.19	2.47*	3.01*	3.50*	4.06*	7.47*	19.35*
	25	1.29	1.55	1.83	2.13	2.45	2.79*	3.45*	4.08*	4.82*	11.23*	36.19*
600	15	1.12	1.33	1.57	1.81	2.05	2.30*	2.77*	3.19*	3.63*	5.85*	10.02*
	20	1.26	1.51	1.78	2.06	2.35	2.66*	3.24*	3.77*	4.35*	7.87*	19.35*
	25	1.39	1.67	1.98	2.30	2.64	3.01*	3.71*	4.38*	5.16*	11.42*	36.19*
700	15	1.19	1.42	1.66	1.92	2.18	2.44*	2.94*	3.39*	3.86*	6.20*	10.37*
	20	1.34	1.61	1.90	2.20	2.51	2.83*	3.45*	4.01*	4.63*	8.25*	19.37*
	25	1.49	1.79	2.11	2.46	2.82	3.21*	3.96*	4.67*	5.49*	11.67*	36.19*
800	15	1.25	1.50	1.76	2.02	2.30	2.58*	3.11*	3.57*	4.07*	6.52*	10.74*
	20	1.42	1.70	2.01	2.32	2.65	2.99*	3.65*	4.24*	4.89*	8.62*	19.41*
	25	1.58	1.89	2.24	2.61	2.99	3.40*	4.19*	4.94*	5.79*	11.96*	36.19*
900	15	1.32	1.57	1.84	2.13	2.41	2.71*	3.26*	3.75*	4.27*	6.83*	11.10*
	20	1.50	1.79	2.11	2.44	2.79	3.15*	3.83*	4.46*	5.14*	8.98*	19.47*
	25	1.67	2.00	2.36	2.75	3.15	3.57*	4.41*	5.19*	6.08*	12.26*	36.19*
1000	15	1.38	1.64	1.93	2.22	2.52	2.83*	3.41*	3.92*	4.47*	7.12*	11.45*
	20	1.57	1.88	2.21	2.56	2.92	3.29*	4.01*	4.67*	5.38*	9.32*	19.57*
	25	1.75	2.10	2.48	2.88	3.30	3.75*	4.62*	5.43*	6.36*	12.58*	36.19*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.0 Ft (RADIUS = 7.1 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	1.44	1.71	2.01	2.31	2.63	2.95*	3.55*	4.09*	4.65*	7.41*	11.80*
	20	1.64	1.96	2.31	2.67	3.05	3.43*	4.19*	4.86*	5.61*	9.66*	19.70*
	25	1.83	2.19	2.59	3.01	3.45	3.91*	4.82*	5.66*	6.62*	12.90*	36.19*
1200	15	1.49	1.78	2.09	2.40	2.73	3.06*	3.69*	4.24*	4.83*	7.68*	12.14*
	20	1.71	2.04	2.40	2.78	3.17	3.57*	4.35*	5.06*	5.82*	9.98*	19.85*
	25	1.90	2.28	2.70	3.13	3.59	4.07*	5.01*	5.89*	6.88*	13.22*	36.19*
1300	15	1.55	1.84	2.16	2.49	2.83	3.17*	3.82*	4.40*	5.01*	7.94*	12.48*
	20	1.77	2.12	2.49	2.88	3.29	3.70*	4.51*	5.24*	6.04*	10.29*	20.04*
	25	1.98	2.37	2.80	3.25	3.73	4.22*	5.20*	6.10*	7.12*	13.54*	36.19*
1400	15	1.60	1.90	2.23	2.57	2.92	3.27*	3.95*	4.54*	5.17*	8.19*	12.80*
	20	1.83	2.19	2.58	2.98	3.40	3.83*	4.67*	5.42*	6.24*	10.60*	20.24*
	25	2.05	2.45	2.90	3.37	3.86	4.37*	5.38*	6.31*	7.36*	13.86*	36.19*
1500	15	1.65	1.96	2.30	2.65	3.01	3.38*	4.07*	4.69*	5.34*	8.44*	13.12*
	20	1.89	2.26	2.66	3.08	3.51	3.95*	4.82*	5.59*	6.44*	10.89*	20.46*
	25	2.12	2.54	3.00	3.48	3.99	4.51*	5.55*	6.52*	7.59*	14.17*	36.20*
1600	15	1.70	2.02	2.37	2.73	3.10	3.48*	4.19*	4.83*	5.49*	8.68*	13.44*
	20	1.95	2.33	2.74	3.17	3.62	4.07*	4.96*	5.76*	6.63*	11.18*	20.70*
	25	2.18	2.62	3.09	3.59	4.11	4.65*	5.72*	6.71*	7.82*	14.48*	36.21*
1700	15	1.75	2.08	2.44	2.81	3.19	3.57*	4.31*	4.96*	5.65*	8.91*	13.75*
	20	2.01	2.40	2.82	3.27	3.72	4.19*	5.11*	5.93*	6.82*	11.46*	20.94*
	25	2.25	2.70	3.18	3.70	4.23	4.79*	5.89*	6.90*	8.03*	14.78*	36.23*
1800	15	1.79	2.14	2.50	2.88	3.27	3.67*	4.43*	5.09*	5.80*	9.14*	14.05*
	20	2.07	2.47	2.90	3.36	3.83	4.31*	5.24*	6.09*	7.00*	11.74*	21.20*
	25	2.32	2.77	3.27	3.80	4.35	4.92*	6.05*	7.09*	8.25*	15.08*	36.25*
1900	15	1.84	2.19	2.57	2.96	3.36	3.76*	4.54*	5.22*	5.95*	9.36*	14.34*
	20	2.12	2.53	2.98	3.44	3.93	4.42*	5.38*	6.24*	7.18*	12.01*	21.46*
	25	2.38	2.85	3.36	3.90	4.46	5.05*	6.21*	7.27*	8.46*	15.38*	36.28*
2000	15	1.88	2.24	2.63	3.03	3.44	3.85*	4.65*	5.35*	6.09*	9.58*	14.63*
	20	2.17	2.60	3.05	3.53	4.02	4.53*	5.51*	6.40*	7.35*	12.27*	21.72*
	25	2.44	2.92	3.45	4.00	4.58	5.18*	6.36*	7.45*	8.66*	15.67*	36.32*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.0 Ft (RADIUS = 7.1 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	1.03	1.25	1.50	1.78	2.10	2.48*	3.38*	4.82*	7.41*	35.27*	121.47*
	20	1.15	1.41	1.71	2.08	2.55	3.26*	5.70*	9.61*	15.69*	81.12*	284.90*
	25	1.25	1.56	1.93	2.43	3.21	4.85*	10.03*	17.56*	29.34*	156.72*	554.34*
200	15	1.30	1.57	1.88	2.22	2.60	3.04*	4.01*	5.25*	7.48*	35.27*	121.47*
	20	1.46	1.79	2.17	2.62	3.16	3.87*	5.92*	9.61*	15.69*	81.12*	284.90*
	25	1.61	2.00	2.47	3.05	3.85	5.19*	10.04*	17.56*	29.34*	156.72*	554.34*
300	15	1.51	1.83	2.18	2.58	3.01	3.50*	4.55*	5.78*	7.77*	35.27*	121.47*
	20	1.71	2.10	2.54	3.05	3.65	4.41*	6.37*	9.68*	15.69*	81.12*	284.90*
	25	1.91	2.36	2.90	3.55	4.41	5.69*	10.08*	17.56*	29.34*	156.72*	554.34*
400	15	1.69	2.05	2.45	2.88	3.36	3.90*	5.03*	6.29*	8.19*	35.27*	121.47*
	20	1.93	2.36	2.86	3.42	4.08	4.89*	6.86*	9.89*	15.70*	81.12*	284.90*
	25	2.16	2.67	3.27	3.99	4.90	6.19*	10.24*	17.56*	29.34*	156.72*	554.34*
500	15	1.86	2.25	2.68	3.16	3.68	4.26*	5.46*	6.77*	8.64*	35.27*	121.47*
	20	2.13	2.60	3.14	3.76	4.46	5.32*	7.33*	10.21*	15.73*	81.12*	284.90*
	25	2.39	2.95	3.60	4.38	5.35	6.66*	10.51*	17.57*	29.34*	156.72*	554.34*
600	15	2.01	2.43	2.90	3.41	3.97	4.58*	5.86*	7.22*	9.09*	35.27*	121.47*
	20	2.32	2.82	3.41	4.06	4.82	5.72*	7.78*	10.58*	15.81*	81.12*	284.90*
	25	2.60	3.20	3.91	4.74	5.76	7.11*	10.85*	17.60*	29.34*	156.72*	554.34*
700	15	2.15	2.60	3.10	3.65	4.24	4.89*	6.23*	7.64*	9.53*	35.27*	121.47*
	20	2.49	3.03	3.65	4.35	5.15	6.09*	8.22*	10.98*	15.95*	81.12*	284.90*
	25	2.80	3.44	4.20	5.08	6.14	7.53*	11.22*	17.68*	29.34*	156.72*	554.34*
800	15	2.29	2.76	3.29	3.87	4.49	5.18*	6.58*	8.04*	9.96*	35.27*	121.47*
	20	2.65	3.22	3.88	4.62	5.46	6.44*	8.63*	11.38*	16.16*	81.12*	284.90*
	25	2.98	3.67	4.46	5.39	6.51	7.93*	11.61*	17.80*	29.34*	156.72*	554.34*
900	15	2.41	2.92	3.47	4.08	4.73	5.45*	6.92*	8.43*	10.37*	35.27*	121.47*
	20	2.80	3.41	4.10	4.88	5.75	6.77*	9.03*	11.78*	16.40*	81.12*	284.90*
	25	3.16	3.88	4.72	5.69	6.85	8.31*	12.00*	17.96*	29.34*	156.72*	554.34*
1000	15	2.54	3.06	3.65	4.28	4.96	5.71*	7.23*	8.79*	10.77*	35.27*	121.47*
	20	2.95	3.59	4.31	5.12	6.03	7.09*	9.40*	12.18*	16.68*	81.12*	284.90*
	25	3.33	4.08	4.96	5.97	7.18	8.67*	12.39*	18.17*	29.35*	156.72*	554.34*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.0 Ft (RADIUS = 7.1 Ft)
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	2.65	3.20	3.81	4.47	5.18	5.96*	7.54*	9.14*	11.16*	35.27*	121.47*
	20	3.09	3.75	4.51	5.35	6.30	7.39*	9.77*	12.57*	16.99*	81.12*	284.90*
	25	3.49	4.28	5.20	6.25	7.49	9.02*	12.77*	18.41*	29.37*	156.72*	554.34*
1200	15	2.77	3.34	3.97	4.66	5.40	6.20*	7.83*	9.48*	11.53*	35.28*	121.47*
	20	3.22	3.92	4.71	5.58	6.56	7.68*	10.12*	12.95*	17.31*	81.12*	284.90*
	25	3.64	4.47	5.42	6.51	7.79	9.36*	13.15*	18.68*	29.40*	156.72*	554.34*
1300	15	2.88	3.47	4.13	4.84	5.60	6.43*	8.12*	9.81*	11.90*	35.30*	121.47*
	20	3.35	4.08	4.89	5.80	6.81	7.96*	10.46*	13.32*	17.64*	81.12*	284.90*
	25	3.80	4.65	5.64	6.76	8.08	9.69*	13.52*	18.97*	29.45*	156.72*	554.34*
1400	15	2.98	3.60	4.28	5.01	5.80	6.65*	8.39*	10.12*	12.25*	35.33*	121.47*
	20	3.48	4.23	5.07	6.01	7.05	8.24*	10.80*	13.69*	17.98*	81.12*	284.90*
	25	3.94	4.83	5.85	7.01	8.37	10.01*	13.88*	19.27*	29.52*	156.72*	554.34*
1500	15	3.08	3.72	4.42	5.18	5.99	6.87*	8.66*	10.43*	12.59*	35.36*	121.47*
	20	3.60	4.38	5.25	6.21	7.29	8.50*	11.12*	14.04*	18.31*	81.12*	284.90*
	25	4.08	5.00	6.05	7.25	8.64	10.31*	14.24*	19.58*	29.61*	156.72*	554.34*
1600	15	3.18	3.84	4.56	5.34	6.18	7.08*	8.92*	10.73*	12.93*	35.41*	121.47*
	20	3.72	4.52	5.42	6.41	7.52	8.76*	11.43*	14.39*	18.65*	81.12*	284.90*
	25	4.22	5.16	6.25	7.48	8.91	10.61*	14.58*	19.89*	29.71*	156.72*	554.34*
1700	15	3.28	3.96	4.70	5.50	6.36	7.29*	9.17*	11.02*	13.26*	35.48*	121.47*
	20	3.84	4.66	5.59	6.61	7.74	9.01*	11.74*	14.73*	18.99*	81.12*	284.90*
	25	4.35	5.33	6.44	7.70	9.17	10.91*	14.93*	20.21*	29.84*	156.72*	554.34*
1800	15	3.38	4.07	4.84	5.66	6.54	7.49*	9.41*	11.30*	13.58*	35.56*	121.47*
	20	3.95	4.80	5.75	6.79	7.96	9.26*	12.04*	15.07*	19.33*	81.12*	284.90*
	25	4.49	5.48	6.63	7.92	9.42	11.19*	15.26*	20.53*	29.99*	156.72*	554.34*
1900	15	3.47	4.18	4.97	5.81	6.72	7.68*	9.65*	11.58*	13.89*	35.66*	121.47*
	20	4.06	4.93	5.91	6.98	8.17	9.50*	12.33*	15.40*	19.67*	81.12*	284.90*
	25	4.61	5.64	6.81	8.14	9.67	11.47*	15.59*	20.86*	30.15*	156.72*	554.34*
2000	15	3.56	4.29	5.10	5.96	6.89	7.88*	9.89*	11.85*	14.20*	35.78*	121.47*
	20	4.17	5.06	6.06	7.16	8.37	9.73*	12.61*	15.72*	20.00*	81.12*	284.90*
	25	4.74	5.79	6.99	8.35	9.91	11.74*	15.91*	21.18*	30.33*	156.72*	554.34*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.0 Ft (RADIUS = 7.1 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	1.81	2.33	3.07	4.49	8.05	14.54*	32.23*	57.99*	98.45*	537.75*	1911.1*
	20	2.10	2.84	4.31	8.66	17.44	32.65*	74.32*	135.18*	230.87*	1271.4*	4525.9*
	25	2.39	3.49	6.91	15.89	32.93	62.51*	143.71*	262.43*	449.19*	2480.9*	8836.8*
200	15	2.36	3.00	3.88	5.24	8.16	14.54*	32.23*	57.99*	98.45*	537.75*	1911.1*
	20	2.76	3.66	5.14	8.74	17.44	32.65*	74.32*	135.18*	230.87*	1271.4*	4525.9*
	25	3.16	4.42	7.26	15.89	32.93	62.51*	143.71*	262.43*	449.19*	2480.9*	8836.8*
300	15	2.80	3.54	4.53	5.94	8.56	14.55*	32.23*	57.99*	98.45*	537.75*	1911.1*
	20	3.29	4.32	5.89	9.11	17.44	32.65*	74.32*	135.18*	230.87*	1271.4*	4525.9*
	25	3.78	5.19	7.89	15.89	32.93	62.51*	143.71*	262.43*	449.19*	2480.9*	8836.8*
400	15	3.18	4.01	5.09	6.58	9.09	14.60*	32.23*	57.99*	98.45*	537.75*	1911.1*
	20	3.75	4.89	6.56	9.63	17.46	32.65*	74.32*	135.18*	230.87*	1271.4*	4525.9*
	25	4.32	5.85	8.57	15.94	32.93	62.51*	143.71*	262.43*	449.19*	2480.9*	8836.8*
500	15	3.52	4.43	5.60	7.16	9.64	14.75*	32.23*	57.99*	98.45*	537.75*	1911.1*
	20	4.17	5.40	7.17	10.20	17.52	32.65*	74.32*	135.18*	230.87*	1271.4*	4525.9*
	25	4.80	6.45	9.22	16.08	32.93	62.51*	143.71*	262.43*	449.19*	2480.9*	8836.8*
600	15	3.84	4.82	6.06	7.70	10.19	14.99*	32.23*	57.99*	98.45*	537.75*	1911.1*
	20	4.55	5.88	7.73	10.77	17.65	32.65*	74.32*	135.18*	230.87*	1271.4*	4525.9*
	25	5.24	7.00	9.84	16.32	32.93	62.51*	143.71*	262.43*	449.19*	2480.9*	8836.8*
700	15	4.13	5.18	6.50	8.21	10.72	15.31*	32.23*	57.99*	98.45*	537.75*	1911.1*
	20	4.90	6.32	8.26	11.32	17.86	32.65*	74.32*	135.18*	230.87*	1271.4*	4525.9*
	25	5.66	7.51	10.43	16.65	32.93	62.51*	143.71*	262.43*	449.19*	2480.9*	8836.8*
800	15	4.41	5.52	6.91	8.69	11.23	15.68*	32.23*	57.99*	98.45*	537.75*	1911.1*
	20	5.24	6.73	8.76	11.86	18.14	32.65*	74.32*	135.18*	230.87*	1271.4*	4525.9*
	25	6.05	8.00	10.99	17.03	32.93	62.51*	143.71*	262.43*	449.19*	2480.9*	8836.8*
900	15	4.67	5.84	7.29	9.14	11.73	16.08*	32.24*	57.99*	98.45*	537.75*	1911.1*
	20	5.56	7.12	9.23	12.38	18.47	32.66*	74.32*	135.18*	230.87*	1271.4*	4525.9*
	25	6.41	8.45	11.53	17.45	32.94	62.51*	143.71*	262.43*	449.19*	2480.9*	8836.8*
1000	15	4.92	6.15	7.66	9.57	12.21	16.49*	32.26*	57.99*	98.45*	537.75*	1911.1*
	20	5.86	7.50	9.68	12.88	18.84	32.68*	74.32*	135.18*	230.87*	1271.4*	4525.9*
	25	6.77	8.89	12.04	17.90	32.96	62.51*	143.71*	262.43*	449.19*	2480.9*	8836.8*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 10.0 Ft (RADIUS = 7.1 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	5.16	6.45	8.02	9.98	12.67	16.91*	32.30*	57.99*	98.45*	537.75*	1911.1*
	20	6.15	7.85	10.11	13.37	19.23	32.71*	74.32*	135.18*	230.87*	1271.4*	4525.9*
	25	7.10	9.31	12.54	18.35	33.00	62.51*	143.71*	262.43*	449.19*	2480.9*	8836.8*
1200	15	5.40	6.73	8.36	10.38	13.11	17.34*	32.36*	57.99*	98.45*	537.75*	1911.1*
	20	6.43	8.20	10.52	13.84	19.63	32.75*	74.32*	135.18*	230.87*	1271.4*	4525.9*
	25	7.43	9.71	13.02	18.81	33.06	62.51*	143.71*	262.43*	449.19*	2480.9*	8836.8*
1300	15	5.62	7.00	8.69	10.77	13.55	17.76*	32.44*	57.99*	98.45*	537.75*	1911.1*
	20	6.70	8.53	10.93	14.30	20.04	32.82*	74.32*	135.18*	230.87*	1271.4*	4525.9*
	25	7.74	10.10	13.48	19.26	33.14	62.51*	143.71*	262.43*	449.19*	2480.9*	8836.8*
1400	15	5.84	7.27	9.00	11.14	13.97	18.18*	32.55*	57.99*	98.45*	537.75*	1911.1*
	20	6.97	8.86	11.31	14.75	20.46	32.91*	74.32*	135.18*	230.87*	1271.4*	4525.9*
	25	8.05	10.48	13.93	19.72	33.24	62.51*	143.71*	262.43*	449.19*	2480.9*	8836.8*
1500	15	6.05	7.53	9.31	11.50	14.38	18.60*	32.68*	57.99*	98.45*	537.75*	1911.1*
	20	7.22	9.17	11.69	15.18	20.88	33.03*	74.32*	135.18*	230.87*	1271.4*	4525.9*
	25	8.34	10.84	14.37	20.17	33.38	62.51*	143.71*	262.43*	449.19*	2480.9*	8836.8*
1600	15	6.26	7.78	9.61	11.86	14.78	19.01*	32.84*	57.99*	98.45*	537.75*	1911.1*
	20	7.47	9.47	12.06	15.60	21.29	33.17*	74.32*	135.18*	230.87*	1271.4*	4525.9*
	25	8.63	11.20	14.79	20.62	33.54	62.51*	143.71*	262.43*	449.19*	2480.9*	8836.8*
1700	15	6.46	8.02	9.91	12.20	15.17	19.41*	33.02*	58.00*	98.45*	537.75*	1911.1*
	20	7.71	9.77	12.41	16.01	21.71	33.33*	74.32*	135.18*	230.87*	1271.4*	4525.9*
	25	8.91	11.54	15.20	21.06	33.73	62.51*	143.71*	262.43*	449.19*	2480.9*	8836.8*
1800	15	6.65	8.26	10.19	12.53	15.55	19.81*	33.23*	58.00*	98.45*	537.75*	1911.1*
	20	7.94	10.06	12.76	16.42	22.12	33.52*	74.32*	135.18*	230.87*	1271.4*	4525.9*
	25	9.18	11.88	15.61	21.49	33.93	62.51*	143.71*	262.43*	449.19*	2480.9*	8836.8*
1900	15	6.84	8.49	10.47	12.86	15.92	20.21*	33.45*	58.01*	98.45*	537.75*	1911.1*
	20	8.18	10.34	13.10	16.81	22.52	33.72*	74.32*	135.18*	230.87*	1271.4*	4525.9*
	25	9.45	12.21	16.00	21.92	34.16	62.51*	143.71*	262.43*	449.19*	2480.9*	8836.8*
2000	15	7.03	8.72	10.74	13.18	16.28	20.60*	33.70*	58.02*	98.45*	537.75*	1911.1*
	20	8.40	10.62	13.44	17.20	22.93	33.95*	74.32*	135.18*	230.87*	1271.4*	4525.9*
	25	9.71	12.53	16.39	22.34	34.41	62.52*	143.71*	262.43*	449.19*	2480.9*	8836.8*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.0 Ft (RADIUS = 8.5 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	0.48	0.55	0.63	0.72	0.80	0.89	1.01*	1.13*	1.25*	1.75*	2.34*
	20	0.51	0.59	0.67	0.76	0.86	0.95	1.09*	1.22*	1.35*	1.96*	2.83*
	25	0.53	0.62	0.71	0.81	0.91	1.01	1.16*	1.31*	1.46*	2.22*	3.74*
200	15	0.55	0.64	0.73	0.83	0.93	1.03	1.18*	1.31*	1.46*	2.06*	2.76*
	20	0.60	0.69	0.79	0.90	1.01	1.12	1.28*	1.44*	1.61*	2.34*	3.31*
	25	0.64	0.74	0.85	0.96	1.08	1.20	1.39*	1.57*	1.76*	2.66*	4.11*
300	15	0.62	0.71	0.82	0.92	1.03	1.14	1.31*	1.46*	1.62*	2.31*	3.10*
	20	0.67	0.77	0.89	1.01	1.13	1.25	1.44*	1.62*	1.81*	2.64*	3.72*
	25	0.72	0.83	0.96	1.09	1.22	1.36	1.57*	1.78*	2.00*	3.01*	4.53*
400	15	0.67	0.77	0.89	1.00	1.12	1.24	1.42*	1.59*	1.77*	2.52*	3.39*
	20	0.73	0.85	0.97	1.10	1.24	1.37	1.58*	1.78*	1.99*	2.91*	4.07*
	25	0.79	0.92	1.06	1.20	1.35	1.49	1.73*	1.96*	2.20*	3.32*	4.92*
500	15	0.72	0.83	0.95	1.07	1.20	1.33	1.52*	1.71*	1.90*	2.72*	3.65*
	20	0.79	0.91	1.05	1.19	1.33	1.48	1.70*	1.92*	2.15*	3.14*	4.39*
	25	0.86	0.99	1.14	1.30	1.46	1.62	1.87*	2.12*	2.38*	3.59*	5.28*
600	15	0.76	0.88	1.01	1.14	1.27	1.41	1.62*	1.82*	2.02*	2.90*	3.90*
	20	0.84	0.98	1.12	1.27	1.42	1.57	1.81*	2.05*	2.29*	3.36*	4.68*
	25	0.92	1.06	1.22	1.39	1.56	1.73	2.00*	2.27*	2.55*	3.85*	5.61*
700	15	0.80	0.93	1.06	1.20	1.34	1.48	1.70*	1.92*	2.13*	3.06*	4.12*
	20	0.89	1.03	1.19	1.34	1.50	1.67	1.92*	2.17*	2.43*	3.56*	4.96*
	25	0.98	1.13	1.30	1.47	1.65	1.84	2.12*	2.41*	2.71*	4.08*	5.93*
800	15	0.84	0.97	1.11	1.26	1.41	1.56	1.79*	2.01*	2.24*	3.22*	4.33*
	20	0.94	1.09	1.25	1.41	1.58	1.75	2.02*	2.28*	2.56*	3.75*	5.22*
	25	1.03	1.19	1.37	1.56	1.74	1.94	2.24*	2.54*	2.86*	4.30*	6.23*
900	15	0.88	1.01	1.16	1.32	1.47	1.62	1.87*	2.10*	2.34*	3.37*	4.53*
	20	0.98	1.14	1.31	1.48	1.66	1.83	2.11*	2.39*	2.68*	3.94*	5.46*
	25	1.08	1.25	1.44	1.63	1.83	2.03	2.35*	2.67*	3.00*	4.51*	6.51*
1000	15	0.91	1.06	1.21	1.37	1.53	1.69	1.94*	2.19*	2.44*	3.51*	4.73*
	20	1.03	1.19	1.36	1.54	1.73	1.91	2.20*	2.49*	2.79*	4.11*	5.69*
	25	1.13	1.31	1.50	1.70	1.91	2.12	2.45*	2.79*	3.14*	4.72*	6.78*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.0 Ft (RADIUS = 8.5 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	0.95	1.09	1.26	1.42	1.59	1.75	2.01*	2.27*	2.53*	3.65*	4.91*
	20	1.07	1.23	1.42	1.60	1.79	1.99	2.29*	2.59*	2.91*	4.27*	5.92*
	25	1.18	1.36	1.56	1.77	1.99	2.21	2.55*	2.90*	3.27*	4.91*	7.04*
1200	15	0.98	1.13	1.30	1.47	1.64	1.81	2.08*	2.35*	2.62*	3.78*	5.09*
	20	1.11	1.28	1.47	1.66	1.86	2.06	2.38*	2.69*	3.01*	4.43*	6.13*
	25	1.22	1.41	1.62	1.84	2.06	2.29	2.65*	3.01*	3.39*	5.09*	7.29*
1300	15	1.01	1.17	1.34	1.52	1.69	1.87	2.15*	2.42*	2.71*	3.90*	5.26*
	20	1.14	1.32	1.52	1.72	1.92	2.13	2.46*	2.78*	3.12*	4.59*	6.34*
	25	1.26	1.46	1.68	1.91	2.14	2.37	2.74*	3.12*	3.51*	5.27*	7.53*
1400	15	1.04	1.20	1.38	1.56	1.74	1.93	2.21*	2.50*	2.79*	4.03*	5.42*
	20	1.18	1.36	1.57	1.77	1.98	2.20	2.53*	2.87*	3.22*	4.73*	6.54*
	25	1.31	1.51	1.74	1.97	2.21	2.45	2.83*	3.22*	3.63*	5.45*	7.77*
1500	15	1.07	1.24	1.42	1.61	1.79	1.98	2.28*	2.57*	2.87*	4.14*	5.58*
	20	1.22	1.41	1.61	1.83	2.04	2.26	2.61*	2.96*	3.31*	4.88*	6.74*
	25	1.35	1.56	1.79	2.03	2.28	2.53	2.92*	3.32*	3.74*	5.61*	8.00*
1600	15	1.10	1.27	1.46	1.65	1.84	2.04	2.34*	2.64*	2.95*	4.26*	5.74*
	20	1.25	1.45	1.66	1.88	2.10	2.33	2.68*	3.04*	3.41*	5.02*	6.93*
	25	1.39	1.60	1.84	2.09	2.34	2.60	3.01*	3.42*	3.85*	5.78*	8.22*
1700	15	1.13	1.31	1.50	1.69	1.89	2.09	2.40*	2.71*	3.03*	4.37*	5.89*
	20	1.29	1.49	1.70	1.93	2.16	2.39	2.76*	3.12*	3.50*	5.16*	7.11*
	25	1.43	1.65	1.89	2.15	2.41	2.67	3.09*	3.52*	3.96*	5.94*	8.43*
1800	15	1.16	1.34	1.53	1.73	1.94	2.14	2.46*	2.78*	3.10*	4.48*	6.04*
	20	1.32	1.52	1.75	1.98	2.21	2.45	2.83*	3.20*	3.59*	5.29*	7.29*
	25	1.46	1.69	1.95	2.21	2.47	2.74	3.17*	3.61*	4.06*	6.09*	8.64*
1900	15	1.19	1.37	1.57	1.77	1.98	2.19	2.52*	2.84*	3.17*	4.59*	6.18*
	20	1.35	1.56	1.79	2.03	2.27	2.51	2.90*	3.28*	3.68*	5.42*	7.47*
	25	1.50	1.74	1.99	2.26	2.53	2.81	3.25*	3.70*	4.16*	6.24*	8.85*
2000	15	1.21	1.40	1.60	1.81	2.03	2.24	2.57*	2.91*	3.25*	4.70*	6.32*
	20	1.38	1.60	1.83	2.08	2.32	2.57	2.96*	3.36*	3.77*	5.55*	7.64*
	25	1.54	1.78	2.04	2.32	2.59	2.88	3.33*	3.79*	4.26*	6.39*	9.05*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.0 Ft (RADIUS = 8.5 Ft)
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	0.74	0.86	0.99	1.13	1.27	1.42	1.66*	1.89*	2.15*	3.90*	9.95*
	20	0.80	0.93	1.08	1.24	1.41	1.58	1.89*	2.21*	2.60*	7.04*	21.26*
	25	0.86	1.00	1.17	1.35	1.54	1.76	2.16*	2.63*	3.33*	12.41*	39.89*
200	15	0.89	1.03	1.20	1.36	1.54	1.71	2.00*	2.29*	2.60*	4.40*	9.95*
	20	0.98	1.14	1.33	1.52	1.73	1.94	2.31*	2.69*	3.13*	7.08*	21.26*
	25	1.07	1.25	1.45	1.68	1.92	2.18	2.64*	3.16*	3.84*	12.41*	39.89*
300	15	1.02	1.18	1.36	1.55	1.75	1.95	2.28*	2.61*	2.96*	4.89*	9.99*
	20	1.13	1.32	1.53	1.75	1.98	2.23	2.64*	3.07*	3.57*	7.29*	21.26*
	25	1.24	1.45	1.68	1.94	2.22	2.52	3.03*	3.61*	4.32*	12.42*	39.89*
400	15	1.12	1.30	1.50	1.71	1.93	2.16	2.52*	2.88*	3.27*	5.34*	10.13*
	20	1.26	1.47	1.70	1.95	2.21	2.48	2.93*	3.41*	3.95*	7.62*	21.26*
	25	1.38	1.62	1.88	2.17	2.48	2.81	3.37*	3.99*	4.74*	12.43*	39.89*
500	15	1.22	1.42	1.63	1.86	2.10	2.34	2.73*	3.13*	3.55*	5.75*	10.36*
	20	1.37	1.60	1.86	2.12	2.41	2.70	3.20*	3.71*	4.29*	8.00*	21.26*
	25	1.52	1.77	2.06	2.38	2.71	3.07	3.68*	4.35*	5.14*	12.50*	39.89*
600	15	1.31	1.52	1.75	2.00	2.25	2.51	2.93*	3.36*	3.81*	6.13*	10.66*
	20	1.48	1.73	2.00	2.29	2.59	2.91	3.44*	3.99*	4.60*	8.39*	21.26*
	25	1.64	1.92	2.23	2.57	2.92	3.31	3.96*	4.67*	5.50*	12.63*	39.89*
700	15	1.39	1.62	1.87	2.12	2.39	2.67	3.11*	3.57*	4.05*	6.48*	11.00*
	20	1.58	1.84	2.13	2.44	2.76	3.10	3.66*	4.24*	4.89*	8.77*	21.27*
	25	1.75	2.05	2.38	2.74	3.12	3.53	4.22*	4.97*	5.84*	12.83*	39.89*
800	15	1.47	1.71	1.97	2.24	2.53	2.82	3.29*	3.77*	4.28*	6.82*	11.35*
	20	1.67	1.95	2.26	2.58	2.93	3.28	3.87*	4.49*	5.17*	9.15*	21.28*
	25	1.86	2.18	2.53	2.91	3.31	3.74	4.47*	5.25*	6.16*	13.06*	39.89*
900	15	1.55	1.79	2.07	2.36	2.65	2.96	3.45*	3.95*	4.49*	7.14*	11.70*
	20	1.76	2.05	2.38	2.72	3.08	3.45	4.07*	4.72*	5.43*	9.51*	21.32*
	25	1.96	2.30	2.67	3.07	3.49	3.94	4.70*	5.52*	6.46*	13.33*	39.89*
1000	15	1.62	1.88	2.17	2.47	2.78	3.09	3.61*	4.13*	4.69*	7.44*	12.05*
	20	1.85	2.15	2.49	2.85	3.23	3.62	4.26*	4.94*	5.68*	9.86*	21.38*
	25	2.06	2.41	2.80	3.22	3.66	4.13	4.92*	5.78*	6.75*	13.62*	39.89*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.0 Ft (RADIUS = 8.5 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	1.69	1.96	2.26	2.57	2.89	3.22	3.76*	4.31*	4.89*	7.73*	12.40*
	20	1.93	2.25	2.60	2.98	3.37	3.77	4.45*	5.15*	5.92*	10.20*	21.47*
	25	2.16	2.52	2.93	3.36	3.82	4.31	5.14*	6.02*	7.03*	13.92*	39.89*
1200	15	1.75	2.03	2.35	2.67	3.01	3.35	3.90*	4.47*	5.08*	8.01*	12.74*
	20	2.01	2.34	2.71	3.10	3.50	3.93	4.62*	5.35*	6.15*	10.53*	21.58*
	25	2.25	2.63	3.05	3.50	3.98	4.49	5.34*	6.26*	7.29*	14.23*	39.89*
1300	15	1.82	2.11	2.43	2.77	3.11	3.47	4.05*	4.63*	5.26*	8.29*	13.08*
	20	2.09	2.43	2.81	3.21	3.63	4.07	4.79*	5.54*	6.37*	10.85*	21.72*
	25	2.34	2.73	3.17	3.64	4.13	4.66	5.54*	6.48*	7.55*	14.54*	39.89*
1400	15	1.88	2.18	2.51	2.86	3.22	3.59	4.18*	4.79*	5.43*	8.55*	13.41*
	20	2.16	2.52	2.91	3.33	3.76	4.21	4.96*	5.73*	6.58*	11.16*	21.88*
	25	2.42	2.83	3.28	3.77	4.28	4.82	5.73*	6.71*	7.80*	14.85*	39.89*
1500	15	1.94	2.25	2.59	2.95	3.32	3.70	4.31*	4.94*	5.61*	8.81*	13.73*
	20	2.23	2.60	3.01	3.44	3.88	4.35	5.12*	5.92*	6.79*	11.47*	22.07*
	25	2.50	2.92	3.39	3.89	4.42	4.98	5.92*	6.92*	8.05*	15.16*	39.90*
1600	15	2.00	2.32	2.67	3.04	3.42	3.81	4.44*	5.09*	5.77*	9.05*	14.05*
	20	2.30	2.68	3.10	3.54	4.00	4.48	5.27*	6.10*	6.99*	11.77*	22.27*
	25	2.58	3.02	3.50	4.02	4.56	5.13	6.10*	7.13*	8.28*	15.47*	39.90*
1700	15	2.06	2.39	2.75	3.13	3.52	3.92	4.57*	5.23*	5.93*	9.30*	14.36*
	20	2.37	2.76	3.19	3.65	4.12	4.61	5.42*	6.27*	7.19*	12.06*	22.49*
	25	2.66	3.11	3.61	4.14	4.69	5.29	6.27*	7.33*	8.51*	15.77*	39.91*
1800	15	2.11	2.45	2.82	3.21	3.61	4.02	4.69*	5.37*	6.09*	9.53*	14.67*
	20	2.44	2.84	3.28	3.75	4.23	4.74	5.57*	6.44*	7.38*	12.34*	22.71*
	25	2.74	3.20	3.71	4.25	4.83	5.43	6.45*	7.53*	8.74*	16.07*	39.92*
1900	15	2.17	2.51	2.90	3.30	3.71	4.13	4.81*	5.51*	6.24*	9.76*	14.97*
	20	2.51	2.91	3.37	3.85	4.35	4.86	5.71*	6.60*	7.57*	12.62*	22.95*
	25	2.81	3.28	3.81	4.37	4.96	5.58	6.61*	7.72*	8.96*	16.37*	39.94*
2000	15	2.22	2.58	2.97	3.38	3.80	4.23	4.92*	5.64*	6.40*	9.99*	15.27*
	20	2.57	2.99	3.46	3.94	4.45	4.99	5.86*	6.77*	7.75*	12.89*	23.20*
	25	2.89	3.37	3.91	4.48	5.08	5.72	6.78*	7.91*	9.17*	16.67*	39.96*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.0 Ft (RADIUS = 8.5 Ft)
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft									
		4	8	12	16	20	24	30	35	40	80
100	15	1.21	1.43	1.68	1.98	2.32	2.75	3.79*	5.60*	8.63*	39.92*
	20	1.34	1.61	1.93	2.34	2.88	3.78	6.86*	11.46*	18.52*	92.09*
	25	1.47	1.79	2.21	2.79	3.80	5.99	12.26*	21.14*	34.82*	178.10*
200	15	1.52	1.79	2.12	2.48	2.89	3.37	4.39*	5.89*	8.65*	39.92*
	20	1.72	2.06	2.46	2.95	3.55	4.40	6.95*	11.46*	18.52*	92.09*
	25	1.91	2.31	2.83	3.49	4.45	6.20	12.26*	21.14*	34.82*	178.10*
300	15	1.77	2.09	2.46	2.88	3.34	3.88	4.95*	6.38*	8.82*	39.92*
	20	2.02	2.41	2.88	3.43	4.10	4.98	7.28*	11.48*	18.52*	92.09*
	25	2.26	2.73	3.32	4.05	5.05	6.65	12.27*	21.14*	34.82*	178.10*
400	15	1.99	2.35	2.76	3.22	3.73	4.32	5.45*	6.89*	9.15*	39.92*
	20	2.29	2.73	3.25	3.86	4.58	5.50	7.72*	11.58*	18.52*	92.09*
	25	2.56	3.09	3.74	4.54	5.59	7.16	12.32*	21.14*	34.82*	178.10*
500	15	2.19	2.58	3.03	3.53	4.09	4.72	5.91*	7.37*	9.55*	39.92*
	20	2.52	3.01	3.58	4.24	5.01	5.98	8.18*	11.78*	18.53*	92.09*
	25	2.84	3.42	4.13	4.99	6.09	7.66	12.46*	21.14*	34.82*	178.10*
600	15	2.37	2.79	3.28	3.82	4.41	5.08	6.33*	7.84*	9.99*	39.92*
	20	2.74	3.26	3.88	4.59	5.41	6.42	8.63*	12.07*	18.55*	92.09*
	25	3.09	3.72	4.48	5.39	6.54	8.13	12.69*	21.15*	34.82*	178.10*
700	15	2.54	2.99	3.51	4.09	4.72	5.42	6.73*	8.28*	10.42*	39.92*
	20	2.95	3.51	4.16	4.91	5.78	6.83	9.08*	12.41*	18.62*	92.09*
	25	3.33	4.00	4.81	5.77	6.97	8.59	12.98*	21.17*	34.82*	178.10*
800	15	2.70	3.18	3.73	4.34	5.00	5.74	7.10*	8.69*	10.85*	39.92*
	20	3.14	3.73	4.43	5.22	6.13	7.22	9.50*	12.77*	18.72*	92.09*
	25	3.55	4.26	5.11	6.13	7.38	9.02	13.31*	21.21*	34.82*	178.10*
900	15	2.85	3.36	3.94	4.57	5.27	6.04	7.45*	9.09*	11.26*	39.92*
	20	3.32	3.95	4.68	5.50	6.46	7.59	9.91*	13.15*	18.88*	92.09*
	25	3.76	4.51	5.41	6.47	7.76	9.44	13.67*	21.29*	34.82*	178.10*
1000	15	3.00	3.53	4.14	4.80	5.53	6.33	7.79*	9.47*	11.67*	39.92*
	20	3.50	4.15	4.92	5.78	6.77	7.94	10.31*	13.53*	19.08*	92.09*
	25	3.96	4.75	5.69	6.79	8.12	9.84	14.03*	21.40*	34.82*	178.10*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.0 Ft (RADIUS = 8.5 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	3.14	3.70	4.33	5.02	5.77	6.61	8.11*	9.84*	12.07*	39.92*	134.23*
	20	3.66	4.35	5.15	6.05	7.07	8.28	10.69*	13.92*	19.31*	92.09*	315.08*
	25	4.15	4.98	5.95	7.10	8.48	10.23	14.40*	21.54*	34.83*	178.10*	613.25*
1200	15	3.27	3.85	4.51	5.23	6.01	6.88	8.42*	10.20*	12.45*	39.92*	134.23*
	20	3.83	4.54	5.37	6.30	7.36	8.60	11.06*	14.30*	19.57*	92.09*	315.08*
	25	4.34	5.20	6.21	7.40	8.81	10.60	14.77*	21.72*	34.84*	178.10*	613.25*
1300	15	3.41	4.01	4.69	5.43	6.24	7.13	8.73*	10.54*	12.83*	39.93*	134.23*
	20	3.98	4.72	5.58	6.55	7.64	8.91	11.42*	14.67*	19.85*	92.09*	315.08*
	25	4.52	5.41	6.46	7.68	9.14	10.96	15.13*	21.93*	34.85*	178.10*	613.25*
1400	15	3.53	4.15	4.86	5.63	6.46	7.38	9.02*	10.87*	13.20*	39.93*	134.23*
	20	4.13	4.90	5.79	6.79	7.91	9.22	11.77*	15.04*	20.15*	92.09*	315.08*
	25	4.69	5.61	6.70	7.96	9.46	11.31	15.50*	22.17*	34.87*	178.10*	613.25*
1500	15	3.65	4.30	5.03	5.82	6.68	7.62	9.30*	11.20*	13.55*	39.95*	134.23*
	20	4.28	5.07	5.99	7.02	8.17	9.51	12.11*	15.41*	20.46*	92.09*	315.08*
	25	4.86	5.81	6.93	8.23	9.76	11.66	15.86*	22.42*	34.90*	178.10*	613.25*
1600	15	3.77	4.44	5.19	6.00	6.89	7.86	9.58*	11.51*	13.90*	39.97*	134.23*
	20	4.42	5.24	6.19	7.24	8.43	9.80	12.44*	15.76*	20.77*	92.09*	315.08*
	25	5.03	6.01	7.16	8.49	10.06	11.99	16.21*	22.68*	34.95*	178.10*	613.25*
1700	15	3.89	4.57	5.35	6.18	7.09	8.09	9.84*	11.82*	14.24*	40.00*	134.23*
	20	4.56	5.40	6.38	7.46	8.68	10.08	12.76*	16.12*	21.09*	92.09*	315.08*
	25	5.19	6.20	7.38	8.75	10.35	12.31	16.56*	22.96*	35.01*	178.10*	613.25*
1800	15	4.00	4.70	5.50	6.36	7.29	8.31	10.10*	12.12*	14.58*	40.04*	134.23*
	20	4.70	5.56	6.56	7.67	8.92	10.35	13.08*	16.46*	21.41*	92.09*	315.08*
	25	5.35	6.38	7.60	9.00	10.63	12.63	16.90*	23.25*	35.08*	178.10*	613.25*
1900	15	4.12	4.83	5.65	6.53	7.49	8.53	10.36*	12.41*	14.91*	40.10*	134.23*
	20	4.83	5.72	6.74	7.88	9.16	10.62	13.39*	16.80*	21.74*	92.09*	315.08*
	25	5.50	6.56	7.81	9.24	10.91	12.94	17.24*	23.54*	35.17*	178.10*	613.25*
2000	15	4.22	4.96	5.80	6.70	7.68	8.74	10.61*	12.70*	15.23*	40.16*	134.23*
	20	4.96	5.87	6.92	8.09	9.39	10.88	13.69*	17.14*	22.07*	92.09*	315.08*
	25	5.65	6.74	8.02	9.48	11.18	13.24	17.58*	23.84*	35.27*	178.10*	613.25*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.0 Ft (RADIUS = 8.5 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft									
		4	8	12	16	20	24	30	35	40	80
100	15	2.15	2.72	3.63	5.65	10.38	18.44	39.82*	70.27*	117.32*	2114.6*
	20	2.52	3.41	5.58	11.64	22.88	41.81	92.23*	164.21*	275.52*	5008.3*
	25	2.91	4.41	9.71	21.65	43.49	80.34	178.64*	319.09*	536.35*	9778.9*
200	15	2.81	3.52	4.53	6.29	10.41	18.44	39.82*	70.27*	117.32*	2114.6*
	20	3.32	4.37	6.32	11.65	22.88	41.81	92.23*	164.21*	275.52*	5008.3*
	25	3.84	5.43	9.80	21.65	43.49	80.34	178.64*	319.09*	536.35*	9778.9*
300	15	3.33	4.15	5.28	7.02	10.62	18.44	39.82*	70.27*	117.32*	2114.6*
	20	3.96	5.14	7.11	11.80	22.88	41.81	92.23*	164.21*	275.52*	5008.3*
	25	4.59	6.30	10.21	21.65	43.49	80.34	178.64*	319.09*	536.35*	9778.9*
400	15	3.79	4.70	5.92	7.72	11.03	18.45	39.82*	70.27*	117.32*	2114.6*
	20	4.51	5.81	7.86	12.15	22.88	41.81	92.23*	164.21*	275.52*	5008.3*
	25	5.23	7.07	10.81	21.66	43.49	80.34	178.64*	319.09*	536.35*	9778.9*
500	15	4.20	5.19	6.50	8.36	11.55	18.50	39.82*	70.27*	117.32*	2114.6*
	20	5.01	6.41	8.54	12.63	22.89	41.81	92.23*	164.21*	275.52*	5008.3*
	25	5.82	7.77	11.45	21.68	43.49	80.34	178.64*	319.09*	536.35*	9778.9*
600	15	4.58	5.65	7.04	8.96	12.09	18.62	39.82*	70.27*	117.32*	2114.6*
	20	5.47	6.96	9.18	13.17	22.93	41.81	92.23*	164.21*	275.52*	5008.3*
	25	6.35	8.41	12.10	21.76	43.49	80.34	178.64*	319.09*	536.35*	9778.9*
700	15	4.94	6.07	7.54	9.53	12.63	18.82	39.82*	70.27*	117.32*	2114.6*
	20	5.90	7.48	9.78	13.72	23.01	41.81	92.23*	164.21*	275.52*	5008.3*
	25	6.85	9.01	12.74	21.90	43.49	80.34	178.64*	319.09*	536.35*	9778.9*
800	15	5.27	6.47	8.00	10.06	13.17	19.09	39.82*	70.27*	117.32*	2114.6*
	20	6.30	7.96	10.34	14.28	23.14	41.81	92.23*	164.21*	275.52*	5008.3*
	25	7.32	9.58	13.35	22.12	43.49	80.34	178.64*	319.09*	536.35*	9778.9*
900	15	5.58	6.84	8.45	10.57	13.70	19.41	39.82*	70.27*	117.32*	2114.6*
	20	6.68	8.42	10.88	14.83	23.33	41.81	92.23*	164.21*	275.52*	5008.3*
	25	7.76	10.11	13.94	22.40	43.49	80.34	178.64*	319.09*	536.35*	9778.9*
1000	15	5.89	7.20	8.87	11.06	14.22	19.77	39.82*	70.27*	117.32*	2114.6*
	20	7.05	8.86	11.39	15.37	23.58	41.81	92.23*	164.21*	275.52*	5008.3*
	25	8.18	10.63	14.52	22.73	43.50	80.34	178.64*	319.09*	536.35*	9778.9*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 12.0 Ft (RADIUS = 8.5 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	4	8	12	16	20	24	30	35	40	60	80
1100	15	6.17	7.55	9.28	11.52	14.72	20.16	39.83*	70.27*	117.32*	611.58*	2114.6*
	20	7.40	9.28	11.89	15.90	23.88	41.82	92.23*	164.21*	275.52*	1446.3*	5008.3*
	25	8.59	11.12	15.07	23.10	43.50	80.34	178.64*	319.09*	536.35*	2822.6*	9778.9*
1200	15	6.45	7.88	9.67	11.97	15.21	20.57	39.84*	70.27*	117.32*	611.58*	2114.6*
	20	7.73	9.69	12.36	16.41	24.20	41.83	92.23*	164.21*	275.52*	1446.3*	5008.3*
	25	8.98	11.59	15.61	23.50	43.51	80.34	178.64*	319.09*	536.35*	2822.6*	9778.9*
1300	15	6.72	8.20	10.05	12.41	15.68	20.98	39.86*	70.27*	117.32*	611.58*	2114.6*
	20	8.06	10.08	12.82	16.92	24.56	41.84	92.23*	164.21*	275.52*	1446.3*	5008.3*
	25	9.36	12.04	16.14	23.92	43.53	80.34	178.64*	319.09*	536.35*	2822.6*	9778.9*
1400	15	6.98	8.51	10.42	12.83	16.14	21.40	39.89*	70.27*	117.32*	611.58*	2114.6*
	20	8.37	10.45	13.27	17.41	24.93	41.87	92.23*	164.21*	275.52*	1446.3*	5008.3*
	25	9.73	12.49	16.64	24.36	43.55	80.34	178.64*	319.09*	536.35*	2822.6*	9778.9*
1500	15	7.24	8.81	10.77	13.24	16.59	21.82	39.93*	70.27*	117.32*	611.58*	2114.6*
	20	8.68	10.82	13.70	17.89	25.32	41.91	92.23*	164.21*	275.52*	1446.3*	5008.3*
	25	10.08	12.91	17.14	24.80	43.59	80.34	178.64*	319.09*	536.35*	2822.6*	9778.9*
1600	15	7.48	9.10	11.12	13.64	17.03	22.24	39.99*	70.27*	117.32*	611.58*	2114.6*
	20	8.98	11.18	14.12	18.36	25.72	41.97	92.23*	164.21*	275.52*	1446.3*	5008.3*
	25	10.43	13.33	17.62	25.24	43.65	80.34	178.64*	319.09*	536.35*	2822.6*	9778.9*
1700	15	7.72	9.39	11.45	14.03	17.47	22.67	40.07*	70.27*	117.32*	611.58*	2114.6*
	20	9.27	11.52	14.53	18.81	26.12	42.04	92.23*	164.21*	275.52*	1446.3*	5008.3*
	25	10.76	13.73	18.09	25.69	43.72	80.34	178.64*	319.09*	536.35*	2822.6*	9778.9*
1800	15	7.96	9.67	11.78	14.40	17.89	23.08	40.17*	70.27*	117.32*	611.58*	2114.6*
	20	9.55	11.86	14.93	19.26	26.53	42.13	92.23*	164.21*	275.52*	1446.3*	5008.3*
	25	11.09	14.13	18.55	26.13	43.82	80.34	178.64*	319.09*	536.35*	2822.6*	9778.9*
1900	15	8.19	9.94	12.10	14.77	18.30	23.50	40.28*	70.27*	117.32*	611.58*	2114.6*
	20	9.83	12.19	15.32	19.70	26.94	42.24	92.23*	164.21*	275.52*	1446.3*	5008.3*
	25	11.41	14.52	19.00	26.58	43.93	80.34	178.64*	319.09*	536.35*	2822.6*	9778.9*
2000	15	8.41	10.20	12.41	15.14	18.70	23.91	40.42*	70.28*	117.32*	611.58*	2114.6*
	20	10.10	12.52	15.70	20.14	27.35	42.37	92.23*	164.21*	275.52*	1446.3*	5008.3*
	25	11.72	14.89	19.45	27.02	44.06	80.34	178.64*	319.09*	536.35*	2822.6*	9778.9*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.0 Ft (RADIUS = 9.9 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	0.54	0.61	0.69	0.77	0.86	0.94	1.07	1.17*	1.29*	1.80*	2.40*
	20	0.58	0.65	0.73	0.82	0.91	1.01	1.15	1.27*	1.41*	2.03*	2.94*
	25	0.61	0.68	0.78	0.87	0.97	1.07	1.23	1.37*	1.52*	2.31*	3.98*
200	15	0.63	0.71	0.80	0.90	1.00	1.09	1.24	1.37*	1.51*	2.12*	2.84*
	20	0.68	0.77	0.87	0.98	1.08	1.19	1.36	1.51*	1.67*	2.42*	3.43*
	25	0.73	0.82	0.93	1.05	1.17	1.29	1.47	1.64*	1.83*	2.76*	4.32*
300	15	0.70	0.79	0.89	1.00	1.11	1.22	1.38	1.53*	1.69*	2.38*	3.18*
	20	0.76	0.86	0.98	1.10	1.22	1.34	1.53	1.70*	1.89*	2.73*	3.84*
	25	0.82	0.93	1.06	1.19	1.32	1.46	1.67	1.86*	2.08*	3.12*	4.73*
400	15	0.76	0.86	0.97	1.09	1.21	1.32	1.50	1.66*	1.84*	2.60*	3.48*
	20	0.84	0.95	1.07	1.20	1.34	1.47	1.68	1.86*	2.07*	3.01*	4.20*
	25	0.91	1.03	1.17	1.31	1.46	1.61	1.84	2.05*	2.30*	3.44*	5.12*
500	15	0.82	0.92	1.04	1.17	1.29	1.42	1.62	1.78*	1.98*	2.80*	3.76*
	20	0.91	1.02	1.16	1.30	1.44	1.59	1.81	2.01*	2.24*	3.25*	4.53*
	25	0.98	1.11	1.26	1.42	1.58	1.74	2.00	2.22*	2.49*	3.73*	5.49*
600	15	0.87	0.98	1.11	1.24	1.38	1.51	1.72	1.90*	2.10*	2.99*	4.00*
	20	0.97	1.09	1.24	1.39	1.54	1.70	1.93	2.14*	2.39*	3.48*	4.83*
	25	1.05	1.19	1.35	1.52	1.69	1.87	2.14	2.38*	2.67*	3.99*	5.83*
700	15	0.92	1.04	1.17	1.31	1.45	1.60	1.81	2.00*	2.22*	3.16*	4.23*
	20	1.02	1.16	1.31	1.47	1.63	1.80	2.05	2.27*	2.53*	3.69*	5.11*
	25	1.12	1.27	1.44	1.62	1.80	1.98	2.27	2.53*	2.83*	4.24*	6.15*
800	15	0.96	1.09	1.23	1.38	1.52	1.67	1.90	2.10*	2.33*	3.32*	4.45*
	20	1.08	1.22	1.38	1.55	1.72	1.89	2.16	2.39*	2.67*	3.88*	5.38*
	25	1.18	1.34	1.52	1.70	1.90	2.09	2.40	2.67*	2.99*	4.47*	6.45*
900	15	1.01	1.14	1.28	1.44	1.59	1.75	1.99	2.20*	2.44*	3.48*	4.66*
	20	1.13	1.28	1.45	1.62	1.80	1.98	2.26	2.50*	2.79*	4.07*	5.63*
	25	1.24	1.41	1.59	1.79	1.99	2.20	2.51	2.80*	3.14*	4.68*	6.74*
1000	15	1.05	1.18	1.34	1.50	1.66	1.82	2.07	2.29*	2.54*	3.62*	4.86*
	20	1.18	1.33	1.51	1.69	1.88	2.07	2.36	2.61*	2.92*	4.25*	5.87*
	25	1.30	1.47	1.67	1.87	2.08	2.30	2.63	2.92*	3.28*	4.89*	7.02*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.0 Ft (RADIUS = 9.9 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	1.09	1.23	1.39	1.55	1.72	1.89	2.15	2.37*	2.64*	3.76*	5.04*
	20	1.23	1.39	1.57	1.76	1.95	2.15	2.45	2.72*	3.03*	4.42*	6.10*
	25	1.35	1.53	1.74	1.95	2.17	2.39	2.74	3.05*	3.41*	5.09*	7.29*
1200	15	1.13	1.27	1.44	1.61	1.78	1.96	2.22	2.46*	2.73*	3.90*	5.23*
	20	1.27	1.44	1.63	1.82	2.02	2.23	2.54	2.82*	3.14*	4.59*	6.32*
	25	1.41	1.59	1.80	2.02	2.25	2.48	2.84	3.16*	3.54*	5.28*	7.55*
1300	15	1.16	1.31	1.48	1.66	1.84	2.02	2.29	2.54*	2.82*	4.03*	5.40*
	20	1.32	1.49	1.68	1.89	2.09	2.30	2.63	2.91*	3.25*	4.74*	6.54*
	25	1.46	1.65	1.87	2.10	2.33	2.57	2.94	3.27*	3.67*	5.47*	7.79*
1400	15	1.20	1.35	1.53	1.71	1.90	2.08	2.36	2.61*	2.91*	4.16*	5.57*
	20	1.36	1.54	1.74	1.95	2.16	2.38	2.71	3.01*	3.36*	4.90*	6.74*
	25	1.50	1.70	1.93	2.17	2.41	2.66	3.04	3.38*	3.79*	5.65*	8.04*
1500	15	1.23	1.39	1.57	1.76	1.95	2.14	2.43	2.69*	2.99*	4.28*	5.74*
	20	1.40	1.58	1.79	2.01	2.23	2.45	2.79	3.10*	3.46*	5.05*	6.95*
	25	1.55	1.76	1.99	2.23	2.48	2.74	3.13	3.49*	3.91*	5.82*	8.27*
1600	15	1.27	1.43	1.62	1.81	2.00	2.20	2.50	2.76*	3.07*	4.40*	5.90*
	20	1.44	1.63	1.84	2.06	2.29	2.52	2.87	3.19*	3.56*	5.19*	7.14*
	25	1.60	1.81	2.05	2.30	2.56	2.82	3.23	3.59*	4.03*	5.99*	8.50*
1700	15	1.30	1.47	1.66	1.86	2.06	2.26	2.56	2.83*	3.15*	4.52*	6.05*
	20	1.48	1.67	1.89	2.12	2.35	2.59	2.95	3.27*	3.66*	5.33*	7.33*
	25	1.64	1.86	2.11	2.37	2.63	2.90	3.32	3.69*	4.14*	6.16*	8.72*
1800	15	1.33	1.51	1.70	1.90	2.11	2.31	2.63	2.90*	3.23*	4.63*	6.20*
	20	1.52	1.72	1.94	2.18	2.41	2.66	3.03	3.36*	3.75*	5.47*	7.52*
	25	1.69	1.91	2.16	2.43	2.70	2.98	3.40	3.79*	4.25*	6.32*	8.93*
1900	15	1.37	1.54	1.74	1.95	2.16	2.37	2.69	2.97*	3.31*	4.74*	6.35*
	20	1.56	1.76	1.99	2.23	2.47	2.72	3.10	3.44*	3.84*	5.61*	7.70*
	25	1.73	1.96	2.22	2.49	2.77	3.05	3.49	3.88*	4.35*	6.47*	9.15*
2000	15	1.40	1.58	1.78	1.99	2.21	2.42	2.75	3.04*	3.38*	4.85*	6.50*
	20	1.59	1.80	2.04	2.28	2.53	2.79	3.17	3.52*	3.93*	5.74*	7.88*
	25	1.77	2.01	2.27	2.55	2.84	3.13	3.57	3.98*	4.46*	6.63*	9.35*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.0 Ft (RADIUS = 9.9 Ft)
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	0.84	0.95	1.08	1.22	1.37	1.52	1.76	1.99*	2.26*	4.20*	10.84*
	20	0.91	1.04	1.19	1.35	1.52	1.71	2.02	2.34*	2.77*	7.82*	23.31*
	25	0.98	1.12	1.29	1.48	1.68	1.91	2.33	2.84*	3.68*	13.91*	43.89*
200	15	1.02	1.16	1.32	1.48	1.66	1.84	2.14	2.41*	2.73*	4.66*	10.84*
	20	1.12	1.28	1.47	1.67	1.88	2.10	2.48	2.85*	3.32*	7.83*	23.31*
	25	1.22	1.40	1.61	1.84	2.09	2.37	2.86	3.39*	4.15*	13.91*	43.89*
300	15	1.16	1.32	1.50	1.69	1.90	2.10	2.43	2.74*	3.11*	5.15*	10.86*
	20	1.30	1.48	1.69	1.92	2.16	2.42	2.84	3.25*	3.77*	7.97*	23.31*
	25	1.42	1.63	1.87	2.14	2.43	2.74	3.28	3.85*	4.63*	13.91*	43.89*
400	15	1.29	1.46	1.66	1.88	2.10	2.33	2.69	3.03*	3.43*	5.60*	10.94*
	20	1.45	1.65	1.89	2.14	2.41	2.69	3.16	3.61*	4.17*	8.25*	23.31*
	25	1.59	1.83	2.10	2.39	2.71	3.06	3.65	4.26*	5.07*	13.92*	43.89*
500	15	1.40	1.59	1.81	2.04	2.28	2.53	2.93	3.29*	3.73*	6.02*	11.13*
	20	1.58	1.80	2.06	2.34	2.63	2.94	3.44	3.92*	4.53*	8.60*	23.32*
	25	1.75	2.00	2.30	2.62	2.97	3.35	3.98	4.63*	5.48*	13.95*	43.89*
600	15	1.50	1.71	1.94	2.19	2.45	2.72	3.14	3.53*	4.00*	6.41*	11.39*
	20	1.71	1.95	2.22	2.52	2.83	3.16	3.70	4.21*	4.86*	8.97*	23.32*
	25	1.89	2.17	2.49	2.83	3.21	3.61	4.29	4.97*	5.85*	14.02*	43.89*
700	15	1.60	1.82	2.07	2.33	2.61	2.89	3.34	3.75*	4.25*	6.78*	11.69*
	20	1.82	2.08	2.37	2.69	3.02	3.37	3.94	4.49*	5.16*	9.34*	23.32*
	25	2.03	2.32	2.66	3.03	3.43	3.85	4.57	5.28*	6.21*	14.16*	43.89*
800	15	1.69	1.92	2.19	2.47	2.76	3.06	3.53	3.96*	4.48*	7.13*	12.02*
	20	1.93	2.20	2.52	2.85	3.20	3.57	4.17	4.74*	5.45*	9.72*	23.33*
	25	2.15	2.46	2.83	3.22	3.64	4.09	4.84	5.58*	6.54*	14.34*	43.89*
900	15	1.78	2.02	2.30	2.59	2.90	3.21	3.71	4.16*	4.71*	7.46*	12.36*
	20	2.04	2.32	2.65	3.00	3.37	3.76	4.39	4.98*	5.72*	10.08*	23.34*
	25	2.27	2.60	2.98	3.39	3.83	4.30	5.09	5.86*	6.86*	14.56*	43.89*
1000	15	1.86	2.12	2.41	2.71	3.03	3.36	3.88	4.35*	4.92*	7.77*	12.70*
	20	2.14	2.44	2.78	3.15	3.53	3.94	4.60	5.22*	5.98*	10.43*	23.38*
	25	2.39	2.73	3.13	3.56	4.02	4.51	5.33	6.13*	7.16*	14.81*	43.89*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.0 Ft (RADIUS = 9.9 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	1.95	2.21	2.51	2.83	3.16	3.50	4.04	4.53*	5.13*	8.07*	13.05*
	20	2.23	2.55	2.90	3.29	3.69	4.11	4.79	5.44*	6.24*	10.78*	23.43*
	25	2.50	2.86	3.27	3.72	4.20	4.71	5.56	6.39*	7.45*	15.08*	43.89*
1200	15	2.02	2.30	2.61	2.94	3.28	3.64	4.20	4.71*	5.32*	8.36*	13.39*
	20	2.32	2.65	3.02	3.42	3.84	4.28	4.98	5.65*	6.48*	11.12*	23.50*
	25	2.60	2.98	3.41	3.88	4.38	4.91	5.78	6.64*	7.73*	15.37*	43.89*
1300	15	2.10	2.38	2.71	3.05	3.40	3.77	4.35	4.87*	5.52*	8.64*	13.72*
	20	2.41	2.75	3.14	3.55	3.98	4.44	5.17	5.86*	6.71*	11.45*	23.60*
	25	2.70	3.10	3.55	4.03	4.54	5.09	6.00	6.88*	8.00*	15.66*	43.89*
1400	15	2.17	2.46	2.80	3.15	3.52	3.90	4.49	5.04*	5.70*	8.92*	14.06*
	20	2.50	2.85	3.25	3.68	4.12	4.59	5.35	6.05*	6.93*	11.77*	23.73*
	25	2.80	3.21	3.67	4.17	4.71	5.27	6.21	7.11*	8.27*	15.96*	43.89*
1500	15	2.24	2.54	2.89	3.26	3.63	4.02	4.64	5.20*	5.88*	9.18*	14.38*
	20	2.58	2.95	3.36	3.80	4.26	4.74	5.52	6.25*	7.15*	12.08*	23.87*
	25	2.90	3.32	3.80	4.32	4.86	5.45	6.41	7.34*	8.52*	16.26*	43.89*
1600	15	2.31	2.62	2.98	3.35	3.74	4.15	4.77	5.35*	6.05*	9.44*	14.70*
	20	2.67	3.04	3.47	3.92	4.39	4.89	5.69	6.44*	7.36*	12.38*	24.03*
	25	2.99	3.43	3.92	4.45	5.02	5.62	6.60	7.56*	8.77*	16.56*	43.89*
1700	15	2.38	2.70	3.06	3.45	3.85	4.26	4.91	5.50*	6.22*	9.69*	15.02*
	20	2.75	3.13	3.57	4.03	4.52	5.03	5.85	6.62*	7.57*	12.68*	24.22*
	25	3.09	3.53	4.04	4.59	5.17	5.78	6.79	7.77*	9.01*	16.86*	43.89*
1800	15	2.44	2.77	3.15	3.54	3.96	4.38	5.04	5.65*	6.39*	9.93*	15.33*
	20	2.82	3.22	3.67	4.15	4.65	5.17	6.01	6.80*	7.77*	12.97*	24.41*
	25	3.18	3.63	4.16	4.72	5.31	5.95	6.98	7.98*	9.24*	17.16*	43.90*
1900	15	2.51	2.84	3.23	3.64	4.06	4.49	5.17	5.79*	6.55*	10.17*	15.64*
	20	2.90	3.31	3.77	4.26	4.77	5.31	6.17	6.97*	7.97*	13.26*	24.62*
	25	3.26	3.73	4.27	4.84	5.46	6.10	7.16	8.18*	9.47*	17.46*	43.90*
2000	15	2.57	2.92	3.31	3.73	4.16	4.60	5.30	5.93*	6.71*	10.41*	15.94*
	20	2.98	3.39	3.86	4.37	4.89	5.44	6.32	7.14*	8.16*	13.54*	24.84*
	25	3.35	3.83	4.38	4.97	5.59	6.26	7.34	8.38*	9.70*	17.75*	43.91*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.0 Ft (RADIUS = 9.9 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	1.38	1.60	1.87	2.18	2.55	3.04	4.31	6.52*	10.01*	45.03*	147.97*
	20	1.55	1.82	2.17	2.62	3.27	4.42	8.21	13.59*	21.74*	104.15*	347.61*
	25	1.70	2.04	2.51	3.21	4.56	7.37	14.86	25.27*	41.07*	201.62*	676.75*
200	15	1.75	2.03	2.36	2.74	3.18	3.72	4.88	6.68*	10.02*	45.03*	147.97*
	20	1.99	2.33	2.77	3.30	3.99	5.00	8.25	13.59*	21.74*	104.15*	347.61*
	25	2.22	2.64	3.21	3.96	5.14	7.46	14.86	25.27*	41.07*	201.62*	676.75*
300	15	2.04	2.37	2.75	3.19	3.69	4.27	5.46	7.09*	10.09*	45.03*	147.97*
	20	2.34	2.75	3.25	3.84	4.59	5.61	8.46	13.60*	21.74*	104.15*	347.61*
	25	2.63	3.12	3.76	4.59	5.77	7.81	14.86	25.27*	41.07*	201.62*	676.75*
400	15	2.30	2.66	3.09	3.57	4.12	4.76	6.00	7.57*	10.32*	45.03*	147.97*
	20	2.65	3.10	3.66	4.32	5.12	6.17	8.84	13.63*	21.74*	104.15*	347.61*
	25	2.98	3.54	4.25	5.14	6.36	8.29	14.88	25.27*	41.07*	201.62*	676.75*
500	15	2.53	2.93	3.40	3.92	4.51	5.19	6.49	8.05*	10.65*	45.03*	147.97*
	20	2.93	3.43	4.03	4.74	5.60	6.69	9.28	13.73*	21.74*	104.15*	347.61*
	25	3.30	3.91	4.68	5.63	6.90	8.79	14.94	25.27*	41.07*	201.62*	676.75*
600	15	2.74	3.17	3.68	4.24	4.87	5.59	6.94	8.52*	11.03*	45.03*	147.97*
	20	3.18	3.72	4.37	5.13	6.03	7.17	9.73	13.91*	21.74*	104.15*	347.61*
	25	3.60	4.26	5.08	6.09	7.40	9.28	15.07	25.27*	41.07*	201.62*	676.75*
700	15	2.94	3.40	3.94	4.54	5.21	5.97	7.36	8.97*	11.44*	45.03*	147.97*
	20	3.42	4.00	4.69	5.49	6.44	7.61	10.18	14.16*	21.76*	104.15*	347.61*
	25	3.88	4.58	5.45	6.51	7.87	9.76	15.27	25.27*	41.07*	201.62*	676.75*
800	15	3.13	3.62	4.19	4.82	5.52	6.32	7.77	9.40*	11.86*	45.03*	147.97*
	20	3.65	4.26	4.99	5.84	6.83	8.04	10.63	14.46*	21.81*	104.15*	347.61*
	25	4.14	4.88	5.80	6.91	8.31	10.23	15.53	25.28*	41.07*	201.62*	676.75*
900	15	3.31	3.82	4.42	5.09	5.82	6.65	8.15	9.82*	12.27*	45.03*	147.97*
	20	3.86	4.50	5.27	6.16	7.19	8.44	11.06	14.79*	21.88*	104.15*	347.61*
	25	4.38	5.17	6.13	7.29	8.73	10.68	15.84	25.31*	41.07*	201.62*	676.75*
1000	15	3.48	4.02	4.64	5.34	6.11	6.97	8.51	10.21*	12.68*	45.03*	147.97*
	20	4.07	4.74	5.55	6.47	7.54	8.83	11.47	15.14*	21.99*	104.15*	347.61*
	25	4.62	5.44	6.45	7.65	9.14	11.11	16.17	25.35*	41.07*	201.62*	676.75*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.0 Ft (RADIUS = 9.9 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
(Ft*s) ^{1/2}	°F/min											
	15	3.64	4.20	4.86	5.58	6.38	7.27	8.86	10.60*	13.08*	45.03*	147.97*
	20	4.26	4.97	5.81	6.77	7.87	9.20	11.88	15.50*	22.14*	104.15*	347.61*
	25	4.84	5.70	6.75	7.99	9.53	11.53	16.51	25.41*	41.07*	201.62*	676.75*
1200	15	3.80	4.38	5.07	5.82	6.65	7.57	9.20	10.97*	13.47*	45.03*	147.97*
	20	4.45	5.18	6.06	7.05	8.20	9.56	12.27	15.86*	22.32*	104.15*	347.61*
	25	5.06	5.95	7.04	8.33	9.90	11.93	16.87	25.50*	41.07*	201.62*	676.75*
1300	15	3.95	4.56	5.26	6.04	6.90	7.85	9.53	11.33*	13.86*	45.03*	147.97*
	20	4.63	5.39	6.30	7.33	8.51	9.90	12.66	16.23*	22.53*	104.15*	347.61*
	25	5.27	6.20	7.32	8.65	10.26	12.33	17.23	25.62*	41.07*	201.62*	676.75*
1400	15	4.10	4.73	5.46	6.26	7.15	8.12	9.84	11.68*	14.23*	45.03*	147.97*
	20	4.81	5.60	6.53	7.59	8.81	10.23	13.03	16.59*	22.77*	104.15*	347.61*
	25	5.48	6.43	7.59	8.96	10.61	12.71	17.59	25.77*	41.08*	201.62*	676.75*
1500	15	4.24	4.89	5.65	6.48	7.38	8.39	10.15	12.02*	14.60*	45.04*	147.97*
	20	4.98	5.80	6.76	7.85	9.10	10.56	13.40	16.96*	23.02*	104.15*	347.61*
	25	5.67	6.66	7.86	9.26	10.95	13.08	17.96	25.94*	41.08*	201.62*	676.75*
1600	15	4.38	5.05	5.83	6.68	7.62	8.65	10.45	12.35*	14.96*	45.04*	147.97*
	20	5.15	5.99	6.98	8.10	9.38	10.87	13.75	17.31*	23.29*	104.15*	347.61*
	25	5.87	6.88	8.11	9.55	11.28	13.44	18.32	26.14*	41.10*	201.62*	676.75*
1700	15	4.52	5.21	6.01	6.88	7.84	8.90	10.74	12.67*	15.31*	45.06*	147.97*
	20	5.31	6.18	7.19	8.35	9.66	11.18	14.10	17.67*	23.57*	104.15*	347.61*
	25	6.06	7.10	8.36	9.84	11.60	13.80	18.68	26.35*	41.12*	201.62*	676.75*
1800	15	4.65	5.36	6.18	7.08	8.06	9.14	11.02	12.98*	15.66*	45.07*	147.97*
	20	5.47	6.36	7.40	8.59	9.92	11.48	14.44	18.02*	23.87*	104.15*	347.61*
	25	6.24	7.31	8.61	10.12	11.91	14.14	19.04	26.58*	41.14*	201.62*	676.75*
1900	15	4.78	5.51	6.35	7.27	8.28	9.38	11.30	13.29*	16.00*	45.10*	147.97*
	20	5.63	6.54	7.61	8.82	10.19	11.77	14.77	18.37*	24.16*	104.15*	347.61*
	25	6.42	7.52	8.85	10.39	12.22	14.48	19.39	26.82*	41.18*	201.62*	676.75*
2000	15	4.91	5.65	6.52	7.46	8.49	9.62	11.57	13.59*	16.33*	45.13*	147.97*
	20	5.78	6.71	7.81	9.05	10.44	12.06	15.09	18.71*	24.47*	104.15*	347.61*
	25	6.59	7.72	9.08	10.66	12.52	14.81	19.74	27.07*	41.23*	201.62*	676.75*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.0 Ft (RADIUS = 9.9 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	RATE OF RISE °F/min	CEILING HEIGHT, Ft									
		4	8	12	16	20	24	30	35	40	80
(Ft*s) ^{1/2}											
	100	2.51	3.16	4.31	7.21	13.24	23.12	48.72	84.45*	138.81*	2334.0*
	20	2.97	4.10	7.39	15.39	29.56	52.82	113.24	197.73*	326.39*	5528.2*
	25	3.48	5.69	13.37	28.92	56.47	101.78	219.63	384.51*	635.65*	10794.*
200											
	15	3.28	4.07	5.29	7.62	13.24	23.12	48.72	84.45*	138.81*	2334.0*
	20	3.91	5.17	7.87	15.40	29.56	52.82	113.24	197.73*	326.39*	5528.2*
	25	4.58	6.68	13.38	28.92	56.47	101.78	219.63	384.51*	635.65*	10794.*
300											
	15	3.90	4.80	6.11	8.32	13.31	23.12	48.72	84.45*	138.81*	2334.0*
	20	4.67	6.05	8.63	15.42	29.56	52.82	113.24	197.73*	326.39*	5528.2*
	25	5.47	7.63	13.52	28.92	56.47	101.78	219.63	384.51*	635.65*	10794.*
400											
	15	4.44	5.43	6.84	9.04	13.55	23.12	48.72	84.45*	138.81*	2334.0*
	20	5.32	6.82	9.40	15.57	29.56	52.82	113.24	197.73*	326.39*	5528.2*
	25	6.23	8.50	13.88	28.92	56.47	101.78	219.63	384.51*	635.65*	10794.*
500											
	15	4.92	6.00	7.49	9.73	13.94	23.13	48.72	84.45*	138.81*	2334.0*
	20	5.91	7.51	10.14	15.87	29.56	52.82	113.24	197.73*	326.39*	5528.2*
	25	6.91	9.29	14.41	28.93	56.47	101.78	219.63	384.51*	635.65*	10794.*
600											
	15	5.37	6.52	8.10	10.38	14.42	23.17	48.72	84.45*	138.81*	2334.0*
	20	6.45	8.15	10.84	16.28	29.57	52.82	113.24	197.73*	326.39*	5528.2*
	25	7.54	10.02	15.00	28.94	56.47	101.78	219.63	384.51*	635.65*	10794.*
700											
	15	5.78	7.01	8.66	11.00	14.94	23.25	48.72	84.45*	138.81*	2334.0*
	20	6.95	8.74	11.50	16.77	29.58	52.82	113.24	197.73*	326.39*	5528.2*
	25	8.13	10.70	15.62	28.97	56.47	101.78	219.63	384.51*	635.65*	10794.*
800											
	15	6.17	7.47	9.19	11.59	15.47	23.40	48.72	84.45*	138.81*	2334.0*
	20	7.43	9.30	12.13	17.29	29.62	52.82	113.24	197.73*	326.39*	5528.2*
	25	8.68	11.35	16.25	29.03	56.47	101.78	219.63	384.51*	635.65*	10794.*
900											
	15	6.54	7.90	9.69	12.15	16.01	23.60	48.72	84.45*	138.81*	2334.0*
	20	7.87	9.83	12.73	17.82	29.69	52.82	113.24	197.73*	326.39*	5528.2*
	25	9.20	11.96	16.87	29.15	56.47	101.78	219.63	384.51*	635.65*	10794.*
1000											
	15	6.89	8.31	10.17	12.69	16.54	23.86	48.72	84.45*	138.81*	2334.0*
	20	8.30	10.33	13.31	18.37	29.80	52.82	113.24	197.73*	326.39*	5528.2*
	25	9.70	12.55	17.48	29.31	56.47	101.78	219.63	384.51*	635.65*	10794.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 14.0 Ft (RADIUS = 9.9 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	7.23	8.71	10.63	13.21	17.07	24.16	48.72	84.45*	138.81*	692.79*	2334.0*
	20	8.71	10.82	13.87	18.91	29.96	52.82	113.24	197.73*	326.39*	1638.8*	5528.2*
	25	10.18	13.11	18.08	29.53	56.47	101.78	219.63	384.51*	635.65*	3198.4*	10794.*
1200	15	7.56	9.09	11.08	13.71	17.59	24.50	48.72	84.45*	138.81*	692.79*	2334.0*
	20	9.11	11.28	14.40	19.45	30.16	52.82	113.24	197.73*	326.39*	1638.8*	5528.2*
	25	10.64	13.66	18.66	29.79	56.47	101.78	219.63	384.51*	635.65*	3198.4*	10794.*
1300	15	7.88	9.46	11.50	14.19	18.09	24.87	48.72	84.45*	138.81*	692.79*	2334.0*
	20	9.49	11.73	14.92	19.98	30.39	52.82	113.24	197.73*	326.39*	1638.8*	5528.2*
	25	11.08	14.18	19.23	30.09	56.48	101.78	219.63	384.51*	635.65*	3198.4*	10794.*
1400	15	8.18	9.82	11.92	14.66	18.59	25.25	48.73	84.45*	138.81*	692.79*	2334.0*
	20	9.86	12.17	15.42	20.50	30.67	52.83	113.24	197.73*	326.39*	1638.8*	5528.2*
	25	11.51	14.69	19.79	30.43	56.48	101.78	219.63	384.51*	635.65*	3198.4*	10794.*
1500	15	8.48	10.16	12.32	15.12	19.08	25.65	48.74	84.45*	138.81*	692.79*	2334.0*
	20	10.22	12.59	15.91	21.01	30.97	52.84	113.24	197.73*	326.39*	1638.8*	5528.2*
	25	11.93	15.18	20.34	30.79	56.49	101.78	219.63	384.51*	635.65*	3198.4*	10794.*
1600	15	8.77	10.50	12.71	15.56	19.55	26.05	48.76	84.45*	138.81*	692.79*	2334.0*
	20	10.57	13.00	16.38	21.52	31.30	52.85	113.24	197.73*	326.39*	1638.8*	5528.2*
	25	12.34	15.66	20.87	31.17	56.50	101.78	219.63	384.51*	635.65*	3198.4*	10794.*
1700	15	9.05	10.83	13.09	16.00	20.02	26.47	48.79	84.45*	138.81*	692.79*	2334.0*
	20	10.91	13.40	16.84	22.02	31.64	52.87	113.24	197.73*	326.39*	1638.8*	5528.2*
	25	12.73	16.13	21.40	31.57	56.51	101.78	219.63	384.51*	635.65*	3198.4*	10794.*
1800	15	9.32	11.15	13.46	16.42	20.48	26.88	48.83	84.45*	138.81*	692.79*	2334.0*
	20	11.24	13.79	17.29	22.50	32.01	52.90	113.24	197.73*	326.39*	1638.8*	5528.2*
	25	13.12	16.58	21.91	31.98	56.53	101.78	219.63	384.51*	635.65*	3198.4*	10794.*
1900	15	9.59	11.46	13.82	16.83	20.93	27.30	48.87	84.45*	138.81*	692.79*	2334.0*
	20	11.57	14.17	17.74	22.98	32.38	52.94	113.24	197.73*	326.39*	1638.8*	5528.2*
	25	13.50	17.02	22.41	32.40	56.57	101.78	219.63	384.51*	635.65*	3198.4*	10794.*
2000	15	9.85	11.76	14.18	17.23	21.37	27.72	48.94	84.45*	138.81*	692.79*	2334.0*
	20	11.88	14.54	18.17	23.46	32.76	52.99	113.24	197.73*	326.39*	1638.8*	5528.2*
	25	13.87	17.46	22.90	32.82	56.61	101.78	219.63	384.51*	635.65*	3198.4*	10794.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 16.0 Ft (RADIUS = 11.3 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
100	15	0.60	0.67	0.75	0.83	0.91	0.99	1.12	1.23	1.34*	1.85*	2.47*	
	20	0.64	0.71	0.80	0.88	0.98	1.07	1.21	1.33	1.46*	2.10*	3.07*	
	25	0.68	0.75	0.84	0.94	1.04	1.14	1.30	1.44	1.59*	2.40*	4.26*	
200	15	0.70	0.78	0.87	0.97	1.06	1.16	1.31	1.44	1.57*	2.18*	2.91*	
	20	0.76	0.85	0.95	1.05	1.16	1.27	1.44	1.58	1.74*	2.50*	3.55*	
	25	0.82	0.91	1.02	1.13	1.25	1.37	1.56	1.73	1.91*	2.87*	4.54*	
300	15	0.79	0.87	0.97	1.08	1.19	1.30	1.46	1.60	1.75*	2.45*	3.27*	
	20	0.86	0.95	1.07	1.19	1.31	1.43	1.62	1.79	1.96*	2.83*	3.97*	
	25	0.93	1.03	1.15	1.29	1.42	1.56	1.78	1.97	2.17*	3.24*	4.94*	
400	15	0.86	0.95	1.06	1.17	1.29	1.41	1.59	1.75	1.91*	2.68*	3.58*	
	20	0.94	1.05	1.17	1.30	1.44	1.57	1.78	1.96	2.16*	3.11*	4.34*	
	25	1.02	1.14	1.28	1.42	1.57	1.72	1.96	2.17	2.40*	3.57*	5.33*	
500	15	0.92	1.02	1.14	1.26	1.39	1.52	1.71	1.88	2.05*	2.89*	3.86*	
	20	1.02	1.13	1.27	1.41	1.55	1.70	1.93	2.12	2.33*	3.36*	4.68*	
	25	1.11	1.24	1.39	1.54	1.70	1.87	2.13	2.35	2.60*	3.87*	5.70*	
600	15	0.98	1.09	1.21	1.34	1.48	1.62	1.82	2.00	2.19*	3.08*	4.11*	
	20	1.09	1.21	1.35	1.50	1.66	1.82	2.06	2.27	2.49*	3.60*	4.99*	
	25	1.19	1.33	1.49	1.65	1.83	2.01	2.28	2.52	2.78*	4.14*	6.05*	
700	15	1.04	1.15	1.28	1.42	1.56	1.71	1.93	2.11	2.31*	3.26*	4.35*	
	20	1.16	1.28	1.44	1.60	1.76	1.93	2.18	2.40	2.64*	3.81*	5.28*	
	25	1.27	1.41	1.58	1.76	1.94	2.13	2.43	2.68	2.96*	4.39*	6.38*	
800	15	1.09	1.21	1.34	1.49	1.64	1.79	2.02	2.22	2.43*	3.43*	4.57*	
	20	1.22	1.35	1.51	1.68	1.85	2.03	2.30	2.53	2.78*	4.02*	5.55*	
	25	1.34	1.49	1.67	1.86	2.05	2.25	2.56	2.83	3.12*	4.63*	6.69*	
900	15	1.14	1.26	1.41	1.56	1.72	1.87	2.12	2.32	2.54*	3.59*	4.79*	
	20	1.28	1.42	1.59	1.76	1.94	2.13	2.41	2.65	2.91*	4.21*	5.81*	
	25	1.41	1.57	1.75	1.95	2.15	2.36	2.69	2.97	3.28*	4.86*	6.99*	
1000	15	1.18	1.31	1.46	1.62	1.79	1.95	2.20	2.42	2.64*	3.74*	4.99*	
	20	1.33	1.48	1.66	1.84	2.03	2.22	2.52	2.77	3.04*	4.39*	6.05*	
	25	1.47	1.64	1.83	2.04	2.25	2.47	2.81	3.10	3.42*	5.07*	7.27*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 16.0 Ft (RADIUS = 11.3 Ft)
FIRE GROWTH: ULTRAFAST ($\alpha = .178 \text{ BTU/s}^3$)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	1.23	1.36	1.52	1.69	1.86	2.03	2.29	2.51	2.74*	3.88*	5.18*
	20	1.39	1.54	1.72	1.91	2.11	2.31	2.62	2.88	3.16*	4.57*	6.29*
	25	1.53	1.71	1.91	2.13	2.35	2.58	2.93	3.23	3.56*	5.28*	7.55*
1200	15	1.27	1.41	1.58	1.75	1.92	2.10	2.37	2.60	2.84*	4.02*	5.37*
	20	1.44	1.60	1.79	1.99	2.19	2.40	2.71	2.99	3.28*	4.74*	6.52*
	25	1.59	1.77	1.98	2.21	2.44	2.67	3.04	3.36	3.70*	5.48*	7.81*
1300	15	1.32	1.46	1.63	1.80	1.99	2.17	2.45	2.68	2.93*	4.16*	5.55*
	20	1.49	1.66	1.85	2.06	2.27	2.48	2.81	3.09	3.39*	4.91*	6.74*
	25	1.65	1.84	2.06	2.29	2.53	2.77	3.15	3.48	3.83*	5.67*	8.06*
1400	15	1.36	1.51	1.68	1.86	2.05	2.24	2.52	2.77	3.03*	4.29*	5.72*
	20	1.54	1.71	1.91	2.12	2.34	2.56	2.90	3.19	3.50*	5.06*	6.95*
	25	1.71	1.90	2.13	2.37	2.61	2.86	3.26	3.59	3.96*	5.85*	8.31*
1500	15	1.40	1.55	1.73	1.92	2.11	2.30	2.60	2.85	3.11*	4.42*	5.89*
	20	1.59	1.76	1.97	2.19	2.41	2.64	2.99	3.29	3.61*	5.22*	7.16*
	25	1.76	1.96	2.19	2.44	2.69	2.96	3.36	3.71	4.08*	6.03*	8.55*
1600	15	1.44	1.59	1.78	1.97	2.17	2.36	2.67	2.93	3.20*	4.54*	6.06*
	20	1.64	1.82	2.03	2.25	2.48	2.72	3.07	3.38	3.71*	5.37*	7.36*
	25	1.82	2.02	2.26	2.51	2.78	3.04	3.46	3.81	4.20*	6.21*	8.78*
1700	15	1.47	1.63	1.82	2.02	2.22	2.43	2.74	3.00	3.28*	4.66*	6.22*
	20	1.68	1.87	2.08	2.31	2.55	2.79	3.16	3.47	3.81*	5.52*	7.55*
	25	1.87	2.08	2.32	2.59	2.85	3.13	3.55	3.92	4.32*	6.38*	9.01*
1800	15	1.51	1.68	1.87	2.07	2.28	2.49	2.81	3.08	3.37*	4.78*	6.37*
	20	1.72	1.92	2.14	2.37	2.62	2.86	3.24	3.56	3.91*	5.66*	7.74*
	25	1.92	2.13	2.39	2.65	2.93	3.21	3.65	4.03	4.44*	6.55*	9.23*
1900	15	1.55	1.72	1.91	2.12	2.33	2.55	2.87	3.15	3.45*	4.89*	6.53*
	20	1.77	1.96	2.19	2.43	2.68	2.93	3.32	3.65	4.01*	5.80*	7.93*
	25	1.97	2.19	2.45	2.72	3.01	3.29	3.74	4.13	4.55*	6.71*	9.45*
2000	15	1.58	1.76	1.96	2.17	2.39	2.61	2.94	3.22	3.52*	5.00*	6.67*
	20	1.81	2.01	2.25	2.49	2.75	3.00	3.40	3.74	4.10*	5.93*	8.11*
	25	2.02	2.24	2.51	2.79	3.08	3.38	3.83	4.23	4.66*	6.87*	9.66*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 16.0 Ft (RADIUS = 11.3 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	0.94	1.05	1.18	1.32	1.47	1.62	1.87	2.10	2.37*	4.55*	11.79*
	20	1.02	1.15	1.30	1.46	1.64	1.83	2.17	2.51	2.97*	8.67*	25.53*
	25	1.10	1.24	1.41	1.61	1.82	2.07	2.53	3.11	4.10*	15.55*	48.18*
200	15	1.15	1.28	1.44	1.61	1.79	1.98	2.28	2.55	2.86*	4.95*	11.79*
	20	1.27	1.42	1.61	1.81	2.03	2.26	2.66	3.04	3.52*	8.68*	25.53*
	25	1.38	1.56	1.78	2.01	2.28	2.57	3.09	3.67	4.50*	15.55*	48.18*
300	15	1.31	1.46	1.65	1.84	2.05	2.26	2.60	2.91	3.26*	5.43*	11.79*
	20	1.47	1.64	1.86	2.09	2.34	2.61	3.05	3.48	3.99*	8.76*	25.53*
	25	1.61	1.82	2.07	2.34	2.64	2.97	3.55	4.16	4.98*	15.55*	48.18*
400	15	1.45	1.62	1.83	2.04	2.27	2.50	2.88	3.22	3.60*	5.89*	11.85*
	20	1.64	1.84	2.08	2.34	2.61	2.91	3.39	3.86	4.41*	8.97*	25.53*
	25	1.81	2.04	2.32	2.62	2.95	3.32	3.95	4.59	5.43*	15.55*	48.18*
500	15	1.58	1.77	1.99	2.22	2.47	2.73	3.13	3.50	3.91*	6.32*	11.98*
	20	1.79	2.01	2.27	2.56	2.86	3.18	3.70	4.20	4.78*	9.27*	25.53*
	25	1.99	2.24	2.54	2.88	3.24	3.63	4.31	4.98	5.85*	15.56*	48.18*
600	15	1.70	1.90	2.14	2.39	2.65	2.93	3.36	3.75	4.19*	6.72*	12.19*
	20	1.94	2.17	2.45	2.76	3.08	3.42	3.98	4.51	5.12*	9.61*	25.53*
	25	2.15	2.42	2.75	3.11	3.50	3.92	4.64	5.35	6.24*	15.60*	48.18*
700	15	1.82	2.03	2.28	2.55	2.83	3.12	3.58	3.99	4.45*	7.09*	12.46*
	20	2.07	2.32	2.62	2.94	3.29	3.65	4.25	4.80	5.44*	9.98*	25.53*
	25	2.30	2.60	2.95	3.33	3.74	4.19	4.94	5.68	6.60*	15.68*	48.18*
800	15	1.92	2.14	2.41	2.69	2.99	3.30	3.78	4.22	4.70*	7.45*	12.76*
	20	2.20	2.46	2.78	3.12	3.48	3.87	4.49	5.07	5.74*	10.34*	25.53*
	25	2.45	2.76	3.13	3.53	3.97	4.44	5.23	6.00	6.95*	15.80*	48.18*
900	15	2.02	2.26	2.54	2.83	3.14	3.47	3.98	4.43	4.93*	7.79*	13.08*
	20	2.32	2.60	2.93	3.29	3.67	4.07	4.73	5.33	6.03*	10.70*	25.54*
	25	2.59	2.91	3.30	3.73	4.18	4.68	5.51	6.31	7.28*	15.97*	48.18*
1000	15	2.12	2.36	2.66	2.97	3.29	3.63	4.16	4.63	5.16*	8.11*	13.41*
	20	2.43	2.72	3.07	3.45	3.85	4.27	4.95	5.58	6.30*	11.06*	25.56*
	25	2.72	3.06	3.47	3.91	4.39	4.91	5.77	6.59	7.60*	16.18*	48.18*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 16.0 Ft (RADIUS = 11.3 Ft)₃
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	2.21	2.47	2.77	3.09	3.43	3.78	4.34	4.83	5.37*	8.42*	13.75*
	20	2.54	2.85	3.21	3.60	4.02	4.46	5.17	5.82	6.57*	11.41*	25.58*
	25	2.84	3.20	3.63	4.09	4.59	5.13	6.02	6.87	7.90*	16.41*	48.18*
1200	15	2.30	2.57	2.88	3.22	3.57	3.93	4.51	5.01	5.58*	8.72*	14.08*
	20	2.65	2.97	3.35	3.75	4.18	4.64	5.37	6.04	6.82*	11.75*	25.63*
	25	2.97	3.34	3.78	4.26	4.78	5.34	6.26	7.14	8.19*	16.66*	48.18*
1300	15	2.38	2.66	2.99	3.34	3.70	4.08	4.67	5.19	5.78*	9.02*	14.42*
	20	2.75	3.08	3.47	3.90	4.34	4.81	5.57	6.26	7.06*	12.08*	25.69*
	25	3.08	3.47	3.93	4.43	4.96	5.54	6.49	7.39	8.47*	16.93*	48.18*
1400	15	2.47	2.75	3.09	3.45	3.83	4.22	4.83	5.37	5.97*	9.30*	14.75*
	20	2.85	3.19	3.60	4.03	4.50	4.98	5.76	6.48	7.30*	12.41*	25.78*
	25	3.20	3.60	4.07	4.59	5.14	5.74	6.72	7.64	8.75*	17.21*	48.18*
1500	15	2.55	2.84	3.19	3.56	3.95	4.35	4.98	5.54	6.16*	9.57*	15.08*
	20	2.94	3.30	3.72	4.17	4.64	5.15	5.95	6.69	7.52*	12.73*	25.88*
	25	3.31	3.72	4.21	4.75	5.32	5.93	6.93	7.88	9.01*	17.49*	48.18*
1600	15	2.63	2.93	3.29	3.67	4.07	4.48	5.13	5.70	6.34*	9.84*	15.40*
	20	3.04	3.40	3.84	4.30	4.79	5.31	6.13	6.89	7.75*	13.04*	26.01*
	25	3.42	3.84	4.35	4.90	5.48	6.11	7.15	8.12	9.27*	17.78*	48.18*
1700	15	2.70	3.02	3.39	3.78	4.19	4.61	5.28	5.87	6.52*	10.09*	15.72*
	20	3.13	3.51	3.95	4.43	4.93	5.46	6.31	7.08	7.96*	13.34*	26.15*
	25	3.52	3.96	4.48	5.05	5.65	6.29	7.35	8.35	9.52*	18.07*	48.18*
1800	15	2.78	3.10	3.48	3.88	4.30	4.74	5.42	6.02	6.69*	10.35*	16.03*
	20	3.22	3.61	4.06	4.55	5.07	5.61	6.48	7.27	8.17*	13.64*	26.31*
	25	3.62	4.08	4.61	5.19	5.81	6.47	7.55	8.57	9.77*	18.36*	48.18*
1900	15	2.85	3.18	3.57	3.98	4.41	4.86	5.56	6.18	6.86*	10.59*	16.34*
	20	3.31	3.70	4.17	4.68	5.20	5.76	6.65	7.46	8.38*	13.94*	26.49*
	25	3.72	4.19	4.74	5.33	5.96	6.64	7.75	8.79	10.01*	18.65*	48.19*
2000	15	2.92	3.26	3.66	4.08	4.52	4.98	5.70	6.33	7.02*	10.84*	16.64*
	20	3.39	3.80	4.28	4.79	5.34	5.91	6.82	7.64	8.58*	14.22*	26.68*
	25	3.82	4.30	4.86	5.47	6.12	6.81	7.94	9.00	10.25*	18.95*	48.19*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 16.0 Ft (RADIUS = 11.3 Ft)
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	1.56	1.78	2.06	2.40	2.81	3.37	4.93	7.57	11.57*	50.63*	162.76*
	20	1.76	2.04	2.42	2.93	3.71	5.22	9.78	16.04	25.38*	117.38*	382.61*
	25	1.94	2.31	2.84	3.70	5.51	9.00	17.88	30.00	48.14*	227.42*	745.08*
200	15	1.98	2.26	2.61	3.02	3.49	4.09	5.45	7.65	11.57*	50.63*	162.76*
	20	2.26	2.62	3.09	3.68	4.47	5.71	9.79	16.04	25.38*	117.38*	382.61*
	25	2.53	2.99	3.62	4.50	5.98	9.04	17.88	30.00	48.14*	227.42*	745.08*
300	15	2.32	2.65	3.05	3.51	4.05	4.69	6.04	7.98	11.60*	50.63*	162.76*
	20	2.67	3.09	3.63	4.28	5.12	6.32	9.91	16.04	25.38*	117.38*	382.61*
	25	3.01	3.54	4.24	5.18	6.61	9.25	17.88	30.00	48.14*	227.42*	745.08*
400	15	2.62	2.98	3.43	3.94	4.53	5.22	6.60	8.43	11.72*	50.63*	162.76*
	20	3.03	3.50	4.09	4.80	5.70	6.91	10.19	16.05	25.38*	117.38*	382.61*
	25	3.42	4.01	4.78	5.78	7.22	9.64	17.88	30.00	48.14*	227.42*	745.08*
500	15	2.88	3.28	3.77	4.33	4.96	5.69	7.13	8.91	11.95*	50.63*	162.76*
	20	3.35	3.86	4.50	5.27	6.22	7.46	10.58	16.09	25.38*	117.38*	382.61*
	25	3.79	4.43	5.26	6.33	7.79	10.11	17.90	30.00	48.14*	227.42*	745.08*
600	15	3.13	3.56	4.09	4.68	5.35	6.13	7.61	9.38	12.27*	50.63*	162.76*
	20	3.64	4.20	4.89	5.70	6.70	7.97	11.02	16.19	25.38*	117.38*	382.61*
	25	4.13	4.82	5.71	6.83	8.33	10.61	17.96	30.00	48.14*	227.42*	745.08*
700	15	3.36	3.82	4.38	5.01	5.72	6.54	8.07	9.85	12.64*	50.63*	162.76*
	20	3.92	4.51	5.24	6.11	7.15	8.46	11.47	16.35	25.38*	117.38*	382.61*
	25	4.45	5.18	6.13	7.30	8.84	11.10	18.08	30.00	48.14*	227.42*	745.08*
800	15	3.57	4.06	4.65	5.32	6.07	6.92	8.50	10.30	13.02*	50.63*	162.76*
	20	4.17	4.80	5.58	6.48	7.57	8.92	11.92	16.58	25.40*	117.38*	382.61*
	25	4.74	5.53	6.52	7.74	9.33	11.58	18.26	30.00	48.14*	227.42*	745.08*
900	15	3.78	4.29	4.92	5.61	6.40	7.28	8.91	10.73	13.42*	50.63*	162.76*
	20	4.42	5.08	5.89	6.84	7.97	9.36	12.36	16.86	25.42*	117.38*	382.61*
	25	5.03	5.85	6.89	8.16	9.79	12.05	18.48	30.00	48.14*	227.42*	745.08*
1000	15	3.97	4.51	5.17	5.89	6.71	7.63	9.31	11.15	13.82*	50.63*	162.76*
	20	4.66	5.35	6.20	7.19	8.35	9.77	12.80	17.17	25.47*	117.38*	382.61*
	25	5.30	6.16	7.24	8.56	10.23	12.51	18.75	30.02	48.14*	227.42*	745.08*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 16.0 Ft (RADIUS = 11.3 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	4.16	4.73	5.40	6.16	7.01	7.96	9.69	11.56	14.22*	50.63*	162.76*
	20	4.88	5.60	6.49	7.51	8.72	10.18	13.23	17.50	25.54*	117.38*	382.61*
	25	5.56	6.46	7.58	8.94	10.65	12.96	19.06	30.04	48.14*	227.42*	745.08*
1200	15	4.34	4.93	5.64	6.42	7.30	8.28	10.05	11.95	14.61*	50.63*	162.76*
	20	5.10	5.85	6.77	7.83	9.07	10.56	13.64	17.84	25.65*	117.38*	382.61*
	25	5.81	6.74	7.91	9.31	11.06	13.39	19.38	30.09	48.14*	227.42*	745.08*
1300	15	4.51	5.13	5.86	6.67	7.58	8.59	10.40	12.33	15.00*	50.63*	162.76*
	20	5.31	6.09	7.04	8.13	9.41	10.94	14.05	18.20	25.78*	117.38*	382.61*
	25	6.05	7.02	8.22	9.67	11.46	13.81	19.72	30.15	48.14*	227.42*	745.08*
1400	15	4.68	5.32	6.07	6.92	7.85	8.89	10.74	12.70	15.38*	50.63*	162.76*
	20	5.51	6.32	7.30	8.43	9.74	11.30	14.45	18.56	25.94*	117.38*	382.61*
	25	6.29	7.29	8.53	10.01	11.84	14.22	20.07	30.23	48.14*	227.42*	745.08*
1500	15	4.85	5.50	6.28	7.15	8.11	9.18	11.07	13.06	15.75*	50.63*	162.76*
	20	5.71	6.54	7.55	8.72	10.06	11.66	14.83	18.92	26.12*	117.38*	382.61*
	25	6.52	7.55	8.82	10.34	12.21	14.63	20.42	30.33	48.14*	227.42*	745.08*
1600	15	5.01	5.68	6.49	7.38	8.36	9.46	11.40	13.41	16.12*	50.63*	162.76*
	20	5.90	6.76	7.80	8.99	10.37	12.00	15.21	19.28	26.33*	117.38*	382.61*
	25	6.74	7.80	9.11	10.67	12.57	15.02	20.78	30.46	48.14*	227.42*	745.08*
1700	15	5.16	5.86	6.69	7.60	8.61	9.74	11.71	13.76	16.48*	50.64*	162.76*
	20	6.09	6.97	8.04	9.27	10.67	12.33	15.59	19.64	26.55*	117.38*	382.61*
	25	6.95	8.04	9.39	10.98	12.92	15.40	21.15	30.60	48.15*	227.42*	745.08*
1800	15	5.32	6.03	6.88	7.82	8.85	10.00	12.02	14.09	16.84*	50.64*	162.76*
	20	6.27	7.18	8.28	9.53	10.97	12.66	15.95	20.00	26.79*	117.38*	382.61*
	25	7.16	8.28	9.66	11.29	13.27	15.77	21.51	30.77	48.15*	227.42*	745.08*
1900	15	5.47	6.20	7.07	8.03	9.09	10.26	12.32	14.42	17.18*	50.65*	162.76*
	20	6.45	7.38	8.51	9.79	11.26	12.98	16.30	20.35	27.04*	117.38*	382.61*
	25	7.37	8.52	9.93	11.59	13.60	16.14	21.87	30.96	48.16*	227.42*	745.08*
2000	15	5.61	6.36	7.25	8.24	9.32	10.52	12.61	14.74	17.53*	50.66*	162.76*
	20	6.62	7.58	8.73	10.04	11.54	13.29	16.65	20.70	27.31*	117.38*	382.61*
	25	7.57	8.75	10.19	11.89	13.93	16.50	22.23	31.16	48.18*	227.42*	745.08*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 16.0 Ft (RADIUS = 11.3 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	2.89	3.65	5.17	9.19	16.68	28.68	59.07	100.70	163.15*	781.86*	2570.0*
	20	3.47	4.97	9.79	20.05	37.65	65.91	137.70	236.17	384.03*	1849.8*	6087.7*
	25	4.15	7.56	18.03	37.95	72.21	127.30	267.33	459.53	748.17*	3610.5*	11887.*
200	15	3.78	4.67	6.16	9.38	16.68	28.68	59.07	100.70	163.15*	781.86*	2570.0*
	20	4.56	6.11	9.99	20.05	37.65	65.91	137.70	236.17	384.03*	1849.8*	6087.7*
	25	5.41	8.30	18.03	37.95	72.21	127.30	267.33	459.53	748.17*	3610.5*	11887.*
300	15	4.50	5.50	7.05	9.94	16.70	28.68	59.07	100.70	163.15*	781.86*	2570.0*
	20	5.43	7.09	10.58	20.05	37.65	65.91	137.70	236.17	384.03*	1849.8*	6087.7*
	25	6.43	9.26	18.06	37.95	72.21	127.30	267.33	459.53	748.17*	3610.5*	11887.*
400	15	5.12	6.22	7.86	10.63	16.79	28.68	59.07	100.70	163.15*	781.86*	2570.0*
	20	6.19	7.95	11.31	20.08	37.65	65.91	137.70	236.17	384.03*	1849.8*	6087.7*
	25	7.31	10.19	18.18	37.95	72.21	127.30	267.33	459.53	748.17*	3610.5*	11887.*
500	15	5.68	6.86	8.58	11.33	17.01	28.68	59.07	100.70	163.15*	781.86*	2570.0*
	20	6.87	8.73	12.06	20.19	37.65	65.91	137.70	236.17	384.03*	1849.8*	6087.7*
	25	8.10	11.05	18.46	37.95	72.21	127.30	267.33	459.53	748.17*	3610.5*	11887.*
600	15	6.19	7.46	9.25	12.02	17.36	28.69	59.07	100.70	163.15*	781.86*	2570.0*
	20	7.49	9.45	12.80	20.42	37.65	65.91	137.70	236.17	384.03*	1849.8*	6087.7*
	25	8.83	11.86	18.88	37.95	72.21	127.30	267.33	459.53	748.17*	3610.5*	11887.*
700	15	6.67	8.01	9.88	12.68	17.79	28.71	59.07	100.70	163.15*	781.86*	2570.0*
	20	8.07	10.12	13.51	20.74	37.65	65.91	137.70	236.17	384.03*	1849.8*	6087.7*
	25	9.51	12.63	19.39	37.95	72.21	127.30	267.33	459.53	748.17*	3610.5*	11887.*
800	15	7.12	8.53	10.47	13.31	18.27	28.76	59.07	100.70	163.15*	781.86*	2570.0*
	20	8.62	10.76	14.19	21.15	37.66	65.91	137.70	236.17	384.03*	1849.8*	6087.7*
	25	10.15	13.35	19.95	37.96	72.21	127.30	267.33	459.53	748.17*	3610.5*	11887.*
900	15	7.54	9.02	11.04	13.92	18.78	28.86	59.07	100.70	163.15*	781.86*	2570.0*
	20	9.14	11.36	14.85	21.61	37.67	65.91	137.70	236.17	384.03*	1849.8*	6087.7*
	25	10.75	14.05	20.54	37.98	72.21	127.30	267.33	459.53	748.17*	3610.5*	11887.*
1000	15	7.95	9.49	11.57	14.51	19.30	29.00	59.07	100.70	163.15*	781.86*	2570.0*
	20	9.63	11.93	15.48	22.10	37.70	65.91	137.70	236.17	384.03*	1849.8*	6087.7*
	25	11.33	14.71	21.14	38.03	72.21	127.30	267.33	459.53	748.17*	3610.5*	11887.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 16.0 Ft (RADIUS = 11.3 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	8.34	9.94	12.09	15.08	19.83	29.18	59.07	100.70	163.15*	781.86*	2570.0*
	20	10.11	12.48	16.09	22.61	37.75	65.91	137.70	236.17	384.03*	1849.8*	6087.7*
	25	11.88	15.34	21.75	38.10	72.21	127.30	267.33	459.53	748.17*	3610.5*	11887.*
1200	15	8.72	10.37	12.58	15.62	20.36	29.42	59.07	100.70	163.15*	781.86*	2570.0*
	20	10.56	13.01	16.68	23.13	37.83	65.91	137.70	236.17	384.03*	1849.8*	6087.7*
	25	12.41	15.96	22.35	38.21	72.21	127.30	267.33	459.53	748.17*	3610.5*	11887.*
1300	15	9.08	10.79	13.06	16.15	20.88	29.69	59.07	100.70	163.15*	781.86*	2570.0*
	20	11.00	13.52	17.26	23.66	37.94	65.91	137.70	236.17	384.03*	1849.8*	6087.7*
	25	12.93	16.55	22.94	38.35	72.21	127.30	267.33	459.53	748.17*	3610.5*	11887.*
1400	15	9.43	11.19	13.53	16.67	21.39	29.99	59.07	100.70	163.15*	781.86*	2570.0*
	20	11.43	14.01	17.81	24.19	38.09	65.92	137.70	236.17	384.03*	1849.8*	6087.7*
	25	13.42	17.12	23.53	38.53	72.21	127.30	267.33	459.53	748.17*	3610.5*	11887.*
1500	15	9.78	11.59	13.98	17.17	21.90	30.32	59.07	100.70	163.15*	781.86*	2570.0*
	20	11.85	14.49	18.35	24.72	38.26	65.92	137.70	236.17	384.03*	1849.8*	6087.7*
	25	13.91	17.68	24.11	38.75	72.21	127.30	267.33	459.53	748.17*	3610.5*	11887.*
1600	15	10.11	11.97	14.41	17.66	22.41	30.68	59.07	100.70	163.15*	781.86*	2570.0*
	20	12.25	14.96	18.88	25.24	38.47	65.92	137.70	236.17	384.03*	1849.8*	6087.7*
	25	14.38	18.22	24.68	39.00	72.21	127.30	267.33	459.53	748.17*	3610.5*	11887.*
1700	15	10.43	12.34	14.84	18.14	22.90	31.04	59.08	100.70	163.15*	781.86*	2570.0*
	20	12.64	15.41	19.39	25.76	38.71	65.92	137.70	236.17	384.03*	1849.8*	6087.7*
	25	14.83	18.75	25.25	39.28	72.21	127.30	267.33	459.53	748.17*	3610.5*	11887.*
1800	15	10.75	12.70	15.25	18.60	23.39	31.43	59.09	100.70	163.15*	781.86*	2570.0*
	20	13.02	15.85	19.90	26.27	38.97	65.93	137.70	236.17	384.03*	1849.8*	6087.7*
	25	15.28	19.27	25.80	39.59	72.22	127.30	267.33	459.53	748.17*	3610.5*	11887.*
1900	15	11.06	13.06	15.66	19.06	23.87	31.82	59.11	100.70	163.15*	781.86*	2570.0*
	20	13.40	16.28	20.39	26.78	39.26	65.94	137.70	236.17	384.03*	1849.8*	6087.7*
	25	15.71	19.77	26.34	39.92	72.22	127.30	267.33	459.53	748.17*	3610.5*	11887.*
2000	15	11.36	13.40	16.06	19.50	24.34	32.22	59.13	100.70	163.15*	781.86*	2570.0*
	20	13.76	16.71	20.87	27.28	39.57	65.95	137.70	236.17	384.03*	1849.8*	6087.7*
	25	16.14	20.26	26.88	40.26	72.23	127.30	267.33	459.53	748.17*	3610.5*	11887.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 18.0 Ft (RADIUS = 12.7 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	0.67	0.73	0.80	0.88	0.96	1.05	1.18	1.28	1.39	1.90*	2.54*
	20	0.71	0.78	0.86	0.95	1.04	1.13	1.27	1.40	1.52	2.17*	3.20*
	25	0.75	0.82	0.91	1.01	1.11	1.21	1.37	1.51	1.66	2.51*	4.55*
200	15	0.78	0.85	0.94	1.03	1.13	1.23	1.38	1.51	1.64	2.25*	2.99*
	20	0.85	0.92	1.02	1.13	1.24	1.35	1.52	1.67	1.82	2.58*	3.68*
	25	0.91	0.99	1.10	1.22	1.34	1.46	1.66	1.83	2.01	2.98*	4.79*
300	15	0.87	0.95	1.05	1.16	1.26	1.37	1.54	1.69	1.83	2.52*	3.36*
	20	0.96	1.05	1.16	1.27	1.40	1.52	1.72	1.88	2.06	2.92*	4.10*
	25	1.03	1.13	1.25	1.39	1.52	1.67	1.89	2.08	2.28	3.37*	5.17*
400	15	0.95	1.04	1.15	1.26	1.38	1.50	1.69	1.84	2.00	2.76*	3.68*
	20	1.05	1.15	1.27	1.40	1.54	1.68	1.89	2.07	2.26	3.21*	4.48*
	25	1.14	1.25	1.39	1.53	1.69	1.84	2.09	2.30	2.52	3.71*	5.56*
500	15	1.03	1.12	1.24	1.36	1.49	1.62	1.81	1.98	2.15	2.98*	3.96*
	20	1.14	1.24	1.38	1.52	1.66	1.81	2.04	2.24	2.45	3.47*	4.83*
	25	1.24	1.36	1.51	1.67	1.83	2.00	2.26	2.50	2.74	4.01*	5.93*
600	15	1.09	1.19	1.32	1.45	1.58	1.72	1.93	2.11	2.29	3.18*	4.22*
	20	1.22	1.33	1.47	1.62	1.78	1.94	2.19	2.40	2.62	3.72*	5.14*
	25	1.33	1.46	1.62	1.79	1.96	2.15	2.43	2.68	2.93	4.29*	6.29*
700	15	1.15	1.26	1.39	1.53	1.67	1.82	2.04	2.23	2.42	3.36*	4.47*
	20	1.29	1.41	1.56	1.72	1.89	2.06	2.32	2.54	2.77	3.94*	5.44*
	25	1.42	1.56	1.72	1.90	2.09	2.28	2.58	2.84	3.12	4.55*	6.62*
800	15	1.21	1.32	1.46	1.61	1.76	1.91	2.15	2.34	2.55	3.53*	4.70*
	20	1.36	1.49	1.65	1.82	1.99	2.17	2.44	2.68	2.92	4.15*	5.72*
	25	1.50	1.64	1.82	2.01	2.21	2.41	2.73	3.00	3.29	4.80*	6.94*
900	15	1.27	1.39	1.53	1.68	1.84	2.00	2.24	2.45	2.66	3.70*	4.91*
	20	1.43	1.56	1.73	1.91	2.09	2.27	2.56	2.81	3.06	4.35*	5.98*
	25	1.58	1.73	1.91	2.11	2.32	2.53	2.87	3.15	3.45	5.03*	7.24*
1000	15	1.32	1.44	1.59	1.75	1.92	2.08	2.34	2.55	2.77	3.85*	5.12*
	20	1.49	1.63	1.81	1.99	2.18	2.38	2.68	2.93	3.20	4.54*	6.24*
	25	1.65	1.81	2.00	2.21	2.43	2.65	3.00	3.30	3.61	5.25*	7.53*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 18.0 Ft (RADIUS = 12.7 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	1.37	1.50	1.66	1.82	1.99	2.16	2.43	2.65	2.88	4.00*	5.32*
	20	1.55	1.70	1.88	2.07	2.27	2.47	2.78	3.05	3.33	4.72*	6.48*
	25	1.72	1.88	2.09	2.30	2.53	2.76	3.12	3.43	3.76	5.47*	7.81*
1200	15	1.42	1.56	1.72	1.89	2.06	2.24	2.52	2.75	2.98	4.15*	5.51*
	20	1.61	1.77	1.95	2.15	2.36	2.57	2.89	3.17	3.45	4.90*	6.71*
	25	1.79	1.96	2.17	2.40	2.63	2.87	3.24	3.57	3.90	5.67*	8.08*
1300	15	1.47	1.61	1.77	1.95	2.13	2.32	2.60	2.84	3.08	4.29*	5.70*
	20	1.67	1.83	2.02	2.23	2.44	2.66	2.99	3.28	3.57	5.07*	6.94*
	25	1.85	2.03	2.25	2.48	2.72	2.97	3.36	3.70	4.04	5.87*	8.34*
1400	15	1.52	1.66	1.83	2.01	2.20	2.39	2.68	2.93	3.18	4.42*	5.88*
	20	1.73	1.89	2.09	2.30	2.52	2.74	3.09	3.38	3.69	5.23*	7.16*
	25	1.92	2.10	2.33	2.57	2.82	3.07	3.47	3.82	4.18	6.06*	8.60*
1500	15	1.56	1.71	1.88	2.07	2.27	2.46	2.76	3.02	3.27	4.55*	6.05*
	20	1.78	1.95	2.15	2.37	2.60	2.83	3.18	3.49	3.80	5.39*	7.37*
	25	1.98	2.17	2.40	2.65	2.91	3.17	3.58	3.94	4.31	6.25*	8.84*
1600	15	1.61	1.76	1.94	2.13	2.33	2.53	2.84	3.10	3.37	4.68*	6.22*
	20	1.83	2.01	2.22	2.44	2.67	2.91	3.28	3.59	3.91	5.55*	7.58*
	25	2.04	2.23	2.47	2.73	2.99	3.27	3.69	4.06	4.44	6.43*	9.08*
1700	15	1.65	1.80	1.99	2.19	2.39	2.60	2.91	3.18	3.45	4.81*	6.38*
	20	1.88	2.06	2.28	2.51	2.75	2.99	3.37	3.69	4.02	5.70*	7.78*
	25	2.10	2.30	2.54	2.81	3.08	3.36	3.80	4.17	4.56	6.61*	9.31*
1800	15	1.69	1.85	2.04	2.24	2.45	2.66	2.99	3.26	3.54	4.93*	6.54*
	20	1.93	2.12	2.34	2.58	2.82	3.07	3.46	3.78	4.12	5.85*	7.97*
	25	2.15	2.36	2.61	2.88	3.16	3.45	3.90	4.28	4.68	6.78*	9.54*
1900	15	1.73	1.89	2.09	2.30	2.51	2.73	3.06	3.34	3.63	5.05*	6.70*
	20	1.98	2.17	2.40	2.64	2.89	3.15	3.54	3.88	4.23	5.99*	8.16*
	25	2.21	2.42	2.68	2.96	3.24	3.54	4.00	4.39	4.80	6.95*	9.76*
2000	15	1.77	1.94	2.14	2.35	2.57	2.79	3.13	3.42	3.71	5.16*	6.85*
	20	2.03	2.22	2.46	2.70	2.96	3.22	3.63	3.97	4.33	6.13*	8.35*
	25	2.26	2.48	2.75	3.03	3.32	3.63	4.09	4.50	4.92	7.11*	9.98*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 18.0 Ft (RADIUS = 12.7 Ft)
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE
TIME INDEX
(Ft*s)^{1/2}
RATE
OF RISE
°F/min

CEILING HEIGHT, Ft

	4	8	12	16	20	24	30	35	40	60	80
100	1.04 1.14 1.23	1.15 1.26 1.37	1.28 1.41 1.54	1.42 1.58 1.74	1.57 1.76 1.97	1.73 1.96 2.23	1.99 2.32 2.75	2.23 2.69 3.42	2.50 3.20 4.60	4.93* 9.60* 17.34*	12.80* 27.90* 52.79*
200	1.28 1.42 1.55	1.40 1.57 1.72	1.56 1.75 1.94	1.73 1.96 2.19	1.92 2.19 2.46	2.11 2.43 2.77	2.42 2.85 3.34	2.71 3.26 3.98	3.02 3.77 4.94	5.27* 9.60* 17.34*	12.80* 27.90* 52.79*
300	1.46 1.64 1.80	1.61 1.81 2.01	1.79 2.03 2.26	1.99 2.27 2.55	2.20 2.53 2.86	2.42 2.81 3.21	2.77 3.27 3.83	3.09 3.72 4.50	3.44 4.26 5.41	5.73* 9.64* 17.34*	12.81* 27.90* 52.79*
400	1.63 1.83 2.03	1.79 2.03 2.26	1.99 2.27 2.54	2.21 2.54 2.86	2.44 2.82 3.20	2.68 3.13 3.59	3.07 3.64 4.26	3.42 4.13 4.96	3.81 4.70 5.87	6.19* 9.79* 17.34*	12.83* 27.90* 52.79*
500	1.77 2.01 2.23	1.95 2.22 2.48	2.17 2.49 2.79	2.41 2.78 3.14	2.66 3.09 3.51	2.92 3.42 3.93	3.34 3.97 4.65	3.72 4.49 5.38	4.13 5.09 6.30	6.63* 10.03* 17.34*	12.92* 27.90* 52.79*
600	1.91 2.17 2.42	2.10 2.40 2.69	2.34 2.69 3.02	2.59 3.00 3.39	2.86 3.33 3.80	3.14 3.69 4.24	3.59 4.27 5.00	3.99 4.82 5.76	4.43 5.46 6.71	7.03* 10.34* 17.36*	13.08* 27.90* 52.79*
700	2.03 2.32 2.59	2.24 2.57 2.88	2.49 2.87 3.24	2.76 3.20 3.63	3.05 3.56 4.06	3.35 3.94 4.53	3.82 4.56 5.33	4.25 5.14 6.12	4.71 5.80 7.09	7.42* 10.68* 17.40*	13.31* 27.90* 52.79*
800	2.15 2.46 2.75	2.37 2.73 3.06	2.64 3.05 3.44	2.92 3.40 3.86	3.22 3.77 4.31	3.54 4.17 4.80	4.04 4.82 5.64	4.49 5.43 6.46	4.97 6.12 7.46	7.79* 11.03* 17.47*	13.57* 27.90* 52.79*
900	2.27 2.60 2.91	2.49 2.88 3.23	2.77 3.21 3.63	3.08 3.58 4.07	3.39 3.97 4.55	3.72 4.39 5.06	4.25 5.07 5.94	4.72 5.71 6.79	5.22 6.42 7.81	8.14* 11.38* 17.59*	13.87* 27.91* 52.79*
1000	2.37 2.73 3.06	2.61 3.02 3.40	2.91 3.37 3.82	3.22 3.76 4.27	3.55 4.17 4.77	3.90 4.60 5.31	4.45 5.32 6.22	4.94 5.97 7.10	5.46 6.71 8.14	8.47* 11.74* 17.74*	14.18* 27.91* 52.79*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 18.0 Ft (RADIUS = 12.7 Ft)
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	2.48	2.73	3.03	3.36	3.71	4.07	4.64	5.14	5.69	8.79*	14.51*
	20	2.85	3.16	3.53	3.93	4.35	4.81	5.55	6.23	6.99	12.09*	27.93*
	25	3.20	3.56	3.99	4.47	4.99	5.55	6.49	7.39	8.46	17.92*	52.79*
1200	15	2.58	2.84	3.16	3.50	3.85	4.23	4.82	5.34	5.91	9.10*	14.83*
	20	2.97	3.29	3.67	4.09	4.53	5.00	5.77	6.47	7.25	12.43*	27.95*
	25	3.34	3.71	4.16	4.66	5.19	5.77	6.75	7.68	8.77	18.13*	52.79*
1300	15	2.67	2.94	3.27	3.63	4.00	4.38	5.00	5.54	6.12	9.40*	15.16*
	20	3.09	3.42	3.81	4.25	4.71	5.19	5.98	6.71	7.51	12.76*	27.99*
	25	3.47	3.86	4.33	4.84	5.40	5.99	7.00	7.95	9.07	18.37*	52.79*
1400	15	2.77	3.05	3.39	3.75	4.14	4.54	5.17	5.73	6.32	9.69*	15.49*
	20	3.20	3.54	3.95	4.40	4.87	5.38	6.19	6.94	7.76	13.09*	28.04*
	25	3.60	4.00	4.48	5.02	5.59	6.21	7.24	8.22	9.36	18.61*	52.79*
1500	15	2.86	3.15	3.50	3.88	4.27	4.68	5.33	5.91	6.52	9.97*	15.82*
	20	3.31	3.66	4.09	4.55	5.04	5.55	6.39	7.16	8.01	13.42*	28.11*
	25	3.73	4.14	4.64	5.19	5.78	6.41	7.47	8.48	9.64	18.87*	52.79*
1600	15	2.95	3.25	3.61	3.99	4.40	4.82	5.49	6.08	6.71	10.25*	16.14*
	20	3.42	3.78	4.22	4.69	5.19	5.73	6.59	7.37	8.24	13.74*	28.20*
	25	3.85	4.27	4.79	5.35	5.96	6.62	7.70	8.73	9.92	19.14*	52.79*
1700	15	3.04	3.34	3.71	4.11	4.53	4.96	5.65	6.26	6.90	10.51*	16.46*
	20	3.52	3.89	4.34	4.83	5.35	5.90	6.78	7.58	8.47	14.05*	28.31*
	25	3.97	4.40	4.93	5.52	6.14	6.81	7.92	8.98	10.19	19.42*	52.79*
1800	15	3.12	3.43	3.82	4.22	4.65	5.10	5.80	6.43	7.09	10.77*	16.77*
	20	3.62	4.00	4.47	4.97	5.50	6.06	6.96	7.79	8.69	14.35*	28.43*
	25	4.08	4.53	5.08	5.67	6.31	7.00	8.14	9.22	10.45	19.70*	52.79*
1900	15	3.20	3.53	3.92	4.34	4.77	5.23	5.95	6.59	7.26	11.03*	17.08*
	20	3.72	4.11	4.59	5.10	5.64	6.22	7.15	7.99	8.91	14.65*	28.57*
	25	4.20	4.66	5.22	5.83	6.48	7.19	8.35	9.45	10.70	19.98*	52.79*
2000	15	3.28	3.61	4.01	4.44	4.89	5.36	6.10	6.75	7.44	11.28*	17.39*
	20	3.82	4.22	4.70	5.23	5.79	6.38	7.32	8.18	9.13	14.95*	28.72*
	25	4.31	4.78	5.35	5.98	6.65	7.37	8.56	9.68	10.95	20.26*	52.80*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 18.0 Ft (RADIUS = 12.7 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	1.75	1.97	2.27	2.62	3.08	3.74	5.68	8.76	13.33	56.75*	178.64*
	20	1.97	2.27	2.69	3.28	4.25	6.19	11.58	18.81	29.48	131.84*	420.20*
	25	2.19	2.59	3.21	4.30	6.71	10.93	21.37	35.38	56.10	255.63*	818.46*
200	15	2.23	2.51	2.87	3.30	3.83	4.49	6.10	8.80	13.33	56.75*	178.64*
	20	2.55	2.93	3.43	4.08	5.01	6.55	11.59	18.81	29.48	131.84*	420.20*
	25	2.87	3.36	4.06	5.10	7.01	10.93	21.37	35.38	56.10	255.63*	818.46*
300	15	2.61	2.94	3.36	3.85	4.43	5.14	6.69	9.03	13.33	56.75*	178.64*
	20	3.01	3.45	4.02	4.74	5.70	7.13	11.64	18.81	29.48	131.84*	420.20*
	25	3.40	3.97	4.75	5.83	7.59	11.03	21.37	35.38	56.10	255.63*	818.46*
400	15	2.94	3.31	3.78	4.32	4.95	5.71	7.27	9.43	13.39	56.75*	178.64*
	20	3.42	3.91	4.54	5.32	6.32	7.73	11.82	18.82	29.48	131.84*	420.20*
	25	3.87	4.50	5.35	6.49	8.20	11.31	21.37	35.38	56.10	255.63*	818.46*
500	15	3.25	3.65	4.16	4.74	5.42	6.22	7.82	9.89	13.55	56.75*	178.64*
	20	3.78	4.31	5.00	5.83	6.88	8.31	12.13	18.83	29.48	131.84*	420.20*
	25	4.29	4.98	5.88	7.08	8.80	11.70	21.37	35.38	56.10	255.63*	818.46*
600	15	3.52	3.96	4.51	5.13	5.85	6.69	8.33	10.37	13.80	56.75*	178.64*
	20	4.11	4.69	5.42	6.31	7.41	8.86	12.51	18.88	29.48	131.84*	420.20*
	25	4.68	5.41	6.38	7.63	9.37	12.16	21.39	35.38	56.10	255.63*	818.46*
700	15	3.78	4.25	4.83	5.49	6.25	7.13	8.82	10.84	14.11	56.75*	178.64*
	20	4.42	5.04	5.82	6.75	7.89	9.37	12.94	18.97	29.48	131.84*	420.20*
	25	5.04	5.82	6.84	8.14	9.92	12.64	21.44	35.38	56.10	255.63*	818.46*
800	15	4.03	4.52	5.14	5.84	6.63	7.55	9.28	11.31	14.46	56.75*	178.64*
	20	4.72	5.37	6.19	7.17	8.35	9.87	13.38	19.12	29.48	131.84*	420.20*
	25	5.38	6.20	7.27	8.63	10.44	13.13	21.54	35.38	56.10	255.63*	818.46*
900	15	4.26	4.78	5.43	6.16	6.99	7.94	9.72	11.76	14.84	56.75*	178.64*
	20	5.00	5.68	6.54	7.56	8.79	10.34	13.83	19.33	29.49	131.84*	420.20*
	25	5.70	6.57	7.68	9.09	10.93	13.61	21.68	35.38	56.10	255.63*	818.46*
1000	15	4.48	5.03	5.70	6.47	7.33	8.32	10.14	12.20	15.23	56.75*	178.64*
	20	5.26	5.98	6.88	7.94	9.21	10.79	14.28	19.58	29.51	131.84*	420.20*
	25	6.01	6.91	8.08	9.53	11.41	14.09	21.87	35.39	56.10	255.63*	818.46*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 18.0 Ft (RADIUS = 12.7 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	4.69	5.26	5.97	6.76	7.66	8.68	10.55	12.63	15.62	56.75*	178.64*
	20	5.52	6.27	7.20	8.30	9.60	11.22	14.71	19.87	29.54	131.84*	420.20*
	25	6.30	7.24	8.45	9.95	11.87	14.55	22.10	35.39	56.10	255.63*	818.46*
1200	15	4.90	5.49	6.22	7.05	7.97	9.03	10.94	13.04	16.02	56.75*	178.64*
	20	5.76	6.54	7.51	8.64	9.99	11.64	15.15	20.18	29.60	131.84*	420.20*
	25	6.59	7.56	8.81	10.35	12.31	15.01	22.37	35.41	56.10	255.63*	818.46*
1300	15	5.09	5.71	6.47	7.32	8.28	9.36	11.32	13.45	16.41	56.75*	178.64*
	20	6.00	6.81	7.81	8.98	10.36	12.04	15.57	20.50	29.67	131.84*	420.20*
	25	6.86	7.87	9.16	10.74	12.74	15.45	22.66	35.43	56.10	255.63*	818.46*
1400	15	5.29	5.92	6.71	7.59	8.57	9.68	11.69	13.84	16.80	56.75*	178.64*
	20	6.23	7.06	8.10	9.30	10.72	12.44	15.99	20.85	29.77	131.84*	420.20*
	25	7.13	8.17	9.50	11.12	13.15	15.89	22.97	35.47	56.10	255.63*	818.46*
1500	15	5.47	6.13	6.94	7.85	8.86	10.00	12.04	14.22	17.18	56.75*	178.64*
	20	6.46	7.31	8.38	9.62	11.07	12.82	16.40	21.20	29.89	131.84*	420.20*
	25	7.39	8.46	9.83	11.49	13.56	16.31	23.30	35.52	56.10	255.63*	818.46*
1600	15	5.65	6.33	7.16	8.10	9.14	10.30	12.39	14.60	17.56	56.75*	178.64*
	20	6.67	7.56	8.65	9.92	11.41	13.19	16.80	21.55	30.04	131.84*	420.20*
	25	7.64	8.75	10.15	11.84	13.95	16.73	23.64	35.59	56.10	255.63*	818.46*
1700	15	5.83	6.53	7.38	8.34	9.41	10.60	12.73	14.96	17.94	56.75*	178.64*
	20	6.89	7.79	8.92	10.22	11.74	13.55	17.19	21.91	30.20	131.84*	420.20*
	25	7.88	9.02	10.46	12.19	14.34	17.14	23.98	35.68	56.10	255.63*	818.46*
1800	15	6.00	6.72	7.60	8.58	9.67	10.89	13.05	15.32	18.30	56.75*	178.64*
	20	7.09	8.03	9.18	10.51	12.06	13.90	17.58	22.27	30.39	131.84*	420.20*
	25	8.12	9.29	10.76	12.53	14.71	17.54	24.33	35.79	56.11	255.63*	818.46*
1900	15	6.17	6.91	7.81	8.81	9.93	11.18	13.38	15.67	18.67	56.76*	178.64*
	20	7.30	8.25	9.43	10.80	12.38	14.25	17.96	22.63	30.60	131.84*	420.20*
	25	8.36	9.55	11.06	12.86	15.08	17.93	24.69	35.91	56.11	255.63*	818.46*
2000	15	6.34	7.09	8.01	9.04	10.18	11.45	13.69	16.01	19.02	56.76*	178.64*
	20	7.49	8.47	9.68	11.07	12.68	14.59	18.33	22.99	30.82	131.84*	420.20*
	25	8.58	9.81	11.35	13.19	15.43	18.32	25.05	36.06	56.11	255.63*	818.46*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 18.0 Ft (RADIUS = 12.7 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	3.29	4.20	6.29	11.62	20.81	35.22	71.01	119.21	190.60	879.26*	2823.5*
	20	4.02	6.10	12.82	25.73	47.34	81.35	165.94	279.99	449.00	2080.6*	6688.6*
	25	4.92	10.15	23.88	48.98	91.07	157.39	322.44	545.06	875.03	4061.3*	13061.*
200	15	4.31	5.34	7.20	11.68	20.81	35.22	71.01	119.21	190.60	879.26*	2823.5*
	20	5.26	7.23	12.86	25.73	47.34	81.35	165.94	279.99	449.00	2080.6*	6688.6*
	25	6.34	10.52	23.88	48.98	91.07	157.39	322.44	545.06	875.03	4061.3*	13061.*
300	15	5.13	6.27	8.14	12.02	20.81	35.22	71.01	119.21	190.60	879.26*	2823.5*
	20	6.25	8.28	13.18	25.73	47.34	81.35	165.94	279.99	449.00	2080.6*	6688.6*
	25	7.49	11.34	23.88	48.98	91.07	157.39	322.44	545.06	875.03	4061.3*	13061.*
400	15	5.83	7.07	9.00	12.60	20.83	35.22	71.01	119.21	190.60	879.26*	2823.5*
	20	7.12	9.23	13.76	25.73	47.34	81.35	165.94	279.99	449.00	2080.6*	6688.6*
	25	8.50	12.26	23.90	48.98	91.07	157.39	322.44	545.06	875.03	4061.3*	13061.*
500	15	6.47	7.79	9.80	13.26	20.92	35.22	71.01	119.21	190.60	879.26*	2823.5*
	20	7.89	10.10	14.45	25.75	47.34	81.35	165.94	279.99	449.00	2080.6*	6688.6*
	25	9.40	13.17	23.99	48.98	91.07	157.39	322.44	545.06	875.03	4061.3*	13061.*
600	15	7.05	8.46	10.53	13.95	21.10	35.23	71.01	119.21	190.60	879.26*	2823.5*
	20	8.60	10.90	15.17	25.83	47.34	81.35	165.94	279.99	449.00	2080.6*	6688.6*
	25	10.23	14.04	24.17	48.98	91.07	157.39	322.44	545.06	875.03	4061.3*	13061.*
700	15	7.59	9.08	11.22	14.63	21.39	35.23	71.01	119.21	190.60	879.26*	2823.5*
	20	9.26	11.65	15.90	25.97	47.34	81.35	165.94	279.99	449.00	2080.6*	6688.6*
	25	11.00	14.87	24.47	48.98	91.07	157.39	322.44	545.06	875.03	4061.3*	13061.*
800	15	8.11	9.66	11.88	15.29	21.76	35.24	71.01	119.21	190.60	879.26*	2823.5*
	20	9.88	12.36	16.61	26.20	47.34	81.35	165.94	279.99	449.00	2080.6*	6688.6*
	25	11.73	15.66	24.86	48.98	91.07	157.39	322.44	545.06	875.03	4061.3*	13061.*
900	15	8.59	10.21	12.50	15.93	22.18	35.27	71.01	119.21	190.60	879.26*	2823.5*
	20	10.48	13.03	17.31	26.51	47.34	81.35	165.94	279.99	449.00	2080.6*	6688.6*
	25	12.42	16.42	25.33	48.98	91.07	157.39	322.44	545.06	875.03	4061.3*	13061.*
1000	15	9.05	10.74	13.09	16.56	22.65	35.32	71.01	119.21	190.60	879.26*	2823.5*
	20	11.04	13.67	17.98	26.88	47.34	81.35	165.94	279.99	449.00	2080.6*	6688.6*
	25	13.08	17.15	25.84	48.99	91.07	157.39	322.44	545.06	875.03	4061.3*	13061.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 18.0 Ft (RADIUS = 12.7 Ft)³
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	9.50	11.24	13.66	17.17	23.14	35.41	71.01	119.21	190.60	879.26*	2823.5*
	20	11.58	14.28	18.64	27.29	47.36	81.35	165.94	279.99	449.00	2080.6*	6688.6*
	25	13.71	17.86	26.38	49.00	91.07	157.39	322.44	545.06	875.03	4061.3*	13061.*
1200	15	9.93	11.73	14.21	17.76	23.64	35.53	71.01	119.21	190.60	879.26*	2823.5*
	20	12.10	14.88	19.28	27.74	47.37	81.35	165.94	279.99	449.00	2080.6*	6688.6*
	25	14.31	18.54	26.95	49.03	91.07	157.39	322.44	545.06	875.03	4061.3*	13061.*
1300	15	10.34	12.20	14.74	18.33	24.16	35.69	71.01	119.21	190.60	879.26*	2823.5*
	20	12.60	15.45	19.90	28.22	47.41	81.35	165.94	279.99	449.00	2080.6*	6688.6*
	25	14.90	19.19	27.52	49.07	91.07	157.39	322.44	545.06	875.03	4061.3*	13061.*
1400	15	10.74	12.65	15.25	18.89	24.67	35.88	71.01	119.21	190.60	879.26*	2823.5*
	20	13.09	16.00	20.51	28.71	47.46	81.35	165.94	279.99	449.00	2080.6*	6688.6*
	25	15.46	19.83	28.10	49.13	91.07	157.39	322.44	545.06	875.03	4061.3*	13061.*
1500	15	11.13	13.09	15.75	19.43	25.19	36.11	71.01	119.21	190.60	879.26*	2823.5*
	20	13.56	16.54	21.10	29.21	47.53	81.35	165.94	279.99	449.00	2080.6*	6688.6*
	25	16.01	20.46	28.69	49.21	91.07	157.39	322.44	545.06	875.03	4061.3*	13061.*
1600	15	11.51	13.52	16.24	19.96	25.70	36.37	71.02	119.21	190.60	879.26*	2823.5*
	20	14.02	17.06	21.67	29.72	47.62	81.35	165.94	279.99	449.00	2080.6*	6688.6*
	25	16.55	21.06	29.27	49.31	91.07	157.39	322.44	545.06	875.03	4061.3*	13061.*
1700	15	11.87	13.94	16.71	20.48	26.21	36.66	71.02	119.21	190.60	879.26*	2823.5*
	20	14.46	17.57	22.24	30.23	47.74	81.35	165.94	279.99	449.00	2080.6*	6688.6*
	25	17.07	21.65	29.85	49.45	91.07	157.39	322.44	545.06	875.03	4061.3*	13061.*
1800	15	12.23	14.34	17.17	20.99	26.72	36.97	71.02	119.21	190.60	879.26*	2823.5*
	20	14.90	18.07	22.79	30.74	47.88	81.35	165.94	279.99	449.00	2080.6*	6688.6*
	25	17.58	22.23	30.42	49.61	91.08	157.39	322.44	545.06	875.03	4061.3*	13061.*
1900	15	12.58	14.74	17.62	21.49	27.22	37.30	71.02	119.21	190.60	879.26*	2823.5*
	20	15.33	18.55	23.33	31.26	48.04	81.35	165.94	279.99	449.00	2080.6*	6688.6*
	25	18.07	22.79	30.99	49.80	91.08	157.39	322.44	545.06	875.03	4061.3*	13061.*
2000	15	12.93	15.13	18.06	21.97	27.71	37.65	71.03	119.21	190.60	879.26*	2823.5*
	20	15.74	19.03	23.86	31.77	48.23	81.35	165.94	279.99	449.00	2080.6*	6688.6*
	25	18.56	23.34	31.55	50.01	91.08	157.39	322.44	545.06	875.03	4061.3*	13061.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 20.0 Ft (RADIUS = 14.1 Ft)
 FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		(Ft*s) ^{1/2}										
		4	8	12	16	20	24	30	35	40	60	80
100	15	0.73	0.78	0.86	0.94	1.02	1.10	1.23	1.34	1.45	1.96*	2.61*
	20	0.78	0.84	0.92	1.01	1.10	1.19	1.34	1.46	1.59	2.24*	3.34*
	25	0.83	0.89	0.98	1.07	1.17	1.28	1.44	1.59	1.74	2.61*	4.88*
200	15	0.86	0.92	1.01	1.10	1.20	1.30	1.45	1.58	1.71	2.31*	3.08*
	20	0.93	1.00	1.10	1.21	1.31	1.43	1.60	1.75	1.91	2.67*	3.81*
	25	1.00	1.08	1.19	1.30	1.42	1.55	1.75	1.92	2.11	3.10*	5.06*
300	15	0.96	1.03	1.13	1.24	1.34	1.45	1.62	1.77	1.92	2.60*	3.45*
	20	1.05	1.14	1.25	1.37	1.49	1.62	1.81	1.98	2.16	3.02*	4.24*
	25	1.14	1.23	1.36	1.49	1.63	1.77	2.00	2.19	2.40	3.49*	5.42*
400	15	1.05	1.13	1.24	1.35	1.47	1.59	1.78	1.93	2.10	2.85*	3.78*
	20	1.16	1.25	1.37	1.50	1.64	1.78	2.00	2.18	2.38	3.32*	4.63*
	25	1.26	1.37	1.50	1.65	1.80	1.96	2.21	2.43	2.66	3.84*	5.80*
500	15	1.13	1.22	1.33	1.46	1.58	1.71	1.91	2.08	2.26	3.07*	4.07*
	20	1.26	1.36	1.49	1.63	1.78	1.93	2.16	2.36	2.57	3.59*	4.98*
	25	1.37	1.49	1.63	1.79	1.96	2.13	2.40	2.64	2.88	4.16*	6.18*
600	15	1.21	1.30	1.42	1.55	1.69	1.83	2.04	2.22	2.41	3.27*	4.34*
	20	1.35	1.45	1.59	1.75	1.90	2.06	2.31	2.53	2.75	3.84*	5.31*
	25	1.48	1.60	1.76	1.93	2.10	2.29	2.58	2.83	3.09	4.45*	6.53*
700	15	1.28	1.37	1.50	1.64	1.79	1.93	2.16	2.35	2.54	3.46*	4.59*
	20	1.43	1.54	1.69	1.85	2.02	2.19	2.46	2.68	2.92	4.07*	5.61*
	25	1.57	1.70	1.87	2.05	2.24	2.44	2.74	3.01	3.29	4.72*	6.87*
800	15	1.34	1.45	1.58	1.73	1.88	2.03	2.27	2.47	2.67	3.64*	4.82*
	20	1.51	1.63	1.79	1.95	2.13	2.31	2.59	2.83	3.08	4.29*	5.90*
	25	1.66	1.80	1.98	2.17	2.37	2.57	2.90	3.18	3.47	4.97*	7.19*
900	15	1.40	1.51	1.66	1.81	1.97	2.13	2.37	2.58	2.80	3.81*	5.05*
	20	1.58	1.71	1.87	2.05	2.24	2.42	2.72	2.97	3.23	4.49*	6.17*
	25	1.75	1.89	2.08	2.28	2.49	2.70	3.04	3.34	3.65	5.21*	7.50*
1000	15	1.46	1.58	1.73	1.88	2.05	2.22	2.47	2.69	2.92	3.97*	5.26*
	20	1.65	1.79	1.96	2.14	2.34	2.53	2.84	3.10	3.37	4.69*	6.43*
	25	1.83	1.98	2.17	2.38	2.60	2.83	3.18	3.49	3.81	5.44*	7.80*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 20.0 Ft (RADIUS = 14.1 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	1.52	1.64	1.79	1.96	2.13	2.30	2.57	2.80	3.03	4.12*	5.46*
	20	1.72	1.86	2.04	2.23	2.43	2.64	2.95	3.23	3.51	4.88*	6.68*
	25	1.91	2.07	2.27	2.49	2.71	2.95	3.32	3.64	3.97	5.66*	8.09*
1200	15	1.58	1.70	1.86	2.03	2.21	2.39	2.66	2.90	3.14	4.27*	5.66*
	20	1.79	1.93	2.12	2.32	2.52	2.74	3.07	3.35	3.64	5.06*	6.92*
	25	1.98	2.15	2.36	2.58	2.82	3.07	3.45	3.78	4.13	5.87*	8.36*
1300	15	1.63	1.76	1.92	2.10	2.28	2.47	2.75	3.00	3.25	4.42*	5.85*
	20	1.85	2.00	2.19	2.40	2.61	2.83	3.17	3.47	3.77	5.23*	7.15*
	25	2.06	2.23	2.44	2.68	2.92	3.18	3.57	3.92	4.27	6.08*	8.63*
1400	15	1.68	1.81	1.98	2.17	2.35	2.55	2.84	3.09	3.35	4.56*	6.03*
	20	1.91	2.07	2.27	2.48	2.70	2.93	3.28	3.58	3.89	5.40*	7.37*
	25	2.13	2.30	2.53	2.77	3.03	3.29	3.69	4.05	4.42	6.28*	8.89*
1500	15	1.73	1.87	2.04	2.23	2.42	2.62	2.93	3.18	3.45	4.69*	6.21*
	20	1.97	2.13	2.34	2.56	2.79	3.02	3.38	3.69	4.01	5.57*	7.59*
	25	2.19	2.38	2.61	2.86	3.12	3.39	3.81	4.18	4.56	6.47*	9.14*
1600	15	1.78	1.92	2.10	2.29	2.49	2.70	3.01	3.27	3.54	4.82*	6.38*
	20	2.03	2.20	2.41	2.63	2.87	3.11	3.48	3.80	4.13	5.73*	7.80*
	25	2.26	2.45	2.69	2.95	3.22	3.49	3.93	4.30	4.69	6.66*	9.39*
1700	15	1.83	1.97	2.16	2.36	2.56	2.77	3.09	3.36	3.64	4.95*	6.55*
	20	2.09	2.26	2.48	2.71	2.95	3.20	3.58	3.90	4.24	5.89*	8.00*
	25	2.33	2.52	2.77	3.03	3.31	3.59	4.04	4.42	4.83	6.84*	9.62*
1800	15	1.88	2.02	2.21	2.42	2.63	2.84	3.17	3.45	3.73	5.08*	6.72*
	20	2.15	2.32	2.54	2.78	3.03	3.28	3.67	4.01	4.35	6.04*	8.21*
	25	2.39	2.59	2.84	3.12	3.40	3.69	4.15	4.54	4.95	7.01*	9.86*
1900	15	1.92	2.07	2.27	2.47	2.69	2.91	3.24	3.53	3.82	5.20*	6.88*
	20	2.20	2.38	2.61	2.85	3.10	3.36	3.76	4.11	4.46	6.19*	8.40*
	25	2.45	2.66	2.92	3.20	3.49	3.79	4.25	4.66	5.08	7.19*	10.09*
2000	15	1.97	2.12	2.32	2.53	2.75	2.98	3.32	3.61	3.91	5.32*	7.03*
	20	2.25	2.44	2.67	2.92	3.18	3.44	3.85	4.21	4.57	6.33*	8.59*
	25	2.51	2.73	2.99	3.28	3.57	3.88	4.36	4.77	5.20	7.36*	10.31*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 20.0 Ft (RADIUS = 14.1 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100 (Ft*s) ^{1/2}	15	1.15	1.25	1.38	1.52	1.67	1.83	2.10	2.35	2.65	5.36*	13.89*
	20	1.26	1.37	1.52	1.70	1.89	2.10	2.47	2.88	3.47	10.61*	30.45*
	25	1.36	1.49	1.67	1.88	2.12	2.40	2.98	3.77	5.18	19.29*	57.74*
200	15	1.41	1.53	1.69	1.86	2.05	2.25	2.57	2.87	3.20	5.62*	13.89*
	20	1.57	1.71	1.90	2.12	2.35	2.60	3.04	3.48	4.04	10.61*	30.45*
	25	1.72	1.89	2.11	2.37	2.66	2.99	3.61	4.32	5.44	19.29*	57.74*
300	15	1.62	1.76	1.94	2.14	2.35	2.58	2.94	3.27	3.64	6.06*	13.89*
	20	1.82	1.99	2.21	2.45	2.72	3.01	3.50	3.98	4.56	10.63*	30.45*
	25	2.00	2.21	2.47	2.76	3.09	3.46	4.13	4.86	5.89	19.29*	57.74*
400	15	1.80	1.96	2.16	2.38	2.62	2.86	3.26	3.63	4.03	6.52*	13.91*
	20	2.03	2.23	2.47	2.74	3.04	3.36	3.89	4.41	5.02	10.72*	30.45*
	25	2.25	2.48	2.77	3.10	3.46	3.87	4.59	5.34	6.36	19.29*	57.74*
500	15	1.96	2.13	2.36	2.60	2.85	3.12	3.56	3.95	4.38	6.96*	13.96*
	20	2.23	2.44	2.71	3.00	3.32	3.67	4.24	4.79	5.44	10.90*	30.45*
	25	2.48	2.73	3.05	3.40	3.80	4.23	5.00	5.79	6.81	19.29*	57.74*
600	15	2.11	2.30	2.54	2.80	3.07	3.36	3.82	4.24	4.70	7.37*	14.07*
	20	2.41	2.64	2.93	3.24	3.59	3.96	4.57	5.15	5.82	11.16*	30.45*
	25	2.69	2.96	3.30	3.68	4.10	4.57	5.38	6.20	7.24	19.30*	57.74*
700	15	2.25	2.45	2.71	2.98	3.27	3.58	4.07	4.51	4.99	7.77*	14.25*
	20	2.58	2.82	3.13	3.47	3.83	4.23	4.87	5.48	6.18	11.47*	30.45*
	25	2.88	3.17	3.54	3.94	4.39	4.88	5.73	6.58	7.64	19.31*	57.74*
800	15	2.39	2.60	2.87	3.16	3.46	3.79	4.30	4.77	5.27	8.14*	14.48*
	20	2.74	3.00	3.32	3.68	4.07	4.48	5.16	5.80	6.52	11.80*	30.45*
	25	3.07	3.37	3.76	4.19	4.66	5.18	6.06	6.94	8.02	19.35*	57.74*
900	15	2.51	2.74	3.02	3.32	3.65	3.99	4.53	5.01	5.54	8.50*	14.74*
	20	2.89	3.16	3.50	3.88	4.29	4.72	5.43	6.09	6.85	12.14*	30.45*
	25	3.24	3.56	3.97	4.42	4.92	5.46	6.38	7.29	8.39	19.42*	57.74*
1000	15	2.64	2.87	3.16	3.48	3.82	4.17	4.74	5.24	5.79	8.84*	15.03*
	20	3.04	3.32	3.68	4.07	4.50	4.95	5.69	6.38	7.15	12.48*	30.45*
	25	3.41	3.74	4.17	4.64	5.16	5.72	6.68	7.62	8.75	19.52*	57.74*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 20.0 Ft (RADIUS = 14.1 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	2.75	2.99	3.30	3.63	3.99	4.35	4.94	5.47	6.03	9.17*	15.34*
	20	3.17	3.47	3.85	4.26	4.70	5.17	5.93	6.65	7.45	12.82*	30.46*
	25	3.57	3.92	4.36	4.86	5.39	5.98	6.97	7.93	9.09	19.65*	57.74*
1200	15	2.86	3.12	3.43	3.78	4.15	4.53	5.14	5.68	6.26	9.49*	15.65*
	20	3.31	3.62	4.01	4.43	4.89	5.38	6.17	6.91	7.73	13.17*	30.47*
	25	3.72	4.09	4.55	5.06	5.62	6.23	7.25	8.24	9.41	19.82*	57.74*
1300	15	2.97	3.23	3.56	3.92	4.30	4.70	5.33	5.89	6.49	9.80*	15.97*
	20	3.44	3.76	4.16	4.60	5.08	5.58	6.40	7.16	8.01	13.50*	30.49*
	25	3.87	4.25	4.73	5.26	5.84	6.46	7.52	8.53	9.73	20.01*	57.74*
1400	15	3.08	3.35	3.69	4.06	4.45	4.86	5.51	6.09	6.71	10.10*	16.29*
	20	3.56	3.90	4.31	4.77	5.26	5.78	6.62	7.40	8.27	13.83*	30.52*
	25	4.01	4.41	4.90	5.45	6.05	6.69	7.78	8.82	10.04	20.21*	57.74*
1500	15	3.18	3.46	3.81	4.19	4.60	5.02	5.69	6.28	6.92	10.39*	16.61*
	20	3.69	4.03	4.46	4.93	5.43	5.97	6.84	7.64	8.53	14.16*	30.56*
	25	4.15	4.56	5.07	5.64	6.25	6.92	8.03	9.09	10.34	20.44*	57.74*
1600	15	3.28	3.57	3.93	4.32	4.74	5.17	5.86	6.47	7.12	10.67*	16.93*
	20	3.80	4.16	4.60	5.09	5.61	6.16	7.05	7.87	8.78	14.48*	30.62*
	25	4.29	4.71	5.24	5.82	6.45	7.13	8.27	9.36	10.63	20.68*	57.74*
1700	15	3.37	3.67	4.04	4.45	4.88	5.32	6.03	6.65	7.32	10.95*	17.25*
	20	3.92	4.29	4.74	5.24	5.77	6.34	7.25	8.10	9.03	14.80*	30.69*
	25	4.42	4.86	5.40	6.00	6.64	7.34	8.51	9.62	10.91	20.93*	57.74*
1800	15	3.47	3.78	4.16	4.57	5.01	5.47	6.19	6.83	7.52	11.21*	17.56*
	20	4.03	4.41	4.88	5.39	5.93	6.51	7.45	8.31	9.26	15.11*	30.78*
	25	4.55	5.00	5.55	6.17	6.83	7.55	8.74	9.88	11.19	21.19*	57.74*
1900	15	3.56	3.88	4.27	4.69	5.14	5.61	6.35	7.01	7.71	11.48*	17.88*
	20	4.14	4.53	5.01	5.53	6.09	6.69	7.65	8.53	9.50	15.41*	30.88*
	25	4.68	5.14	5.71	6.34	7.02	7.75	8.97	10.13	11.46	21.45*	57.74*
2000	15	3.65	3.97	4.38	4.81	5.27	5.75	6.51	7.18	7.89	11.73*	18.18*
	20	4.25	4.65	5.14	5.68	6.25	6.86	7.84	8.74	9.72	15.71*	31.00*
	25	4.80	5.27	5.86	6.50	7.20	7.95	9.19	10.37	11.72	21.72*	57.74*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 20.0 Ft (RADIUS = 14.1 Ft)³
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	1.94	2.17	2.48	2.87	3.38	4.16	6.56	10.12	15.29	63.43*	195.66*
	20	2.20	2.52	2.98	3.66	4.90	7.35	13.65	21.96	34.07	147.61*	460.50*
	25	2.46	2.90	3.62	5.04	8.14	13.17	25.36	41.48	65.04	286.40*	897.14*
200	15	2.47	2.76	3.15	3.61	4.18	4.94	6.86	10.13	15.29	63.43*	195.66*
	20	2.85	3.24	3.79	4.53	5.62	7.56	13.65	21.96	34.07	147.61*	460.50*
	25	3.21	3.75	4.54	5.80	8.30	13.17	25.36	41.48	65.04	286.40*	897.14*
300	15	2.91	3.24	3.68	4.20	4.83	5.62	7.42	10.27	15.29	63.43*	195.66*
	20	3.37	3.83	4.44	5.24	6.34	8.08	13.67	21.96	34.07	147.61*	460.50*
	25	3.82	4.43	5.30	6.57	8.76	13.20	25.36	41.48	65.04	286.40*	897.14*
400	15	3.28	3.66	4.14	4.72	5.40	6.23	8.00	10.59	15.32	63.43*	195.66*
	20	3.82	4.33	5.01	5.87	7.00	8.67	13.76	21.96	34.07	147.61*	460.50*
	25	4.34	5.02	5.95	7.27	9.35	13.35	25.36	41.48	65.04	286.40*	897.14*
500	15	3.62	4.03	4.56	5.18	5.90	6.78	8.57	11.01	15.41	63.43*	195.66*
	20	4.23	4.78	5.52	6.43	7.61	9.26	13.97	21.96	34.07	147.61*	460.50*
	25	4.81	5.54	6.55	7.91	9.95	13.64	25.36	41.48	65.04	286.40*	897.14*
600	15	3.93	4.37	4.94	5.60	6.37	7.29	9.11	11.47	15.58	63.43*	195.66*
	20	4.60	5.20	5.98	6.95	8.17	9.83	14.28	21.98	34.07	147.61*	460.50*
	25	5.25	6.03	7.09	8.50	10.54	14.02	25.37	41.48	65.04	286.40*	897.14*
700	15	4.22	4.69	5.30	6.00	6.81	7.76	9.63	11.94	15.83	63.43*	195.66*
	20	4.95	5.59	6.42	7.43	8.69	10.38	14.66	22.02	34.07	147.61*	460.50*
	25	5.65	6.48	7.60	9.06	11.11	14.46	25.38	41.48	65.04	286.40*	897.14*
800	15	4.49	4.99	5.63	6.37	7.22	8.21	10.11	12.42	16.14	63.43*	195.66*
	20	5.28	5.95	6.83	7.88	9.19	10.90	15.07	22.11	34.07	147.61*	460.50*
	25	6.03	6.91	8.07	9.58	11.66	14.92	25.42	41.48	65.04	286.40*	897.14*
900	15	4.75	5.28	5.95	6.72	7.61	8.63	10.58	12.88	16.48	63.43*	195.66*
	20	5.59	6.30	7.21	8.31	9.66	11.40	15.50	22.24	34.08	147.61*	460.50*
	25	6.39	7.31	8.52	10.08	12.19	15.40	25.49	41.48	65.04	286.40*	897.14*
1000	15	5.00	5.55	6.26	7.06	7.98	9.04	11.03	13.34	16.85	63.43*	195.66*
	20	5.89	6.63	7.58	8.72	10.11	11.88	15.94	22.42	34.08	147.61*	460.50*
	25	6.74	7.70	8.96	10.56	12.70	15.87	25.60	41.48	65.04	286.40*	897.14*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 20.0 Ft (RADIUS = 14.1 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	5.24	5.82	6.55	7.38	8.33	9.43	11.46	13.78	17.24	63.43*	195.66*
	20	6.18	6.95	7.94	9.12	10.54	12.34	16.38	22.64	34.10	147.61*	460.50*
	25	7.07	8.07	9.37	11.02	13.19	16.35	25.75	41.48	65.04	286.40*	897.14*
1200	15	5.47	6.07	6.83	7.69	8.67	9.80	11.88	14.22	17.63	63.43*	195.66*
	20	6.45	7.25	8.28	9.50	10.96	12.79	16.82	22.89	34.12	147.61*	460.50*
	25	7.39	8.42	9.77	11.46	13.67	16.82	25.94	41.49	65.04	286.40*	897.14*
1300	15	5.69	6.31	7.10	7.99	9.00	10.16	12.28	14.64	18.02	63.43*	195.66*
	20	6.72	7.55	8.61	9.86	11.36	13.22	17.26	23.18	34.16	147.61*	460.50*
	25	7.70	8.76	10.15	11.88	14.13	17.28	26.16	41.50	65.04	286.40*	897.14*
1400	15	5.90	6.55	7.36	8.28	9.32	10.51	12.68	15.06	18.41	63.43*	195.66*
	20	6.98	7.84	8.93	10.21	11.75	13.64	17.69	23.48	34.21	147.61*	460.50*
	25	8.00	9.10	10.52	12.30	14.57	17.73	26.41	41.51	65.04	286.40*	897.14*
1500	15	6.11	6.78	7.61	8.56	9.63	10.85	13.06	15.46	18.80	63.43*	195.66*
	20	7.23	8.11	9.24	10.56	12.13	14.05	18.11	23.80	34.28	147.61*	460.50*
	25	8.29	9.42	10.88	12.70	15.01	18.18	26.69	41.53	65.04	286.40*	897.14*
1600	15	6.31	7.00	7.86	8.84	9.94	11.18	13.43	15.85	19.19	63.43*	195.66*
	20	7.47	8.38	9.54	10.89	12.50	14.45	18.53	24.14	34.37	147.61*	460.50*
	25	8.57	9.73	11.24	13.09	15.43	18.62	26.98	41.56	65.04	286.40*	897.14*
1700	15	6.51	7.22	8.10	9.11	10.23	11.50	13.79	16.24	19.57	63.43*	195.66*
	20	7.71	8.65	9.83	11.22	12.85	14.84	18.94	24.48	34.49	147.61*	460.50*
	25	8.84	10.04	11.58	13.46	15.85	19.05	27.29	41.61	65.04	286.40*	897.14*
1800	15	6.70	7.43	8.34	9.37	10.52	11.81	14.14	16.62	19.95	63.43*	195.66*
	20	7.94	8.90	10.11	11.53	13.20	15.22	19.35	24.83	34.62	147.61*	460.50*
	25	9.11	10.34	11.91	13.83	16.25	19.47	27.62	41.66	65.04	286.40*	897.14*
1900	15	6.89	7.64	8.57	9.62	10.79	12.12	14.48	16.99	20.33	63.43*	195.66*
	20	8.17	9.15	10.39	11.84	13.55	15.59	19.74	25.18	34.77	147.61*	460.50*
	25	9.37	10.63	12.24	14.20	16.65	19.89	27.95	41.73	65.04	286.40*	897.14*
2000	15	7.08	7.84	8.79	9.87	11.07	12.42	14.82	17.35	20.70	63.43*	195.66*
	20	8.39	9.40	10.67	12.15	13.88	15.96	20.13	25.54	34.94	147.61*	460.50*
	25	9.63	10.91	12.55	14.55	17.03	20.30	28.29	41.82	65.04	286.40*	897.14*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 20.0 Ft (RADIUS = 14.1 Ft)
 FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	3.72	4.84	7.78	14.55	25.69	42.87	84.72	140.21	221.40	985.51*	3095.4*
	20	4.63	7.64	16.55	32.58	58.83	99.38	198.36	329.67	521.93	2332.4*	7333.0*
	25	5.84	13.51	31.10	62.31	113.46	192.55	385.70	642.04	1017.4	4553.0*	14319.*
200	15	4.87	6.08	8.48	14.56	25.69	42.87	84.72	140.21	221.40	985.51*	3095.4*
	20	6.02	8.60	16.56	32.58	58.83	99.38	198.36	329.67	521.93	2332.4*	7333.0*
	25	7.39	13.61	31.10	62.31	113.46	192.55	385.70	642.04	1017.4	4553.0*	14319.*
300	15	5.79	7.10	9.41	14.71	25.69	42.87	84.72	140.21	221.40	985.51*	3095.4*
	20	7.14	9.69	16.66	32.58	58.83	99.38	198.36	329.67	521.93	2332.4*	7333.0*
	25	8.68	14.13	31.10	62.31	113.46	192.55	385.70	642.04	1017.4	4553.0*	14319.*
400	15	6.58	7.99	10.32	15.09	25.69	42.87	84.72	140.21	221.40	985.51*	3095.4*
	20	8.11	10.70	16.98	32.58	58.83	99.38	198.36	329.67	521.93	2332.4*	7333.0*
	25	9.80	14.91	31.10	62.31	113.46	192.55	385.70	642.04	1017.4	4553.0*	14319.*
500	15	7.30	8.79	11.17	15.64	25.72	42.87	84.72	140.21	221.40	985.51*	3095.4*
	20	8.98	11.64	17.51	32.59	58.83	99.38	198.36	329.67	521.93	2332.4*	7333.0*
	25	10.82	15.78	31.12	62.31	113.46	192.55	385.70	642.04	1017.4	4553.0*	14319.*
600	15	7.95	9.53	11.96	16.27	25.78	42.87	84.72	140.21	221.40	985.51*	3095.4*
	20	9.78	12.52	18.14	32.60	58.83	99.38	198.36	329.67	521.93	2332.4*	7333.0*
	25	11.75	16.66	31.16	62.31	113.46	192.55	385.70	642.04	1017.4	4553.0*	14319.*
700	15	8.57	10.22	12.71	16.93	25.92	42.87	84.72	140.21	221.40	985.51*	3095.4*
	20	10.53	13.34	18.82	32.64	58.83	99.38	198.36	329.67	521.93	2332.4*	7333.0*
	25	12.62	17.52	31.26	62.31	113.46	192.55	385.70	642.04	1017.4	4553.0*	14319.*
800	15	9.14	10.86	13.42	17.60	26.14	42.87	84.72	140.21	221.40	985.51*	3095.4*
	20	11.23	14.12	19.52	32.72	58.83	99.38	198.36	329.67	521.93	2332.4*	7333.0*
	25	13.44	18.36	31.44	62.31	113.46	192.55	385.70	642.04	1017.4	4553.0*	14319.*
900	15	9.69	11.48	14.10	18.26	26.44	42.87	84.72	140.21	221.40	985.51*	3095.4*
	20	11.89	14.87	20.22	32.86	58.83	99.38	198.36	329.67	521.93	2332.4*	7333.0*
	25	14.21	19.18	31.70	62.31	113.46	192.55	385.70	642.04	1017.4	4553.0*	14319.*
1000	15	10.21	12.06	14.75	18.91	26.79	42.89	84.72	140.21	221.40	985.51*	3095.4*
	20	12.53	15.58	20.92	33.06	58.83	99.38	198.36	329.67	521.93	2332.4*	7333.0*
	25	14.96	19.96	32.04	62.31	113.46	192.55	385.70	642.04	1017.4	4553.0*	14319.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 20.0 Ft (RADIUS = 14.1 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	10.71	12.62	15.37	19.54	27.20	42.92	84.72	140.21	221.40	985.51*	3095.4*
	20	13.14	16.26	21.60	33.32	58.83	99.38	198.36	329.67	521.93	2332.4*	7333.0*
	25	15.67	20.73	32.43	62.31	113.46	192.55	385.70	642.04	1017.4	4553.0*	14319.*
1200	15	11.19	13.16	15.97	20.17	27.63	42.96	84.72	140.21	221.40	985.51*	3095.4*
	20	13.72	16.91	22.28	33.64	58.83	99.38	198.36	329.67	521.93	2332.4*	7333.0*
	25	16.35	21.47	32.88	62.31	113.46	192.55	385.70	642.04	1017.4	4553.0*	14319.*
1300	15	11.65	13.69	16.55	20.78	28.10	43.03	84.72	140.21	221.40	985.51*	3095.4*
	20	14.29	17.55	22.93	33.99	58.84	99.38	198.36	329.67	521.93	2332.4*	7333.0*
	25	17.01	22.19	33.36	62.32	113.46	192.55	385.70	642.04	1017.4	4553.0*	14319.*
1400	15	12.10	14.19	17.12	21.37	28.58	43.12	84.72	140.21	221.40	985.51*	3095.4*
	20	14.84	18.16	23.58	34.39	58.85	99.38	198.36	329.67	521.93	2332.4*	7333.0*
	25	17.65	22.89	33.87	62.33	113.46	192.55	385.70	642.04	1017.4	4553.0*	14319.*
1500	15	12.54	14.68	17.66	21.95	29.07	43.24	84.72	140.21	221.40	985.51*	3095.4*
	20	15.37	18.76	24.21	34.81	58.87	99.38	198.36	329.67	521.93	2332.4*	7333.0*
	25	18.27	23.57	34.40	62.35	113.46	192.55	385.70	642.04	1017.4	4553.0*	14319.*
1600	15	12.96	15.16	18.19	22.52	29.57	43.40	84.72	140.21	221.40	985.51*	3095.4*
	20	15.88	19.34	24.83	35.26	58.89	99.38	198.36	329.67	521.93	2332.4*	7333.0*
	25	18.87	24.24	34.94	62.37	113.46	192.55	385.70	642.04	1017.4	4553.0*	14319.*
1700	15	13.38	15.62	18.71	23.08	30.07	43.58	84.72	140.21	221.40	985.51*	3095.4*
	20	16.38	19.90	25.44	35.72	58.93	99.38	198.36	329.67	521.93	2332.4*	7333.0*
	25	19.45	24.88	35.49	62.41	113.46	192.55	385.70	642.04	1017.4	4553.0*	14319.*
1800	15	13.78	16.07	19.22	23.62	30.58	43.79	84.72	140.21	221.40	985.51*	3095.4*
	20	16.87	20.45	26.03	36.20	58.98	99.38	198.36	329.67	521.93	2332.4*	7333.0*
	25	20.03	25.52	36.05	62.47	113.46	192.55	385.70	642.04	1017.4	4553.0*	14319.*
1900	15	14.17	16.51	19.71	24.16	31.08	44.02	84.72	140.21	221.40	985.51*	3095.4*
	20	17.35	20.99	26.61	36.68	59.05	99.38	198.36	329.67	521.93	2332.4*	7333.0*
	25	20.58	26.14	36.61	62.54	113.46	192.55	385.70	642.04	1017.4	4553.0*	14319.*
2000	15	14.56	16.94	20.20	24.68	31.58	44.28	84.73	140.21	221.40	985.51*	3095.4*
	20	17.82	21.52	27.19	37.17	59.14	99.38	198.36	329.67	521.93	2332.4*	7333.0*
	25	21.13	26.75	37.17	62.62	113.46	192.55	385.70	642.04	1017.4	4553.0*	14319.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 22.0 Ft (RADIUS = 15.6 Ft)
 FIRE GROWTH: ULTRAFAST ($\alpha = .178 \text{ BTU/s}^3$)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	0.80	0.84	0.91	0.99	1.07	1.16	1.29	1.40	1.51	2.01*	2.69*
	20	0.85	0.90	0.98	1.07	1.16	1.25	1.40	1.53	1.66	2.31*	3.49*
	25	0.90	0.96	1.05	1.14	1.24	1.35	1.52	1.66	1.83	2.73*	5.22*
200	15	0.94	0.99	1.08	1.17	1.27	1.37	1.52	1.65	1.78	2.38*	3.16*
	20	1.02	1.09	1.18	1.28	1.39	1.51	1.68	1.84	1.99	2.76*	3.95*
	25	1.09	1.17	1.27	1.39	1.51	1.64	1.84	2.02	2.21	3.22*	5.36*
300	15	1.05	1.12	1.21	1.32	1.42	1.54	1.71	1.85	2.00	2.67*	3.54*
	20	1.15	1.23	1.34	1.46	1.58	1.71	1.91	2.08	2.26	3.12*	4.39*
	25	1.25	1.34	1.46	1.59	1.73	1.88	2.11	2.31	2.52	3.63*	5.69*
400	15	1.15	1.22	1.33	1.44	1.56	1.68	1.87	2.03	2.19	2.93*	3.88*
	20	1.27	1.36	1.48	1.61	1.74	1.89	2.10	2.29	2.49	3.43*	4.78*
	25	1.39	1.48	1.62	1.76	1.92	2.08	2.33	2.56	2.79	3.99*	6.06*
500	15	1.24	1.32	1.43	1.55	1.68	1.81	2.01	2.19	2.36	3.16*	4.18*
	20	1.38	1.47	1.60	1.74	1.89	2.04	2.28	2.49	2.70	3.71*	5.14*
	25	1.51	1.62	1.76	1.92	2.09	2.26	2.54	2.78	3.03	4.31*	6.43*
600	15	1.32	1.41	1.53	1.66	1.79	1.93	2.15	2.33	2.52	3.37*	4.45*
	20	1.48	1.58	1.72	1.87	2.03	2.19	2.44	2.66	2.89	3.96*	5.47*
	25	1.62	1.74	1.89	2.06	2.24	2.43	2.73	2.98	3.26	4.61*	6.79*
700	15	1.40	1.49	1.62	1.76	1.90	2.05	2.27	2.47	2.67	3.56*	4.71*
	20	1.57	1.68	1.82	1.98	2.15	2.33	2.59	2.83	3.07	4.20*	5.78*
	25	1.73	1.85	2.02	2.20	2.39	2.59	2.90	3.18	3.46	4.89*	7.14*
800	15	1.47	1.57	1.70	1.85	2.00	2.15	2.39	2.60	2.80	3.75*	4.95*
	20	1.66	1.77	1.93	2.09	2.27	2.45	2.74	2.98	3.23	4.42*	6.08*
	25	1.83	1.96	2.13	2.32	2.53	2.74	3.07	3.36	3.66	5.15*	7.46*
900	15	1.54	1.64	1.78	1.93	2.09	2.25	2.50	2.72	2.94	3.92*	5.18*
	20	1.74	1.86	2.02	2.20	2.38	2.58	2.87	3.13	3.39	4.64*	6.35*
	25	1.92	2.06	2.24	2.45	2.66	2.88	3.22	3.53	3.84	5.40*	7.78*
1000	15	1.61	1.71	1.86	2.02	2.18	2.35	2.61	2.83	3.06	4.09*	5.40*
	20	1.82	1.94	2.11	2.30	2.49	2.69	3.00	3.27	3.54	4.84*	6.62*
	25	2.01	2.16	2.35	2.56	2.78	3.01	3.37	3.69	4.02	5.63*	8.08*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 22.0 Ft (RADIUS = 15.6 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	1.67	1.78	1.93	2.10	2.27	2.44	2.71	2.95	3.18	4.25*	5.61*
	20	1.89	2.03	2.20	2.39	2.60	2.80	3.13	3.40	3.69	5.03*	6.88*
	25	2.10	2.25	2.45	2.67	2.90	3.14	3.52	3.84	4.19	5.86*	8.37*
1200	15	1.73	1.85	2.00	2.17	2.35	2.53	2.81	3.05	3.30	4.40*	5.81*
	20	1.97	2.10	2.29	2.49	2.70	2.91	3.24	3.53	3.83	5.22*	7.12*
	25	2.18	2.34	2.55	2.78	3.02	3.27	3.66	3.99	4.35	6.08*	8.65*
1300	15	1.79	1.91	2.07	2.25	2.43	2.62	2.91	3.16	3.41	4.55*	6.00*
	20	2.04	2.18	2.37	2.58	2.79	3.01	3.36	3.66	3.97	5.40*	7.36*
	25	2.26	2.43	2.64	2.88	3.13	3.39	3.79	4.14	4.51	6.29*	8.93*
1400	15	1.85	1.97	2.14	2.32	2.51	2.70	3.00	3.26	3.52	4.69*	6.19*
	20	2.10	2.25	2.45	2.66	2.89	3.12	3.47	3.78	4.10	5.58*	7.59*
	25	2.34	2.51	2.73	2.98	3.24	3.50	3.92	4.28	4.66	6.49*	9.19*
1500	15	1.90	2.03	2.20	2.39	2.59	2.79	3.09	3.35	3.62	4.83*	6.37*
	20	2.17	2.32	2.53	2.75	2.98	3.21	3.58	3.90	4.22	5.75*	7.81*
	25	2.42	2.59	2.82	3.08	3.34	3.61	4.04	4.42	4.81	6.69*	9.45*
1600	15	1.96	2.09	2.27	2.46	2.66	2.87	3.18	3.45	3.72	4.97*	6.55*
	20	2.24	2.39	2.60	2.83	3.06	3.31	3.69	4.01	4.35	5.91*	8.03*
	25	2.49	2.67	2.91	3.17	3.44	3.72	4.17	4.55	4.95	6.88*	9.70*
1700	15	2.01	2.15	2.33	2.53	2.73	2.94	3.27	3.54	3.82	5.10*	6.72*
	20	2.30	2.46	2.68	2.91	3.15	3.40	3.79	4.12	4.47	6.07*	8.24*
	25	2.56	2.75	2.99	3.26	3.54	3.83	4.28	4.68	5.09	7.07*	9.94*
1800	15	2.06	2.20	2.39	2.59	2.80	3.02	3.35	3.63	3.92	5.23*	6.89*
	20	2.36	2.53	2.75	2.99	3.23	3.49	3.89	4.23	4.58	6.23*	8.44*
	25	2.63	2.83	3.08	3.35	3.64	3.94	4.40	4.80	5.23	7.26*	10.18*
1900	15	2.11	2.26	2.45	2.65	2.87	3.09	3.43	3.72	4.02	5.36*	7.06*
	20	2.42	2.59	2.82	3.06	3.32	3.58	3.99	4.34	4.70	6.38*	8.65*
	25	2.70	2.90	3.16	3.44	3.73	4.04	4.51	4.93	5.36	7.43*	10.42*
2000	15	2.16	2.31	2.50	2.72	2.94	3.16	3.51	3.81	4.11	5.48*	7.22*
	20	2.48	2.66	2.89	3.14	3.40	3.67	4.08	4.44	4.81	6.53*	8.84*
	25	2.77	2.97	3.24	3.52	3.83	4.14	4.63	5.05	5.49	7.61*	10.64*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 22.0 Ft (RADIUS = 15.6 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	1.26	1.35	1.48	1.62	1.78	1.94	2.22	2.49	2.80	5.84*	15.06*
	20	1.38	1.49	1.64	1.82	2.02	2.24	2.64	3.09	3.77	11.71*	33.17*
	25	1.49	1.62	1.81	2.03	2.28	2.59	3.24	4.18	5.82	21.41*	63.03*
200	15	1.54	1.66	1.82	1.99	2.18	2.39	2.72	3.03	3.38	6.03*	15.06*
	20	1.72	1.86	2.05	2.27	2.51	2.78	3.24	3.72	4.34	11.71*	33.17*
	25	1.89	2.06	2.29	2.56	2.86	3.21	3.89	4.70	6.01	21.41*	63.03*
300	15	1.77	1.91	2.09	2.29	2.51	2.74	3.12	3.46	3.85	6.43*	15.06*
	20	2.00	2.16	2.39	2.64	2.91	3.21	3.73	4.24	4.88	11.72*	33.17*
	25	2.21	2.41	2.67	2.98	3.32	3.72	4.44	5.25	6.43	21.41*	63.03*
400	15	1.98	2.13	2.33	2.55	2.79	3.05	3.46	3.84	4.26	6.88*	15.06*
	20	2.24	2.43	2.67	2.95	3.26	3.59	4.15	4.70	5.36	11.77*	33.17*
	25	2.48	2.71	3.01	3.35	3.73	4.16	4.93	5.76	6.90	21.41*	63.03*
500	15	2.16	2.32	2.54	2.79	3.05	3.33	3.77	4.18	4.63	7.31*	15.09*
	20	2.46	2.66	2.93	3.24	3.57	3.92	4.53	5.11	5.80	11.89*	33.17*
	25	2.73	2.98	3.31	3.68	4.09	4.55	5.37	6.22	7.35	21.41*	63.03*
600	15	2.32	2.50	2.74	3.00	3.28	3.58	4.06	4.49	4.96	7.73*	15.17*
	20	2.66	2.88	3.17	3.50	3.85	4.23	4.87	5.49	6.21	12.09*	33.17*
	25	2.97	3.23	3.58	3.98	4.42	4.91	5.77	6.66	7.80	21.41*	63.03*
700	15	2.48	2.67	2.93	3.20	3.50	3.82	4.32	4.78	5.28	8.13*	15.30*
	20	2.84	3.08	3.39	3.74	4.12	4.52	5.20	5.84	6.59	12.36*	33.17*
	25	3.18	3.47	3.84	4.26	4.73	5.25	6.15	7.06	8.22	21.42*	63.03*
800	15	2.63	2.83	3.10	3.39	3.71	4.04	4.57	5.05	5.57	8.51*	15.48*
	20	3.02	3.27	3.60	3.97	4.37	4.79	5.50	6.17	6.95	12.65*	33.17*
	25	3.38	3.69	4.08	4.53	5.02	5.56	6.50	7.45	8.62	21.43*	63.03*
900	15	2.77	2.98	3.26	3.57	3.90	4.25	4.81	5.31	5.86	8.88*	15.71*
	20	3.19	3.45	3.80	4.19	4.60	5.05	5.79	6.49	7.29	12.97*	33.17*
	25	3.58	3.90	4.31	4.78	5.30	5.86	6.84	7.81	9.01	21.47*	63.03*
1000	15	2.90	3.13	3.42	3.75	4.09	4.45	5.04	5.56	6.12	9.23*	15.97*
	20	3.35	3.63	3.99	4.39	4.83	5.30	6.07	6.79	7.61	13.30*	33.17*
	25	3.76	4.10	4.53	5.02	5.56	6.15	7.16	8.16	9.38	21.53*	63.03*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 22.0 Ft (RADIUS = 15.6 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	3.03	3.27	3.57	3.91	4.27	4.65	5.25	5.79	6.38	9.57*	16.25*
	20	3.50	3.79	4.17	4.59	5.05	5.53	6.33	7.08	7.92	13.63*	33.17*
	25	3.94	4.29	4.74	5.25	5.81	6.42	7.47	8.50	9.74	21.62*	63.03*
1200	15	3.15	3.40	3.72	4.07	4.44	4.83	5.46	6.02	6.63	9.90*	16.55*
	20	3.65	3.95	4.35	4.78	5.25	5.76	6.59	7.36	8.23	13.97*	33.18*
	25	4.11	4.48	4.95	5.48	6.05	6.69	7.76	8.82	10.08	21.73*	63.03*
1300	15	3.27	3.53	3.86	4.22	4.61	5.01	5.66	6.24	6.86	10.21*	16.85*
	20	3.79	4.11	4.52	4.97	5.46	5.98	6.83	7.62	8.52	14.30*	33.19*
	25	4.27	4.65	5.14	5.69	6.29	6.94	8.05	9.13	10.42	21.87*	63.03*
1400	15	3.39	3.65	4.00	4.37	4.77	5.19	5.86	6.45	7.10	10.52*	17.16*
	20	3.93	4.26	4.68	5.15	5.65	6.19	7.07	7.88	8.80	14.63*	33.20*
	25	4.43	4.83	5.33	5.90	6.52	7.19	8.33	9.43	10.74	22.03*	63.03*
1500	15	3.50	3.78	4.13	4.52	4.93	5.36	6.05	6.66	7.32	10.82*	17.47*
	20	4.07	4.41	4.84	5.32	5.84	6.39	7.30	8.14	9.07	14.96*	33.23*
	25	4.59	5.00	5.52	6.10	6.74	7.43	8.60	9.73	11.06	22.22*	63.03*
1600	15	3.61	3.89	4.26	4.66	5.08	5.52	6.23	6.86	7.54	11.11*	17.79*
	20	4.20	4.55	5.00	5.49	6.02	6.59	7.52	8.38	9.34	15.28*	33.26*
	25	4.74	5.16	5.70	6.30	6.95	7.66	8.86	10.01	11.37	22.42*	63.03*
1700	15	3.72	4.01	4.38	4.79	5.23	5.68	6.41	7.06	7.75	11.39*	18.10*
	20	4.33	4.69	5.15	5.66	6.20	6.79	7.74	8.62	9.59	15.60*	33.31*
	25	4.89	5.32	5.87	6.49	7.16	7.89	9.11	10.29	11.66	22.64*	63.03*
1800	15	3.83	4.12	4.51	4.93	5.37	5.84	6.58	7.25	7.95	11.67*	18.41*
	20	4.45	4.82	5.29	5.82	6.38	6.98	7.95	8.85	9.85	15.92*	33.36*
	25	5.03	5.48	6.04	6.67	7.36	8.11	9.36	10.56	11.96	22.87*	63.03*
1900	15	3.93	4.23	4.63	5.06	5.51	5.99	6.76	7.43	8.16	11.94*	18.72*
	20	4.57	4.95	5.44	5.98	6.55	7.16	8.16	9.08	10.09	16.23*	33.43*
	25	5.17	5.63	6.21	6.86	7.56	8.33	9.60	10.83	12.24	23.11*	63.03*
2000	15	4.03	4.34	4.74	5.18	5.65	6.14	6.92	7.62	8.35	12.21*	19.03*
	20	4.69	5.08	5.58	6.13	6.72	7.35	8.36	9.30	10.33	16.53*	33.52*
	25	5.31	5.78	6.37	7.03	7.76	8.54	9.84	11.08	12.52	23.36*	63.03*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 22.0 Ft (RADIUS = 15.6 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	2.13	2.37	2.70	3.13	3.72	4.66	7.57	11.63	17.48	70.69*	213.88*
	20	2.43	2.77	3.29	4.11	5.70	8.69	16.00	25.50	39.20	164.77*	503.65*
	25	2.73	3.23	4.10	5.98	9.83	15.76	29.91	48.36	75.02	319.88*	981.38*
200	15	2.73	3.03	3.43	3.93	4.56	5.42	7.76	11.64	17.48	70.69*	213.88*
	20	3.15	3.57	4.18	5.01	6.33	8.80	16.00	25.50	39.20	164.77*	503.65*
	25	3.57	4.16	5.08	6.63	9.89	15.76	29.91	48.36	75.02	319.88*	981.38*
300	15	3.21	3.55	4.01	4.57	5.26	6.14	8.25	11.71	17.48	70.69*	213.88*
	20	3.73	4.22	4.89	5.78	7.06	9.20	16.01	25.50	39.20	164.77*	503.65*
	25	4.24	4.91	5.89	7.40	10.20	15.77	29.91	48.36	75.02	319.88*	981.38*
400	15	3.62	4.01	4.52	5.13	5.86	6.78	8.82	11.94	17.49	70.69*	213.88*
	20	4.23	4.77	5.50	6.45	7.75	9.75	16.04	25.50	39.20	164.77*	503.65*
	25	4.83	5.56	6.61	8.13	10.71	15.83	29.91	48.36	75.02	319.88*	981.38*
500	15	4.00	4.42	4.97	5.63	6.41	7.37	9.40	12.29	17.53	70.69*	213.88*
	20	4.69	5.27	6.06	7.06	8.39	10.34	16.16	25.50	39.20	164.77*	503.65*
	25	5.35	6.14	7.25	8.81	11.29	15.99	29.91	48.36	75.02	319.88*	981.38*
600	15	4.34	4.80	5.39	6.09	6.92	7.91	9.96	12.72	17.64	70.69*	213.88*
	20	5.10	5.73	6.57	7.62	8.99	10.92	16.38	25.50	39.20	164.77*	503.65*
	25	5.84	6.68	7.84	9.45	11.88	16.27	29.91	48.36	75.02	319.88*	981.38*
700	15	4.66	5.15	5.78	6.52	7.39	8.42	10.50	13.18	17.82	70.69*	213.88*
	20	5.49	6.16	7.04	8.14	9.55	11.48	16.67	25.52	39.20	164.77*	503.65*
	25	6.29	7.18	8.40	10.04	12.47	16.63	29.92	48.36	75.02	319.88*	981.38*
800	15	4.97	5.48	6.15	6.93	7.83	8.90	11.01	13.65	18.06	70.69*	213.88*
	20	5.86	6.56	7.49	8.64	10.08	12.03	17.03	25.56	39.20	164.77*	503.65*
	25	6.71	7.65	8.92	10.61	13.03	17.04	29.93	48.36	75.02	319.88*	981.38*
900	15	5.26	5.80	6.49	7.31	8.25	9.35	11.50	14.12	18.36	70.69*	213.88*
	20	6.20	6.94	7.91	9.10	10.59	12.55	17.43	25.63	39.20	164.77*	503.65*
	25	7.11	8.09	9.41	11.15	13.59	17.48	29.96	48.36	75.02	319.88*	981.38*
1000	15	5.53	6.10	6.83	7.67	8.65	9.79	11.98	14.58	18.69	70.69*	213.88*
	20	6.53	7.31	8.32	9.55	11.07	13.06	17.84	25.74	39.21	164.77*	503.65*
	25	7.50	8.51	9.88	11.67	14.12	17.94	30.01	48.36	75.02	319.88*	981.38*

SPACING = 22.0 Ft (RADIUS = 15.6 Ft)
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	5.79	6.38	7.14	8.02	9.03	10.21	12.43	15.04	19.05	70.69*	213.88*
	20	6.85	7.66	8.71	9.98	11.54	13.55	18.27	25.89	39.21	164.77*	503.65*
	25	7.86	8.92	10.34	12.16	14.64	18.41	30.08	48.36	75.02	319.88*	981.38*
1200	15	6.05	6.66	7.45	8.36	9.40	10.61	12.88	15.49	19.42	70.69*	213.88*
	20	7.16	7.99	9.08	10.39	11.99	14.03	18.71	26.08	39.22	164.77*	503.65*
	25	8.22	9.31	10.77	12.64	15.15	18.87	30.19	48.36	75.02	319.88*	981.38*
1300	15	6.30	6.93	7.75	8.69	9.76	10.99	13.30	15.93	19.80	70.69*	213.88*
	20	7.45	8.32	9.44	10.78	12.42	14.49	19.14	26.30	39.23	164.77*	503.65*
	25	8.56	9.69	11.19	13.10	15.64	19.34	30.34	48.36	75.02	319.88*	981.38*
1400	15	6.53	7.19	8.03	9.00	10.10	11.37	13.72	16.36	20.19	70.69*	213.88*
	20	7.74	8.63	9.79	11.17	12.84	14.94	19.58	26.55	39.26	164.77*	503.65*
	25	8.89	10.06	11.60	13.55	16.11	19.81	30.51	48.36	75.02	319.88*	981.38*
1500	15	6.76	7.44	8.31	9.31	10.44	11.73	14.12	16.78	20.58	70.69*	213.88*
	20	8.02	8.94	10.12	11.54	13.25	15.37	20.01	26.82	39.29	164.77*	503.65*
	25	9.22	10.41	11.99	13.98	16.58	20.27	30.72	48.37	75.02	319.88*	981.38*
1600	15	6.99	7.69	8.58	9.60	10.76	12.09	14.52	17.20	20.97	70.69*	213.88*
	20	8.29	9.23	10.45	11.90	13.64	15.80	20.44	27.12	39.34	164.77*	503.65*
	25	9.53	10.76	12.38	14.40	17.03	20.72	30.95	48.38	75.02	319.88*	981.38*
1700	15	7.21	7.93	8.84	9.89	11.08	12.43	14.90	17.60	21.36	70.69*	213.88*
	20	8.55	9.52	10.77	12.26	14.03	16.22	20.86	27.43	39.41	164.77*	503.65*
	25	9.83	11.09	12.75	14.81	17.48	21.17	31.20	48.40	75.02	319.88*	981.38*
1800	15	7.42	8.16	9.10	10.17	11.39	12.77	15.28	18.00	21.75	70.69*	213.88*
	20	8.81	9.81	11.08	12.60	14.41	16.62	21.28	27.75	39.49	164.77*	503.65*
	25	10.13	11.42	13.11	15.21	17.91	21.61	31.47	48.42	75.02	319.88*	981.38*
1900	15	7.63	8.39	9.35	10.45	11.69	13.10	15.64	18.39	22.13	70.69*	213.88*
	20	9.06	10.08	11.39	12.94	14.77	17.02	21.69	28.08	39.59	164.77*	503.65*
	25	10.42	11.74	13.47	15.61	18.33	22.04	31.76	48.46	75.02	319.88*	981.38*
2000	15	7.84	8.61	9.60	10.72	11.98	13.42	16.00	18.77	22.51	70.69*	213.88*
	20	9.31	10.35	11.69	13.26	15.13	17.41	22.10	28.42	39.71	164.77*	503.65*
	25	10.71	12.06	13.82	15.99	18.75	22.47	32.06	48.50	75.02	319.88*	981.38*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 22.0 Ft (RADIUS = 15.6 Ft)³
 FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	4.19	5.60	9.69	18.04	31.42	51.72	100.36	163.88	255.81	1101.1*	3386.4*
	20	5.32	9.71	21.08	40.77	72.33	120.29	235.33	385.72	603.42	2606.4*	8022.7*
	25	6.99	17.70	39.89	78.23	139.76	233.33	457.86	751.45	1176.5	5088.1*	15666.*
200	15	5.47	6.91	10.11	18.04	31.42	51.72	100.36	163.88	255.81	1101.1*	3386.4*
	20	6.86	10.35	21.08	40.77	72.33	120.29	235.33	385.72	603.42	2606.4*	8022.7*
	25	8.61	17.71	39.89	78.23	139.76	233.33	457.86	751.45	1176.5	5088.1*	15666.*
300	15	6.49	8.02	10.95	18.08	31.42	51.72	100.36	163.88	255.81	1101.1*	3386.4*
	20	8.10	11.38	21.10	40.77	72.33	120.29	235.33	385.72	603.42	2606.4*	8022.7*
	25	10.02	17.91	39.89	78.23	139.76	233.33	457.86	751.45	1176.5	5088.1*	15666.*
400	15	7.38	8.99	11.85	18.27	31.42	51.72	100.36	163.88	255.81	1101.1*	3386.4*
	20	9.18	12.43	21.22	40.77	72.33	120.29	235.33	385.72	603.42	2606.4*	8022.7*
	25	11.26	18.41	39.89	78.23	139.76	233.33	457.86	751.45	1176.5	5088.1*	15666.*
500	15	8.17	9.87	12.73	18.64	31.43	51.72	100.36	163.88	255.81	1101.1*	3386.4*
	20	10.15	13.42	21.51	40.77	72.33	120.29	235.33	385.72	603.42	2606.4*	8022.7*
	25	12.38	19.12	39.89	78.23	139.76	233.33	457.86	751.45	1176.5	5088.1*	15666.*
600	15	8.90	10.68	13.57	19.14	31.44	51.72	100.36	163.88	255.81	1101.1*	3386.4*
	20	11.05	14.36	21.95	40.77	72.33	120.29	235.33	385.72	603.42	2606.4*	8022.7*
	25	13.42	19.92	39.90	78.23	139.76	233.33	457.86	751.45	1176.5	5088.1*	15666.*
700	15	9.58	11.44	14.37	19.73	31.49	51.72	100.36	163.88	255.81	1101.1*	3386.4*
	20	11.88	15.25	22.51	40.77	72.33	120.29	235.33	385.72	603.42	2606.4*	8022.7*
	25	14.38	20.76	39.92	78.23	139.76	233.33	457.86	751.45	1176.5	5088.1*	15666.*
800	15	10.23	12.15	15.13	20.35	31.59	51.72	100.36	163.88	255.81	1101.1*	3386.4*
	20	12.66	16.10	23.13	40.79	72.33	120.29	235.33	385.72	603.42	2606.4*	8022.7*
	25	15.30	21.61	39.97	78.23	139.76	233.33	457.86	751.45	1176.5	5088.1*	15666.*
900	15	10.83	12.83	15.86	21.00	31.74	51.72	100.36	163.88	255.81	1101.1*	3386.4*
	20	13.40	16.91	23.78	40.83	72.33	120.29	235.33	385.72	603.42	2606.4*	8022.7*
	25	16.16	22.44	40.06	78.23	139.76	233.33	457.86	751.45	1176.5	5088.1*	15666.*
1000	15	11.41	13.48	16.57	21.64	31.95	51.73	100.36	163.88	255.81	1101.1*	3386.4*
	20	14.11	17.68	24.45	40.91	72.33	120.29	235.33	385.72	603.42	2606.4*	8022.7*
	25	16.99	23.27	40.20	78.23	139.76	233.33	457.86	751.45	1176.5	5088.1*	15666.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 22.0 Ft (RADIUS = 15.6 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	11.97	14.09	17.24	22.29	32.23	51.73	100.36	163.88	255.81	1101.1*	3386.4*
	20	14.79	18.43	25.13	41.02	72.33	120.29	235.33	385.72	603.42	2606.4*	8022.7*
	25	17.78	24.07	40.40	78.23	139.76	233.33	457.86	751.45	1176.5	5088.1*	15666.*
1200	15	12.51	14.69	17.89	22.93	32.56	51.74	100.36	163.88	255.81	1101.1*	3386.4*
	20	15.44	19.15	25.81	41.18	72.33	120.29	235.33	385.72	603.42	2606.4*	8022.7*
	25	18.54	24.86	40.66	78.23	139.76	233.33	457.86	751.45	1176.5	5088.1*	15666.*
1300	15	13.02	15.26	18.52	23.56	32.92	51.76	100.36	163.88	255.81	1101.1*	3386.4*
	20	16.07	19.84	26.48	41.38	72.33	120.29	235.33	385.72	603.42	2606.4*	8022.7*
	25	19.27	25.63	40.97	78.23	139.76	233.33	457.86	751.45	1176.5	5088.1*	15666.*
1400	15	13.52	15.82	19.14	24.18	33.33	51.80	100.36	163.88	255.81	1101.1*	3386.4*
	20	16.68	20.52	27.15	41.63	72.33	120.29	235.33	385.72	603.42	2606.4*	8022.7*
	25	19.99	26.38	41.33	78.23	139.76	233.33	457.86	751.45	1176.5	5088.1*	15666.*
1500	15	14.01	16.36	19.73	24.79	33.75	51.85	100.36	163.88	255.81	1101.1*	3386.4*
	20	17.27	21.17	27.81	41.92	72.33	120.29	235.33	385.72	603.42	2606.4*	8022.7*
	25	20.68	27.11	41.73	78.23	139.76	233.33	457.86	751.45	1176.5	5088.1*	15666.*
1600	15	14.48	16.88	20.31	25.39	34.20	51.91	100.36	163.88	255.81	1101.1*	3386.4*
	20	17.85	21.81	28.45	42.24	72.34	120.29	235.33	385.72	603.42	2606.4*	8022.7*
	25	21.35	27.83	42.17	78.24	139.76	233.33	457.86	751.45	1176.5	5088.1*	15666.*
1700	15	14.94	17.40	20.87	25.97	34.67	52.00	100.36	163.88	255.81	1101.1*	3386.4*
	20	18.41	22.43	29.09	42.60	72.35	120.29	235.33	385.72	603.42	2606.4*	8022.7*
	25	22.00	28.53	42.63	78.24	139.76	233.33	457.86	751.45	1176.5	5088.1*	15666.*
1800	15	15.39	17.89	21.43	26.55	35.14	52.11	100.36	163.88	255.81	1101.1*	3386.4*
	20	18.95	23.04	29.72	42.99	72.36	120.29	235.33	385.72	603.42	2606.4*	8022.7*
	25	22.64	29.22	43.11	78.25	139.76	233.33	457.86	751.45	1176.5	5088.1*	15666.*
1900	15	15.83	18.38	21.96	27.12	35.62	52.25	100.36	163.88	255.81	1101.1*	3386.4*
	20	19.49	23.63	30.34	43.39	72.38	120.29	235.33	385.72	603.42	2606.4*	8022.7*
	25	23.26	29.89	43.61	78.27	139.76	233.33	457.86	751.45	1176.5	5088.1*	15666.*
2000	15	16.26	18.86	22.49	27.68	36.11	52.41	100.36	163.88	255.81	1101.1*	3386.4*
	20	20.01	24.21	30.95	43.82	72.40	120.29	235.33	385.72	603.42	2606.4*	8022.7*
	25	23.87	30.56	44.12	78.29	139.76	233.33	457.86	751.45	1176.5	5088.1*	15666.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 24.0 Ft (RADIUS = 17.0 Ft)
 FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	(Ft*s) ^{1/2}											
	15	0.86	0.90	0.97	1.05	1.13	1.21	1.34	1.45	1.57	2.07*	2.76*
	20	0.92	0.97	1.05	1.13	1.22	1.32	1.47	1.60	1.73	2.39*	3.66*
200	25	0.98	1.03	1.12	1.21	1.31	1.42	1.59	1.74	1.91	2.86*	5.59*
	15	1.02	1.07	1.15	1.24	1.34	1.44	1.59	1.72	1.86	2.45*	3.24*
	20	1.11	1.17	1.26	1.36	1.47	1.59	1.77	1.92	2.08	2.85*	4.10*
300	25	1.19	1.26	1.36	1.48	1.60	1.73	1.94	2.12	2.32	3.35*	5.69*
	15	1.14	1.20	1.29	1.40	1.50	1.62	1.79	1.94	2.09	2.75*	3.64*
	20	1.25	1.33	1.43	1.55	1.67	1.80	2.01	2.18	2.36	3.22*	4.54*
400	25	1.36	1.44	1.56	1.69	1.84	1.98	2.22	2.43	2.65	3.76*	5.98*
	15	1.25	1.32	1.42	1.53	1.65	1.77	1.96	2.12	2.29	3.01*	3.98*
	20	1.38	1.46	1.58	1.71	1.85	1.99	2.21	2.41	2.61	3.54*	4.94*
500	25	1.51	1.60	1.73	1.88	2.04	2.20	2.46	2.69	2.93	4.13*	6.34*
	15	1.35	1.42	1.53	1.65	1.78	1.91	2.12	2.29	2.47	3.25*	4.28*
	20	1.50	1.59	1.72	1.86	2.01	2.16	2.40	2.61	2.83	3.82*	5.31*
600	25	1.64	1.75	1.89	2.05	2.22	2.40	2.68	2.93	3.19	4.47*	6.71*
	15	1.44	1.52	1.63	1.76	1.90	2.04	2.26	2.44	2.63	3.46*	4.57*
	20	1.61	1.70	1.84	1.99	2.15	2.32	2.57	2.80	3.03	4.09*	5.64*
700	25	1.77	1.88	2.03	2.20	2.39	2.58	2.88	3.14	3.42	4.77*	7.07*
	15	1.52	1.61	1.73	1.87	2.01	2.16	2.39	2.59	2.79	3.67*	4.83*
	20	1.71	1.81	1.96	2.12	2.29	2.46	2.73	2.97	3.22	4.33*	5.96*
800	25	1.88	2.00	2.17	2.35	2.54	2.75	3.06	3.34	3.64	5.06*	7.41*
	15	1.60	1.69	1.82	1.97	2.12	2.28	2.52	2.72	2.93	3.85*	5.08*
	20	1.81	1.91	2.07	2.24	2.41	2.60	2.89	3.13	3.39	4.57*	6.26*
900	25	1.99	2.12	2.29	2.49	2.69	2.90	3.24	3.53	3.85	5.33*	7.74*
	15	1.68	1.77	1.91	2.06	2.22	2.38	2.64	2.85	3.07	4.03*	5.31*
	20	1.90	2.01	2.17	2.35	2.53	2.73	3.03	3.29	3.56	4.78*	6.55*
1000	25	2.10	2.23	2.41	2.61	2.83	3.05	3.41	3.72	4.04	5.58*	8.06*
	15	1.75	1.85	1.99	2.15	2.32	2.49	2.75	2.98	3.21	4.21*	5.54*
	20	1.98	2.10	2.27	2.46	2.65	2.85	3.17	3.44	3.72	4.99*	6.82*
	25	2.20	2.33	2.53	2.74	2.96	3.20	3.57	3.89	4.23	5.83*	8.37*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 24.0 Ft (RADIUS = 17.0 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	1.82	1.92	2.07	2.24	2.41	2.59	2.86	3.09	3.33	4.37*	5.75*
	20	2.07	2.19	2.37	2.56	2.76	2.97	3.30	3.58	3.87	5.19*	7.08*
	25	2.29	2.44	2.64	2.86	3.09	3.33	3.72	4.05	4.40	6.06*	8.67*
1200	15	1.89	2.00	2.15	2.32	2.50	2.68	2.96	3.21	3.45	4.53*	5.96*
	20	2.15	2.28	2.46	2.66	2.87	3.09	3.42	3.72	4.02	5.39*	7.33*
	25	2.38	2.53	2.74	2.97	3.21	3.47	3.86	4.21	4.58	6.29*	8.96*
1300	15	1.95	2.06	2.22	2.40	2.58	2.77	3.07	3.32	3.57	4.68*	6.16*
	20	2.22	2.36	2.55	2.75	2.97	3.20	3.55	3.85	4.16	5.57*	7.57*
	25	2.47	2.63	2.84	3.08	3.33	3.60	4.01	4.37	4.74	6.51*	9.23*
1400	15	2.02	2.13	2.30	2.48	2.67	2.86	3.17	3.42	3.69	4.83*	6.35*
	20	2.30	2.44	2.63	2.85	3.07	3.30	3.67	3.98	4.30	5.75*	7.81*
	25	2.56	2.72	2.94	3.19	3.45	3.72	4.14	4.51	4.90	6.72*	9.50*
1500	15	2.08	2.20	2.37	2.55	2.75	2.95	3.26	3.53	3.80	4.97*	6.54*
	20	2.37	2.52	2.72	2.94	3.17	3.41	3.78	4.10	4.44	5.93*	8.04*
	25	2.64	2.81	3.04	3.29	3.56	3.84	4.28	4.66	5.06	6.92*	9.77*
1600	15	2.14	2.26	2.43	2.63	2.83	3.03	3.35	3.63	3.91	5.11*	6.72*
	20	2.44	2.59	2.80	3.02	3.26	3.51	3.89	4.22	4.57	6.10*	8.26*
	25	2.72	2.90	3.13	3.39	3.67	3.96	4.41	4.80	5.21	7.12*	10.02*
1700	15	2.19	2.32	2.50	2.70	2.90	3.12	3.44	3.72	4.01	5.25*	6.90*
	20	2.51	2.67	2.88	3.11	3.36	3.61	4.00	4.34	4.69	6.26*	8.48*
	25	2.80	2.98	3.22	3.49	3.78	4.07	4.53	4.94	5.36	7.31*	10.27*
1800	15	2.25	2.38	2.57	2.77	2.98	3.20	3.53	3.82	4.11	5.38*	7.07*
	20	2.58	2.74	2.95	3.19	3.45	3.71	4.11	4.46	4.82	6.43*	8.69*
	25	2.88	3.06	3.31	3.59	3.88	4.18	4.66	5.07	5.50	7.50*	10.52*
1900	15	2.31	2.44	2.63	2.84	3.05	3.28	3.62	3.91	4.21	5.51*	7.24*
	20	2.65	2.81	3.03	3.28	3.53	3.80	4.21	4.57	4.94	6.58*	8.89*
	25	2.96	3.14	3.40	3.68	3.98	4.29	4.78	5.20	5.64	7.69*	10.76*
2000	15	2.36	2.50	2.69	2.90	3.13	3.35	3.70	4.01	4.31	5.64*	7.40*
	20	2.71	2.88	3.10	3.36	3.62	3.89	4.32	4.68	5.06	6.74*	9.09*
	25	3.03	3.22	3.49	3.78	4.08	4.40	4.89	5.33	5.78	7.87*	10.99*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 24.0 Ft (RADIUS = 17.0 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	1.36	1.45	1.58	1.72	1.88	2.05	2.34	2.62	2.96	6.35*	16.30*
	20	1.50	1.61	1.76	1.94	2.15	2.38	2.82	3.32	4.10	12.90*	36.07*
	25	1.62	1.76	1.95	2.18	2.45	2.78	3.53	4.65	6.54	23.71*	68.68*
200	15	1.68	1.79	1.95	2.13	2.32	2.53	2.87	3.20	3.57	6.48*	16.30*
	20	1.88	2.01	2.21	2.43	2.68	2.96	3.45	3.97	4.66	12.90*	36.07*
	25	2.06	2.23	2.47	2.75	3.07	3.45	4.19	5.12	6.67	23.71*	68.68*
300	15	1.93	2.06	2.24	2.45	2.67	2.91	3.30	3.66	4.07	6.84*	16.30*
	20	2.18	2.34	2.57	2.83	3.11	3.43	3.97	4.52	5.21	12.91*	36.07*
	25	2.41	2.61	2.89	3.21	3.57	3.99	4.77	5.67	7.03	23.71*	68.68*
400	15	2.15	2.30	2.50	2.73	2.98	3.24	3.66	4.06	4.50	7.26*	16.30*
	20	2.45	2.63	2.88	3.17	3.48	3.83	4.42	5.00	5.71	12.93*	36.07*
	25	2.72	2.94	3.25	3.60	4.00	4.46	5.28	6.20	7.48	23.71*	68.68*
500	15	2.35	2.51	2.73	2.98	3.25	3.53	3.99	4.42	4.88	7.69*	16.32*
	20	2.69	2.89	3.16	3.47	3.81	4.19	4.82	5.44	6.17	13.00*	36.07*
	25	2.99	3.24	3.58	3.96	4.39	4.88	5.75	6.68	7.95	23.71*	68.68*
600	15	2.54	2.71	2.95	3.21	3.50	3.80	4.30	4.75	5.24	8.12*	16.36*
	20	2.91	3.12	3.42	3.75	4.12	4.52	5.19	5.84	6.60	13.15*	36.07*
	25	3.25	3.52	3.87	4.29	4.75	5.26	6.18	7.14	8.40	23.71*	68.68*
700	15	2.71	2.89	3.15	3.43	3.74	4.06	4.58	5.05	5.57	8.52*	16.45*
	20	3.11	3.35	3.66	4.02	4.40	4.83	5.53	6.21	7.00	13.36*	36.07*
	25	3.49	3.77	4.15	4.59	5.08	5.62	6.58	7.57	8.84	23.71*	68.68*
800	15	2.87	3.07	3.34	3.64	3.96	4.30	4.84	5.34	5.89	8.91*	16.59*
	20	3.31	3.55	3.89	4.26	4.67	5.12	5.86	6.56	7.38	13.62*	36.07*
	25	3.71	4.01	4.42	4.88	5.39	5.96	6.96	7.97	9.26	23.71*	68.68*
900	15	3.03	3.23	3.52	3.83	4.17	4.52	5.10	5.62	6.18	9.28*	16.78*
	20	3.49	3.75	4.10	4.50	4.93	5.39	6.16	6.90	7.74	13.90*	36.07*
	25	3.92	4.24	4.67	5.15	5.69	6.28	7.31	8.36	9.66	23.73*	68.68*
1000	15	3.17	3.39	3.69	4.01	4.37	4.74	5.34	5.88	6.46	9.64*	17.00*
	20	3.67	3.94	4.31	4.72	5.17	5.65	6.46	7.22	8.09	14.21*	36.08*
	25	4.12	4.46	4.90	5.41	5.97	6.59	7.66	8.73	10.05	23.76*	68.68*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 24.0 Ft (RADIUS = 17.0 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	3.31	3.54	3.85	4.19	4.56	4.95	5.57	6.13	6.74	9.99*	17.25*
	20	3.84	4.12	4.51	4.94	5.40	5.91	6.74	7.52	8.41	14.53*	36.08*
	25	4.32	4.67	5.13	5.66	6.24	6.88	7.98	9.08	10.42	23.81*	68.68*
1200	15	3.45	3.69	4.01	4.36	4.74	5.14	5.79	6.37	7.00	10.32*	17.52*
	20	4.00	4.30	4.70	5.14	5.63	6.15	7.01	7.82	8.73	14.85*	36.08*
	25	4.51	4.87	5.35	5.90	6.50	7.16	8.30	9.42	10.78	23.88*	68.68*
1300	15	3.58	3.83	4.16	4.53	4.92	5.34	6.00	6.60	7.25	10.65*	17.81*
	20	4.16	4.47	4.88	5.34	5.84	6.38	7.27	8.10	9.04	15.18*	36.08*
	25	4.69	5.07	5.57	6.13	6.75	7.44	8.60	9.75	11.14	23.98*	68.68*
1400	15	3.71	3.96	4.31	4.69	5.09	5.52	6.21	6.83	7.49	10.96*	18.10*
	20	4.31	4.63	5.06	5.53	6.05	6.61	7.52	8.38	9.34	15.50*	36.09*
	25	4.86	5.26	5.77	6.35	7.00	7.70	8.90	10.07	11.48	24.10*	68.68*
1500	15	3.83	4.10	4.45	4.84	5.26	5.70	6.41	7.05	7.73	11.27*	18.40*
	20	4.46	4.79	5.23	5.72	6.26	6.83	7.77	8.64	9.62	15.83*	36.10*
	25	5.03	5.44	5.97	6.57	7.23	7.96	9.18	10.38	11.81	24.24*	68.68*
1600	15	3.95	4.23	4.59	4.99	5.43	5.88	6.61	7.26	7.96	11.57*	18.71*
	20	4.60	4.94	5.40	5.90	6.45	7.04	8.01	8.90	9.90	16.15*	36.12*
	25	5.20	5.62	6.17	6.78	7.46	8.20	9.46	10.68	12.13	24.40*	68.68*
1700	15	4.07	4.35	4.73	5.14	5.59	6.05	6.80	7.47	8.18	11.86*	19.02*
	20	4.74	5.10	5.56	6.08	6.65	7.25	8.24	9.15	10.18	16.47*	36.15*
	25	5.36	5.79	6.36	6.99	7.69	8.45	9.73	10.98	12.45	24.58*	68.68*
1800	15	4.19	4.47	4.86	5.29	5.74	6.22	6.98	7.67	8.40	12.14*	19.32*
	20	4.88	5.24	5.72	6.26	6.83	7.45	8.46	9.40	10.44	16.78*	36.18*
	25	5.52	5.96	6.54	7.19	7.90	8.68	10.00	11.27	12.76	24.77*	68.68*
1900	15	4.30	4.59	4.99	5.43	5.89	6.38	7.17	7.86	8.61	12.42*	19.63*
	20	5.01	5.39	5.88	6.43	7.02	7.65	8.68	9.64	10.70	17.10*	36.23*
	25	5.67	6.13	6.72	7.39	8.12	8.91	10.26	11.55	13.06	24.98*	68.68*
2000	15	4.41	4.71	5.12	5.56	6.04	6.54	7.34	8.06	8.82	12.69*	19.93*
	20	5.14	5.53	6.03	6.59	7.20	7.84	8.90	9.88	10.96	17.40*	36.28*
	25	5.83	6.29	6.90	7.58	8.33	9.14	10.51	11.82	13.35	25.20*	68.68*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 24.0 Ft (RADIUS = 17.0 Ft)³
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft									
		4	8	12	16	20	24	30	35	40	80
100	15	2.33	2.58	2.93	3.40	4.09	5.24	8.71	13.33	19.91	78.57* 233.36*
	20	2.67	3.04	3.63	4.63	6.67	10.24	18.66	29.47	44.91	183.40* 549.78*
	25	3.01	3.58	4.66	7.15	11.79	18.73	35.07	56.07	86.13	356.22* 1071.4*
200	15	2.99	3.30	3.72	4.26	4.97	5.97	8.82	13.34	19.91	78.57* 233.36*
	20	3.47	3.92	4.59	5.55	7.16	10.28	18.66	29.47	44.91	183.40* 549.78*
	25	3.95	4.60	5.67	7.62	11.81	18.73	35.07	56.07	86.13	356.22* 1071.4*
300	15	3.52	3.87	4.36	4.96	5.71	6.71	9.21	13.37	19.91	78.57* 233.36*
	20	4.11	4.62	5.36	6.36	7.87	10.55	18.66	29.47	44.91	183.40* 549.78*
	25	4.69	5.42	6.54	8.36	11.97	18.74	35.07	56.07	86.13	356.22* 1071.4*
400	15	3.98	4.37	4.91	5.56	6.36	7.38	9.75	13.51	19.91	78.57* 233.36*
	20	4.66	5.23	6.03	7.08	8.58	11.02	18.68	29.47	44.91	183.40* 549.78*
	25	5.33	6.13	7.31	9.11	12.36	18.76	35.07	56.07	86.13	356.22* 1071.4*
500	15	4.39	4.82	5.40	6.10	6.95	8.00	10.32	13.78	19.93	78.57* 233.36*
	20	5.16	5.78	6.63	7.74	9.25	11.57	18.73	29.47	44.91	183.40* 549.78*
	25	5.91	6.77	8.01	9.82	12.87	18.83	35.07	56.07	86.13	356.22* 1071.4*
600	15	4.77	5.23	5.86	6.60	7.49	8.58	10.89	14.15	19.99	78.57* 233.36*
	20	5.62	6.28	7.18	8.34	9.88	12.15	18.85	29.47	44.91	183.40* 549.78*
	25	6.45	7.36	8.65	10.49	13.43	18.99	35.07	56.07	86.13	356.22* 1071.4*
700	15	5.12	5.62	6.28	7.06	7.99	9.12	11.44	14.57	20.10	78.57* 233.36*
	20	6.05	6.75	7.70	8.90	10.48	12.72	19.06	29.48	44.91	183.40* 549.78*
	25	6.94	7.90	9.25	11.12	14.01	19.24	35.07	56.07	86.13	356.22* 1071.4*
800	15	5.46	5.98	6.68	7.50	8.47	9.63	11.98	15.02	20.28	78.57* 233.36*
	20	6.45	7.19	8.19	9.43	11.04	13.28	19.34	29.49	44.91	183.40* 549.78*
	25	7.41	8.42	9.82	11.73	14.59	19.57	35.07	56.07	86.13	356.22* 1071.4*
900	15	5.77	6.33	7.05	7.91	8.92	10.12	12.49	15.49	20.51	78.57* 233.36*
	20	6.83	7.61	8.65	9.94	11.58	13.82	19.67	29.52	44.91	183.40* 549.78*
	25	7.85	8.90	10.35	12.31	15.15	19.95	35.08	56.07	86.13	356.22* 1071.4*
1000	15	6.08	6.65	7.41	8.31	9.35	10.58	12.99	15.95	20.79	78.57* 233.36*
	20	7.20	8.01	9.08	10.42	12.10	14.35	20.04	29.58	44.91	183.40* 549.78*
	25	8.28	9.37	10.87	12.86	15.71	20.36	35.10	56.07	86.13	356.22* 1071.4*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 24.0 Ft (RADIUS = 17.0 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	6.37	6.97	7.76	8.69	9.76	11.02	13.47	16.42	21.11	78.57*	233.36*
	20	7.55	8.39	9.51	10.88	12.60	14.87	20.44	29.66	44.91	183.40*	549.78*
	25	8.68	9.81	11.36	13.39	16.25	20.79	35.13	56.07	86.13	356.22*	1071.4*
1200	15	6.65	7.27	8.09	9.05	10.16	11.45	13.94	16.87	21.45	78.57*	233.36*
	20	7.89	8.76	9.91	11.32	13.08	15.37	20.85	29.78	44.91	183.40*	549.78*
	25	9.08	10.24	11.83	13.90	16.78	21.24	35.18	56.07	86.13	356.22*	1071.4*
1300	15	6.92	7.57	8.41	9.40	10.54	11.87	14.39	17.33	21.81	78.57*	233.36*
	20	8.21	9.11	10.30	11.75	13.54	15.86	21.28	29.94	44.92	183.40*	549.78*
	25	9.45	10.66	12.28	14.40	17.29	21.70	35.26	56.08	86.13	356.22*	1071.4*
1400	15	7.18	7.85	8.72	9.74	10.91	12.27	14.83	17.77	22.18	78.57*	233.36*
	20	8.53	9.46	10.68	12.17	13.99	16.33	21.70	30.12	44.93	183.40*	549.78*
	25	9.82	11.06	12.73	14.88	17.80	22.16	35.36	56.08	86.13	356.22*	1071.4*
1500	15	7.43	8.12	9.03	10.07	11.27	12.66	15.25	18.21	22.56	78.57*	233.36*
	20	8.83	9.79	11.05	12.57	14.43	16.79	22.13	30.33	44.94	183.40*	549.78*
	25	10.17	11.45	13.15	15.35	18.29	22.62	35.49	56.08	86.13	356.22*	1071.4*
1600	15	7.68	8.39	9.32	10.39	11.62	13.03	15.67	18.64	22.94	78.57*	233.36*
	20	9.13	10.11	11.40	12.96	14.85	17.24	22.56	30.57	44.97	183.40*	549.78*
	25	10.52	11.82	13.57	15.80	18.77	23.08	35.64	56.08	86.13	356.22*	1071.4*
1700	15	7.92	8.65	9.60	10.70	11.96	13.40	16.08	19.06	23.33	78.57*	233.36*
	20	9.42	10.43	11.75	13.34	15.27	17.68	22.99	30.83	45.00	183.40*	549.78*
	25	10.86	12.19	13.98	16.25	19.24	23.54	35.83	56.09	86.13	356.22*	1071.4*
1800	15	8.16	8.91	9.88	11.01	12.29	13.76	16.47	19.47	23.72	78.57*	233.36*
	20	9.71	10.74	12.09	13.71	15.67	18.11	23.42	31.11	45.04	183.40*	549.78*
	25	11.18	12.55	14.37	16.68	19.70	23.99	36.03	56.09	86.13	356.22*	1071.4*
1900	15	8.39	9.16	10.15	11.31	12.61	14.11	16.86	19.88	24.10	78.57*	233.36*
	20	9.98	11.04	12.42	14.08	16.07	18.54	23.84	31.41	45.10	183.40*	549.78*
	25	11.51	12.90	14.76	17.10	20.15	24.43	36.26	56.11	86.13	356.22*	1071.4*
2000	15	8.61	9.40	10.42	11.60	12.93	14.46	17.24	20.28	24.49	78.57*	233.36*
	20	10.26	11.33	12.74	14.43	16.45	18.95	24.26	31.72	45.17	183.40*	549.78*
	25	11.82	13.24	15.14	17.51	20.59	24.88	36.50	56.12	86.13	356.22*	1071.4*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 24.0 Ft (RADIUS = 17.0 Ft)³
 FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	4.69	6.53	12.02	22.16	38.10	61.92	118.09	190.46	294.10	1226.7*	3697.6*
	20	6.12	12.35	26.53	50.44	88.06	144.37	277.28	448.65	694.12	2903.9*	8760.1*
	25	8.49	22.84	50.47	97.06	170.44	280.30	539.74	874.30	1353.6	5669.0*	17107.*
200	15	6.10	7.85	12.20	22.16	38.10	61.92	118.09	190.46	294.10	1226.7*	3697.6*
	20	7.78	12.66	26.53	50.44	88.06	144.37	277.28	448.65	694.12	2903.9*	8760.1*
	25	10.06	22.84	50.47	97.06	170.44	280.30	539.74	874.30	1353.6	5669.0*	17107.*
300	15	7.23	9.04	12.85	22.17	38.10	61.92	118.09	190.46	294.10	1226.7*	3697.6*
	20	9.15	13.50	26.54	50.44	88.06	144.37	277.28	448.65	694.12	2903.9*	8760.1*
	25	11.55	22.88	50.47	97.06	170.44	280.30	539.74	874.30	1353.6	5669.0*	17107.*
400	15	8.21	10.09	13.68	22.23	38.10	61.92	118.09	190.46	294.10	1226.7*	3697.6*
	20	10.34	14.49	26.56	50.44	88.06	144.37	277.28	448.65	694.12	2903.9*	8760.1*
	25	12.89	23.09	50.47	97.06	170.44	280.30	539.74	874.30	1353.6	5669.0*	17107.*
500	15	9.09	11.05	14.56	22.41	38.10	61.92	118.09	190.46	294.10	1226.7*	3697.6*
	20	11.41	15.50	26.66	50.44	88.06	144.37	277.28	448.65	694.12	2903.9*	8760.1*
	25	14.12	23.52	50.47	97.06	170.44	280.30	539.74	874.30	1353.6	5669.0*	17107.*
600	15	9.90	11.93	15.42	22.74	38.10	61.92	118.09	190.46	294.10	1226.7*	3697.6*
	20	12.40	16.48	26.88	50.44	88.06	144.37	277.28	448.65	694.12	2903.9*	8760.1*
	25	15.26	24.13	50.47	97.06	170.44	280.30	539.74	874.30	1353.6	5669.0*	17107.*
700	15	10.65	12.76	16.25	23.18	38.11	61.92	118.09	190.46	294.10	1226.7*	3697.6*
	20	13.32	17.42	27.24	50.44	88.06	144.37	277.28	448.65	694.12	2903.9*	8760.1*
	25	16.32	24.85	50.47	97.06	170.44	280.30	539.74	874.30	1353.6	5669.0*	17107.*
800	15	11.36	13.54	17.06	23.71	38.14	61.92	118.09	190.46	294.10	1226.7*	3697.6*
	20	14.18	18.33	27.69	50.44	88.06	144.37	277.28	448.65	694.12	2903.9*	8760.1*
	25	17.32	25.62	50.48	97.06	170.44	280.30	539.74	874.30	1353.6	5669.0*	17107.*
900	15	12.03	14.28	17.83	24.29	38.20	61.92	118.09	190.46	294.10	1226.7*	3697.6*
	20	15.00	19.19	28.23	50.45	88.06	144.37	277.28	448.65	694.12	2903.9*	8760.1*
	25	18.28	26.42	50.50	97.06	170.44	280.30	539.74	874.30	1353.6	5669.0*	17107.*
1000	15	12.67	14.98	18.58	24.90	38.30	61.92	118.09	190.46	294.10	1226.7*	3697.6*
	20	15.79	20.03	28.81	50.47	88.06	144.37	277.28	448.65	694.12	2903.9*	8760.1*
	25	19.19	27.23	50.53	97.06	170.44	280.30	539.74	874.30	1353.6	5669.0*	17107.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 24.0 Ft (RADIUS = 17.0 Ft)³
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	13.29	15.66	19.30	25.52	38.44	61.92	118.09	190.46	294.10	1226.7*	3697.6*
	20	16.54	20.84	29.43	50.50	88.06	144.37	277.28	448.65	694.12	2903.9*	8760.1*
	25	20.06	28.04	50.60	97.06	170.44	280.30	539.74	874.30	1353.6	5669.0*	17107.*
1200	15	13.88	16.31	20.00	26.15	38.63	61.92	118.09	190.46	294.10	1226.7*	3697.6*
	20	17.26	21.61	30.07	50.55	88.06	144.37	277.28	448.65	694.12	2903.9*	8760.1*
	25	20.90	28.85	50.70	97.06	170.44	280.30	539.74	874.30	1353.6	5669.0*	17107.*
1300	15	14.45	16.94	20.68	26.78	38.87	61.92	118.09	190.46	294.10	1226.7*	3697.6*
	20	17.95	22.37	30.72	50.63	88.06	144.37	277.28	448.65	694.12	2903.9*	8760.1*
	25	21.71	29.64	50.83	97.06	170.44	280.30	539.74	874.30	1353.6	5669.0*	17107.*
1400	15	15.00	17.55	21.34	27.40	39.16	61.93	118.09	190.46	294.10	1226.7*	3697.6*
	20	18.63	23.10	31.38	50.74	88.06	144.37	277.28	448.65	694.12	2903.9*	8760.1*
	25	22.50	30.43	51.01	97.06	170.44	280.30	539.74	874.30	1353.6	5669.0*	17107.*
1500	15	15.54	18.14	21.98	28.03	39.48	61.95	118.09	190.46	294.10	1226.7*	3697.6*
	20	19.28	23.81	32.03	50.89	88.06	144.37	277.28	448.65	694.12	2903.9*	8760.1*
	25	23.26	31.20	51.24	97.06	170.44	280.30	539.74	874.30	1353.6	5669.0*	17107.*
1600	15	16.06	18.72	22.61	28.64	39.84	61.97	118.09	190.46	294.10	1226.7*	3697.6*
	20	19.92	24.51	32.69	51.07	88.07	144.37	277.28	448.65	694.12	2903.9*	8760.1*
	25	24.01	31.95	51.51	97.06	170.44	280.30	539.74	874.30	1353.6	5669.0*	17107.*
1700	15	16.57	19.28	23.22	29.25	40.22	62.00	118.09	190.46	294.10	1226.7*	3697.6*
	20	20.54	25.18	33.34	51.29	88.07	144.37	277.28	448.65	694.12	2903.9*	8760.1*
	25	24.73	32.70	51.81	97.06	170.44	280.30	539.74	874.30	1353.6	5669.0*	17107.*
1800	15	17.07	19.82	23.81	29.85	40.63	62.05	118.09	190.46	294.10	1226.7*	3697.6*
	20	21.14	25.85	33.99	51.54	88.07	144.37	277.28	448.65	694.12	2903.9*	8760.1*
	25	25.43	33.43	52.15	97.06	170.44	280.30	539.74	874.30	1353.6	5669.0*	17107.*
1900	15	17.55	20.35	24.40	30.45	41.06	62.10	118.09	190.46	294.10	1226.7*	3697.6*
	20	21.73	26.49	34.63	51.82	88.07	144.37	277.28	448.65	694.12	2903.9*	8760.1*
	25	26.12	34.15	52.52	97.06	170.44	280.30	539.74	874.30	1353.6	5669.0*	17107.*
2000	15	18.02	20.88	24.97	31.03	41.50	62.18	118.09	190.46	294.10	1226.7*	3697.6*
	20	22.31	27.12	35.26	52.13	88.08	144.37	277.28	448.65	694.12	2903.9*	8760.1*
	25	26.79	34.86	52.92	97.07	170.44	280.30	539.74	874.30	1353.6	5669.0*	17107.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 26.0 Ft (RADIUS = 18.4 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	0.93	0.96	1.03	1.11	1.19	1.27	1.40	1.51	1.63	2.13	2.84*
	20	0.99	1.04	1.11	1.20	1.29	1.38	1.53	1.66	1.80	2.48	3.85*
	25	1.05	1.10	1.19	1.28	1.38	1.49	1.67	1.82	1.99	3.00	5.99*
200	15	1.09	1.14	1.22	1.31	1.41	1.51	1.66	1.79	1.93	2.53	3.33*
	20	1.19	1.25	1.34	1.44	1.55	1.67	1.85	2.01	2.17	2.95	4.26*
	25	1.29	1.35	1.45	1.57	1.69	1.83	2.04	2.22	2.43	3.49	6.05*
300	15	1.23	1.29	1.38	1.48	1.59	1.70	1.87	2.02	2.17	2.84	3.73*
	20	1.36	1.42	1.53	1.64	1.77	1.90	2.10	2.28	2.47	3.34	4.70*
	25	1.47	1.55	1.67	1.80	1.94	2.09	2.33	2.55	2.77	3.93	6.30*
400	15	1.35	1.41	1.51	1.62	1.74	1.86	2.05	2.22	2.39	3.11	4.08*
	20	1.50	1.57	1.69	1.82	1.96	2.10	2.32	2.52	2.73	3.67	5.11*
	25	1.63	1.72	1.85	2.00	2.16	2.32	2.59	2.82	3.07	4.31	6.64*
500	15	1.46	1.52	1.63	1.75	1.88	2.01	2.22	2.39	2.57	3.36	4.40*
	20	1.63	1.71	1.83	1.97	2.12	2.28	2.52	2.74	2.96	3.97	5.48*
	25	1.78	1.88	2.02	2.18	2.35	2.53	2.82	3.07	3.34	4.65	7.00*
600	15	1.56	1.63	1.74	1.87	2.01	2.15	2.37	2.56	2.75	3.58	4.69*
	20	1.74	1.83	1.97	2.12	2.28	2.44	2.71	2.93	3.17	4.24	5.82*
	25	1.92	2.02	2.17	2.35	2.53	2.72	3.03	3.30	3.59	4.97	7.36*
700	15	1.65	1.73	1.85	1.98	2.13	2.28	2.51	2.71	2.91	3.79	4.95*
	20	1.85	1.95	2.09	2.25	2.42	2.60	2.88	3.12	3.37	4.50	6.15*
	25	2.04	2.15	2.32	2.50	2.70	2.90	3.23	3.52	3.82	5.27	7.70*
800	15	1.73	1.82	1.95	2.09	2.24	2.40	2.64	2.85	3.07	3.99	5.21*
	20	1.96	2.06	2.21	2.38	2.56	2.74	3.04	3.29	3.55	4.74	6.45*
	25	2.16	2.28	2.45	2.65	2.85	3.07	3.41	3.72	4.03	5.55	8.04*
900	15	1.82	1.91	2.04	2.19	2.35	2.51	2.77	2.99	3.21	4.17	5.45*
	20	2.06	2.16	2.32	2.50	2.69	2.88	3.19	3.45	3.73	4.96	6.74*
	25	2.28	2.40	2.58	2.79	3.00	3.23	3.59	3.91	4.24	5.81	8.36*
1000	15	1.90	1.99	2.13	2.29	2.45	2.62	2.89	3.12	3.35	4.35	5.68*
	20	2.15	2.26	2.43	2.61	2.81	3.01	3.33	3.61	3.90	5.18	7.02*
	25	2.38	2.52	2.71	2.92	3.15	3.38	3.76	4.09	4.44	6.07	8.68*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 26.0 Ft (RADIUS = 18.4 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	1.97	2.07	2.22	2.38	2.55	2.73	3.01	3.24	3.48	4.52	5.90*
	20	2.24	2.36	2.53	2.72	2.93	3.14	3.47	3.76	4.06	5.39	7.29*
	25	2.49	2.63	2.82	3.05	3.28	3.53	3.92	4.26	4.62	6.31	8.98*
1200	15	2.05	2.15	2.30	2.47	2.65	2.83	3.12	3.36	3.61	4.69	6.11*
	20	2.33	2.45	2.63	2.83	3.04	3.26	3.61	3.90	4.21	5.59	7.55*
	25	2.59	2.73	2.94	3.17	3.41	3.67	4.08	4.43	4.81	6.54	9.27*
1300	15	2.12	2.22	2.38	2.55	2.74	2.93	3.22	3.48	3.74	4.85	6.31*
	20	2.41	2.54	2.73	2.93	3.15	3.38	3.74	4.04	4.36	5.78	7.80*
	25	2.68	2.83	3.05	3.29	3.54	3.81	4.23	4.59	4.98	6.77	9.55*
1400	15	2.19	2.29	2.46	2.64	2.83	3.02	3.33	3.59	3.86	5.00	6.51*
	20	2.49	2.63	2.82	3.03	3.26	3.49	3.86	4.18	4.51	5.97	8.04*
	25	2.78	2.93	3.16	3.40	3.67	3.94	4.37	4.75	5.15	6.99	9.83*
1500	15	2.25	2.36	2.53	2.72	2.91	3.12	3.43	3.70	3.97	5.15	6.70*
	20	2.57	2.71	2.91	3.13	3.36	3.61	3.98	4.31	4.65	6.15	8.27*
	25	2.87	3.03	3.26	3.51	3.78	4.07	4.51	4.90	5.31	7.20	10.10*
1600	15	2.32	2.43	2.60	2.80	3.00	3.21	3.53	3.80	4.09	5.30	6.89*
	20	2.65	2.79	3.00	3.22	3.46	3.71	4.10	4.44	4.79	6.33	8.50*
	25	2.96	3.12	3.36	3.62	3.90	4.19	4.65	5.05	5.47	7.41	10.36*
1700	15	2.38	2.50	2.68	2.87	3.08	3.29	3.62	3.91	4.20	5.44	7.07*
	20	2.73	2.87	3.08	3.32	3.56	3.82	4.22	4.56	4.92	6.50	8.72*
	25	3.05	3.22	3.46	3.73	4.01	4.31	4.78	5.20	5.63	7.61	10.61*
1800	15	2.44	2.56	2.75	2.95	3.16	3.38	3.72	4.01	4.31	5.58	7.25*
	20	2.80	2.95	3.17	3.41	3.66	3.92	4.33	4.69	5.05	6.67	8.93*
	25	3.13	3.31	3.55	3.83	4.13	4.43	4.92	5.34	5.78	7.80	10.86*
1900	15	2.50	2.63	2.81	3.02	3.24	3.46	3.81	4.11	4.41	5.71	7.42*
	20	2.87	3.03	3.25	3.49	3.75	4.02	4.44	4.80	5.18	6.83	9.15*
	25	3.21	3.39	3.65	3.93	4.23	4.55	5.04	5.48	5.93	8.00	11.11*
2000	15	2.56	2.69	2.88	3.09	3.31	3.54	3.90	4.20	4.52	5.84	7.59*
	20	2.94	3.10	3.33	3.58	3.84	4.12	4.55	4.92	5.31	7.00	9.35*
	25	3.29	3.48	3.74	4.03	4.34	4.66	5.17	5.61	6.07	8.18	11.35*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 26.0 Ft (RADIUS = 18.4 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	1.47	1.55	1.68	1.83	1.99	2.17	2.47	2.77	3.13	6.91	17.62*
	20	1.62	1.73	1.88	2.07	2.29	2.54	3.01	3.57	4.48	14.19	39.18*
	25	1.76	1.89	2.09	2.33	2.62	2.99	3.85	5.19	7.34	26.19	74.71*
200	15	1.82	1.92	2.08	2.26	2.46	2.67	3.03	3.37	3.77	7.00	17.62*
	20	2.03	2.17	2.37	2.60	2.86	3.15	3.68	4.24	5.00	14.19	39.18*
	25	2.24	2.41	2.65	2.95	3.29	3.70	4.52	5.58	7.41	26.19	74.71*
300	15	2.10	2.22	2.40	2.61	2.84	3.08	3.48	3.86	4.29	7.30	17.62*
	20	2.37	2.53	2.76	3.02	3.32	3.64	4.22	4.81	5.57	14.19	39.18*
	25	2.62	2.82	3.11	3.44	3.82	4.27	5.12	6.13	7.71	26.19	74.71*
400	15	2.34	2.48	2.68	2.91	3.16	3.43	3.87	4.28	4.74	7.71	17.62*
	20	2.66	2.84	3.09	3.39	3.71	4.07	4.69	5.32	6.09	14.20	39.18*
	25	2.96	3.18	3.50	3.87	4.28	4.77	5.66	6.67	8.14	26.19	74.71*
500	15	2.55	2.71	2.93	3.18	3.45	3.74	4.22	4.66	5.15	8.14	17.63*
	20	2.92	3.12	3.40	3.71	4.07	4.46	5.12	5.78	6.57	14.25	39.18*
	25	3.26	3.51	3.85	4.25	4.70	5.21	6.15	7.17	8.59	26.19	74.71*
600	15	2.76	2.92	3.16	3.43	3.72	4.03	4.54	5.01	5.52	8.57	17.66*
	20	3.16	3.37	3.67	4.02	4.39	4.81	5.51	6.20	7.02	14.35	39.18*
	25	3.54	3.80	4.17	4.60	5.08	5.63	6.61	7.65	9.05	26.19	74.71*
700	15	2.94	3.12	3.38	3.66	3.97	4.30	4.84	5.33	5.87	8.98	17.72*
	20	3.38	3.61	3.93	4.30	4.70	5.14	5.88	6.59	7.44	14.51	39.18*
	25	3.80	4.08	4.47	4.93	5.44	6.01	7.03	8.10	9.50	26.19	74.71*
800	15	3.12	3.31	3.58	3.88	4.21	4.56	5.12	5.64	6.20	9.37	17.82*
	20	3.60	3.84	4.18	4.56	4.99	5.45	6.22	6.96	7.84	14.73	39.18*
	25	4.04	4.34	4.76	5.24	5.77	6.37	7.43	8.52	9.93	26.20	74.71*
900	15	3.29	3.49	3.77	4.09	4.43	4.80	5.39	5.93	6.52	9.76	17.96*
	20	3.80	4.06	4.41	4.81	5.26	5.74	6.55	7.32	8.21	14.99	39.18*
	25	4.27	4.59	5.03	5.53	6.09	6.71	7.81	8.93	10.35	26.20	74.71*
1000	15	3.45	3.66	3.95	4.29	4.65	5.03	5.64	6.20	6.81	10.13	18.14*
	20	3.99	4.26	4.63	5.06	5.52	6.02	6.86	7.65	8.57	15.27	39.18*
	25	4.49	4.83	5.28	5.81	6.39	7.04	8.17	9.32	10.75	26.22	74.71*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 26.0 Ft (RADIUS = 18.4 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	3.60	3.82	4.13	4.48	4.85	5.25	5.89	6.47	7.10	10.48	18.36*
	20	4.17	4.46	4.85	5.29	5.77	6.29	7.16	7.98	8.92	15.57	39.18*
	25	4.71	5.06	5.53	6.07	6.68	7.35	8.52	9.69	11.14	26.25	74.71*
1200	15	3.75	3.98	4.30	4.66	5.05	5.46	6.12	6.72	7.37	10.83	18.60*
	20	4.35	4.65	5.05	5.51	6.01	6.55	7.44	8.29	9.26	15.88	39.18*
	25	4.91	5.28	5.77	6.33	6.96	7.65	8.85	10.05	11.52	26.29	74.71*
1300	15	3.90	4.13	4.47	4.84	5.24	5.67	6.35	6.97	7.64	11.17	18.86*
	20	4.52	4.83	5.25	5.72	6.24	6.79	7.72	8.59	9.58	16.20	39.18*
	25	5.11	5.49	6.00	6.58	7.23	7.94	9.17	10.40	11.89	26.35	74.71*
1400	15	4.03	4.28	4.62	5.01	5.42	5.86	6.57	7.21	7.90	11.49	19.13*
	20	4.69	5.01	5.44	5.93	6.46	7.04	7.99	8.88	9.89	16.52	39.18*
	25	5.30	5.69	6.22	6.82	7.49	8.22	9.49	10.74	12.25	26.44	74.71*
1500	15	4.17	4.42	4.78	5.18	5.60	6.06	6.78	7.44	8.14	11.81	19.42*
	20	4.85	5.18	5.63	6.13	6.68	7.27	8.25	9.16	10.19	16.85	39.19*
	25	5.49	5.89	6.44	7.06	7.74	8.50	9.79	11.06	12.60	26.54	74.71*
1600	15	4.30	4.56	4.93	5.34	5.78	6.24	6.99	7.66	8.39	12.12	19.71*
	20	5.01	5.35	5.81	6.33	6.89	7.50	8.50	9.44	10.49	17.17	39.20*
	25	5.67	6.09	6.65	7.28	7.99	8.76	10.09	11.38	12.93	26.66	74.71*
1700	15	4.43	4.70	5.08	5.50	5.95	6.43	7.19	7.88	8.62	12.42	20.01*
	20	5.16	5.51	5.98	6.52	7.10	7.72	8.75	9.70	10.78	17.49	39.21*
	25	5.85	6.27	6.85	7.50	8.23	9.02	10.37	11.69	13.27	26.81	74.71*
1800	15	4.55	4.83	5.22	5.65	6.11	6.60	7.39	8.09	8.85	12.72	20.30*
	20	5.31	5.67	6.16	6.70	7.30	7.93	8.99	9.96	11.06	17.81	39.23*
	25	6.02	6.46	7.05	7.72	8.46	9.27	10.65	12.00	13.59	26.97	74.71*
1900	15	4.68	4.96	5.36	5.80	6.28	6.78	7.58	8.30	9.08	13.00	20.60*
	20	5.46	5.83	6.32	6.88	7.49	8.15	9.22	10.22	11.33	18.12	39.26*
	25	6.19	6.64	7.24	7.93	8.69	9.52	10.93	12.29	13.91	27.15	74.71*
2000	15	4.80	5.09	5.50	5.95	6.44	6.95	7.77	8.51	9.30	13.29	20.91*
	20	5.60	5.98	6.49	7.06	7.68	8.35	9.45	10.47	11.60	18.43	39.29*
	25	6.35	6.81	7.43	8.14	8.91	9.76	11.19	12.58	14.22	27.34	74.71*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 26.0 Ft (RADIUS = 18.4 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	2.54	2.79	3.18	3.70	4.51	5.94	10.00	15.23	22.60	87.10	254.15*
	20	2.92	3.33	4.01	5.25	7.83	12.00	21.66	33.91	51.23	203.57	599.00*
	25	3.31	3.98	5.34	8.56	14.05	22.14	40.88	64.70	98.44	395.59	1167.5*
200	15	3.26	3.58	4.03	4.62	5.41	6.58	10.05	15.23	22.60	87.10	254.15*
	20	3.79	4.28	5.03	6.15	8.16	12.02	21.66	33.91	51.23	203.57	599.00*
	25	4.34	5.08	6.34	8.84	14.06	22.14	40.88	64.70	98.44	395.59	1167.5*
300	15	3.84	4.20	4.72	5.37	6.20	7.33	10.33	15.24	22.60	87.10	254.15*
	20	4.50	5.05	5.86	7.00	8.81	12.16	21.66	33.91	51.23	203.57	599.00*
	25	5.15	5.97	7.26	9.49	14.12	22.14	40.88	64.70	98.44	395.59	1167.5*
400	15	4.34	4.75	5.31	6.01	6.89	8.03	10.81	15.32	22.60	87.10	254.15*
	20	5.10	5.71	6.58	7.76	9.52	12.52	21.67	33.91	51.23	203.57	599.00*
	25	5.86	6.74	8.08	10.22	14.36	22.14	40.88	64.70	98.44	395.59	1167.5*
500	15	4.79	5.24	5.85	6.60	7.51	8.68	11.36	15.50	22.61	87.10	254.15*
	20	5.65	6.31	7.23	8.46	10.20	13.01	21.69	33.91	51.23	203.57	599.00*
	25	6.50	7.43	8.83	10.95	14.76	22.17	40.88	64.70	98.44	395.59	1167.5*
600	15	5.21	5.68	6.34	7.13	8.09	9.29	11.92	15.79	22.63	87.10	254.15*
	20	6.15	6.85	7.83	9.11	10.86	13.55	21.75	33.91	51.23	203.57	599.00*
	25	7.08	8.07	9.52	11.65	15.26	22.24	40.88	64.70	98.44	395.59	1167.5*
700	15	5.59	6.10	6.80	7.63	8.63	9.86	12.48	16.16	22.70	87.10	254.15*
	20	6.62	7.36	8.39	9.71	11.49	14.11	21.87	33.91	51.23	203.57	599.00*
	25	7.62	8.67	10.16	12.31	15.80	22.39	40.88	64.70	98.44	395.59	1167.5*
800	15	5.96	6.50	7.23	8.10	9.14	10.40	13.03	16.58	22.81	87.10	254.15*
	20	7.06	7.84	8.91	10.28	12.08	14.68	22.05	33.91	51.23	203.57	599.00*
	25	8.14	9.22	10.77	12.95	16.36	22.60	40.88	64.70	98.44	395.59	1167.5*
900	15	6.30	6.87	7.63	8.54	9.62	10.92	13.56	17.02	22.97	87.10	254.15*
	20	7.48	8.30	9.41	10.82	12.65	15.23	22.31	33.92	51.23	203.57	599.00*
	25	8.62	9.76	11.35	13.56	16.93	22.89	40.89	64.70	98.44	395.59	1167.5*
1000	15	6.64	7.23	8.02	8.97	10.08	11.41	14.08	17.48	23.19	87.10	254.15*
	20	7.88	8.73	9.88	11.33	13.20	15.78	22.61	33.95	51.23	203.57	599.00*
	25	9.09	10.26	11.90	14.15	17.49	23.23	40.89	64.70	98.44	395.59	1167.5*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 26.0 Ft (RADIUS = 18.4 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	6.95	7.57	8.40	9.37	10.52	11.88	14.58	17.94	23.45	87.10	254.15*
	20	8.26	9.15	10.34	11.83	13.73	16.31	22.95	33.99	51.23	203.57	599.00*
	25	9.53	10.75	12.43	14.72	18.05	23.60	40.90	64.70	98.44	395.59	1167.5*
1200	15	7.26	7.90	8.75	9.76	10.94	12.34	15.07	18.40	23.75	87.10	254.15*
	20	8.63	9.55	10.78	12.31	14.24	16.83	23.32	34.05	51.23	203.57	599.00*
	25	9.96	11.21	12.95	15.27	18.59	24.01	40.92	64.70	98.44	395.59	1167.5*
1300	15	7.56	8.22	9.10	10.14	11.35	12.78	15.54	18.85	24.07	87.10	254.15*
	20	8.99	9.93	11.20	12.77	14.74	17.34	23.71	34.14	51.24	203.57	599.00*
	25	10.37	11.66	13.44	15.80	19.13	24.43	40.95	64.70	98.44	395.59	1167.5*
1400	15	7.84	8.52	9.44	10.51	11.75	13.21	16.00	19.31	24.41	87.10	254.15*
	20	9.34	10.31	11.61	13.21	15.21	17.84	24.12	34.26	51.24	203.57	599.00*
	25	10.77	12.10	13.92	16.31	19.65	24.87	41.00	64.70	98.44	395.59	1167.5*
1500	15	8.12	8.82	9.76	10.86	12.13	13.62	16.45	19.75	24.77	87.10	254.15*
	20	9.67	10.67	12.01	13.64	15.68	18.32	24.53	34.41	51.24	203.57	599.00*
	25	11.16	12.52	14.38	16.81	20.16	25.31	41.07	64.70	98.44	395.59	1167.5*
1600	15	8.39	9.11	10.08	11.21	12.51	14.02	16.89	20.20	25.14	87.10	254.15*
	20	10.00	11.02	12.39	14.07	16.13	18.80	24.95	34.58	51.25	203.57	599.00*
	25	11.54	12.93	14.83	17.30	20.67	25.76	41.16	64.70	98.44	395.59	1167.5*
1700	15	8.65	9.40	10.39	11.54	12.87	14.42	17.32	20.63	25.51	87.10	254.15*
	20	10.32	11.37	12.77	14.47	16.57	19.26	25.38	34.78	51.27	203.57	599.00*
	25	11.91	13.33	15.27	17.77	21.16	26.22	41.27	64.70	98.44	395.59	1167.5*
1800	15	8.91	9.67	10.69	11.87	13.23	14.80	17.74	21.06	25.89	87.10	254.15*
	20	10.63	11.70	13.13	14.87	17.01	19.71	25.80	35.01	51.29	203.57	599.00*
	25	12.27	13.72	15.69	18.23	21.65	26.67	41.40	64.70	98.44	395.59	1167.5*
1900	15	9.16	9.94	10.98	12.19	13.57	15.17	18.15	21.48	26.27	87.10	254.15*
	20	10.93	12.03	13.49	15.26	17.43	20.16	26.22	35.25	51.31	203.57	599.00*
	25	12.62	14.10	16.11	18.69	22.12	27.12	41.56	64.71	98.44	395.59	1167.5*
2000	15	9.41	10.21	11.27	12.50	13.91	15.54	18.55	21.90	26.66	87.10	254.15*
	20	11.23	12.35	13.84	15.65	17.84	20.60	26.65	35.51	51.35	203.57	599.00*
	25	12.97	14.48	16.52	19.13	22.59	27.57	41.73	64.71	98.44	395.59	1167.5*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 26.0 Ft (RADIUS = 18.4 Ft)
 FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	5.23	7.70	14.79	26.98	45.82	73.58	138.10	220.18	336.57	1362.6	4029.7*
	20	7.07	15.57	33.01	61.77	106.27	171.92	324.63	519.00	794.70	3226.2	9547.3*
	25	10.49	29.07	63.06	119.14	205.94	334.06	632.16	1011.7	1550.0	6298.4	18644.*
200	15	6.78	8.95	14.85	26.98	45.82	73.58	138.10	220.18	336.57	1362.6	4029.7*
	20	8.82	15.67	33.01	61.77	106.27	171.92	324.63	519.00	794.70	3226.2	9547.3*
	25	11.82	29.07	63.06	119.14	205.94	334.06	632.16	1011.7	1550.0	6298.4	18644.*
300	15	8.02	10.19	15.23	26.98	45.82	73.58	138.10	220.18	336.57	1362.6	4029.7*
	20	10.30	16.20	33.01	61.77	106.27	171.92	324.63	519.00	794.70	3226.2	9547.3*
	25	13.34	29.08	63.06	119.14	205.94	334.06	632.16	1011.7	1550.0	6298.4	18644.*
400	15	9.09	11.31	15.92	27.00	45.82	73.58	138.10	220.18	336.57	1362.6	4029.7*
	20	11.60	17.05	33.02	61.77	106.27	171.92	324.63	519.00	794.70	3226.2	9547.3*
	25	14.76	29.13	63.06	119.14	205.94	334.06	632.16	1011.7	1550.0	6298.4	18644.*
500	15	10.06	12.34	16.73	27.06	45.82	73.58	138.10	220.18	336.57	1362.6	4029.7*
	20	12.78	18.00	33.04	61.77	106.27	171.92	324.63	519.00	794.70	3226.2	9547.3*
	25	16.08	29.30	63.06	119.14	205.94	334.06	632.16	1011.7	1550.0	6298.4	18644.*
600	15	10.95	13.29	17.58	27.22	45.82	73.58	138.10	220.18	336.57	1362.6	4029.7*
	20	13.86	18.98	33.11	61.77	106.27	171.92	324.63	519.00	794.70	3226.2	9547.3*
	25	17.31	29.63	63.06	119.14	205.94	334.06	632.16	1011.7	1550.0	6298.4	18644.*
700	15	11.77	14.19	18.42	27.49	45.82	73.58	138.10	220.18	336.57	1362.6	4029.7*
	20	14.86	19.94	33.27	61.77	106.27	171.92	324.63	519.00	794.70	3226.2	9547.3*
	25	18.46	30.12	63.06	119.14	205.94	334.06	632.16	1011.7	1550.0	6298.4	18644.*
800	15	12.55	15.03	19.25	27.86	45.82	73.58	138.10	220.18	336.57	1362.6	4029.7*
	20	15.81	20.88	33.52	61.77	106.27	171.92	324.63	519.00	794.70	3226.2	9547.3*
	25	19.55	30.72	63.06	119.14	205.94	334.06	632.16	1011.7	1550.0	6298.4	18644.*
900	15	13.29	15.84	20.06	28.31	45.84	73.58	138.10	220.18	336.57	1362.6	4029.7*
	20	16.71	21.79	33.87	61.77	106.27	171.92	324.63	519.00	794.70	3226.2	9547.3*
	25	20.59	31.40	63.06	119.14	205.94	334.06	632.16	1011.7	1550.0	6298.4	18644.*
1000	15	13.99	16.60	20.84	28.83	45.87	73.58	138.10	220.18	336.57	1362.6	4029.7*
	20	17.57	22.68	34.30	61.78	106.27	171.92	324.63	519.00	794.70	3226.2	9547.3*
	25	21.59	32.13	63.07	119.14	205.94	334.06	632.16	1011.7	1550.0	6298.4	18644.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 26.0 Ft (RADIUS = 18.4 Ft)³
 FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	14.67	17.34	21.60	29.38	45.93	73.58	138.10	220.18	336.57	1362.6	4029.7*
	20	18.39	23.53	34.79	61.78	106.27	171.92	324.63	519.00	794.70	3226.2	9547.3*
	25	22.54	32.89	63.08	119.14	205.94	334.06	632.16	1011.7	1550.0	6298.4	18644.*
1200	15	15.31	18.05	22.34	29.97	46.01	73.58	138.10	220.18	336.57	1362.6	4029.7*
	20	19.19	24.37	35.33	61.80	106.27	171.92	324.63	519.00	794.70	3226.2	9547.3*
	25	23.46	33.66	63.11	119.14	205.94	334.06	632.16	1011.7	1550.0	6298.4	18644.*
1300	15	15.94	18.73	23.06	30.56	46.14	73.58	138.10	220.18	336.57	1362.6	4029.7*
	20	19.95	25.17	35.90	61.82	106.27	171.92	324.63	519.00	794.70	3226.2	9547.3*
	25	24.35	34.44	63.14	119.14	205.94	334.06	632.16	1011.7	1550.0	6298.4	18644.*
1400	15	16.55	19.39	23.77	31.17	46.30	73.58	138.10	220.18	336.57	1362.6	4029.7*
	20	20.69	25.96	36.50	61.85	106.27	171.92	324.63	519.00	794.70	3226.2	9547.3*
	25	25.22	35.23	63.20	119.14	205.94	334.06	632.16	1011.7	1550.0	6298.4	18644.*
1500	15	17.14	20.03	24.45	31.78	46.50	73.58	138.10	220.18	336.57	1362.6	4029.7*
	20	21.41	26.73	37.11	61.90	106.27	171.92	324.63	519.00	794.70	3226.2	9547.3*
	25	26.05	36.01	63.29	119.14	205.94	334.06	632.16	1011.7	1550.0	6298.4	18644.*
1600	15	17.71	20.66	25.12	32.40	46.73	73.59	138.10	220.18	336.57	1362.6	4029.7*
	20	22.11	27.47	37.74	61.97	106.27	171.92	324.63	519.00	794.70	3226.2	9547.3*
	25	26.86	36.78	63.40	119.14	205.94	334.06	632.16	1011.7	1550.0	6298.4	18644.*
1700	15	18.27	21.27	25.77	33.01	47.00	73.60	138.10	220.18	336.57	1362.6	4029.7*
	20	22.79	28.20	38.37	62.07	106.27	171.92	324.63	519.00	794.70	3226.2	9547.3*
	25	27.66	37.55	63.54	119.14	205.94	334.06	632.16	1011.7	1550.0	6298.4	18644.*
1800	15	18.81	21.86	26.41	33.62	47.31	73.61	138.10	220.18	336.57	1362.6	4029.7*
	20	23.45	28.92	39.01	62.19	106.27	171.92	324.63	519.00	794.70	3226.2	9547.3*
	25	28.43	38.30	63.72	119.14	205.94	334.06	632.16	1011.7	1550.0	6298.4	18644.*
1900	15	19.34	22.44	27.03	34.23	47.64	73.63	138.10	220.18	336.57	1362.6	4029.7*
	20	24.10	29.62	39.64	62.34	106.27	171.92	324.63	519.00	794.70	3226.2	9547.3*
	25	29.19	39.05	63.93	119.14	205.94	334.06	632.16	1011.7	1550.0	6298.4	18644.*
2000	15	19.86	23.01	27.65	34.83	48.00	73.66	138.10	220.18	336.57	1362.6	4029.7*
	20	24.73	30.30	40.28	62.51	106.27	171.92	324.63	519.00	794.70	3226.2	9547.3*
	25	29.92	39.80	64.17	119.14	205.94	334.06	632.16	1011.7	1550.0	6298.4	18644.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 28.0 Ft (RADIUS = 19.8 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	0.99	1.02	1.09	1.16	1.24	1.33	1.46	1.57	1.69	2.20	2.93*
	20	1.06	1.10	1.18	1.26	1.35	1.45	1.60	1.73	1.87	2.58	4.05*
	25	1.13	1.18	1.26	1.35	1.46	1.57	1.74	1.91	2.08	3.16	6.41*
200	15	1.17	1.22	1.29	1.38	1.48	1.58	1.73	1.87	2.01	2.61	3.42*
	20	1.28	1.33	1.42	1.53	1.64	1.75	1.93	2.10	2.26	3.07	4.44*
	25	1.38	1.44	1.54	1.66	1.79	1.92	2.14	2.33	2.54	3.66	6.45*
300	15	1.32	1.37	1.46	1.56	1.67	1.78	1.96	2.11	2.26	2.94	3.83*
	20	1.46	1.52	1.62	1.74	1.86	2.00	2.20	2.39	2.58	3.47	4.87*
	25	1.59	1.66	1.77	1.91	2.05	2.20	2.45	2.67	2.90	4.11	6.65*
400	15	1.45	1.51	1.60	1.71	1.83	1.96	2.15	2.31	2.48	3.22	4.19*
	20	1.61	1.68	1.79	1.92	2.06	2.21	2.44	2.64	2.85	3.81	5.28*
	25	1.76	1.84	1.97	2.12	2.28	2.45	2.72	2.96	3.22	4.50	6.97*
500	15	1.57	1.63	1.73	1.85	1.98	2.11	2.32	2.50	2.68	3.48	4.51*
	20	1.75	1.83	1.95	2.09	2.24	2.40	2.65	2.86	3.09	4.13	5.66*
	25	1.92	2.01	2.15	2.31	2.49	2.67	2.96	3.22	3.50	4.86	7.31*
600	15	1.67	1.74	1.85	1.98	2.12	2.26	2.48	2.67	2.87	3.71	4.81*
	20	1.88	1.96	2.09	2.24	2.41	2.57	2.84	3.07	3.31	4.41	6.01*
	25	2.07	2.17	2.32	2.49	2.68	2.87	3.19	3.46	3.76	5.19	7.67*
700	15	1.77	1.85	1.97	2.10	2.25	2.40	2.63	2.83	3.04	3.93	5.08*
	20	2.00	2.09	2.23	2.39	2.56	2.74	3.02	3.26	3.52	4.68	6.34*
	25	2.20	2.31	2.47	2.66	2.85	3.06	3.40	3.69	4.00	5.50	8.01*
800	15	1.87	1.95	2.07	2.21	2.37	2.52	2.77	2.98	3.20	4.14	5.34*
	20	2.11	2.21	2.35	2.52	2.70	2.89	3.19	3.45	3.71	4.93	6.65*
	25	2.33	2.45	2.62	2.81	3.02	3.24	3.59	3.90	4.23	5.79	8.35*
900	15	1.96	2.04	2.17	2.32	2.48	2.65	2.90	3.12	3.35	4.33	5.59*
	20	2.22	2.32	2.47	2.65	2.84	3.04	3.35	3.62	3.90	5.17	6.95*
	25	2.46	2.58	2.76	2.96	3.18	3.41	3.78	4.10	4.44	6.07	8.68*
1000	15	2.04	2.13	2.27	2.42	2.59	2.76	3.03	3.26	3.50	4.52	5.82*
	20	2.32	2.43	2.59	2.77	2.97	3.18	3.50	3.78	4.08	5.39	7.23*
	25	2.57	2.70	2.89	3.10	3.33	3.57	3.96	4.29	4.65	6.33	8.99*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 28.0 Ft (RADIUS = 19.8 Ft)³
 FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	2.13	2.22	2.36	2.52	2.69	2.87	3.15	3.39	3.64	4.70	6.05*
	20	2.42	2.53	2.70	2.89	3.10	3.31	3.65	3.94	4.25	5.61	7.50*
	25	2.69	2.82	3.01	3.24	3.48	3.73	4.13	4.48	4.85	6.59	9.30*
1200	15	2.21	2.30	2.45	2.62	2.80	2.98	3.27	3.52	3.77	4.87	6.26*
	20	2.51	2.63	2.81	3.01	3.22	3.44	3.79	4.09	4.41	5.82	7.77*
	25	2.80	2.93	3.14	3.37	3.62	3.88	4.29	4.65	5.04	6.83	9.60*
1300	15	2.28	2.38	2.53	2.71	2.89	3.09	3.38	3.64	3.90	5.03	6.47*
	20	2.61	2.72	2.91	3.12	3.34	3.57	3.93	4.24	4.57	6.02	8.02*
	25	2.90	3.04	3.26	3.50	3.75	4.02	4.45	4.83	5.22	7.07	9.88*
1400	15	2.36	2.46	2.62	2.80	2.99	3.19	3.49	3.76	4.03	5.19	6.68*
	20	2.69	2.82	3.01	3.22	3.45	3.69	4.06	4.38	4.72	6.22	8.27*
	25	3.00	3.15	3.37	3.62	3.88	4.16	4.60	4.99	5.40	7.30	10.16*
1500	15	2.43	2.53	2.70	2.88	3.08	3.28	3.60	3.87	4.15	5.35	6.87*
	20	2.78	2.91	3.10	3.32	3.56	3.81	4.19	4.52	4.87	6.41	8.51*
	25	3.10	3.25	3.48	3.74	4.01	4.30	4.75	5.15	5.57	7.52	10.44*
1600	15	2.50	2.61	2.78	2.97	3.17	3.38	3.70	3.98	4.27	5.50	7.06*
	20	2.86	3.00	3.20	3.43	3.67	3.92	4.31	4.66	5.01	6.59	8.74*
	25	3.20	3.36	3.59	3.85	4.14	4.43	4.90	5.31	5.74	7.73	10.70*
1700	15	2.57	2.68	2.85	3.05	3.26	3.47	3.81	4.09	4.39	5.65	7.25*
	20	2.95	3.08	3.29	3.52	3.77	4.03	4.44	4.79	5.15	6.77	8.97*
	25	3.29	3.45	3.69	3.97	4.26	4.56	5.04	5.46	5.90	7.94	10.96*
1800	15	2.64	2.75	2.93	3.13	3.34	3.56	3.90	4.20	4.50	5.79	7.43*
	20	3.03	3.17	3.38	3.62	3.87	4.14	4.56	4.92	5.29	6.95	9.19*
	25	3.38	3.55	3.80	4.08	4.37	4.69	5.18	5.61	6.06	8.15	11.22*
1900	15	2.70	2.82	3.00	3.21	3.42	3.65	4.00	4.30	4.61	5.93	7.61*
	20	3.10	3.25	3.47	3.71	3.97	4.25	4.67	5.04	5.42	7.12	9.40*
	25	3.47	3.64	3.90	4.18	4.49	4.81	5.31	5.75	6.22	8.35	11.47*
2000	15	2.77	2.89	3.07	3.28	3.51	3.74	4.10	4.40	4.72	6.07	7.78*
	20	3.18	3.33	3.55	3.80	4.07	4.35	4.79	5.16	5.56	7.28	9.61*
	25	3.56	3.74	4.00	4.29	4.60	4.93	5.44	5.90	6.37	8.54	11.71*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 28.0 Ft (RADIUS = 19.8 Ft)
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft									
		4	8	12	16	20	24	30	35	40	80
100	15	1.58	1.66	1.79	1.94	2.10	2.29	2.60	2.92	3.31	19.03*
	20	1.75	1.85	2.01	2.20	2.43	2.69	3.21	3.85	4.91	42.48*
	25	1.90	2.03	2.24	2.49	2.81	3.22	4.22	5.80	8.22	81.14*
200	15	1.96	2.06	2.22	2.40	2.60	2.82	3.19	3.55	3.97	19.03*
	20	2.20	2.33	2.53	2.77	3.04	3.35	3.91	4.52	5.38	42.48*
	25	2.42	2.59	2.85	3.15	3.52	3.96	4.87	6.11	8.26	81.14*
300	15	2.26	2.38	2.56	2.77	3.00	3.25	3.67	4.06	4.51	19.03*
	20	2.56	2.71	2.95	3.22	3.53	3.87	4.48	5.12	5.95	42.48*
	25	2.84	3.04	3.33	3.68	4.09	4.56	5.50	6.64	8.48	81.14*
400	15	2.52	2.66	2.86	3.09	3.35	3.63	4.08	4.51	4.99	19.03*
	20	2.87	3.05	3.31	3.61	3.95	4.33	4.98	5.65	6.49	42.48*
	25	3.20	3.43	3.75	4.14	4.58	5.09	6.06	7.18	8.86	81.14*
500	15	2.76	2.91	3.13	3.38	3.66	3.96	4.45	4.91	5.42	19.04*
	20	3.16	3.35	3.63	3.96	4.33	4.73	5.43	6.13	6.99	42.48*
	25	3.53	3.78	4.13	4.55	5.02	5.57	6.58	7.70	9.30	81.14*
600	15	2.98	3.14	3.38	3.65	3.95	4.27	4.79	5.28	5.81	19.05*
	20	3.42	3.63	3.93	4.29	4.68	5.11	5.85	6.57	7.45	42.48*
	25	3.83	4.10	4.48	4.92	5.43	6.00	7.05	8.19	9.76	81.14*
700	15	3.18	3.35	3.61	3.90	4.21	4.55	5.11	5.62	6.18	19.08*
	20	3.66	3.89	4.21	4.59	5.00	5.46	6.23	6.99	7.89	42.48*
	25	4.11	4.40	4.80	5.27	5.81	6.41	7.50	8.66	10.21	81.14*
800	15	3.37	3.55	3.82	4.13	4.47	4.82	5.41	5.94	6.53	19.15*
	20	3.89	4.13	4.48	4.87	5.31	5.79	6.60	7.38	8.31	42.48*
	25	4.38	4.68	5.11	5.60	6.16	6.79	7.92	9.10	10.66	81.14*
900	15	3.55	3.75	4.03	4.35	4.70	5.08	5.69	6.24	6.86	19.26*
	20	4.11	4.36	4.73	5.14	5.60	6.10	6.94	7.75	8.70	42.48*
	25	4.63	4.95	5.40	5.92	6.50	7.16	8.32	9.53	11.09	81.14*
1000	15	3.73	3.93	4.23	4.57	4.93	5.32	5.96	6.54	7.17	19.40*
	20	4.32	4.59	4.96	5.40	5.87	6.39	7.27	8.11	9.08	42.48*
	25	4.87	5.21	5.67	6.21	6.82	7.50	8.70	9.94	11.50	81.14*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 28.0 Ft (RADIUS = 19.8 Ft)
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	3.90	4.11	4.42	4.77	5.15	5.56	6.22	6.81	7.47	11.04	19.58*
	20	4.52	4.80	5.19	5.64	6.14	6.68	7.58	8.45	9.45	16.74	42.48*
	25	5.10	5.45	5.94	6.50	7.13	7.84	9.07	10.33	11.91	28.91	81.14*
1200	15	4.06	4.28	4.60	4.97	5.36	5.78	6.46	7.08	7.76	11.40	19.78*
	20	4.71	5.00	5.41	5.88	6.39	6.95	7.89	8.78	9.80	17.04	42.48*
	25	5.32	5.69	6.19	6.78	7.43	8.16	9.42	10.71	12.30	28.93	81.14*
1300	15	4.21	4.44	4.78	5.15	5.56	6.00	6.70	7.34	8.04	11.74	20.01*
	20	4.90	5.20	5.62	6.11	6.64	7.22	8.18	9.09	10.14	17.35	42.48*
	25	5.54	5.92	6.44	7.04	7.72	8.47	9.77	11.07	12.68	28.97	81.14*
1400	15	4.36	4.60	4.95	5.34	5.76	6.21	6.94	7.59	8.31	12.08	20.26*
	20	5.08	5.39	5.83	6.33	6.88	7.47	8.46	9.40	10.46	17.67	42.48*
	25	5.75	6.14	6.68	7.30	7.99	8.76	10.10	11.43	13.06	29.03	81.14*
1500	15	4.51	4.76	5.11	5.52	5.95	6.41	7.16	7.84	8.57	12.41	20.53*
	20	5.26	5.58	6.03	6.55	7.11	7.72	8.74	9.69	10.78	17.99	42.49*
	25	5.95	6.35	6.91	7.55	8.26	9.05	10.42	11.77	13.42	29.10	81.14*
1600	15	4.65	4.91	5.27	5.69	6.14	6.61	7.38	8.07	8.82	12.73	20.80*
	20	5.43	5.76	6.22	6.76	7.34	7.96	9.00	9.98	11.09	18.31	42.49*
	25	6.15	6.56	7.14	7.79	8.53	9.34	10.73	12.11	13.77	29.19	81.14*
1700	15	4.79	5.05	5.43	5.86	6.32	6.81	7.59	8.30	9.07	13.05	21.08*
	20	5.59	5.94	6.41	6.96	7.55	8.20	9.27	10.26	11.40	18.63	42.50*
	25	6.34	6.77	7.36	8.03	8.78	9.61	11.03	12.43	14.12	29.30	81.14*
1800	15	4.93	5.20	5.58	6.02	6.49	7.00	7.80	8.53	9.31	13.35	21.37*
	20	5.76	6.11	6.60	7.16	7.77	8.43	9.52	10.54	11.69	18.95	42.51*
	25	6.53	6.97	7.57	8.26	9.03	9.88	11.33	12.75	14.46	29.43	81.14*
1900	15	5.06	5.34	5.73	6.18	6.67	7.18	8.01	8.75	9.55	13.65	21.66*
	20	5.92	6.28	6.78	7.35	7.98	8.65	9.77	10.81	11.98	19.27	42.52*
	25	6.71	7.16	7.78	8.49	9.27	10.14	11.62	13.06	14.79	29.58	81.14*
2000	15	5.19	5.47	5.88	6.34	6.84	7.36	8.21	8.96	9.78	13.95	21.95*
	20	6.07	6.44	6.96	7.54	8.18	8.87	10.01	11.07	12.26	19.59	42.54*
	25	6.89	7.35	7.98	8.71	9.51	10.40	11.90	13.37	15.12	29.74	81.14*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 28.0 Ft (RADIUS = 19.8 Ft)³
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	2.75	3.02	3.43	4.03	5.00	6.77	11.45	17.34	25.57	96.32	276.31*
	20	3.18	3.63	4.43	6.00	9.18	14.00	25.03	38.84	58.22	225.38	651.47*
	25	3.63	4.41	6.17	10.20	16.65	26.00	47.41	74.30	112.05	438.15	1270.0*
200	15	3.53	3.87	4.36	5.00	5.90	7.29	11.47	17.34	25.57	96.32	276.31*
	20	4.13	4.67	5.50	6.84	9.36	14.01	25.03	38.84	58.22	225.38	651.47*
	25	4.74	5.59	7.10	10.34	16.65	26.00	47.41	74.30	112.05	438.15	1270.0*
300	15	4.16	4.55	5.10	5.80	6.72	8.02	11.64	17.34	25.57	96.32	276.31*
	20	4.90	5.50	6.39	7.71	9.91	14.07	25.03	38.84	58.22	225.38	651.47*
	25	5.63	6.55	8.05	10.85	16.67	26.00	47.41	74.30	112.05	438.15	1270.0*
400	15	4.71	5.13	5.73	6.49	7.45	8.74	12.03	17.37	25.57	96.32	276.31*
	20	5.56	6.21	7.17	8.51	10.58	14.30	25.03	38.84	58.22	225.38	651.47*
	25	6.41	7.38	8.92	11.52	16.79	26.00	47.41	74.30	112.05	438.15	1270.0*
500	15	5.20	5.66	6.31	7.11	8.11	9.42	12.53	17.48	25.57	96.32	276.31*
	20	6.15	6.86	7.87	9.24	11.27	14.69	25.03	38.84	58.22	225.38	651.47*
	25	7.10	8.13	9.71	12.24	17.05	26.01	47.41	74.30	112.05	438.15	1270.0*
600	15	5.65	6.15	6.84	7.68	8.73	10.05	13.07	17.69	25.58	96.32	276.31*
	20	6.70	7.45	8.51	9.93	11.94	15.18	25.06	38.84	58.22	225.38	651.47*
	25	7.73	8.82	10.45	12.95	17.44	26.04	47.41	74.30	112.05	438.15	1270.0*
700	15	6.07	6.60	7.33	8.22	9.30	10.65	13.63	17.99	25.61	96.32	276.31*
	20	7.21	8.00	9.11	10.57	12.59	15.71	25.12	38.84	58.22	225.38	651.47*
	25	8.33	9.47	11.14	13.64	17.91	26.10	47.41	74.30	112.05	438.15	1270.0*
800	15	6.47	7.03	7.79	8.72	9.84	11.22	14.19	18.35	25.68	96.32	276.31*
	20	7.69	8.52	9.67	11.18	13.22	16.25	25.22	38.84	58.22	225.38	651.47*
	25	8.89	10.07	11.79	14.30	18.43	26.22	47.41	74.30	112.05	438.15	1270.0*
900	15	6.85	7.43	8.23	9.20	10.35	11.77	14.73	18.75	25.78	96.32	276.31*
	20	8.15	9.01	10.21	11.75	13.81	16.81	25.39	38.85	58.22	225.38	651.47*
	25	9.42	10.65	12.42	14.94	18.97	26.41	47.41	74.30	112.05	438.15	1270.0*
1000	15	7.21	7.82	8.65	9.65	10.84	12.29	15.26	19.18	25.93	96.32	276.31*
	20	8.58	9.48	10.72	12.30	14.39	17.36	25.61	38.86	58.22	225.38	651.47*
	25	9.92	11.19	13.01	15.56	19.52	26.65	47.42	74.30	112.05	438.15	1270.0*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 28.0 Ft (RADIUS = 19.8 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	7.55	8.19	9.05	10.08	11.31	12.79	15.78	19.63	26.13	96.32	276.31*
	20	9.00	9.93	11.21	12.83	14.95	17.90	25.88	38.87	58.22	225.38	651.47*
	25	10.41	11.72	13.58	16.16	20.08	26.94	47.42	74.30	112.05	438.15	1270.0*
1200	15	7.89	8.54	9.44	10.50	11.76	13.27	16.29	20.08	26.37	96.32	276.31*
	20	9.40	10.36	11.68	13.34	15.49	18.44	26.19	38.90	58.22	225.38	651.47*
	25	10.87	12.22	14.13	16.74	20.63	27.27	47.42	74.30	112.05	438.15	1270.0*
1300	15	8.21	8.89	9.81	10.91	12.20	13.74	16.78	20.53	26.64	96.32	276.31*
	20	9.79	10.78	12.14	13.84	16.01	18.96	26.53	38.95	58.22	225.38	651.47*
	25	11.32	12.71	14.66	17.30	21.17	27.64	47.44	74.30	112.05	438.15	1270.0*
1400	15	8.52	9.22	10.17	11.30	12.62	14.19	17.26	20.99	26.94	96.32	276.31*
	20	10.17	11.19	12.58	14.31	16.52	19.48	26.89	39.01	58.22	225.38	651.47*
	25	11.76	13.18	15.17	17.85	21.71	28.03	47.45	74.30	112.05	438.15	1270.0*
1500	15	8.82	9.54	10.52	11.68	13.03	14.63	17.73	21.44	27.26	96.32	276.31*
	20	10.53	11.58	13.00	14.78	17.01	19.98	27.27	39.10	58.22	225.38	651.47*
	25	12.18	13.64	15.67	18.38	22.24	28.43	47.48	74.30	112.05	438.15	1270.0*
1600	15	9.11	9.86	10.86	12.05	13.43	15.06	18.19	21.89	27.60	96.32	276.31*
	20	10.89	11.96	13.42	15.23	17.49	20.48	27.67	39.21	58.22	225.38	651.47*
	25	12.60	14.09	16.15	18.90	22.76	28.85	47.52	74.30	112.05	438.15	1270.0*
1700	15	9.40	10.16	11.19	12.41	13.82	15.47	18.64	22.34	27.95	96.32	276.31*
	20	11.23	12.33	13.82	15.66	17.96	20.96	28.07	39.35	58.23	225.38	651.47*
	25	13.00	14.52	16.62	19.40	23.28	29.29	47.58	74.30	112.05	438.15	1270.0*
1800	15	9.68	10.46	11.52	12.76	14.20	15.88	19.08	22.77	28.31	96.32	276.31*
	20	11.57	12.69	14.22	16.09	18.42	21.44	28.48	39.51	58.24	225.38	651.47*
	25	13.39	14.94	17.08	19.90	23.78	29.72	47.65	74.30	112.05	438.15	1270.0*
1900	15	9.96	10.75	11.83	13.10	14.57	16.28	19.51	23.21	28.68	96.32	276.31*
	20	11.90	13.05	14.60	16.51	18.87	21.91	28.90	39.69	58.25	225.38	651.47*
	25	13.77	15.36	17.53	20.38	24.28	30.16	47.74	74.30	112.05	438.15	1270.0*
2000	15	10.22	11.04	12.14	13.44	14.93	16.67	19.93	23.64	29.05	96.32	276.31*
	20	12.22	13.40	14.98	16.92	19.31	22.37	29.31	39.89	58.27	225.38	651.47*
	25	14.15	15.76	17.97	20.85	24.77	30.60	47.85	74.30	112.05	438.15	1270.0*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 28.0 Ft (RADIUS = 19.8 Ft)
 FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	5.83	9.19	18.05	32.58	54.68	86.84	160.57	253.26	383.49	1509.7	4383.6*
	20	8.21	19.43	40.65	74.95	127.19	203.27	377.83	597.35	905.86	3574.5	10386.*
	25	13.13	36.54	77.91	144.81	246.75	395.24	736.00	1164.6	1767.1	6978.8	20282.*
200	15	7.50	10.25	18.06	32.58	54.68	86.84	160.57	253.26	383.49	1509.7	4383.6*
	20	10.00	19.45	40.65	74.95	127.19	203.27	377.83	597.35	905.86	3574.5	10386.*
	25	14.04	36.54	77.91	144.81	246.75	395.24	736.00	1164.6	1767.1	6978.8	20282.*
300	15	8.85	11.50	18.23	32.58	54.68	86.84	160.57	253.26	383.49	1509.7	4383.6*
	20	11.58	19.69	40.65	74.95	127.19	203.27	377.83	597.35	905.86	3574.5	10386.*
	25	15.48	36.54	77.91	144.81	246.75	395.24	736.00	1164.6	1767.1	6978.8	20282.*
400	15	10.03	12.68	18.69	32.58	54.68	86.84	160.57	253.26	383.49	1509.7	4383.6*
	20	12.99	20.27	40.65	74.95	127.19	203.27	377.83	597.35	905.86	3574.5	10386.*
	25	16.93	36.55	77.91	144.81	246.75	395.24	736.00	1164.6	1767.1	6978.8	20282.*
500	15	11.08	13.77	19.37	32.60	54.68	86.84	160.57	253.26	383.49	1509.7	4383.6*
	20	14.26	21.08	40.65	74.95	127.19	203.27	377.83	597.35	905.86	3574.5	10386.*
	25	18.31	36.59	77.91	144.81	246.75	395.24	736.00	1164.6	1767.1	6978.8	20282.*
600	15	12.05	14.79	20.14	32.65	54.68	86.84	160.57	253.26	383.49	1509.7	4383.6*
	20	15.43	21.98	40.67	74.95	127.19	203.27	377.83	597.35	905.86	3574.5	10386.*
	25	19.61	36.71	77.91	144.81	246.75	395.24	736.00	1164.6	1767.1	6978.8	20282.*
700	15	12.95	15.75	20.95	32.77	54.68	86.84	160.57	253.26	383.49	1509.7	4383.6*
	20	16.53	22.92	40.72	74.95	127.19	203.27	377.83	597.35	905.86	3574.5	10386.*
	25	20.85	36.94	77.91	144.81	246.75	395.24	736.00	1164.6	1767.1	6978.8	20282.*
800	15	13.80	16.65	21.78	32.98	54.68	86.84	160.57	253.26	383.49	1509.7	4383.6*
	20	17.56	23.86	40.81	74.95	127.19	203.27	377.83	597.35	905.86	3574.5	10386.*
	25	22.03	37.30	77.91	144.81	246.75	395.24	736.00	1164.6	1767.1	6978.8	20282.*
900	15	14.60	17.52	22.60	33.28	54.68	86.84	160.57	253.26	383.49	1509.7	4383.6*
	20	18.54	24.79	40.98	74.95	127.19	203.27	377.83	597.35	905.86	3574.5	10386.*
	25	23.15	37.76	77.91	144.81	246.75	395.24	736.00	1164.6	1767.1	6978.8	20282.*
1000	15	15.37	18.34	23.40	33.65	54.69	86.84	160.57	253.26	383.49	1509.7	4383.6*
	20	19.47	25.71	41.21	74.95	127.19	203.27	377.83	597.35	905.86	3574.5	10386.*
	25	24.23	38.32	77.91	144.81	246.75	395.24	736.00	1164.6	1767.1	6978.8	20282.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 28.0 Ft (RADIUS = 19.8 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	16.11	19.14	24.19	34.09	54.71	86.84	160.57	253.26	383.49	1509.7	4383.6*
	20	20.37	26.60	41.53	74.95	127.19	203.27	377.83	597.35	905.86	3574.5	10386.*
	25	25.26	38.94	77.91	144.81	246.75	395.24	736.00	1164.6	1767.1	6978.8	20282.*
1200	15	16.81	19.90	24.96	34.57	54.74	86.84	160.57	253.26	383.49	1509.7	4383.6*
	20	21.23	27.47	41.90	74.96	127.19	203.27	377.83	597.35	905.86	3574.5	10386.*
	25	26.26	39.61	77.92	144.81	246.75	395.24	736.00	1164.6	1767.1	6978.8	20282.*
1300	15	17.50	20.64	25.72	35.10	54.78	86.84	160.57	253.26	383.49	1509.7	4383.6*
	20	22.07	28.32	42.34	74.96	127.19	203.27	377.83	597.35	905.86	3574.5	10386.*
	25	27.22	40.32	77.92	144.81	246.75	395.24	736.00	1164.6	1767.1	6978.8	20282.*
1400	15	18.16	21.36	26.45	35.65	54.85	86.84	160.57	253.26	383.49	1509.7	4383.6*
	20	22.88	29.16	42.82	74.97	127.19	203.27	377.83	597.35	905.86	3574.5	10386.*
	25	28.16	41.05	77.94	144.81	246.75	395.24	736.00	1164.6	1767.1	6978.8	20282.*
1500	15	18.80	22.05	27.18	36.21	54.95	86.84	160.57	253.26	383.49	1509.7	4383.6*
	20	23.66	29.97	43.33	74.98	127.19	203.27	377.83	597.35	905.86	3574.5	10386.*
	25	29.07	41.79	77.96	144.81	246.75	395.24	736.00	1164.6	1767.1	6978.8	20282.*
1600	15	19.42	22.73	27.88	36.80	55.07	86.84	160.57	253.26	383.49	1509.7	4383.6*
	20	24.42	30.77	43.88	75.00	127.19	203.27	377.83	597.35	905.86	3574.5	10386.*
	25	29.95	42.54	77.99	144.81	246.75	395.24	736.00	1164.6	1767.1	6978.8	20282.*
1700	15	20.03	23.39	28.57	37.39	55.23	86.84	160.57	253.26	383.49	1509.7	4383.6*
	20	25.16	31.54	44.45	75.03	127.19	203.27	377.83	597.35	905.86	3574.5	10386.*
	25	30.81	43.29	78.03	144.81	246.75	395.24	736.00	1164.6	1767.1	6978.8	20282.*
1800	15	20.62	24.03	29.25	37.98	55.41	86.84	160.57	253.26	383.49	1509.7	4383.6*
	20	25.88	32.31	45.03	75.07	127.19	203.27	377.83	597.35	905.86	3574.5	10386.*
	25	31.66	44.05	78.09	144.81	246.75	395.24	736.00	1164.6	1767.1	6978.8	20282.*
1900	15	21.20	24.66	29.92	38.58	55.63	86.85	160.57	253.26	383.49	1509.7	4383.6*
	20	26.59	33.05	45.63	75.13	127.19	203.27	377.83	597.35	905.86	3574.5	10386.*
	25	32.48	44.80	78.17	144.81	246.75	395.24	736.00	1164.6	1767.1	6978.8	20282.*
2000	15	21.77	25.27	30.57	39.18	55.88	86.86	160.57	253.26	383.49	1509.7	4383.6*
	20	27.28	33.79	46.23	75.20	127.19	203.27	377.83	597.35	905.86	3574.5	10386.*
	25	33.28	45.55	78.28	144.81	246.75	395.24	736.00	1164.6	1767.1	6978.8	20282.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 30.0 Ft (RADIUS = 21.2 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	CEILING HEIGHT, Ft	4	8	12	16	20	24	30	35	40	60	80
(Ft*s) ^{1/2}	RATE OF RISE °F/min											
100	15	1.06	1.09	1.15	1.22	1.30	1.38	1.52	1.63	1.75	2.27	3.01*
	20	1.14	1.17	1.24	1.33	1.42	1.51	1.67	1.80	1.95	2.68	4.27*
	25	1.21	1.25	1.33	1.43	1.53	1.64	1.82	1.99	2.17	3.33	6.85*
200	15	1.26	1.29	1.37	1.46	1.55	1.65	1.81	1.94	2.08	2.70	3.52*
	20	1.37	1.42	1.51	1.61	1.72	1.84	2.02	2.18	2.36	3.19	4.62*
	25	1.48	1.54	1.64	1.75	1.88	2.02	2.24	2.43	2.65	3.83	6.88*
300	15	1.42	1.46	1.54	1.64	1.75	1.86	2.04	2.19	2.35	3.04	3.93*
	20	1.56	1.62	1.72	1.83	1.96	2.09	2.30	2.49	2.68	3.60	5.05*
	25	1.70	1.77	1.88	2.02	2.16	2.32	2.57	2.79	3.03	4.29	7.04*
400	15	1.55	1.60	1.70	1.81	1.93	2.05	2.24	2.41	2.58	3.34	4.30*
	20	1.73	1.79	1.90	2.03	2.17	2.32	2.55	2.75	2.97	3.96	5.46*
	25	1.89	1.97	2.09	2.24	2.41	2.58	2.85	3.10	3.36	4.70	7.32*
500	15	1.68	1.73	1.84	1.96	2.08	2.22	2.43	2.61	2.79	3.60	4.63*
	20	1.88	1.95	2.07	2.21	2.36	2.52	2.77	2.99	3.22	4.29	5.84*
	25	2.06	2.15	2.29	2.45	2.62	2.81	3.11	3.37	3.66	5.07	7.65*
600	15	1.79	1.85	1.96	2.09	2.23	2.37	2.59	2.79	2.98	3.85	4.93*
	20	2.02	2.09	2.22	2.37	2.53	2.71	2.97	3.21	3.45	4.58	6.20*
	25	2.22	2.31	2.46	2.64	2.83	3.03	3.34	3.63	3.93	5.42	8.00*
700	15	1.90	1.97	2.08	2.22	2.36	2.51	2.75	2.95	3.16	4.07	5.21*
	20	2.14	2.23	2.37	2.53	2.70	2.88	3.16	3.41	3.67	4.86	6.53*
	25	2.37	2.47	2.63	2.81	3.01	3.23	3.56	3.86	4.18	5.74	8.34*
800	15	2.00	2.07	2.20	2.34	2.49	2.65	2.90	3.11	3.33	4.29	5.48*
	20	2.27	2.35	2.50	2.67	2.85	3.04	3.34	3.60	3.88	5.12	6.85*
	25	2.51	2.61	2.78	2.98	3.19	3.42	3.77	4.09	4.42	6.04	8.68*
900	15	2.10	2.17	2.30	2.45	2.61	2.78	3.04	3.26	3.49	4.49	5.73*
	20	2.38	2.47	2.63	2.81	3.00	3.20	3.51	3.79	4.07	5.37	7.16*
	25	2.64	2.75	2.93	3.14	3.36	3.59	3.97	4.30	4.65	6.33	9.01*
1000	15	2.19	2.27	2.41	2.56	2.73	2.90	3.17	3.41	3.65	4.68	5.97*
	20	2.49	2.59	2.75	2.94	3.14	3.34	3.67	3.96	4.26	5.61	7.45*
	25	2.77	2.88	3.07	3.29	3.52	3.77	4.16	4.50	4.87	6.61	9.33*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 30.0 Ft (RADIUS = 21.2 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE
TIME INDEX

CEILING HEIGHT, Ft

RATE
OF RISE

(Ft*s)^{1/2}

°F/min

4

8

12

16

20

24

30

35

40

60

80

1100	15	2.28	2.36	2.50	2.67	2.84	3.02	3.30	3.54	3.79	4.87	6.20*
	20	2.60	2.70	2.87	3.06	3.27	3.49	3.83	4.12	4.44	5.83	7.73*
	25	2.89	3.01	3.21	3.43	3.67	3.93	4.34	4.69	5.07	6.87	9.63*
1200	15	2.37	2.45	2.60	2.77	2.95	3.13	3.42	3.68	3.93	5.05	6.42*
	20	2.70	2.81	2.98	3.18	3.40	3.62	3.98	4.29	4.61	6.05	7.99*
	25	3.01	3.13	3.34	3.57	3.82	4.09	4.51	4.88	5.27	7.12	9.94*
1300	15	2.45	2.54	2.69	2.86	3.05	3.24	3.54	3.80	4.07	5.22	6.63*
	20	2.80	2.91	3.09	3.30	3.52	3.75	4.12	4.44	4.77	6.26	8.25*
	25	3.12	3.25	3.46	3.71	3.97	4.24	4.68	5.06	5.46	7.37	10.23*
1400	15	2.53	2.62	2.78	2.96	3.15	3.35	3.66	3.93	4.20	5.39	6.84*
	20	2.90	3.01	3.20	3.41	3.64	3.88	4.26	4.59	4.93	6.46	8.51*
	25	3.23	3.37	3.59	3.84	4.11	4.39	4.84	5.23	5.65	7.61	10.51*
1500	15	2.61	2.70	2.87	3.05	3.25	3.45	3.77	4.05	4.33	5.55	7.04*
	20	2.99	3.11	3.30	3.52	3.76	4.01	4.40	4.74	5.09	6.66	8.75*
	25	3.34	3.48	3.71	3.96	4.24	4.53	4.99	5.40	5.83	7.84	10.79*
1600	15	2.68	2.78	2.95	3.14	3.34	3.55	3.88	4.16	4.46	5.71	7.24*
	20	3.08	3.20	3.40	3.63	3.87	4.13	4.53	4.88	5.24	6.85	8.99*
	25	3.44	3.59	3.82	4.09	4.37	4.67	5.15	5.57	6.01	8.06	11.06*
1700	15	2.76	2.86	3.03	3.23	3.43	3.65	3.99	4.28	4.58	5.86	7.43*
	20	3.17	3.29	3.50	3.73	3.98	4.25	4.66	5.01	5.39	7.04	9.22*
	25	3.54	3.69	3.93	4.21	4.50	4.81	5.30	5.73	6.18	8.28	11.33*
1800	15	2.83	2.94	3.11	3.31	3.52	3.75	4.09	4.39	4.70	6.01	7.61*
	20	3.25	3.38	3.59	3.84	4.09	4.36	4.78	5.15	5.53	7.22	9.45*
	25	3.64	3.80	4.04	4.32	4.63	4.94	5.44	5.88	6.35	8.49	11.59*
1900	15	2.90	3.01	3.19	3.39	3.61	3.84	4.19	4.50	4.81	6.16	7.79*
	20	3.34	3.47	3.69	3.93	4.20	4.47	4.90	5.28	5.67	7.40	9.67*
	25	3.74	3.90	4.15	4.44	4.75	5.07	5.58	6.04	6.51	8.70	11.84*
2000	15	2.97	3.08	3.27	3.48	3.70	3.93	4.29	4.61	4.93	6.30	7.97*
	20	3.42	3.56	3.78	4.03	4.30	4.58	5.02	5.41	5.81	7.58	9.88*
	25	3.83	4.00	4.26	4.55	4.87	5.20	5.72	6.18	6.67	8.90	12.09*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 30.0 Ft (RADIUS = 21.2 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
100	15	1.70	1.77	1.89	2.05	2.22	2.41	2.74	3.07	3.50	8.16	20.53*	
	20	1.87	1.97	2.14	2.34	2.58	2.86	3.43	4.16	5.39	17.08	46.00*	
	25	2.04	2.18	2.39	2.66	3.01	3.47	4.65	6.49	9.18	31.77	87.98*	
200	15	2.10	2.19	2.35	2.54	2.75	2.98	3.36	3.74	4.18	8.20	20.53*	
	20	2.36	2.49	2.70	2.94	3.22	3.55	4.15	4.82	5.80	17.08	46.00*	
	25	2.61	2.78	3.04	3.37	3.76	4.24	5.26	6.71	9.20	31.77	87.98*	
300	15	2.43	2.54	2.72	2.94	3.17	3.43	3.86	4.28	4.75	8.41	20.53*	
	20	2.75	2.91	3.14	3.42	3.74	4.11	4.75	5.44	6.36	17.08	46.00*	
	25	3.06	3.26	3.56	3.93	4.36	4.87	5.90	7.20	9.35	31.77	87.98*	
400	15	2.71	2.84	3.04	3.28	3.54	3.83	4.30	4.74	5.25	8.76	20.53*	
	20	3.09	3.27	3.53	3.84	4.19	4.59	5.28	5.99	6.91	17.08	46.00*	
	25	3.45	3.68	4.01	4.42	4.88	5.43	6.49	7.74	9.68	31.77	87.98*	
500	15	2.96	3.11	3.33	3.59	3.87	4.18	4.69	5.16	5.70	9.17	20.53*	
	20	3.40	3.59	3.88	4.22	4.60	5.02	5.75	6.50	7.43	17.09	46.00*	
	25	3.81	4.06	4.42	4.85	5.35	5.93	7.02	8.27	10.09	31.77	87.98*	
600	15	3.20	3.35	3.59	3.87	4.18	4.51	5.05	5.55	6.11	9.60	20.54*	
	20	3.68	3.89	4.20	4.56	4.97	5.42	6.19	6.96	7.91	17.14	46.00*	
	25	4.13	4.40	4.79	5.25	5.78	6.40	7.52	8.77	10.54	31.77	87.98*	
700	15	3.42	3.58	3.84	4.14	4.46	4.81	5.38	5.91	6.50	10.02	20.56*	
	20	3.94	4.17	4.50	4.88	5.31	5.78	6.60	7.40	8.37	17.22	46.00*	
	25	4.44	4.72	5.14	5.63	6.19	6.83	7.99	9.26	10.99	31.77	87.98*	
800	15	3.63	3.80	4.07	4.39	4.73	5.09	5.69	6.25	6.86	10.44	20.60*	
	20	4.19	4.43	4.78	5.18	5.64	6.13	6.98	7.81	8.80	17.36	46.00*	
	25	4.72	5.03	5.47	5.98	6.57	7.23	8.44	9.72	11.44	31.78	87.98*	
900	15	3.82	4.01	4.29	4.62	4.98	5.36	5.99	6.57	7.21	10.84	20.67*	
	20	4.43	4.68	5.05	5.47	5.94	6.46	7.34	8.20	9.21	17.55	46.00*	
	25	4.99	5.32	5.78	6.31	6.93	7.62	8.86	10.16	11.87	31.78	87.98*	
1000	15	4.01	4.21	4.51	4.85	5.22	5.62	6.28	6.88	7.53	11.24	20.78*	
	20	4.65	4.92	5.30	5.74	6.24	6.78	7.69	8.57	9.61	17.77	46.00*	
	25	5.25	5.59	6.07	6.63	7.27	7.99	9.26	10.59	12.30	31.78	87.98*	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 30.0 Ft (RADIUS = 21.2 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	4.19	4.40	4.71	5.07	5.45	5.87	6.55	7.17	7.85	11.62	20.92*
	20	4.87	5.14	5.54	6.01	6.52	7.08	8.02	8.93	9.99	18.03	46.00*
	25	5.50	5.86	6.36	6.94	7.60	8.34	9.65	11.00	12.72	31.79	87.98*
1200	15	4.37	4.58	4.90	5.27	5.68	6.11	6.81	7.45	8.15	11.99	21.09*
	20	5.08	5.36	5.78	6.26	6.79	7.37	8.34	9.28	10.36	18.31	46.00*
	25	5.74	6.11	6.63	7.23	7.91	8.68	10.02	11.39	13.13	31.80	87.98*
1300	15	4.53	4.76	5.09	5.48	5.89	6.34	7.06	7.72	8.44	12.35	21.28*
	20	5.28	5.58	6.01	6.50	7.05	7.65	8.65	9.61	10.71	18.60	46.00*
	25	5.98	6.36	6.89	7.52	8.22	9.00	10.38	11.78	13.52	31.82	87.98*
1400	15	4.70	4.93	5.27	5.67	6.10	6.56	7.31	7.99	8.73	12.70	21.50*
	20	5.48	5.78	6.23	6.74	7.31	7.92	8.95	9.93	11.06	18.91	46.00*
	25	6.20	6.59	7.15	7.79	8.51	9.32	10.73	12.15	13.91	31.86	87.98*
1500	15	4.86	5.09	5.45	5.86	6.30	6.78	7.55	8.24	9.00	13.04	21.74*
	20	5.67	5.98	6.44	6.97	7.55	8.18	9.24	10.24	11.39	19.22	46.00*
	25	6.42	6.83	7.40	8.06	8.80	9.63	11.07	12.51	14.29	31.91	87.98*
1600	15	5.01	5.26	5.62	6.04	6.50	6.99	7.78	8.49	9.27	13.37	21.99*
	20	5.85	6.18	6.65	7.19	7.79	8.44	9.52	10.55	11.72	19.54	46.00*
	25	6.63	7.05	7.64	8.32	9.08	9.93	11.39	12.86	14.66	31.97	87.98*
1700	15	5.16	5.41	5.79	6.22	6.69	7.19	8.00	8.74	9.53	13.69	22.25*
	20	6.03	6.37	6.85	7.41	8.02	8.69	9.80	10.84	12.03	19.86	46.00*
	25	6.84	7.27	7.87	8.57	9.35	10.22	11.71	13.20	15.02	32.05	87.98*
1800	15	5.31	5.57	5.96	6.40	6.88	7.39	8.22	8.97	9.78	14.01	22.52*
	20	6.21	6.55	7.05	7.62	8.25	8.93	10.07	11.13	12.34	20.18	46.01*
	25	7.04	7.48	8.10	8.82	9.61	10.50	12.03	13.54	15.37	32.15	87.98*
1900	15	5.45	5.72	6.12	6.57	7.06	7.59	8.44	9.20	10.03	14.32	22.80*
	20	6.38	6.73	7.24	7.83	8.47	9.17	10.33	11.41	12.64	20.50	46.01*
	25	7.24	7.69	8.32	9.06	9.87	10.78	12.33	13.87	15.72	32.26	87.98*
2000	15	5.59	5.87	6.27	6.74	7.24	7.78	8.65	9.43	10.27	14.63	23.08*
	20	6.55	6.91	7.43	8.03	8.69	9.40	10.58	11.69	12.94	20.82	46.03*
	25	7.44	7.90	8.54	9.29	10.13	11.05	12.63	14.19	16.06	32.39	87.98*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 30.0 Ft (RADIUS = 21.2 Ft)³
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	2.97	3.25	3.71	4.40	5.56	7.72	13.06	19.67	28.84	106.27	299.89*
	20	3.44	3.96	4.91	6.91	10.71	16.26	28.79	44.31	65.91	248.91	707.33*
	25	3.96	4.89	7.19	12.10	19.60	30.37	54.71	84.94	127.03	484.07	1379.0*
200	15	3.82	4.17	4.69	5.41	6.44	8.11	13.07	19.67	28.84	106.27	299.89*
	20	4.48	5.07	6.02	7.63	10.80	16.26	28.79	44.31	65.91	248.91	707.33*
	25	5.17	6.14	7.99	12.15	19.60	30.37	54.71	84.94	127.03	484.07	1379.0*
300	15	4.50	4.90	5.49	6.25	7.28	8.80	13.16	19.67	28.84	106.27	299.89*
	20	5.31	5.96	6.96	8.49	11.20	16.29	28.79	44.31	65.91	248.91	707.33*
	25	6.13	7.17	8.94	12.48	19.61	30.37	54.71	84.94	127.03	484.07	1379.0*
400	15	5.09	5.53	6.17	6.99	8.05	9.52	13.44	19.68	28.84	106.27	299.89*
	20	6.03	6.74	7.79	9.32	11.81	16.41	28.79	44.31	65.91	248.91	707.33*
	25	6.97	8.06	9.84	13.06	19.65	30.37	54.71	84.94	127.03	484.07	1379.0*
500	15	5.62	6.10	6.79	7.65	8.75	10.22	13.87	19.74	28.84	106.27	299.89*
	20	6.67	7.43	8.54	10.09	12.48	16.68	28.79	44.31	65.91	248.91	707.33*
	25	7.72	8.87	10.68	13.73	19.80	30.37	54.71	84.94	127.03	484.07	1379.0*
600	15	6.11	6.62	7.35	8.26	9.40	10.88	14.38	19.87	28.84	106.27	299.89*
	20	7.26	8.07	9.23	10.81	13.15	17.08	28.80	44.31	65.91	248.91	707.33*
	25	8.41	9.62	11.46	14.43	20.06	30.38	54.71	84.94	127.03	484.07	1379.0*
700	15	6.56	7.11	7.88	8.83	10.00	11.50	14.91	20.09	28.86	106.27	299.89*
	20	7.82	8.66	9.87	11.49	13.81	17.55	28.82	44.31	65.91	248.91	707.33*
	25	9.06	10.31	12.20	15.12	20.42	30.40	54.71	84.94	127.03	484.07	1379.0*
800	15	6.99	7.57	8.38	9.37	10.58	12.10	15.46	20.38	28.89	106.27	299.89*
	20	8.34	9.22	10.47	12.14	14.46	18.06	28.87	44.31	65.91	248.91	707.33*
	25	9.66	10.96	12.89	15.80	20.87	30.46	54.71	84.94	127.03	484.07	1379.0*
900	15	7.40	8.00	8.85	9.87	11.12	12.67	16.01	20.72	28.94	106.27	299.89*
	20	8.83	9.75	11.05	12.75	15.08	18.59	28.96	44.31	65.91	248.91	707.33*
	25	10.24	11.58	13.55	16.47	21.35	30.55	54.71	84.94	127.03	484.07	1379.0*
1000	15	7.79	8.42	9.30	10.36	11.64	13.22	16.55	21.11	29.04	106.27	299.89*
	20	9.30	10.26	11.59	13.33	15.68	19.14	29.10	44.32	65.91	248.91	707.33*
	25	10.78	12.17	14.19	17.11	21.87	30.70	54.71	84.94	127.03	484.07	1379.0*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 30.0 Ft (RADIUS = 21.2 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	8.17	8.82	9.73	10.82	12.14	13.75	17.08	21.53	29.17	106.27	299.89*
	20	9.75	10.74	12.12	13.90	16.26	19.68	29.29	44.32	65.91	248.91	707.33*
	25	11.31	12.74	14.80	17.74	22.40	30.89	54.71	84.94	127.03	484.07	1379.0*
1200	15	8.53	9.20	10.14	11.27	12.62	14.26	17.60	21.96	29.35	106.27	299.89*
	20	10.19	11.21	12.62	14.44	16.83	20.22	29.52	44.33	65.91	248.91	707.33*
	25	11.82	13.28	15.38	18.34	22.94	31.13	54.72	84.94	127.03	484.07	1379.0*
1300	15	8.87	9.57	10.54	11.70	13.08	14.75	18.11	22.40	29.56	106.27	299.89*
	20	10.61	11.66	13.11	14.96	17.38	20.75	29.79	44.35	65.91	248.91	707.33*
	25	12.30	13.80	15.95	18.94	23.48	31.42	54.72	84.94	127.03	484.07	1379.0*
1400	15	9.21	9.93	10.93	12.12	13.53	15.23	18.61	22.85	29.80	106.27	299.89*
	20	11.02	12.09	13.58	15.47	17.91	21.28	30.09	44.38	65.91	248.91	707.33*
	25	12.78	14.31	16.50	19.51	24.02	31.74	54.73	84.94	127.03	484.07	1379.0*
1500	15	9.54	10.28	11.30	12.52	13.97	15.69	19.10	23.30	30.08	106.27	299.89*
	20	11.41	12.52	14.04	15.96	18.44	21.80	30.43	44.43	65.91	248.91	707.33*
	25	13.24	14.81	17.03	20.07	24.56	32.08	54.74	84.94	127.03	484.07	1379.0*
1600	15	9.85	10.62	11.67	12.92	14.39	16.14	19.57	23.75	30.37	106.27	299.89*
	20	11.80	12.93	14.49	16.44	18.94	22.31	30.78	44.49	65.91	248.91	707.33*
	25	13.68	15.29	17.55	20.62	25.09	32.45	54.75	84.94	127.03	484.07	1379.0*
1700	15	10.17	10.95	12.02	13.30	14.80	16.58	20.04	24.19	30.69	106.27	299.89*
	20	12.17	13.33	14.92	16.91	19.44	22.81	31.15	44.57	65.91	248.91	707.33*
	25	14.12	15.75	18.05	21.15	25.61	32.84	54.77	84.94	127.03	484.07	1379.0*
1800	15	10.47	11.27	12.37	13.68	15.20	17.01	20.50	24.64	31.02	106.27	299.89*
	20	12.54	13.72	15.34	17.37	19.92	23.31	31.53	44.67	65.92	248.91	707.33*
	25	14.54	16.21	18.55	21.68	26.13	33.24	54.81	84.94	127.03	484.07	1379.0*
1900	15	10.76	11.58	12.71	14.04	15.60	17.43	20.95	25.08	31.36	106.27	299.89*
	20	12.89	14.10	15.76	17.81	20.40	23.79	31.92	44.79	65.92	248.91	707.33*
	25	14.95	16.65	19.03	22.19	26.65	33.65	54.85	84.94	127.03	484.07	1379.0*
2000	15	11.05	11.89	13.04	14.40	15.98	17.84	21.39	25.52	31.72	106.27	299.89*
	20	13.24	14.47	16.16	18.25	20.86	24.27	32.32	44.93	65.93	248.91	707.33*
	25	15.36	17.09	19.50	22.69	27.15	34.08	54.91	84.94	127.03	484.07	1379.0*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 30.0 Ft (RADIUS = 21.2 Ft)³
 FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	6.49	11.07	21.86	39.04	64.80	101.84	185.71	289.96	435.19	1668.3	4760.5*
	20	9.65	24.00	49.57	90.17	151.09	238.76	437.33	684.26	1028.3	3950.4	11279.*
	25	16.43	45.40	95.27	174.47	293.36	464.48	852.16	1334.3	2006.2	7712.9	22027.*
200	15	8.28	11.84	21.86	39.04	64.80	101.84	185.71	289.96	435.19	1668.3	4760.5*
	20	11.37	24.01	49.57	90.17	151.09	238.76	437.33	684.26	1028.3	3950.4	11279.*
	25	16.90	45.40	95.27	174.47	293.36	464.48	852.16	1334.3	2006.2	7712.9	22027.*
300	15	9.75	13.03	21.91	39.04	64.80	101.84	185.71	289.96	435.19	1668.3	4760.5*
	20	13.02	24.08	49.57	90.17	151.09	238.76	437.33	684.26	1028.3	3950.4	11279.*
	25	18.10	45.40	95.27	174.47	293.36	464.48	852.16	1334.3	2006.2	7712.9	22027.*
400	15	11.02	14.23	22.15	39.04	64.80	101.84	185.71	289.96	435.19	1668.3	4760.5*
	20	14.51	24.37	49.57	90.17	151.09	238.76	437.33	684.26	1028.3	3950.4	11279.*
	25	19.49	45.40	95.27	174.47	293.36	464.48	852.16	1334.3	2006.2	7712.9	22027.*
500	15	12.16	15.36	22.62	39.04	64.80	101.84	185.71	289.96	435.19	1668.3	4760.5*
	20	15.88	24.93	49.58	90.17	151.09	238.76	437.33	684.26	1028.3	3950.4	11279.*
	25	20.90	45.41	95.27	174.47	293.36	464.48	852.16	1334.3	2006.2	7712.9	22027.*
600	15	13.21	16.44	23.25	39.05	64.80	101.84	185.71	289.96	435.19	1668.3	4760.5*
	20	17.14	25.68	49.58	90.17	151.09	238.76	437.33	684.26	1028.3	3950.4	11279.*
	25	22.25	45.43	95.27	174.47	293.36	464.48	852.16	1334.3	2006.2	7712.9	22027.*
700	15	14.19	17.45	23.98	39.09	64.80	101.84	185.71	289.96	435.19	1668.3	4760.5*
	20	18.32	26.52	49.59	90.17	151.09	238.76	437.33	684.26	1028.3	3950.4	11279.*
	25	23.55	45.51	95.27	174.47	293.36	464.48	852.16	1334.3	2006.2	7712.9	22027.*
800	15	15.11	18.42	24.75	39.18	64.80	101.84	185.71	289.96	435.19	1668.3	4760.5*
	20	19.44	27.41	49.61	90.17	151.09	238.76	437.33	684.26	1028.3	3950.4	11279.*
	25	24.80	45.65	95.27	174.47	293.36	464.48	852.16	1334.3	2006.2	7712.9	22027.*
900	15	15.98	19.34	25.54	39.33	64.80	101.84	185.71	289.96	435.19	1668.3	4760.5*
	20	20.50	28.32	49.66	90.17	151.09	238.76	437.33	684.26	1028.3	3950.4	11279.*
	25	25.99	45.88	95.27	174.47	293.36	464.48	852.16	1334.3	2006.2	7712.9	22027.*
1000	15	16.81	20.23	26.34	39.54	64.80	101.84	185.71	289.96	435.19	1668.3	4760.5*
	20	21.51	29.23	49.76	90.17	151.09	238.76	437.33	684.26	1028.3	3950.4	11279.*
	25	27.14	46.21	95.27	174.47	293.36	464.48	852.16	1334.3	2006.2	7712.9	22027.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 30.0 Ft (RADIUS = 21.2 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	17.61	21.08	27.14	39.83	64.80	101.84	185.71	289.96	435.19	1668.3	4760.5*
	20	22.48	30.13	49.91	90.17	151.09	238.76	437.33	684.26	1028.3	3950.4	11279.*
	25	28.25	46.62	95.27	174.47	293.36	464.48	852.16	1334.3	2006.2	7712.9	22027.*
1200	15	18.38	21.90	27.93	40.18	64.81	101.84	185.71	289.96	435.19	1668.3	4760.5*
	20	23.42	31.02	50.11	90.17	151.09	238.76	437.33	684.26	1028.3	3950.4	11279.*
	25	29.32	47.11	95.27	174.47	293.36	464.48	852.16	1334.3	2006.2	7712.9	22027.*
1300	15	19.12	22.69	28.70	40.58	64.82	101.84	185.71	289.96	435.19	1668.3	4760.5*
	20	24.32	31.90	50.37	90.17	151.09	238.76	437.33	684.26	1028.3	3950.4	11279.*
	25	30.36	47.66	95.27	174.47	293.36	464.48	852.16	1334.3	2006.2	7712.9	22027.*
1400	15	19.84	23.46	29.47	41.03	64.85	101.84	185.71	289.96	435.19	1668.3	4760.5*
	20	25.20	32.77	50.68	90.17	151.09	238.76	437.33	684.26	1028.3	3950.4	11279.*
	25	31.37	48.26	95.28	174.47	293.36	464.48	852.16	1334.3	2006.2	7712.9	22027.*
1500	15	20.53	24.21	30.22	41.52	64.88	101.84	185.71	289.96	435.19	1668.3	4760.5*
	20	26.05	33.62	51.05	90.17	151.09	238.76	437.33	684.26	1028.3	3950.4	11279.*
	25	32.35	48.89	95.28	174.47	293.36	464.48	852.16	1334.3	2006.2	7712.9	22027.*
1600	15	21.21	24.93	30.95	42.03	64.93	101.84	185.71	289.96	435.19	1668.3	4760.5*
	20	26.87	34.45	51.46	90.17	151.09	238.76	437.33	684.26	1028.3	3950.4	11279.*
	25	33.30	49.56	95.29	174.47	293.36	464.48	852.16	1334.3	2006.2	7712.9	22027.*
1700	15	21.87	25.64	31.68	42.56	65.00	101.84	185.71	289.96	435.19	1668.3	4760.5*
	20	27.68	35.27	51.91	90.18	151.09	238.76	437.33	684.26	1028.3	3950.4	11279.*
	25	34.24	50.25	95.29	174.47	293.36	464.48	852.16	1334.3	2006.2	7712.9	22027.*
1800	15	22.51	26.33	32.39	43.11	65.09	101.84	185.71	289.96	435.19	1668.3	4760.5*
	20	28.46	36.07	52.39	90.19	151.09	238.76	437.33	684.26	1028.3	3950.4	11279.*
	25	35.14	50.95	95.31	174.47	293.36	464.48	852.16	1334.3	2006.2	7712.9	22027.*
1900	15	23.14	27.01	33.09	43.67	65.20	101.84	185.71	289.96	435.19	1668.3	4760.5*
	20	29.23	36.86	52.89	90.21	151.09	238.76	437.33	684.26	1028.3	3950.4	11279.*
	25	36.03	51.67	95.33	174.47	293.36	464.48	852.16	1334.3	2006.2	7712.9	22027.*
2000	15	23.75	27.67	33.77	44.24	65.34	101.84	185.71	289.96	435.19	1668.3	4760.5*
	20	29.98	37.64	53.42	90.23	151.09	238.76	437.33	684.26	1028.3	3950.4	11279.*
	25	36.90	52.39	95.36	174.47	293.36	464.48	852.16	1334.3	2006.2	7712.9	22027.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 32.0 Ft (RADIUS = 22.6 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	1.13	1.15	1.21	1.28	1.36	1.44	1.57	1.69	1.81	2.34	3.10*
	20	1.21	1.24	1.31	1.39	1.48	1.58	1.74	1.87	2.02	2.79	4.51*
	25	1.29	1.33	1.40	1.50	1.60	1.72	1.90	2.08	2.27	3.51	7.33*
200	15	1.34	1.37	1.44	1.53	1.62	1.72	1.88	2.02	2.16	2.79	3.61*
	20	1.46	1.50	1.59	1.69	1.80	1.92	2.11	2.27	2.45	3.31	4.82*
	25	1.58	1.63	1.73	1.85	1.98	2.11	2.34	2.54	2.76	4.01	7.34*
300	15	1.51	1.55	1.63	1.73	1.84	1.95	2.13	2.28	2.44	3.14	4.04*
	20	1.67	1.72	1.82	1.93	2.06	2.19	2.41	2.59	2.79	3.74	5.24*
	25	1.82	1.88	1.99	2.13	2.27	2.43	2.69	2.92	3.16	4.48	7.46*
400	15	1.66	1.70	1.79	1.90	2.02	2.14	2.34	2.51	2.68	3.45	4.41*
	20	1.85	1.90	2.01	2.14	2.28	2.43	2.66	2.87	3.09	4.11	5.65*
	25	2.02	2.09	2.22	2.37	2.53	2.71	2.99	3.24	3.51	4.91	7.71*
500	15	1.79	1.84	1.94	2.06	2.19	2.32	2.53	2.71	2.90	3.73	4.75*
	20	2.01	2.07	2.19	2.33	2.48	2.64	2.90	3.12	3.36	4.45	6.03*
	25	2.20	2.28	2.42	2.59	2.76	2.95	3.26	3.53	3.82	5.29	8.02*
600	15	1.92	1.97	2.08	2.20	2.34	2.48	2.71	2.90	3.10	3.98	5.05*
	20	2.15	2.22	2.35	2.50	2.67	2.84	3.11	3.35	3.60	4.76	6.39*
	25	2.37	2.46	2.61	2.79	2.98	3.18	3.50	3.80	4.11	5.65	8.35*
700	15	2.03	2.09	2.20	2.34	2.48	2.63	2.87	3.08	3.29	4.22	5.34*
	20	2.29	2.37	2.50	2.66	2.84	3.02	3.31	3.56	3.83	5.05	6.74*
	25	2.53	2.63	2.79	2.97	3.18	3.39	3.74	4.04	4.37	5.98	8.69*
800	15	2.14	2.20	2.32	2.46	2.62	2.78	3.03	3.24	3.47	4.44	5.61*
	20	2.42	2.50	2.65	2.82	3.00	3.19	3.50	3.76	4.04	5.32	7.06*
	25	2.68	2.78	2.95	3.15	3.36	3.59	3.95	4.28	4.62	6.30	9.02*
900	15	2.24	2.31	2.44	2.59	2.75	2.91	3.17	3.40	3.63	4.65	5.87*
	20	2.55	2.63	2.78	2.96	3.15	3.36	3.67	3.95	4.25	5.58	7.37*
	25	2.83	2.93	3.11	3.32	3.54	3.78	4.16	4.50	4.86	6.60	9.35*
1000	15	2.34	2.41	2.55	2.70	2.87	3.04	3.32	3.55	3.79	4.85	6.12*
	20	2.67	2.76	2.92	3.10	3.30	3.51	3.84	4.14	4.44	5.82	7.67*
	25	2.96	3.07	3.26	3.48	3.71	3.96	4.36	4.71	5.08	6.88	9.67*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 32.0 Ft (RADIUS = 22.6 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	2.44	2.51	2.65	2.81	2.99	3.17	3.45	3.70	3.95	5.04	6.35*
	20	2.78	2.87	3.04	3.23	3.44	3.66	4.01	4.31	4.63	6.06	7.95*
	25	3.09	3.21	3.40	3.63	3.87	4.13	4.55	4.91	5.30	7.16	9.99*
1200	15	2.53	2.61	2.75	2.92	3.10	3.29	3.58	3.83	4.10	5.23	6.58*
	20	2.89	2.99	3.16	3.36	3.58	3.81	4.16	4.48	4.81	6.28	8.23*
	25	3.22	3.34	3.54	3.78	4.03	4.30	4.73	5.11	5.51	7.42	10.29*
1300	15	2.62	2.70	2.85	3.02	3.21	3.40	3.71	3.97	4.24	5.41	6.80*
	20	3.00	3.10	3.28	3.49	3.71	3.95	4.32	4.64	4.98	6.50	8.49*
	25	3.34	3.47	3.68	3.92	4.18	4.46	4.90	5.30	5.71	7.68	10.59*
1400	15	2.71	2.79	2.94	3.12	3.31	3.51	3.83	4.10	4.38	5.58	7.01*
	20	3.10	3.21	3.39	3.61	3.84	4.08	4.46	4.80	5.15	6.71	8.75*
	25	3.46	3.59	3.81	4.06	4.33	4.62	5.08	5.48	5.91	7.92	10.88*
1500	15	2.79	2.88	3.04	3.22	3.42	3.62	3.95	4.22	4.51	5.75	7.22*
	20	3.20	3.31	3.50	3.72	3.96	4.21	4.61	4.95	5.31	6.92	9.00*
	25	3.57	3.71	3.93	4.19	4.47	4.77	5.24	5.66	6.10	8.16	11.16*
1600	15	2.87	2.96	3.12	3.31	3.52	3.73	4.06	4.35	4.64	5.91	7.42*
	20	3.30	3.41	3.61	3.84	4.08	4.34	4.74	5.10	5.47	7.12	9.24*
	25	3.69	3.83	4.06	4.32	4.61	4.92	5.40	5.83	6.28	8.40	11.44*
1700	15	2.95	3.04	3.21	3.41	3.61	3.83	4.17	4.47	4.77	6.07	7.61*
	20	3.39	3.51	3.71	3.95	4.20	4.46	4.88	5.24	5.62	7.31	9.48*
	25	3.79	3.94	4.18	4.45	4.75	5.06	5.56	6.00	6.46	8.62	11.71*
1800	15	3.03	3.12	3.30	3.50	3.71	3.93	4.28	4.58	4.89	6.23	7.80*
	20	3.48	3.61	3.81	4.05	4.31	4.58	5.01	5.38	5.77	7.50	9.71*
	25	3.90	4.05	4.29	4.58	4.88	5.20	5.71	6.16	6.63	8.84	11.97*
1900	15	3.11	3.20	3.38	3.58	3.80	4.03	4.39	4.70	5.02	6.38	7.98*
	20	3.57	3.70	3.91	4.16	4.42	4.70	5.14	5.52	5.92	7.69	9.94*
	25	4.00	4.16	4.41	4.70	5.01	5.34	5.86	6.32	6.81	9.06	12.23*
2000	15	3.18	3.28	3.46	3.67	3.89	4.13	4.49	4.81	5.13	6.53	8.17*
	20	3.66	3.79	4.01	4.26	4.53	4.82	5.27	5.66	6.06	7.87	10.16*
	25	4.11	4.26	4.52	4.82	5.14	5.47	6.01	6.48	6.97	9.27	12.48*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 32.0 Ft (RADIUS = 22.6 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	1.81	1.88	2.00	2.16	2.33	2.53	2.88	3.24	3.71	8.86	22.12*
	20	2.00	2.10	2.27	2.48	2.73	3.04	3.66	4.51	5.93	18.69	49.73*
	25	2.19	2.32	2.55	2.84	3.22	3.74	5.14	7.25	10.24	34.89	95.25*
200	15	2.24	2.33	2.49	2.68	2.90	3.13	3.53	3.93	4.41	8.88	22.12*
	20	2.53	2.65	2.87	3.12	3.42	3.76	4.41	5.15	6.27	18.69	49.73*
	25	2.79	2.97	3.25	3.59	4.00	4.53	5.69	7.40	10.25	34.89	95.25*
300	15	2.59	2.70	2.89	3.10	3.35	3.61	4.06	4.49	5.00	9.04	22.12*
	20	2.95	3.10	3.34	3.63	3.97	4.35	5.04	5.79	6.81	18.69	49.73*
	25	3.28	3.49	3.80	4.19	4.64	5.20	6.34	7.83	10.34	34.89	95.25*
400	15	2.90	3.02	3.23	3.47	3.74	4.03	4.52	4.98	5.52	9.35	22.12*
	20	3.31	3.49	3.76	4.08	4.44	4.86	5.59	6.36	7.36	18.69	49.73*
	25	3.70	3.94	4.28	4.70	5.20	5.79	6.94	8.35	10.60	34.89	95.25*
500	15	3.17	3.31	3.53	3.80	4.09	4.40	4.93	5.43	5.99	9.75	22.12*
	20	3.64	3.83	4.13	4.48	4.87	5.31	6.09	6.88	7.89	18.69	49.73*
	25	4.09	4.34	4.72	5.17	5.70	6.32	7.50	8.88	10.97	34.89	95.25*
600	15	3.43	3.57	3.82	4.10	4.41	4.75	5.31	5.83	6.42	10.17	22.13*
	20	3.95	4.15	4.47	4.84	5.26	5.73	6.55	7.37	8.39	18.72	49.73*
	25	4.44	4.71	5.11	5.60	6.15	6.80	8.02	9.40	11.39	34.89	95.25*
700	15	3.66	3.82	4.08	4.38	4.71	5.07	5.66	6.21	6.82	10.60	22.14*
	20	4.23	4.45	4.79	5.18	5.63	6.12	6.98	7.83	8.87	18.78	49.73*
	25	4.76	5.06	5.48	5.99	6.58	7.26	8.51	9.89	11.83	34.89	95.25*
800	15	3.89	4.05	4.33	4.64	4.99	5.37	5.99	6.56	7.20	11.02	22.16*
	20	4.50	4.73	5.09	5.50	5.97	6.49	7.38	8.26	9.32	18.88	49.73*
	25	5.07	5.38	5.83	6.37	6.98	7.69	8.98	10.37	12.28	34.89	95.25*
900	15	4.10	4.28	4.56	4.90	5.26	5.66	6.30	6.90	7.56	11.43	22.21*
	20	4.75	5.00	5.37	5.81	6.30	6.84	7.76	8.67	9.75	19.02	49.73*
	25	5.37	5.69	6.16	6.72	7.36	8.09	9.42	10.83	12.72	34.89	95.25*
1000	15	4.30	4.49	4.79	5.14	5.52	5.93	6.60	7.22	7.91	11.83	22.28*
	20	4.99	5.25	5.64	6.10	6.61	7.17	8.13	9.06	10.16	19.21	49.73*
	25	5.65	5.98	6.48	7.06	7.73	8.48	9.84	11.27	13.16	34.89	95.25*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 32.0 Ft (RADIUS = 22.6 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	4.49	4.69	5.00	5.37	5.76	6.19	6.89	7.53	8.24	12.22	22.38*
	20	5.23	5.50	5.90	6.38	6.91	7.49	8.48	9.43	10.56	19.44	49.73*
	25	5.91	6.27	6.78	7.39	8.08	8.85	10.25	11.70	13.59	34.90	95.25*
1200	15	4.68	4.89	5.21	5.59	6.00	6.44	7.16	7.83	8.55	12.60	22.51*
	20	5.45	5.73	6.16	6.65	7.20	7.80	8.81	9.79	10.94	19.69	49.73*
	25	6.17	6.54	7.07	7.70	8.41	9.21	10.64	12.11	14.01	34.90	95.25*
1300	15	4.86	5.08	5.41	5.80	6.23	6.69	7.43	8.11	8.86	12.97	22.68*
	20	5.67	5.96	6.40	6.91	7.47	8.09	9.14	10.14	11.31	19.96	49.73*
	25	6.42	6.80	7.35	8.00	8.73	9.56	11.02	12.51	14.42	34.92	95.25*
1400	15	5.04	5.26	5.61	6.01	6.45	6.92	7.69	8.39	9.16	13.33	22.86*
	20	5.88	6.18	6.63	7.16	7.74	8.38	9.45	10.48	11.67	20.25	49.73*
	25	6.67	7.06	7.63	8.29	9.05	9.89	11.38	12.90	14.81	34.94	95.25*
1500	15	5.21	5.44	5.80	6.21	6.66	7.15	7.94	8.66	9.45	13.68	23.07*
	20	6.08	6.40	6.86	7.40	8.00	8.66	9.76	10.81	12.02	20.55	49.73*
	25	6.90	7.31	7.89	8.58	9.35	10.22	11.74	13.28	15.21	34.97	95.25*
1600	15	5.37	5.61	5.98	6.41	6.87	7.37	8.18	8.92	9.73	14.03	23.29*
	20	6.28	6.60	7.08	7.64	8.25	8.93	10.05	11.13	12.36	20.86	49.73*
	25	7.13	7.55	8.15	8.85	9.65	10.53	12.08	13.65	15.59	35.01	95.25*
1700	15	5.53	5.78	6.16	6.60	7.08	7.59	8.42	9.17	10.00	14.36	23.53*
	20	6.48	6.81	7.30	7.87	8.50	9.19	10.34	11.44	12.69	21.17	49.74*
	25	7.35	7.78	8.40	9.12	9.93	10.84	12.42	14.01	15.96	35.06	95.25*
1800	15	5.69	5.94	6.33	6.78	7.27	7.80	8.65	9.42	10.26	14.69	23.78*
	20	6.66	7.00	7.51	8.10	8.74	9.45	10.63	11.74	13.01	21.49	49.74*
	25	7.57	8.01	8.64	9.38	10.21	11.14	12.75	14.36	16.33	35.13	95.25*
1900	15	5.85	6.10	6.50	6.97	7.47	8.01	8.88	9.67	10.52	15.02	24.04*
	20	6.85	7.20	7.72	8.32	8.98	9.70	10.90	12.04	13.33	21.81	49.74*
	25	7.78	8.23	8.88	9.64	10.49	11.43	13.07	14.70	16.69	35.21	95.25*
2000	15	6.00	6.26	6.67	7.14	7.66	8.21	9.10	9.90	10.78	15.33	24.30*
	20	7.03	7.39	7.92	8.53	9.21	9.94	11.17	12.33	13.64	22.13	49.75*
	25	7.99	8.45	9.12	9.89	10.76	11.72	13.38	15.04	17.04	35.31	95.25*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 32.0 Ft (RADIUS = 22.6 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	3.19	3.49	4.00	4.80	6.23	8.81	14.85	22.24	32.43	116.98	324.96*
	20	3.72	4.31	5.46	8.00	12.45	18.80	32.97	50.36	74.35	274.24	766.71*
	25	4.31	5.45	8.43	14.27	22.96	35.29	62.84	96.71	143.48	533.51	1495.0*
200	15	4.10	4.48	5.05	5.85	7.04	9.07	14.85	22.24	32.43	116.98	324.96*
	20	4.84	5.50	6.59	8.55	12.48	18.80	32.97	50.36	74.35	274.24	766.71*
	25	5.61	6.74	9.04	14.29	22.96	35.29	62.84	96.71	143.48	533.51	1495.0*
300	15	4.84	5.26	5.90	6.74	7.90	9.68	14.90	22.24	32.43	116.98	324.96*
	20	5.73	6.45	7.58	9.38	12.74	18.81	32.97	50.36	74.35	274.24	766.71*
	25	6.66	7.83	9.96	14.46	22.96	35.29	62.84	96.71	143.48	533.51	1495.0*
400	15	5.48	5.94	6.63	7.52	8.70	10.39	15.08	22.25	32.43	116.98	324.96*
	20	6.51	7.28	8.46	10.22	13.24	18.86	32.97	50.36	74.35	274.24	766.71*
	25	7.56	8.79	10.88	14.89	22.97	35.29	62.84	96.71	143.48	533.51	1495.0*
500	15	6.05	6.55	7.29	8.22	9.43	11.09	15.41	22.27	32.43	116.98	324.96*
	20	7.21	8.03	9.25	11.02	13.86	19.03	32.97	50.36	74.35	274.24	766.71*
	25	8.37	9.66	11.74	15.48	23.03	35.29	62.84	96.71	143.48	533.51	1495.0*
600	15	6.58	7.11	7.89	8.87	10.11	11.77	15.86	22.34	32.43	116.98	324.96*
	20	7.84	8.71	9.98	11.77	14.51	19.31	32.97	50.36	74.35	274.24	766.71*
	25	9.12	10.45	12.56	16.13	23.18	35.29	62.84	96.71	143.48	533.51	1495.0*
700	15	7.07	7.64	8.45	9.47	10.75	12.42	16.36	22.48	32.43	116.98	324.96*
	20	8.44	9.35	10.67	12.49	15.18	19.69	32.98	50.36	74.35	274.24	766.71*
	25	9.81	11.20	13.34	16.81	23.42	35.30	62.84	96.71	143.48	533.51	1495.0*
800	15	7.53	8.13	8.98	10.04	11.35	13.04	16.89	22.70	32.44	116.98	324.96*
	20	9.00	9.95	11.31	13.16	15.83	20.14	33.00	50.36	74.35	274.24	766.71*
	25	10.46	11.90	14.07	17.49	23.75	35.32	62.84	96.71	143.48	533.51	1495.0*
900	15	7.97	8.60	9.48	10.58	11.93	13.64	17.42	22.97	32.47	116.98	324.96*
	20	9.53	10.52	11.93	13.81	16.47	20.63	33.04	50.36	74.35	274.24	766.71*
	25	11.08	12.56	14.77	18.17	24.16	35.36	62.84	96.71	143.48	533.51	1495.0*
1000	15	8.39	9.04	9.96	11.10	12.48	14.21	17.96	23.30	32.52	116.98	324.96*
	20	10.04	11.06	12.51	14.43	17.09	21.15	33.12	50.36	74.35	274.24	766.71*
	25	11.67	13.19	15.45	18.83	24.61	35.43	62.84	96.71	143.48	533.51	1495.0*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 32.0 Ft (RADIUS = 22.6 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	8.79	9.47	10.42	11.59	13.01	14.76	18.50	23.67	32.61	116.98	324.96*
	20	10.53	11.58	13.07	15.03	17.69	21.68	33.23	50.36	74.35	274.24	766.71*
	25	12.24	13.80	16.09	19.47	25.09	35.54	62.84	96.71	143.48	533.51	1495.0*
1200	15	9.18	9.88	10.87	12.07	13.51	15.30	19.03	24.07	32.72	116.98	324.96*
	20	11.00	12.08	13.61	15.60	18.28	22.21	33.38	50.36	74.35	274.24	766.71*
	25	12.79	14.38	16.72	20.10	25.60	35.69	62.84	96.71	143.48	533.51	1495.0*
1300	15	9.55	10.28	11.29	12.52	14.00	15.81	19.55	24.49	32.87	116.98	324.96*
	20	11.45	12.57	14.13	16.16	18.86	22.74	33.58	50.37	74.35	274.24	766.71*
	25	13.31	14.95	17.32	20.72	26.12	35.88	62.84	96.71	143.48	533.51	1495.0*
1400	15	9.92	10.66	11.70	12.97	14.48	16.32	20.06	24.91	33.06	116.98	324.96*
	20	11.89	13.03	14.63	16.69	19.42	23.27	33.81	50.38	74.35	274.24	766.71*
	25	13.82	15.49	17.91	21.32	26.64	36.11	62.85	96.71	143.48	533.51	1495.0*
1500	15	10.27	11.03	12.11	13.40	14.94	16.81	20.57	25.35	33.27	116.98	324.96*
	20	12.32	13.49	15.12	17.22	19.96	23.80	34.07	50.40	74.35	274.24	766.71*
	25	14.32	16.02	18.47	21.91	27.17	36.37	62.85	96.71	143.48	533.51	1495.0*
1600	15	10.61	11.40	12.49	13.82	15.39	17.28	21.06	25.79	33.52	116.98	324.96*
	20	12.73	13.93	15.60	17.73	20.49	24.32	34.36	50.43	74.35	274.24	766.71*
	25	14.80	16.54	19.03	22.48	27.70	36.67	62.85	96.71	143.48	533.51	1495.0*
1700	15	10.94	11.75	12.87	14.23	15.83	17.74	21.54	26.24	33.78	116.98	324.96*
	20	13.13	14.36	16.06	18.22	21.01	24.84	34.68	50.47	74.35	274.24	766.71*
	25	15.27	17.04	19.56	23.05	28.23	36.99	62.86	96.71	143.48	533.51	1495.0*
1800	15	11.27	12.09	13.24	14.63	16.25	18.20	22.02	26.68	34.07	116.98	324.96*
	20	13.53	14.78	16.51	18.71	21.52	25.35	35.01	50.53	74.36	274.24	766.71*
	25	15.73	17.53	20.09	23.60	28.75	37.34	62.87	96.71	143.48	533.51	1495.0*
1900	15	11.59	12.43	13.61	15.01	16.67	18.64	22.49	27.12	34.38	116.98	324.96*
	20	13.91	15.19	16.95	19.18	22.02	25.85	35.37	50.60	74.36	274.24	766.71*
	25	16.17	18.01	20.60	24.14	29.28	37.70	62.89	96.71	143.48	533.51	1495.0*
2000	15	11.90	12.76	13.96	15.39	17.08	19.07	22.95	27.57	34.70	116.98	324.96*
	20	14.29	15.59	17.39	19.64	22.51	26.34	35.73	50.69	74.36	274.24	766.71*
	25	16.61	18.47	21.11	24.67	29.79	38.08	62.92	96.71	143.48	533.51	1495.0*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 32.0 Ft (RADIUS = 22.6 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	7.23	13.34	26.26	46.43	76.29	118.73	213.71	330.53	491.96	1839.0	5161.1*
	20	11.47	29.37	59.92	107.62	178.24	278.72	503.62	780.36	1162.8	4355.2	12229.*
	25	20.41	55.82	115.42	208.48	346.32	542.47	981.58	1522.0	2268.8	8503.5	23881.*
200	15	9.13	13.80	26.26	46.43	76.29	118.73	213.71	330.53	491.96	1839.0	5161.1*
	20	12.98	29.37	59.92	107.62	178.24	278.72	503.62	780.36	1162.8	4355.2	12229.*
	25	20.58	55.82	115.42	208.48	346.32	542.47	981.58	1522.0	2268.8	8503.5	23881.*
300	15	10.70	14.84	26.27	46.43	76.29	118.73	213.71	330.53	491.96	1839.0	5161.1*
	20	14.65	29.39	59.92	107.62	178.24	278.72	503.62	780.36	1162.8	4355.2	12229.*
	25	21.39	55.82	115.42	208.48	346.32	542.47	981.58	1522.0	2268.8	8503.5	23881.*
400	15	12.07	16.01	26.36	46.43	76.29	118.73	213.71	330.53	491.96	1839.0	5161.1*
	20	16.21	29.49	59.92	107.62	178.24	278.72	503.62	780.36	1162.8	4355.2	12229.*
	25	22.61	55.82	115.42	208.48	346.32	542.47	981.58	1522.0	2268.8	8503.5	23881.*
500	15	13.30	17.17	26.62	46.43	76.29	118.73	213.71	330.53	491.96	1839.0	5161.1*
	20	17.66	29.79	59.92	107.62	178.24	278.72	503.62	780.36	1162.8	4355.2	12229.*
	25	23.95	55.82	115.42	208.48	346.32	542.47	981.58	1522.0	2268.8	8503.5	23881.*
600	15	14.43	18.28	27.05	46.44	76.29	118.73	213.71	330.53	491.96	1839.0	5161.1*
	20	19.01	30.28	59.92	107.62	178.24	278.72	503.62	780.36	1162.8	4355.2	12229.*
	25	25.31	55.82	115.42	208.48	346.32	542.47	981.58	1522.0	2268.8	8503.5	23881.*
700	15	15.49	19.35	27.63	46.45	76.29	118.73	213.71	330.53	491.96	1839.0	5161.1*
	20	20.27	30.94	59.92	107.62	178.24	278.72	503.62	780.36	1162.8	4355.2	12229.*
	25	26.64	55.84	115.42	208.48	346.32	542.47	981.58	1522.0	2268.8	8503.5	23881.*
800	15	16.48	20.36	28.30	46.47	76.29	118.73	213.71	330.53	491.96	1839.0	5161.1*
	20	21.47	31.71	59.93	107.62	178.24	278.72	503.62	780.36	1162.8	4355.2	12229.*
	25	27.94	55.87	115.42	208.48	346.32	542.47	981.58	1522.0	2268.8	8503.5	23881.*
900	15	17.43	21.34	29.02	46.53	76.29	118.73	213.71	330.53	491.96	1839.0	5161.1*
	20	22.61	32.53	59.94	107.62	178.24	278.72	503.62	780.36	1162.8	4355.2	12229.*
	25	29.19	55.95	115.42	208.48	346.32	542.47	981.58	1522.0	2268.8	8503.5	23881.*
1000	15	18.32	22.28	29.78	46.63	76.29	118.73	213.71	330.53	491.96	1839.0	5161.1*
	20	23.70	33.39	59.97	107.62	178.24	278.72	503.62	780.36	1162.8	4355.2	12229.*
	25	30.40	56.09	115.42	208.48	346.32	542.47	981.58	1522.0	2268.8	8503.5	23881.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 32.0 Ft (RADIUS = 22.6 Ft)³
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	19.19	23.18	30.55	46.78	76.29	118.73	213.71	330.53	491.96	1839.0	5161.1*
	20	24.75	34.27	60.02	107.62	178.24	278.72	503.62	780.36	1162.8	4355.2	12229.*
	25	31.57	56.29	115.42	208.48	346.32	542.47	981.58	1522.0	2268.8	8503.5	23881.*
1200	15	20.02	24.05	31.33	46.98	76.29	118.73	213.71	330.53	491.96	1839.0	5161.1*
	20	25.75	35.15	60.10	107.62	178.24	278.72	503.62	780.36	1162.8	4355.2	12229.*
	25	32.71	56.56	115.42	208.48	346.32	542.47	981.58	1522.0	2268.8	8503.5	23881.*
1300	15	20.82	24.90	32.11	47.24	76.29	118.73	213.71	330.53	491.96	1839.0	5161.1*
	20	26.73	36.03	60.21	107.62	178.24	278.72	503.62	780.36	1162.8	4355.2	12229.*
	25	33.82	56.90	115.42	208.48	346.32	542.47	981.58	1522.0	2268.8	8503.5	23881.*
1400	15	21.59	25.72	32.88	47.55	76.30	118.73	213.71	330.53	491.96	1839.0	5161.1*
	20	27.67	36.91	60.37	107.62	178.24	278.72	503.62	780.36	1162.8	4355.2	12229.*
	25	34.89	57.30	115.42	208.48	346.32	542.47	981.58	1522.0	2268.8	8503.5	23881.*
1500	15	22.34	26.52	33.64	47.91	76.31	118.73	213.71	330.53	491.96	1839.0	5161.1*
	20	28.59	37.77	60.57	107.62	178.24	278.72	503.62	780.36	1162.8	4355.2	12229.*
	25	35.94	57.77	115.42	208.48	346.32	542.47	981.58	1522.0	2268.8	8503.5	23881.*
1600	15	23.07	27.29	34.40	48.31	76.32	118.73	213.71	330.53	491.96	1839.0	5161.1*
	20	29.48	38.63	60.82	107.62	178.24	278.72	503.62	780.36	1162.8	4355.2	12229.*
	25	36.96	58.28	115.42	208.48	346.32	542.47	981.58	1522.0	2268.8	8503.5	23881.*
1700	15	23.78	28.05	35.14	48.75	76.34	118.73	213.71	330.53	491.96	1839.0	5161.1*
	20	30.34	39.47	61.11	107.62	178.24	278.72	503.62	780.36	1162.8	4355.2	12229.*
	25	37.96	58.83	115.42	208.48	346.32	542.47	981.58	1522.0	2268.8	8503.5	23881.*
1800	15	24.48	28.79	35.88	49.21	76.38	118.73	213.71	330.53	491.96	1839.0	5161.1*
	20	31.19	40.31	61.45	107.62	178.24	278.72	503.62	780.36	1162.8	4355.2	12229.*
	25	38.93	59.42	115.42	208.48	346.32	542.47	981.58	1522.0	2268.8	8503.5	23881.*
1900	15	25.16	29.51	36.60	49.70	76.43	118.73	213.71	330.53	491.96	1839.0	5161.1*
	20	32.02	41.13	61.81	107.62	178.24	278.72	503.62	780.36	1162.8	4355.2	12229.*
	25	39.89	60.04	115.43	208.48	346.32	542.47	981.58	1522.0	2268.8	8503.5	23881.*
2000	15	25.82	30.22	37.32	50.21	76.49	118.73	213.71	330.53	491.96	1839.0	5161.1*
	20	32.83	41.94	62.22	107.63	178.24	278.72	503.62	780.36	1162.8	4355.2	12229.*
	25	40.82	60.68	115.43	208.48	346.32	542.47	981.58	1522.0	2268.8	8503.5	23881.*

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 34.0 Ft (RADIUS = 24.0 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	1.19	1.21	1.27	1.34	1.42	1.50	1.63	1.75	1.87	2.42	3.20
	20	1.28	1.31	1.37	1.46	1.55	1.65	1.81	1.95	2.10	2.90	4.77
	25	1.37	1.40	1.48	1.57	1.68	1.80	1.99	2.16	2.36	3.71	7.83
200	15	1.42	1.44	1.51	1.60	1.70	1.80	1.95	2.09	2.24	2.88	3.72
	20	1.56	1.59	1.67	1.77	1.89	2.01	2.20	2.37	2.55	3.44	5.04
	25	1.68	1.73	1.82	1.94	2.07	2.21	2.44	2.65	2.88	4.20	7.84
300	15	1.60	1.63	1.71	1.81	1.92	2.03	2.21	2.37	2.53	3.25	4.15
	20	1.77	1.82	1.91	2.03	2.16	2.29	2.51	2.70	2.90	3.88	5.45
	25	1.93	1.99	2.10	2.24	2.39	2.55	2.81	3.04	3.30	4.68	7.92
400	15	1.76	1.80	1.89	2.00	2.12	2.24	2.44	2.61	2.78	3.56	4.54
	20	1.96	2.01	2.12	2.25	2.39	2.54	2.78	2.99	3.21	4.27	5.86
	25	2.15	2.22	2.34	2.49	2.66	2.84	3.12	3.38	3.66	5.12	8.14
500	15	1.91	1.95	2.05	2.16	2.29	2.43	2.64	2.82	3.01	3.85	4.88
	20	2.14	2.19	2.31	2.45	2.60	2.77	3.02	3.25	3.49	4.62	6.25
	25	2.35	2.42	2.56	2.72	2.90	3.10	3.41	3.69	3.99	5.52	8.43
600	15	2.04	2.08	2.19	2.32	2.45	2.60	2.82	3.02	3.22	4.12	5.20
	20	2.29	2.36	2.48	2.63	2.80	2.97	3.25	3.49	3.75	4.94	6.62
	25	2.53	2.61	2.76	2.94	3.13	3.34	3.67	3.96	4.28	5.89	8.75
700	15	2.16	2.21	2.32	2.46	2.60	2.76	2.99	3.20	3.42	4.36	5.49
	20	2.44	2.51	2.65	2.81	2.98	3.16	3.46	3.71	3.99	5.24	6.97
	25	2.70	2.79	2.95	3.13	3.34	3.56	3.91	4.22	4.56	6.23	9.08
800	15	2.28	2.33	2.45	2.59	2.75	2.91	3.16	3.38	3.60	4.59	5.77
	20	2.58	2.66	2.80	2.97	3.15	3.35	3.65	3.93	4.21	5.52	7.30
	25	2.86	2.95	3.12	3.32	3.54	3.77	4.14	4.47	4.82	6.56	9.42
900	15	2.39	2.45	2.57	2.72	2.88	3.05	3.31	3.54	3.78	4.81	6.04
	20	2.72	2.79	2.94	3.12	3.31	3.52	3.84	4.12	4.42	5.79	7.62
	25	3.01	3.11	3.29	3.50	3.73	3.97	4.36	4.70	5.07	6.87	9.75
1000	15	2.50	2.56	2.69	2.84	3.01	3.18	3.46	3.70	3.94	5.02	6.29
	20	2.84	2.92	3.08	3.27	3.47	3.68	4.02	4.32	4.63	6.04	7.92
	25	3.16	3.26	3.45	3.67	3.90	4.16	4.56	4.92	5.31	7.17	10.07

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 34.0 Ft (RADIUS = 24.0 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	2.60	2.66	2.80	2.96	3.13	3.32	3.60	3.85	4.11	5.22	6.53
	20	2.96	3.05	3.21	3.41	3.62	3.84	4.19	4.50	4.82	6.29	8.21
	25	3.30	3.41	3.60	3.83	4.08	4.34	4.76	5.14	5.53	7.45	10.39
1200	15	2.70	2.77	2.91	3.07	3.25	3.44	3.74	3.99	4.26	5.41	6.77
	20	3.08	3.17	3.34	3.54	3.76	3.99	4.35	4.67	5.01	6.52	8.50
	25	3.43	3.55	3.75	3.99	4.24	4.52	4.95	5.34	5.75	7.73	10.70
1300	15	2.79	2.86	3.01	3.18	3.37	3.56	3.87	4.13	4.41	5.60	6.99
	20	3.20	3.29	3.47	3.67	3.90	4.14	4.51	4.84	5.19	6.75	8.77
	25	3.57	3.68	3.89	4.14	4.40	4.69	5.14	5.54	5.96	7.99	11.00
1400	15	2.88	2.96	3.11	3.29	3.48	3.68	4.00	4.27	4.55	5.78	7.21
	20	3.31	3.40	3.59	3.80	4.03	4.28	4.67	5.01	5.36	6.97	9.03
	25	3.69	3.81	4.03	4.28	4.56	4.85	5.32	5.73	6.17	8.25	11.29
1500	15	2.97	3.05	3.21	3.39	3.59	3.80	4.12	4.40	4.69	5.95	7.42
	20	3.41	3.51	3.70	3.92	4.16	4.42	4.82	5.17	5.53	7.18	9.29
	25	3.81	3.94	4.16	4.43	4.71	5.01	5.49	5.91	6.36	8.49	11.58
1600	15	3.06	3.14	3.30	3.49	3.69	3.91	4.24	4.53	4.83	6.12	7.62
	20	3.52	3.62	3.82	4.04	4.29	4.55	4.96	5.32	5.70	7.39	9.54
	25	3.93	4.07	4.30	4.56	4.86	5.17	5.66	6.09	6.56	8.74	11.86
1700	15	3.15	3.23	3.39	3.59	3.80	4.02	4.36	4.66	4.96	6.29	7.82
	20	3.62	3.73	3.93	4.16	4.42	4.68	5.10	5.47	5.86	7.59	9.78
	25	4.05	4.19	4.42	4.70	5.00	5.32	5.82	6.27	6.74	8.97	12.14
1800	15	3.23	3.32	3.48	3.68	3.90	4.12	4.47	4.78	5.09	6.45	8.02
	20	3.72	3.83	4.03	4.28	4.54	4.81	5.24	5.62	6.02	7.79	10.02
	25	4.16	4.30	4.55	4.83	5.14	5.46	5.98	6.44	6.93	9.20	12.41
1900	15	3.31	3.40	3.57	3.78	4.00	4.23	4.59	4.90	5.22	6.61	8.21
	20	3.81	3.93	4.14	4.39	4.65	4.93	5.38	5.77	6.17	7.98	10.25
	25	4.28	4.42	4.67	4.96	5.27	5.61	6.14	6.61	7.11	9.43	12.67
2000	15	3.39	3.48	3.66	3.87	4.09	4.33	4.70	5.01	5.34	6.76	8.40
	20	3.91	4.03	4.24	4.50	4.77	5.06	5.51	5.91	6.32	8.17	10.48
	25	4.38	4.53	4.79	5.08	5.41	5.75	6.29	6.77	7.28	9.64	12.93

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 34.0 Ft (RADIUS = 24.0 Ft)
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	1.92	1.99	2.11	2.27	2.45	2.66	3.03	3.41	3.94	9.60	23.81
	20	2.13	2.23	2.40	2.62	2.89	3.22	3.92	4.91	6.53	20.42	53.70
	25	2.33	2.48	2.71	3.03	3.44	4.04	5.70	8.09	11.39	38.24	102.97
200	15	2.39	2.48	2.64	2.83	3.05	3.29	3.71	4.13	4.64	9.61	23.81
	20	2.69	2.82	3.04	3.30	3.62	3.98	4.68	5.51	6.79	20.42	53.70
	25	2.99	3.17	3.45	3.82	4.27	4.85	6.18	8.18	11.40	38.24	102.97
300	15	2.77	2.87	3.05	3.28	3.53	3.80	4.27	4.72	5.25	9.73	23.81
	20	3.15	3.30	3.55	3.85	4.20	4.60	5.34	6.15	7.30	20.42	53.70
	25	3.51	3.72	4.05	4.45	4.94	5.54	6.81	8.53	11.45	38.24	102.97
400	15	3.09	3.21	3.42	3.66	3.94	4.24	4.75	5.23	5.80	10.00	23.81
	20	3.54	3.71	3.99	4.32	4.70	5.13	5.91	6.74	7.85	20.42	53.70
	25	3.96	4.20	4.56	5.00	5.53	6.16	7.43	9.02	11.64	38.24	102.97
500	15	3.39	3.52	3.74	4.01	4.31	4.63	5.18	5.69	6.29	10.37	23.81
	20	3.89	4.08	4.38	4.74	5.15	5.61	6.44	7.29	8.39	20.42	53.70
	25	4.37	4.63	5.02	5.49	6.05	6.72	8.00	9.55	11.95	38.24	102.97
600	15	3.66	3.80	4.04	4.33	4.65	5.00	5.57	6.12	6.74	10.78	23.81
	20	4.22	4.42	4.75	5.13	5.57	6.06	6.92	7.80	8.90	20.43	53.70
	25	4.75	5.02	5.44	5.95	6.54	7.23	8.55	10.07	12.34	38.24	102.97
700	15	3.91	4.06	4.32	4.63	4.97	5.33	5.94	6.51	7.16	11.20	23.82
	20	4.52	4.74	5.08	5.49	5.95	6.47	7.37	8.27	9.39	20.47	53.70
	25	5.10	5.39	5.84	6.37	6.99	7.71	9.06	10.58	12.76	38.24	102.97
800	15	4.15	4.31	4.58	4.91	5.26	5.65	6.29	6.89	7.55	11.63	23.83
	20	4.81	5.04	5.40	5.83	6.32	6.86	7.79	8.72	9.86	20.54	53.70
	25	5.43	5.74	6.21	6.77	7.41	8.16	9.54	11.07	13.20	38.24	102.97
900	15	4.37	4.55	4.83	5.17	5.55	5.95	6.62	7.24	7.93	12.04	23.86
	20	5.08	5.32	5.71	6.16	6.66	7.22	8.19	9.15	10.31	20.65	53.70
	25	5.74	6.07	6.56	7.14	7.82	8.59	10.00	11.54	13.65	38.24	102.97
1000	15	4.59	4.77	5.07	5.43	5.82	6.24	6.93	7.58	8.29	12.45	23.91
	20	5.34	5.60	5.99	6.46	6.99	7.57	8.57	9.56	10.73	20.80	53.70
	25	6.04	6.39	6.90	7.50	8.20	9.00	10.45	12.00	14.09	38.24	102.97

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 34.0 Ft (RADIUS = 24.0 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	4.80	4.99	5.30	5.67	6.08	6.52	7.24	7.90	8.64	12.85	23.99
	20	5.59	5.86	6.27	6.76	7.31	7.91	8.94	9.95	11.15	20.98	53.70
	25	6.33	6.69	7.22	7.85	8.57	9.39	10.87	12.44	14.52	38.24	102.97
1200	15	5.00	5.20	5.52	5.91	6.33	6.78	7.53	8.21	8.97	13.24	24.09
	20	5.83	6.11	6.54	7.04	7.61	8.23	9.30	10.33	11.55	21.20	53.70
	25	6.61	6.98	7.53	8.18	8.92	9.77	11.28	12.87	14.95	38.25	102.97
1300	15	5.19	5.40	5.74	6.13	6.57	7.04	7.81	8.51	9.29	13.62	24.22
	20	6.06	6.35	6.80	7.32	7.90	8.55	9.64	10.69	11.93	21.45	53.70
	25	6.88	7.26	7.83	8.50	9.26	10.13	11.68	13.29	15.36	38.25	102.97
1400	15	5.38	5.59	5.94	6.35	6.80	7.29	8.08	8.80	9.60	13.99	24.37
	20	6.29	6.59	7.05	7.59	8.19	8.85	9.97	11.05	12.31	21.72	53.70
	25	7.14	7.53	8.12	8.81	9.59	10.48	12.06	13.69	15.77	38.26	102.97
1500	15	5.56	5.78	6.14	6.57	7.03	7.53	8.34	9.08	9.90	14.36	24.55
	20	6.51	6.81	7.29	7.84	8.46	9.14	10.29	11.39	12.67	22.00	53.70
	25	7.39	7.80	8.40	9.11	9.92	10.83	12.43	14.09	16.18	38.28	102.97
1600	15	5.74	5.97	6.34	6.77	7.25	7.76	8.59	9.36	10.19	14.71	24.75
	20	6.72	7.04	7.52	8.09	8.73	9.43	10.60	11.72	13.03	22.29	53.70
	25	7.63	8.05	8.67	9.40	10.23	11.16	12.80	14.47	16.57	38.30	102.97
1700	15	5.91	6.15	6.53	6.98	7.46	7.99	8.84	9.62	10.47	15.06	24.96
	20	6.93	7.25	7.75	8.34	8.99	9.70	10.90	12.05	13.37	22.60	53.70
	25	7.87	8.30	8.94	9.69	10.53	11.48	13.15	14.84	16.96	38.34	102.97
1800	15	6.08	6.32	6.72	7.17	7.67	8.21	9.09	9.88	10.75	15.40	25.19
	20	7.13	7.46	7.98	8.58	9.24	9.97	11.20	12.37	13.71	22.90	53.70
	25	8.11	8.55	9.20	9.96	10.83	11.80	13.49	15.21	17.34	38.38	102.97
1900	15	6.25	6.50	6.90	7.37	7.88	8.43	9.32	10.14	11.02	15.73	25.43
	20	7.33	7.67	8.20	8.81	9.49	10.24	11.49	12.68	14.04	23.22	53.70
	25	8.33	8.79	9.45	10.24	11.12	12.11	13.83	15.57	17.71	38.44	102.97
2000	15	6.41	6.66	7.07	7.55	8.08	8.64	9.55	10.38	11.29	16.06	25.68
	20	7.52	7.87	8.41	9.04	9.74	10.50	11.77	12.98	14.36	23.53	53.70
	25	8.56	9.02	9.70	10.50	11.40	12.41	14.16	15.92	18.07	38.51	102.97

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 34.0 Ft (RADIUS = 24.0 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	3.41	3.75	4.32	5.25	7.01	10.03	16.83	25.08	36.35	128.49	351.59
	20	4.01	4.69	6.11	9.27	14.41	21.65	37.61	57.02	83.60	301.48	829.76
	25	4.68	6.08	9.90	16.74	26.74	40.80	71.86	109.67	161.49	586.66	1618.1
200	15	4.40	4.80	5.43	6.32	7.72	10.18	16.83	25.08	36.35	128.49	351.59
	20	5.21	5.95	7.22	9.64	14.42	21.65	37.61	57.02	83.60	301.48	829.76
	25	6.08	7.40	10.31	16.75	26.74	40.80	71.86	109.67	161.49	586.66	1618.1
300	15	5.19	5.64	6.32	7.25	8.58	10.69	16.85	25.08	36.35	128.49	351.59
	20	6.17	6.97	8.25	10.40	14.56	21.65	37.61	57.02	83.60	301.48	829.76
	25	7.20	8.55	11.14	16.82	26.74	40.80	71.86	109.67	161.49	586.66	1618.1
400	15	5.87	6.37	7.10	8.07	9.40	11.36	16.95	25.08	36.35	128.49	351.59
	20	7.01	7.85	9.17	11.23	14.93	21.67	37.61	57.02	83.60	301.48	829.76
	25	8.17	9.57	12.04	17.09	26.74	40.80	71.86	109.67	161.49	586.66	1618.1
500	15	6.49	7.02	7.80	8.82	10.16	12.05	17.19	25.09	36.35	128.49	351.59
	20	7.75	8.65	10.01	12.04	15.46	21.75	37.61	57.02	83.60	301.48	829.76
	25	9.04	10.49	12.93	17.55	26.77	40.80	71.86	109.67	161.49	586.66	1618.1
600	15	7.05	7.62	8.45	9.50	10.87	12.74	17.55	25.12	36.35	128.49	351.59
	20	8.44	9.38	10.79	12.82	16.07	21.92	37.61	57.02	83.60	301.48	829.76
	25	9.85	11.34	13.77	18.12	26.83	40.80	71.86	109.67	161.49	586.66	1618.1
700	15	7.58	8.18	9.05	10.14	11.54	13.41	17.99	25.20	36.35	128.49	351.59
	20	9.08	10.06	11.52	13.56	16.71	22.20	37.61	57.02	83.60	301.48	829.76
	25	10.59	12.13	14.58	18.76	26.96	40.80	71.86	109.67	161.49	586.66	1618.1
800	15	8.08	8.70	9.61	10.75	12.18	14.05	18.48	25.34	36.36	128.49	351.59
	20	9.68	10.71	12.20	14.27	17.36	22.56	37.62	57.02	83.60	301.48	829.76
	25	11.29	12.88	15.35	19.42	27.18	40.80	71.86	109.67	161.49	586.66	1618.1
900	15	8.55	9.20	10.14	11.32	12.78	14.67	19.00	25.54	36.37	128.49	351.59
	20	10.26	11.32	12.85	14.95	18.00	22.99	37.64	57.02	83.60	301.48	829.76
	25	11.96	13.59	16.09	20.08	27.47	40.82	71.86	109.67	161.49	586.66	1618.1
1000	15	9.00	9.68	10.65	11.86	13.36	15.27	19.53	25.80	36.39	128.49	351.59
	20	10.80	11.90	13.47	15.60	18.63	23.45	37.67	57.02	83.60	301.48	829.76
	25	12.59	14.27	16.80	20.75	27.83	40.85	71.86	109.67	161.49	586.66	1618.1

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 34.0 Ft (RADIUS = 24.0 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	9.43	10.14	11.14	12.39	13.92	15.84	20.06	26.11	36.44	128.49	351.59
	20	11.32	12.45	14.07	16.23	19.26	23.95	37.73	57.02	83.60	301.48	829.76
	25	13.20	14.91	17.48	21.40	28.24	40.90	71.86	109.67	161.49	586.66	1618.1
1200	15	9.85	10.57	11.61	12.89	14.45	16.40	20.59	26.46	36.51	128.49	351.59
	20	11.83	12.99	14.64	16.83	19.86	24.46	37.82	57.02	83.60	301.48	829.76
	25	13.79	15.54	18.14	22.05	28.69	40.97	71.86	109.67	161.49	586.66	1618.1
1300	15	10.25	11.00	12.07	13.38	14.97	16.94	21.12	26.83	36.60	128.49	351.59
	20	12.31	13.50	15.20	17.42	20.46	24.98	37.94	57.02	83.60	301.48	829.76
	25	14.36	16.14	18.78	22.68	29.16	41.08	71.86	109.67	161.49	586.66	1618.1
1400	15	10.64	11.41	12.51	13.85	15.47	17.47	21.64	27.23	36.73	128.49	351.59
	20	12.79	14.00	15.73	17.99	21.04	25.50	38.09	57.02	83.60	301.48	829.76
	25	14.90	16.73	19.40	23.30	29.65	41.22	71.86	109.67	161.49	586.66	1618.1
1500	15	11.01	11.81	12.93	14.31	15.96	17.98	22.16	27.64	36.88	128.49	351.59
	20	13.24	14.49	16.25	18.54	21.61	26.02	38.28	57.03	83.60	301.48	829.76
	25	15.44	17.29	20.01	23.91	30.15	41.40	71.86	109.67	161.49	586.66	1618.1
1600	15	11.38	12.19	13.35	14.75	16.43	18.48	22.66	28.06	37.07	128.49	351.59
	20	13.69	14.96	16.76	19.08	22.16	26.55	38.50	57.04	83.60	301.48	829.76
	25	15.95	17.84	20.59	24.51	30.66	41.61	71.86	109.67	161.49	586.66	1618.1
1700	15	11.74	12.57	13.75	15.18	16.89	18.97	23.16	28.49	37.28	128.49	351.59
	20	14.12	15.42	17.25	19.61	22.71	27.07	38.75	57.06	83.60	301.48	829.76
	25	16.46	18.38	21.16	25.10	31.18	41.85	71.87	109.67	161.49	586.66	1618.1
1800	15	12.09	12.94	14.15	15.61	17.34	19.44	23.65	28.93	37.52	128.49	351.59
	20	14.54	15.87	17.73	20.12	23.24	27.58	39.02	57.09	83.60	301.48	829.76
	25	16.95	18.90	21.72	25.67	31.70	42.13	71.87	109.67	161.49	586.66	1618.1
1900	15	12.43	13.30	14.53	16.02	17.78	19.91	24.13	29.37	37.78	128.49	351.59
	20	14.96	16.31	18.20	20.62	23.76	28.09	39.32	57.12	83.60	301.48	829.76
	25	17.43	19.41	22.27	26.24	32.22	42.42	71.88	109.67	161.49	586.66	1618.1
2000	15	12.76	13.65	14.91	16.42	18.22	20.36	24.61	29.81	38.06	128.49	351.59
	20	15.36	16.74	18.66	21.11	24.27	28.60	39.63	57.17	83.60	301.48	829.76
	25	17.90	19.91	22.80	26.79	32.74	42.74	71.88	109.67	161.49	586.66	1618.1

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 34.0 Ft (RADIUS = 24.0 Ft)³
 FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	8.08	16.02	31.33	54.86	89.26	137.67	244.78	375.24	554.12	2022.6	5586.5
	20	13.77	35.63	71.84	127.51	208.91	323.52	577.19	886.26	1310.1	4790.3	13237.
	25	25.11	67.96	138.63	247.28	406.17	629.92	1125.2	1728.7	2556.4	9353.3	25851.
200	15	10.06	16.23	31.33	54.86	89.26	137.67	244.78	375.24	554.12	2022.6	5586.5
	20	14.92	35.63	71.84	127.51	208.91	323.52	577.19	886.26	1310.1	4790.3	13237.
	25	25.15	67.96	138.63	247.28	406.17	629.92	1125.2	1728.7	2556.4	9353.3	25851.
300	15	11.73	17.02	31.33	54.86	89.26	137.67	244.78	375.24	554.12	2022.6	5586.5
	20	16.54	35.63	71.84	127.51	208.91	323.52	577.19	886.26	1310.1	4790.3	13237.
	25	25.56	67.96	138.63	247.28	406.17	629.92	1125.2	1728.7	2556.4	9353.3	25851.
400	15	13.20	18.10	31.36	54.86	89.26	137.67	244.78	375.24	554.12	2022.6	5586.5
	20	18.14	35.65	71.84	127.51	208.91	323.52	577.19	886.26	1310.1	4790.3	13237.
	25	26.47	67.96	138.63	247.28	406.17	629.92	1125.2	1728.7	2556.4	9353.3	25851.
500	15	14.52	19.24	31.46	54.86	89.26	137.67	244.78	375.24	554.12	2022.6	5586.5
	20	19.65	35.76	71.84	127.51	208.91	323.52	577.19	886.26	1310.1	4790.3	13237.
	25	27.65	67.96	138.63	247.28	406.17	629.92	1125.2	1728.7	2556.4	9353.3	25851.
600	15	15.73	20.36	31.70	54.86	89.26	137.67	244.78	375.24	554.12	2022.6	5586.5
	20	21.07	36.02	71.84	127.51	208.91	323.52	577.19	886.26	1310.1	4790.3	13237.
	25	28.93	67.96	138.63	247.28	406.17	629.92	1125.2	1728.7	2556.4	9353.3	25851.
700	15	16.87	21.46	32.08	54.87	89.26	137.67	244.78	375.24	554.12	2022.6	5586.5
	20	22.41	36.44	71.84	127.51	208.91	323.52	577.19	886.26	1310.1	4790.3	13237.
	25	30.24	67.96	138.63	247.28	406.17	629.92	1125.2	1728.7	2556.4	9353.3	25851.
800	15	17.93	22.52	32.59	54.87	89.26	137.67	244.78	375.24	554.12	2022.6	5586.5
	20	23.68	37.00	71.84	127.51	208.91	323.52	577.19	886.26	1310.1	4790.3	13237.
	25	31.55	67.97	138.63	247.28	406.17	629.92	1125.2	1728.7	2556.4	9353.3	25851.
900	15	18.95	23.54	33.19	54.89	89.26	137.67	244.78	375.24	554.12	2022.6	5586.5
	20	24.90	37.67	71.85	127.51	208.91	323.52	577.19	886.26	1310.1	4790.3	13237.
	25	32.83	67.99	138.63	247.28	406.17	629.92	1125.2	1728.7	2556.4	9353.3	25851.
1000	15	19.91	24.52	33.86	54.92	89.26	137.67	244.78	375.24	554.12	2022.6	5586.5
	20	26.06	38.41	71.85	127.51	208.91	323.52	577.19	886.26	1310.1	4790.3	13237.
	25	34.08	68.03	138.63	247.28	406.17	629.92	1125.2	1728.7	2556.4	9353.3	25851.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 34.0 Ft (RADIUS = 24.0 Ft)³
 FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	20.84	25.48	34.56	54.98	89.26	137.67	244.78	375.24	554.12	2022.6	5586.5
	20	27.18	39.20	71.86	127.51	208.91	323.52	577.19	886.26	1310.1	4790.3	13237.
	25	35.31	68.09	138.63	247.28	406.17	629.92	1125.2	1728.7	2556.4	9353.3	25851.
1200	15	21.73	26.40	35.29	55.08	89.26	137.67	244.78	375.24	554.12	2022.6	5586.5
	20	28.26	40.02	71.88	127.51	208.91	323.52	577.19	886.26	1310.1	4790.3	13237.
	25	36.50	68.20	138.63	247.28	406.17	629.92	1125.2	1728.7	2556.4	9353.3	25851.
1300	15	22.59	27.29	36.04	55.21	89.26	137.67	244.78	375.24	554.12	2022.6	5586.5
	20	29.30	40.87	71.92	127.51	208.91	323.52	577.19	886.26	1310.1	4790.3	13237.
	25	37.66	68.36	138.63	247.28	406.17	629.92	1125.2	1728.7	2556.4	9353.3	25851.
1400	15	23.42	28.16	36.79	55.39	89.26	137.67	244.78	375.24	554.12	2022.6	5586.5
	20	30.31	41.72	71.98	127.51	208.91	323.52	577.19	886.26	1310.1	4790.3	13237.
	25	38.80	68.56	138.63	247.28	406.17	629.92	1125.2	1728.7	2556.4	9353.3	25851.
1500	15	24.23	29.01	37.55	55.61	89.27	137.67	244.78	375.24	554.12	2022.6	5586.5
	20	31.30	42.57	72.07	127.51	208.91	323.52	577.19	886.26	1310.1	4790.3	13237.
	25	39.90	68.83	138.63	247.28	406.17	629.92	1125.2	1728.7	2556.4	9353.3	25851.
1600	15	25.02	29.83	38.31	55.88	89.27	137.67	244.78	375.24	554.12	2022.6	5586.5
	20	32.25	43.43	72.18	127.51	208.91	323.52	577.19	886.26	1310.1	4790.3	13237.
	25	40.99	69.14	138.63	247.28	406.17	629.92	1125.2	1728.7	2556.4	9353.3	25851.
1700	15	25.78	30.64	39.06	56.19	89.28	137.67	244.78	375.24	554.12	2022.6	5586.5
	20	33.18	44.28	72.33	127.51	208.91	323.52	577.19	886.26	1310.1	4790.3	13237.
	25	42.04	69.51	138.63	247.28	406.17	629.92	1125.2	1728.7	2556.4	9353.3	25851.
1800	15	26.53	31.43	39.80	56.53	89.29	137.67	244.78	375.24	554.12	2022.6	5586.5
	20	34.09	45.12	72.51	127.51	208.91	323.52	577.19	886.26	1310.1	4790.3	13237.
	25	43.08	69.92	138.63	247.28	406.17	629.92	1125.2	1728.7	2556.4	9353.3	25851.
1900	15	27.26	32.20	40.54	56.91	89.30	137.67	244.78	375.24	554.12	2022.6	5586.5
	20	34.98	45.96	72.73	127.51	208.91	323.52	577.19	886.26	1310.1	4790.3	13237.
	25	44.09	70.38	138.64	247.28	406.17	629.92	1125.2	1728.7	2556.4	9353.3	25851.
2000	15	27.97	32.95	41.28	57.32	89.32	137.67	244.78	375.24	554.12	2022.6	5586.5
	20	35.85	46.79	72.98	127.51	208.91	323.52	577.19	886.26	1310.1	4790.3	13237.
	25	45.09	70.88	138.64	247.28	406.17	629.92	1125.2	1728.7	2556.4	9353.3	25851.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 36.0 Ft (RADIUS = 25.5 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100 (Ft*s) ^{1/2}	15	1.26	1.27	1.33	1.40	1.48	1.56	1.69	1.81	1.93	2.49	3.32
	20	1.36	1.38	1.44	1.52	1.62	1.72	1.88	2.02	2.18	3.01	5.04
	25	1.45	1.48	1.55	1.65	1.76	1.87	2.07	2.25	2.46	3.93	8.36
200	15	1.50	1.52	1.59	1.68	1.77	1.87	2.03	2.17	2.31	2.97	3.84
	20	1.65	1.68	1.76	1.86	1.97	2.09	2.29	2.46	2.64	3.57	5.28
	25	1.78	1.82	1.92	2.04	2.17	2.31	2.55	2.76	3.00	4.40	8.36
300	15	1.70	1.72	1.80	1.90	2.01	2.12	2.30	2.46	2.62	3.35	4.29
	20	1.88	1.92	2.01	2.13	2.26	2.39	2.61	2.81	3.02	4.03	5.68
	25	2.05	2.10	2.21	2.35	2.50	2.66	2.93	3.17	3.44	4.89	8.43
400	15	1.87	1.90	1.99	2.09	2.21	2.34	2.53	2.71	2.88	3.68	4.68
	20	2.08	2.13	2.23	2.36	2.50	2.66	2.90	3.11	3.34	4.43	6.10
	25	2.28	2.34	2.47	2.62	2.79	2.97	3.26	3.53	3.82	5.34	8.61
500	15	2.02	2.06	2.15	2.27	2.40	2.53	2.74	2.93	3.12	3.98	5.04
	20	2.27	2.32	2.43	2.57	2.73	2.89	3.15	3.39	3.63	4.79	6.50
	25	2.50	2.56	2.70	2.86	3.05	3.24	3.56	3.85	4.15	5.75	8.88
600	15	2.16	2.20	2.30	2.43	2.57	2.71	2.94	3.14	3.34	4.25	5.36
	20	2.44	2.49	2.62	2.77	2.93	3.11	3.39	3.64	3.90	5.12	6.87
	25	2.69	2.76	2.91	3.09	3.28	3.49	3.83	4.14	4.47	6.13	9.19
700	15	2.29	2.34	2.45	2.58	2.72	2.88	3.12	3.33	3.55	4.51	5.67
	20	2.59	2.66	2.79	2.95	3.12	3.31	3.61	3.87	4.15	5.43	7.23
	25	2.87	2.95	3.11	3.30	3.51	3.73	4.09	4.41	4.76	6.49	9.52
800	15	2.42	2.47	2.58	2.72	2.87	3.04	3.29	3.51	3.74	4.75	5.96
	20	2.74	2.81	2.95	3.12	3.30	3.50	3.81	4.09	4.38	5.72	7.57
	25	3.04	3.13	3.29	3.49	3.71	3.95	4.33	4.67	5.03	6.83	9.86
900	15	2.54	2.59	2.71	2.86	3.02	3.18	3.45	3.68	3.92	4.97	6.23
	20	2.88	2.96	3.10	3.28	3.47	3.68	4.01	4.30	4.60	6.00	7.90
	25	3.20	3.30	3.47	3.68	3.91	4.16	4.55	4.91	5.29	7.15	10.19
1000	15	2.65	2.70	2.83	2.98	3.15	3.33	3.61	3.85	4.10	5.19	6.49
	20	3.02	3.09	3.25	3.44	3.64	3.85	4.20	4.50	4.81	6.27	8.21
	25	3.36	3.46	3.64	3.86	4.10	4.36	4.77	5.14	5.53	7.46	10.52

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 36.0 Ft (RADIUS = 25.5 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	2.76	2.82	2.95	3.11	3.28	3.47	3.75	4.00	4.26	5.40	6.74
	20	3.15	3.23	3.39	3.58	3.79	4.02	4.37	4.69	5.02	6.52	8.51
	25	3.51	3.61	3.80	4.03	4.28	4.55	4.98	5.36	5.77	7.75	10.84
1200	15	2.86	2.92	3.06	3.23	3.41	3.60	3.90	4.16	4.42	5.60	6.98
	20	3.28	3.36	3.53	3.73	3.95	4.18	4.55	4.87	5.21	6.76	8.80
	25	3.65	3.76	3.96	4.20	4.46	4.73	5.18	5.58	6.00	8.04	11.15
1300	15	2.97	3.03	3.17	3.34	3.53	3.73	4.03	4.30	4.58	5.79	7.21
	20	3.40	3.48	3.66	3.86	4.09	4.33	4.71	5.05	5.40	7.00	9.08
	25	3.79	3.90	4.11	4.36	4.63	4.91	5.37	5.78	6.22	8.31	11.46
1400	15	3.06	3.13	3.28	3.45	3.65	3.85	4.17	4.44	4.73	5.98	7.44
	20	3.51	3.60	3.78	4.00	4.23	4.48	4.88	5.22	5.58	7.23	9.36
	25	3.93	4.04	4.26	4.51	4.79	5.09	5.56	5.98	6.43	8.57	11.77
1500	15	3.16	3.23	3.38	3.56	3.76	3.97	4.30	4.58	4.88	6.16	7.66
	20	3.63	3.72	3.91	4.13	4.37	4.63	5.03	5.39	5.76	7.45	9.62
	25	4.06	4.18	4.40	4.66	4.95	5.25	5.74	6.18	6.64	8.83	12.06
1600	15	3.25	3.32	3.48	3.67	3.87	4.09	4.42	4.72	5.02	6.33	7.87
	20	3.74	3.84	4.03	4.26	4.50	4.77	5.18	5.55	5.93	7.66	9.88
	25	4.19	4.31	4.54	4.81	5.10	5.42	5.92	6.36	6.84	9.08	12.35
1700	15	3.34	3.42	3.58	3.77	3.98	4.20	4.55	4.85	5.16	6.51	8.07
	20	3.85	3.95	4.14	4.38	4.63	4.90	5.33	5.71	6.10	7.87	10.13
	25	4.31	4.44	4.67	4.95	5.25	5.58	6.09	6.55	7.03	9.33	12.63
1800	15	3.43	3.51	3.67	3.87	4.09	4.31	4.67	4.98	5.29	6.67	8.28
	20	3.95	4.06	4.26	4.50	4.76	5.04	5.48	5.86	6.26	8.07	10.37
	25	4.43	4.56	4.80	5.09	5.40	5.73	6.26	6.73	7.22	9.57	12.91
1900	15	3.52	3.60	3.77	3.97	4.19	4.42	4.78	5.10	5.43	6.84	8.47
	20	4.06	4.16	4.37	4.62	4.89	5.17	5.62	6.01	6.42	8.27	10.61
	25	4.55	4.68	4.93	5.22	5.54	5.88	6.42	6.90	7.41	9.80	13.18
2000	15	3.60	3.68	3.86	4.06	4.29	4.53	4.90	5.22	5.55	7.00	8.66
	20	4.16	4.27	4.48	4.73	5.01	5.30	5.76	6.16	6.58	8.47	10.85
	25	4.67	4.80	5.06	5.36	5.68	6.03	6.58	7.07	7.59	10.03	13.45

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 36.0 Ft (RADIUS = 25.5 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	2.04	2.10	2.23	2.39	2.58	2.79	3.18	3.60	4.18	10.40	25.60
	20	2.27	2.36	2.54	2.77	3.06	3.42	4.21	5.35	7.19	22.27	57.90
	25	2.48	2.63	2.88	3.22	3.69	4.38	6.33	9.01	12.65	41.83	111.16
200	15	2.54	2.62	2.78	2.98	3.20	3.46	3.90	4.34	4.89	10.41	25.60
	20	2.87	2.99	3.22	3.49	3.82	4.21	4.97	5.90	7.37	22.27	57.90
	25	3.18	3.37	3.67	4.06	4.54	5.19	6.72	9.05	12.65	41.83	111.16
300	15	2.94	3.04	3.22	3.45	3.71	3.99	4.48	4.95	5.52	10.49	25.60
	20	3.35	3.50	3.76	4.07	4.43	4.86	5.65	6.55	7.84	22.27	57.90
	25	3.74	3.96	4.30	4.73	5.25	5.91	7.33	9.33	12.68	41.83	111.16
400	15	3.29	3.40	3.61	3.86	4.14	4.45	4.98	5.49	6.08	10.71	25.60
	20	3.77	3.94	4.22	4.57	4.96	5.42	6.25	7.15	8.38	22.27	57.90
	25	4.23	4.47	4.84	5.31	5.87	6.55	7.95	9.77	12.80	41.83	111.16
500	15	3.60	3.73	3.95	4.23	4.53	4.87	5.43	5.97	6.59	11.05	25.60
	20	4.15	4.33	4.64	5.01	5.44	5.93	6.80	7.72	8.92	22.27	57.90
	25	4.66	4.92	5.33	5.83	6.42	7.13	8.54	10.28	13.05	41.83	111.16
600	15	3.89	4.03	4.27	4.56	4.89	5.25	5.85	6.42	7.06	11.44	25.60
	20	4.49	4.70	5.03	5.42	5.88	6.39	7.30	8.24	9.44	22.28	57.90
	25	5.06	5.35	5.78	6.31	6.93	7.67	9.10	10.80	13.40	41.83	111.16
700	15	4.16	4.31	4.57	4.88	5.23	5.60	6.23	6.83	7.50	11.85	25.61
	20	4.82	5.03	5.39	5.81	6.29	6.82	7.77	8.74	9.95	22.30	57.90
	25	5.44	5.74	6.20	6.76	7.41	8.18	9.63	11.31	13.79	41.83	111.16
800	15	4.41	4.57	4.85	5.17	5.54	5.94	6.60	7.22	7.92	12.27	25.61
	20	5.12	5.35	5.72	6.17	6.67	7.23	8.21	9.21	10.43	22.34	57.90
	25	5.79	6.11	6.59	7.18	7.86	8.65	10.14	11.81	14.21	41.83	111.16
900	15	4.66	4.82	5.11	5.46	5.84	6.25	6.94	7.59	8.31	12.69	25.63
	20	5.41	5.66	6.05	6.51	7.03	7.62	8.64	9.65	10.89	22.42	57.90
	25	6.13	6.46	6.97	7.57	8.28	9.10	10.62	12.30	14.65	41.83	111.16
1000	15	4.89	5.06	5.36	5.72	6.12	6.56	7.27	7.94	8.68	13.11	25.67
	20	5.69	5.95	6.35	6.83	7.38	7.99	9.04	10.08	11.33	22.53	57.90
	25	6.45	6.80	7.32	7.95	8.69	9.53	11.08	12.77	15.09	41.83	111.16

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 36.0 Ft (RADIUS = 25.5 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	5.11	5.29	5.61	5.98	6.40	6.85	7.59	8.28	9.04	13.51	25.72
	20	5.96	6.22	6.65	7.15	7.71	8.34	9.42	10.49	11.76	22.68	57.90
	25	6.76	7.12	7.66	8.32	9.07	9.94	11.52	13.23	15.52	41.83	111.16
1200	15	5.32	5.51	5.84	6.23	6.66	7.13	7.89	8.60	9.39	13.91	25.80
	20	6.21	6.49	6.93	7.45	8.03	8.68	9.79	10.88	12.18	22.86	57.90
	25	7.05	7.43	7.99	8.67	9.45	10.34	11.95	13.67	15.95	41.83	111.16
1300	15	5.53	5.73	6.07	6.47	6.91	7.40	8.19	8.92	9.72	14.30	25.90
	20	6.46	6.75	7.20	7.74	8.34	9.01	10.15	11.26	12.58	23.08	57.90
	25	7.34	7.73	8.31	9.01	9.81	10.72	12.37	14.10	16.38	41.84	111.16
1400	15	5.73	5.93	6.29	6.70	7.16	7.66	8.47	9.22	10.05	14.68	26.03
	20	6.70	7.00	7.47	8.02	8.64	9.33	10.50	11.63	12.97	23.32	57.90
	25	7.61	8.01	8.62	9.34	10.16	11.09	12.77	14.52	16.80	41.84	111.16
1500	15	5.92	6.14	6.50	6.93	7.40	7.91	8.75	9.51	10.36	15.06	26.18
	20	6.94	7.24	7.72	8.29	8.93	9.64	10.83	11.99	13.35	23.58	57.90
	25	7.88	8.30	8.92	9.65	10.50	11.45	13.16	14.93	17.21	41.85	111.16
1600	15	6.11	6.33	6.71	7.15	7.63	8.16	9.01	9.80	10.67	15.42	26.36
	20	7.16	7.48	7.97	8.56	9.21	9.94	11.16	12.34	13.72	23.85	57.90
	25	8.15	8.57	9.21	9.96	10.83	11.80	13.54	15.33	17.61	41.86	111.16
1700	15	6.30	6.52	6.91	7.36	7.86	8.40	9.27	10.08	10.96	15.78	26.55
	20	7.38	7.71	8.22	8.82	9.49	10.23	11.48	12.68	14.08	24.14	57.90
	25	8.40	8.84	9.49	10.26	11.15	12.14	13.91	15.72	18.01	41.88	111.16
1800	15	6.48	6.71	7.10	7.57	8.08	8.63	9.53	10.35	11.25	16.13	26.76
	20	7.60	7.93	8.45	9.07	9.76	10.51	11.79	13.01	14.43	24.43	57.90
	25	8.65	9.10	9.76	10.56	11.46	12.48	14.27	16.10	18.40	41.91	111.16
1900	15	6.65	6.89	7.30	7.77	8.29	8.86	9.78	10.62	11.54	16.47	26.98
	20	7.81	8.15	8.69	9.32	10.02	10.79	12.09	13.34	14.77	24.73	57.90
	25	8.89	9.35	10.03	10.84	11.76	12.80	14.62	16.47	18.78	41.95	111.16
2000	15	6.83	7.07	7.48	7.97	8.51	9.08	10.02	10.88	11.81	16.81	27.22
	20	8.02	8.37	8.91	9.56	10.28	11.06	12.39	13.65	15.11	25.04	57.91
	25	9.13	9.60	10.30	11.13	12.06	13.12	14.97	16.84	19.16	41.99	111.16

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 36.0 Ft (RADIUS = 25.5 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	3.65	4.02	4.66	5.77	7.93	11.39	19.02	28.19	40.63	140.84	379.81
	20	4.31	5.10	6.87	10.72	16.61	24.81	42.73	64.33	93.69	330.70	896.63
	25	5.07	6.83	11.60	19.54	30.99	46.94	81.83	123.91	181.17	643.70	1748.7
200	15	4.70	5.13	5.82	6.84	8.49	11.47	19.02	28.19	40.63	140.84	379.81
	20	5.60	6.43	7.92	10.93	16.61	24.81	42.73	64.33	93.69	330.70	896.63
	25	6.57	8.14	11.83	19.54	30.99	46.94	81.83	123.91	181.17	643.70	1748.7
300	15	5.55	6.03	6.77	7.80	9.33	11.85	19.03	28.19	40.63	140.84	379.81
	20	6.63	7.51	8.98	11.57	16.67	24.81	42.73	64.33	93.69	330.70	896.63
	25	7.77	9.33	12.51	19.56	30.99	46.94	81.83	123.91	181.17	643.70	1748.7
400	15	6.28	6.80	7.60	8.67	10.16	12.45	19.07	28.19	40.63	140.84	379.81
	20	7.52	8.45	9.94	12.37	16.91	24.82	42.73	64.33	93.69	330.70	896.63
	25	8.81	10.41	13.37	19.70	30.99	46.94	81.83	123.91	181.17	643.70	1748.7
500	15	6.94	7.50	8.34	9.45	10.94	13.13	19.22	28.19	40.63	140.84	379.81
	20	8.32	9.30	10.83	13.18	17.32	24.85	42.73	64.33	93.69	330.70	896.63
	25	9.74	11.38	14.25	20.01	31.00	46.94	81.83	123.91	181.17	643.70	1748.7
600	15	7.54	8.14	9.02	10.17	11.68	13.81	19.49	28.20	40.63	140.84	379.81
	20	9.06	10.08	11.64	13.97	17.86	24.95	42.73	64.33	93.69	330.70	896.63
	25	10.60	12.28	15.11	20.47	31.02	46.94	81.83	123.91	181.17	643.70	1748.7
700	15	8.11	8.73	9.66	10.85	12.38	14.49	19.86	28.24	40.63	140.84	379.81
	20	9.74	10.81	12.41	14.73	18.45	25.12	42.74	64.33	93.69	330.70	896.63
	25	11.40	13.12	15.95	21.02	31.08	46.94	81.83	123.91	181.17	643.70	1748.7
800	15	8.64	9.30	10.26	11.48	13.05	15.14	20.29	28.32	40.63	140.84	379.81
	20	10.39	11.49	13.14	15.47	19.08	25.38	42.74	64.33	93.69	330.70	896.63
	25	12.15	13.92	16.75	21.63	31.20	46.94	81.83	123.91	181.17	643.70	1748.7
900	15	9.14	9.83	10.83	12.09	13.68	15.78	20.77	28.46	40.64	140.84	379.81
	20	11.00	12.14	13.83	16.18	19.71	25.72	42.74	64.33	93.69	330.70	896.63
	25	12.87	14.67	17.52	22.27	31.38	46.95	81.83	123.91	181.17	643.70	1748.7
1000	15	9.62	10.33	11.37	12.67	14.29	16.40	21.28	28.64	40.65	140.84	379.81
	20	11.58	12.76	14.48	16.86	20.35	26.11	42.76	64.33	93.69	330.70	896.63
	25	13.55	15.39	18.26	22.92	31.63	46.96	81.83	123.91	181.17	643.70	1748.7

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 36.0 Ft (RADIUS = 25.5 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	10.08	10.82	11.89	13.22	14.87	17.00	21.79	28.88	40.67	140.84	379.81
	20	12.14	13.35	15.12	17.51	20.98	26.55	42.78	64.33	93.69	330.70	896.63
	25	14.20	16.09	18.98	23.57	31.94	46.97	81.83	123.91	181.17	643.70	1748.7
1200	15	10.53	11.29	12.39	13.75	15.44	17.58	22.32	29.16	40.71	140.84	379.81
	20	12.68	13.93	15.72	18.15	21.60	27.01	42.82	64.33	93.69	330.70	896.63
	25	14.82	16.75	19.68	24.22	32.30	47.01	81.83	123.91	181.17	643.70	1748.7
1300	15	10.96	11.74	12.87	14.27	15.98	18.14	22.84	29.48	40.76	140.84	379.81
	20	13.20	14.48	16.31	18.77	22.20	27.50	42.89	64.33	93.69	330.70	896.63
	25	15.43	17.39	20.35	24.86	32.70	47.06	81.83	123.91	181.17	643.70	1748.7
1400	15	11.37	12.18	13.34	14.76	16.51	18.69	23.36	29.84	40.84	140.84	379.81
	20	13.70	15.01	16.88	19.36	22.80	28.00	42.98	64.33	93.69	330.70	896.63
	25	16.02	18.02	21.00	25.49	33.13	47.13	81.83	123.91	181.17	643.70	1748.7
1500	15	11.78	12.60	13.79	15.25	17.02	19.23	23.88	30.21	40.94	140.84	379.81
	20	14.19	15.53	17.43	19.95	23.39	28.51	43.10	64.33	93.69	330.70	896.63
	25	16.59	18.62	21.64	26.12	33.59	47.24	81.83	123.91	181.17	643.70	1748.7
1600	15	12.17	13.01	14.23	15.72	17.52	19.75	24.40	30.60	41.07	140.84	379.81
	20	14.67	16.03	17.97	20.51	23.96	29.02	43.25	64.34	93.69	330.70	896.63
	25	17.14	19.21	22.26	26.73	34.06	47.36	81.83	123.91	181.17	643.70	1748.7
1700	15	12.55	13.42	14.66	16.18	18.01	20.26	24.90	31.01	41.23	140.84	379.81
	20	15.13	16.52	18.49	21.07	24.53	29.54	43.42	64.34	93.69	330.70	896.63
	25	17.68	19.78	22.86	27.34	34.55	47.52	81.83	123.91	181.17	643.70	1748.7
1800	15	12.92	13.81	15.08	16.62	18.48	20.75	25.41	31.42	41.41	140.84	379.81
	20	15.58	17.00	19.00	21.61	25.08	30.05	43.63	64.35	93.69	330.70	896.63
	25	18.20	20.34	23.45	27.93	35.04	47.71	81.83	123.91	181.17	643.70	1748.7
1900	15	13.29	14.19	15.48	17.06	18.95	21.24	25.90	31.85	41.61	140.84	379.81
	20	16.02	17.46	19.50	22.13	25.62	30.57	43.86	64.37	93.69	330.70	896.63
	25	18.72	20.88	24.03	28.52	35.54	47.92	81.83	123.91	181.17	643.70	1748.7
2000	15	13.65	14.57	15.88	17.49	19.40	21.72	26.39	32.27	41.84	140.84	379.81
	20	16.46	17.92	19.99	22.65	26.16	31.08	44.11	64.39	93.69	330.70	896.63
	25	19.22	21.41	24.59	29.10	36.05	48.16	81.84	123.91	181.17	643.70	1748.7

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 36.0 Ft (RADIUS = 25.5 Ft)³
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	9.06	19.11	37.13	64.42	103.85	158.81	279.14	424.36	622.02	2219.7	6037.7
	20	16.57	42.86	85.49	150.07	243.41	373.54	658.57	1002.6	1471.0	5257.3	14307.
	25	30.62	82.02	165.21	291.27	473.49	727.56	1284.1	1955.9	2870.6	10265.	27939.
200	15	11.09	19.19	37.13	64.42	103.85	158.81	279.14	424.36	622.02	2219.7	6037.7
	20	17.30	42.86	85.49	150.07	243.41	373.54	658.57	1002.6	1471.0	5257.3	14307.
	25	30.62	82.02	165.21	291.27	473.49	727.56	1284.1	1955.9	2870.6	10265.	27939.
300	15	12.85	19.69	37.13	64.42	103.85	158.81	279.14	424.36	622.02	2219.7	6037.7
	20	18.76	42.86	85.49	150.07	243.41	373.54	658.57	1002.6	1471.0	5257.3	14307.
	25	30.77	82.02	165.21	291.27	473.49	727.56	1284.1	1955.9	2870.6	10265.	27939.
400	15	14.40	20.58	37.13	64.42	103.85	158.81	279.14	424.36	622.02	2219.7	6037.7
	20	20.34	42.86	85.49	150.07	243.41	373.54	658.57	1002.6	1471.0	5257.3	14307.
	25	31.30	82.02	165.21	291.27	473.49	727.56	1284.1	1955.9	2870.6	10265.	27939.
500	15	15.81	21.64	37.16	64.42	103.85	158.81	279.14	424.36	622.02	2219.7	6037.7
	20	21.88	42.89	85.49	150.07	243.41	373.54	658.57	1002.6	1471.0	5257.3	14307.
	25	32.19	82.02	165.21	291.27	473.49	727.56	1284.1	1955.9	2870.6	10265.	27939.
600	15	17.11	22.75	37.26	64.42	103.85	158.81	279.14	424.36	622.02	2219.7	6037.7
	20	23.36	42.99	85.49	150.07	243.41	373.54	658.57	1002.6	1471.0	5257.3	14307.
	25	33.30	82.02	165.21	291.27	473.49	727.56	1284.1	1955.9	2870.6	10265.	27939.
700	15	18.32	23.85	37.47	64.42	103.85	158.81	279.14	424.36	622.02	2219.7	6037.7
	20	24.76	43.19	85.49	150.07	243.41	373.54	658.57	1002.6	1471.0	5257.3	14307.
	25	34.51	82.02	165.21	291.27	473.49	727.56	1284.1	1955.9	2870.6	10265.	27939.
800	15	19.46	24.93	37.79	64.42	103.85	158.81	279.14	424.36	622.02	2219.7	6037.7
	20	26.11	43.52	85.49	150.07	243.41	373.54	658.57	1002.6	1471.0	5257.3	14307.
	25	35.77	82.02	165.21	291.27	473.49	727.56	1284.1	1955.9	2870.6	10265.	27939.
900	15	20.55	25.98	38.22	64.42	103.85	158.81	279.14	424.36	622.02	2219.7	6037.7
	20	27.39	43.97	85.49	150.07	243.41	373.54	658.57	1002.6	1471.0	5257.3	14307.
	25	37.04	82.02	165.21	291.27	473.49	727.56	1284.1	1955.9	2870.6	10265.	27939.
1000	15	21.58	27.00	38.74	64.43	103.85	158.81	279.14	424.36	622.02	2219.7	6037.7
	20	28.63	44.53	85.49	150.07	243.41	373.54	658.57	1002.6	1471.0	5257.3	14307.
	25	38.30	82.03	165.21	291.27	473.49	727.56	1284.1	1955.9	2870.6	10265.	27939.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 36.0 Ft (RADIUS = 25.5 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	22.57	28.00	39.33	64.45	103.85	158.81	279.14	424.36	622.02	2219.7	6037.7
	20	29.81	45.17	85.49	150.07	243.41	373.54	658.57	1002.6	1471.0	5257.3	14307.
	25	39.55	82.04	165.21	291.27	473.49	727.56	1284.1	1955.9	2870.6	10265.	27939.
1200	15	23.53	28.96	39.97	64.48	103.85	158.81	279.14	424.36	622.02	2219.7	6037.7
	20	30.96	45.88	85.49	150.07	243.41	373.54	658.57	1002.6	1471.0	5257.3	14307.
	25	40.77	82.07	165.21	291.27	473.49	727.56	1284.1	1955.9	2870.6	10265.	27939.
1300	15	24.45	29.90	40.65	64.54	103.85	158.81	279.14	424.36	622.02	2219.7	6037.7
	20	32.07	46.63	85.50	150.07	243.41	373.54	658.57	1002.6	1471.0	5257.3	14307.
	25	41.98	82.12	165.21	291.27	473.49	727.56	1284.1	1955.9	2870.6	10265.	27939.
1400	15	25.34	30.82	41.35	64.62	103.85	158.81	279.14	424.36	622.02	2219.7	6037.7
	20	33.15	47.41	85.52	150.07	243.41	373.54	658.57	1002.6	1471.0	5257.3	14307.
	25	43.15	82.20	165.21	291.27	473.49	727.56	1284.1	1955.9	2870.6	10265.	27939.
1500	15	26.21	31.71	42.07	64.73	103.85	158.81	279.14	424.36	622.02	2219.7	6037.7
	20	34.20	48.21	85.54	150.07	243.41	373.54	658.57	1002.6	1471.0	5257.3	14307.
	25	44.31	82.31	165.21	291.27	473.49	727.56	1284.1	1955.9	2870.6	10265.	27939.
1600	15	27.05	32.58	42.80	64.88	103.85	158.81	279.14	424.36	622.02	2219.7	6037.7
	20	35.22	49.02	85.58	150.07	243.41	373.54	658.57	1002.6	1471.0	5257.3	14307.
	25	45.44	82.46	165.21	291.27	473.49	727.56	1284.1	1955.9	2870.6	10265.	27939.
1700	15	27.87	33.43	43.53	65.06	103.85	158.81	279.14	424.36	622.02	2219.7	6037.7
	20	36.21	49.85	85.64	150.07	243.41	373.54	658.57	1002.6	1471.0	5257.3	14307.
	25	46.55	82.64	165.21	291.27	473.49	727.56	1284.1	1955.9	2870.6	10265.	27939.
1800	15	28.66	34.26	44.27	65.27	103.86	158.81	279.14	424.36	622.02	2219.7	6037.7
	20	37.18	50.68	85.72	150.07	243.41	373.54	658.57	1002.6	1471.0	5257.3	14307.
	25	47.64	82.87	165.21	291.27	473.49	727.56	1284.1	1955.9	2870.6	10265.	27939.
1900	15	29.45	35.08	45.01	65.53	103.86	158.81	279.14	424.36	622.02	2219.7	6037.7
	20	38.13	51.51	85.81	150.07	243.41	373.54	658.57	1002.6	1471.0	5257.3	14307.
	25	48.71	83.15	165.21	291.27	473.49	727.56	1284.1	1955.9	2870.6	10265.	27939.
2000	15	30.21	35.87	45.74	65.82	103.86	158.81	279.14	424.36	622.02	2219.7	6037.7
	20	39.06	52.34	85.94	150.07	243.41	373.54	658.57	1002.6	1471.0	5257.3	14307.
	25	49.77	83.46	165.21	291.27	473.49	727.56	1284.1	1955.9	2870.6	10265.	27939.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 38.0 Ft (RADIUS = 26.9 Ft)
 FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	1.33	1.33	1.39	1.46	1.54	1.62	1.75	1.87	1.99	2.57	3.43
	20	1.43	1.45	1.51	1.59	1.69	1.79	1.95	2.10	2.26	3.13	5.34
	25	1.53	1.55	1.63	1.73	1.83	1.96	2.16	2.35	2.56	4.16	8.92
200	15	1.59	1.60	1.67	1.75	1.84	1.94	2.10	2.25	2.39	3.06	3.96
	20	1.74	1.76	1.84	1.95	2.06	2.18	2.38	2.55	2.74	3.70	5.54
	25	1.88	1.92	2.02	2.14	2.27	2.42	2.66	2.88	3.13	4.62	8.92
300	15	1.79	1.81	1.89	1.99	2.09	2.21	2.39	2.55	2.71	3.46	4.42
	20	1.99	2.02	2.11	2.23	2.36	2.50	2.72	2.92	3.13	4.17	5.93
	25	2.17	2.22	2.33	2.46	2.62	2.78	3.06	3.31	3.58	5.11	8.97
400	15	1.97	2.00	2.08	2.19	2.31	2.43	2.63	2.81	2.99	3.80	4.83
	20	2.20	2.24	2.35	2.48	2.62	2.77	3.02	3.24	3.47	4.59	6.35
	25	2.42	2.47	2.60	2.75	2.92	3.10	3.40	3.68	3.97	5.57	9.12
500	15	2.14	2.17	2.26	2.37	2.50	2.64	2.85	3.04	3.24	4.11	5.19
	20	2.40	2.44	2.56	2.70	2.85	3.02	3.28	3.52	3.77	4.96	6.75
	25	2.64	2.70	2.84	3.01	3.19	3.39	3.71	4.01	4.33	5.99	9.36
600	15	2.29	2.32	2.42	2.54	2.68	2.83	3.06	3.26	3.46	4.39	5.53
	20	2.58	2.63	2.75	2.90	3.07	3.25	3.53	3.78	4.05	5.31	7.14
	25	2.85	2.92	3.06	3.24	3.44	3.65	4.00	4.31	4.65	6.39	9.66
700	15	2.43	2.46	2.57	2.70	2.85	3.00	3.24	3.46	3.68	4.65	5.85
	20	2.75	2.80	2.93	3.09	3.27	3.46	3.76	4.03	4.31	5.63	7.50
	25	3.04	3.12	3.27	3.46	3.67	3.90	4.27	4.60	4.95	6.75	9.99
800	15	2.56	2.60	2.71	2.85	3.00	3.17	3.42	3.65	3.88	4.90	6.14
	20	2.91	2.96	3.10	3.27	3.46	3.66	3.97	4.26	4.55	5.93	7.85
	25	3.22	3.30	3.47	3.67	3.89	4.13	4.52	4.86	5.24	7.10	10.32
900	15	2.69	2.73	2.85	2.99	3.15	3.32	3.59	3.83	4.07	5.14	6.42
	20	3.06	3.12	3.26	3.44	3.64	3.85	4.18	4.47	4.78	6.22	8.19
	25	3.40	3.48	3.66	3.87	4.10	4.35	4.75	5.12	5.51	7.44	10.65
1000	15	2.81	2.85	2.98	3.13	3.30	3.47	3.75	4.00	4.25	5.36	6.69
	20	3.20	3.27	3.42	3.61	3.81	4.03	4.37	4.68	5.00	6.49	8.51
	25	3.56	3.65	3.83	4.06	4.30	4.56	4.98	5.36	5.76	7.75	10.98

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 38.0 Ft (RADIUS = 26.9 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	2.92	2.97	3.10	3.26	3.43	3.62	3.91	4.16	4.42	5.58	6.95
	20	3.34	3.41	3.57	3.76	3.97	4.20	4.56	4.88	5.21	6.75	8.82
	25	3.72	3.82	4.01	4.24	4.49	4.76	5.20	5.59	6.01	8.06	11.31
1200	15	3.03	3.09	3.22	3.38	3.56	3.76	4.06	4.32	4.59	5.78	7.20
	20	3.47	3.55	3.71	3.91	4.13	4.37	4.74	5.07	5.42	7.01	9.12
	25	3.87	3.97	4.17	4.41	4.67	4.96	5.41	5.81	6.25	8.35	11.65
1300	15	3.14	3.20	3.33	3.50	3.69	3.89	4.20	4.47	4.75	5.98	7.44
	20	3.60	3.68	3.85	4.06	4.29	4.53	4.92	5.26	5.61	7.25	9.40
	25	4.02	4.12	4.33	4.58	4.85	5.14	5.61	6.03	6.48	8.64	11.94
1400	15	3.25	3.30	3.45	3.62	3.82	4.02	4.34	4.62	4.91	6.18	7.67
	20	3.72	3.81	3.98	4.20	4.43	4.69	5.08	5.44	5.80	7.49	9.68
	25	4.16	4.27	4.49	4.74	5.02	5.32	5.81	6.24	6.70	8.91	12.25
1500	15	3.35	3.41	3.56	3.74	3.94	4.15	4.48	4.76	5.06	6.36	7.90
	20	3.85	3.93	4.11	4.34	4.58	4.84	5.25	5.61	5.99	7.72	9.96
	25	4.30	4.42	4.64	4.90	5.19	5.50	6.00	6.44	6.91	9.18	12.55
1600	15	3.45	3.51	3.66	3.85	4.05	4.27	4.61	4.90	5.21	6.55	8.11
	20	3.96	4.05	4.24	4.47	4.72	4.99	5.41	5.78	6.17	7.94	10.22
	25	4.44	4.55	4.78	5.05	5.35	5.67	6.18	6.64	7.12	9.44	12.85
1700	15	3.54	3.61	3.76	3.96	4.17	4.39	4.74	5.04	5.36	6.72	8.33
	20	4.08	4.17	4.36	4.60	4.86	5.13	5.56	5.94	6.34	8.15	10.48
	25	4.57	4.69	4.92	5.20	5.51	5.84	6.36	6.83	7.33	9.69	13.14
1800	15	3.64	3.70	3.86	4.06	4.28	4.50	4.86	5.17	5.50	6.90	8.53
	20	4.19	4.28	4.48	4.73	4.99	5.27	5.71	6.11	6.51	8.37	10.73
	25	4.70	4.82	5.06	5.35	5.66	6.00	6.54	7.02	7.52	9.94	13.42
1900	15	3.73	3.80	3.96	4.16	4.38	4.62	4.98	5.30	5.63	7.07	8.74
	20	4.30	4.40	4.60	4.85	5.12	5.41	5.86	6.26	6.68	8.57	10.98
	25	4.83	4.95	5.20	5.49	5.81	6.16	6.71	7.20	7.72	10.18	13.70
2000	15	3.82	3.89	4.06	4.27	4.49	4.73	5.10	5.43	5.77	7.23	8.94
	20	4.41	4.51	4.72	4.97	5.25	5.54	6.01	6.42	6.84	8.77	11.22
	25	4.95	5.08	5.33	5.63	5.96	6.31	6.88	7.38	7.91	10.41	13.98

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 38.0 Ft (RADIUS = 26.9 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
100	15	2.16	2.21	2.34	2.51	2.70	2.93	3.34	3.80	4.45	11.26	27.50	
	20	2.40	2.50	2.68	2.93	3.23	3.62	4.52	5.85	7.90	24.25	62.36	
	25	2.64	2.79	3.06	3.43	3.95	4.76	7.03	10.01	14.02	45.68	119.83	
200	15	2.69	2.76	2.93	3.13	3.36	3.63	4.09	4.56	5.15	11.26	27.50	
	20	3.04	3.17	3.40	3.69	4.03	4.45	5.28	6.33	8.03	24.25	62.36	
	25	3.38	3.57	3.89	4.31	4.84	5.55	7.33	10.03	14.02	45.68	119.83	
300	15	3.11	3.21	3.40	3.63	3.89	4.19	4.69	5.20	5.80	11.31	27.50	
	20	3.55	3.71	3.97	4.29	4.68	5.13	5.98	6.97	8.43	24.25	62.36	
	25	3.98	4.20	4.56	5.01	5.58	6.30	7.90	10.23	14.03	45.68	119.83	
400	15	3.48	3.59	3.80	4.06	4.35	4.67	5.22	5.75	6.38	11.49	27.50	
	20	4.00	4.17	4.46	4.82	5.24	5.72	6.61	7.59	8.95	24.25	62.36	
	25	4.49	4.74	5.13	5.63	6.22	6.96	8.52	10.61	14.11	45.68	119.83	
500	15	3.82	3.94	4.17	4.45	4.76	5.11	5.69	6.26	6.91	11.78	27.50	
	20	4.40	4.59	4.91	5.29	5.74	6.25	7.18	8.17	9.49	24.25	62.36	
	25	4.96	5.23	5.65	6.18	6.81	7.57	9.12	11.09	14.29	45.68	119.83	
600	15	4.12	4.26	4.50	4.80	5.14	5.51	6.13	6.72	7.40	12.15	27.50	
	20	4.77	4.97	5.31	5.73	6.20	6.74	7.70	8.71	10.02	24.26	62.36	
	25	5.39	5.67	6.13	6.68	7.34	8.14	9.69	11.59	14.58	45.68	119.83	
700	15	4.41	4.55	4.82	5.13	5.49	5.88	6.53	7.15	7.86	12.55	27.50	
	20	5.12	5.33	5.69	6.13	6.63	7.19	8.19	9.22	10.53	24.27	62.36	
	25	5.78	6.09	6.57	7.15	7.84	8.66	10.24	12.11	14.93	45.68	119.83	
800	15	4.68	4.83	5.11	5.45	5.82	6.23	6.91	7.56	8.29	12.97	27.50	
	20	5.44	5.67	6.05	6.51	7.03	7.62	8.65	9.71	11.03	24.29	62.36	
	25	6.16	6.48	6.99	7.60	8.31	9.16	10.76	12.61	15.33	45.68	119.83	
900	15	4.94	5.10	5.39	5.74	6.14	6.56	7.28	7.94	8.70	13.39	27.51	
	20	5.75	5.99	6.39	6.87	7.41	8.03	9.09	10.17	11.50	24.34	62.36	
	25	6.52	6.86	7.38	8.02	8.76	9.63	11.26	13.11	15.74	45.68	119.83	
1000	15	5.19	5.35	5.66	6.03	6.43	6.88	7.62	8.31	9.09	13.80	27.54	
	20	6.05	6.30	6.72	7.21	7.78	8.41	9.51	10.62	11.96	24.42	62.36	
	25	6.86	7.21	7.76	8.42	9.19	10.08	11.74	13.59	16.17	45.68	119.83	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 38.0 Ft (RADIUS = 26.9 Ft)
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	5.42	5.60	5.92	6.30	6.72	7.18	7.95	8.66	9.46	14.21	27.57
	20	6.33	6.59	7.03	7.54	8.13	8.78	9.92	11.04	12.41	24.54	62.36
	25	7.19	7.55	8.12	8.80	9.60	10.51	12.21	14.06	16.61	45.68	119.83
1200	15	5.65	5.83	6.16	6.56	7.00	7.48	8.27	9.00	9.82	14.62	27.63
	20	6.60	6.88	7.33	7.86	8.47	9.14	10.30	11.45	12.84	24.68	62.36
	25	7.50	7.88	8.47	9.17	9.99	10.93	12.65	14.52	17.04	45.68	119.83
1300	15	5.87	6.06	6.40	6.81	7.27	7.76	8.58	9.33	10.17	15.01	27.71
	20	6.87	7.15	7.61	8.17	8.79	9.49	10.68	11.85	13.25	24.86	62.36
	25	7.81	8.20	8.80	9.53	10.37	11.33	13.09	14.96	17.47	45.68	119.83
1400	15	6.08	6.28	6.63	7.06	7.53	8.03	8.87	9.65	10.51	15.40	27.81
	20	7.12	7.42	7.89	8.46	9.11	9.82	11.04	12.24	13.66	25.07	62.36
	25	8.10	8.51	9.13	9.88	10.74	11.72	13.50	15.40	17.89	45.68	119.83
1500	15	6.29	6.49	6.86	7.29	7.78	8.30	9.16	9.96	10.83	15.79	27.94
	20	7.37	7.67	8.17	8.75	9.41	10.14	11.39	12.61	14.05	25.30	62.36
	25	8.39	8.81	9.45	10.21	11.09	12.10	13.91	15.82	18.31	45.68	119.83
1600	15	6.49	6.70	7.08	7.52	8.02	8.56	9.44	10.25	11.15	16.16	28.09
	20	7.61	7.92	8.43	9.03	9.71	10.46	11.73	12.98	14.43	25.55	62.36
	25	8.67	9.10	9.75	10.54	11.44	12.47	14.31	16.23	18.72	45.69	119.83
1700	15	6.69	6.90	7.29	7.75	8.26	8.81	9.71	10.55	11.46	16.53	28.25
	20	7.85	8.17	8.69	9.30	10.00	10.76	12.07	13.33	14.81	25.81	62.36
	25	8.94	9.38	10.05	10.86	11.78	12.82	14.69	16.64	19.13	45.70	119.83
1800	15	6.88	7.10	7.50	7.97	8.49	9.05	9.98	10.83	11.76	16.89	28.44
	20	8.08	8.41	8.94	9.57	10.28	11.06	12.39	13.68	15.17	26.09	62.36
	25	9.20	9.65	10.34	11.17	12.11	13.17	15.07	17.03	19.53	45.72	119.83
1900	15	7.06	7.30	7.70	8.18	8.72	9.29	10.24	11.11	12.06	17.24	28.64
	20	8.30	8.64	9.18	9.83	10.56	11.36	12.71	14.01	15.53	26.38	62.36
	25	9.46	9.92	10.63	11.47	12.43	13.51	15.44	17.42	19.92	45.74	119.83
2000	15	7.25	7.48	7.90	8.39	8.94	9.53	10.49	11.38	12.35	17.59	28.86
	20	8.52	8.87	9.42	10.09	10.83	11.64	13.02	14.34	15.88	26.67	62.36
	25	9.72	10.19	10.91	11.76	12.74	13.85	15.80	17.80	20.31	45.77	119.83

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 38.0 Ft (RADIUS = 26.9 Ft)³
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	4	8	12	16	20	24	30	35	40	60	80
100	15	3.89	4.30	5.03	6.37	8.97	12.90	21.43	31.59	45.29	154.07	409.72
	20	4.63	5.56	7.78	12.35	19.07	28.33	48.38	72.33	104.68	362.00	967.47
	25	5.49	7.73	13.54	22.69	35.75	53.77	92.82	139.51	202.60	704.80	1887.0
200	15	5.01	5.48	6.24	7.41	9.39	12.94	21.43	31.59	45.29	154.07	409.72
	20	6.00	6.94	8.72	12.46	19.07	28.33	48.38	72.33	104.68	362.00	967.47
	25	7.08	8.96	13.64	22.69	35.75	53.77	92.82	139.51	202.60	704.80	1887.0
300	15	5.92	6.43	7.24	8.40	10.17	13.19	21.43	31.59	45.29	154.07	409.72
	20	7.10	8.09	9.78	12.94	19.09	28.33	48.38	72.33	104.68	362.00	967.47
	25	8.36	10.19	14.14	22.69	35.75	53.77	92.82	139.51	202.60	704.80	1887.0
400	15	6.70	7.26	8.12	9.30	10.99	13.70	21.45	31.59	45.29	154.07	409.72
	20	8.05	9.09	10.78	13.66	19.22	28.33	48.38	72.33	104.68	362.00	967.47
	25	9.47	11.31	14.91	22.75	35.75	53.77	92.82	139.51	202.60	704.80	1887.0
500	15	7.40	8.00	8.90	10.12	11.79	14.33	21.53	31.59	45.29	154.07	409.72
	20	8.90	9.99	11.70	14.45	19.50	28.35	48.38	72.33	104.68	362.00	967.47
	25	10.47	12.34	15.75	22.92	35.75	53.77	92.82	139.51	202.60	704.80	1887.0
600	15	8.04	8.68	9.62	10.87	12.56	15.00	21.71	31.59	45.29	154.07	409.72
	20	9.69	10.82	12.56	15.24	19.93	28.39	48.38	72.33	104.68	362.00	967.47
	25	11.39	13.29	16.61	23.24	35.75	53.77	92.82	139.51	202.60	704.80	1887.0
700	15	8.64	9.31	10.30	11.58	13.28	15.67	21.99	31.61	45.29	154.07	409.72
	20	10.42	11.59	13.36	16.02	20.46	28.48	48.38	72.33	104.68	362.00	967.47
	25	12.24	14.18	17.46	23.68	35.78	53.77	92.82	139.51	202.60	704.80	1887.0
800	15	9.21	9.90	10.93	12.26	13.98	16.33	22.35	31.65	45.29	154.07	409.72
	20	11.11	12.31	14.13	16.78	21.04	28.65	48.38	72.33	104.68	362.00	967.47
	25	13.04	15.02	18.28	24.21	35.83	53.77	92.82	139.51	202.60	704.80	1887.0
900	15	9.75	10.47	11.53	12.89	14.64	16.98	22.77	31.73	45.29	154.07	409.72
	20	11.76	13.00	14.85	17.51	21.64	28.88	48.38	72.33	104.68	362.00	967.47
	25	13.80	15.82	19.08	24.79	35.92	53.77	92.82	139.51	202.60	704.80	1887.0
1000	15	10.26	11.01	12.11	13.50	15.27	17.62	23.23	31.85	45.30	154.07	409.72
	20	12.38	13.66	15.55	18.21	22.26	29.19	48.39	72.33	104.68	362.00	967.47
	25	14.53	16.58	19.85	25.40	36.07	53.77	92.82	139.51	202.60	704.80	1887.0

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 38.0 Ft (RADIUS = 26.9 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	10.75	11.52	12.66	14.08	15.88	18.23	23.72	32.02	45.31	154.07	409.72
	20	12.98	14.29	16.22	18.90	22.89	29.54	48.40	72.33	104.68	362.00	967.47
	25	15.22	17.32	20.60	26.02	36.28	53.78	92.82	139.51	202.60	704.80	1887.0
1200	15	11.22	12.02	13.19	14.65	16.47	18.84	24.23	32.23	45.32	154.07	409.72
	20	13.55	14.90	16.86	19.56	23.51	29.95	48.42	72.33	104.68	362.00	967.47
	25	15.89	18.02	21.33	26.66	36.53	53.79	92.82	139.51	202.60	704.80	1887.0
1300	15	11.68	12.50	13.70	15.19	17.04	19.42	24.74	32.49	45.35	154.07	409.72
	20	14.11	15.48	17.48	20.20	24.12	30.38	48.45	72.33	104.68	362.00	967.47
	25	16.54	18.71	22.03	27.29	36.84	53.81	92.82	139.51	202.60	704.80	1887.0
1400	15	12.12	12.97	14.19	15.72	17.60	19.99	25.25	32.78	45.39	154.07	409.72
	20	14.65	16.05	18.08	20.83	24.73	30.84	48.49	72.33	104.68	362.00	967.47
	25	17.17	19.37	22.72	27.93	37.19	53.84	92.82	139.51	202.60	704.80	1887.0
1500	15	12.55	13.42	14.67	16.23	18.14	20.55	25.77	33.10	45.46	154.07	409.72
	20	15.17	16.60	18.67	21.44	25.33	31.32	48.56	72.33	104.68	362.00	967.47
	25	17.77	20.01	23.38	28.56	37.57	53.89	92.82	139.51	202.60	704.80	1887.0
1600	15	12.97	13.85	15.14	16.72	18.66	21.09	26.29	33.45	45.54	154.07	409.72
	20	15.67	17.13	19.23	22.03	25.92	31.81	48.65	72.34	104.68	362.00	967.47
	25	18.36	20.63	24.03	29.18	37.98	53.96	92.82	139.51	202.60	704.80	1887.0
1700	15	13.38	14.28	15.59	17.20	19.17	21.62	26.80	33.82	45.64	154.07	409.72
	20	16.17	17.65	19.79	22.61	26.50	32.30	48.76	72.34	104.68	362.00	967.47
	25	18.94	21.24	24.67	29.80	38.42	54.05	92.82	139.51	202.60	704.80	1887.0
1800	15	13.78	14.70	16.03	17.68	19.67	22.14	27.31	34.20	45.77	154.07	409.72
	20	16.65	18.16	20.33	23.18	27.07	32.81	48.89	72.34	104.68	362.00	967.47
	25	19.50	21.83	25.29	30.41	38.87	54.16	92.82	139.51	202.60	704.80	1887.0
1900	15	14.17	15.10	16.46	18.14	20.16	22.65	27.81	34.60	45.92	154.07	409.72
	20	17.12	18.66	20.85	23.74	27.63	33.31	49.05	72.35	104.68	362.00	967.47
	25	20.05	22.41	25.90	31.01	39.34	54.30	92.82	139.51	202.60	704.80	1887.0
2000	15	14.55	15.50	16.89	18.59	20.63	23.15	28.31	35.01	46.09	154.07	409.72
	20	17.58	19.14	21.37	24.28	28.19	33.82	49.24	72.36	104.68	362.00	967.47
	25	20.58	22.97	26.49	31.61	39.81	54.46	92.82	139.51	202.60	704.80	1887.0

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 38.0 Ft (RADIUS = 26.9 Ft)³
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	10.22	22.66	43.71	75.19	120.18	182.31	317.03	478.16	695.99	2430.8	6515.7
	20	19.87	51.17	101.01	175.52	282.03	429.17	748.29	1130.1	1646.2	5757.7	15440.
	25	37.01	98.18	195.47	340.92	548.86	836.15	1459.3	2204.8	3212.8	11242.	30152.
200	15	12.23	22.68	43.71	75.19	120.18	182.31	317.03	478.16	695.99	2430.8	6515.7
	20	20.24	51.17	101.01	175.52	282.03	429.17	748.29	1130.1	1646.2	5757.7	15440.
	25	37.01	98.18	195.47	340.92	548.86	836.15	1459.3	2204.8	3212.8	11242.	30152.
300	15	14.07	22.93	43.71	75.19	120.18	182.31	317.03	478.16	695.99	2430.8	6515.7
	20	21.41	51.17	101.01	175.52	282.03	429.17	748.29	1130.1	1646.2	5757.7	15440.
	25	37.05	98.18	195.47	340.92	548.86	836.15	1459.3	2204.8	3212.8	11242.	30152.
400	15	15.71	23.58	43.72	75.19	120.18	182.31	317.03	478.16	695.99	2430.8	6515.7
	20	22.90	51.17	101.01	175.52	282.03	429.17	748.29	1130.1	1646.2	5757.7	15440.
	25	37.28	98.18	195.47	340.92	548.86	836.15	1459.3	2204.8	3212.8	11242.	30152.
500	15	17.20	24.49	43.72	75.19	120.18	182.31	317.03	478.16	695.99	2430.8	6515.7
	20	24.43	51.18	101.01	175.52	282.03	429.17	748.29	1130.1	1646.2	5757.7	15440.
	25	37.82	98.18	195.47	340.92	548.86	836.15	1459.3	2204.8	3212.8	11242.	30152.
600	15	18.58	25.51	43.76	75.19	120.18	182.31	317.03	478.16	695.99	2430.8	6515.7
	20	25.93	51.20	101.01	175.52	282.03	429.17	748.29	1130.1	1646.2	5757.7	15440.
	25	38.65	98.18	195.47	340.92	548.86	836.15	1459.3	2204.8	3212.8	11242.	30152.
700	15	19.87	26.58	43.84	75.19	120.18	182.31	317.03	478.16	695.99	2430.8	6515.7
	20	27.38	51.27	101.01	175.52	282.03	429.17	748.29	1130.1	1646.2	5757.7	15440.
	25	39.67	98.18	195.47	340.92	548.86	836.15	1459.3	2204.8	3212.8	11242.	30152.
800	15	21.08	27.65	44.00	75.19	120.18	182.31	317.03	478.16	695.99	2430.8	6515.7
	20	28.78	51.42	101.01	175.52	282.03	429.17	748.29	1130.1	1646.2	5757.7	15440.
	25	40.80	98.18	195.47	340.92	548.86	836.15	1459.3	2204.8	3212.8	11242.	30152.
900	15	22.24	28.72	44.26	75.19	120.18	182.31	317.03	478.16	695.99	2430.8	6515.7
	20	30.13	51.67	101.01	175.52	282.03	429.17	748.29	1130.1	1646.2	5757.7	15440.
	25	41.99	98.18	195.47	340.92	548.86	836.15	1459.3	2204.8	3212.8	11242.	30152.
1000	15	23.34	29.76	44.61	75.20	120.18	182.31	317.03	478.16	695.99	2430.8	6515.7
	20	31.42	52.01	101.01	175.52	282.03	429.17	748.29	1130.1	1646.2	5757.7	15440.
	25	43.21	98.18	195.47	340.92	548.86	836.15	1459.3	2204.8	3212.8	11242.	30152.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 38.0 Ft (RADIUS = 26.9 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	24.40	30.79	45.04	75.20	120.18	182.31	317.03	478.16	695.99	2430.8	6515.7
	20	32.68	52.45	101.01	175.52	282.03	429.17	748.29	1130.1	1646.2	5757.7	15440.
	25	44.44	98.18	195.47	340.92	548.86	836.15	1459.3	2204.8	3212.8	11242.	30152.
1200	15	25.41	31.78	45.54	75.21	120.18	182.31	317.03	478.16	695.99	2430.8	6515.7
	20	33.89	52.98	101.01	175.52	282.03	429.17	748.29	1130.1	1646.2	5757.7	15440.
	25	45.66	98.19	195.47	340.92	548.86	836.15	1459.3	2204.8	3212.8	11242.	30152.
1300	15	26.40	32.76	46.11	75.23	120.18	182.31	317.03	478.16	695.99	2430.8	6515.7
	20	35.06	53.57	101.01	175.52	282.03	429.17	748.29	1130.1	1646.2	5757.7	15440.
	25	46.88	98.20	195.47	340.92	548.86	836.15	1459.3	2204.8	3212.8	11242.	30152.
1400	15	27.35	33.72	46.71	75.26	120.18	182.31	317.03	478.16	695.99	2430.8	6515.7
	20	36.20	54.22	101.01	175.52	282.03	429.17	748.29	1130.1	1646.2	5757.7	15440.
	25	48.08	98.22	195.47	340.92	548.86	836.15	1459.3	2204.8	3212.8	11242.	30152.
1500	15	28.27	34.65	47.36	75.30	120.18	182.31	317.03	478.16	695.99	2430.8	6515.7
	20	37.31	54.92	101.02	175.52	282.03	429.17	748.29	1130.1	1646.2	5757.7	15440.
	25	49.26	98.25	195.47	340.92	548.86	836.15	1459.3	2204.8	3212.8	11242.	30152.
1600	15	29.17	35.56	48.03	75.36	120.18	182.31	317.03	478.16	695.99	2430.8	6515.7
	20	38.40	55.65	101.03	175.52	282.03	429.17	748.29	1130.1	1646.2	5757.7	15440.
	25	50.43	98.30	195.47	340.92	548.86	836.15	1459.3	2204.8	3212.8	11242.	30152.
1700	15	30.04	36.45	48.71	75.45	120.18	182.31	317.03	478.16	695.99	2430.8	6515.7
	20	39.45	56.40	101.05	175.52	282.03	429.17	748.29	1130.1	1646.2	5757.7	15440.
	25	51.58	98.37	195.47	340.92	548.86	836.15	1459.3	2204.8	3212.8	11242.	30152.
1800	15	30.90	37.33	49.41	75.56	120.18	182.31	317.03	478.16	695.99	2430.8	6515.7
	20	40.48	57.17	101.07	175.52	282.03	429.17	748.29	1130.1	1646.2	5757.7	15440.
	25	52.72	98.47	195.47	340.92	548.86	836.15	1459.3	2204.8	3212.8	11242.	30152.
1900	15	31.73	38.18	50.12	75.70	120.18	182.31	317.03	478.16	695.99	2430.8	6515.7
	20	41.49	57.96	101.11	175.52	282.03	429.17	748.29	1130.1	1646.2	5757.7	15440.
	25	53.83	98.59	195.47	340.92	548.86	836.15	1459.3	2204.8	3212.8	11242.	30152.
2000	15	32.54	39.02	50.83	75.87	120.18	182.31	317.03	478.16	695.99	2430.8	6515.7
	20	42.48	58.76	101.15	175.52	282.03	429.17	748.29	1130.1	1646.2	5757.7	15440.
	25	54.93	98.74	195.47	340.92	548.86	836.15	1459.3	2204.8	3212.8	11242.	30152.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 40.0 Ft (RADIUS = 28.3 Ft)
 FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	1.40	1.40	1.45	1.52	1.60	1.68	1.81	1.93	2.06	2.64	3.55
	20	1.51	1.52	1.58	1.66	1.75	1.86	2.02	2.17	2.34	3.26	5.65
	25	1.61	1.63	1.71	1.80	1.91	2.04	2.24	2.44	2.67	4.42	9.51
200	15	1.67	1.68	1.74	1.83	1.92	2.02	2.18	2.32	2.47	3.15	4.09
	20	1.83	1.85	1.93	2.03	2.15	2.27	2.47	2.65	2.84	3.84	5.82
	25	1.99	2.02	2.11	2.23	2.37	2.52	2.77	3.00	3.25	4.85	9.51
300	15	1.89	1.90	1.98	2.07	2.18	2.29	2.48	2.64	2.80	3.56	4.56
	20	2.10	2.12	2.22	2.33	2.46	2.60	2.83	3.03	3.25	4.32	6.19
	25	2.29	2.33	2.44	2.58	2.74	2.91	3.18	3.44	3.73	5.34	9.55
400	15	2.08	2.10	2.18	2.29	2.40	2.53	2.73	2.91	3.09	3.92	4.98
	20	2.33	2.36	2.46	2.59	2.73	2.89	3.14	3.36	3.60	4.75	6.60
	25	2.55	2.60	2.73	2.88	3.05	3.24	3.55	3.83	4.13	5.81	9.67
500	15	2.25	2.28	2.37	2.48	2.61	2.74	2.96	3.15	3.35	4.24	5.35
	20	2.53	2.57	2.68	2.82	2.98	3.15	3.42	3.66	3.91	5.14	7.01
	25	2.79	2.85	2.98	3.15	3.34	3.54	3.87	4.17	4.50	6.24	9.88
600	15	2.41	2.44	2.54	2.66	2.80	2.94	3.17	3.38	3.59	4.53	5.70
	20	2.72	2.77	2.89	3.04	3.21	3.38	3.67	3.93	4.20	5.50	7.41
	25	3.01	3.07	3.22	3.40	3.60	3.82	4.17	4.49	4.84	6.65	10.16
700	15	2.56	2.59	2.69	2.83	2.97	3.13	3.37	3.59	3.81	4.80	6.02
	20	2.90	2.95	3.08	3.24	3.42	3.61	3.91	4.18	4.47	5.83	7.78
	25	3.22	3.28	3.44	3.63	3.84	4.07	4.45	4.79	5.15	7.03	10.48
800	15	2.70	2.73	2.84	2.98	3.14	3.30	3.56	3.78	4.02	5.06	6.33
	20	3.07	3.12	3.26	3.43	3.61	3.82	4.14	4.42	4.73	6.14	8.14
	25	3.41	3.48	3.65	3.85	4.07	4.32	4.71	5.07	5.45	7.39	10.80
900	15	2.84	2.87	2.99	3.13	3.29	3.46	3.73	3.97	4.22	5.30	6.62
	20	3.23	3.28	3.43	3.61	3.80	4.01	4.35	4.65	4.97	6.44	8.48
	25	3.59	3.67	3.84	4.06	4.29	4.55	4.96	5.33	5.73	7.73	11.14
1000	15	2.96	3.00	3.12	3.27	3.44	3.62	3.90	4.15	4.40	5.54	6.90
	20	3.38	3.44	3.59	3.78	3.98	4.20	4.55	4.87	5.20	6.72	8.81
	25	3.77	3.85	4.03	4.25	4.50	4.77	5.20	5.58	6.00	8.06	11.47

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 40.0 Ft (RADIUS = 28.3 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	3.09	3.13	3.25	3.41	3.58	3.77	4.06	4.32	4.59	5.76	7.16
	20	3.53	3.59	3.75	3.94	4.16	4.38	4.75	5.07	5.42	6.99	9.13
	25	3.94	4.02	4.21	4.44	4.70	4.98	5.42	5.82	6.25	8.37	11.80
1200	15	3.20	3.25	3.38	3.54	3.72	3.91	4.22	4.48	4.76	5.97	7.42
	20	3.67	3.73	3.90	4.10	4.32	4.56	4.94	5.27	5.63	7.25	9.44
	25	4.10	4.19	4.39	4.63	4.89	5.18	5.64	6.06	6.50	8.68	12.12
1300	15	3.32	3.36	3.50	3.67	3.86	4.05	4.37	4.64	4.93	6.18	7.67
	20	3.80	3.87	4.04	4.25	4.48	4.73	5.12	5.47	5.83	7.51	9.73
	25	4.25	4.35	4.55	4.80	5.08	5.38	5.85	6.28	6.74	8.97	12.44
1400	15	3.43	3.48	3.62	3.79	3.99	4.19	4.51	4.80	5.09	6.38	7.90
	20	3.94	4.01	4.19	4.40	4.64	4.89	5.30	5.65	6.03	7.75	10.02
	25	4.41	4.50	4.72	4.97	5.26	5.57	6.06	6.50	6.97	9.25	12.76
1500	15	3.54	3.59	3.73	3.91	4.11	4.32	4.66	4.95	5.25	6.57	8.14
	20	4.07	4.14	4.32	4.54	4.79	5.05	5.47	5.84	6.22	7.99	10.30
	25	4.55	4.66	4.87	5.14	5.43	5.75	6.26	6.71	7.19	9.53	13.07
1600	15	3.64	3.69	3.84	4.03	4.23	4.45	4.79	5.09	5.40	6.76	8.36
	20	4.19	4.27	4.46	4.68	4.94	5.21	5.63	6.01	6.41	8.22	10.57
	25	4.70	4.80	5.03	5.30	5.60	5.93	6.45	6.92	7.41	9.80	13.37
1700	15	3.74	3.80	3.95	4.14	4.35	4.58	4.93	5.24	5.55	6.95	8.58
	20	4.31	4.39	4.59	4.82	5.08	5.36	5.80	6.18	6.59	8.44	10.84
	25	4.84	4.95	5.18	5.46	5.77	6.10	6.64	7.11	7.62	10.06	13.66
1800	15	3.84	3.90	4.06	4.25	4.47	4.70	5.06	5.37	5.70	7.12	8.80
	20	4.43	4.52	4.71	4.95	5.22	5.50	5.95	6.35	6.77	8.66	11.10
	25	4.97	5.09	5.33	5.61	5.93	6.27	6.82	7.31	7.83	10.31	13.95
1900	15	3.94	4.00	4.16	4.36	4.58	4.82	5.19	5.51	5.84	7.30	9.00
	20	4.55	4.63	4.84	5.08	5.36	5.65	6.11	6.51	6.94	8.87	11.35
	25	5.11	5.22	5.47	5.76	6.09	6.44	7.00	7.50	8.03	10.56	14.24
2000	15	4.03	4.10	4.26	4.47	4.69	4.93	5.31	5.64	5.98	7.47	9.21
	20	4.66	4.75	4.96	5.21	5.49	5.79	6.26	6.68	7.11	9.08	11.60
	25	5.24	5.36	5.61	5.91	6.24	6.60	7.18	7.69	8.23	10.81	14.52

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 40.0 Ft (RADIUS = 28.3 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE
 TIME INDEX

RATE
 OF RISE

°F/min

(Ft*s)^{1/2}

CEILING HEIGHT, Ft

	4	8	12	16	20	24	30	35	40	60	80
100	2.28 2.54 2.79	2.33 2.63 2.95	2.46 2.83 3.24	2.63 3.09 3.65	2.83 3.42 4.24	3.07 3.85 5.19	3.51 4.88 7.81	4.01 6.41 11.10	4.74 8.68 15.50	12.17 26.37 49.79	29.50 67.07 129.00
200	2.84 3.22 3.58	2.91 3.35 3.78	3.08 3.58 4.12	3.28 3.89 4.57	3.53 4.25 5.15	3.80 4.70 5.95	4.28 5.62 8.02	4.79 6.81 11.11	5.43 8.75 15.50	12.17 26.37 49.79	29.50 67.07 129.00
300	3.29 3.76 4.22	3.38 3.91 4.45	3.57 4.19 4.82	3.81 4.53 5.31	4.08 4.93 5.92	4.39 5.41 6.71	4.92 6.33 8.53	5.45 7.43 11.24	6.10 9.09 15.51	12.20 26.37 49.79	29.50 67.07 129.00
400	3.68 4.24 4.76	3.79 4.41 5.02	4.00 4.71 5.43	4.26 5.08 5.95	4.56 5.52 6.60	4.89 6.03 7.40	5.47 6.98 9.14	6.03 8.05 11.55	6.70 9.58 15.55	12.33 26.37 49.79	29.50 67.07 129.00
500	4.04 4.66 5.26	4.15 4.85 5.54	4.39 5.18 5.98	4.67 5.58 6.53	4.99 6.04 7.21	5.35 6.58 8.03	5.96 7.57 9.74	6.55 8.64 11.98	7.24 10.11 15.68	12.58 26.37 49.79	29.50 67.07 129.00
600	4.36 5.05 5.71	4.49 5.26 6.01	4.74 5.61 6.48	5.05 6.03 7.07	5.39 6.53 7.77	5.77 7.09 8.62	6.41 8.12 10.33	7.03 9.20 12.47	7.75 10.64 15.90	12.92 26.37 49.79	29.50 67.07 129.00
700	4.67 5.42 6.14	4.81 5.64 6.45	5.07 6.01 6.95	5.39 6.46 7.56	5.76 6.98 8.29	6.16 7.57 9.17	6.84 8.63 10.89	7.48 9.73 12.97	8.22 11.16 16.20	13.30 26.38 49.79	29.50 67.07 129.00
800	4.96 5.77 6.54	5.10 6.00 6.87	5.38 6.39 7.39	5.72 6.86 8.03	6.11 7.40 8.79	6.53 8.02 9.69	7.24 9.11 11.43	7.91 10.24 13.48	8.67 11.67 16.56	13.71 26.39 49.79	29.50 67.07 129.00
900	5.23 6.09 6.91	5.38 6.34 7.26	5.68 6.74 7.81	6.04 7.24 8.47	6.44 7.80 9.26	6.88 8.44 10.18	7.61 9.57 11.95	8.31 10.72 13.98	9.10 12.15 16.95	14.12 26.42 49.79	29.51 67.07 129.00
1000	5.49 6.41 7.28	5.65 6.66 7.64	5.96 7.09 8.21	6.33 7.60 8.90	6.75 8.19 9.71	7.21 8.85 10.66	7.97 10.01 12.44	8.69 11.18 14.47	9.50 12.63 17.36	14.54 26.48 49.79	29.52 67.07 129.00

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 40.0 Ft (RADIUS = 28.3 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	5.74	5.91	6.23	6.62	7.05	7.53	8.32	9.06	9.89	14.95	29.55
	20	6.71	6.97	7.41	7.95	8.56	9.24	10.43	11.62	13.08	26.56	67.07
	25	7.62	8.00	8.59	9.30	10.14	11.11	12.92	14.95	17.79	49.79	129.00
1200	15	5.98	6.16	6.49	6.89	7.34	7.84	8.65	9.41	10.27	15.36	29.59
	20	7.00	7.27	7.73	8.28	8.91	9.61	10.83	12.05	13.53	26.67	67.07
	25	7.96	8.35	8.95	9.69	10.55	11.54	13.39	15.41	18.21	49.79	129.00
1300	15	6.21	6.40	6.74	7.16	7.62	8.13	8.97	9.75	10.63	15.76	29.65
	20	7.28	7.56	8.04	8.60	9.25	9.97	11.22	12.46	13.96	26.81	67.07
	25	8.28	8.68	9.31	10.07	10.95	11.97	13.84	15.87	18.64	49.79	129.00
1400	15	6.44	6.63	6.99	7.42	7.90	8.42	9.28	10.09	10.98	16.16	29.72
	20	7.55	7.84	8.33	8.92	9.58	10.32	11.60	12.86	14.37	26.98	67.07
	25	8.60	9.01	9.65	10.43	11.33	12.37	14.27	16.32	19.07	49.79	129.00
1500	15	6.66	6.86	7.22	7.67	8.16	8.70	9.58	10.41	11.32	16.55	29.83
	20	7.81	8.11	8.62	9.22	9.90	10.66	11.97	13.25	14.78	27.18	67.07
	25	8.90	9.32	9.99	10.78	11.71	12.77	14.70	16.76	19.49	49.79	129.00
1600	15	6.87	7.08	7.45	7.91	8.42	8.97	9.88	10.72	11.65	16.93	29.95
	20	8.07	8.38	8.90	9.51	10.21	10.99	12.33	13.63	15.18	27.40	67.07
	25	9.20	9.63	10.31	11.13	12.07	13.15	15.11	17.18	19.91	49.80	129.00
1700	15	7.08	7.29	7.68	8.15	8.67	9.23	10.16	11.02	11.97	17.31	30.09
	20	8.32	8.64	9.17	9.80	10.52	11.31	12.67	14.00	15.56	27.64	67.07
	25	9.48	9.93	10.63	11.46	12.43	13.53	15.51	17.60	20.32	49.80	129.00
1800	15	7.28	7.50	7.90	8.38	8.91	9.49	10.44	11.32	12.29	17.67	30.25
	20	8.56	8.89	9.43	10.08	10.81	11.63	13.01	14.36	15.94	27.89	67.07
	25	9.76	10.22	10.93	11.79	12.77	13.89	15.91	18.01	20.73	49.81	129.00
1900	15	7.48	7.70	8.11	8.60	9.15	9.74	10.71	11.61	12.59	18.04	30.43
	20	8.80	9.14	9.69	10.36	11.10	11.93	13.35	14.71	16.31	28.16	67.07
	25	10.04	10.51	11.23	12.11	13.11	14.25	16.29	18.41	21.13	49.82	129.00
2000	15	7.68	7.90	8.32	8.82	9.38	9.98	10.98	11.89	12.89	18.39	30.63
	20	9.03	9.38	9.94	10.62	11.39	12.23	13.67	15.06	16.68	28.44	67.07
	25	10.31	10.79	11.53	12.42	13.44	14.60	16.67	18.81	21.53	49.84	129.00

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 40.0 Ft (RADIUS = 28.3 Ft)
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
100	15	4.14	4.59	5.44	7.07	10.14	14.57	24.07	35.30	50.35	168.22	441.37	
	20	4.96	6.07	8.85	14.18	21.80	32.23	54.58	81.08	116.62	395.49	1042.4	
	25	5.95	8.80	15.73	26.22	41.04	61.33	104.89	156.54	225.88	770.17	2033.4	
200	15	5.33	5.84	6.69	8.03	10.42	14.59	24.07	35.30	50.35	168.22	441.37	
	20	6.42	7.49	9.63	14.23	21.81	32.23	54.58	81.08	116.62	395.49	1042.4	
	25	7.63	9.90	15.77	26.22	41.04	61.33	104.89	156.54	225.88	770.17	2033.4	
300	15	6.29	6.85	7.74	9.04	11.11	14.74	24.07	35.30	50.35	168.22	441.37	
	20	7.58	8.70	10.67	14.55	21.81	32.23	54.58	81.08	116.62	395.49	1042.4	
	25	8.99	11.14	16.08	26.22	41.04	61.33	104.89	156.54	225.88	770.17	2033.4	
400	15	7.12	7.72	8.66	9.97	11.92	15.13	24.08	35.30	50.35	168.22	441.37	
	20	8.60	9.75	11.69	15.16	21.87	32.23	54.58	81.08	116.62	395.49	1042.4	
	25	10.17	12.29	16.70	26.24	41.04	61.33	104.89	156.54	225.88	770.17	2033.4	
500	15	7.87	8.51	9.49	10.82	12.72	15.69	24.12	35.30	50.35	168.22	441.37	
	20	9.51	10.70	12.64	15.89	22.04	32.23	54.58	81.08	116.62	395.49	1042.4	
	25	11.23	13.37	17.48	26.32	41.04	61.33	104.89	156.54	225.88	770.17	2033.4	
600	15	8.55	9.23	10.25	11.62	13.50	16.32	24.22	35.30	50.35	168.22	441.37	
	20	10.34	11.58	13.54	16.67	22.35	32.25	54.58	81.08	116.62	395.49	1042.4	
	25	12.20	14.36	18.31	26.51	41.05	61.33	104.89	156.54	225.88	770.17	2033.4	
700	15	9.19	9.90	10.96	12.36	14.25	16.98	24.41	35.31	50.35	168.22	441.37	
	20	11.12	12.40	14.38	17.44	22.77	32.29	54.58	81.08	116.62	395.49	1042.4	
	25	13.11	15.30	19.15	26.81	41.05	61.33	104.89	156.54	225.88	770.17	2033.4	
800	15	9.79	10.53	11.63	13.07	14.97	17.64	24.69	35.33	50.35	168.22	441.37	
	20	11.85	13.17	15.18	18.21	23.28	32.38	54.58	81.08	116.62	395.49	1042.4	
	25	13.96	16.19	19.98	27.22	41.07	61.33	104.89	156.54	225.88	770.17	2033.4	
900	15	10.36	11.13	12.27	13.74	15.65	18.29	25.04	35.37	50.35	168.22	441.37	
	20	12.54	13.90	15.94	18.95	23.84	32.53	54.58	81.08	116.62	395.49	1042.4	
	25	14.77	17.03	20.79	27.71	41.11	61.33	104.89	156.54	225.88	770.17	2033.4	
1000	15	10.91	11.70	12.87	14.37	16.31	18.94	25.44	35.44	50.36	168.22	441.37	
	20	13.21	14.59	16.68	19.68	24.42	32.73	54.59	81.08	116.62	395.49	1042.4	
	25	15.54	17.84	21.59	28.25	41.19	61.33	104.89	156.54	225.88	770.17	2033.4	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 40.0 Ft (RADIUS = 28.3 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	11.43	12.25	13.45	14.99	16.95	19.57	25.89	35.54	50.36	168.22	441.37
	20	13.84	15.26	17.38	20.39	25.02	33.00	54.59	81.08	116.62	395.49	1042.4
	25	16.28	18.62	22.36	28.83	41.30	61.33	104.89	156.54	225.88	770.17	2033.4
1200	15	11.93	12.77	14.01	15.58	17.57	20.18	26.36	35.69	50.37	168.22	441.37
	20	14.45	15.91	18.05	21.07	25.63	33.32	54.60	81.08	116.62	395.49	1042.4
	25	17.00	19.36	23.11	29.43	41.46	61.34	104.89	156.54	225.88	770.17	2033.4
1300	15	12.42	13.28	14.55	16.15	18.16	20.79	26.84	35.88	50.38	168.22	441.37
	20	15.04	16.53	18.71	21.74	26.24	33.69	54.61	81.08	116.62	395.49	1042.4
	25	17.68	20.08	23.85	30.04	41.67	61.34	104.89	156.54	225.88	770.17	2033.4
1400	15	12.89	13.77	15.07	16.70	18.74	21.38	27.34	36.11	50.40	168.22	441.37
	20	15.61	17.13	19.34	22.39	26.85	34.09	54.63	81.08	116.62	395.49	1042.4
	25	18.35	20.78	24.56	30.67	41.92	61.36	104.89	156.54	225.88	770.17	2033.4
1500	15	13.35	14.25	15.58	17.24	19.31	21.95	27.85	36.37	50.43	168.22	441.37
	20	16.17	17.71	19.96	23.03	27.46	34.51	54.66	81.08	116.62	395.49	1042.4
	25	19.00	21.46	25.26	31.29	42.21	61.38	104.89	156.54	225.88	770.17	2033.4
1600	15	13.79	14.72	16.07	17.76	19.86	22.51	28.36	36.66	50.48	168.22	441.37
	20	16.70	18.28	20.56	23.65	28.06	34.96	54.71	81.08	116.62	395.49	1042.4
	25	19.62	22.12	25.94	31.91	42.54	61.41	104.89	156.54	225.88	770.17	2033.4
1700	15	14.22	15.17	16.55	18.27	20.39	23.06	28.87	36.98	50.54	168.22	441.37
	20	17.23	18.83	21.14	24.26	28.65	35.42	54.77	81.08	116.62	395.49	1042.4
	25	20.23	22.77	26.60	32.53	42.90	61.45	104.89	156.54	225.88	770.17	2033.4
1800	15	14.65	15.61	17.02	18.77	20.91	23.60	29.37	37.32	50.62	168.22	441.37
	20	17.74	19.36	21.71	24.85	29.23	35.90	54.85	81.08	116.62	395.49	1042.4
	25	20.83	23.39	27.25	33.15	43.29	61.51	104.89	156.54	225.88	770.17	2033.4
1900	15	15.06	16.04	17.47	19.25	21.42	24.13	29.88	37.68	50.72	168.22	441.37
	20	18.24	19.89	22.27	25.43	29.81	36.38	54.95	81.08	116.62	395.49	1042.4
	25	21.41	24.01	27.89	33.76	43.70	61.58	104.89	156.54	225.88	770.17	2033.4
2000	15	15.46	16.46	17.92	19.73	21.92	24.65	30.38	38.05	50.84	168.22	441.37
	20	18.73	20.40	22.81	26.00	30.38	36.87	55.07	81.08	116.62	395.49	1042.4
	25	21.98	24.60	28.52	34.36	44.13	61.67	104.89	156.54	225.88	770.17	2033.4

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 40.0 Ft (RADIUS = 28.3 Ft)³
 FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	11.61	26.71	51.17	87.29	138.39	208.35	358.65	536.95	776.39	2656.6	7021.5
	20	23.69	60.66	118.58	204.10	325.10	490.81	846.89	1269.3	1836.7	6292.9	16639.
	25	44.40	116.64	229.73	396.67	632.92	956.48	1651.8	2476.8	3584.8	12288.	32494.
200	15	13.51	26.71	51.17	87.29	138.39	208.35	358.65	536.95	776.39	2656.6	7021.5
	20	23.84	60.66	118.58	204.10	325.10	490.81	846.89	1269.3	1836.7	6292.9	16639.
	25	44.40	116.64	229.73	396.67	632.92	956.48	1651.8	2476.8	3584.8	12288.	32494.
300	15	15.40	26.81	51.17	87.29	138.39	208.35	358.65	536.95	776.39	2656.6	7021.5
	20	24.63	60.66	118.58	204.10	325.10	490.81	846.89	1269.3	1836.7	6292.9	16639.
	25	44.40	116.64	229.73	396.67	632.92	956.48	1651.8	2476.8	3584.8	12288.	32494.
400	15	17.12	27.20	51.17	87.29	138.39	208.35	358.65	536.95	776.39	2656.6	7021.5
	20	25.92	60.66	118.58	204.10	325.10	490.81	846.89	1269.3	1836.7	6292.9	16639.
	25	44.47	116.64	229.73	396.67	632.92	956.48	1651.8	2476.8	3584.8	12288.	32494.
500	15	18.69	27.88	51.17	87.29	138.39	208.35	358.65	536.95	776.39	2656.6	7021.5
	20	27.37	60.66	118.58	204.10	325.10	490.81	846.89	1269.3	1836.7	6292.9	16639.
	25	44.72	116.64	229.73	396.67	632.92	956.48	1651.8	2476.8	3584.8	12288.	32494.
600	15	20.15	28.77	51.18	87.29	138.39	208.35	358.65	536.95	776.39	2656.6	7021.5
	20	28.86	60.67	118.58	204.10	325.10	490.81	846.89	1269.3	1836.7	6292.9	16639.
	25	45.22	116.64	229.73	396.67	632.92	956.48	1651.8	2476.8	3584.8	12288.	32494.
700	15	21.51	29.75	51.21	87.29	138.39	208.35	358.65	536.95	776.39	2656.6	7021.5
	20	30.33	60.69	118.58	204.10	325.10	490.81	846.89	1269.3	1836.7	6292.9	16639.
	25	45.96	116.64	229.73	396.67	632.92	956.48	1651.8	2476.8	3584.8	12288.	32494.
800	15	22.80	30.78	51.27	87.29	138.39	208.35	358.65	536.95	776.39	2656.6	7021.5
	20	31.76	60.74	118.58	204.10	325.10	490.81	846.89	1269.3	1836.7	6292.9	16639.
	25	46.87	116.64	229.73	396.67	632.92	956.48	1651.8	2476.8	3584.8	12288.	32494.
900	15	24.03	31.83	51.39	87.29	138.39	208.35	358.65	536.95	776.39	2656.6	7021.5
	20	33.15	60.84	118.58	204.10	325.10	490.81	846.89	1269.3	1836.7	6292.9	16639.
	25	47.90	116.64	229.73	396.67	632.92	956.48	1651.8	2476.8	3584.8	12288.	32494.
1000	15	25.20	32.87	51.58	87.29	138.39	208.35	358.65	536.95	776.39	2656.6	7021.5
	20	34.50	61.00	118.58	204.10	325.10	490.81	846.89	1269.3	1836.7	6292.9	16639.
	25	49.00	116.64	229.73	396.67	632.92	956.48	1651.8	2476.8	3584.8	12288.	32494.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 40.0 Ft (RADIUS = 28.3 Ft)³
 FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	26.32	33.90	51.85	87.29	138.39	208.35	358.65	536.95	776.39	2656.6	7021.5
	20	35.81	61.25	118.58	204.10	325.10	490.81	846.89	1269.3	1836.7	6292.9	16639.
	25	50.16	116.64	229.73	396.67	632.92	956.48	1651.8	2476.8	3584.8	12288.	32494.
1200	15	27.40	34.92	52.19	87.29	138.39	208.35	358.65	536.95	776.39	2656.6	7021.5
	20	37.08	61.57	118.58	204.10	325.10	490.81	846.89	1269.3	1836.7	6292.9	16639.
	25	51.33	116.64	229.73	396.67	632.92	956.48	1651.8	2476.8	3584.8	12288.	32494.
1300	15	28.44	35.92	52.61	87.30	138.39	208.35	358.65	536.95	776.39	2656.6	7021.5
	20	38.31	61.97	118.58	204.10	325.10	490.81	846.89	1269.3	1836.7	6292.9	16639.
	25	52.52	116.64	229.73	396.67	632.92	956.48	1651.8	2476.8	3584.8	12288.	32494.
1400	15	29.46	36.91	53.08	87.30	138.39	208.35	358.65	536.95	776.39	2656.6	7021.5
	20	39.51	62.45	118.58	204.10	325.10	490.81	846.89	1269.3	1836.7	6292.9	16639.
	25	53.71	116.65	229.73	396.67	632.92	956.48	1651.8	2476.8	3584.8	12288.	32494.
1500	15	30.44	37.87	53.60	87.32	138.39	208.35	358.65	536.95	776.39	2656.6	7021.5
	20	40.68	62.98	118.58	204.10	325.10	490.81	846.89	1269.3	1836.7	6292.9	16639.
	25	54.90	116.65	229.73	396.67	632.92	956.48	1651.8	2476.8	3584.8	12288.	32494.
1600	15	31.39	38.82	54.17	87.34	138.39	208.35	358.65	536.95	776.39	2656.6	7021.5
	20	41.82	63.57	118.59	204.10	325.10	490.81	846.89	1269.3	1836.7	6292.9	16639.
	25	56.08	116.67	229.73	396.67	632.92	956.48	1651.8	2476.8	3584.8	12288.	32494.
1700	15	32.32	39.75	54.77	87.37	138.39	208.35	358.65	536.95	776.39	2656.6	7021.5
	20	42.93	64.20	118.59	204.10	325.10	490.81	846.89	1269.3	1836.7	6292.9	16639.
	25	57.25	116.69	229.73	396.67	632.92	956.48	1651.8	2476.8	3584.8	12288.	32494.
1800	15	33.23	40.66	55.40	87.42	138.39	208.35	358.65	536.95	776.39	2656.6	7021.5
	20	44.02	64.87	118.60	204.10	325.10	490.81	846.89	1269.3	1836.7	6292.9	16639.
	25	58.41	116.71	229.73	396.67	632.92	956.48	1651.8	2476.8	3584.8	12288.	32494.
1900	15	34.11	41.55	56.05	87.48	138.39	208.35	358.65	536.95	776.39	2656.6	7021.5
	20	45.09	65.57	118.60	204.10	325.10	490.81	846.89	1269.3	1836.7	6292.9	16639.
	25	59.55	116.76	229.73	396.67	632.92	956.48	1651.8	2476.8	3584.8	12288.	32494.
2000	15	34.98	42.43	56.71	87.56	138.39	208.35	358.65	536.95	776.39	2656.6	7021.5
	20	46.14	66.29	118.62	204.10	325.10	490.81	846.89	1269.3	1836.7	6292.9	16639.
	25	60.68	116.81	229.73	396.67	632.92	956.48	1651.8	2476.8	3584.8	12288.	32494.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 42.0 Ft (RADIUS = 29.7 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	1.47	1.46	1.51	1.58	1.66	1.74	1.88	2.00	2.12	2.72	3.68
	20	1.58	1.59	1.65	1.73	1.82	1.93	2.10	2.25	2.42	3.39	5.97
	25	1.69	1.71	1.78	1.88	1.99	2.12	2.33	2.54	2.78	4.70	10.14
200	15	1.75	1.76	1.82	1.90	1.99	2.10	2.26	2.40	2.55	3.25	4.22
	20	1.93	1.94	2.02	2.12	2.24	2.36	2.56	2.75	2.95	3.98	6.11
	25	2.09	2.12	2.21	2.33	2.47	2.63	2.88	3.12	3.38	5.09	10.14
300	15	1.99	1.99	2.07	2.16	2.27	2.38	2.57	2.73	2.90	3.67	4.70
	20	2.21	2.23	2.32	2.43	2.56	2.71	2.94	3.14	3.37	4.48	6.47
	25	2.41	2.45	2.56	2.70	2.86	3.03	3.32	3.58	3.87	5.58	10.16
400	15	2.19	2.20	2.28	2.39	2.50	2.63	2.83	3.01	3.20	4.04	5.13
	20	2.45	2.48	2.58	2.71	2.85	3.01	3.26	3.49	3.73	4.92	6.88
	25	2.69	2.74	2.86	3.01	3.19	3.38	3.69	3.98	4.30	6.06	10.25
500	15	2.37	2.39	2.47	2.59	2.72	2.85	3.07	3.26	3.47	4.37	5.52
	20	2.67	2.70	2.81	2.95	3.11	3.28	3.55	3.80	4.06	5.32	7.29
	25	2.94	2.99	3.13	3.30	3.49	3.69	4.03	4.34	4.68	6.50	10.44
600	15	2.54	2.56	2.65	2.78	2.91	3.06	3.29	3.50	3.71	4.67	5.87
	20	2.87	2.91	3.02	3.18	3.34	3.53	3.82	4.08	4.36	5.69	7.69
	25	3.17	3.23	3.38	3.56	3.76	3.98	4.34	4.67	5.03	6.91	10.70
700	15	2.70	2.72	2.82	2.95	3.10	3.25	3.50	3.72	3.94	4.95	6.21
	20	3.06	3.10	3.23	3.39	3.56	3.76	4.07	4.34	4.64	6.03	8.07
	25	3.39	3.45	3.61	3.80	4.02	4.25	4.63	4.98	5.36	7.31	11.00
800	15	2.85	2.87	2.98	3.11	3.27	3.43	3.69	3.92	4.16	5.22	6.52
	20	3.23	3.28	3.41	3.58	3.77	3.98	4.30	4.59	4.90	6.36	8.43
	25	3.59	3.66	3.83	4.03	4.26	4.50	4.91	5.27	5.67	7.68	11.32
900	15	2.99	3.01	3.13	3.27	3.43	3.60	3.88	4.12	4.36	5.47	6.82
	20	3.40	3.45	3.59	3.77	3.97	4.18	4.53	4.83	5.15	6.66	8.79
	25	3.79	3.86	4.03	4.25	4.49	4.75	5.17	5.55	5.96	8.03	11.65
1000	15	3.12	3.15	3.27	3.42	3.59	3.77	4.05	4.30	4.56	5.71	7.11
	20	3.56	3.62	3.76	3.95	4.16	4.38	4.74	5.05	5.39	6.96	9.12
	25	3.97	4.05	4.23	4.45	4.70	4.98	5.41	5.81	6.24	8.37	11.98

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 42.0 Ft (RADIUS = 29.7 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	3.25	3.28	3.41	3.56	3.74	3.92	4.22	4.48	4.75	5.94	7.38
	20	3.72	3.77	3.93	4.12	4.34	4.57	4.94	5.27	5.62	7.24	9.45
	25	4.15	4.23	4.42	4.65	4.91	5.20	5.65	6.06	6.50	8.69	12.31
1200	15	3.38	3.41	3.54	3.70	3.88	4.08	4.38	4.65	4.93	6.16	7.64
	20	3.87	3.93	4.09	4.29	4.51	4.75	5.14	5.48	5.84	7.51	9.76
	25	4.32	4.41	4.60	4.85	5.12	5.41	5.88	6.30	6.76	9.01	12.64
1300	15	3.50	3.53	3.67	3.83	4.02	4.22	4.54	4.82	5.10	6.38	7.90
	20	4.01	4.07	4.24	4.45	4.68	4.93	5.33	5.68	6.05	7.77	10.07
	25	4.49	4.58	4.78	5.03	5.31	5.61	6.10	6.54	7.01	9.31	12.96
1400	15	3.61	3.65	3.79	3.96	4.16	4.36	4.69	4.98	5.27	6.58	8.14
	20	4.15	4.22	4.39	4.60	4.84	5.10	5.51	5.87	6.26	8.02	10.37
	25	4.65	4.74	4.95	5.21	5.50	5.81	6.31	6.76	7.25	9.60	13.28
1500	15	3.73	3.77	3.91	4.09	4.29	4.50	4.84	5.13	5.44	6.78	8.38
	20	4.29	4.35	4.53	4.76	5.00	5.27	5.69	6.06	6.46	8.26	10.65
	25	4.80	4.90	5.12	5.39	5.68	6.00	6.52	6.98	7.48	9.89	13.60
1600	15	3.84	3.88	4.03	4.21	4.42	4.64	4.98	5.28	5.60	6.98	8.61
	20	4.42	4.49	4.67	4.90	5.16	5.43	5.86	6.25	6.65	8.50	10.93
	25	4.96	5.05	5.28	5.55	5.86	6.19	6.72	7.20	7.70	10.17	13.90
1700	15	3.94	3.99	4.14	4.33	4.54	4.77	5.12	5.43	5.75	7.17	8.84
	20	4.55	4.62	4.81	5.05	5.31	5.59	6.03	6.43	6.84	8.73	11.21
	25	5.10	5.21	5.44	5.72	6.03	6.37	6.92	7.40	7.93	10.44	14.20
1800	15	4.05	4.10	4.25	4.45	4.66	4.89	5.26	5.58	5.91	7.35	9.06
	20	4.67	4.75	4.94	5.19	5.45	5.74	6.20	6.60	7.02	8.96	11.47
	25	5.25	5.35	5.59	5.88	6.20	6.55	7.11	7.61	8.14	10.70	14.50
1900	15	4.15	4.20	4.36	4.56	4.78	5.02	5.39	5.72	6.05	7.53	9.27
	20	4.80	4.87	5.07	5.32	5.60	5.89	6.36	6.77	7.20	9.18	11.74
	25	5.39	5.50	5.74	6.04	6.37	6.72	7.29	7.81	8.35	10.96	14.79
2000	15	4.25	4.31	4.47	4.67	4.90	5.14	5.52	5.85	6.20	7.71	9.49
	20	4.92	5.00	5.20	5.46	5.74	6.04	6.51	6.94	7.38	9.40	11.99
	25	5.53	5.64	5.89	6.19	6.53	6.89	7.48	8.00	8.55	11.21	15.08

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 42.0 Ft (RADIUS = 29.7 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	2.40	2.44	2.58	2.75	2.96	3.21	3.69	4.24	5.06	13.14	31.62
	20	2.68	2.78	2.98	3.25	3.61	4.09	5.27	7.02	9.51	28.63	72.04
	25	2.95	3.12	3.44	3.88	4.56	5.68	8.67	12.29	17.11	54.18	138.70
200	15	2.99	3.06	3.23	3.44	3.69	3.98	4.49	5.03	5.73	13.14	31.62
	20	3.40	3.53	3.77	4.09	4.48	4.97	5.98	7.34	9.56	28.63	72.04
	25	3.79	4.00	4.36	4.84	5.48	6.39	8.80	12.30	17.11	54.18	138.70
300	15	3.47	3.56	3.75	3.99	4.27	4.59	5.15	5.71	6.41	13.16	31.62
	20	3.97	4.13	4.41	4.76	5.19	5.70	6.71	7.92	9.82	28.63	72.04
	25	4.46	4.70	5.10	5.62	6.28	7.15	9.24	12.37	17.11	54.18	138.70
400	15	3.89	3.99	4.20	4.47	4.78	5.12	5.72	6.31	7.02	13.25	31.62
	20	4.48	4.65	4.96	5.35	5.80	6.35	7.37	8.55	10.26	28.63	72.04
	25	5.04	5.31	5.74	6.30	6.98	7.86	9.82	12.61	17.13	54.18	138.70
500	15	4.26	4.37	4.61	4.90	5.23	5.60	6.24	6.85	7.59	13.45	31.62
	20	4.93	5.12	5.45	5.87	6.36	6.93	7.98	9.15	10.78	28.63	72.04
	25	5.56	5.85	6.32	6.90	7.62	8.52	10.42	12.98	17.21	54.18	138.70
600	15	4.61	4.73	4.98	5.29	5.65	6.04	6.71	7.36	8.11	13.75	31.62
	20	5.34	5.55	5.91	6.35	6.86	7.46	8.55	9.72	11.30	28.63	72.04
	25	6.05	6.35	6.85	7.46	8.21	9.13	11.01	13.43	17.37	54.18	138.70
700	15	4.93	5.06	5.33	5.66	6.03	6.45	7.15	7.82	8.60	14.11	31.62
	20	5.73	5.95	6.33	6.80	7.34	7.96	9.08	10.27	11.83	28.64	72.04
	25	6.49	6.82	7.34	7.99	8.76	9.70	11.58	13.92	17.62	54.18	138.70
800	15	5.23	5.37	5.66	6.00	6.40	6.83	7.57	8.26	9.07	14.50	31.62
	20	6.10	6.33	6.73	7.22	7.78	8.43	9.58	10.79	12.34	28.64	72.04
	25	6.92	7.26	7.80	8.48	9.28	10.24	12.14	14.41	17.93	54.18	138.70
900	15	5.52	5.67	5.97	6.33	6.74	7.20	7.96	8.68	9.51	14.91	31.62
	20	6.44	6.69	7.10	7.62	8.20	8.87	10.06	11.29	12.84	28.66	72.04
	25	7.32	7.68	8.24	8.94	9.77	10.76	12.67	14.91	18.28	54.18	138.70
1000	15	5.80	5.95	6.26	6.65	7.07	7.55	8.34	9.08	9.93	15.32	31.63
	20	6.77	7.03	7.46	8.00	8.61	9.30	10.52	11.76	13.32	28.69	72.04
	25	7.70	8.07	8.66	9.39	10.24	11.25	13.18	15.41	18.67	54.18	138.70

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 42.0 Ft (RADIUS = 29.7 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	6.06	6.23	6.55	6.95	7.39	7.88	8.70	9.46	10.33	15.73	31.64
	20	7.09	7.36	7.81	8.36	8.99	9.70	10.96	12.22	13.79	28.75	72.04
	25	8.07	8.45	9.07	9.81	10.69	11.72	13.68	15.89	19.07	54.18	138.70
1200	15	6.32	6.49	6.82	7.23	7.69	8.20	9.04	9.83	10.72	16.14	31.67
	20	7.40	7.67	8.14	8.71	9.36	10.10	11.38	12.67	14.25	28.83	72.04
	25	8.42	8.82	9.45	10.22	11.12	12.18	14.16	16.37	19.49	54.18	138.70
1300	15	6.56	6.74	7.09	7.51	7.99	8.51	9.38	10.19	11.10	16.55	31.71
	20	7.69	7.98	8.46	9.05	9.72	10.47	11.78	13.10	14.69	28.94	72.04
	25	8.77	9.18	9.83	10.62	11.54	12.62	14.62	16.84	19.91	54.18	138.70
1400	15	6.80	6.99	7.35	7.78	8.27	8.81	9.70	10.53	11.46	16.95	31.77
	20	7.98	8.27	8.77	9.38	10.07	10.84	12.18	13.51	15.12	29.07	72.04
	25	9.10	9.52	10.19	11.00	11.95	13.05	15.08	17.30	20.33	54.18	138.70
1500	15	7.03	7.22	7.59	8.04	8.55	9.10	10.02	10.87	11.82	17.35	31.85
	20	8.26	8.56	9.08	9.70	10.40	11.19	12.56	13.92	15.54	29.23	72.04
	25	9.42	9.85	10.54	11.37	12.34	13.46	15.52	17.75	20.76	54.18	138.70
1600	15	7.26	7.46	7.84	8.30	8.82	9.38	10.32	11.19	12.16	17.74	31.94
	20	8.53	8.84	9.37	10.01	10.73	11.54	12.94	14.31	15.95	29.42	72.04
	25	9.73	10.18	10.88	11.73	12.72	13.86	15.95	18.19	21.18	54.18	138.70
1700	15	7.48	7.68	8.07	8.55	9.08	9.66	10.62	11.51	12.50	18.12	32.06
	20	8.80	9.11	9.66	10.31	11.05	11.88	13.30	14.69	16.35	29.63	72.04
	25	10.04	10.49	11.21	12.08	13.09	14.25	16.37	18.62	21.59	54.18	138.70
1800	15	7.69	7.90	8.30	8.79	9.33	9.93	10.91	11.82	12.82	18.50	32.20
	20	9.05	9.38	9.93	10.60	11.36	12.20	13.65	15.07	16.75	29.85	72.04
	25	10.34	10.80	11.54	12.43	13.46	14.64	16.77	19.04	22.01	54.19	138.70
1900	15	7.90	8.12	8.53	9.03	9.58	10.19	11.19	12.12	13.14	18.87	32.35
	20	9.31	9.64	10.21	10.89	11.66	12.52	14.00	15.43	17.13	30.10	72.04
	25	10.63	11.10	11.85	12.76	13.81	15.01	17.17	19.45	22.42	54.19	138.70
2000	15	8.11	8.33	8.75	9.26	9.83	10.45	11.47	12.41	13.45	19.23	32.53
	20	9.55	9.89	10.47	11.17	11.96	12.84	14.34	15.79	17.50	30.35	72.04
	25	10.91	11.40	12.16	13.09	14.16	15.38	17.57	19.86	22.82	54.20	138.70

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 42.0 Ft (RADIUS = 29.7 Ft)³
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	4.39	4.90	5.89	7.88	11.44	16.41	26.96	39.34	55.84	183.33	474.83
	20	5.30	6.63	10.10	16.22	24.84	36.52	61.38	90.60	129.57	431.25	1121.7
	25	6.43	10.07	18.19	30.16	46.92	69.68	118.12	175.10	251.14	839.99	2188.1
200	15	5.66	6.22	7.17	8.74	11.61	16.42	26.96	39.34	55.84	183.33	474.83
	20	6.85	8.09	10.69	16.24	24.84	36.52	61.38	90.60	129.57	431.25	1121.7
	25	8.20	10.98	18.20	30.16	46.92	69.68	118.12	175.10	251.14	839.99	2188.1
300	15	6.68	7.29	8.27	9.74	12.18	16.50	26.96	39.34	55.84	183.33	474.83
	20	8.09	9.35	11.67	16.43	24.84	36.52	61.38	90.60	129.57	431.25	1121.7
	25	9.64	12.19	18.36	30.16	46.92	69.68	118.12	175.10	251.14	839.99	2188.1
400	15	7.56	8.21	9.23	10.70	12.94	16.77	26.96	39.34	55.84	183.33	474.83
	20	9.16	10.46	12.69	16.89	24.86	36.52	61.38	90.60	129.57	431.25	1121.7
	25	10.89	13.37	18.81	30.17	46.92	69.68	118.12	175.10	251.14	839.99	2188.1
500	15	8.35	9.04	10.10	11.58	13.74	17.23	26.98	39.34	55.84	183.33	474.83
	20	10.13	11.46	13.67	17.54	24.95	36.52	61.38	90.60	129.57	431.25	1121.7
	25	12.02	14.48	19.48	30.20	46.92	69.68	118.12	175.10	251.14	839.99	2188.1
600	15	9.07	9.80	10.90	12.41	14.53	17.81	27.03	39.34	55.84	183.33	474.83
	20	11.01	12.38	14.59	18.27	25.14	36.53	61.38	90.60	129.57	431.25	1121.7
	25	13.05	15.52	20.25	30.29	46.92	69.68	118.12	175.10	251.14	839.99	2188.1
700	15	9.75	10.51	11.65	13.18	15.29	18.43	27.15	39.35	55.84	183.33	474.83
	20	11.84	13.25	15.47	19.03	25.46	36.55	61.38	90.60	129.57	431.25	1121.7
	25	14.01	16.50	21.06	30.47	46.93	69.68	118.12	175.10	251.14	839.99	2188.1
800	15	10.39	11.17	12.36	13.92	16.03	19.08	27.34	39.35	55.84	183.33	474.83
	20	12.61	14.06	16.31	19.79	25.86	36.59	61.38	90.60	129.57	431.25	1121.7
	25	14.92	17.43	21.88	30.75	46.93	69.68	118.12	175.10	251.14	839.99	2188.1
900	15	10.99	11.81	13.03	14.62	16.74	19.73	27.61	39.37	55.84	183.33	474.83
	20	13.35	14.83	17.10	20.54	26.35	36.67	61.38	90.60	129.57	431.25	1121.7
	25	15.78	18.32	22.69	31.13	46.95	69.68	118.12	175.10	251.14	839.99	2188.1
1000	15	11.57	12.41	13.66	15.29	17.42	20.37	27.94	39.41	55.84	183.33	474.83
	20	14.05	15.57	17.87	21.28	26.88	36.79	61.38	90.60	129.57	431.25	1121.7
	25	16.60	19.17	23.50	31.57	46.98	69.68	118.12	175.10	251.14	839.99	2188.1

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 42.0 Ft (RADIUS = 29.7 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	12.12	12.99	14.28	15.93	18.08	21.01	28.33	39.47	55.84	183.33	474.83
	20	14.72	16.27	18.60	22.00	27.44	36.97	61.38	90.60	129.57	431.25	1121.7
	25	17.38	19.99	24.29	32.07	47.03	69.68	118.12	175.10	251.14	839.99	2188.1
1200	15	12.66	13.55	14.86	16.55	18.72	21.64	28.75	39.56	55.85	183.33	474.83
	20	15.37	16.95	19.32	22.71	28.02	37.20	61.38	90.60	129.57	431.25	1121.7
	25	18.14	20.77	25.06	32.61	47.12	69.68	118.12	175.10	251.14	839.99	2188.1
1300	15	13.17	14.08	15.43	17.15	19.35	22.26	29.20	39.69	55.85	183.33	474.83
	20	16.00	17.61	20.00	23.40	28.61	37.48	61.39	90.60	129.57	431.25	1121.7
	25	18.87	21.54	25.82	33.18	47.24	69.68	118.12	175.10	251.14	839.99	2188.1
1400	15	13.67	14.60	15.98	17.73	19.95	22.86	29.67	39.85	55.86	183.33	474.83
	20	16.60	18.24	20.67	24.08	29.21	37.80	61.39	90.60	129.57	431.25	1121.7
	25	19.57	22.27	26.56	33.77	47.40	69.69	118.12	175.10	251.14	839.99	2188.1
1500	15	14.15	15.11	16.52	18.30	20.54	23.45	30.15	40.04	55.88	183.33	474.83
	20	17.19	18.86	21.32	24.74	29.81	38.16	61.41	90.60	129.57	431.25	1121.7
	25	20.26	22.99	27.28	34.36	47.59	69.69	118.12	175.10	251.14	839.99	2188.1
1600	15	14.62	15.60	17.03	18.84	21.11	24.03	30.64	40.27	55.90	183.33	474.83
	20	17.76	19.46	21.95	25.38	30.41	38.55	61.43	90.60	129.57	431.25	1121.7
	25	20.92	23.69	27.99	34.97	47.83	69.71	118.12	175.10	251.14	839.99	2188.1
1700	15	15.08	16.08	17.54	19.38	21.67	24.60	31.14	40.53	55.93	183.33	474.83
	20	18.32	20.04	22.56	26.01	31.00	38.96	61.46	90.60	129.57	431.25	1121.7
	25	21.57	24.36	28.68	35.58	48.10	69.72	118.12	175.10	251.14	839.99	2188.1
1800	15	15.53	16.54	18.03	19.90	22.21	25.16	31.64	40.82	55.98	183.33	474.83
	20	18.86	20.61	23.16	26.63	31.59	39.39	61.50	90.60	129.57	431.25	1121.7
	25	22.20	25.03	29.36	36.19	48.41	69.75	118.12	175.10	251.14	839.99	2188.1
1900	15	15.97	17.00	18.51	20.41	22.75	25.71	32.14	41.13	56.04	183.33	474.83
	20	19.39	21.16	23.74	27.23	32.18	39.84	61.55	90.60	129.57	431.25	1121.7
	25	22.82	25.67	30.02	36.80	48.74	69.78	118.12	175.10	251.14	839.99	2188.1
2000	15	16.40	17.44	18.99	20.91	23.27	26.24	32.64	41.46	56.12	183.33	474.83
	20	19.91	21.71	24.32	27.83	32.75	40.30	61.62	90.60	129.57	431.25	1121.7
	25	23.43	26.31	30.68	37.41	49.10	69.83	118.12	175.10	251.14	839.99	2188.1

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 42.0 Ft (RADIUS = 29.7 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	13.29	31.30	59.56	100.81	158.61	237.10	404.27	601.01	863.58	2897.8	7556.2
	20	28.07	71.44	138.38	236.05	372.94	558.88	954.93	1421.1	2043.3	6864.5	17906.
	25	52.86	137.62	268.32	459.03	726.30	1089.4	1862.8	2773.1	3988.3	13404.	34969.
200	15	14.98	31.30	59.56	100.81	158.61	237.10	404.27	601.01	863.58	2897.8	7556.2
	20	28.11	71.44	138.38	236.05	372.94	558.88	954.93	1421.1	2043.3	6864.5	17906.
	25	52.86	137.62	268.32	459.03	726.30	1089.4	1862.8	2773.1	3988.3	13404.	34969.
300	15	16.88	31.33	59.56	100.81	158.61	237.10	404.27	601.01	863.58	2897.8	7556.2
	20	28.55	71.44	138.38	236.05	372.94	558.88	954.93	1421.1	2043.3	6864.5	17906.
	25	52.86	137.62	268.32	459.03	726.30	1089.4	1862.8	2773.1	3988.3	13404.	34969.
400	15	18.66	31.51	59.56	100.81	158.61	237.10	404.27	601.01	863.58	2897.8	7556.2
	20	29.53	71.44	138.38	236.05	372.94	558.88	954.93	1421.1	2043.3	6864.5	17906.
	25	52.88	137.62	268.32	459.03	726.30	1089.4	1862.8	2773.1	3988.3	13404.	34969.
500	15	20.30	31.96	59.56	100.81	158.61	237.10	404.27	601.01	863.58	2897.8	7556.2
	20	30.82	71.44	138.38	236.05	372.94	558.88	954.93	1421.1	2043.3	6864.5	17906.
	25	52.96	137.62	268.32	459.03	726.30	1089.4	1862.8	2773.1	3988.3	13404.	34969.
600	15	21.83	32.63	59.56	100.81	158.61	237.10	404.27	601.01	863.58	2897.8	7556.2
	20	32.23	71.44	138.38	236.05	372.94	558.88	954.93	1421.1	2043.3	6864.5	17906.
	25	53.20	137.62	268.32	459.03	726.30	1089.4	1862.8	2773.1	3988.3	13404.	34969.
700	15	23.27	33.47	59.57	100.81	158.61	237.10	404.27	601.01	863.58	2897.8	7556.2
	20	33.68	71.44	138.38	236.05	372.94	558.88	954.93	1421.1	2043.3	6864.5	17906.
	25	53.62	137.62	268.32	459.03	726.30	1089.4	1862.8	2773.1	3988.3	13404.	34969.
800	15	24.63	34.41	59.59	100.81	158.61	237.10	404.27	601.01	863.58	2897.8	7556.2
	20	35.11	71.46	138.38	236.05	372.94	558.88	954.93	1421.1	2043.3	6864.5	17906.
	25	54.25	137.62	268.32	459.03	726.30	1089.4	1862.8	2773.1	3988.3	13404.	34969.
900	15	25.92	35.40	59.63	100.81	158.61	237.10	404.27	601.01	863.58	2897.8	7556.2
	20	36.53	71.49	138.38	236.05	372.94	558.88	954.93	1421.1	2043.3	6864.5	17906.
	25	55.03	137.62	268.32	459.03	726.30	1089.4	1862.8	2773.1	3988.3	13404.	34969.
1000	15	27.16	36.41	59.72	100.81	158.61	237.10	404.27	601.01	863.58	2897.8	7556.2
	20	37.91	71.55	138.38	236.05	372.94	558.88	954.93	1421.1	2043.3	6864.5	17906.
	25	55.94	137.62	268.32	459.03	726.30	1089.4	1862.8	2773.1	3988.3	13404.	34969.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 42.0 Ft (RADIUS = 29.7 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	28.35	37.43	59.86	100.81	158.61	237.10	404.27	601.01	863.58	2897.8	7556.2
	20	39.26	71.65	138.38	236.05	372.94	558.88	954.93	1421.1	2043.3	6864.5	17906.
	25	56.95	137.62	268.32	459.03	726.30	1089.4	1862.8	2773.1	3988.3	13404.	34969.
1200	15	29.49	38.44	60.05	100.81	158.61	237.10	404.27	601.01	863.58	2897.8	7556.2
	20	40.57	71.81	138.38	236.05	372.94	558.88	954.93	1421.1	2043.3	6864.5	17906.
	25	58.01	137.62	268.32	459.03	726.30	1089.4	1862.8	2773.1	3988.3	13404.	34969.
1300	15	30.60	39.45	60.31	100.81	158.61	237.10	404.27	601.01	863.58	2897.8	7556.2
	20	41.86	72.04	138.38	236.05	372.94	558.88	954.93	1421.1	2043.3	6864.5	17906.
	25	59.12	137.62	268.32	459.03	726.30	1089.4	1862.8	2773.1	3988.3	13404.	34969.
1400	15	31.67	40.45	60.63	100.81	158.61	237.10	404.27	601.01	863.58	2897.8	7556.2
	20	43.11	72.32	138.38	236.05	372.94	558.88	954.93	1421.1	2043.3	6864.5	17906.
	25	60.25	137.62	268.32	459.03	726.30	1089.4	1862.8	2773.1	3988.3	13404.	34969.
1500	15	32.71	41.43	61.01	100.81	158.61	237.10	404.27	601.01	863.58	2897.8	7556.2
	20	44.33	72.67	138.38	236.05	372.94	558.88	954.93	1421.1	2043.3	6864.5	17906.
	25	61.40	137.62	268.32	459.03	726.30	1089.4	1862.8	2773.1	3988.3	13404.	34969.
1600	15	33.72	42.41	61.44	100.82	158.61	237.10	404.27	601.01	863.58	2897.8	7556.2
	20	45.53	73.08	138.38	236.05	372.94	558.88	954.93	1421.1	2043.3	6864.5	17906.
	25	62.55	137.62	268.32	459.03	726.30	1089.4	1862.8	2773.1	3988.3	13404.	34969.
1700	15	34.71	43.36	61.91	100.83	158.61	237.10	404.27	601.01	863.58	2897.8	7556.2
	20	46.70	73.55	138.38	236.05	372.94	558.88	954.93	1421.1	2043.3	6864.5	17906.
	25	63.71	137.63	268.32	459.03	726.30	1089.4	1862.8	2773.1	3988.3	13404.	34969.
1800	15	35.67	44.30	62.43	100.85	158.61	237.10	404.27	601.01	863.58	2897.8	7556.2
	20	47.84	74.07	138.38	236.05	372.94	558.88	954.93	1421.1	2043.3	6864.5	17906.
	25	64.86	137.63	268.32	459.03	726.30	1089.4	1862.8	2773.1	3988.3	13404.	34969.
1900	15	36.61	45.23	62.98	100.87	158.61	237.10	404.27	601.01	863.58	2897.8	7556.2
	20	48.96	74.63	138.38	236.05	372.94	558.88	954.93	1421.1	2043.3	6864.5	17906.
	25	66.01	137.64	268.32	459.03	726.30	1089.4	1862.8	2773.1	3988.3	13404.	34969.
2000	15	37.53	46.14	63.56	100.90	158.61	237.10	404.27	601.01	863.58	2897.8	7556.2
	20	50.06	75.23	138.39	236.05	372.94	558.88	954.93	1421.1	2043.3	6864.5	17906.
	25	67.15	137.66	268.32	459.03	726.30	1089.4	1862.8	2773.1	3988.3	13404.	34969.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 44.0 Ft (RADIUS = 31.1 Ft)
 FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	1.54	1.53	1.57	1.64	1.72	1.80	1.94	2.06	2.19	2.80	3.82
	20	1.66	1.66	1.72	1.80	1.90	2.00	2.17	2.33	2.50	3.53	6.32
	25	1.78	1.79	1.86	1.96	2.08	2.21	2.43	2.64	2.89	5.00	10.80
200	15	1.84	1.84	1.90	1.98	2.07	2.17	2.34	2.48	2.64	3.35	4.36
	20	2.02	2.03	2.11	2.21	2.33	2.45	2.66	2.85	3.05	4.13	6.43
	25	2.20	2.22	2.31	2.44	2.58	2.73	2.99	3.24	3.52	5.35	10.80
300	15	2.08	2.09	2.16	2.25	2.36	2.47	2.66	2.82	2.99	3.78	4.85
	20	2.32	2.33	2.42	2.54	2.67	2.81	3.05	3.26	3.49	4.64	6.76
	25	2.54	2.57	2.68	2.82	2.98	3.15	3.45	3.72	4.03	5.83	10.81
400	15	2.30	2.30	2.38	2.48	2.60	2.73	2.93	3.11	3.30	4.16	5.28
	20	2.57	2.59	2.69	2.82	2.97	3.13	3.38	3.62	3.86	5.10	7.16
	25	2.83	2.87	2.99	3.15	3.33	3.52	3.84	4.14	4.47	6.31	10.88
500	15	2.49	2.50	2.58	2.70	2.83	2.96	3.18	3.38	3.58	4.50	5.68
	20	2.80	2.83	2.94	3.08	3.24	3.41	3.69	3.94	4.20	5.51	7.57
	25	3.10	3.14	3.27	3.44	3.64	3.85	4.20	4.51	4.86	6.77	11.04
600	15	2.67	2.68	2.77	2.89	3.03	3.18	3.41	3.62	3.84	4.82	6.05
	20	3.02	3.05	3.16	3.31	3.48	3.67	3.97	4.23	4.52	5.89	7.98
	25	3.34	3.39	3.53	3.72	3.92	4.15	4.52	4.86	5.23	7.19	11.27
700	15	2.83	2.85	2.95	3.08	3.22	3.38	3.63	3.85	4.08	5.11	6.39
	20	3.21	3.25	3.37	3.53	3.72	3.91	4.23	4.51	4.81	6.24	8.37
	25	3.57	3.62	3.78	3.97	4.19	4.43	4.82	5.18	5.57	7.60	11.55
800	15	2.99	3.01	3.11	3.25	3.40	3.57	3.83	4.06	4.30	5.38	6.72
	20	3.40	3.44	3.57	3.74	3.93	4.14	4.47	4.77	5.08	6.57	8.74
	25	3.78	3.84	4.01	4.21	4.44	4.70	5.11	5.48	5.89	7.98	11.86
900	15	3.14	3.16	3.27	3.41	3.57	3.74	4.02	4.26	4.51	5.64	7.02
	20	3.58	3.62	3.76	3.94	4.14	4.35	4.70	5.01	5.34	6.89	9.10
	25	3.99	4.05	4.22	4.44	4.68	4.95	5.38	5.77	6.19	8.34	12.19
1000	15	3.28	3.30	3.42	3.57	3.74	3.92	4.20	4.46	4.72	5.89	7.32
	20	3.75	3.79	3.94	4.13	4.34	4.56	4.92	5.25	5.59	7.19	9.44
	25	4.18	4.25	4.43	4.66	4.91	5.19	5.63	6.04	6.48	8.69	12.52

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 44.0 Ft (RADIUS = 31.1 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	3.42	3.44	3.56	3.72	3.89	4.08	4.38	4.64	4.91	6.13	7.60
	20	3.91	3.96	4.11	4.31	4.52	4.76	5.14	5.47	5.82	7.48	9.78
	25	4.37	4.44	4.63	4.87	5.13	5.42	5.88	6.30	6.75	9.02	12.85
1200	15	3.55	3.58	3.70	3.86	4.04	4.24	4.55	4.82	5.10	6.35	7.87
	20	4.07	4.12	4.28	4.48	4.71	4.95	5.34	5.69	6.05	7.76	10.10
	25	4.55	4.63	4.82	5.07	5.34	5.64	6.12	6.55	7.02	9.35	13.18
1300	15	3.68	3.70	3.83	4.00	4.19	4.39	4.71	4.99	5.28	6.57	8.13
	20	4.22	4.27	4.44	4.65	4.88	5.13	5.54	5.90	6.27	8.03	10.41
	25	4.73	4.81	5.01	5.26	5.54	5.85	6.35	6.80	7.28	9.66	13.51
1400	15	3.80	3.83	3.96	4.14	4.33	4.54	4.87	5.16	5.46	6.79	8.38
	20	4.37	4.42	4.60	4.81	5.05	5.31	5.73	6.10	6.49	8.29	10.72
	25	4.89	4.98	5.19	5.45	5.74	6.06	6.57	7.03	7.53	9.96	13.83
1500	15	3.92	3.95	4.09	4.27	4.47	4.68	5.02	5.32	5.63	7.00	8.63
	20	4.51	4.57	4.75	4.97	5.22	5.49	5.91	6.29	6.69	8.54	11.01
	25	5.06	5.15	5.36	5.63	5.93	6.26	6.79	7.26	7.77	10.26	14.15
1600	15	4.04	4.07	4.21	4.40	4.60	4.82	5.17	5.48	5.80	7.20	8.87
	20	4.65	4.71	4.89	5.12	5.38	5.65	6.09	6.48	6.90	8.79	11.30
	25	5.22	5.31	5.53	5.81	6.12	6.45	7.00	7.48	8.00	10.54	14.46
1700	15	4.15	4.19	4.33	4.52	4.73	4.96	5.32	5.63	5.96	7.39	9.10
	20	4.79	4.85	5.04	5.27	5.54	5.82	6.27	6.67	7.09	9.03	11.58
	25	5.37	5.47	5.70	5.98	6.30	6.64	7.20	7.70	8.23	10.82	14.77
1800	15	4.26	4.30	4.45	4.64	4.86	5.09	5.46	5.78	6.11	7.58	9.33
	20	4.92	4.98	5.18	5.42	5.69	5.98	6.44	6.85	7.28	9.26	11.86
	25	5.53	5.62	5.86	6.15	6.48	6.83	7.40	7.91	8.45	11.09	15.07
1900	15	4.37	4.41	4.56	4.76	4.98	5.22	5.60	5.93	6.27	7.77	9.55
	20	5.05	5.12	5.31	5.56	5.84	6.13	6.61	7.03	7.47	9.49	12.13
	25	5.68	5.78	6.02	6.32	6.65	7.01	7.59	8.12	8.67	11.36	15.37
2000	15	4.47	4.52	4.67	4.88	5.11	5.35	5.73	6.07	6.42	7.95	9.76
	20	5.18	5.25	5.45	5.70	5.98	6.29	6.77	7.20	7.65	9.71	12.39
	25	5.82	5.92	6.17	6.48	6.82	7.19	7.78	8.32	8.89	11.62	15.66

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 44.0 Ft (RADIUS = 31.1 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	2.52	2.56	2.70	2.88	3.10	3.36	3.87	4.48	5.42	14.17	33.85
	20	2.82	2.92	3.13	3.43	3.81	4.35	5.72	7.69	10.42	31.04	77.30
	25	3.11	3.30	3.64	4.14	4.91	6.24	9.60	13.58	18.85	58.86	148.94
200	15	3.15	3.21	3.38	3.60	3.86	4.16	4.70	5.28	6.05	14.17	33.85
	20	3.58	3.71	3.97	4.31	4.72	5.25	6.37	7.93	10.44	31.04	77.30
	25	4.00	4.22	4.61	5.13	5.84	6.87	9.68	13.59	18.85	58.86	148.94
300	15	3.65	3.73	3.93	4.18	4.47	4.80	5.39	5.98	6.73	14.18	33.85
	20	4.19	4.34	4.64	5.01	5.46	6.01	7.10	8.47	10.63	31.04	77.30
	25	4.71	4.96	5.38	5.94	6.66	7.63	10.03	13.62	18.85	58.86	148.94
400	15	4.09	4.19	4.41	4.68	5.00	5.36	5.98	6.60	7.36	14.24	33.85
	20	4.72	4.89	5.22	5.62	6.10	6.68	7.78	9.08	11.02	31.04	77.30
	25	5.32	5.60	6.06	6.65	7.39	8.36	10.56	13.79	18.86	58.86	148.94
500	15	4.49	4.59	4.83	5.13	5.47	5.86	6.52	7.17	7.95	14.40	33.85
	20	5.19	5.39	5.73	6.17	6.68	7.28	8.41	9.69	11.51	31.04	77.30
	25	5.88	6.17	6.66	7.29	8.06	9.03	11.15	14.09	18.90	58.86	148.94
600	15	4.85	4.97	5.22	5.54	5.91	6.31	7.01	7.69	8.49	14.66	33.85
	20	5.63	5.84	6.21	6.67	7.21	7.84	9.00	10.27	12.02	31.04	77.30
	25	6.38	6.70	7.22	7.87	8.67	9.67	11.74	14.50	19.01	58.86	148.94
700	15	5.19	5.32	5.59	5.93	6.31	6.74	7.47	8.18	9.00	14.98	33.85
	20	6.04	6.26	6.66	7.14	7.71	8.36	9.55	10.83	12.54	31.04	77.30
	25	6.86	7.19	7.74	8.42	9.25	10.26	12.32	14.95	19.19	58.86	148.94
800	15	5.51	5.65	5.93	6.29	6.69	7.14	7.90	8.63	9.48	15.35	33.85
	20	6.43	6.66	7.07	7.58	8.17	8.85	10.07	11.37	13.06	31.05	77.30
	25	7.30	7.66	8.23	8.94	9.79	10.82	12.89	15.44	19.45	58.86	148.94
900	15	5.81	5.96	6.26	6.63	7.06	7.52	8.31	9.07	9.93	15.75	33.85
	20	6.80	7.04	7.47	8.00	8.61	9.31	10.57	11.88	13.57	31.06	77.30
	25	7.73	8.10	8.69	9.43	10.30	11.36	13.43	15.93	19.76	58.86	148.94
1000	15	6.11	6.26	6.57	6.96	7.40	7.89	8.71	9.48	10.37	16.15	33.86
	20	7.15	7.40	7.85	8.40	9.03	9.76	11.05	12.37	14.06	31.08	77.30
	25	8.13	8.52	9.13	9.89	10.79	11.87	13.96	16.42	20.11	58.86	148.94

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 44.0 Ft (RADIUS = 31.1 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	6.39	6.54	6.87	7.28	7.73	8.24	9.08	9.88	10.79	16.56	33.87
	20	7.48	7.75	8.21	8.78	9.44	10.18	11.50	12.85	14.54	31.11	77.30
	25	8.52	8.92	9.55	10.34	11.27	12.37	14.47	16.91	20.49	58.86	148.94
1200	15	6.65	6.82	7.16	7.58	8.05	8.57	9.44	10.26	11.19	16.97	33.88
	20	7.81	8.08	8.56	9.15	9.83	10.59	11.94	13.31	15.01	31.17	77.30
	25	8.90	9.31	9.96	10.77	11.72	12.84	14.97	17.39	20.89	58.86	148.94
1300	15	6.91	7.09	7.44	7.87	8.36	8.89	9.79	10.63	11.58	17.38	33.91
	20	8.12	8.40	8.90	9.51	10.20	10.99	12.36	13.75	15.46	31.24	77.30
	25	9.26	9.68	10.35	11.18	12.16	13.30	15.45	17.87	21.29	58.86	148.94
1400	15	7.17	7.35	7.71	8.15	8.66	9.21	10.13	10.99	11.96	17.79	33.95
	20	8.42	8.71	9.23	9.85	10.56	11.37	12.78	14.19	15.91	31.35	77.30
	25	9.61	10.04	10.73	11.58	12.58	13.74	15.92	18.34	21.71	58.86	148.94
1500	15	7.41	7.60	7.97	8.43	8.95	9.51	10.46	11.34	12.33	18.19	34.01
	20	8.71	9.02	9.54	10.18	10.92	11.74	13.17	14.60	16.34	31.47	77.30
	25	9.95	10.39	11.10	11.97	12.99	14.18	16.38	18.80	22.13	58.86	148.94
1600	15	7.65	7.84	8.22	8.70	9.23	9.81	10.77	11.68	12.68	18.58	34.08
	20	9.00	9.31	9.85	10.51	11.26	12.10	13.56	15.01	16.76	31.62	77.30
	25	10.28	10.73	11.46	12.35	13.39	14.60	16.82	19.25	22.55	58.86	148.94
1700	15	7.88	8.08	8.47	8.96	9.50	10.10	11.08	12.00	13.03	18.97	34.18
	20	9.28	9.60	10.15	10.83	11.59	12.45	13.94	15.41	17.18	31.80	77.30
	25	10.60	11.07	11.81	12.72	13.78	15.00	17.25	19.69	22.96	58.86	148.94
1800	15	8.11	8.31	8.71	9.21	9.77	10.38	11.39	12.32	13.37	19.36	34.29
	20	9.55	9.88	10.45	11.13	11.92	12.79	14.31	15.80	17.58	31.99	77.30
	25	10.91	11.39	12.15	13.08	14.16	15.40	17.68	20.12	23.38	58.86	148.94
1900	15	8.33	8.54	8.95	9.46	10.03	10.65	11.68	12.64	13.70	19.74	34.42
	20	9.82	10.15	10.73	11.44	12.23	13.13	14.67	16.18	17.98	32.21	77.30
	25	11.22	11.71	12.49	13.43	14.53	15.79	18.09	20.55	23.79	58.87	148.94
2000	15	8.55	8.76	9.18	9.70	10.28	10.92	11.97	12.94	14.03	20.11	34.56
	20	10.08	10.42	11.01	11.73	12.55	13.46	15.02	16.55	18.37	32.44	77.30
	25	11.52	12.02	12.81	13.78	14.89	16.17	18.50	20.97	24.20	58.87	148.94

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 44.0 Ft (RADIUS = 31.1 Ft)³
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	4.65	5.23	6.39	8.81	12.89	18.43	30.12	43.74	61.78	199.45	510.15
	20	5.66	7.28	11.51	18.49	28.19	41.25	68.80	100.95	143.59	469.40	1205.4
	25	6.97	11.56	20.95	34.55	53.43	78.87	132.57	195.28	278.46	914.47	2351.6
200	15	6.00	6.62	7.69	9.53	12.97	18.43	30.12	43.74	61.78	199.45	510.15
	20	7.30	8.74	11.91	18.50	28.19	41.25	68.80	100.95	143.59	469.40	1205.4
	25	8.81	12.23	20.95	34.55	53.43	78.87	132.57	195.28	278.46	914.47	2351.6
300	15	7.07	7.74	8.83	10.51	13.41	18.47	30.12	43.74	61.78	199.45	510.15
	20	8.61	10.04	12.80	18.59	28.19	41.25	68.80	100.95	143.59	469.40	1205.4
	25	10.33	13.38	21.02	34.55	53.43	78.87	132.57	195.28	278.46	914.47	2351.6
400	15	8.00	8.71	9.83	11.48	14.10	18.64	30.12	43.74	61.78	199.45	510.15
	20	9.74	11.20	13.80	18.91	28.20	41.25	68.80	100.95	143.59	469.40	1205.4
	25	11.65	14.56	21.30	34.55	53.43	78.87	132.57	195.28	278.46	914.47	2351.6
500	15	8.84	9.58	10.75	12.39	14.87	19.00	30.12	43.74	61.78	199.45	510.15
	20	10.76	12.26	14.79	19.44	28.24	41.25	68.80	100.95	143.59	469.40	1205.4
	25	12.84	15.70	21.81	34.56	53.43	78.87	132.57	195.28	278.46	914.47	2351.6
600	15	9.61	10.39	11.59	13.25	15.65	19.49	30.15	43.74	61.78	199.45	510.15
	20	11.70	13.23	15.74	20.09	28.34	41.25	68.80	100.95	143.59	469.40	1205.4
	25	13.93	16.77	22.48	34.59	53.43	78.87	132.57	195.28	278.46	914.47	2351.6
700	15	10.32	11.13	12.37	14.05	16.42	20.06	30.21	43.74	61.78	199.45	510.15
	20	12.57	14.14	16.64	20.81	28.54	41.26	68.80	100.95	143.59	469.40	1205.4
	25	14.95	17.79	23.23	34.69	53.43	78.87	132.57	195.28	278.46	914.47	2351.6
800	15	11.00	11.84	13.11	14.82	17.17	20.67	30.33	43.74	61.78	199.45	510.15
	20	13.40	14.99	17.51	21.55	28.84	41.27	68.80	100.95	143.59	469.40	1205.4
	25	15.91	18.77	24.02	34.85	53.43	78.87	132.57	195.28	278.46	914.47	2351.6
900	15	11.64	12.51	13.81	15.55	17.90	21.31	30.52	43.75	61.78	199.45	510.15
	20	14.17	15.80	18.34	22.30	29.23	41.31	68.80	100.95	143.59	469.40	1205.4
	25	16.82	19.69	24.82	35.11	53.43	78.87	132.57	195.28	278.46	914.47	2351.6
1000	15	12.25	13.14	14.49	16.25	18.61	21.95	30.77	43.76	61.78	199.45	510.15
	20	14.92	16.58	19.14	23.04	29.68	41.38	68.80	100.95	143.59	469.40	1205.4
	25	17.68	20.58	25.62	35.44	53.45	78.87	132.57	195.28	278.46	914.47	2351.6

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 44.0 Ft (RADIUS = 31.1 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	12.83	13.75	15.13	16.92	19.29	22.59	31.08	43.79	61.78	199.45	510.15
	20	15.63	17.32	19.91	23.77	30.18	41.48	68.80	100.95	143.59	469.40	1205.4
	25	18.51	21.44	26.41	35.83	53.47	78.87	132.57	195.28	278.46	914.47	2351.6
1200	15	13.40	14.34	15.75	17.57	19.95	23.22	31.44	43.85	61.78	199.45	510.15
	20	16.32	18.04	20.65	24.49	30.71	41.63	68.80	100.95	143.59	469.40	1205.4
	25	19.31	22.27	27.20	36.29	53.51	78.87	132.57	195.28	278.46	914.47	2351.6
1300	15	13.94	14.91	16.35	18.20	20.60	23.84	31.84	43.92	61.78	199.45	510.15
	20	16.98	18.73	21.37	25.20	31.27	41.82	68.80	100.95	143.59	469.40	1205.4
	25	20.09	23.07	27.97	36.78	53.57	78.87	132.57	195.28	278.46	914.47	2351.6
1400	15	14.47	15.45	16.92	18.81	21.22	24.46	32.26	44.03	61.78	199.45	510.15
	20	17.62	19.40	22.07	25.89	31.84	42.06	68.80	100.95	143.59	469.40	1205.4
	25	20.83	23.84	28.73	37.31	53.65	78.87	132.57	195.28	278.46	914.47	2351.6
1500	15	14.98	15.99	17.48	19.40	21.83	25.06	32.71	44.16	61.79	199.45	510.15
	20	18.24	20.05	22.74	26.57	32.42	42.34	68.81	100.95	143.59	469.40	1205.4
	25	21.56	24.60	29.47	37.86	53.77	78.87	132.57	195.28	278.46	914.47	2351.6
1600	15	15.48	16.50	18.03	19.97	22.43	25.66	33.17	44.33	61.80	199.45	510.15
	20	18.84	20.68	23.40	27.24	33.01	42.65	68.82	100.95	143.59	469.40	1205.4
	25	22.26	25.33	30.20	38.43	53.92	78.87	132.57	195.28	278.46	914.47	2351.6
1700	15	15.96	17.01	18.56	20.53	23.01	26.24	33.65	44.53	61.82	199.45	510.15
	20	19.43	21.30	24.05	27.89	33.60	42.99	68.83	100.95	143.59	469.40	1205.4
	25	22.95	26.04	30.92	39.01	54.10	78.88	132.57	195.28	278.46	914.47	2351.6
1800	15	16.43	17.50	19.08	21.08	23.58	26.82	34.13	44.75	61.84	199.45	510.15
	20	20.01	21.90	24.68	28.53	34.19	43.37	68.85	100.95	143.59	469.40	1205.4
	25	23.62	26.74	31.62	39.60	54.31	78.89	132.57	195.28	278.46	914.47	2351.6
1900	15	16.90	17.98	19.59	21.61	24.14	27.38	34.62	45.00	61.88	199.45	510.15
	20	20.57	22.48	25.29	29.16	34.77	43.76	68.88	100.95	143.59	469.40	1205.4
	25	24.27	27.42	32.31	40.20	54.56	78.90	132.57	195.28	278.46	914.47	2351.6
2000	15	17.35	18.45	20.08	22.13	24.68	27.93	35.11	45.28	61.92	199.45	510.15
	20	21.12	23.06	25.89	29.77	35.35	44.18	68.91	100.95	143.59	469.40	1205.4
	25	24.91	28.09	32.99	40.79	54.83	78.92	132.57	195.28	278.46	914.47	2351.6

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 44.0 Ft (RADIUS = 31.1 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	15.30	36.48	68.96	115.86	180.98	268.75	454.13	670.65	957.91	3155.1	8120.9
	20	33.05	83.62	160.58	271.65	425.90	633.82	1073.0	1586.1	2266.9	7474.4	19245.
	25	62.51	161.33	311.61	528.48	829.68	1235.7	2093.4	3095.4	4424.9	14595.	37583.
200	15	16.68	36.48	68.96	115.86	180.98	268.75	454.13	670.65	957.91	3155.1	8120.9
	20	33.06	83.62	160.58	271.65	425.90	633.82	1073.0	1586.1	2266.9	7474.4	19245.
	25	62.51	161.33	311.61	528.48	829.68	1235.7	2093.4	3095.4	4424.9	14595.	37583.
300	15	18.54	36.49	68.96	115.86	180.98	268.75	454.13	670.65	957.91	3155.1	8120.9
	20	33.25	83.62	160.58	271.65	425.90	633.82	1073.0	1586.1	2266.9	7474.4	19245.
	25	62.51	161.33	311.61	528.48	829.68	1235.7	2093.4	3095.4	4424.9	14595.	37583.
400	15	20.35	36.56	68.96	115.86	180.98	268.75	454.13	670.65	957.91	3155.1	8120.9
	20	33.89	83.62	160.58	271.65	425.90	633.82	1073.0	1586.1	2266.9	7474.4	19245.
	25	62.51	161.33	311.61	528.48	829.68	1235.7	2093.4	3095.4	4424.9	14595.	37583.
500	15	22.05	36.79	68.96	115.86	180.98	268.75	454.13	670.65	957.91	3155.1	8120.9
	20	34.92	83.62	160.58	271.65	425.90	633.82	1073.0	1586.1	2266.9	7474.4	19245.
	25	62.53	161.33	311.61	528.48	829.68	1235.7	2093.4	3095.4	4424.9	14595.	37583.
600	15	23.64	37.24	68.96	115.86	180.98	268.75	454.13	670.65	957.91	3155.1	8120.9
	20	36.17	83.62	160.58	271.65	425.90	633.82	1073.0	1586.1	2266.9	7474.4	19245.
	25	62.62	161.33	311.61	528.48	829.68	1235.7	2093.4	3095.4	4424.9	14595.	37583.
700	15	25.15	37.88	68.97	115.86	180.98	268.75	454.13	670.65	957.91	3155.1	8120.9
	20	37.53	83.62	160.58	271.65	425.90	633.82	1073.0	1586.1	2266.9	7474.4	19245.
	25	62.81	161.33	311.61	528.48	829.68	1235.7	2093.4	3095.4	4424.9	14595.	37583.
800	15	26.58	38.66	68.97	115.86	180.98	268.75	454.13	670.65	957.91	3155.1	8120.9
	20	38.93	83.62	160.58	271.65	425.90	633.82	1073.0	1586.1	2266.9	7474.4	19245.
	25	63.15	161.33	311.61	528.48	829.68	1235.7	2093.4	3095.4	4424.9	14595.	37583.
900	15	27.94	39.54	68.98	115.86	180.98	268.75	454.13	670.65	957.91	3155.1	8120.9
	20	40.33	83.63	160.58	271.65	425.90	633.82	1073.0	1586.1	2266.9	7474.4	19245.
	25	63.66	161.33	311.61	528.48	829.68	1235.7	2093.4	3095.4	4424.9	14595.	37583.
1000	15	29.24	40.48	69.02	115.86	180.98	268.75	454.13	670.65	957.91	3155.1	8120.9
	20	41.72	83.64	160.58	271.65	425.90	633.82	1073.0	1586.1	2266.9	7474.4	19245.
	25	64.31	161.33	311.61	528.48	829.68	1235.7	2093.4	3095.4	4424.9	14595.	37583.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 44.0 Ft (RADIUS = 31.1 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	30.50	41.45	69.07	115.86	180.98	268.75	454.13	670.65	957.91	3155.1	8120.9
	20	43.10	83.68	160.58	271.65	425.90	633.82	1073.0	1586.1	2266.9	7474.4	19245.
	25	65.09	161.33	311.61	528.48	829.68	1235.7	2093.4	3095.4	4424.9	14595.	37583.
1200	15	31.70	42.43	69.16	115.86	180.98	268.75	454.13	670.65	957.91	3155.1	8120.9
	20	44.44	83.74	160.58	271.65	425.90	633.82	1073.0	1586.1	2266.9	7474.4	19245.
	25	65.96	161.33	311.61	528.48	829.68	1235.7	2093.4	3095.4	4424.9	14595.	37583.
1300	15	32.87	43.43	69.29	115.86	180.98	268.75	454.13	670.65	957.91	3155.1	8120.9
	20	45.76	83.84	160.58	271.65	425.90	633.82	1073.0	1586.1	2266.9	7474.4	19245.
	25	66.92	161.33	311.61	528.48	829.68	1235.7	2093.4	3095.4	4424.9	14595.	37583.
1400	15	34.00	44.42	69.48	115.86	180.98	268.75	454.13	670.65	957.91	3155.1	8120.9
	20	47.06	83.98	160.58	271.65	425.90	633.82	1073.0	1586.1	2266.9	7474.4	19245.
	25	67.93	161.33	311.61	528.48	829.68	1235.7	2093.4	3095.4	4424.9	14595.	37583.
1500	15	35.10	45.41	69.71	115.86	180.98	268.75	454.13	670.65	957.91	3155.1	8120.9
	20	48.33	84.17	160.58	271.65	425.90	633.82	1073.0	1586.1	2266.9	7474.4	19245.
	25	68.98	161.33	311.61	528.48	829.68	1235.7	2093.4	3095.4	4424.9	14595.	37583.
1600	15	36.17	46.39	69.99	115.86	180.98	268.75	454.13	670.65	957.91	3155.1	8120.9
	20	49.57	84.41	160.58	271.65	425.90	633.82	1073.0	1586.1	2266.9	7474.4	19245.
	25	70.06	161.33	311.61	528.48	829.68	1235.7	2093.4	3095.4	4424.9	14595.	37583.
1700	15	37.21	47.36	70.33	115.87	180.98	268.75	454.13	670.65	957.91	3155.1	8120.9
	20	50.78	84.70	160.58	271.65	425.90	633.82	1073.0	1586.1	2266.9	7474.4	19245.
	25	71.16	161.33	311.61	528.48	829.68	1235.7	2093.4	3095.4	4424.9	14595.	37583.
1800	15	38.23	48.32	70.71	115.87	180.98	268.75	454.13	670.65	957.91	3155.1	8120.9
	20	51.98	85.04	160.58	271.65	425.90	633.82	1073.0	1586.1	2266.9	7474.4	19245.
	25	72.27	161.33	311.61	528.48	829.68	1235.7	2093.4	3095.4	4424.9	14595.	37583.
1900	15	39.22	49.26	71.13	115.88	180.98	268.75	454.13	670.65	957.91	3155.1	8120.9
	20	53.15	85.43	160.58	271.65	425.90	633.82	1073.0	1586.1	2266.9	7474.4	19245.
	25	73.39	161.34	311.61	528.48	829.68	1235.7	2093.4	3095.4	4424.9	14595.	37583.
2000	15	40.19	50.20	71.59	115.89	180.98	268.75	454.13	670.65	957.91	3155.1	8120.9
	20	54.30	85.87	160.58	271.65	425.90	633.82	1073.0	1586.1	2266.9	7474.4	19245.
	25	74.52	161.34	311.61	528.48	829.68	1235.7	2093.4	3095.4	4424.9	14595.	37583.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 46.0 Ft (RADIUS = 32.5 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	1.61	1.59	1.64	1.70	1.78	1.86	2.00	2.12	2.25	2.89	3.96
	20	1.74	1.73	1.79	1.87	1.97	2.07	2.25	2.41	2.59	3.68	6.69
	25	1.86	1.87	1.94	2.04	2.16	2.29	2.52	2.74	3.01	5.32	11.49
200	15	1.93	1.92	1.97	2.05	2.15	2.25	2.42	2.56	2.72	3.45	4.50
	20	2.12	2.13	2.20	2.30	2.42	2.54	2.75	2.95	3.16	4.28	6.77
	25	2.30	2.32	2.42	2.54	2.68	2.84	3.11	3.37	3.66	5.62	11.49
300	15	2.18	2.18	2.25	2.34	2.45	2.56	2.75	2.91	3.09	3.90	5.00
	20	2.43	2.44	2.53	2.64	2.78	2.92	3.16	3.37	3.61	4.81	7.07
	25	2.66	2.69	2.80	2.94	3.10	3.28	3.58	3.87	4.18	6.10	11.50
400	15	2.41	2.41	2.48	2.59	2.70	2.83	3.04	3.22	3.41	4.29	5.44
	20	2.70	2.71	2.81	2.94	3.09	3.25	3.51	3.75	4.00	5.27	7.46
	25	2.97	3.00	3.13	3.28	3.46	3.66	3.99	4.30	4.64	6.59	11.55
500	15	2.61	2.61	2.70	2.81	2.94	3.07	3.30	3.49	3.70	4.64	5.85
	20	2.94	2.96	3.07	3.21	3.37	3.54	3.83	4.08	4.35	5.70	7.87
	25	3.25	3.29	3.42	3.59	3.79	4.01	4.36	4.69	5.05	7.05	11.68
600	15	2.80	2.80	2.89	3.01	3.15	3.30	3.53	3.74	3.97	4.96	6.23
	20	3.16	3.19	3.30	3.46	3.63	3.81	4.11	4.39	4.68	6.09	8.28
	25	3.51	3.55	3.70	3.88	4.09	4.32	4.70	5.05	5.43	7.48	11.88
700	15	2.97	2.98	3.07	3.20	3.35	3.51	3.76	3.98	4.21	5.26	6.58
	20	3.37	3.40	3.52	3.69	3.87	4.06	4.38	4.67	4.98	6.45	8.67
	25	3.75	3.80	3.95	4.15	4.37	4.61	5.01	5.38	5.78	7.89	12.15
800	15	3.14	3.15	3.25	3.38	3.54	3.70	3.97	4.20	4.45	5.54	6.91
	20	3.57	3.60	3.73	3.90	4.09	4.30	4.64	4.94	5.26	6.80	9.05
	25	3.97	4.03	4.19	4.40	4.63	4.89	5.31	5.69	6.11	8.29	12.44
900	15	3.29	3.30	3.41	3.55	3.71	3.89	4.17	4.41	4.67	5.81	7.23
	20	3.76	3.79	3.93	4.11	4.31	4.53	4.88	5.20	5.53	7.12	9.42
	25	4.19	4.25	4.42	4.64	4.88	5.15	5.59	5.99	6.42	8.66	12.76
1000	15	3.44	3.46	3.57	3.72	3.89	4.07	4.36	4.61	4.88	6.07	7.53
	20	3.94	3.97	4.12	4.30	4.51	4.74	5.11	5.44	5.79	7.44	9.77
	25	4.39	4.46	4.64	4.86	5.12	5.40	5.86	6.27	6.72	9.02	13.08

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 46.0 Ft (RADIUS = 32.5 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	3.58	3.60	3.72	3.87	4.05	4.24	4.54	4.80	5.08	6.31	7.82
	20	4.11	4.15	4.30	4.49	4.71	4.95	5.33	5.67	6.03	7.73	10.11
	25	4.59	4.66	4.84	5.08	5.35	5.64	6.11	6.55	7.01	9.36	13.41
1200	15	3.72	3.74	3.86	4.02	4.21	4.40	4.71	4.99	5.27	6.55	8.10
	20	4.27	4.32	4.47	4.67	4.90	5.15	5.54	5.90	6.27	8.02	10.45
	25	4.78	4.85	5.05	5.29	5.57	5.87	6.36	6.81	7.29	9.70	13.74
1300	15	3.86	3.88	4.00	4.17	4.36	4.56	4.88	5.17	5.46	6.78	8.37
	20	4.43	4.48	4.64	4.85	5.09	5.34	5.75	6.11	6.50	8.30	10.77
	25	4.96	5.04	5.24	5.50	5.78	6.09	6.60	7.06	7.55	10.02	14.07
1400	15	3.99	4.01	4.14	4.31	4.51	4.71	5.05	5.34	5.64	7.00	8.63
	20	4.59	4.63	4.80	5.02	5.26	5.53	5.95	6.32	6.72	8.57	11.08
	25	5.14	5.22	5.43	5.69	5.99	6.31	6.83	7.30	7.81	10.33	14.40
1500	15	4.11	4.14	4.27	4.45	4.65	4.86	5.21	5.51	5.82	7.21	8.88
	20	4.74	4.79	4.96	5.19	5.44	5.71	6.14	6.53	6.93	8.83	11.38
	25	5.32	5.39	5.61	5.88	6.19	6.52	7.06	7.54	8.06	10.63	14.72
1600	15	4.24	4.26	4.40	4.58	4.79	5.01	5.36	5.67	5.99	7.42	9.12
	20	4.88	4.94	5.12	5.35	5.60	5.88	6.33	6.72	7.14	9.08	11.68
	25	5.48	5.57	5.79	6.07	6.38	6.72	7.27	7.77	8.31	10.93	15.03
1700	15	4.35	4.38	4.53	4.71	4.92	5.15	5.51	5.83	6.16	7.62	9.36
	20	5.03	5.08	5.27	5.50	5.77	6.05	6.51	6.92	7.35	9.33	11.96
	25	5.65	5.73	5.96	6.25	6.57	6.92	7.49	8.00	8.54	11.21	15.35
1800	15	4.47	4.50	4.65	4.84	5.06	5.29	5.66	5.99	6.32	7.82	9.60
	20	5.17	5.22	5.41	5.66	5.93	6.22	6.69	7.11	7.55	9.57	12.25
	25	5.81	5.90	6.13	6.43	6.76	7.11	7.69	8.22	8.77	11.49	15.65
1900	15	4.59	4.62	4.77	4.96	5.19	5.42	5.80	6.14	6.48	8.01	9.82
	20	5.30	5.36	5.56	5.80	6.08	6.38	6.86	7.29	7.74	9.81	12.52
	25	5.97	6.06	6.30	6.60	6.94	7.30	7.90	8.43	9.00	11.77	15.96
2000	15	4.70	4.73	4.88	5.09	5.31	5.56	5.95	6.29	6.64	8.20	10.05
	20	5.44	5.50	5.70	5.95	6.24	6.54	7.03	7.47	7.93	10.04	12.79
	25	6.12	6.21	6.46	6.77	7.11	7.49	8.09	8.64	9.22	12.04	16.26

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 46.0 Ft (RADIUS = 32.5 Ft)
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	2.64	2.68	2.82	3.01	3.24	3.52	4.07	4.75	5.81	15.27	36.20
	20	2.96	3.07	3.29	3.61	4.03	4.63	6.21	8.42	11.39	33.61	82.84
	25	3.28	3.48	3.85	4.41	5.31	6.87	10.62	14.98	20.72	63.84	159.74
200	15	3.30	3.37	3.54	3.77	4.04	4.35	4.92	5.55	6.40	15.27	36.20
	20	3.76	3.90	4.17	4.53	4.97	5.54	6.80	8.59	11.40	33.61	82.84
	25	4.21	4.45	4.86	5.43	6.22	7.41	10.66	14.98	20.72	63.84	159.74
300	15	3.83	3.92	4.12	4.37	4.67	5.02	5.63	6.27	7.08	15.28	36.20
	20	4.41	4.57	4.87	5.26	5.74	6.33	7.53	9.07	11.54	33.61	82.84
	25	4.96	5.23	5.68	6.28	7.06	8.15	10.92	15.00	20.72	63.84	159.74
400	15	4.30	4.39	4.61	4.90	5.22	5.60	6.25	6.91	7.72	15.31	36.20
	20	4.96	5.14	5.48	5.90	6.41	7.02	8.22	9.66	11.86	33.61	82.84
	25	5.61	5.90	6.39	7.02	7.82	8.89	11.40	15.11	20.72	63.84	159.74
500	15	4.71	4.82	5.06	5.37	5.72	6.12	6.81	7.49	8.32	15.43	36.20
	20	5.47	5.66	6.02	6.48	7.01	7.65	8.87	10.27	12.30	33.61	82.84
	25	6.19	6.50	7.02	7.68	8.51	9.58	11.96	15.34	20.75	63.84	159.74
600	15	5.10	5.21	5.47	5.80	6.17	6.60	7.32	8.03	8.88	15.64	36.20
	20	5.93	6.14	6.52	7.00	7.57	8.23	9.48	10.86	12.80	33.61	82.84
	25	6.73	7.06	7.61	8.30	9.15	10.23	12.54	15.68	20.81	63.84	159.74
700	15	5.46	5.58	5.86	6.20	6.60	7.04	7.80	8.54	9.40	15.93	36.20
	20	6.36	6.58	6.99	7.49	8.09	8.77	10.05	11.43	13.31	33.61	82.84
	25	7.23	7.58	8.15	8.87	9.75	10.85	13.12	16.10	20.94	63.84	159.74
800	15	5.79	5.93	6.22	6.58	7.00	7.46	8.25	9.01	9.90	16.27	36.20
	20	6.77	7.00	7.43	7.96	8.57	9.29	10.59	11.98	13.83	33.61	82.84
	25	7.70	8.07	8.66	9.41	10.32	11.43	13.69	16.56	21.14	63.84	159.74
900	15	6.11	6.25	6.56	6.94	7.38	7.86	8.68	9.46	10.37	16.65	36.20
	20	7.15	7.40	7.84	8.39	9.03	9.77	11.10	12.51	14.34	33.62	82.84
	25	8.15	8.53	9.15	9.92	10.85	11.99	14.25	17.03	21.40	63.84	159.74
1000	15	6.42	6.57	6.89	7.28	7.74	8.24	9.08	9.89	10.82	17.04	36.21
	20	7.52	7.78	8.24	8.81	9.47	10.23	11.59	13.01	14.84	33.63	82.84
	25	8.57	8.97	9.61	10.41	11.37	12.52	14.79	17.52	21.71	63.84	159.74

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 46.0 Ft (RADIUS = 32.5 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
1100	15	6.71	6.87	7.20	7.61	8.08	8.60	9.47	10.31	11.26	17.45	36.21	
	20	7.88	8.14	8.62	9.21	9.90	10.68	12.07	13.50	15.33	33.65	82.84	
	25	8.98	9.39	10.05	10.88	11.86	13.03	15.31	18.01	22.05	63.84	159.74	
1200	15	7.00	7.16	7.50	7.93	8.41	8.95	9.85	10.70	11.68	17.85	36.22	
	20	8.22	8.49	8.99	9.60	10.30	11.10	12.52	13.98	15.81	33.68	82.84	
	25	9.38	9.80	10.48	11.33	12.33	13.53	15.82	18.49	22.42	63.84	159.74	
1300	15	7.27	7.44	7.79	8.24	8.74	9.29	10.21	11.09	12.08	18.26	36.24	
	20	8.55	8.83	9.34	9.97	10.69	11.51	12.96	14.44	16.27	33.74	82.84	
	25	9.76	10.19	10.89	11.76	12.79	14.00	16.32	18.97	22.81	63.84	159.74	
1400	15	7.54	7.71	8.08	8.53	9.05	9.61	10.56	11.46	12.47	18.67	36.27	
	20	8.87	9.16	9.69	10.33	11.07	11.91	13.39	14.88	16.73	33.81	82.84	
	25	10.13	10.57	11.29	12.18	13.23	14.47	16.80	19.44	23.21	63.84	159.74	
1500	15	7.79	7.97	8.35	8.82	9.35	9.93	10.90	11.82	12.85	19.07	36.31	
	20	9.17	9.48	10.02	10.68	11.44	12.30	13.80	15.32	17.17	33.90	82.84	
	25	10.48	10.94	11.68	12.59	13.66	14.92	17.27	19.91	23.61	63.84	159.74	
1600	15	8.04	8.23	8.62	9.10	9.64	10.24	11.24	12.17	13.22	19.47	36.36	
	20	9.48	9.79	10.34	11.02	11.80	12.68	14.21	15.74	17.61	34.02	82.84	
	25	10.83	11.30	12.06	12.99	14.08	15.35	17.73	20.37	24.02	63.84	159.74	
1700	15	8.29	8.48	8.88	9.37	9.93	10.54	11.56	12.51	13.58	19.87	36.44	
	20	9.77	10.09	10.66	11.35	12.15	13.04	14.60	16.15	18.03	34.16	82.84	
	25	11.17	11.65	12.42	13.37	14.48	15.78	18.18	20.82	24.44	63.85	159.74	
1800	15	8.53	8.72	9.13	9.64	10.21	10.83	11.87	12.85	13.93	20.26	36.52	
	20	10.06	10.38	10.96	11.67	12.49	13.40	14.98	16.56	18.45	34.32	82.84	
	25	11.50	11.99	12.78	13.75	14.88	16.20	18.62	21.27	24.85	63.85	159.74	
1900	15	8.76	8.96	9.38	9.90	10.48	11.12	12.18	13.17	14.28	20.64	36.63	
	20	10.34	10.67	11.27	11.99	12.82	13.75	15.36	16.95	18.86	34.50	82.84	
	25	11.83	12.32	13.13	14.12	15.27	16.60	19.05	21.70	25.26	63.85	159.74	
2000	15	8.99	9.19	9.62	10.15	10.75	11.40	12.48	13.49	14.61	21.02	36.75	
	20	10.61	10.95	11.56	12.30	13.14	14.09	15.72	17.34	19.26	34.70	82.84	
	25	12.14	12.65	13.47	14.48	15.65	17.00	19.48	22.13	25.67	63.85	159.74	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 46.0 Ft (RADIUS = 32.5 Ft)³
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
100	15	4.92	5.58	6.96	9.87	14.47	20.65	33.55	48.50	68.18	216.61	547.43	
	20	6.05	8.03	13.11	21.01	31.89	46.43	76.89	112.18	158.71	510.04	1293.7	
	25	7.55	13.26	24.02	39.41	60.60	88.95	148.32	217.17	307.97	993.79	2524.0	
200	15	6.34	7.03	8.25	10.43	14.51	20.65	33.55	48.50	68.18	216.61	547.43	
	20	7.77	9.45	13.34	21.01	31.89	46.43	76.89	112.18	158.71	510.04	1293.7	
	25	9.46	13.71	24.02	39.41	60.60	88.95	148.32	217.17	307.97	993.79	2524.0	
300	15	7.48	8.21	9.42	11.36	14.81	20.66	33.55	48.50	68.18	216.61	547.43	
	20	9.15	10.79	14.09	21.05	31.89	46.43	76.89	112.18	158.71	510.04	1293.7	
	25	11.05	14.73	24.04	39.41	60.60	88.95	148.32	217.17	307.97	993.79	2524.0	
400	15	8.46	9.23	10.47	12.33	15.40	20.76	33.55	48.50	68.18	216.61	547.43	
	20	10.35	12.00	15.04	21.23	31.89	46.43	76.89	112.18	158.71	510.04	1293.7	
	25	12.44	15.89	24.19	39.41	60.60	88.95	148.32	217.17	307.97	993.79	2524.0	
500	15	9.34	10.15	11.42	13.26	16.12	21.00	33.56	48.50	68.18	216.61	547.43	
	20	11.43	13.10	16.02	21.63	31.90	46.43	76.89	112.18	158.71	510.04	1293.7	
	25	13.70	17.03	24.54	39.41	60.60	88.95	148.32	217.17	307.97	993.79	2524.0	
600	15	10.15	10.99	12.30	14.14	16.89	21.39	33.57	48.50	68.18	216.61	547.43	
	20	12.41	14.12	16.98	22.18	31.95	46.43	76.89	112.18	158.71	510.04	1293.7	
	25	14.85	18.13	25.07	39.42	60.60	88.95	148.32	217.17	307.97	993.79	2524.0	
700	15	10.91	11.78	13.12	14.98	17.66	21.89	33.60	48.50	68.18	216.61	547.43	
	20	13.34	15.07	17.91	22.83	32.07	46.43	76.89	112.18	158.71	510.04	1293.7	
	25	15.92	19.19	25.72	39.46	60.60	88.95	148.32	217.17	307.97	993.79	2524.0	
800	15	11.62	12.52	13.90	15.77	18.41	22.46	33.67	48.50	68.18	216.61	547.43	
	20	14.20	15.97	18.80	23.53	32.26	46.44	76.89	112.18	158.71	510.04	1293.7	
	25	16.94	20.19	26.45	39.55	60.60	88.95	148.32	217.17	307.97	993.79	2524.0	
900	15	12.29	13.22	14.64	16.53	19.15	23.06	33.78	48.50	68.18	216.61	547.43	
	20	15.02	16.82	19.66	24.25	32.54	46.45	76.89	112.18	158.71	510.04	1293.7	
	25	17.90	21.16	27.21	39.69	60.60	88.95	148.32	217.17	307.97	993.79	2524.0	
1000	15	12.94	13.89	15.34	17.26	19.88	23.68	33.96	48.51	68.18	216.61	547.43	
	20	15.81	17.64	20.49	24.98	32.89	46.49	76.89	112.18	158.71	510.04	1293.7	
	25	18.81	22.09	27.99	39.91	60.60	88.95	148.32	217.17	307.97	993.79	2524.0	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 46.0 Ft (RADIUS = 32.5 Ft)³
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	13.56	14.54	16.01	17.96	20.58	24.31	34.19	48.52	68.18	216.61	547.43
	20	16.56	18.42	21.29	25.71	33.31	46.54	76.89	112.18	158.71	510.04	1293.7
	25	19.69	22.98	28.78	40.19	60.61	88.95	148.32	217.17	307.97	993.79	2524.0
1200	15	14.15	15.15	16.66	18.64	21.26	24.94	34.47	48.55	68.18	216.61	547.43
	20	17.28	19.17	22.06	26.44	33.78	46.62	76.89	112.18	158.71	510.04	1293.7
	25	20.53	23.85	29.56	40.54	60.63	88.95	148.32	217.17	307.97	993.79	2524.0
1300	15	14.72	15.75	17.29	19.29	21.93	25.56	34.80	48.59	68.18	216.61	547.43
	20	17.98	19.90	22.81	27.15	34.28	46.74	76.89	112.18	158.71	510.04	1293.7
	25	21.35	24.69	30.34	40.94	60.65	88.95	148.32	217.17	307.97	993.79	2524.0
1400	15	15.28	16.33	17.90	19.93	22.57	26.18	35.17	48.65	68.18	216.61	547.43
	20	18.66	20.60	23.54	27.86	34.81	46.90	76.89	112.18	158.71	510.04	1293.7
	25	22.14	25.50	31.10	41.39	60.69	88.95	148.32	217.17	307.97	993.79	2524.0
1500	15	15.82	16.89	18.49	20.55	23.21	26.80	35.57	48.74	68.19	216.61	547.43
	20	19.31	21.29	24.25	28.55	35.35	47.09	76.89	112.18	158.71	510.04	1293.7
	25	22.90	26.29	31.86	41.87	60.75	88.95	148.32	217.17	307.97	993.79	2524.0
1600	15	16.34	17.43	19.06	21.15	23.82	27.40	35.99	48.85	68.19	216.61	547.43
	20	19.95	21.95	24.94	29.23	35.91	47.32	76.89	112.18	158.71	510.04	1293.7
	25	23.65	27.06	32.61	42.38	60.83	88.95	148.32	217.17	307.97	993.79	2524.0
1700	15	16.85	17.96	19.62	21.73	24.43	28.00	36.44	48.98	68.20	216.61	547.43
	20	20.57	22.60	25.61	29.90	36.48	47.59	76.90	112.18	158.71	510.04	1293.7
	25	24.37	27.81	33.34	42.91	60.94	88.95	148.32	217.17	307.97	993.79	2524.0
1800	15	17.35	18.48	20.16	22.30	25.02	28.59	36.89	49.15	68.21	216.61	547.43
	20	21.18	23.23	26.27	30.56	37.06	47.89	76.90	112.18	158.71	510.04	1293.7
	25	25.08	28.54	34.06	43.46	61.07	88.95	148.32	217.17	307.97	993.79	2524.0
1900	15	17.84	18.99	20.69	22.86	25.60	29.16	37.36	49.34	68.23	216.61	547.43
	20	21.77	23.85	26.91	31.21	37.63	48.22	76.92	112.18	158.71	510.04	1293.7
	25	25.77	29.26	34.78	44.02	61.23	88.96	148.32	217.17	307.97	993.79	2524.0
2000	15	18.32	19.48	21.21	23.41	26.16	29.73	37.83	49.56	68.25	216.61	547.43
	20	22.35	24.45	27.54	31.85	38.21	48.57	76.93	112.18	158.71	510.04	1293.7
	25	26.44	29.96	35.48	44.60	61.42	88.96	148.32	217.17	307.97	993.79	2524.0

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 46.0 Ft (RADIUS = 32.5 Ft)³
 FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	17.66	42.30	79.46	132.56	205.67	303.49	508.47	746.20	1059.8	3429.2	8716.8
	20	38.69	97.31	185.37	311.14	484.32	716.08	1201.8	1765.1	2508.3	8124.0	20657.
	25	73.45	188.01	359.96	605.55	943.73	1396.3	2344.8	3444.9	4896.3	15864.	40342.
200	15	18.67	42.30	79.46	132.56	205.67	303.49	508.47	746.20	1059.8	3429.2	8716.8
	20	38.70	97.31	185.37	311.14	484.32	716.08	1201.8	1765.1	2508.3	8124.0	20657.
	25	73.45	188.01	359.96	605.55	943.73	1396.3	2344.8	3444.9	4896.3	15864.	40342.
300	15	20.41	42.30	79.46	132.56	205.67	303.49	508.47	746.20	1059.8	3429.2	8716.8
	20	38.76	97.31	185.37	311.14	484.32	716.08	1201.8	1765.1	2508.3	8124.0	20657.
	25	73.45	188.01	359.96	605.55	943.73	1396.3	2344.8	3444.9	4896.3	15864.	40342.
400	15	22.22	42.32	79.46	132.56	205.67	303.49	508.47	746.20	1059.8	3429.2	8716.8
	20	39.10	97.31	185.37	311.14	484.32	716.08	1201.8	1765.1	2508.3	8124.0	20657.
	25	73.45	188.01	359.96	605.55	943.73	1396.3	2344.8	3444.9	4896.3	15864.	40342.
500	15	23.96	42.42	79.46	132.56	205.67	303.49	508.47	746.20	1059.8	3429.2	8716.8
	20	39.81	97.31	185.37	311.14	484.32	716.08	1201.8	1765.1	2508.3	8124.0	20657.
	25	73.45	188.01	359.96	605.55	943.73	1396.3	2344.8	3444.9	4896.3	15864.	40342.
600	15	25.61	42.67	79.46	132.56	205.67	303.49	508.47	746.20	1059.8	3429.2	8716.8
	20	40.83	97.31	185.37	311.14	484.32	716.08	1201.8	1765.1	2508.3	8124.0	20657.
	25	73.47	188.01	359.96	605.55	943.73	1396.3	2344.8	3444.9	4896.3	15864.	40342.
700	15	27.18	43.09	79.46	132.56	205.67	303.49	508.47	746.20	1059.8	3429.2	8716.8
	20	42.03	97.31	185.37	311.14	484.32	716.08	1201.8	1765.1	2508.3	8124.0	20657.
	25	73.54	188.01	359.96	605.55	943.73	1396.3	2344.8	3444.9	4896.3	15864.	40342.
800	15	28.67	43.68	79.46	132.56	205.67	303.49	508.47	746.20	1059.8	3429.2	8716.8
	20	43.33	97.31	185.37	311.14	484.32	716.08	1201.8	1765.1	2508.3	8124.0	20657.
	25	73.69	188.01	359.96	605.55	943.73	1396.3	2344.8	3444.9	4896.3	15864.	40342.
900	15	30.10	44.40	79.47	132.56	205.67	303.49	508.47	746.20	1059.8	3429.2	8716.8
	20	44.67	97.31	185.37	311.14	484.32	716.08	1201.8	1765.1	2508.3	8124.0	20657.
	25	73.95	188.01	359.96	605.55	943.73	1396.3	2344.8	3444.9	4896.3	15864.	40342.
1000	15	31.46	45.21	79.48	132.56	205.67	303.49	508.47	746.20	1059.8	3429.2	8716.8
	20	46.04	97.32	185.37	311.14	484.32	716.08	1201.8	1765.1	2508.3	8124.0	20657.
	25	74.34	188.01	359.96	605.55	943.73	1396.3	2344.8	3444.9	4896.3	15864.	40342.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 46.0 Ft (RADIUS = 32.5 Ft)³
 FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	32.78	46.09	79.49	132.56	205.67	303.49	508.47	746.20	1059.8	3429.2	8716.8
	20	47.40	97.33	185.37	311.14	484.32	716.08	1201.8	1765.1	2508.3	8124.0	20657.
	25	74.85	188.01	359.96	605.55	943.73	1396.3	2344.8	3444.9	4896.3	15864.	40342.
1200	15	34.05	47.00	79.53	132.56	205.67	303.49	508.47	746.20	1059.8	3429.2	8716.8
	20	48.76	97.35	185.37	311.14	484.32	716.08	1201.8	1765.1	2508.3	8124.0	20657.
	25	75.49	188.01	359.96	605.55	943.73	1396.3	2344.8	3444.9	4896.3	15864.	40342.
1300	15	35.27	47.95	79.59	132.56	205.67	303.49	508.47	746.20	1059.8	3429.2	8716.8
	20	50.10	97.38	185.37	311.14	484.32	716.08	1201.8	1765.1	2508.3	8124.0	20657.
	25	76.22	188.01	359.96	605.55	943.73	1396.3	2344.8	3444.9	4896.3	15864.	40342.
1400	15	36.46	48.91	79.67	132.56	205.67	303.49	508.47	746.20	1059.8	3429.2	8716.8
	20	51.42	97.43	185.37	311.14	484.32	716.08	1201.8	1765.1	2508.3	8124.0	20657.
	25	77.04	188.01	359.96	605.55	943.73	1396.3	2344.8	3444.9	4896.3	15864.	40342.
1500	15	37.62	49.88	79.79	132.56	205.67	303.49	508.47	746.20	1059.8	3429.2	8716.8
	20	52.72	97.51	185.37	311.14	484.32	716.08	1201.8	1765.1	2508.3	8124.0	20657.
	25	77.93	188.01	359.96	605.55	943.73	1396.3	2344.8	3444.9	4896.3	15864.	40342.
1600	15	38.75	50.84	79.95	132.56	205.67	303.49	508.47	746.20	1059.8	3429.2	8716.8
	20	53.99	97.63	185.37	311.14	484.32	716.08	1201.8	1765.1	2508.3	8124.0	20657.
	25	78.88	188.01	359.96	605.55	943.73	1396.3	2344.8	3444.9	4896.3	15864.	40342.
1700	15	39.84	51.81	80.15	132.56	205.67	303.49	508.47	746.20	1059.8	3429.2	8716.8
	20	55.25	97.78	185.37	311.14	484.32	716.08	1201.8	1765.1	2508.3	8124.0	20657.
	25	79.87	188.01	359.96	605.55	943.73	1396.3	2344.8	3444.9	4896.3	15864.	40342.
1800	15	40.92	52.78	80.39	132.56	205.67	303.49	508.47	746.20	1059.8	3429.2	8716.8
	20	56.49	97.97	185.37	311.14	484.32	716.08	1201.8	1765.1	2508.3	8124.0	20657.
	25	80.89	188.01	359.96	605.55	943.73	1396.3	2344.8	3444.9	4896.3	15864.	40342.
1900	15	41.96	53.73	80.68	132.56	205.67	303.49	508.47	746.20	1059.8	3429.2	8716.8
	20	57.70	98.20	185.37	311.14	484.32	716.08	1201.8	1765.1	2508.3	8124.0	20657.
	25	81.93	188.01	359.96	605.55	943.73	1396.3	2344.8	3444.9	4896.3	15864.	40342.
2000	15	42.99	54.68	81.01	132.57	205.67	303.49	508.47	746.20	1059.8	3429.2	8716.8
	20	58.89	98.47	185.37	311.14	484.32	716.08	1201.8	1765.1	2508.3	8124.0	20657.
	25	83.00	188.01	359.96	605.55	943.73	1396.3	2344.8	3444.9	4896.3	15864.	40342.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 48.0 Ft (RADIUS = 33.9 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	1.68	1.66	1.70	1.76	1.84	1.93	2.06	2.19	2.32	2.97	4.11
	20	1.82	1.81	1.86	1.94	2.04	2.15	2.32	2.49	2.68	3.84	7.07
	25	1.95	1.95	2.02	2.12	2.24	2.38	2.62	2.85	3.14	5.66	12.22
200	15	2.01	2.00	2.05	2.13	2.23	2.33	2.50	2.64	2.80	3.55	4.64
	20	2.22	2.22	2.29	2.39	2.51	2.64	2.85	3.05	3.26	4.44	7.13
	25	2.41	2.43	2.52	2.64	2.79	2.95	3.23	3.50	3.80	5.92	12.22
300	15	2.28	2.27	2.34	2.43	2.54	2.65	2.84	3.01	3.19	4.01	5.15
	20	2.54	2.55	2.63	2.75	2.88	3.03	3.27	3.49	3.73	4.98	7.40
	25	2.79	2.81	2.92	3.06	3.23	3.41	3.72	4.01	4.34	6.39	12.23
400	15	2.52	2.51	2.58	2.69	2.80	2.93	3.14	3.33	3.52	4.41	5.61
	20	2.83	2.83	2.93	3.06	3.21	3.37	3.64	3.88	4.14	5.46	7.78
	25	3.11	3.14	3.26	3.42	3.61	3.81	4.15	4.46	4.82	6.87	12.26
500	15	2.73	2.73	2.81	2.92	3.05	3.19	3.41	3.61	3.82	4.78	6.02
	20	3.08	3.09	3.20	3.34	3.50	3.68	3.96	4.22	4.50	5.89	8.19
	25	3.40	3.44	3.57	3.75	3.95	4.17	4.53	4.87	5.24	7.34	12.36
600	15	2.93	2.93	3.01	3.13	3.27	3.42	3.66	3.87	4.09	5.11	6.41
	20	3.31	3.33	3.45	3.60	3.77	3.96	4.27	4.54	4.84	6.29	8.59
	25	3.67	3.71	3.86	4.05	4.26	4.49	4.88	5.24	5.63	7.78	12.54
700	15	3.11	3.11	3.20	3.33	3.48	3.63	3.89	4.11	4.35	5.42	6.77
	20	3.53	3.55	3.68	3.84	4.02	4.22	4.55	4.84	5.15	6.67	8.99
	25	3.93	3.97	4.12	4.32	4.55	4.80	5.21	5.58	6.00	8.20	12.78
800	15	3.28	3.29	3.38	3.52	3.67	3.84	4.11	4.34	4.59	5.71	7.11
	20	3.74	3.76	3.89	4.06	4.26	4.47	4.81	5.12	5.45	7.02	9.38
	25	4.16	4.21	4.38	4.59	4.82	5.09	5.52	5.91	6.34	8.60	13.06
900	15	3.45	3.45	3.56	3.70	3.86	4.03	4.31	4.56	4.82	5.99	7.44
	20	3.94	3.96	4.10	4.28	4.48	4.70	5.06	5.38	5.72	7.36	9.75
	25	4.39	4.44	4.61	4.83	5.08	5.36	5.81	6.22	6.66	8.99	13.36
1000	15	3.60	3.61	3.72	3.87	4.04	4.22	4.51	4.77	5.04	6.25	7.75
	20	4.12	4.15	4.30	4.48	4.70	4.93	5.30	5.63	5.99	7.68	10.11
	25	4.61	4.66	4.84	5.07	5.33	5.62	6.09	6.51	6.97	9.36	13.68

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 48.0 Ft (RADIUS = 33.9 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	3.75	3.76	3.88	4.03	4.21	4.40	4.70	4.97	5.25	6.50	8.04
	20	4.30	4.34	4.49	4.68	4.90	5.14	5.53	5.88	6.25	7.99	10.46
	25	4.81	4.87	5.06	5.30	5.57	5.87	6.35	6.79	7.27	9.71	14.01
1200	15	3.90	3.91	4.03	4.19	4.37	4.57	4.88	5.16	5.45	6.75	8.33
	20	4.48	4.51	4.67	4.87	5.10	5.35	5.75	6.11	6.49	8.29	10.80
	25	5.01	5.08	5.27	5.52	5.80	6.11	6.61	7.06	7.56	10.05	14.34
1300	15	4.04	4.05	4.18	4.34	4.53	4.73	5.06	5.34	5.64	6.98	8.61
	20	4.65	4.68	4.84	5.05	5.29	5.55	5.96	6.33	6.73	8.57	11.13
	25	5.21	5.27	5.47	5.73	6.02	6.34	6.86	7.33	7.83	10.38	14.66
1400	15	4.18	4.19	4.32	4.49	4.68	4.89	5.23	5.52	5.83	7.21	8.87
	20	4.81	4.85	5.01	5.23	5.48	5.74	6.17	6.55	6.96	8.85	11.45
	25	5.39	5.46	5.67	5.94	6.24	6.56	7.10	7.58	8.10	10.70	14.99
1500	15	4.31	4.32	4.46	4.63	4.83	5.05	5.39	5.70	6.02	7.43	9.13
	20	4.97	5.01	5.18	5.40	5.66	5.93	6.37	6.76	7.18	9.12	11.76
	25	5.58	5.65	5.86	6.14	6.45	6.78	7.33	7.83	8.36	11.02	15.31
1600	15	4.44	4.45	4.59	4.77	4.98	5.20	5.55	5.87	6.19	7.64	9.38
	20	5.12	5.16	5.34	5.57	5.83	6.11	6.56	6.97	7.39	9.38	12.06
	25	5.75	5.83	6.05	6.33	6.65	6.99	7.56	8.07	8.61	11.32	15.63
1700	15	4.56	4.58	4.72	4.91	5.12	5.35	5.71	6.03	6.37	7.85	9.63
	20	5.27	5.32	5.50	5.73	6.00	6.29	6.75	7.17	7.61	9.64	12.36
	25	5.92	6.00	6.23	6.52	6.85	7.20	7.78	8.30	8.86	11.62	15.95
1800	15	4.68	4.70	4.85	5.04	5.26	5.49	5.86	6.19	6.54	8.05	9.87
	20	5.42	5.46	5.65	5.89	6.17	6.46	6.94	7.36	7.81	9.88	12.64
	25	6.09	6.17	6.41	6.70	7.04	7.40	7.99	8.53	9.10	11.90	16.26
1900	15	4.80	4.82	4.97	5.17	5.39	5.63	6.01	6.35	6.70	8.25	10.10
	20	5.56	5.61	5.80	6.05	6.33	6.63	7.12	7.55	8.01	10.13	12.93
	25	6.26	6.34	6.58	6.88	7.23	7.60	8.20	8.75	9.33	12.19	16.57
2000	15	4.92	4.94	5.09	5.30	5.52	5.77	6.16	6.50	6.86	8.45	10.33
	20	5.70	5.75	5.95	6.20	6.49	6.80	7.30	7.74	8.21	10.36	13.20
	25	6.42	6.50	6.75	7.06	7.41	7.79	8.41	8.96	9.56	12.46	16.87

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 48.0 Ft (RADIUS = 33.9 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	2.76	2.81	2.95	3.15	3.39	3.68	4.28	5.05	6.24	16.44	38.68
	20	3.10	3.22	3.46	3.80	4.26	4.95	6.77	9.21	12.44	36.34	88.69
	25	3.45	3.66	4.07	4.70	5.76	7.57	11.72	16.49	22.74	69.15	171.12
200	15	3.46	3.52	3.70	3.94	4.22	4.54	5.16	5.83	6.77	16.44	38.68
	20	3.95	4.09	4.38	4.75	5.23	5.85	7.27	9.32	12.44	36.34	88.69
	25	4.43	4.68	5.13	5.75	6.63	8.00	11.74	16.49	22.74	69.15	171.12
300	15	4.02	4.10	4.30	4.57	4.88	5.24	5.89	6.57	7.45	16.44	38.68
	20	4.63	4.79	5.11	5.52	6.03	6.66	7.99	9.73	12.53	36.34	88.69
	25	5.22	5.50	5.98	6.63	7.49	8.72	11.92	16.50	22.74	69.15	171.12
400	15	4.51	4.60	4.83	5.12	5.46	5.84	6.53	7.23	8.10	16.46	38.68
	20	5.21	5.40	5.75	6.19	6.73	7.38	8.69	10.29	12.78	36.34	88.69
	25	5.90	6.21	6.72	7.40	8.27	9.46	12.32	16.56	22.74	69.15	171.12
500	15	4.94	5.05	5.29	5.61	5.97	6.39	7.11	7.83	8.71	16.55	38.68
	20	5.74	5.94	6.32	6.79	7.36	8.04	9.35	10.89	13.18	36.34	88.69
	25	6.51	6.84	7.39	8.10	8.99	10.16	12.84	16.73	22.75	69.15	171.12
600	15	5.35	5.46	5.72	6.06	6.45	6.88	7.64	8.39	9.28	16.72	38.68
	20	6.23	6.44	6.84	7.34	7.94	8.64	9.97	11.48	13.65	36.34	88.69
	25	7.08	7.43	8.00	8.74	9.66	10.83	13.41	17.01	22.79	69.15	171.12
700	15	5.72	5.85	6.13	6.48	6.89	7.35	8.14	8.91	9.82	16.96	38.68
	20	6.68	6.91	7.33	7.86	8.48	9.20	10.56	12.06	14.15	36.34	88.69
	25	7.60	7.97	8.57	9.34	10.28	11.46	13.98	17.37	22.87	69.15	171.12
800	15	6.08	6.21	6.50	6.88	7.30	7.78	8.60	9.40	10.34	17.27	38.68
	20	7.11	7.35	7.79	8.34	8.98	9.74	11.12	12.62	14.66	36.34	88.69
	25	8.10	8.48	9.11	9.90	10.87	12.07	14.55	17.79	23.01	69.15	171.12
900	15	6.42	6.55	6.86	7.25	7.70	8.20	9.05	9.87	10.82	17.62	38.68
	20	7.52	7.77	8.23	8.80	9.47	10.24	11.65	13.16	15.17	36.34	88.69
	25	8.57	8.97	9.62	10.43	11.43	12.64	15.12	18.24	23.22	69.15	171.12
1000	15	6.74	6.88	7.21	7.61	8.08	8.59	9.47	10.32	11.29	18.00	38.69
	20	7.90	8.17	8.64	9.23	9.92	10.72	12.16	13.68	15.67	36.35	88.69
	25	9.02	9.43	10.10	10.94	11.96	13.20	15.67	18.71	23.47	69.15	171.12

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 48.0 Ft (RADIUS = 33.9 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	7.05	7.20	7.53	7.96	8.44	8.97	9.88	10.74	11.74	18.39	38.69
	20	8.28	8.55	9.04	9.65	10.37	11.18	12.65	14.19	16.17	36.36	88.69
	25	9.45	9.87	10.57	11.43	12.47	13.73	16.20	19.19	23.77	69.15	171.12
1200	15	7.34	7.50	7.85	8.29	8.78	9.34	10.27	11.16	12.17	18.79	38.69
	20	8.63	8.91	9.43	10.06	10.79	11.63	13.12	14.68	16.65	36.38	88.69
	25	9.86	10.30	11.01	11.90	12.97	14.24	16.73	19.67	24.11	69.15	171.12
1300	15	7.63	7.79	8.16	8.61	9.12	9.69	10.64	11.55	12.59	19.19	38.71
	20	8.98	9.27	9.80	10.45	11.20	12.06	13.58	15.15	17.13	36.41	88.69
	25	10.26	10.71	11.45	12.36	13.44	14.74	17.24	20.15	24.46	69.15	171.12
1400	15	7.91	8.08	8.45	8.92	9.44	10.03	11.01	11.94	13.00	19.60	38.72
	20	9.32	9.61	10.15	10.82	11.59	12.47	14.02	15.61	17.59	36.46	88.69
	25	10.65	11.11	11.86	12.80	13.90	15.22	17.73	20.63	24.84	69.15	171.12
1500	15	8.18	8.35	8.74	9.22	9.76	10.36	11.36	12.31	13.39	20.00	38.75
	20	9.64	9.95	10.50	11.19	11.98	12.87	14.46	16.06	18.05	36.53	88.69
	25	11.03	11.50	12.27	13.22	14.35	15.69	18.22	21.10	25.23	69.15	171.12
1600	15	8.44	8.62	9.02	9.51	10.06	10.68	11.71	12.68	13.77	20.41	38.79
	20	9.96	10.27	10.84	11.54	12.35	13.27	14.87	16.50	18.49	36.62	88.69
	25	11.39	11.88	12.67	13.64	14.79	16.14	18.69	21.57	25.63	69.15	171.12
1700	15	8.70	8.89	9.29	9.79	10.36	10.99	12.04	13.03	14.14	20.81	38.84
	20	10.27	10.59	11.17	11.89	12.71	13.65	15.28	16.92	18.93	36.72	88.69
	25	11.75	12.24	13.05	14.04	15.21	16.58	19.16	22.03	26.03	69.15	171.12
1800	15	8.95	9.14	9.56	10.07	10.65	11.30	12.37	13.38	14.51	21.20	38.91
	20	10.57	10.90	11.49	12.23	13.07	14.02	15.68	17.34	19.36	36.85	88.69
	25	12.10	12.60	13.42	14.44	15.62	17.02	19.61	22.48	26.44	69.15	171.12
1900	15	9.20	9.39	9.81	10.34	10.94	11.59	12.69	13.71	14.86	21.59	38.99
	20	10.86	11.20	11.81	12.56	13.42	14.38	16.07	17.75	19.78	37.00	88.69
	25	12.44	12.95	13.79	14.82	16.03	17.44	20.06	22.93	26.85	69.15	171.12
2000	15	9.44	9.63	10.07	10.61	11.22	11.89	13.00	14.04	15.21	21.98	39.09
	20	11.15	11.49	12.12	12.88	13.75	14.74	16.45	18.15	20.19	37.17	88.69
	25	12.77	13.29	14.15	15.20	16.42	17.85	20.49	23.37	27.26	69.15	171.12

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 48.0 Ft (RADIUS = 33.9 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	5.20	5.96	7.61	11.05	16.21	23.06	37.29	53.65	75.08	234.87	586.71
	20	6.45	8.89	14.88	23.78	35.95	52.10	85.68	124.33	175.01	553.26	1386.8
	25	8.20	15.17	27.43	44.78	68.48	99.97	165.45	240.85	339.77	1078.2	2705.7
200	15	6.70	7.47	8.86	11.45	16.23	23.06	37.29	53.65	75.08	234.87	586.71
	20	8.26	10.23	15.00	23.78	35.95	52.10	85.68	124.33	175.01	553.26	1386.8
	25	10.16	15.43	27.43	44.78	68.48	99.97	165.45	240.85	339.77	1078.2	2705.7
300	15	7.89	8.70	10.06	12.31	16.42	23.07	37.29	53.65	75.08	234.87	586.71
	20	9.71	11.60	15.58	23.80	35.95	52.10	85.68	124.33	175.01	553.26	1386.8
	25	11.82	16.28	27.43	44.78	68.48	99.97	165.45	240.85	339.77	1078.2	2705.7
400	15	8.93	9.77	11.14	13.26	16.88	23.12	37.29	53.65	75.08	234.87	586.71
	20	10.97	12.85	16.44	23.89	35.95	52.10	85.68	124.33	175.01	553.26	1386.8
	25	13.28	17.37	27.50	44.78	68.48	99.97	165.45	240.85	339.77	1078.2	2705.7
500	15	9.86	10.74	12.13	14.20	17.53	23.27	37.29	53.65	75.08	234.87	586.71
	20	12.11	13.99	17.39	24.15	35.95	52.10	85.68	124.33	175.01	553.26	1386.8
	25	14.60	18.51	27.70	44.78	68.48	99.97	165.45	240.85	339.77	1078.2	2705.7
600	15	10.71	11.62	13.05	15.10	18.26	23.56	37.29	53.65	75.08	234.87	586.71
	20	13.15	15.05	18.35	24.58	35.97	52.10	85.68	124.33	175.01	553.26	1386.8
	25	15.81	19.62	28.08	44.79	68.48	99.97	165.45	240.85	339.77	1078.2	2705.7
700	15	11.51	12.45	13.91	15.96	19.01	23.97	37.31	53.65	75.08	234.87	586.71
	20	14.12	16.05	19.29	25.13	36.03	52.10	85.68	124.33	175.01	553.26	1386.8
	25	16.94	20.70	28.61	44.80	68.48	99.97	165.45	240.85	339.77	1078.2	2705.7
800	15	12.26	13.23	14.72	16.78	19.76	24.46	37.34	53.65	75.08	234.87	586.71
	20	15.03	16.99	20.20	25.76	36.14	52.10	85.68	124.33	175.01	553.26	1386.8
	25	18.01	21.74	29.24	44.84	68.48	99.97	165.45	240.85	339.77	1078.2	2705.7
900	15	12.97	13.97	15.49	17.57	20.51	25.01	37.41	53.65	75.08	234.87	586.71
	20	15.90	17.89	21.08	26.44	36.32	52.11	85.68	124.33	175.01	553.26	1386.8
	25	19.02	22.74	29.93	44.91	68.48	99.97	165.45	240.85	339.77	1078.2	2705.7
1000	15	13.64	14.67	16.23	18.33	21.24	25.60	37.52	53.65	75.08	234.87	586.71
	20	16.73	18.74	21.94	27.14	36.57	52.12	85.68	124.33	175.01	553.26	1386.8
	25	19.98	23.70	30.67	45.03	68.49	99.97	165.45	240.85	339.77	1078.2	2705.7

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 48.0 Ft (RADIUS = 33.9 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
1100	15	14.29	15.34	16.93	19.06	21.96	26.21	37.68	53.65	75.08	234.87	586.71	
	20	17.52	19.56	22.77	27.86	36.89	52.14	85.68	124.33	175.01	553.26	1386.8	
	25	20.90	24.63	31.42	45.21	68.49	99.97	165.45	240.85	339.77	1078.2	2705.7	
1200	15	14.92	15.99	17.61	19.76	22.66	26.82	37.89	53.67	75.08	234.87	586.71	
	20	18.28	20.35	23.57	28.58	37.27	52.19	85.68	124.33	175.01	553.26	1386.8	
	25	21.79	25.53	32.19	45.44	68.49	99.97	165.45	240.85	339.77	1078.2	2705.7	
1300	15	15.52	16.62	18.27	20.44	23.34	27.44	38.14	53.69	75.08	234.87	586.71	
	20	19.01	21.11	24.35	29.29	37.70	52.25	85.68	124.33	175.01	553.26	1386.8	
	25	22.65	26.40	32.96	45.74	68.50	99.97	165.45	240.85	339.77	1078.2	2705.7	
1400	15	16.11	17.23	18.91	21.10	24.01	28.06	38.44	53.72	75.08	234.87	586.71	
	20	19.73	21.85	25.10	30.00	38.16	52.34	85.68	124.33	175.01	553.26	1386.8	
	25	23.48	27.25	33.72	46.08	68.52	99.97	165.45	240.85	339.77	1078.2	2705.7	
1500	15	16.68	17.81	19.52	21.75	24.66	28.68	38.78	53.77	75.08	234.87	586.71	
	20	20.42	22.57	25.84	30.70	38.66	52.46	85.68	124.33	175.01	553.26	1386.8	
	25	24.29	28.08	34.48	46.48	68.54	99.97	165.45	240.85	339.77	1078.2	2705.7	
1600	15	17.23	18.39	20.12	22.37	25.30	29.29	39.15	53.84	75.09	234.87	586.71	
	20	21.09	23.27	26.56	31.40	39.18	52.62	85.68	124.33	175.01	553.26	1386.8	
	25	25.07	28.88	35.24	46.91	68.58	99.97	165.45	240.85	339.77	1078.2	2705.7	
1700	15	17.77	18.94	20.71	22.98	25.92	29.89	39.54	53.92	75.09	234.87	586.71	
	20	21.74	23.95	27.26	32.08	39.71	52.81	85.68	124.33	175.01	553.26	1386.8	
	25	25.84	29.67	35.98	47.37	68.64	99.97	165.45	240.85	339.77	1078.2	2705.7	
1800	15	18.29	19.49	21.28	23.58	26.53	30.49	39.96	54.04	75.09	234.87	586.71	
	20	22.38	24.61	27.95	32.76	40.26	53.03	85.68	124.33	175.01	553.26	1386.8	
	25	26.58	30.43	36.72	47.86	68.71	99.98	165.45	240.85	339.77	1078.2	2705.7	
1900	15	18.80	20.02	21.83	24.16	27.13	31.08	40.39	54.17	75.10	234.87	586.71	
	20	23.00	25.26	28.62	33.42	40.81	53.28	85.69	124.33	175.01	553.26	1386.8	
	25	27.31	31.18	37.45	48.37	68.80	99.98	165.45	240.85	339.77	1078.2	2705.7	
2000	15	19.30	20.54	22.38	24.73	27.72	31.66	40.84	54.33	75.11	234.87	586.71	
	20	23.61	25.89	29.28	34.08	41.37	53.56	85.69	124.33	175.01	553.26	1386.8	
	25	28.02	31.92	38.17	48.89	68.92	99.98	165.45	240.85	339.77	1078.2	2705.7	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 48.0 Ft (RADIUS = 33.9 Ft)³
 FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
(Ft*s) ^{1/2}												
100	15	20.36	48.81	91.14	151.02	232.81	341.51	567.57	827.96	1169.6	3720.8	9344.8
	20	45.05	112.65	212.94	354.81	548.58	806.10	1341.8	1958.8	2768.5	8815.0	22145.
	25	85.79	217.89	413.75	690.78	1069.2	1572.1	2618.2	3823.3	5404.6	17214.	43249.
200	15	21.01	48.81	91.14	151.02	232.81	341.51	567.57	827.96	1169.6	3720.8	9344.8
	20	45.05	112.65	212.94	354.81	548.58	806.10	1341.8	1958.8	2768.5	8815.0	22145.
	25	85.79	217.89	413.75	690.78	1069.2	1572.1	2618.2	3823.3	5404.6	17214.	43249.
300	15	22.56	48.81	91.14	151.02	232.81	341.51	567.57	827.96	1169.6	3720.8	9344.8
	20	45.07	112.65	212.94	354.81	548.58	806.10	1341.8	1958.8	2768.5	8815.0	22145.
	25	85.79	217.89	413.75	690.78	1069.2	1572.1	2618.2	3823.3	5404.6	17214.	43249.
400	15	24.32	48.82	91.14	151.02	232.81	341.51	567.57	827.96	1169.6	3720.8	9344.8
	20	45.21	112.65	212.94	354.81	548.58	806.10	1341.8	1958.8	2768.5	8815.0	22145.
	25	85.79	217.89	413.75	690.78	1069.2	1572.1	2618.2	3823.3	5404.6	17214.	43249.
500	15	26.07	48.85	91.14	151.02	232.81	341.51	567.57	827.96	1169.6	3720.8	9344.8
	20	45.63	112.65	212.94	354.81	548.58	806.10	1341.8	1958.8	2768.5	8815.0	22145.
	25	85.79	217.89	413.75	690.78	1069.2	1572.1	2618.2	3823.3	5404.6	17214.	43249.
600	15	27.76	48.96	91.14	151.02	232.81	341.51	567.57	827.96	1169.6	3720.8	9344.8
	20	46.35	112.65	212.94	354.81	548.58	806.10	1341.8	1958.8	2768.5	8815.0	22145.
	25	85.79	217.89	413.75	690.78	1069.2	1572.1	2618.2	3823.3	5404.6	17214.	43249.
700	15	29.38	49.20	91.14	151.02	232.81	341.51	567.57	827.96	1169.6	3720.8	9344.8
	20	47.32	112.65	212.94	354.81	548.58	806.10	1341.8	1958.8	2768.5	8815.0	22145.
	25	85.81	217.89	413.75	690.78	1069.2	1572.1	2618.2	3823.3	5404.6	17214.	43249.
800	15	30.92	49.58	91.14	151.02	232.81	341.51	567.57	827.96	1169.6	3720.8	9344.8
	20	48.45	112.65	212.94	354.81	548.58	806.10	1341.8	1958.8	2768.5	8815.0	22145.
	25	85.86	217.89	413.75	690.78	1069.2	1572.1	2618.2	3823.3	5404.6	17214.	43249.
900	15	32.41	50.10	91.14	151.02	232.81	341.51	567.57	827.96	1169.6	3720.8	9344.8
	20	49.68	112.65	212.94	354.81	548.58	806.10	1341.8	1958.8	2768.5	8815.0	22145.
	25	85.97	217.89	413.75	690.78	1069.2	1572.1	2618.2	3823.3	5404.6	17214.	43249.
1000	15	33.83	50.75	91.14	151.02	232.81	341.51	567.57	827.96	1169.6	3720.8	9344.8
	20	50.97	112.65	212.94	354.81	548.58	806.10	1341.8	1958.8	2768.5	8815.0	22145.
	25	86.15	217.89	413.75	690.78	1069.2	1572.1	2618.2	3823.3	5404.6	17214.	43249.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 48.0 Ft (RADIUS = 33.9 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	35.21	51.48	91.14	151.02	232.81	341.51	567.57	827.96	1169.6	3720.8	9344.8
	20	52.29	112.65	212.94	354.81	548.58	806.10	1341.8	1958.8	2768.5	8815.0	22145.
	25	86.43	217.89	413.75	690.78	1069.2	1572.1	2618.2	3823.3	5404.6	17214.	43249.
1200	15	36.53	52.29	91.15	151.02	232.81	341.51	567.57	827.96	1169.6	3720.8	9344.8
	20	53.62	112.65	212.94	354.81	548.58	806.10	1341.8	1958.8	2768.5	8815.0	22145.
	25	86.82	217.89	413.75	690.78	1069.2	1572.1	2618.2	3823.3	5404.6	17214.	43249.
1300	15	37.82	53.14	91.17	151.02	232.81	341.51	567.57	827.96	1169.6	3720.8	9344.8
	20	54.95	112.66	212.94	354.81	548.58	806.10	1341.8	1958.8	2768.5	8815.0	22145.
	25	87.30	217.89	413.75	690.78	1069.2	1572.1	2618.2	3823.3	5404.6	17214.	43249.
1400	15	39.07	54.04	91.21	151.02	232.81	341.51	567.57	827.96	1169.6	3720.8	9344.8
	20	56.27	112.68	212.94	354.81	548.58	806.10	1341.8	1958.8	2768.5	8815.0	22145.
	25	87.89	217.89	413.75	690.78	1069.2	1572.1	2618.2	3823.3	5404.6	17214.	43249.
1500	15	40.28	54.95	91.26	151.02	232.81	341.51	567.57	827.96	1169.6	3720.8	9344.8
	20	57.58	112.71	212.94	354.81	548.58	806.10	1341.8	1958.8	2768.5	8815.0	22145.
	25	88.56	217.89	413.75	690.78	1069.2	1572.1	2618.2	3823.3	5404.6	17214.	43249.
1600	15	41.46	55.88	91.33	151.02	232.81	341.51	567.57	827.96	1169.6	3720.8	9344.8
	20	58.88	112.75	212.94	354.81	548.58	806.10	1341.8	1958.8	2768.5	8815.0	22145.
	25	89.31	217.89	413.75	690.78	1069.2	1572.1	2618.2	3823.3	5404.6	17214.	43249.
1700	15	42.62	56.82	91.43	151.02	232.81	341.51	567.57	827.96	1169.6	3720.8	9344.8
	20	60.16	112.81	212.94	354.81	548.58	806.10	1341.8	1958.8	2768.5	8815.0	22145.
	25	90.13	217.89	413.75	690.78	1069.2	1572.1	2618.2	3823.3	5404.6	17214.	43249.
1800	15	43.74	57.77	91.57	151.02	232.81	341.51	567.57	827.96	1169.6	3720.8	9344.8
	20	61.43	112.90	212.94	354.81	548.58	806.10	1341.8	1958.8	2768.5	8815.0	22145.
	25	91.00	217.89	413.75	690.78	1069.2	1572.1	2618.2	3823.3	5404.6	17214.	43249.
1900	15	44.84	58.72	91.73	151.02	232.81	341.51	567.57	827.96	1169.6	3720.8	9344.8
	20	62.67	113.01	212.94	354.81	548.58	806.10	1341.8	1958.8	2768.5	8815.0	22145.
	25	91.91	217.89	413.75	690.78	1069.2	1572.1	2618.2	3823.3	5404.6	17214.	43249.
2000	15	45.92	59.66	91.93	151.02	232.81	341.51	567.57	827.96	1169.6	3720.8	9344.8
	20	63.90	113.15	212.94	354.81	548.58	806.10	1341.8	1958.8	2768.5	8815.0	22145.
	25	92.87	217.89	413.75	690.78	1069.2	1572.1	2618.2	3823.3	5404.6	17214.	43249.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 50.0 Ft (RADIUS = 35.4 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	1.75	1.72	1.76	1.83	1.90	1.99	2.13	2.25	2.39	3.06	4.27
	20	1.89	1.88	1.93	2.02	2.11	2.22	2.40	2.58	2.77	4.01	7.47
	25	2.03	2.03	2.10	2.21	2.33	2.47	2.72	2.96	3.27	6.03	12.99
200	15	2.10	2.08	2.13	2.21	2.30	2.41	2.58	2.73	2.89	3.65	4.79
	20	2.32	2.31	2.38	2.48	2.60	2.73	2.95	3.15	3.37	4.60	7.52
	25	2.52	2.53	2.62	2.75	2.90	3.07	3.35	3.63	3.95	6.25	12.99
300	15	2.38	2.37	2.43	2.52	2.63	2.74	2.93	3.10	3.29	4.13	5.31
	20	2.66	2.66	2.74	2.86	2.99	3.14	3.39	3.61	3.86	5.15	7.75
	25	2.91	2.93	3.04	3.19	3.35	3.54	3.86	4.16	4.51	6.69	12.99
400	15	2.63	2.62	2.69	2.79	2.91	3.04	3.25	3.43	3.63	4.54	5.77
	20	2.95	2.96	3.05	3.18	3.33	3.50	3.77	4.01	4.28	5.64	8.11
	25	3.25	3.28	3.40	3.56	3.75	3.96	4.30	4.63	5.00	7.17	13.02
500	15	2.85	2.84	2.92	3.03	3.16	3.30	3.52	3.73	3.94	4.92	6.20
	20	3.22	3.23	3.33	3.47	3.64	3.81	4.11	4.37	4.66	6.09	8.51
	25	3.56	3.59	3.72	3.90	4.10	4.33	4.70	5.05	5.44	7.64	13.09
600	15	3.06	3.05	3.13	3.25	3.39	3.54	3.78	4.00	4.22	5.26	6.60
	20	3.47	3.48	3.59	3.74	3.92	4.11	4.42	4.70	5.01	6.50	8.92
	25	3.84	3.88	4.02	4.21	4.43	4.67	5.07	5.43	5.84	8.09	13.24
700	15	3.25	3.24	3.33	3.46	3.61	3.77	4.02	4.25	4.49	5.58	6.97
	20	3.69	3.71	3.83	3.99	4.18	4.38	4.71	5.01	5.33	6.89	9.32
	25	4.11	4.15	4.30	4.50	4.73	4.99	5.40	5.79	6.22	8.52	13.45
800	15	3.43	3.43	3.52	3.66	3.81	3.98	4.25	4.49	4.74	5.88	7.32
	20	3.91	3.93	4.06	4.23	4.42	4.64	4.98	5.30	5.63	7.26	9.72
	25	4.36	4.40	4.56	4.78	5.02	5.28	5.72	6.13	6.57	8.93	13.71
900	15	3.60	3.60	3.70	3.84	4.00	4.18	4.46	4.71	4.98	6.16	7.65
	20	4.12	4.14	4.27	4.45	4.66	4.88	5.24	5.57	5.92	7.60	10.10
	25	4.59	4.64	4.81	5.04	5.29	5.57	6.03	6.45	6.91	9.33	14.00
1000	15	3.77	3.77	3.87	4.02	4.19	4.37	4.67	4.93	5.20	6.43	7.97
	20	4.31	4.34	4.48	4.67	4.88	5.11	5.49	5.83	6.20	7.93	10.46
	25	4.82	4.87	5.05	5.28	5.55	5.84	6.32	6.75	7.23	9.71	14.31

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 50.0 Ft (RADIUS = 35.4 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	3.92	3.93	4.04	4.19	4.37	4.56	4.86	5.13	5.42	6.69	8.27
	20	4.50	4.53	4.67	4.87	5.09	5.34	5.73	6.08	6.46	8.25	10.82
	25	5.04	5.09	5.28	5.52	5.80	6.10	6.59	7.05	7.54	10.07	14.63
1200	15	4.08	4.08	4.19	4.35	4.54	4.73	5.05	5.33	5.63	6.94	8.57
	20	4.68	4.71	4.86	5.07	5.30	5.55	5.96	6.32	6.71	8.56	11.16
	25	5.25	5.30	5.50	5.75	6.04	6.35	6.86	7.33	7.83	10.42	14.96
1300	15	4.22	4.23	4.35	4.51	4.70	4.91	5.23	5.52	5.83	7.19	8.85
	20	4.86	4.89	5.05	5.26	5.50	5.76	6.18	6.56	6.96	8.85	11.50
	25	5.45	5.51	5.71	5.97	6.27	6.59	7.12	7.60	8.12	10.76	15.28
1400	15	4.37	4.37	4.50	4.67	4.86	5.07	5.41	5.71	6.02	7.42	9.12
	20	5.03	5.06	5.23	5.44	5.69	5.96	6.39	6.78	7.20	9.14	11.82
	25	5.65	5.71	5.92	6.18	6.49	6.82	7.37	7.86	8.40	11.09	15.61
1500	15	4.50	4.51	4.64	4.82	5.02	5.23	5.58	5.89	6.21	7.65	9.39
	20	5.20	5.23	5.40	5.62	5.88	6.15	6.60	7.00	7.43	9.41	12.14
	25	5.84	5.90	6.12	6.39	6.71	7.05	7.61	8.12	8.66	11.41	15.94
1600	15	4.64	4.65	4.78	4.96	5.17	5.39	5.75	6.07	6.40	7.87	9.65
	20	5.36	5.39	5.57	5.80	6.06	6.34	6.80	7.21	7.65	9.68	12.45
	25	6.02	6.09	6.31	6.59	6.92	7.27	7.84	8.36	8.93	11.72	16.26
1700	15	4.77	4.78	4.92	5.10	5.31	5.54	5.91	6.24	6.58	8.08	9.90
	20	5.52	5.55	5.73	5.97	6.24	6.53	7.00	7.42	7.87	9.95	12.76
	25	6.20	6.27	6.50	6.79	7.12	7.48	8.07	8.60	9.18	12.03	16.58
1800	15	4.90	4.91	5.05	5.24	5.46	5.69	6.07	6.40	6.75	8.29	10.15
	20	5.67	5.71	5.89	6.14	6.41	6.71	7.19	7.62	8.08	10.20	13.05
	25	6.38	6.45	6.68	6.98	7.32	7.69	8.30	8.84	9.43	12.32	16.89
1900	15	5.03	5.04	5.18	5.38	5.60	5.84	6.23	6.57	6.92	8.50	10.39
	20	5.82	5.86	6.05	6.30	6.58	6.89	7.38	7.82	8.29	10.45	13.34
	25	6.55	6.63	6.86	7.17	7.52	7.90	8.51	9.07	9.67	12.62	17.21
2000	15	5.15	5.16	5.31	5.51	5.74	5.98	6.38	6.73	7.09	8.70	10.62
	20	5.97	6.01	6.20	6.46	6.75	7.06	7.56	8.01	8.49	10.70	13.62
	25	6.72	6.80	7.04	7.36	7.71	8.10	8.73	9.30	9.91	12.90	17.52

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 50.0 Ft (RADIUS = 35.4 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	2.89	2.93	3.08	3.28	3.54	3.85	4.51	5.37	6.72	17.68	41.29
	20	3.25	3.37	3.63	3.99	4.51	5.29	7.38	10.06	13.56	39.23	94.84
	25	3.62	3.85	4.30	5.02	6.26	8.34	12.91	18.12	24.90	74.78	183.11
200	15	3.62	3.68	3.87	4.11	4.40	4.75	5.40	6.13	7.17	17.68	41.29
	20	4.14	4.29	4.59	4.99	5.50	6.19	7.79	10.12	13.57	39.23	94.84
	25	4.65	4.92	5.40	6.08	7.08	8.67	12.92	18.12	24.90	74.78	183.11
300	15	4.21	4.29	4.49	4.77	5.09	5.47	6.15	6.88	7.84	17.68	41.29
	20	4.85	5.02	5.36	5.79	6.33	7.02	8.48	10.46	13.62	39.23	94.84
	25	5.48	5.78	6.29	6.99	7.95	9.34	13.03	18.12	24.90	74.78	183.11
400	15	4.72	4.81	5.04	5.34	5.69	6.10	6.82	7.56	8.50	17.69	41.29
	20	5.47	5.66	6.02	6.49	7.06	7.76	9.18	10.98	13.81	39.23	94.84
	25	6.20	6.52	7.07	7.80	8.75	10.07	13.35	18.16	24.90	74.78	183.11
500	15	5.18	5.28	5.53	5.85	6.23	6.66	7.41	8.18	9.12	17.75	41.29
	20	6.02	6.23	6.62	7.11	7.71	8.44	9.86	11.56	14.14	39.23	94.84
	25	6.84	7.19	7.77	8.52	9.49	10.78	13.82	18.27	24.91	74.78	183.11
600	15	5.60	5.71	5.98	6.32	6.72	7.18	7.97	8.75	9.71	17.87	41.29
	20	6.53	6.75	7.17	7.69	8.32	9.06	10.50	12.15	14.57	39.23	94.84
	25	7.43	7.80	8.41	9.19	10.18	11.46	14.35	18.48	24.93	74.78	183.11
700	15	6.00	6.11	6.40	6.76	7.19	7.66	8.48	9.29	10.26	18.08	41.29
	20	7.01	7.24	7.68	8.23	8.88	9.65	11.10	12.74	15.05	39.23	94.84
	25	7.98	8.37	9.00	9.82	10.83	12.12	14.92	18.78	24.98	74.78	183.11
800	15	6.37	6.49	6.80	7.18	7.62	8.11	8.97	9.80	10.79	18.35	41.29
	20	7.46	7.70	8.16	8.73	9.41	10.20	11.68	13.30	15.55	39.24	94.84
	25	8.50	8.91	9.56	10.40	11.44	12.74	15.49	19.16	25.08	74.78	183.11
900	15	6.72	6.85	7.17	7.57	8.03	8.54	9.43	10.29	11.29	18.67	41.29
	20	7.88	8.14	8.61	9.21	9.91	10.72	12.23	13.86	16.05	39.24	94.84
	25	9.00	9.41	10.10	10.96	12.02	13.33	16.05	19.57	25.22	74.78	183.11
1000	15	7.06	7.20	7.53	7.94	8.42	8.96	9.87	10.75	11.77	19.02	41.29
	20	8.29	8.56	9.05	9.67	10.39	11.22	12.75	14.39	16.56	39.24	94.84
	25	9.47	9.90	10.60	11.49	12.58	13.90	16.61	20.02	25.43	74.78	183.11

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 50.0 Ft (RADIUS = 35.4 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	7.38	7.53	7.87	8.30	8.80	9.35	10.29	11.19	12.24	19.40	41.30
	20	8.68	8.96	9.47	10.10	10.85	11.70	13.26	14.91	17.05	39.24	94.84
	25	9.92	10.36	11.09	12.00	13.11	14.45	17.15	20.48	25.68	74.78	183.11
1200	15	7.69	7.85	8.20	8.65	9.16	9.73	10.69	11.62	12.68	19.79	41.30
	20	9.06	9.34	9.87	10.52	11.29	12.17	13.75	15.41	17.55	39.26	94.84
	25	10.36	10.81	11.56	12.50	13.62	14.98	17.68	20.95	25.97	74.78	183.11
1300	15	8.00	8.15	8.52	8.98	9.51	10.09	11.09	12.03	13.12	20.19	41.31
	20	9.42	9.71	10.26	10.93	11.71	12.61	14.22	15.90	18.03	39.28	94.84
	25	10.78	11.24	12.01	12.97	14.12	15.50	18.20	21.43	26.29	74.78	183.11
1400	15	8.29	8.45	8.83	9.30	9.85	10.45	11.46	12.43	13.53	20.59	41.32
	20	9.77	10.07	10.63	11.32	12.13	13.04	14.68	16.37	18.50	39.31	94.84
	25	11.19	11.66	12.45	13.43	14.60	16.00	18.71	21.90	26.63	74.78	183.11
1500	15	8.57	8.74	9.13	9.62	10.17	10.79	11.83	12.82	13.94	20.99	41.34
	20	10.11	10.42	11.00	11.70	12.53	13.46	15.13	16.83	18.97	39.35	94.84
	25	11.58	12.07	12.87	13.87	15.06	16.48	19.21	22.38	27.00	74.78	183.11
1600	15	8.85	9.02	9.42	9.92	10.49	11.13	12.19	13.20	14.34	21.39	41.36
	20	10.45	10.76	11.35	12.08	12.92	13.87	15.56	17.28	19.42	39.41	94.84
	25	11.97	12.46	13.29	14.31	15.52	16.96	19.70	22.84	27.38	74.78	183.11
1700	15	9.12	9.30	9.71	10.22	10.80	11.45	12.54	13.56	14.72	21.79	41.40
	20	10.77	11.09	11.70	12.44	13.29	14.27	15.98	17.72	19.87	39.49	94.84
	25	12.34	12.85	13.69	14.73	15.96	17.42	20.18	23.31	27.77	74.78	183.11
1800	15	9.38	9.56	9.98	10.51	11.11	11.77	12.88	13.92	15.10	22.19	41.45
	20	11.09	11.42	12.03	12.79	13.66	14.65	16.40	18.15	20.31	39.59	94.84
	25	12.71	13.22	14.08	15.14	16.39	17.87	20.65	23.77	28.16	74.78	183.11
1900	15	9.64	9.83	10.26	10.79	11.40	12.08	13.21	14.27	15.47	22.59	41.51
	20	11.39	11.73	12.36	13.13	14.02	15.03	16.80	18.58	20.74	39.71	94.84
	25	13.06	13.59	14.46	15.54	16.81	18.30	21.10	24.22	28.56	74.78	183.11
2000	15	9.89	10.08	10.52	11.07	11.69	12.38	13.53	14.61	15.83	22.98	41.59
	20	11.70	12.04	12.68	13.47	14.38	15.40	17.19	18.99	21.17	39.84	94.84
	25	13.41	13.95	14.84	15.93	17.22	18.73	21.55	24.67	28.96	74.78	183.11

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 50.0 Ft (RADIUS = 35.4 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	5.49	6.36	8.36	12.37	18.12	25.70	41.34	59.20	82.51	254.27	628.08
	20	6.88	9.89	16.83	26.84	40.39	58.29	95.21	137.44	192.55	599.19	1484.8
	25	8.92	17.30	31.20	50.70	77.13	112.01	184.03	266.43	373.98	1167.8	2897.1
200	15	7.06	7.92	9.52	12.62	18.12	25.70	41.34	59.20	82.51	254.27	628.08
	20	8.77	11.11	16.89	26.84	40.39	58.29	95.21	137.44	192.55	599.19	1484.8
	25	10.91	17.44	31.20	50.70	77.13	112.01	184.03	266.43	373.98	1167.8	2897.1
300	15	8.32	9.21	10.74	13.37	18.23	25.70	41.34	59.20	82.51	254.27	628.08
	20	10.29	12.47	17.29	26.84	40.39	58.29	95.21	137.44	192.55	599.19	1484.8
	25	12.64	18.08	31.20	50.70	77.13	112.01	184.03	266.43	373.98	1167.8	2897.1
400	15	9.41	10.33	11.86	14.29	18.57	25.72	41.34	59.20	82.51	254.27	628.08
	20	11.62	13.75	18.04	26.88	40.39	58.29	95.21	137.44	192.55	599.19	1484.8
	25	14.16	19.06	31.23	50.70	77.13	112.01	184.03	266.43	373.98	1167.8	2897.1
500	15	10.38	11.34	12.88	15.22	19.12	25.81	41.34	59.20	82.51	254.27	628.08
	20	12.81	14.94	18.93	27.03	40.40	58.29	95.21	137.44	192.55	599.19	1484.8
	25	15.54	20.16	31.33	50.70	77.13	112.01	184.03	266.43	373.98	1167.8	2897.1
600	15	11.28	12.27	13.84	16.14	19.78	26.00	41.34	59.20	82.51	254.27	628.08
	20	13.91	16.05	19.86	27.33	40.40	58.29	95.21	137.44	192.55	599.19	1484.8
	25	16.81	21.26	31.57	50.70	77.13	112.01	184.03	266.43	373.98	1167.8	2897.1
700	15	12.12	13.14	14.73	17.02	20.50	26.31	41.34	59.20	82.51	254.27	628.08
	20	14.93	17.08	20.80	27.76	40.43	58.29	95.21	137.44	192.55	599.19	1484.8
	25	18.00	22.35	31.95	50.70	77.13	112.01	184.03	266.43	373.98	1167.8	2897.1
800	15	12.90	13.95	15.58	17.86	21.24	26.72	41.36	59.20	82.51	254.27	628.08
	20	15.89	18.07	21.72	28.30	40.48	58.29	95.21	137.44	192.55	599.19	1484.8
	25	19.12	23.41	32.45	50.72	77.13	112.01	184.03	266.43	373.98	1167.8	2897.1
900	15	13.65	14.73	16.38	18.67	21.98	27.21	41.39	59.20	82.51	254.27	628.08
	20	16.80	19.00	22.62	28.91	40.59	58.29	95.21	137.44	192.55	599.19	1484.8
	25	20.18	24.44	33.05	50.75	77.13	112.01	184.03	266.43	373.98	1167.8	2897.1
1000	15	14.36	15.47	17.15	19.45	22.72	27.74	41.45	59.21	82.51	254.27	628.08
	20	17.67	19.90	23.50	29.57	40.75	58.29	95.21	137.44	192.55	599.19	1484.8
	25	21.19	25.43	33.71	50.81	77.13	112.01	184.03	266.43	373.98	1167.8	2897.1

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 50.0 Ft (RADIUS = 35.4 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX	RATE OF RISE °F/min	CEILING HEIGHT, Ft									
		(Ft*s) ^{1/2}									
		4	8	12	16	20	24	30	35	40	80
1100	15	15.05	16.17	17.89	20.21	23.44	28.31	41.55	59.21	82.51	254.27
	20	18.50	20.75	24.35	30.25	40.97	58.30	95.21	137.44	192.55	628.08
	25	22.16	26.39	34.41	50.90	77.13	112.01	184.03	266.43	373.98	1484.8
1200	15	15.70	16.85	18.60	20.94	24.16	28.90	41.70	59.21	82.51	254.27
	20	19.30	21.58	25.17	30.95	41.25	58.32	95.21	137.44	192.55	628.08
	25	23.10	27.33	35.14	51.05	77.13	112.01	184.03	266.43	373.98	1484.8
1300	15	16.34	17.51	19.28	21.65	24.85	29.50	41.88	59.22	82.51	254.27
	20	20.07	22.38	25.98	31.65	41.59	58.35	95.21	137.44	192.55	628.08
	25	24.00	28.23	35.88	51.24	77.13	112.01	184.03	266.43	373.98	1484.8
1400	15	16.95	18.15	19.95	22.33	25.54	30.11	42.11	59.24	82.51	254.27
	20	20.82	23.15	26.76	32.36	41.98	58.40	95.21	137.44	192.55	628.08
	25	24.88	29.11	36.63	51.48	77.14	112.01	184.03	266.43	373.98	1484.8
1500	15	17.55	18.76	20.59	23.00	26.21	30.72	42.38	59.26	82.51	254.27
	20	21.55	23.91	27.53	33.06	42.40	58.47	95.21	137.44	192.55	628.08
	25	25.72	29.97	37.38	51.77	77.15	112.01	184.03	266.43	373.98	1484.8
1600	15	18.13	19.36	21.22	23.65	26.86	31.33	42.68	59.30	82.51	254.27
	20	22.25	24.64	28.27	33.75	42.86	58.56	95.21	137.44	192.55	628.08
	25	26.55	30.81	38.13	52.10	77.16	112.01	184.03	266.43	373.98	1484.8
1700	15	18.69	19.95	21.83	24.29	27.51	31.94	43.02	59.35	82.51	254.27
	20	22.94	25.35	29.00	34.45	43.34	58.68	95.21	137.44	192.55	628.08
	25	27.35	31.63	38.88	52.47	77.19	112.01	184.03	266.43	373.98	1484.8
1800	15	19.24	20.52	22.43	24.91	28.14	32.54	43.38	59.42	82.51	254.27
	20	23.61	26.04	29.72	35.13	43.84	58.83	95.21	137.44	192.55	628.08
	25	28.13	32.43	39.62	52.88	77.22	112.01	184.03	266.43	373.98	1484.8
1900	15	19.78	21.07	23.01	25.51	28.76	33.13	43.77	59.51	82.51	254.27
	20	24.27	26.72	30.41	35.81	44.36	59.00	95.21	137.44	192.55	628.08
	25	28.90	33.21	40.36	53.32	77.27	112.01	184.03	266.43	373.98	1484.8
2000	15	20.31	21.62	23.58	26.11	29.36	33.72	44.18	59.62	82.52	254.27
	20	24.91	27.39	31.10	36.47	44.90	59.21	95.22	137.44	192.55	628.08
	25	29.64	33.98	41.09	53.78	77.33	112.01	184.03	266.43	373.98	1484.8

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 50.0 Ft (RADIUS = 35.4 Ft)³
 FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	23.41	56.07	104.07	171.36	262.58	383.00	631.69	916.29	1287.8	4030.6	10006.
	20	52.19	129.75	243.50	402.94	619.05	904.38	1493.7	2168.1	3048.5	9549.3	23713.
	25	99.64	251.22	473.37	784.72	1206.7	1763.9	2914.8	4232.0	5951.4	18648.	46311.
200	15	23.78	56.07	104.07	171.36	262.58	383.00	631.69	916.29	1287.8	4030.6	10006.
	20	52.19	129.75	243.50	402.94	619.05	904.38	1493.7	2168.1	3048.5	9549.3	23713.
	25	99.64	251.22	473.37	784.72	1206.7	1763.9	2914.8	4232.0	5951.4	18648.	46311.
300	15	25.04	56.07	104.07	171.36	262.58	383.00	631.69	916.29	1287.8	4030.6	10006.
	20	52.19	129.75	243.50	402.94	619.05	904.38	1493.7	2168.1	3048.5	9549.3	23713.
	25	99.64	251.22	473.37	784.72	1206.7	1763.9	2914.8	4232.0	5951.4	18648.	46311.
400	15	26.69	56.07	104.07	171.36	262.58	383.00	631.69	916.29	1287.8	4030.6	10006.
	20	52.24	129.75	243.50	402.94	619.05	904.38	1493.7	2168.1	3048.5	9549.3	23713.
	25	99.64	251.22	473.37	784.72	1206.7	1763.9	2914.8	4232.0	5951.4	18648.	46311.
500	15	28.42	56.08	104.07	171.36	262.58	383.00	631.69	916.29	1287.8	4030.6	10006.
	20	52.44	129.75	243.50	402.94	619.05	904.38	1493.7	2168.1	3048.5	9549.3	23713.
	25	99.64	251.22	473.37	784.72	1206.7	1763.9	2914.8	4232.0	5951.4	18648.	46311.
600	15	30.12	56.12	104.07	171.36	262.58	383.00	631.69	916.29	1287.8	4030.6	10006.
	20	52.87	129.75	243.50	402.94	619.05	904.38	1493.7	2168.1	3048.5	9549.3	23713.
	25	99.65	251.22	473.37	784.72	1206.7	1763.9	2914.8	4232.0	5951.4	18648.	46311.
700	15	31.77	56.23	104.07	171.36	262.58	383.00	631.69	916.29	1287.8	4030.6	10006.
	20	53.56	129.75	243.50	402.94	619.05	904.38	1493.7	2168.1	3048.5	9549.3	23713.
	25	99.65	251.22	473.37	784.72	1206.7	1763.9	2914.8	4232.0	5951.4	18648.	46311.
800	15	33.36	56.44	104.07	171.36	262.58	383.00	631.69	916.29	1287.8	4030.6	10006.
	20	54.46	129.75	243.50	402.94	619.05	904.38	1493.7	2168.1	3048.5	9549.3	23713.
	25	99.66	251.22	473.37	784.72	1206.7	1763.9	2914.8	4232.0	5951.4	18648.	46311.
900	15	34.90	56.77	104.07	171.36	262.58	383.00	631.69	916.29	1287.8	4030.6	10006.
	20	55.51	129.75	243.50	402.94	619.05	904.38	1493.7	2168.1	3048.5	9549.3	23713.
	25	99.70	251.22	473.37	784.72	1206.7	1763.9	2914.8	4232.0	5951.4	18648.	46311.
1000	15	36.38	57.22	104.07	171.36	262.58	383.00	631.69	916.29	1287.8	4030.6	10006.
	20	56.66	129.75	243.50	402.94	619.05	904.38	1493.7	2168.1	3048.5	9549.3	23713.
	25	99.77	251.22	473.37	784.72	1206.7	1763.9	2914.8	4232.0	5951.4	18648.	46311.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 50.0 Ft (RADIUS = 35.4 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	37.80	57.78	104.07	171.36	262.58	383.00	631.69	916.29	1287.8	4030.6	10006.
	20	57.89	129.75	243.50	402.94	619.05	904.38	1493.7	2168.1	3048.5	9549.3	23713.
	25	99.89	251.22	473.37	784.72	1206.7	1763.9	2914.8	4232.0	5951.4	18648.	46311.
1200	15	39.19	58.43	104.07	171.36	262.58	383.00	631.69	916.29	1287.8	4030.6	10006.
	20	59.15	129.75	243.50	402.94	619.05	904.38	1493.7	2168.1	3048.5	9549.3	23713.
	25	100.08	251.22	473.37	784.72	1206.7	1763.9	2914.8	4232.0	5951.4	18648.	46311.
1300	15	40.53	59.16	104.08	171.36	262.58	383.00	631.69	916.29	1287.8	4030.6	10006.
	20	60.43	129.75	243.50	402.94	619.05	904.38	1493.7	2168.1	3048.5	9549.3	23713.
	25	100.35	251.22	473.37	784.72	1206.7	1763.9	2914.8	4232.0	5951.4	18648.	46311.
1400	15	41.83	59.94	104.09	171.36	262.58	383.00	631.69	916.29	1287.8	4030.6	10006.
	20	61.73	129.75	243.50	402.94	619.05	904.38	1493.7	2168.1	3048.5	9549.3	23713.
	25	100.70	251.22	473.37	784.72	1206.7	1763.9	2914.8	4232.0	5951.4	18648.	46311.
1500	15	43.10	60.77	104.11	171.36	262.58	383.00	631.69	916.29	1287.8	4030.6	10006.
	20	63.03	129.76	243.50	402.94	619.05	904.38	1493.7	2168.1	3048.5	9549.3	23713.
	25	101.14	251.22	473.37	784.72	1206.7	1763.9	2914.8	4232.0	5951.4	18648.	46311.
1600	15	44.34	61.63	104.14	171.36	262.58	383.00	631.69	916.29	1287.8	4030.6	10006.
	20	64.32	129.78	243.50	402.94	619.05	904.38	1493.7	2168.1	3048.5	9549.3	23713.
	25	101.66	251.22	473.37	784.72	1206.7	1763.9	2914.8	4232.0	5951.4	18648.	46311.
1700	15	45.54	62.51	104.18	171.36	262.58	383.00	631.69	916.29	1287.8	4030.6	10006.
	20	65.61	129.80	243.50	402.94	619.05	904.38	1493.7	2168.1	3048.5	9549.3	23713.
	25	102.26	251.22	473.37	784.72	1206.7	1763.9	2914.8	4232.0	5951.4	18648.	46311.
1800	15	46.72	63.41	104.24	171.36	262.58	383.00	631.69	916.29	1287.8	4030.6	10006.
	20	66.89	129.83	243.50	402.94	619.05	904.38	1493.7	2168.1	3048.5	9549.3	23713.
	25	102.93	251.22	473.37	784.72	1206.7	1763.9	2914.8	4232.0	5951.4	18648.	46311.
1900	15	47.88	64.33	104.32	171.36	262.58	383.00	631.69	916.29	1287.8	4030.6	10006.
	20	68.15	129.87	243.50	402.94	619.05	904.38	1493.7	2168.1	3048.5	9549.3	23713.
	25	103.66	251.22	473.37	784.72	1206.7	1763.9	2914.8	4232.0	5951.4	18648.	46311.
2000	15	49.00	65.25	104.42	171.36	262.58	383.00	631.69	916.29	1287.8	4030.6	10006.
	20	69.40	129.93	243.50	402.94	619.05	904.38	1493.7	2168.1	3048.5	9549.3	23713.
	25	104.45	251.22	473.37	784.72	1206.7	1763.9	2914.8	4232.0	5951.4	18648.	46311.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 52.0 Ft (RADIUS = 36.8 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	1.82	1.79	1.83	1.89	1.97	2.05	2.19	2.32	2.46	3.15	4.43
	20	1.97	1.95	2.01	2.09	2.19	2.30	2.48	2.66	2.86	4.19	7.90
	25	2.12	2.12	2.19	2.29	2.42	2.56	2.82	3.08	3.40	6.42	13.80
200	15	2.19	2.16	2.21	2.29	2.38	2.49	2.66	2.81	2.97	3.76	4.95
	20	2.41	2.40	2.47	2.58	2.70	2.83	3.05	3.26	3.49	4.78	7.93
	25	2.63	2.64	2.73	2.86	3.01	3.18	3.48	3.76	4.10	6.60	13.80
300	15	2.48	2.46	2.52	2.61	2.72	2.84	3.03	3.20	3.38	4.25	5.47
	20	2.77	2.77	2.85	2.96	3.10	3.25	3.50	3.74	3.99	5.34	8.13
	25	3.04	3.05	3.16	3.31	3.48	3.68	4.01	4.32	4.68	7.01	13.80
400	15	2.74	2.72	2.79	2.89	3.01	3.14	3.35	3.54	3.74	4.67	5.95
	20	3.08	3.08	3.17	3.30	3.45	3.62	3.90	4.15	4.42	5.84	8.47
	25	3.40	3.42	3.54	3.70	3.89	4.11	4.46	4.80	5.18	7.49	13.81
500	15	2.97	2.96	3.03	3.14	3.27	3.41	3.64	3.85	4.06	5.06	6.38
	20	3.36	3.36	3.46	3.61	3.77	3.95	4.25	4.52	4.81	6.30	8.86
	25	3.72	3.74	3.88	4.06	4.26	4.49	4.88	5.23	5.64	7.96	13.87
600	15	3.19	3.17	3.26	3.37	3.51	3.66	3.91	4.13	4.36	5.41	6.79
	20	3.62	3.62	3.73	3.89	4.06	4.26	4.57	4.86	5.17	6.72	9.27
	25	4.02	4.05	4.19	4.38	4.60	4.85	5.25	5.63	6.05	8.42	13.99
700	15	3.39	3.38	3.46	3.59	3.74	3.90	4.16	4.39	4.63	5.74	7.17
	20	3.86	3.87	3.98	4.15	4.33	4.54	4.88	5.18	5.51	7.12	9.67
	25	4.29	4.33	4.48	4.68	4.92	5.18	5.61	6.00	6.44	8.86	14.18
800	15	3.58	3.57	3.66	3.79	3.95	4.12	4.39	4.63	4.89	6.05	7.53
	20	4.08	4.09	4.22	4.39	4.59	4.81	5.16	5.48	5.82	7.49	10.07
	25	4.55	4.59	4.75	4.97	5.21	5.49	5.94	6.35	6.81	9.28	14.41
900	15	3.76	3.75	3.85	3.99	4.15	4.33	4.61	4.87	5.13	6.34	7.87
	20	4.30	4.31	4.45	4.63	4.83	5.06	5.43	5.76	6.12	7.85	10.45
	25	4.80	4.84	5.01	5.24	5.50	5.78	6.25	6.68	7.16	9.68	14.69
1000	15	3.93	3.92	4.03	4.17	4.34	4.53	4.82	5.09	5.37	6.62	8.19
	20	4.51	4.52	4.66	4.85	5.06	5.30	5.69	6.03	6.40	8.19	10.82
	25	5.04	5.08	5.26	5.50	5.77	6.06	6.55	7.00	7.49	10.06	14.98

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 52.0 Ft (RADIUS = 36.8 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	4.10	4.09	4.20	4.35	4.53	4.72	5.03	5.30	5.59	6.89	8.50
	20	4.70	4.72	4.87	5.06	5.29	5.53	5.93	6.29	6.68	8.52	11.19
	25	5.27	5.31	5.50	5.74	6.02	6.33	6.84	7.30	7.81	10.44	15.29
1200	15	4.26	4.25	4.36	4.52	4.70	4.90	5.22	5.51	5.80	7.15	8.81
	20	4.89	4.91	5.06	5.27	5.50	5.76	6.17	6.54	6.94	8.83	11.54
	25	5.48	5.53	5.73	5.98	6.27	6.59	7.11	7.59	8.11	10.80	15.61
1300	15	4.41	4.40	4.52	4.69	4.87	5.08	5.41	5.70	6.01	7.39	9.10
	20	5.08	5.10	5.26	5.47	5.71	5.97	6.40	6.78	7.19	9.13	11.88
	25	5.70	5.75	5.95	6.21	6.51	6.84	7.38	7.87	8.41	11.15	15.94
1400	15	4.56	4.55	4.68	4.85	5.04	5.25	5.59	5.90	6.21	7.64	9.38
	20	5.26	5.28	5.44	5.66	5.91	6.18	6.62	7.02	7.44	9.43	12.21
	25	5.90	5.96	6.16	6.44	6.74	7.08	7.64	8.15	8.70	11.49	16.26
1500	15	4.70	4.70	4.83	5.00	5.20	5.42	5.77	6.08	6.41	7.87	9.65
	20	5.43	5.45	5.62	5.85	6.10	6.38	6.84	7.24	7.68	9.71	12.54
	25	6.10	6.16	6.37	6.65	6.97	7.32	7.89	8.41	8.97	11.82	16.59
1600	15	4.84	4.84	4.97	5.15	5.36	5.58	5.95	6.27	6.60	8.10	9.92
	20	5.60	5.62	5.80	6.03	6.29	6.58	7.05	7.46	7.91	9.99	12.85
	25	6.30	6.35	6.58	6.86	7.19	7.55	8.13	8.67	9.24	12.14	16.91
1700	15	4.98	4.98	5.11	5.30	5.51	5.74	6.11	6.44	6.79	8.32	10.18
	20	5.76	5.79	5.97	6.21	6.48	6.77	7.25	7.68	8.13	10.26	13.16
	25	6.48	6.55	6.77	7.07	7.40	7.77	8.37	8.92	9.51	12.45	17.23
1800	15	5.12	5.12	5.25	5.44	5.66	5.90	6.28	6.61	6.97	8.53	10.43
	20	5.92	5.95	6.13	6.38	6.66	6.96	7.45	7.89	8.35	10.52	13.47
	25	6.67	6.73	6.97	7.27	7.61	7.99	8.60	9.16	9.76	12.75	17.55
1900	15	5.25	5.25	5.39	5.58	5.81	6.05	6.44	6.78	7.14	8.74	10.67
	20	6.08	6.11	6.30	6.55	6.83	7.14	7.64	8.09	8.57	10.78	13.76
	25	6.85	6.91	7.15	7.46	7.82	8.20	8.83	9.40	10.01	13.05	17.87
2000	15	5.38	5.38	5.52	5.72	5.95	6.20	6.60	6.95	7.32	8.95	10.92
	20	6.23	6.27	6.46	6.71	7.00	7.32	7.83	8.29	8.78	11.03	14.05
	25	7.03	7.09	7.34	7.65	8.01	8.41	9.05	9.63	10.26	13.35	18.18

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 52.0 Ft (RADIUS = 36.8 Ft) ³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	3.01	3.06	3.21	3.42	3.69	4.03	4.76	5.72	7.23	18.99	44.04
	20	3.40	3.53	3.80	4.20	4.78	5.67	8.04	10.97	14.77	42.31	101.31
	25	3.79	4.05	4.55	5.37	6.83	9.19	14.20	19.87	27.23	80.75	195.72
200	15	3.78	3.84	4.03	4.28	4.59	4.95	5.65	6.45	7.61	18.99	44.04
	20	4.33	4.49	4.80	5.23	5.79	6.55	8.37	11.01	14.77	42.31	101.31
	25	4.88	5.17	5.69	6.44	7.57	9.42	14.20	19.87	27.23	80.75	195.72
300	15	4.40	4.47	4.69	4.97	5.31	5.70	6.43	7.21	8.26	18.99	44.04
	20	5.08	5.26	5.61	6.07	6.65	7.39	9.02	11.26	14.80	42.31	101.31
	25	5.75	6.07	6.62	7.38	8.44	10.02	14.27	19.87	27.23	80.75	195.72
400	15	4.93	5.02	5.26	5.57	5.93	6.35	7.11	7.90	8.92	19.00	44.04
	20	5.72	5.92	6.30	6.79	7.40	8.16	9.71	11.73	14.93	42.31	101.31
	25	6.50	6.84	7.43	8.21	9.26	10.73	14.51	19.89	27.23	80.75	195.72
500	15	5.41	5.51	5.77	6.10	6.49	6.94	7.73	8.54	9.55	19.03	44.04
	20	6.31	6.52	6.93	7.45	8.08	8.85	10.40	12.29	15.20	42.31	101.31
	25	7.17	7.54	8.16	8.97	10.02	11.45	14.90	19.96	27.23	80.75	195.72
600	15	5.86	5.96	6.24	6.59	7.01	7.48	8.30	9.14	10.15	19.13	44.04
	20	6.84	7.07	7.50	8.05	8.71	9.50	11.05	12.87	15.58	42.31	101.31
	25	7.79	8.18	8.82	9.66	10.73	12.14	15.40	20.11	27.24	80.75	195.72
700	15	6.27	6.39	6.68	7.05	7.49	7.98	8.84	9.69	10.72	19.29	44.04
	20	7.34	7.58	8.03	8.61	9.29	10.11	11.67	13.45	16.03	42.31	101.31
	25	8.37	8.78	9.45	10.31	11.40	12.81	15.94	20.35	27.27	80.75	195.72
800	15	6.66	6.78	7.09	7.48	7.94	8.45	9.34	10.22	11.26	19.52	44.04
	20	7.81	8.06	8.53	9.13	9.84	10.68	12.26	14.03	16.51	42.31	101.31
	25	8.92	9.34	10.03	10.92	12.03	13.44	16.49	20.66	27.33	80.75	195.72
900	15	7.03	7.16	7.48	7.89	8.37	8.90	9.82	10.72	11.78	19.80	44.04
	20	8.26	8.52	9.01	9.63	10.36	11.22	12.82	14.59	17.00	42.31	101.31
	25	9.44	9.87	10.59	11.51	12.64	14.06	17.05	21.04	27.43	80.75	195.72
1000	15	7.38	7.52	7.86	8.28	8.77	9.33	10.27	11.20	12.27	20.13	44.04
	20	8.68	8.96	9.47	10.11	10.86	11.74	13.37	15.13	17.50	42.31	101.31
	25	9.93	10.38	11.12	12.06	13.21	14.64	17.61	21.45	27.58	80.75	195.72

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 52.0 Ft (RADIUS = 36.8 Ft)
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	7.72	7.87	8.21	8.66	9.17	9.74	10.71	11.65	12.75	20.48	44.04
	20	9.09	9.37	9.90	10.56	11.34	12.24	13.89	15.66	18.00	42.31	101.31
	25	10.40	10.87	11.63	12.59	13.77	15.21	18.16	21.89	27.78	80.75	195.72
1200	15	8.05	8.20	8.56	9.02	9.54	10.13	11.13	12.10	13.21	20.86	44.04
	20	9.48	9.78	10.32	11.00	11.80	12.72	14.40	16.17	18.50	42.32	101.31
	25	10.86	11.33	12.12	13.10	14.30	15.76	18.70	22.34	28.02	80.75	195.72
1300	15	8.37	8.52	8.89	9.36	9.91	10.51	11.54	12.52	13.66	21.25	44.05
	20	9.87	10.17	10.73	11.42	12.24	13.18	14.89	16.68	18.98	42.33	101.31
	25	11.30	11.79	12.59	13.60	14.82	16.29	19.23	22.81	28.30	80.75	195.72
1400	15	8.67	8.83	9.22	9.70	10.26	10.88	11.93	12.94	14.09	21.64	44.05
	20	10.23	10.54	11.12	11.83	12.67	13.63	15.36	17.16	19.46	42.35	101.31
	25	11.73	12.23	13.05	14.08	15.32	16.81	19.75	23.28	28.61	80.75	195.72
1500	15	8.97	9.13	9.53	10.03	10.60	11.23	12.31	13.34	14.51	22.04	44.06
	20	10.59	10.91	11.50	12.23	13.09	14.07	15.82	17.64	19.94	42.38	101.31
	25	12.14	12.65	13.49	14.54	15.80	17.31	20.26	23.75	28.94	80.75	195.72
1600	15	9.26	9.43	9.83	10.34	10.93	11.58	12.68	13.73	14.92	22.44	44.08
	20	10.94	11.26	11.87	12.62	13.49	14.49	16.27	18.10	20.40	42.42	101.31
	25	12.54	13.06	13.92	14.99	16.27	17.80	20.76	24.21	29.29	80.75	195.72
1700	15	9.54	9.71	10.13	10.65	11.25	11.92	13.04	14.11	15.32	22.84	44.11
	20	11.28	11.61	12.23	13.00	13.89	14.90	16.71	18.56	20.86	42.47	101.31
	25	12.94	13.47	14.34	15.43	16.73	18.28	21.25	24.68	29.65	80.75	195.72
1800	15	9.81	9.99	10.42	10.96	11.57	12.25	13.39	14.48	15.70	23.24	44.14
	20	11.61	11.95	12.58	13.36	14.27	15.31	17.14	19.00	21.31	42.54	101.31
	25	13.32	13.86	14.75	15.86	17.18	18.75	21.73	25.14	30.03	80.75	195.72
1900	15	10.08	10.27	10.70	11.25	11.88	12.57	13.74	14.84	16.08	23.63	44.19
	20	11.93	12.28	12.92	13.72	14.65	15.70	17.55	19.43	21.75	42.63	101.31
	25	13.69	14.24	15.15	16.28	17.62	19.20	22.20	25.60	30.42	80.75	195.72
2000	15	10.35	10.53	10.98	11.54	12.18	12.89	14.07	15.19	16.46	24.03	44.24
	20	12.25	12.60	13.26	14.07	15.01	16.08	17.96	19.86	22.18	42.73	101.31
	25	14.06	14.62	15.54	16.69	18.05	19.65	22.67	26.05	30.81	80.75	195.72

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 52.0 Ft (RADIUS = 36.8 Ft)³
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	5.79	6.80	9.21	13.81	20.19	28.56	45.72	65.19	90.47	274.85	671.61
	20	7.34	11.05	18.99	30.19	45.25	65.02	105.53	151.59	211.39	647.93	1587.9
	25	9.74	19.67	35.37	57.20	86.57	125.11	204.15	294.01	410.73	1263.0	3098.5
200	15	7.44	8.41	10.26	13.96	20.19	28.56	45.72	65.19	90.47	274.85	671.61
	20	9.30	12.09	19.01	30.19	45.25	65.02	105.53	151.59	211.39	647.93	1587.9
	25	11.72	19.73	35.37	57.20	86.57	125.11	204.15	294.01	410.73	1263.0	3098.5
300	15	8.76	9.75	11.48	14.57	20.25	28.57	45.72	65.19	90.47	274.85	671.61
	20	10.90	13.43	19.26	30.19	45.25	65.02	105.53	151.59	211.39	647.93	1587.9
	25	13.51	20.16	35.37	57.20	86.57	125.11	204.15	294.01	410.73	1263.0	3098.5
400	15	9.90	10.92	12.62	15.42	20.47	28.57	45.72	65.19	90.47	274.85	671.61
	20	12.29	14.74	19.85	30.20	45.25	65.02	105.53	151.59	211.39	647.93	1587.9
	25	15.09	20.99	35.37	57.20	86.57	125.11	204.15	294.01	410.73	1263.0	3098.5
500	15	10.92	11.97	13.68	16.34	20.91	28.62	45.72	65.19	90.47	274.85	671.61
	20	13.54	15.96	20.65	30.28	45.25	65.02	105.53	151.59	211.39	647.93	1587.9
	25	16.53	22.01	35.42	57.20	86.57	125.11	204.15	294.01	410.73	1263.0	3098.5
600	15	11.86	12.95	14.67	17.26	21.49	28.73	45.72	65.19	90.47	274.85	671.61
	20	14.69	17.10	21.55	30.46	45.26	65.02	105.53	151.59	211.39	647.93	1587.9
	25	17.86	23.09	35.54	57.20	86.57	125.11	204.15	294.01	410.73	1263.0	3098.5
700	15	12.74	13.85	15.60	18.15	22.16	28.95	45.72	65.19	90.47	274.85	671.61
	20	15.76	18.18	22.46	30.77	45.27	65.02	105.53	151.59	211.39	647.93	1587.9
	25	19.11	24.17	35.79	57.20	86.57	125.11	204.15	294.01	410.73	1263.0	3098.5
800	15	13.57	14.71	16.48	19.01	22.87	29.26	45.72	65.19	90.47	274.85	671.61
	20	16.77	19.20	23.38	31.20	45.29	65.02	105.53	151.59	211.39	647.93	1587.9
	25	20.28	25.24	36.15	57.20	86.57	125.11	204.15	294.01	410.73	1263.0	3098.5
900	15	14.35	15.52	17.31	19.84	23.60	29.67	45.74	65.19	90.47	274.85	671.61
	20	17.72	20.17	24.29	31.72	45.34	65.02	105.53	151.59	211.39	647.93	1587.9
	25	21.39	26.28	36.63	57.21	86.57	125.11	204.15	294.01	410.73	1263.0	3098.5
1000	15	15.10	16.29	18.11	20.65	24.33	30.14	45.77	65.20	90.47	274.85	671.61
	20	18.64	21.11	25.18	32.31	45.43	65.02	105.53	151.59	211.39	647.93	1587.9
	25	22.45	27.30	37.19	57.24	86.57	125.11	204.15	294.01	410.73	1263.0	3098.5

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 52.0 Ft (RADIUS = 36.8 Ft)³
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	15.81	17.03	18.88	21.43	25.05	30.65	45.83	65.20	90.47	274.85	671.61
	20	19.51	22.00	26.05	32.93	45.57	65.02	105.53	151.59	211.39	647.93	1587.9
	25	23.47	28.29	37.81	57.28	86.57	125.11	204.15	294.01	410.73	1263.0	3098.5
1200	15	16.50	17.74	19.62	22.18	25.77	31.20	45.91	65.20	90.47	274.85	671.61
	20	20.35	22.87	26.90	33.59	45.76	65.03	105.53	151.59	211.39	647.93	1587.9
	25	24.45	29.25	38.47	57.36	86.57	125.11	204.15	294.01	410.73	1263.0	3098.5
1300	15	17.17	18.43	20.34	22.91	26.48	31.78	46.04	65.20	90.47	274.85	671.61
	20	21.16	23.70	27.72	34.27	46.01	65.04	105.53	151.59	211.39	647.93	1587.9
	25	25.40	30.18	39.17	57.47	86.57	125.11	204.15	294.01	410.73	1263.0	3098.5
1400	15	17.81	19.09	21.03	23.63	27.17	32.36	46.20	65.21	90.47	274.85	671.61
	20	21.95	24.51	28.53	34.95	46.30	65.06	105.53	151.59	211.39	647.93	1587.9
	25	26.32	31.10	39.88	57.62	86.58	125.11	204.15	294.01	410.73	1263.0	3098.5
1500	15	18.44	19.74	21.71	24.32	27.86	32.96	46.40	65.22	90.47	274.85	671.61
	20	22.71	25.30	29.32	35.64	46.64	65.10	105.53	151.59	211.39	647.93	1587.9
	25	27.20	31.99	40.61	57.81	86.58	125.11	204.15	294.01	410.73	1263.0	3098.5
1600	15	19.05	20.37	22.36	24.99	28.53	33.56	46.63	65.24	90.47	274.85	671.61
	20	23.45	26.06	30.09	36.33	47.03	65.15	105.53	151.59	211.39	647.93	1587.9
	25	28.07	32.86	41.35	58.04	86.58	125.11	204.15	294.01	410.73	1263.0	3098.5
1700	15	19.64	20.98	23.00	25.65	29.19	34.16	46.90	65.27	90.48	274.85	671.61
	20	24.17	26.80	30.85	37.02	47.44	65.22	105.53	151.59	211.39	647.93	1587.9
	25	28.91	33.71	42.08	58.32	86.59	125.11	204.15	294.01	410.73	1263.0	3098.5
1800	15	20.22	21.58	23.62	26.30	29.84	34.76	47.21	65.31	90.48	274.85	671.61
	20	24.88	27.53	31.59	37.71	47.88	65.30	105.53	151.59	211.39	647.93	1587.9
	25	29.73	34.54	42.82	58.63	86.61	125.11	204.15	294.01	410.73	1263.0	3098.5
1900	15	20.78	22.16	24.23	26.93	30.47	35.35	47.54	65.36	90.48	274.85	671.61
	20	25.56	28.24	32.31	38.39	48.35	65.42	105.53	151.59	211.39	647.93	1587.9
	25	30.54	35.35	43.55	58.98	86.63	125.11	204.15	294.01	410.73	1263.0	3098.5
2000	15	21.33	22.73	24.82	27.55	31.10	35.95	47.89	65.42	90.48	274.85	671.61
	20	26.23	28.94	33.02	39.07	48.84	65.55	105.53	151.59	211.39	647.93	1587.9
	25	31.32	36.15	44.29	59.36	86.66	125.11	204.15	294.01	410.73	1263.0	3098.5

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 52.0 Ft (RADIUS = 36.8 Ft)³
 FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	26.82	64.13	118.35	193.71	295.12	428.18	701.11	1011.5	1414.7	4359.3	10702.
	20	60.17	148.74	277.26	455.82	696.11	1011.4	1658.2	2393.8	3349.2	10328.	25362.
	25	115.14	288.25	539.24	887.95	1357.2	1972.9	3236.0	4672.6	6538.7	20169.	49532.
200	15	27.00	64.13	118.35	193.71	295.12	428.18	701.11	1011.5	1414.7	4359.3	10702.
	20	60.17	148.74	277.26	455.82	696.11	1011.4	1658.2	2393.8	3349.2	10328.	25362.
	25	115.14	288.25	539.24	887.95	1357.2	1972.9	3236.0	4672.6	6538.7	20169.	49532.
300	15	27.92	64.13	118.35	193.71	295.12	428.18	701.11	1011.5	1414.7	4359.3	10702.
	20	60.17	148.74	277.26	455.82	696.11	1011.4	1658.2	2393.8	3349.2	10328.	25362.
	25	115.14	288.25	539.24	887.95	1357.2	1972.9	3236.0	4672.6	6538.7	20169.	49532.
400	15	29.39	64.13	118.35	193.71	295.12	428.18	701.11	1011.5	1414.7	4359.3	10702.
	20	60.18	148.74	277.26	455.82	696.11	1011.4	1658.2	2393.8	3349.2	10328.	25362.
	25	115.14	288.25	539.24	887.95	1357.2	1972.9	3236.0	4672.6	6538.7	20169.	49532.
500	15	31.05	64.13	118.35	193.71	295.12	428.18	701.11	1011.5	1414.7	4359.3	10702.
	20	60.26	148.74	277.26	455.82	696.11	1011.4	1658.2	2393.8	3349.2	10328.	25362.
	25	115.14	288.25	539.24	887.95	1357.2	1972.9	3236.0	4672.6	6538.7	20169.	49532.
600	15	32.73	64.14	118.35	193.71	295.12	428.18	701.11	1011.5	1414.7	4359.3	10702.
	20	60.47	148.74	277.26	455.82	696.11	1011.4	1658.2	2393.8	3349.2	10328.	25362.
	25	115.14	288.25	539.24	887.95	1357.2	1972.9	3236.0	4672.6	6538.7	20169.	49532.
700	15	34.40	64.18	118.35	193.71	295.12	428.18	701.11	1011.5	1414.7	4359.3	10702.
	20	60.89	148.74	277.26	455.82	696.11	1011.4	1658.2	2393.8	3349.2	10328.	25362.
	25	115.14	288.25	539.24	887.95	1357.2	1972.9	3236.0	4672.6	6538.7	20169.	49532.
800	15	36.02	64.28	118.35	193.71	295.12	428.18	701.11	1011.5	1414.7	4359.3	10702.
	20	61.52	148.74	277.26	455.82	696.11	1011.4	1658.2	2393.8	3349.2	10328.	25362.
	25	115.14	288.25	539.24	887.95	1357.2	1972.9	3236.0	4672.6	6538.7	20169.	49532.
900	15	37.59	64.46	118.35	193.71	295.12	428.18	701.11	1011.5	1414.7	4359.3	10702.
	20	62.33	148.74	277.26	455.82	696.11	1011.4	1658.2	2393.8	3349.2	10328.	25362.
	25	115.15	288.25	539.24	887.95	1357.2	1972.9	3236.0	4672.6	6538.7	20169.	49532.
1000	15	39.12	64.73	118.35	193.71	295.12	428.18	701.11	1011.5	1414.7	4359.3	10702.
	20	63.29	148.74	277.26	455.82	696.11	1011.4	1658.2	2393.8	3349.2	10328.	25362.
	25	115.17	288.25	539.24	887.95	1357.2	1972.9	3236.0	4672.6	6538.7	20169.	49532.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 52.0 Ft (RADIUS = 36.8 Ft)³
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	40.59	65.11	118.35	193.71	295.12	428.18	701.11	1011.5	1414.7	4359.3	10702.
	20	64.36	148.74	277.26	455.82	696.11	1011.4	1658.2	2393.8	3349.2	10328.	25362.
	25	115.22	288.25	539.24	887.95	1357.2	1972.9	3236.0	4672.6	6538.7	20169.	49532.
1200	15	42.03	65.58	118.35	193.71	295.12	428.18	701.11	1011.5	1414.7	4359.3	10702.
	20	65.50	148.74	277.26	455.82	696.11	1011.4	1658.2	2393.8	3349.2	10328.	25362.
	25	115.29	288.25	539.24	887.95	1357.2	1972.9	3236.0	4672.6	6538.7	20169.	49532.
1300	15	43.42	66.14	118.35	193.71	295.12	428.18	701.11	1011.5	1414.7	4359.3	10702.
	20	66.69	148.74	277.26	455.82	696.11	1011.4	1658.2	2393.8	3349.2	10328.	25362.
	25	115.41	288.25	539.24	887.95	1357.2	1972.9	3236.0	4672.6	6538.7	20169.	49532.
1400	15	44.78	66.78	118.35	193.71	295.12	428.18	701.11	1011.5	1414.7	4359.3	10702.
	20	67.92	148.74	277.26	455.82	696.11	1011.4	1658.2	2393.8	3349.2	10328.	25362.
	25	115.59	288.25	539.24	887.95	1357.2	1972.9	3236.0	4672.6	6538.7	20169.	49532.
1500	15	46.10	67.48	118.36	193.71	295.12	428.18	701.11	1011.5	1414.7	4359.3	10702.
	20	69.17	148.75	277.26	455.82	696.11	1011.4	1658.2	2393.8	3349.2	10328.	25362.
	25	115.83	288.25	539.24	887.95	1357.2	1972.9	3236.0	4672.6	6538.7	20169.	49532.
1600	15	47.39	68.23	118.37	193.71	295.12	428.18	701.11	1011.5	1414.7	4359.3	10702.
	20	70.43	148.75	277.26	455.82	696.11	1011.4	1658.2	2393.8	3349.2	10328.	25362.
	25	116.14	288.25	539.24	887.95	1357.2	1972.9	3236.0	4672.6	6538.7	20169.	49532.
1700	15	48.64	69.02	118.39	193.71	295.12	428.18	701.11	1011.5	1414.7	4359.3	10702.
	20	71.70	148.76	277.26	455.82	696.11	1011.4	1658.2	2393.8	3349.2	10328.	25362.
	25	116.52	288.25	539.24	887.95	1357.2	1972.9	3236.0	4672.6	6538.7	20169.	49532.
1800	15	49.87	69.84	118.41	193.71	295.12	428.18	701.11	1011.5	1414.7	4359.3	10702.
	20	72.97	148.76	277.26	455.82	696.11	1011.4	1658.2	2393.8	3349.2	10328.	25362.
	25	116.97	288.25	539.24	887.95	1357.2	1972.9	3236.0	4672.6	6538.7	20169.	49532.
1900	15	51.08	70.69	118.44	193.71	295.12	428.18	701.11	1011.5	1414.7	4359.3	10702.
	20	74.23	148.78	277.26	455.82	696.11	1011.4	1658.2	2393.8	3349.2	10328.	25362.
	25	117.48	288.25	539.24	887.95	1357.2	1972.9	3236.0	4672.6	6538.7	20169.	49532.
2000	15	52.26	71.56	118.49	193.71	295.12	428.18	701.11	1011.5	1414.7	4359.3	10702.
	20	75.48	148.80	277.26	455.82	696.11	1011.4	1658.2	2393.8	3349.2	10328.	25362.
	25	118.06	288.25	539.24	887.95	1357.2	1972.9	3236.0	4672.6	6538.7	20169.	49532.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 54.0 Ft (RADIUS = 38.2 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	1.89	1.85	1.89	1.95	2.03	2.12	2.26	2.39	2.53	3.24	4.61
	20	2.05	2.03	2.08	2.16	2.26	2.38	2.57	2.75	2.96	4.39	8.34
	25	2.21	2.20	2.27	2.38	2.51	2.66	2.92	3.20	3.55	6.84	14.64
200	15	2.27	2.24	2.29	2.37	2.46	2.57	2.74	2.89	3.06	3.86	5.11
	20	2.51	2.50	2.57	2.67	2.79	2.93	3.15	3.37	3.60	4.96	8.36
	25	2.74	2.74	2.84	2.97	3.12	3.30	3.61	3.90	4.26	6.97	14.66
300	15	2.58	2.56	2.61	2.70	2.81	2.93	3.12	3.30	3.49	4.37	5.64
	20	2.89	2.88	2.96	3.07	3.21	3.37	3.62	3.86	4.12	5.52	8.53
	25	3.17	3.18	3.29	3.44	3.62	3.81	4.15	4.48	4.85	7.35	14.65
400	15	2.85	2.83	2.89	2.99	3.11	3.24	3.46	3.65	3.85	4.81	6.12
	20	3.21	3.20	3.30	3.43	3.58	3.75	4.03	4.29	4.57	6.04	8.84
	25	3.54	3.56	3.68	3.85	4.04	4.26	4.63	4.98	5.37	7.82	14.65
500	15	3.10	3.07	3.15	3.26	3.39	3.53	3.76	3.97	4.18	5.20	6.57
	20	3.50	3.50	3.60	3.74	3.91	4.09	4.40	4.67	4.97	6.51	9.22
	25	3.88	3.90	4.03	4.21	4.42	4.66	5.05	5.42	5.84	8.29	14.70
600	15	3.32	3.30	3.38	3.50	3.64	3.79	4.03	4.25	4.49	5.56	6.98
	20	3.77	3.77	3.88	4.03	4.21	4.41	4.73	5.03	5.34	6.94	9.63
	25	4.19	4.21	4.36	4.55	4.78	5.03	5.45	5.84	6.27	8.76	14.79
700	15	3.53	3.51	3.60	3.72	3.87	4.03	4.29	4.52	4.77	5.90	7.37
	20	4.02	4.02	4.14	4.30	4.49	4.70	5.04	5.35	5.69	7.35	10.03
	25	4.48	4.51	4.66	4.87	5.10	5.37	5.81	6.22	6.67	9.20	14.95
800	15	3.73	3.71	3.80	3.93	4.09	4.26	4.53	4.78	5.04	6.22	7.74
	20	4.26	4.26	4.39	4.56	4.76	4.98	5.34	5.66	6.01	7.74	10.43
	25	4.75	4.78	4.95	5.16	5.41	5.69	6.15	6.58	7.05	9.63	15.16
900	15	3.92	3.90	4.00	4.13	4.30	4.47	4.76	5.02	5.29	6.52	8.09
	20	4.48	4.49	4.62	4.80	5.01	5.24	5.62	5.96	6.32	8.10	10.82
	25	5.01	5.04	5.22	5.44	5.71	6.00	6.48	6.92	7.41	10.04	15.41
1000	15	4.10	4.08	4.18	4.33	4.50	4.68	4.98	5.25	5.53	6.81	8.42
	20	4.70	4.71	4.84	5.03	5.25	5.49	5.88	6.24	6.62	8.45	11.20
	25	5.26	5.29	5.47	5.71	5.99	6.29	6.79	7.25	7.75	10.44	15.69

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 54.0 Ft (RADIUS = 38.2 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft											
		4	8	12	16	20	24	30	35	40	60	80	
1100	15	4.27	4.25	4.36	4.51	4.69	4.88	5.19	5.47	5.76	7.08	8.74	
	20	4.90	4.91	5.06	5.26	5.48	5.73	6.14	6.50	6.90	8.79	11.56	
	25	5.49	5.54	5.72	5.97	6.25	6.57	7.09	7.56	8.08	10.82	15.99	
1200	15	4.44	4.42	4.53	4.69	4.87	5.07	5.40	5.68	5.98	7.35	9.05	
	20	5.10	5.12	5.27	5.47	5.71	5.96	6.38	6.76	7.17	9.11	11.92	
	25	5.72	5.77	5.96	6.22	6.51	6.84	7.37	7.86	8.40	11.19	16.30	
1300	15	4.60	4.58	4.70	4.86	5.05	5.26	5.59	5.89	6.20	7.61	9.35	
	20	5.30	5.31	5.46	5.68	5.92	6.19	6.62	7.01	7.43	9.42	12.27	
	25	5.95	5.99	6.19	6.46	6.76	7.10	7.65	8.15	8.70	11.54	16.62	
1400	15	4.75	4.74	4.86	5.03	5.22	5.44	5.78	6.09	6.41	7.85	9.64	
	20	5.48	5.50	5.66	5.88	6.13	6.40	6.85	7.25	7.68	9.72	12.61	
	25	6.16	6.21	6.42	6.69	7.00	7.35	7.92	8.44	9.00	11.89	16.94	
1500	15	4.90	4.89	5.01	5.19	5.39	5.61	5.96	6.28	6.61	8.09	9.92	
	20	5.66	5.68	5.85	6.07	6.33	6.61	7.07	7.49	7.93	10.02	12.94	
	25	6.37	6.42	6.63	6.91	7.24	7.59	8.18	8.71	9.29	12.23	17.27	
1600	15	5.05	5.04	5.17	5.35	5.55	5.78	6.14	6.47	6.81	8.33	10.19	
	20	5.84	5.86	6.03	6.26	6.53	6.82	7.29	7.72	8.17	10.30	13.27	
	25	6.57	6.62	6.84	7.13	7.47	7.83	8.43	8.97	9.57	12.56	17.59	
1700	15	5.19	5.18	5.31	5.50	5.71	5.94	6.32	6.65	7.00	8.56	10.45	
	20	6.01	6.03	6.21	6.44	6.72	7.02	7.50	7.94	8.40	10.58	13.58	
	25	6.77	6.82	7.05	7.35	7.69	8.06	8.67	9.23	9.84	12.88	17.92	
1800	15	5.33	5.32	5.46	5.65	5.87	6.10	6.49	6.83	7.18	8.78	10.71	
	20	6.18	6.20	6.38	6.62	6.90	7.21	7.71	8.15	8.63	10.85	13.89	
	25	6.96	7.02	7.25	7.55	7.90	8.29	8.91	9.48	10.10	13.19	18.24	
1900	15	5.47	5.46	5.60	5.79	6.02	6.26	6.65	7.00	7.37	8.99	10.97	
	20	6.34	6.36	6.55	6.80	7.09	7.40	7.91	8.36	8.85	11.12	14.20	
	25	7.15	7.21	7.45	7.76	8.12	8.51	9.15	9.73	10.36	13.50	18.56	
2000	15	5.61	5.60	5.74	5.94	6.17	6.42	6.82	7.17	7.55	9.21	11.21	
	20	6.50	6.53	6.72	6.97	7.27	7.59	8.11	8.57	9.07	11.37	14.49	
	25	7.33	7.39	7.64	7.96	8.32	8.72	9.38	9.97	10.61	13.80	18.87	

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 54.0 Ft (RADIUS = 38.2 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	3.14	3.18	3.34	3.57	3.85	4.22	5.02	6.11	7.79	20.38	46.92
	20	3.55	3.69	3.98	4.42	5.07	6.10	8.76	11.95	16.06	45.56	108.11
	25	3.97	4.26	4.81	5.76	7.47	10.11	15.58	21.76	29.72	87.08	208.98
200	15	3.95	4.01	4.20	4.46	4.78	5.17	5.92	6.80	8.10	20.38	46.92
	20	4.53	4.69	5.03	5.49	6.09	6.93	9.01	11.97	16.06	45.56	108.11
	25	5.11	5.42	5.99	6.82	8.11	10.26	15.59	21.76	29.72	87.08	208.98
300	15	4.59	4.67	4.89	5.18	5.53	5.94	6.71	7.56	8.71	20.38	46.92
	20	5.31	5.50	5.86	6.35	6.98	7.79	9.60	12.15	16.08	45.56	108.11
	25	6.02	6.36	6.96	7.79	8.97	10.78	15.62	21.76	29.72	87.08	208.98
400	15	5.15	5.24	5.48	5.80	6.18	6.62	7.42	8.26	9.36	20.38	46.92
	20	5.98	6.19	6.59	7.11	7.76	8.57	10.28	12.56	16.16	45.56	108.11
	25	6.80	7.17	7.80	8.65	9.80	11.46	15.79	21.76	29.72	87.08	208.98
500	15	5.65	5.75	6.01	6.36	6.76	7.23	8.06	8.92	10.00	20.41	46.92
	20	6.59	6.81	7.24	7.79	8.46	9.29	10.97	13.08	16.37	45.56	108.11
	25	7.51	7.90	8.56	9.43	10.58	12.16	16.11	21.80	29.72	87.08	208.98
600	15	6.12	6.22	6.50	6.87	7.30	7.79	8.65	9.53	10.61	20.47	46.92
	20	7.15	7.39	7.84	8.41	9.11	9.96	11.63	13.64	16.70	45.56	108.11
	25	8.16	8.57	9.25	10.15	11.31	12.86	16.55	21.90	29.72	87.08	208.98
700	15	6.55	6.66	6.96	7.35	7.80	8.31	9.20	10.10	11.20	20.59	46.92
	20	7.67	7.92	8.39	9.00	9.72	10.58	12.26	14.22	17.10	45.56	108.11
	25	8.77	9.19	9.90	10.83	12.00	13.54	17.05	22.08	29.74	87.08	208.98
800	15	6.95	7.08	7.39	7.79	8.26	8.80	9.72	10.65	11.75	20.78	46.92
	20	8.17	8.43	8.92	9.54	10.29	11.18	12.87	14.80	17.55	45.56	108.11
	25	9.34	9.78	10.52	11.46	12.66	14.19	17.59	22.33	29.77	87.08	208.98
900	15	7.34	7.47	7.80	8.22	8.71	9.26	10.22	11.16	12.28	21.03	46.92
	20	8.63	8.90	9.42	10.06	10.83	11.74	13.45	15.36	18.03	45.56	108.11
	25	9.88	10.34	11.10	12.07	13.28	14.82	18.14	22.66	29.84	87.08	208.98
1000	15	7.71	7.85	8.19	8.63	9.13	9.70	10.69	11.65	12.79	21.32	46.92
	20	9.08	9.36	9.89	10.56	11.35	12.28	14.01	15.91	18.52	45.56	108.11
	25	10.40	10.87	11.65	12.65	13.88	15.42	18.69	23.03	29.94	87.08	208.98

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 54.0 Ft (RADIUS = 38.2 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	8.07	8.21	8.56	9.02	9.54	10.13	11.14	12.13	13.28	21.65	46.92
	20	9.51	9.80	10.34	11.03	11.85	12.80	14.55	16.45	19.01	45.56	108.11
	25	10.89	11.38	12.18	13.20	14.45	16.01	19.24	23.43	30.09	87.08	208.98
1200	15	8.41	8.55	8.92	9.39	9.93	10.54	11.58	12.58	13.76	22.01	46.93
	20	9.92	10.22	10.78	11.49	12.32	13.29	15.07	16.98	19.51	45.57	108.11
	25	11.37	11.87	12.69	13.73	15.01	16.57	19.79	23.86	30.28	87.08	208.98
1300	15	8.74	8.89	9.27	9.75	10.31	10.93	12.00	13.03	14.22	22.38	46.93
	20	10.32	10.62	11.20	11.93	12.78	13.77	15.58	17.49	20.00	45.57	108.11
	25	11.83	12.34	13.18	14.25	15.54	17.12	20.32	24.31	30.51	87.08	208.98
1400	15	9.06	9.21	9.61	10.10	10.67	11.31	12.40	13.45	14.66	22.76	46.93
	20	10.70	11.02	11.61	12.36	13.23	14.24	16.07	17.99	20.48	45.58	108.11
	25	12.28	12.80	13.66	14.74	16.06	17.66	20.85	24.76	30.77	87.08	208.98
1500	15	9.37	9.53	9.93	10.44	11.03	11.68	12.80	13.87	15.09	23.15	46.94
	20	11.08	11.40	12.01	12.77	13.66	14.69	16.54	18.48	20.96	45.60	108.11
	25	12.71	13.24	14.12	15.23	16.56	18.18	21.37	25.22	31.07	87.08	208.98
1600	15	9.67	9.84	10.25	10.77	11.37	12.04	13.18	14.27	15.52	23.55	46.95
	20	11.44	11.77	12.39	13.17	14.08	15.13	17.01	18.96	21.43	45.63	108.11
	25	13.13	13.67	14.57	15.70	17.05	18.68	21.88	25.69	31.38	87.08	208.98
1700	15	9.97	10.14	10.56	11.09	11.71	12.40	13.56	14.66	15.93	23.94	46.97
	20	11.80	12.13	12.77	13.57	14.49	15.56	17.46	19.42	21.90	45.66	108.11
	25	13.54	14.09	15.01	16.16	17.53	19.18	22.38	26.15	31.72	87.08	208.98
1800	15	10.25	10.43	10.86	11.41	12.04	12.74	13.92	15.05	16.33	24.34	46.99
	20	12.14	12.48	13.14	13.95	14.89	15.97	17.90	19.88	22.35	45.71	108.11
	25	13.94	14.50	15.44	16.60	17.99	19.66	22.87	26.61	32.07	87.08	208.98
1900	15	10.53	10.71	11.15	11.72	12.36	13.07	14.28	15.42	16.72	24.74	47.02
	20	12.48	12.83	13.49	14.32	15.28	16.38	18.33	20.33	22.80	45.77	108.11
	25	14.33	14.90	15.85	17.04	18.45	20.13	23.36	27.07	32.44	87.08	208.98
2000	15	10.81	10.99	11.44	12.02	12.67	13.40	14.63	15.79	17.10	25.13	47.06
	20	12.81	13.17	13.84	14.69	15.67	16.78	18.76	20.76	23.25	45.85	108.11
	25	14.72	15.30	16.26	17.46	18.89	20.59	23.83	27.53	32.81	87.08	208.98

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 54.0 Ft (RADIUS = 38.2 Ft)³
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	6.10	7.28	10.17	15.38	22.45	31.67	50.44	71.64	99.02	296.66	717.36
	20	7.83	12.36	21.36	33.85	50.55	72.32	116.68	166.80	231.58	699.58	1696.3
	25	10.67	22.29	39.95	64.31	96.87	139.34	225.88	323.69	450.12	1363.8	3310.2
200	15	7.82	8.92	11.08	15.46	22.46	31.67	50.44	71.64	99.02	296.66	717.36
	20	9.87	13.19	21.37	33.85	50.55	72.32	116.68	166.80	231.58	699.58	1696.3
	25	12.61	22.31	39.95	64.31	96.87	139.34	225.88	323.69	450.12	1363.8	3310.2
300	15	9.20	10.31	12.28	15.92	22.48	31.67	50.44	71.64	99.02	296.66	717.36
	20	11.54	14.49	21.51	33.85	50.55	72.32	116.68	166.80	231.58	699.58	1696.3
	25	14.44	22.56	39.95	64.31	96.87	139.34	225.88	323.69	450.12	1363.8	3310.2
400	15	10.40	11.53	13.44	16.69	22.61	31.68	50.44	71.64	99.02	296.66	717.36
	20	12.99	15.80	21.93	33.86	50.55	72.32	116.68	166.80	231.58	699.58	1696.3
	25	16.08	23.21	39.95	64.31	96.87	139.34	225.88	323.69	450.12	1363.8	3310.2
500	15	11.47	12.63	14.52	17.57	22.93	31.70	50.44	71.64	99.02	296.66	717.36
	20	14.30	17.04	22.61	33.89	50.55	72.32	116.68	166.80	231.58	699.58	1696.3
	25	17.58	24.11	39.96	64.31	96.87	139.34	225.88	323.69	450.12	1363.8	3310.2
600	15	12.46	13.64	15.54	18.47	23.42	31.76	50.44	71.64	99.02	296.66	717.36
	20	15.50	18.22	23.43	33.99	50.55	72.32	116.68	166.80	231.58	699.58	1696.3
	25	18.97	25.12	40.02	64.31	96.87	139.34	225.88	323.69	450.12	1363.8	3310.2
700	15	13.38	14.59	16.51	19.37	24.01	31.90	50.44	71.64	99.02	296.66	717.36
	20	16.62	19.34	24.31	34.19	50.55	72.32	116.68	166.80	231.58	699.58	1696.3
	25	20.26	26.18	40.16	64.31	96.87	139.34	225.88	323.69	450.12	1363.8	3310.2
800	15	14.24	15.48	17.42	20.24	24.67	32.12	50.45	71.64	99.02	296.66	717.36
	20	17.68	20.40	25.21	34.50	50.56	72.32	116.68	166.80	231.58	699.58	1696.3
	25	21.49	27.24	40.40	64.31	96.87	139.34	225.88	323.69	450.12	1363.8	3310.2
900	15	15.07	16.33	18.29	21.09	25.37	32.43	50.45	71.64	99.02	296.66	717.36
	20	18.68	21.41	26.11	34.91	50.59	72.32	116.68	166.80	231.58	699.58	1696.3
	25	22.65	28.29	40.74	64.32	96.87	139.34	225.88	323.69	450.12	1363.8	3310.2
1000	15	15.85	17.13	19.12	21.92	26.09	32.82	50.47	71.64	99.02	296.66	717.36
	20	19.63	22.38	27.01	35.40	50.63	72.32	116.68	166.80	231.58	699.58	1696.3
	25	23.76	29.32	41.17	64.32	96.87	139.34	225.88	323.69	450.12	1363.8	3310.2

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 54.0 Ft (RADIUS = 38.2 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	16.60	17.91	19.92	22.72	26.80	33.27	50.50	71.64	99.02	296.66	717.36
	20	20.55	23.31	27.89	35.96	50.71	72.33	116.68	166.80	231.58	699.58	1696.3
	25	24.83	30.33	41.69	64.34	96.87	139.34	225.88	323.69	450.12	1363.8	3310.2
1200	15	17.32	18.65	20.69	23.50	27.52	33.77	50.54	71.64	99.02	296.66	717.36
	20	21.43	24.21	28.75	36.56	50.83	72.33	116.68	166.80	231.58	699.58	1696.3
	25	25.86	31.31	42.26	64.38	96.87	139.34	225.88	323.69	450.12	1363.8	3310.2
1300	15	18.02	19.37	21.44	24.25	28.23	34.29	50.62	71.64	99.02	296.66	717.36
	20	22.28	25.08	29.59	37.19	50.99	72.33	116.68	166.80	231.58	699.58	1696.3
	25	26.85	32.28	42.89	64.43	96.87	139.34	225.88	323.69	450.12	1363.8	3310.2
1400	15	18.69	20.07	22.16	24.99	28.93	34.85	50.72	71.64	99.02	296.66	717.36
	20	23.10	25.92	30.42	37.84	51.19	72.34	116.68	166.80	231.58	699.58	1696.3
	25	27.81	33.22	43.55	64.51	96.87	139.34	225.88	323.69	450.12	1363.8	3310.2
1500	15	19.35	20.74	22.86	25.70	29.63	35.41	50.86	71.65	99.02	296.66	717.36
	20	23.90	26.74	31.23	38.50	51.45	72.36	116.68	166.80	231.58	699.58	1696.3
	25	28.74	34.14	44.23	64.62	96.87	139.34	225.88	323.69	450.12	1363.8	3310.2
1600	15	19.98	21.40	23.54	26.40	30.31	35.99	51.03	71.66	99.02	296.66	717.36
	20	24.68	27.54	32.03	39.18	51.74	72.38	116.68	166.80	231.58	699.58	1696.3
	25	29.64	35.04	44.93	64.77	96.88	139.34	225.88	323.69	450.12	1363.8	3310.2
1700	15	20.60	22.04	24.21	27.09	30.98	36.58	51.23	71.67	99.02	296.66	717.36
	20	25.43	28.32	32.81	39.85	52.07	72.42	116.68	166.80	231.58	699.58	1696.3
	25	30.53	35.92	45.64	64.95	96.88	139.34	225.88	323.69	450.12	1363.8	3310.2
1800	15	21.21	22.66	24.85	27.75	31.64	37.17	51.47	71.69	99.02	296.66	717.36
	20	26.17	29.08	33.57	40.53	52.44	72.46	116.68	166.80	231.58	699.58	1696.3
	25	31.39	36.78	46.36	65.17	96.88	139.34	225.88	323.69	450.12	1363.8	3310.2
1900	15	21.80	23.27	25.49	28.41	32.30	37.76	51.74	71.72	99.02	296.66	717.36
	20	26.89	29.82	34.32	41.21	52.84	72.53	116.68	166.80	231.58	699.58	1696.3
	25	32.23	37.62	47.08	65.43	96.89	139.34	225.88	323.69	450.12	1363.8	3310.2
2000	15	22.38	23.87	26.11	29.05	32.94	38.35	52.03	71.76	99.02	296.66	717.36
	20	27.59	30.54	35.05	41.89	53.27	72.61	116.68	166.80	231.58	699.58	1696.3
	25	33.05	38.45	47.80	65.72	96.90	139.34	225.88	323.69	450.12	1363.8	3310.2

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 54.0 Ft (RADIUS = 38.2 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	30.62	73.04	134.07	218.19	330.62	477.26	776.12	1114.0	1550.7	4707.8	11434.
	20	69.04	169.77	314.43	513.77	780.17	1127.6	1835.9	2636.6	3671.7	11154.	27096.
	25	132.39	329.25	611.77	1001.1	1521.3	2199.9	3583.0	5146.8	7168.4	21783.	52919.
200	15	30.69	73.04	134.07	218.19	330.62	477.26	776.12	1114.0	1550.7	4707.8	11434.
	20	69.04	169.77	314.43	513.77	780.17	1127.6	1835.9	2636.6	3671.7	11154.	27096.
	25	132.39	329.25	611.77	1001.1	1521.3	2199.9	3583.0	5146.8	7168.4	21783.	52919.
300	15	31.29	73.04	134.07	218.19	330.62	477.26	776.12	1114.0	1550.7	4707.8	11434.
	20	69.04	169.77	314.43	513.77	780.17	1127.6	1835.9	2636.6	3671.7	11154.	27096.
	25	132.39	329.25	611.77	1001.1	1521.3	2199.9	3583.0	5146.8	7168.4	21783.	52919.
400	15	32.50	73.04	134.07	218.19	330.62	477.26	776.12	1114.0	1550.7	4707.8	11434.
	20	69.05	169.77	314.43	513.77	780.17	1127.6	1835.9	2636.6	3671.7	11154.	27096.
	25	132.39	329.25	611.77	1001.1	1521.3	2199.9	3583.0	5146.8	7168.4	21783.	52919.
500	15	34.02	73.04	134.07	218.19	330.62	477.26	776.12	1114.0	1550.7	4707.8	11434.
	20	69.07	169.77	314.43	513.77	780.17	1127.6	1835.9	2636.6	3671.7	11154.	27096.
	25	132.39	329.25	611.77	1001.1	1521.3	2199.9	3583.0	5146.8	7168.4	21783.	52919.
600	15	35.65	73.05	134.07	218.19	330.62	477.26	776.12	1114.0	1550.7	4707.8	11434.
	20	69.16	169.77	314.43	513.77	780.17	1127.6	1835.9	2636.6	3671.7	11154.	27096.
	25	132.39	329.25	611.77	1001.1	1521.3	2199.9	3583.0	5146.8	7168.4	21783.	52919.
700	15	37.30	73.06	134.07	218.19	330.62	477.26	776.12	1114.0	1550.7	4707.8	11434.
	20	69.37	169.77	314.43	513.77	780.17	1127.6	1835.9	2636.6	3671.7	11154.	27096.
	25	132.39	329.25	611.77	1001.1	1521.3	2199.9	3583.0	5146.8	7168.4	21783.	52919.
800	15	38.93	73.10	134.07	218.19	330.62	477.26	776.12	1114.0	1550.7	4707.8	11434.
	20	69.75	169.77	314.43	513.77	780.17	1127.6	1835.9	2636.6	3671.7	11154.	27096.
	25	132.40	329.25	611.77	1001.1	1521.3	2199.9	3583.0	5146.8	7168.4	21783.	52919.
900	15	40.53	73.18	134.07	218.19	330.62	477.26	776.12	1114.0	1550.7	4707.8	11434.
	20	70.31	169.77	314.43	513.77	780.17	1127.6	1835.9	2636.6	3671.7	11154.	27096.
	25	132.40	329.25	611.77	1001.1	1521.3	2199.9	3583.0	5146.8	7168.4	21783.	52919.
1000	15	42.08	73.32	134.07	218.19	330.62	477.26	776.12	1114.0	1550.7	4707.8	11434.
	20	71.02	169.77	314.43	513.77	780.17	1127.6	1835.9	2636.6	3671.7	11154.	27096.
	25	132.40	329.25	611.77	1001.1	1521.3	2199.9	3583.0	5146.8	7168.4	21783.	52919.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 54.0 Ft (RADIUS = 38.2 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	43.60	73.54	134.07	218.19	330.62	477.26	776.12	1114.0	1550.7	4707.8	11434.
	20	71.88	169.77	314.43	513.77	780.17	1127.6	1835.9	2636.6	3671.7	11154.	27096.
	25	132.41	329.25	611.77	1001.1	1521.3	2199.9	3583.0	5146.8	7168.4	21783.	52919.
1200	15	45.08	73.84	134.07	218.19	330.62	477.26	776.12	1114.0	1550.7	4707.8	11434.
	20	72.85	169.77	314.43	513.77	780.17	1127.6	1835.9	2636.6	3671.7	11154.	27096.
	25	132.44	329.25	611.77	1001.1	1521.3	2199.9	3583.0	5146.8	7168.4	21783.	52919.
1300	15	46.52	74.23	134.07	218.19	330.62	477.26	776.12	1114.0	1550.7	4707.8	11434.
	20	73.90	169.77	314.43	513.77	780.17	1127.6	1835.9	2636.6	3671.7	11154.	27096.
	25	132.49	329.25	611.77	1001.1	1521.3	2199.9	3583.0	5146.8	7168.4	21783.	52919.
1400	15	47.92	74.69	134.07	218.19	330.62	477.26	776.12	1114.0	1550.7	4707.8	11434.
	20	75.01	169.77	314.43	513.77	780.17	1127.6	1835.9	2636.6	3671.7	11154.	27096.
	25	132.56	329.25	611.77	1001.1	1521.3	2199.9	3583.0	5146.8	7168.4	21783.	52919.
1500	15	49.29	75.24	134.07	218.19	330.62	477.26	776.12	1114.0	1550.7	4707.8	11434.
	20	76.16	169.77	314.43	513.77	780.17	1127.6	1835.9	2636.6	3671.7	11154.	27096.
	25	132.67	329.25	611.77	1001.1	1521.3	2199.9	3583.0	5146.8	7168.4	21783.	52919.
1600	15	50.63	75.84	134.07	218.19	330.62	477.26	776.12	1114.0	1550.7	4707.8	11434.
	20	77.35	169.77	314.43	513.77	780.17	1127.6	1835.9	2636.6	3671.7	11154.	27096.
	25	132.82	329.25	611.77	1001.1	1521.3	2199.9	3583.0	5146.8	7168.4	21783.	52919.
1700	15	51.93	76.51	134.08	218.19	330.62	477.26	776.12	1114.0	1550.7	4707.8	11434.
	20	78.57	169.78	314.43	513.77	780.17	1127.6	1835.9	2636.6	3671.7	11154.	27096.
	25	133.02	329.25	611.77	1001.1	1521.3	2199.9	3583.0	5146.8	7168.4	21783.	52919.
1800	15	53.21	77.22	134.09	218.19	330.62	477.26	776.12	1114.0	1550.7	4707.8	11434.
	20	79.79	169.78	314.43	513.77	780.17	1127.6	1835.9	2636.6	3671.7	11154.	27096.
	25	133.28	329.25	611.77	1001.1	1521.3	2199.9	3583.0	5146.8	7168.4	21783.	52919.
1900	15	54.47	77.97	134.10	218.19	330.62	477.26	776.12	1114.0	1550.7	4707.8	11434.
	20	81.02	169.78	314.43	513.77	780.17	1127.6	1835.9	2636.6	3671.7	11154.	27096.
	25	133.59	329.25	611.77	1001.1	1521.3	2199.9	3583.0	5146.8	7168.4	21783.	52919.
2000	15	55.69	78.75	134.12	218.19	330.62	477.26	776.12	1114.0	1550.7	4707.8	11434.
	20	82.26	169.79	314.43	513.77	780.17	1127.6	1835.9	2636.6	3671.7	11154.	27096.
	25	133.96	329.25	611.77	1001.1	1521.3	2199.9	3583.0	5146.8	7168.4	21783.	52919.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 56.0 Ft (RADIUS = 39.6 Ft)
 FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	1.96	1.92	1.96	2.02	2.09	2.18	2.32	2.46	2.60	3.34	4.80
	20	2.13	2.10	2.16	2.24	2.34	2.45	2.65	2.84	3.06	4.59	8.81
	25	2.29	2.28	2.36	2.46	2.60	2.75	3.03	3.32	3.70	7.28	15.53
200	15	2.36	2.33	2.37	2.45	2.54	2.65	2.82	2.98	3.15	3.97	5.28
	20	2.61	2.59	2.66	2.76	2.89	3.03	3.26	3.48	3.72	5.15	8.82
	25	2.85	2.85	2.94	3.08	3.24	3.42	3.74	4.05	4.42	7.38	15.53
300	15	2.69	2.65	2.71	2.80	2.91	3.02	3.22	3.40	3.59	4.49	5.81
	20	3.00	2.99	3.07	3.19	3.33	3.48	3.74	3.99	4.25	5.72	8.95
	25	3.30	3.31	3.42	3.57	3.75	3.95	4.30	4.64	5.03	7.72	15.53
400	15	2.97	2.94	3.00	3.10	3.22	3.35	3.57	3.76	3.97	4.94	6.30
	20	3.34	3.33	3.42	3.55	3.71	3.88	4.16	4.43	4.72	6.24	9.24
	25	3.69	3.70	3.82	3.99	4.19	4.41	4.79	5.15	5.57	8.17	15.54
500	15	3.22	3.19	3.26	3.37	3.50	3.64	3.88	4.09	4.31	5.35	6.76
	20	3.64	3.64	3.74	3.88	4.05	4.23	4.54	4.83	5.13	6.72	9.61
	25	4.04	4.06	4.19	4.37	4.59	4.83	5.23	5.62	6.05	8.64	15.57
600	15	3.46	3.43	3.50	3.62	3.76	3.91	4.16	4.39	4.62	5.72	7.18
	20	3.92	3.92	4.03	4.18	4.36	4.56	4.89	5.19	5.52	7.17	10.00
	25	4.36	4.38	4.53	4.73	4.95	5.21	5.64	6.04	6.49	9.11	15.64
700	15	3.67	3.65	3.73	3.85	4.00	4.16	4.43	4.66	4.91	6.07	7.58
	20	4.19	4.18	4.30	4.46	4.65	4.87	5.21	5.53	5.87	7.59	10.41
	25	4.66	4.69	4.84	5.05	5.29	5.57	6.02	6.44	6.91	9.56	15.77
800	15	3.88	3.85	3.94	4.07	4.23	4.40	4.68	4.93	5.19	6.39	7.95
	20	4.43	4.43	4.56	4.73	4.93	5.15	5.52	5.85	6.21	7.98	10.81
	25	4.95	4.98	5.14	5.36	5.62	5.90	6.37	6.81	7.30	10.00	15.95
900	15	4.08	4.05	4.14	4.28	4.45	4.62	4.92	5.18	5.45	6.70	8.31
	20	4.67	4.67	4.80	4.98	5.19	5.42	5.81	6.15	6.53	8.36	11.20
	25	5.22	5.25	5.42	5.65	5.92	6.22	6.71	7.17	7.67	10.41	16.18
1000	15	4.26	4.24	4.34	4.48	4.65	4.84	5.14	5.41	5.70	7.00	8.65
	20	4.89	4.89	5.03	5.22	5.44	5.68	6.08	6.44	6.83	8.72	11.58
	25	5.48	5.51	5.69	5.93	6.21	6.52	7.03	7.50	8.02	10.82	16.45

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 56.0 Ft (RADIUS = 39.6 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	4.44	4.42	4.52	4.67	4.85	5.05	5.36	5.64	5.94	7.28	8.98
	20	5.11	5.11	5.25	5.45	5.68	5.93	6.35	6.72	7.12	9.06	11.96
	25	5.73	5.76	5.95	6.20	6.49	6.81	7.34	7.83	8.36	11.21	16.73
1200	15	4.62	4.59	4.70	4.86	5.04	5.24	5.57	5.86	6.17	7.56	9.30
	20	5.32	5.32	5.47	5.67	5.91	6.17	6.60	6.99	7.40	9.39	12.32
	25	5.96	6.00	6.20	6.46	6.76	7.09	7.63	8.14	8.69	11.59	17.03
1300	15	4.78	4.76	4.87	5.04	5.23	5.43	5.77	6.07	6.39	7.82	9.60
	20	5.52	5.52	5.68	5.89	6.13	6.40	6.85	7.24	7.67	9.72	12.68
	25	6.20	6.23	6.44	6.70	7.01	7.36	7.92	8.44	9.01	11.95	17.35
1400	15	4.95	4.93	5.04	5.21	5.41	5.62	5.97	6.28	6.60	8.07	9.90
	20	5.71	5.72	5.88	6.10	6.35	6.63	7.08	7.49	7.93	10.03	13.02
	25	6.42	6.46	6.67	6.95	7.27	7.62	8.20	8.73	9.31	12.31	17.66
1500	15	5.11	5.08	5.20	5.38	5.58	5.80	6.16	6.48	6.81	8.32	10.18
	20	5.90	5.91	6.07	6.30	6.56	6.85	7.31	7.74	8.19	10.33	13.36
	25	6.64	6.68	6.89	7.18	7.51	7.87	8.47	9.01	9.61	12.66	17.98
1600	15	5.26	5.24	5.36	5.54	5.75	5.98	6.34	6.67	7.01	8.56	10.46
	20	6.08	6.09	6.26	6.49	6.76	7.06	7.54	7.97	8.43	10.62	13.69
	25	6.85	6.89	7.11	7.41	7.74	8.12	8.73	9.29	9.89	12.99	18.31
1700	15	5.41	5.39	5.52	5.70	5.91	6.15	6.52	6.86	7.21	8.80	10.74
	20	6.26	6.27	6.45	6.69	6.96	7.26	7.76	8.20	8.67	10.91	14.01
	25	7.05	7.10	7.33	7.63	7.97	8.36	8.98	9.55	10.17	13.32	18.63
1800	15	5.55	5.54	5.67	5.85	6.07	6.31	6.70	7.04	7.40	9.02	11.00
	20	6.44	6.45	6.63	6.87	7.16	7.47	7.97	8.42	8.91	11.18	14.33
	25	7.26	7.30	7.54	7.85	8.20	8.59	9.23	9.81	10.45	13.64	18.95
1900	15	5.70	5.68	5.81	6.01	6.23	6.48	6.87	7.22	7.59	9.25	11.26
	20	6.61	6.62	6.80	7.06	7.35	7.66	8.18	8.64	9.14	11.46	14.64
	25	7.45	7.50	7.74	8.06	8.42	8.82	9.47	10.07	10.71	13.96	19.27
2000	15	5.84	5.82	5.96	6.15	6.38	6.63	7.04	7.40	7.78	9.46	11.51
	20	6.78	6.79	6.98	7.23	7.53	7.85	8.38	8.86	9.36	11.72	14.94
	25	7.65	7.70	7.94	8.26	8.63	9.04	9.71	10.32	10.98	14.27	19.59

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 56.0 Ft (RADIUS = 39.6 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	3.27	3.31	3.48	3.72	4.02	4.42	5.31	6.54	8.38	21.85	49.95
	20	3.71	3.85	4.17	4.65	5.38	6.57	9.54	13.00	17.44	49.01	115.25
	25	4.15	4.47	5.09	6.19	8.17	11.10	17.08	23.78	32.38	93.78	222.90
200	15	4.11	4.17	4.37	4.65	4.98	5.39	6.20	7.17	8.62	21.85	49.95
	20	4.72	4.90	5.26	5.75	6.41	7.34	9.71	13.01	17.44	49.01	115.25
	25	5.34	5.69	6.30	7.23	8.71	11.20	17.08	23.78	32.38	93.78	222.90
300	15	4.78	4.86	5.09	5.39	5.76	6.19	7.01	7.92	9.19	21.85	49.95
	20	5.54	5.74	6.13	6.65	7.32	8.20	10.24	13.14	17.45	49.01	115.25
	25	6.29	6.66	7.31	8.22	9.54	11.62	17.10	23.78	32.38	93.78	222.90
400	15	5.37	5.46	5.71	6.04	6.43	6.89	7.74	8.64	9.84	21.85	49.95
	20	6.25	6.46	6.88	7.43	8.13	9.00	10.90	13.47	17.50	49.01	115.25
	25	7.11	7.51	8.18	9.10	10.38	12.25	17.20	23.78	32.38	93.78	222.90
500	15	5.89	5.99	6.26	6.62	7.04	7.52	8.40	9.31	10.48	21.86	49.95
	20	6.88	7.12	7.56	8.14	8.86	9.74	11.58	13.94	17.65	49.01	115.25
	25	7.85	8.27	8.97	9.91	11.17	12.94	17.45	23.80	32.38	93.78	222.90
600	15	6.38	6.48	6.77	7.15	7.59	8.10	9.01	9.94	11.10	21.91	49.95
	20	7.47	7.71	8.18	8.79	9.53	10.43	12.25	14.48	17.92	49.01	115.25
	25	8.53	8.97	9.70	10.66	11.92	13.64	17.82	23.86	32.39	93.78	222.90
700	15	6.83	6.94	7.25	7.64	8.11	8.64	9.58	10.53	11.69	22.00	49.95
	20	8.01	8.27	8.76	9.39	10.16	11.08	12.89	15.05	18.27	49.01	115.25
	25	9.17	9.62	10.37	11.36	12.63	14.32	18.28	23.98	32.39	93.78	222.90
800	15	7.25	7.37	7.70	8.11	8.60	9.15	10.12	11.09	12.26	22.15	49.95
	20	8.53	8.80	9.31	9.96	10.75	11.69	13.51	15.62	18.69	49.01	115.25
	25	9.76	10.23	11.01	12.02	13.31	14.98	18.79	24.18	32.41	93.78	222.90
900	15	7.66	7.79	8.12	8.55	9.06	9.63	10.63	11.62	12.81	22.35	49.95
	20	9.02	9.30	9.83	10.50	11.31	12.28	14.11	16.19	19.14	49.01	115.25
	25	10.33	10.81	11.62	12.65	13.95	15.62	19.32	24.44	32.45	93.78	222.90
1000	15	8.04	8.18	8.53	8.98	9.50	10.09	11.12	12.13	13.33	22.61	49.95
	20	9.48	9.77	10.32	11.02	11.85	12.83	14.68	16.74	19.62	49.01	115.25
	25	10.87	11.37	12.19	13.25	14.57	16.24	19.86	24.76	32.52	93.78	222.90

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 56.0 Ft (RADIUS = 39.6 Ft)
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	8.41	8.55	8.91	9.38	9.92	10.53	11.58	12.62	13.83	22.91	49.95
	20	9.93	10.23	10.79	11.51	12.37	13.37	15.24	17.29	20.10	49.01	115.25
	25	11.39	11.90	12.74	13.82	15.16	16.84	20.41	25.13	32.62	93.78	222.90
1200	15	8.77	8.91	9.29	9.77	10.33	10.95	12.03	13.09	14.32	23.24	49.95
	20	10.36	10.67	11.25	11.99	12.86	13.88	15.77	17.82	20.59	49.01	115.25
	25	11.89	12.41	13.28	14.38	15.74	17.43	20.95	25.52	32.76	93.78	222.90
1300	15	9.11	9.26	9.65	10.15	10.72	11.36	12.47	13.54	14.79	23.59	49.95
	20	10.77	11.09	11.69	12.45	13.34	14.38	16.29	18.35	21.08	49.01	115.25
	25	12.37	12.90	13.79	14.91	16.29	17.99	21.49	25.94	32.94	93.78	222.90
1400	15	9.45	9.60	10.00	10.51	11.10	11.76	12.89	13.98	15.25	23.96	49.96
	20	11.18	11.50	12.12	12.89	13.80	14.86	16.80	18.86	21.56	49.02	115.25
	25	12.83	13.38	14.29	15.43	16.83	18.54	22.02	26.38	33.16	93.78	222.90
1500	15	9.77	9.93	10.34	10.86	11.47	12.14	13.30	14.41	15.70	24.34	49.96
	20	11.57	11.90	12.53	13.32	14.25	15.33	17.29	19.36	22.04	49.03	115.25
	25	13.29	13.84	14.77	15.93	17.35	19.08	22.55	26.82	33.41	93.78	222.90
1600	15	10.09	10.25	10.67	11.21	11.83	12.52	13.70	14.83	16.13	24.72	49.97
	20	11.95	12.28	12.93	13.74	14.69	15.79	17.77	19.85	22.52	49.04	115.25
	25	13.73	14.29	15.24	16.42	17.86	19.60	23.07	27.27	33.68	93.78	222.90
1700	15	10.40	10.56	10.99	11.54	12.17	12.88	14.08	15.23	16.55	25.11	49.98
	20	12.32	12.66	13.32	14.15	15.11	16.23	18.23	20.32	22.99	49.07	115.25
	25	14.16	14.73	15.69	16.90	18.35	20.11	23.58	27.73	33.98	93.78	222.90
1800	15	10.70	10.87	11.31	11.87	12.51	13.24	14.46	15.63	16.97	25.51	49.99
	20	12.68	13.03	13.70	14.55	15.53	16.66	18.69	20.79	23.46	49.10	115.25
	25	14.58	15.16	16.14	17.36	18.83	20.61	24.08	28.19	34.30	93.78	222.90
1900	15	10.99	11.16	11.61	12.19	12.85	13.58	14.83	16.02	17.37	25.90	50.02
	20	13.03	13.39	14.08	14.93	15.94	17.08	19.14	21.25	23.91	49.14	115.25
	25	14.98	15.58	16.57	17.81	19.31	21.10	24.57	28.65	34.64	93.78	222.90
2000	15	11.28	11.45	11.91	12.50	13.17	13.92	15.19	16.39	17.77	26.29	50.04
	20	13.38	13.74	14.44	15.31	16.33	17.50	19.57	21.70	24.37	49.19	115.25
	25	15.38	15.99	17.00	18.26	19.77	21.57	25.06	29.10	34.99	93.78	222.90

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 56.0 Ft (RADIUS = 39.6 Ft)³
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	6.42	7.80	11.26	17.10	24.91	35.04	55.54	78.56	108.16	319.76	765.42
	20	8.37	13.84	23.96	37.86	56.31	80.24	128.70	183.14	253.19	754.27	1810.2
	25	11.74	25.17	44.97	72.08	108.08	154.76	249.31	355.57	492.30	1470.6	3532.6
200	15	8.22	9.46	12.00	17.14	24.91	35.04	55.54	78.56	108.16	319.76	765.42
	20	10.46	14.45	23.96	37.86	56.31	80.24	128.70	183.14	253.19	754.27	1810.2
	25	13.58	25.17	44.97	72.08	108.08	154.76	249.31	355.57	492.30	1470.6	3532.6
300	15	9.67	10.90	13.15	17.46	24.92	35.04	55.54	78.56	108.16	319.76	765.42
	20	12.20	15.66	24.03	37.86	56.31	80.24	128.70	183.14	253.19	754.27	1810.2
	25	15.43	25.30	44.97	72.08	108.08	154.76	249.31	355.57	492.30	1470.6	3532.6
400	15	10.92	12.16	14.32	18.11	24.99	35.04	55.54	78.56	108.16	319.76	765.42
	20	13.71	16.96	24.31	37.86	56.31	80.24	128.70	183.14	253.19	754.27	1810.2
	25	17.13	25.76	44.97	72.08	108.08	154.76	249.31	355.57	492.30	1470.6	3532.6
500	15	12.04	13.31	15.42	18.93	25.21	35.05	55.54	78.56	108.16	319.76	765.42
	20	15.08	18.22	24.84	37.87	56.31	80.24	128.70	183.14	253.19	754.27	1810.2
	25	18.68	26.50	44.98	72.08	108.08	154.76	249.31	355.57	492.30	1470.6	3532.6
600	15	13.07	14.37	16.47	19.81	25.58	35.08	55.54	78.56	108.16	319.76	765.42
	20	16.34	19.42	25.56	37.92	56.31	80.24	128.70	183.14	253.19	754.27	1810.2
	25	20.13	27.42	45.00	72.08	108.08	154.76	249.31	355.57	492.30	1470.6	3532.6
700	15	14.03	15.35	17.46	20.70	26.09	35.16	55.54	78.56	108.16	319.76	765.42
	20	17.51	20.57	26.37	38.03	56.31	80.24	128.70	183.14	253.19	754.27	1810.2
	25	21.48	28.42	45.07	72.08	108.08	154.76	249.31	355.57	492.30	1470.6	3532.6
800	15	14.94	16.28	18.41	21.58	26.68	35.31	55.54	78.56	108.16	319.76	765.42
	20	18.61	21.66	27.23	38.24	56.32	80.24	128.70	183.14	253.19	754.27	1810.2
	25	22.76	29.46	45.20	72.08	108.08	154.76	249.31	355.57	492.30	1470.6	3532.6
900	15	15.79	17.17	19.31	22.44	27.33	35.53	55.54	78.56	108.16	319.76	765.42
	20	19.66	22.71	28.12	38.53	56.32	80.24	128.70	183.14	253.19	754.27	1810.2
	25	23.97	30.50	45.42	72.08	108.08	154.76	249.31	355.57	492.30	1470.6	3532.6
1000	15	16.61	18.01	20.17	23.28	28.02	35.83	55.55	78.56	108.16	319.76	765.42
	20	20.66	23.72	29.00	38.92	56.34	80.24	128.70	183.14	253.19	754.27	1810.2
	25	25.13	31.53	45.73	72.09	108.08	154.76	249.31	355.57	492.30	1470.6	3532.6

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 56.0 Ft (RADIUS = 39.6 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	17.40	18.82	21.00	24.09	28.72	36.20	55.56	78.56	108.16	319.76	765.42
	20	21.62	24.69	29.88	39.38	56.38	80.24	128.70	183.14	253.19	754.27	1810.2
	25	26.24	32.55	46.12	72.09	108.08	154.76	249.31	355.57	492.30	1470.6	3532.6
1200	15	18.15	19.59	21.80	24.89	29.42	36.63	55.59	78.56	108.16	319.76	765.42
	20	22.54	25.62	30.75	39.90	56.45	80.24	128.70	183.14	253.19	754.27	1810.2
	25	27.32	33.55	46.59	72.11	108.08	154.76	249.31	355.57	492.30	1470.6	3532.6
1300	15	18.88	20.34	22.58	25.67	30.13	37.09	55.63	78.56	108.16	319.76	765.42
	20	23.43	26.52	31.61	40.46	56.54	80.24	128.70	183.14	253.19	754.27	1810.2
	25	28.35	34.53	47.12	72.13	108.08	154.76	249.31	355.57	492.30	1470.6	3532.6
1400	15	19.59	21.07	23.33	26.42	30.83	37.60	55.69	78.56	108.16	319.76	765.42
	20	24.29	27.40	32.45	41.06	56.67	80.25	128.70	183.14	253.19	754.27	1810.2
	25	29.35	35.49	47.69	72.17	108.08	154.76	249.31	355.57	492.30	1470.6	3532.6
1500	15	20.27	21.77	24.06	27.16	31.53	38.13	55.77	78.56	108.16	319.76	765.42
	20	25.12	28.26	33.28	41.68	56.84	80.25	128.70	183.14	253.19	754.27	1810.2
	25	30.33	36.44	48.31	72.23	108.08	154.76	249.31	355.57	492.30	1470.6	3532.6
1600	15	20.94	22.46	24.76	27.88	32.22	38.68	55.89	78.56	108.16	319.76	765.42
	20	25.93	29.09	34.09	42.33	57.05	80.26	128.70	183.14	253.19	754.27	1810.2
	25	31.27	37.36	48.95	72.31	108.08	154.76	249.31	355.57	492.30	1470.6	3532.6
1700	15	21.58	23.13	25.46	28.59	32.90	39.24	56.03	78.57	108.16	319.76	765.42
	20	26.72	29.89	34.89	42.98	57.30	80.28	128.70	183.14	253.19	754.27	1810.2
	25	32.20	38.27	49.62	72.42	108.08	154.76	249.31	355.57	492.30	1470.6	3532.6
1800	15	22.22	23.78	26.13	29.28	33.57	39.81	56.20	78.58	108.16	319.76	765.42
	20	27.49	30.68	35.68	43.64	57.59	80.30	128.70	183.14	253.19	754.27	1810.2
	25	33.10	39.16	50.30	72.55	108.08	154.76	249.31	355.57	492.30	1470.6	3532.6
1900	15	22.83	24.41	26.79	29.96	34.24	40.39	56.40	78.59	108.16	319.76	765.42
	20	28.25	31.46	36.45	44.30	57.91	80.34	128.70	183.14	253.19	754.27	1810.2
	25	33.97	40.03	50.99	72.72	108.08	154.76	249.31	355.57	492.30	1470.6	3532.6
2000	15	23.44	25.03	27.44	30.62	34.89	40.97	56.64	78.61	108.16	319.76	765.42
	20	28.98	32.21	37.20	44.97	58.26	80.38	128.70	183.14	253.19	754.27	1810.2
	25	34.83	40.88	51.69	72.92	108.09	154.76	249.31	355.57	492.30	1470.6	3532.6

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 56.0 Ft (RADIUS = 39.6 Ft)³
 FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, Ft										
(Ft*s) ^{1/2}	°F/min	4	8	12	16	20	24	30	35	40	60	80
100	15	34.82	82.87	151.32	244.95	369.25	530.46	857.01	1224.1	1696.4	5076.8	12202.
	20	78.89	192.98	355.23	577.08	871.64	1253.7	2027.5	2897.4	4016.9	12029.	28918.
	25	151.54	374.49	691.39	1124.7	1699.9	2446.0	3957.3	5656.2	7842.6	23491.	56477.
200	15	34.85	82.87	151.32	244.95	369.25	530.46	857.01	1224.1	1696.4	5076.8	12202.
	20	78.89	192.98	355.23	577.08	871.64	1253.7	2027.5	2897.4	4016.9	12029.	28918.
	25	151.54	374.49	691.39	1124.7	1699.9	2446.0	3957.3	5656.2	7842.6	23491.	56477.
300	15	35.18	82.87	151.32	244.95	369.25	530.46	857.01	1224.1	1696.4	5076.8	12202.
	20	78.89	192.98	355.23	577.08	871.64	1253.7	2027.5	2897.4	4016.9	12029.	28918.
	25	151.54	374.49	691.39	1124.7	1699.9	2446.0	3957.3	5656.2	7842.6	23491.	56477.
400	15	36.10	82.87	151.32	244.95	369.25	530.46	857.01	1224.1	1696.4	5076.8	12202.
	20	78.89	192.98	355.23	577.08	871.64	1253.7	2027.5	2897.4	4016.9	12029.	28918.
	25	151.54	374.49	691.39	1124.7	1699.9	2446.0	3957.3	5656.2	7842.6	23491.	56477.
500	15	37.42	82.87	151.32	244.95	369.25	530.46	857.01	1224.1	1696.4	5076.8	12202.
	20	78.90	192.98	355.23	577.08	871.64	1253.7	2027.5	2897.4	4016.9	12029.	28918.
	25	151.54	374.49	691.39	1124.7	1699.9	2446.0	3957.3	5656.2	7842.6	23491.	56477.
600	15	38.94	82.87	151.32	244.95	369.25	530.46	857.01	1224.1	1696.4	5076.8	12202.
	20	78.93	192.98	355.23	577.08	871.64	1253.7	2027.5	2897.4	4016.9	12029.	28918.
	25	151.54	374.49	691.39	1124.7	1699.9	2446.0	3957.3	5656.2	7842.6	23491.	56477.
700	15	40.53	82.88	151.32	244.95	369.25	530.46	857.01	1224.1	1696.4	5076.8	12202.
	20	79.02	192.98	355.23	577.08	871.64	1253.7	2027.5	2897.4	4016.9	12029.	28918.
	25	151.54	374.49	691.39	1124.7	1699.9	2446.0	3957.3	5656.2	7842.6	23491.	56477.
800	15	42.14	82.89	151.32	244.95	369.25	530.46	857.01	1224.1	1696.4	5076.8	12202.
	20	79.21	192.98	355.23	577.08	871.64	1253.7	2027.5	2897.4	4016.9	12029.	28918.
	25	151.54	374.49	691.39	1124.7	1699.9	2446.0	3957.3	5656.2	7842.6	23491.	56477.
900	15	43.74	82.92	151.32	244.95	369.25	530.46	857.01	1224.1	1696.4	5076.8	12202.
	20	79.54	192.98	355.23	577.08	871.64	1253.7	2027.5	2897.4	4016.9	12029.	28918.
	25	151.54	374.49	691.39	1124.7	1699.9	2446.0	3957.3	5656.2	7842.6	23491.	56477.
1000	15	45.32	82.98	151.32	244.95	369.25	530.46	857.01	1224.1	1696.4	5076.8	12202.
	20	80.01	192.98	355.23	577.08	871.64	1253.7	2027.5	2897.4	4016.9	12029.	28918.
	25	151.54	374.49	691.39	1124.7	1699.9	2446.0	3957.3	5656.2	7842.6	23491.	56477.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 56.0 Ft (RADIUS = 39.6 Ft)³
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX	RATE OF RISE	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
(Ft*s) ^{1/2}	°F/min											
	15	46.86	83.09	151.32	244.95	369.25	530.46	857.01	1224.1	1696.4	5076.8	12202.
	20	80.63	192.98	355.23	577.08	871.64	1253.7	2027.5	2897.4	4016.9	12029.	28918.
	25	151.55	374.49	691.39	1124.7	1699.9	2446.0	3957.3	5656.2	7842.6	23491.	56477.
1200	15	48.37	83.26	151.32	244.95	369.25	530.46	857.01	1224.1	1696.4	5076.8	12202.
	20	81.37	192.98	355.23	577.08	871.64	1253.7	2027.5	2897.4	4016.9	12029.	28918.
	25	151.55	374.49	691.39	1124.7	1699.9	2446.0	3957.3	5656.2	7842.6	23491.	56477.
1300	15	49.85	83.49	151.32	244.95	369.25	530.46	857.01	1224.1	1696.4	5076.8	12202.
	20	82.23	192.98	355.23	577.08	871.64	1253.7	2027.5	2897.4	4016.9	12029.	28918.
	25	151.57	374.49	691.39	1124.7	1699.9	2446.0	3957.3	5656.2	7842.6	23491.	56477.
1400	15	51.29	83.80	151.32	244.95	369.25	530.46	857.01	1224.1	1696.4	5076.8	12202.
	20	83.17	192.98	355.23	577.08	871.64	1253.7	2027.5	2897.4	4016.9	12029.	28918.
	25	151.59	374.49	691.39	1124.7	1699.9	2446.0	3957.3	5656.2	7842.6	23491.	56477.
1500	15	52.70	84.18	151.32	244.95	369.25	530.46	857.01	1224.1	1696.4	5076.8	12202.
	20	84.19	192.98	355.23	577.08	871.64	1253.7	2027.5	2897.4	4016.9	12029.	28918.
	25	151.63	374.49	691.39	1124.7	1699.9	2446.0	3957.3	5656.2	7842.6	23491.	56477.
1600	15	54.09	84.62	151.33	244.95	369.25	530.46	857.01	1224.1	1696.4	5076.8	12202.
	20	85.26	192.98	355.23	577.08	871.64	1253.7	2027.5	2897.4	4016.9	12029.	28918.
	25	151.70	374.49	691.39	1124.7	1699.9	2446.0	3957.3	5656.2	7842.6	23491.	56477.
1700	15	55.44	85.13	151.33	244.95	369.25	530.46	857.01	1224.1	1696.4	5076.8	12202.
	20	86.37	192.98	355.23	577.08	871.64	1253.7	2027.5	2897.4	4016.9	12029.	28918.
	25	151.79	374.49	691.39	1124.7	1699.9	2446.0	3957.3	5656.2	7842.6	23491.	56477.
1800	15	56.76	85.70	151.33	244.95	369.25	530.46	857.01	1224.1	1696.4	5076.8	12202.
	20	87.52	192.98	355.23	577.08	871.64	1253.7	2027.5	2897.4	4016.9	12029.	28918.
	25	151.91	374.49	691.39	1124.7	1699.9	2446.0	3957.3	5656.2	7842.6	23491.	56477.
1900	15	58.06	86.32	151.33	244.95	369.25	530.46	857.01	1224.1	1696.4	5076.8	12202.
	20	88.69	192.98	355.23	577.08	871.64	1253.7	2027.5	2897.4	4016.9	12029.	28918.
	25	152.07	374.49	691.39	1124.7	1699.9	2446.0	3957.3	5656.2	7842.6	23491.	56477.
2000	15	59.34	86.98	151.34	244.95	369.25	530.46	857.01	1224.1	1696.4	5076.8	12202.
	20	89.87	192.98	355.23	577.08	871.64	1253.7	2027.5	2897.4	4016.9	12029.	28918.
	25	152.27	374.49	691.39	1124.7	1699.9	2446.0	3957.3	5656.2	7842.6	23491.	56477.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 58.0 Ft (RADIUS = 41.0 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	2.03	1.99	2.02	2.08	2.16	2.25	2.39	2.53	2.67	3.44	5.00
	20	2.21	2.18	2.23	2.31	2.42	2.53	2.74	2.93	3.16	4.82	9.29
	25	2.38	2.37	2.44	2.55	2.69	2.85	3.14	3.46	3.86	7.74	16.47
200	15	2.45	2.41	2.45	2.53	2.63	2.73	2.91	3.07	3.24	4.09	5.46
	20	2.71	2.69	2.76	2.86	2.98	3.13	3.36	3.59	3.84	5.35	9.30
	25	2.96	2.96	3.05	3.19	3.35	3.54	3.87	4.20	4.59	7.81	16.47
300	15	2.79	2.75	2.80	2.89	3.00	3.12	3.32	3.50	3.69	4.62	5.99
	20	3.12	3.10	3.18	3.30	3.44	3.60	3.87	4.12	4.39	5.92	9.41
	25	3.43	3.43	3.54	3.70	3.88	4.09	4.46	4.81	5.22	8.11	16.47
400	15	3.08	3.04	3.11	3.21	3.32	3.46	3.68	3.87	4.08	5.08	6.49
	20	3.47	3.45	3.54	3.68	3.83	4.01	4.30	4.57	4.87	6.46	9.66
	25	3.84	3.84	3.97	4.14	4.34	4.57	4.96	5.34	5.77	8.55	16.47
500	15	3.35	3.31	3.38	3.49	3.62	3.76	4.00	4.21	4.43	5.50	6.95
	20	3.79	3.77	3.87	4.02	4.19	4.38	4.69	4.98	5.30	6.95	10.01
	25	4.20	4.21	4.35	4.54	4.76	5.00	5.42	5.82	6.26	9.01	16.49
600	15	3.59	3.56	3.63	3.75	3.89	4.04	4.29	4.52	4.76	5.88	7.38
	20	4.08	4.07	4.18	4.33	4.51	4.72	5.05	5.36	5.69	7.40	10.40
	25	4.54	4.55	4.70	4.90	5.13	5.40	5.84	6.25	6.72	9.48	16.54
700	15	3.82	3.78	3.86	3.99	4.14	4.30	4.57	4.81	5.06	6.23	7.79
	20	4.35	4.34	4.46	4.62	4.82	5.03	5.39	5.71	6.06	7.83	10.80
	25	4.85	4.87	5.03	5.24	5.49	5.76	6.23	6.66	7.15	9.94	16.65
800	15	4.03	4.00	4.09	4.22	4.37	4.54	4.82	5.08	5.34	6.57	8.17
	20	4.61	4.60	4.72	4.90	5.10	5.33	5.70	6.04	6.41	8.24	11.20
	25	5.15	5.17	5.34	5.56	5.82	6.11	6.60	7.05	7.55	10.38	16.80
900	15	4.24	4.20	4.30	4.43	4.60	4.78	5.07	5.33	5.61	6.89	8.54
	20	4.86	4.85	4.98	5.16	5.37	5.61	6.00	6.35	6.73	8.62	11.59
	25	5.43	5.46	5.63	5.86	6.14	6.44	6.94	7.41	7.93	10.80	17.01
1000	15	4.43	4.40	4.50	4.64	4.81	5.00	5.30	5.58	5.87	7.19	8.89
	20	5.09	5.08	5.22	5.41	5.63	5.88	6.28	6.65	7.05	8.99	11.98
	25	5.70	5.73	5.91	6.15	6.44	6.75	7.28	7.76	8.30	11.21	17.25

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 58.0 Ft (RADIUS = 41.0 Ft)
 FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	4.62	4.59	4.69	4.84	5.02	5.21	5.53	5.81	6.11	7.48	9.22
	20	5.31	5.31	5.45	5.65	5.88	6.14	6.56	6.94	7.35	9.34	12.36
	25	5.96	5.99	6.18	6.43	6.72	7.05	7.59	8.10	8.65	11.61	17.52
1200	15	4.80	4.77	4.87	5.03	5.21	5.42	5.75	6.04	6.35	7.76	9.55
	20	5.53	5.53	5.67	5.88	6.12	6.38	6.82	7.21	7.64	9.68	12.73
	25	6.21	6.24	6.43	6.70	7.00	7.34	7.90	8.42	8.99	12.00	17.81
1300	15	4.97	4.94	5.05	5.21	5.40	5.61	5.96	6.26	6.58	8.03	9.86
	20	5.74	5.74	5.89	6.10	6.35	6.62	7.07	7.48	7.91	10.01	13.09
	25	6.45	6.48	6.68	6.96	7.27	7.62	8.20	8.73	9.31	12.37	18.11
1400	15	5.14	5.11	5.23	5.39	5.59	5.81	6.16	6.47	6.80	8.30	10.16
	20	5.94	5.94	6.10	6.32	6.57	6.86	7.32	7.74	8.18	10.33	13.44
	25	6.68	6.72	6.93	7.21	7.53	7.89	8.48	9.03	9.63	12.74	18.42
1500	15	5.31	5.28	5.39	5.57	5.77	5.99	6.35	6.68	7.02	8.55	10.46
	20	6.14	6.14	6.30	6.53	6.79	7.08	7.56	7.99	8.45	10.64	13.79
	25	6.91	6.94	7.16	7.45	7.78	8.15	8.76	9.32	9.93	13.09	18.74
1600	15	5.47	5.44	5.56	5.74	5.94	6.17	6.55	6.88	7.22	8.80	10.74
	20	6.33	6.33	6.50	6.73	7.00	7.30	7.79	8.23	8.70	10.94	14.12
	25	7.13	7.17	7.39	7.68	8.03	8.41	9.03	9.60	10.23	13.44	19.06
1700	15	5.62	5.59	5.72	5.90	6.12	6.35	6.73	7.07	7.43	9.04	11.02
	20	6.52	6.52	6.69	6.93	7.21	7.51	8.01	8.47	8.95	11.24	14.45
	25	7.34	7.38	7.61	7.91	8.27	8.65	9.29	9.88	10.52	13.78	19.38
1800	15	5.78	5.75	5.87	6.06	6.28	6.52	6.91	7.26	7.63	9.27	11.29
	20	6.70	6.70	6.88	7.12	7.41	7.72	8.24	8.70	9.19	11.52	14.78
	25	7.55	7.59	7.83	8.14	8.50	8.90	9.55	10.15	10.80	14.11	19.70
1900	15	5.93	5.90	6.03	6.22	6.44	6.69	7.09	7.45	7.82	9.50	11.56
	20	6.88	6.88	7.06	7.31	7.61	7.93	8.45	8.92	9.42	11.80	15.09
	25	7.76	7.80	8.04	8.36	8.73	9.13	9.80	10.41	11.07	14.43	20.02
2000	15	6.07	6.04	6.18	6.37	6.60	6.86	7.26	7.63	8.01	9.73	11.82
	20	7.05	7.05	7.24	7.50	7.80	8.13	8.66	9.14	9.66	12.08	15.40
	25	7.96	8.00	8.25	8.57	8.95	9.36	10.05	10.67	11.34	14.74	20.34

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 58.0 Ft (RADIUS = 41.0 Ft) ³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	3.40	3.45	3.62	3.87	4.20	4.63	5.62	7.01	9.02	23.40	53.13
	20	3.86	4.02	4.37	4.90	5.73	7.09	10.38	14.13	18.91	52.65	122.74
	25	4.34	4.69	5.39	6.67	8.95	12.18	18.69	25.94	35.23	100.86	237.51
200	15	4.28	4.34	4.55	4.83	5.19	5.62	6.50	7.56	9.20	23.40	53.13
	20	4.93	5.11	5.49	6.02	6.75	7.79	10.49	14.13	18.91	52.65	122.74
	25	5.58	5.96	6.63	7.67	9.38	12.23	18.69	25.94	35.23	100.86	237.51
300	15	4.98	5.06	5.29	5.61	5.99	6.45	7.32	8.31	9.71	23.40	53.13
	20	5.78	5.99	6.40	6.96	7.68	8.65	10.94	14.21	18.92	52.65	122.74
	25	6.57	6.98	7.67	8.67	10.16	12.56	18.69	25.94	35.23	100.86	237.51
400	15	5.59	5.68	5.94	6.28	6.69	7.17	8.07	9.04	10.34	23.40	53.13
	20	6.52	6.74	7.18	7.77	8.51	9.46	11.57	14.47	18.95	52.65	122.74
	25	7.43	7.86	8.58	9.58	10.99	13.12	18.76	25.95	35.23	100.86	237.51
500	15	6.14	6.23	6.51	6.88	7.32	7.83	8.75	9.72	10.98	23.41	53.13
	20	7.18	7.42	7.89	8.50	9.26	10.22	12.24	14.88	19.05	52.65	122.74
	25	8.20	8.65	9.40	10.42	11.80	13.79	18.93	25.95	35.23	100.86	237.51
600	15	6.64	6.75	7.04	7.43	7.89	8.43	9.38	10.37	11.61	23.44	53.13
	20	7.79	8.05	8.54	9.18	9.96	10.93	12.90	15.39	19.26	52.65	122.74
	25	8.91	9.38	10.15	11.19	12.56	14.47	19.23	25.99	35.23	100.86	237.51
700	15	7.11	7.23	7.54	7.95	8.43	8.98	9.97	10.97	12.21	23.50	53.13
	20	8.36	8.63	9.14	9.80	10.61	11.60	13.56	15.94	19.56	52.65	122.74
	25	9.57	10.06	10.86	11.92	13.29	15.16	19.63	26.07	35.23	100.86	237.51
800	15	7.56	7.68	8.00	8.43	8.94	9.51	10.52	11.54	12.79	23.61	53.13
	20	8.89	9.17	9.71	10.40	11.23	12.23	14.19	16.50	19.93	52.65	122.74
	25	10.20	10.69	11.52	12.60	13.99	15.83	20.10	26.21	35.24	100.86	237.51
900	15	7.98	8.10	8.45	8.89	9.41	10.01	11.05	12.09	13.35	23.78	53.13
	20	9.40	9.69	10.25	10.96	11.81	12.83	14.79	17.06	20.35	52.65	122.74
	25	10.79	11.30	12.15	13.25	14.65	16.48	20.60	26.41	35.27	100.86	237.51
1000	15	8.38	8.51	8.87	9.33	9.87	10.48	11.55	12.62	13.89	24.00	53.13
	20	9.89	10.19	10.76	11.49	12.37	13.40	15.38	17.62	20.80	52.65	122.74
	25	11.35	11.88	12.75	13.87	15.29	17.11	21.13	26.68	35.31	100.86	237.51

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 58.0 Ft (RADIUS = 41.0 Ft)³
 FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	8.76	8.90	9.27	9.75	10.31	10.94	12.04	13.12	14.40	24.26	53.13
	20	10.35	10.66	11.25	12.00	12.90	13.96	15.95	18.18	21.27	52.65	122.74
	25	11.89	12.43	13.32	14.47	15.90	17.72	21.66	26.99	35.37	100.86	237.51
1200	15	9.14	9.28	9.66	10.16	10.73	11.38	12.50	13.60	14.90	24.56	53.13
	20	10.80	11.12	11.73	12.50	13.41	14.49	16.50	18.72	21.75	52.65	122.74
	25	12.41	12.96	13.88	15.04	16.50	18.32	22.20	27.34	35.47	100.86	237.51
1300	15	9.50	9.64	10.04	10.55	11.14	11.80	12.95	14.07	15.39	24.89	53.13
	20	11.24	11.56	12.19	12.97	13.91	15.00	17.04	19.25	22.23	52.65	122.74
	25	12.91	13.48	14.41	15.60	17.07	18.90	22.74	27.73	35.61	100.86	237.51
1400	15	9.84	10.00	10.40	10.92	11.53	12.21	13.39	14.53	15.86	25.24	53.13
	20	11.66	11.99	12.63	13.44	14.39	15.50	17.56	19.77	22.71	52.65	122.74
	25	13.40	13.97	14.93	16.14	17.62	19.47	23.27	28.14	35.77	100.86	237.51
1500	15	10.18	10.34	10.75	11.29	11.91	12.61	13.81	14.97	16.32	25.60	53.13
	20	12.06	12.40	13.06	13.88	14.86	15.99	18.06	20.28	23.20	52.66	122.74
	25	13.87	14.46	15.43	16.66	18.16	20.02	23.80	28.56	35.98	100.86	237.51
1600	15	10.51	10.67	11.10	11.65	12.28	13.00	14.22	15.40	16.76	25.98	53.14
	20	12.46	12.81	13.48	14.32	15.31	16.46	18.56	20.78	23.68	52.67	122.74
	25	14.33	14.93	15.91	17.17	18.69	20.56	24.33	29.00	36.21	100.86	237.51
1700	15	10.83	10.99	11.43	12.00	12.65	13.38	14.62	15.82	17.20	26.36	53.15
	20	12.85	13.20	13.88	14.74	15.75	16.92	19.04	21.27	24.15	52.68	122.74
	25	14.78	15.38	16.39	17.66	19.20	21.08	24.84	29.44	36.46	100.86	237.51
1800	15	11.14	11.31	11.76	12.33	13.00	13.74	15.01	16.23	17.63	26.74	53.15
	20	13.22	13.58	14.28	15.15	16.18	17.37	19.51	21.75	24.62	52.70	122.74
	25	15.22	15.83	16.85	18.14	19.70	21.60	25.35	29.89	36.75	100.86	237.51
1900	15	11.45	11.62	12.08	12.67	13.34	14.10	15.39	16.63	18.04	27.13	53.17
	20	13.59	13.96	14.67	15.56	16.60	17.80	19.97	22.22	25.08	52.73	122.74
	25	15.64	16.27	17.30	18.61	20.19	22.10	25.86	30.34	37.05	100.86	237.51
2000	15	11.75	11.92	12.39	12.99	13.68	14.45	15.76	17.02	18.45	27.52	53.19
	20	13.95	14.32	15.05	15.95	17.01	18.23	20.42	22.68	25.54	52.77	122.74
	25	16.06	16.69	17.75	19.07	20.67	22.59	26.35	30.79	37.37	100.86	237.51

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 58.0 Ft (RADIUS = 41.0 Ft)³
 FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	6.76	8.38	12.46	18.97	27.58	38.68	61.02	85.97	117.93	344.18	815.87
	20	8.94	15.47	26.80	42.22	62.56	88.80	141.63	200.67	276.29	812.12	1929.7
	25	12.97	28.33	50.47	80.55	120.24	171.44	274.52	389.75	537.38	1583.6	3766.0
200	15	8.63	10.04	13.03	18.98	27.58	38.68	61.02	85.97	117.93	344.18	815.87
	20	11.09	15.89	26.80	42.22	62.56	88.80	141.63	200.67	276.29	812.12	1929.7
	25	14.65	28.33	50.47	80.55	120.24	171.44	274.52	389.75	537.38	1583.6	3766.0
300	15	10.14	11.52	14.11	19.19	27.58	38.68	61.02	85.97	117.93	344.18	815.87
	20	12.89	16.97	26.83	42.22	62.56	88.80	141.63	200.67	276.29	812.12	1929.7
	25	16.51	28.39	50.47	80.55	120.24	171.44	274.52	389.75	537.38	1583.6	3766.0
400	15	11.45	12.83	15.27	19.71	27.61	38.68	61.02	85.97	117.93	344.18	815.87
	20	14.47	18.23	26.99	42.22	62.56	88.80	141.63	200.67	276.29	812.12	1929.7
	25	18.25	28.67	50.47	80.55	120.24	171.44	274.52	389.75	537.38	1583.6	3766.0
500	15	12.62	14.02	16.39	20.44	27.74	38.68	61.02	85.97	117.93	344.18	815.87
	20	15.90	19.49	27.38	42.22	62.56	88.80	141.63	200.67	276.29	812.12	1929.7
	25	19.85	29.24	50.47	80.55	120.24	171.44	274.52	389.75	537.38	1583.6	3766.0
600	15	13.70	15.12	17.46	21.27	28.01	38.70	61.02	85.97	117.93	344.18	815.87
	20	17.21	20.71	27.96	42.24	62.56	88.80	141.63	200.67	276.29	812.12	1929.7
	25	21.35	30.03	50.48	80.55	120.24	171.44	274.52	389.75	537.38	1583.6	3766.0
700	15	14.70	16.15	18.48	22.14	28.41	38.74	61.02	85.97	117.93	344.18	815.87
	20	18.43	21.89	28.69	42.30	62.56	88.80	141.63	200.67	276.29	812.12	1929.7
	25	22.75	30.94	50.51	80.55	120.24	171.44	274.52	389.75	537.38	1583.6	3766.0
800	15	15.64	17.11	19.45	23.02	28.93	38.82	61.02	85.97	117.93	344.18	815.87
	20	19.58	23.01	29.49	42.42	62.56	88.80	141.63	200.67	276.29	812.12	1929.7
	25	24.08	31.92	50.57	80.55	120.24	171.44	274.52	389.75	537.38	1583.6	3766.0
900	15	16.54	18.03	20.38	23.88	29.51	38.97	61.02	85.97	117.93	344.18	815.87
	20	20.67	24.09	30.33	42.61	62.57	88.80	141.63	200.67	276.29	812.12	1929.7
	25	25.35	32.93	50.70	80.55	120.24	171.44	274.52	389.75	537.38	1583.6	3766.0
1000	15	17.39	18.91	21.27	24.73	30.15	39.19	61.02	85.97	117.93	344.18	815.87
	20	21.72	25.13	31.20	42.89	62.57	88.80	141.63	200.67	276.29	812.12	1929.7
	25	26.55	33.95	50.89	80.55	120.24	171.44	274.52	389.75	537.38	1583.6	3766.0

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 58.0 Ft (RADIUS = 41.0 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	18.21	19.75	22.13	25.56	30.82	39.47	61.03	85.97	117.93	344.18	815.87
	20	22.72	26.13	32.07	43.24	62.59	88.80	141.63	200.67	276.29	812.12	1929.7
	25	27.71	34.97	51.16	80.55	120.24	171.44	274.52	389.75	537.38	1583.6	3766.0
1200	15	19.00	20.56	22.96	26.37	31.50	39.82	61.04	85.97	117.93	344.18	815.87
	20	23.68	27.10	32.93	43.67	62.62	88.80	141.63	200.67	276.29	812.12	1929.7
	25	28.83	35.98	51.51	80.55	120.24	171.44	274.52	389.75	537.38	1583.6	3766.0
1300	15	19.76	21.34	23.76	27.17	32.19	40.22	61.06	85.97	117.93	344.18	815.87
	20	24.61	28.04	33.79	44.15	62.67	88.80	141.63	200.67	276.29	812.12	1929.7
	25	29.91	36.97	51.93	80.56	120.24	171.44	274.52	389.75	537.38	1583.6	3766.0
1400	15	20.50	22.10	24.54	27.94	32.89	40.66	61.09	85.98	117.93	344.18	815.87
	20	25.50	28.95	34.64	44.68	62.75	88.80	141.63	200.67	276.29	812.12	1929.7
	25	30.96	37.95	52.40	80.58	120.24	171.44	274.52	389.75	537.38	1583.6	3766.0
1500	15	21.21	22.83	25.30	28.70	33.58	41.14	61.14	85.98	117.93	344.18	815.87
	20	26.38	29.84	35.48	45.24	62.85	88.81	141.63	200.67	276.29	812.12	1929.7
	25	31.97	38.91	52.93	80.61	120.24	171.44	274.52	389.75	537.38	1583.6	3766.0
1600	15	21.91	23.55	26.04	29.45	34.28	41.64	61.21	85.98	117.93	344.18	815.87
	20	27.22	30.70	36.31	45.83	62.99	88.81	141.63	200.67	276.29	812.12	1929.7
	25	32.96	39.85	53.49	80.65	120.24	171.44	274.52	389.75	537.38	1583.6	3766.0
1700	15	22.59	24.24	26.75	30.17	34.96	42.17	61.31	85.98	117.93	344.18	815.87
	20	28.05	31.54	37.13	46.44	63.16	88.82	141.63	200.67	276.29	812.12	1929.7
	25	33.92	40.78	54.09	80.70	120.24	171.44	274.52	389.75	537.38	1583.6	3766.0
1800	15	23.25	24.92	27.46	30.88	35.64	42.71	61.42	85.98	117.93	344.18	815.87
	20	28.85	32.36	37.93	47.07	63.36	88.83	141.63	200.67	276.29	812.12	1929.7
	25	34.86	41.69	54.72	80.78	120.24	171.44	274.52	389.75	537.38	1583.6	3766.0
1900	15	23.89	25.58	28.14	31.58	36.31	43.26	61.56	85.99	117.93	344.18	815.87
	20	29.64	33.16	38.72	47.71	63.60	88.84	141.63	200.67	276.29	812.12	1929.7
	25	35.78	42.59	55.37	80.88	120.24	171.44	274.52	389.75	537.38	1583.6	3766.0
2000	15	24.52	26.23	28.81	32.26	36.98	43.82	61.73	86.00	117.93	344.18	815.87
	20	30.41	33.95	39.49	48.36	63.87	88.86	141.63	200.67	276.29	812.12	1929.7
	25	36.68	43.47	56.03	81.00	120.24	171.44	274.52	389.75	537.38	1583.6	3766.0

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 58.0 Ft (RADIUS = 41.0 Ft)³
 FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	39.46	93.69	170.21	274.10	411.17	588.00	944.06	1342.1	1852.1	5467.0	13009.
	20	89.77	218.50	399.89	646.09	970.93	1390.0	2233.8	3177.2	4385.9	12954.	30830.
	25	172.72	424.27	778.56	1259.4	1893.8	2712.2	4360.1	6202.6	8563.3	25297.	60210.
200	15	39.47	93.69	170.21	274.10	411.17	588.00	944.06	1342.1	1852.1	5467.0	13009.
	20	89.77	218.50	399.89	646.09	970.93	1390.0	2233.8	3177.2	4385.9	12954.	30830.
	25	172.72	424.27	778.56	1259.4	1893.8	2712.2	4360.1	6202.6	8563.3	25297.	60210.
300	15	39.63	93.69	170.21	274.10	411.17	588.00	944.06	1342.1	1852.1	5467.0	13009.
	20	89.77	218.50	399.89	646.09	970.93	1390.0	2233.8	3177.2	4385.9	12954.	30830.
	25	172.72	424.27	778.56	1259.4	1893.8	2712.2	4360.1	6202.6	8563.3	25297.	60210.
400	15	40.24	93.69	170.21	274.10	411.17	588.00	944.06	1342.1	1852.1	5467.0	13009.
	20	89.77	218.50	399.89	646.09	970.93	1390.0	2233.8	3177.2	4385.9	12954.	30830.
	25	172.72	424.27	778.56	1259.4	1893.8	2712.2	4360.1	6202.6	8563.3	25297.	60210.
500	15	41.31	93.69	170.21	274.10	411.17	588.00	944.06	1342.1	1852.1	5467.0	13009.
	20	89.77	218.50	399.89	646.09	970.93	1390.0	2233.8	3177.2	4385.9	12954.	30830.
	25	172.72	424.27	778.56	1259.4	1893.8	2712.2	4360.1	6202.6	8563.3	25297.	60210.
600	15	42.66	93.69	170.21	274.10	411.17	588.00	944.06	1342.1	1852.1	5467.0	13009.
	20	89.78	218.50	399.89	646.09	970.93	1390.0	2233.8	3177.2	4385.9	12954.	30830.
	25	172.72	424.27	778.56	1259.4	1893.8	2712.2	4360.1	6202.6	8563.3	25297.	60210.
700	15	44.16	93.69	170.21	274.10	411.17	588.00	944.06	1342.1	1852.1	5467.0	13009.
	20	89.81	218.50	399.89	646.09	970.93	1390.0	2233.8	3177.2	4385.9	12954.	30830.
	25	172.72	424.27	778.56	1259.4	1893.8	2712.2	4360.1	6202.6	8563.3	25297.	60210.
800	15	45.71	93.69	170.21	274.10	411.17	588.00	944.06	1342.1	1852.1	5467.0	13009.
	20	89.90	218.50	399.89	646.09	970.93	1390.0	2233.8	3177.2	4385.9	12954.	30830.
	25	172.72	424.27	778.56	1259.4	1893.8	2712.2	4360.1	6202.6	8563.3	25297.	60210.
900	15	47.29	93.70	170.21	274.10	411.17	588.00	944.06	1342.1	1852.1	5467.0	13009.
	20	90.06	218.50	399.89	646.09	970.93	1390.0	2233.8	3177.2	4385.9	12954.	30830.
	25	172.72	424.27	778.56	1259.4	1893.8	2712.2	4360.1	6202.6	8563.3	25297.	60210.
1000	15	48.86	93.72	170.21	274.10	411.17	588.00	944.06	1342.1	1852.1	5467.0	13009.
	20	90.33	218.50	399.89	646.09	970.93	1390.0	2233.8	3177.2	4385.9	12954.	30830.
	25	172.72	424.27	778.56	1259.4	1893.8	2712.2	4360.1	6202.6	8563.3	25297.	60210.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 58.0 Ft (RADIUS = 41.0 Ft)³
 FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	50.42	93.77	170.21	274.10	411.17	588.00	944.06	1342.1	1852.1	5467.0	13009.
	20	90.72	218.50	399.89	646.09	970.93	1390.0	2233.8	3177.2	4385.9	12954.	30830.
	25	172.72	424.27	778.56	1259.4	1893.8	2712.2	4360.1	6202.6	8563.3	25297.	60210.
1200	15	51.95	93.85	170.21	274.10	411.17	588.00	944.06	1342.1	1852.1	5467.0	13009.
	20	91.23	218.50	399.89	646.09	970.93	1390.0	2233.8	3177.2	4385.9	12954.	30830.
	25	172.72	424.27	778.56	1259.4	1893.8	2712.2	4360.1	6202.6	8563.3	25297.	60210.
1300	15	53.45	93.97	170.21	274.10	411.17	588.00	944.06	1342.1	1852.1	5467.0	13009.
	20	91.87	218.50	399.89	646.09	970.93	1390.0	2233.8	3177.2	4385.9	12954.	30830.
	25	172.72	424.27	778.56	1259.4	1893.8	2712.2	4360.1	6202.6	8563.3	25297.	60210.
1400	15	54.93	94.14	170.21	274.10	411.17	588.00	944.06	1342.1	1852.1	5467.0	13009.
	20	92.60	218.50	399.89	646.09	970.93	1390.0	2233.8	3177.2	4385.9	12954.	30830.
	25	172.73	424.27	778.56	1259.4	1893.8	2712.2	4360.1	6202.6	8563.3	25297.	60210.
1500	15	56.37	94.38	170.21	274.10	411.17	588.00	944.06	1342.1	1852.1	5467.0	13009.
	20	93.43	218.50	399.89	646.09	970.93	1390.0	2233.8	3177.2	4385.9	12954.	30830.
	25	172.74	424.27	778.56	1259.4	1893.8	2712.2	4360.1	6202.6	8563.3	25297.	60210.
1600	15	57.79	94.67	170.21	274.10	411.17	588.00	944.06	1342.1	1852.1	5467.0	13009.
	20	94.34	218.50	399.89	646.09	970.93	1390.0	2233.8	3177.2	4385.9	12954.	30830.
	25	172.76	424.27	778.56	1259.4	1893.8	2712.2	4360.1	6202.6	8563.3	25297.	60210.
1700	15	59.18	95.02	170.21	274.10	411.17	588.00	944.06	1342.1	1852.1	5467.0	13009.
	20	95.31	218.50	399.89	646.09	970.93	1390.0	2233.8	3177.2	4385.9	12954.	30830.
	25	172.80	424.27	778.56	1259.4	1893.8	2712.2	4360.1	6202.6	8563.3	25297.	60210.
1800	15	60.55	95.43	170.21	274.10	411.17	588.00	944.06	1342.1	1852.1	5467.0	13009.
	20	96.33	218.50	399.89	646.09	970.93	1390.0	2233.8	3177.2	4385.9	12954.	30830.
	25	172.85	424.27	778.56	1259.4	1893.8	2712.2	4360.1	6202.6	8563.3	25297.	60210.
1900	15	61.89	95.90	170.21	274.10	411.17	588.00	944.06	1342.1	1852.1	5467.0	13009.
	20	97.40	218.50	399.89	646.09	970.93	1390.0	2233.8	3177.2	4385.9	12954.	30830.
	25	172.92	424.27	778.56	1259.4	1893.8	2712.2	4360.1	6202.6	8563.3	25297.	60210.
2000	15	63.21	96.42	170.21	274.10	411.17	588.00	944.06	1342.1	1852.1	5467.0	13009.
	20	98.49	218.50	399.89	646.09	970.93	1390.0	2233.8	3177.2	4385.9	12954.	30830.
	25	173.01	424.27	778.56	1259.4	1893.8	2712.2	4360.1	6202.6	8563.3	25297.	60210.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 60.0 Ft (RADIUS = 42.4 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	2.11	2.06	2.09	2.15	2.22	2.31	2.46	2.60	2.75	3.54	5.22
	20	2.29	2.26	2.31	2.39	2.49	2.61	2.82	3.03	3.27	5.06	9.80
	25	2.47	2.45	2.53	2.64	2.79	2.95	3.26	3.59	4.03	8.23	17.44
200	15	2.54	2.49	2.54	2.61	2.71	2.81	2.99	3.15	3.33	4.20	5.65
	20	2.82	2.79	2.85	2.96	3.08	3.23	3.47	3.70	3.96	5.56	9.81
	25	3.08	3.07	3.16	3.30	3.47	3.67	4.01	4.35	4.77	8.28	17.44
300	15	2.89	2.85	2.90	2.99	3.10	3.22	3.42	3.60	3.80	4.74	6.18
	20	3.24	3.21	3.29	3.41	3.55	3.72	3.99	4.25	4.53	6.13	9.89
	25	3.56	3.56	3.67	3.83	4.02	4.24	4.61	4.98	5.41	8.54	17.44
400	15	3.20	3.15	3.21	3.31	3.43	3.57	3.79	3.99	4.20	5.22	6.68
	20	3.60	3.58	3.67	3.80	3.96	4.14	4.44	4.72	5.02	6.67	10.11
	25	3.98	3.99	4.11	4.29	4.50	4.73	5.14	5.52	5.97	8.95	17.44
500	15	3.47	3.43	3.50	3.60	3.73	3.88	4.12	4.33	4.56	5.65	7.15
	20	3.93	3.91	4.01	4.16	4.33	4.52	4.84	5.14	5.47	7.18	10.44
	25	4.37	4.37	4.51	4.70	4.92	5.18	5.61	6.02	6.48	9.40	17.46
600	15	3.73	3.68	3.76	3.87	4.01	4.17	4.42	4.65	4.90	6.04	7.59
	20	4.24	4.22	4.33	4.48	4.67	4.87	5.21	5.53	5.87	7.64	10.81
	25	4.72	4.73	4.88	5.08	5.32	5.59	6.04	6.47	6.96	9.87	17.50
700	15	3.96	3.92	4.00	4.12	4.27	4.44	4.71	4.95	5.21	6.41	8.01
	20	4.52	4.51	4.62	4.79	4.98	5.20	5.56	5.89	6.25	8.08	11.21
	25	5.04	5.06	5.21	5.43	5.68	5.97	6.44	6.89	7.40	10.33	17.58
800	15	4.19	4.15	4.23	4.36	4.52	4.69	4.97	5.23	5.50	6.75	8.40
	20	4.79	4.77	4.90	5.07	5.28	5.51	5.89	6.23	6.61	8.50	11.61
	25	5.35	5.37	5.53	5.76	6.03	6.32	6.82	7.29	7.81	10.77	17.71
900	15	4.40	4.36	4.45	4.58	4.75	4.93	5.23	5.49	5.77	7.08	8.77
	20	5.04	5.03	5.16	5.34	5.56	5.80	6.19	6.55	6.95	8.89	12.01
	25	5.65	5.67	5.84	6.08	6.35	6.66	7.18	7.67	8.20	11.20	17.89
1000	15	4.60	4.56	4.65	4.80	4.97	5.16	5.47	5.75	6.04	7.39	9.13
	20	5.29	5.27	5.41	5.60	5.83	6.08	6.49	6.86	7.27	9.27	12.40
	25	5.93	5.95	6.13	6.38	6.67	6.99	7.53	8.03	8.58	11.62	18.10

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 60.0 Ft (RADIUS = 42.4 Ft)
FIRE GROWTH: ULTRAFAST (ALPHA = .178 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	4.80	4.76	4.85	5.00	5.18	5.38	5.70	5.99	6.29	7.69	9.47
	20	5.52	5.51	5.65	5.85	6.08	6.34	6.77	7.16	7.58	9.63	12.78
	25	6.19	6.22	6.41	6.66	6.96	7.30	7.85	8.37	8.94	12.03	18.35
1200	15	4.98	4.94	5.05	5.20	5.39	5.59	5.92	6.22	6.54	7.98	9.80
	20	5.75	5.73	5.88	6.09	6.33	6.60	7.04	7.44	7.87	9.98	13.15
	25	6.45	6.48	6.67	6.94	7.25	7.60	8.17	8.70	9.29	12.42	18.63
1300	15	5.17	5.13	5.23	5.39	5.58	5.80	6.14	6.45	6.77	8.25	10.12
	20	5.96	5.95	6.10	6.32	6.57	6.85	7.30	7.72	8.16	10.32	13.52
	25	6.70	6.73	6.93	7.21	7.53	7.88	8.48	9.02	9.62	12.81	18.92
1400	15	5.34	5.30	5.41	5.58	5.78	5.99	6.35	6.67	7.00	8.52	10.43
	20	6.17	6.16	6.32	6.54	6.80	7.09	7.56	7.98	8.44	10.65	13.88
	25	6.95	6.97	7.18	7.47	7.80	8.16	8.77	9.33	9.95	13.18	19.22
1500	15	5.51	5.47	5.59	5.76	5.96	6.19	6.55	6.88	7.22	8.78	10.73
	20	6.38	6.37	6.53	6.76	7.03	7.32	7.80	8.24	8.71	10.96	14.23
	25	7.18	7.21	7.43	7.72	8.06	8.44	9.06	9.63	10.26	13.54	19.53
1600	15	5.68	5.64	5.76	5.93	6.14	6.37	6.75	7.08	7.44	9.04	11.03
	20	6.58	6.57	6.74	6.97	7.24	7.55	8.04	8.49	8.97	11.27	14.57
	25	7.41	7.44	7.66	7.96	8.31	8.70	9.34	9.93	10.57	13.90	19.84
1700	15	5.84	5.80	5.92	6.10	6.32	6.56	6.94	7.28	7.65	9.28	11.31
	20	6.77	6.76	6.94	7.18	7.46	7.77	8.28	8.73	9.23	11.57	14.91
	25	7.64	7.67	7.89	8.20	8.56	8.96	9.61	10.21	10.87	14.24	20.16
1800	15	6.00	5.96	6.09	6.27	6.49	6.73	7.13	7.48	7.85	9.52	11.59
	20	6.96	6.95	7.13	7.38	7.67	7.98	8.50	8.97	9.47	11.87	15.24
	25	7.85	7.89	8.12	8.44	8.80	9.21	9.87	10.49	11.16	14.58	20.48
1900	15	6.15	6.12	6.24	6.43	6.66	6.91	7.31	7.67	8.05	9.76	11.86
	20	7.15	7.14	7.32	7.57	7.87	8.19	8.73	9.21	9.72	12.15	15.56
	25	8.07	8.10	8.34	8.66	9.04	9.45	10.13	10.76	11.44	14.91	20.80
2000	15	6.31	6.27	6.40	6.59	6.82	7.08	7.49	7.86	8.25	9.99	12.13
	20	7.33	7.32	7.51	7.77	8.07	8.40	8.94	9.43	9.96	12.43	15.87
	25	8.28	8.31	8.56	8.89	9.27	9.69	10.39	11.02	11.72	15.23	21.12

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 60.0 Ft (RADIUS = 42.4 Ft)
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	3.53	3.58	3.76	4.03	4.38	4.85	5.96	7.51	9.70	25.04	56.46
	20	4.02	4.19	4.57	5.16	6.11	7.67	11.28	15.33	20.48	56.49	130.60
	25	4.53	4.92	5.71	7.20	9.80	13.33	20.41	28.26	38.27	108.35	252.84
200	15	4.45	4.51	4.73	5.03	5.40	5.87	6.81	8.00	9.82	25.04	56.46
	20	5.13	5.33	5.74	6.31	7.11	8.29	11.35	15.33	20.48	56.49	130.60
	25	5.82	6.24	6.98	8.15	10.12	13.36	20.41	28.26	38.27	108.35	252.84
300	15	5.18	5.26	5.50	5.83	6.23	6.72	7.65	8.73	10.28	25.04	56.46
	20	6.02	6.24	6.68	7.27	8.06	9.13	11.71	15.38	20.48	56.49	130.60
	25	6.86	7.30	8.05	9.15	10.84	13.60	20.41	28.26	38.27	108.35	252.84
400	15	5.81	5.90	6.17	6.53	6.96	7.46	8.41	9.46	10.88	25.04	56.46
	20	6.79	7.03	7.49	8.12	8.91	9.95	12.29	15.57	20.50	56.49	130.60
	25	7.75	8.21	8.99	10.08	11.66	14.09	20.45	28.26	38.27	108.35	252.84
500	15	6.38	6.48	6.77	7.15	7.61	8.14	9.11	10.15	11.52	25.05	56.46
	20	7.48	7.73	8.23	8.87	9.69	10.72	12.94	15.92	20.57	56.49	130.60
	25	8.56	9.04	9.84	10.94	12.47	14.71	20.56	28.27	38.27	108.35	252.84
600	15	6.91	7.02	7.32	7.72	8.20	8.76	9.76	10.81	12.15	25.06	56.46
	20	8.11	8.38	8.90	9.57	10.41	11.45	13.61	16.38	20.72	56.49	130.60
	25	9.30	9.80	10.62	11.74	13.25	15.38	20.79	28.28	38.27	108.35	252.84
700	15	7.40	7.51	7.84	8.26	8.76	9.34	10.37	11.43	12.76	25.10	56.46
	20	8.71	8.99	9.53	10.22	11.08	12.13	14.26	16.90	20.96	56.49	130.60
	25	9.99	10.50	11.36	12.49	13.99	16.05	21.13	28.33	38.27	108.35	252.84
800	15	7.86	7.98	8.32	8.76	9.28	9.88	10.94	12.02	13.35	25.19	56.46
	20	9.26	9.56	10.12	10.84	11.72	12.78	14.90	17.45	21.28	56.49	130.60
	25	10.64	11.17	12.04	13.20	14.70	16.72	21.54	28.42	38.27	108.35	252.84
900	15	8.30	8.43	8.78	9.24	9.78	10.40	11.48	12.58	13.92	25.32	56.46
	20	9.79	10.10	10.68	11.42	12.32	13.40	15.52	18.00	21.66	56.49	130.60
	25	11.25	11.80	12.70	13.87	15.39	17.38	22.01	28.57	38.28	108.35	252.84
1000	15	8.72	8.85	9.22	9.69	10.25	10.89	12.00	13.12	14.47	25.50	56.46
	20	10.30	10.61	11.21	11.98	12.90	14.00	16.12	18.56	22.09	56.49	130.60
	25	11.84	12.40	13.32	14.52	16.04	18.03	22.50	28.78	38.31	108.35	252.84

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 60.0 Ft (RADIUS = 42.4 Ft)³
FIRE GROWTH: FAST (ALPHA = .0444 BTU/s²)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	9.12	9.26	9.64	10.13	10.71	11.36	12.50	13.64	15.00	25.73	56.46
	20	10.79	11.11	11.72	12.51	13.45	14.57	16.70	19.12	22.53	56.49	130.60
	25	12.40	12.97	13.92	15.14	16.67	18.65	23.02	29.04	38.35	108.35	252.84
1200	15	9.51	9.65	10.04	10.55	11.14	11.81	12.98	14.14	15.51	25.99	56.46
	20	11.25	11.58	12.21	13.02	13.98	15.12	17.26	19.66	23.00	56.50	130.60
	25	12.94	13.53	14.49	15.73	17.29	19.26	23.55	29.35	38.41	108.35	252.84
1300	15	9.88	10.03	10.43	10.95	11.56	12.25	13.45	14.62	16.01	26.29	56.46
	20	11.70	12.04	12.69	13.51	14.49	15.65	17.81	20.20	23.47	56.50	130.60
	25	13.47	14.06	15.05	16.31	17.88	19.86	24.08	29.69	38.51	108.35	252.84
1400	15	10.24	10.39	10.81	11.35	11.97	12.68	13.90	15.09	16.49	26.61	56.46
	20	12.14	12.49	13.15	13.99	14.99	16.17	18.35	20.73	23.94	56.50	130.60
	25	13.97	14.58	15.58	16.86	18.45	20.44	24.61	30.06	38.63	108.35	252.84
1500	15	10.59	10.75	11.18	11.73	12.37	13.09	14.33	15.54	16.96	26.96	56.46
	20	12.57	12.92	13.60	14.46	15.47	16.67	18.87	21.25	24.42	56.50	130.60
	25	14.47	15.08	16.10	17.41	19.01	21.00	25.14	30.46	38.78	108.35	252.84
1600	15	10.94	11.10	11.53	12.10	12.75	13.49	14.76	15.99	17.42	27.32	56.47
	20	12.98	13.34	14.03	14.91	15.94	17.15	19.37	21.75	24.90	56.51	130.60
	25	14.94	15.57	16.61	17.93	19.55	21.56	25.67	30.87	38.97	108.35	252.84
1700	15	11.27	11.43	11.88	12.46	13.13	13.88	15.17	16.42	17.87	27.68	56.47
	20	13.38	13.75	14.45	15.35	16.40	17.63	19.87	22.25	25.38	56.51	130.60
	25	15.41	16.05	17.10	18.44	20.08	22.10	26.19	31.29	39.18	108.35	252.84
1800	15	11.60	11.76	12.22	12.81	13.49	14.26	15.57	16.84	18.30	28.06	56.48
	20	13.77	14.14	14.87	15.78	16.85	18.09	20.35	22.74	25.85	56.52	130.60
	25	15.87	16.51	17.58	18.94	20.60	22.63	26.70	31.72	39.42	108.35	252.84
1900	15	11.91	12.08	12.55	13.15	13.85	14.63	15.97	17.25	18.73	28.44	56.48
	20	14.16	14.53	15.27	16.19	17.28	18.54	20.83	23.23	26.32	56.54	130.60
	25	16.31	16.96	18.05	19.43	21.11	23.14	27.21	32.16	39.68	108.35	252.84
2000	15	12.23	12.40	12.87	13.49	14.20	14.99	16.35	17.65	19.15	28.83	56.50
	20	14.53	14.91	15.66	16.60	17.71	18.99	21.29	23.70	26.78	56.56	130.60
	25	16.75	17.41	18.51	19.91	21.60	23.65	27.72	32.61	39.97	108.35	252.84

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 60.0 Ft (RADIUS = 42.4 Ft)
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	7.10	9.03	13.79	20.99	30.46	42.60	66.91	93.91	128.35	369.99	868.77
	20	9.58	17.27	29.90	46.95	69.33	98.04	155.52	219.43	300.94	873.24	2055.0
	25	14.38	31.79	56.46	89.75	133.41	189.44	301.62	426.36	585.49	1702.9	4010.8
200	15	9.06	10.66	14.19	21.00	30.46	42.60	66.91	93.91	128.35	369.99	868.77
	20	11.75	17.53	29.90	46.95	69.33	98.04	155.52	219.43	300.94	873.24	2055.0
	25	15.84	31.79	56.46	89.75	133.41	189.44	301.62	426.36	585.49	1702.9	4010.8
300	15	10.63	12.18	15.17	21.12	30.46	42.60	66.91	93.91	128.35	369.99	868.77
	20	13.62	18.44	29.91	46.95	69.33	98.04	155.52	219.43	300.94	873.24	2055.0
	25	17.68	31.82	56.46	89.75	133.41	189.44	301.62	426.36	585.49	1702.9	4010.8
400	15	11.99	13.53	16.30	21.50	30.47	42.60	66.91	93.91	128.35	369.99	868.77
	20	15.26	19.63	29.99	46.95	69.33	98.04	155.52	219.43	300.94	873.24	2055.0
	25	19.45	31.97	56.46	89.75	133.41	189.44	301.62	426.36	585.49	1702.9	4010.8
500	15	13.21	14.76	17.43	22.13	30.54	42.60	66.91	93.91	128.35	369.99	868.77
	20	16.74	20.87	30.24	46.95	69.33	98.04	155.52	219.43	300.94	873.24	2055.0
	25	21.10	32.37	56.47	89.75	133.41	189.44	301.62	426.36	585.49	1702.9	4010.8
600	15	14.34	15.90	18.51	22.90	30.72	42.61	66.91	93.91	128.35	369.99	868.77
	20	18.11	22.10	30.69	46.96	69.33	98.04	155.52	219.43	300.94	873.24	2055.0
	25	22.64	32.99	56.47	89.75	133.41	189.44	301.62	426.36	585.49	1702.9	4010.8
700	15	15.38	16.97	19.56	23.73	31.02	42.63	66.91	93.91	128.35	369.99	868.77
	20	19.38	23.30	31.29	46.99	69.33	98.04	155.52	219.43	300.94	873.24	2055.0
	25	24.09	33.79	56.48	89.75	133.41	189.44	301.62	426.36	585.49	1702.9	4010.8
800	15	16.37	17.98	20.55	24.58	31.44	42.68	66.91	93.91	128.35	369.99	868.77
	20	20.58	24.45	32.01	47.05	69.33	98.04	155.52	219.43	300.94	873.24	2055.0
	25	25.47	34.69	56.51	89.75	133.41	189.44	301.62	426.36	585.49	1702.9	4010.8
900	15	17.30	18.93	21.51	25.44	31.94	42.77	66.91	93.91	128.35	369.99	868.77
	20	21.72	25.56	32.79	47.16	69.33	98.04	155.52	219.43	300.94	873.24	2055.0
	25	26.79	35.64	56.57	89.75	133.41	189.44	301.62	426.36	585.49	1702.9	4010.8
1000	15	18.19	19.84	22.43	26.29	32.52	42.91	66.91	93.91	128.35	369.99	868.77
	20	22.81	26.63	33.62	47.34	69.33	98.04	155.52	219.43	300.94	873.24	2055.0
	25	28.04	36.63	56.68	89.75	133.41	189.44	301.62	426.36	585.49	1702.9	4010.8

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 60.0 Ft (RADIUS = 42.4 Ft)³
FIRE GROWTH: MEDIUM (ALPHA = .0111 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	19.05	20.72	23.32	27.13	33.13	43.11	66.91	93.91	128.35	369.99	868.77
	20	23.85	27.66	34.46	47.60	69.34	98.04	155.52	219.43	300.94	873.24	2055.0
	25	29.25	37.63	56.85	89.75	133.41	189.44	301.62	426.36	585.49	1702.9	4010.8
1200	15	19.87	21.56	24.18	27.96	33.78	43.38	66.91	93.91	128.35	369.99	868.77
	20	24.85	28.66	35.32	47.92	69.35	98.04	155.52	219.43	300.94	873.24	2055.0
	25	30.41	38.63	57.08	89.75	133.41	189.44	301.62	426.36	585.49	1702.9	4010.8
1300	15	20.66	22.37	25.01	28.77	34.45	43.70	66.92	93.91	128.35	369.99	868.77
	20	25.82	29.63	36.17	48.30	69.38	98.04	155.52	219.43	300.94	873.24	2055.0
	25	31.54	39.62	57.38	89.75	133.41	189.44	301.62	426.36	585.49	1702.9	4010.8
1400	15	21.43	23.16	25.81	29.56	35.13	44.07	66.94	93.91	128.35	369.99	868.77
	20	26.76	30.57	37.02	48.74	69.41	98.04	155.52	219.43	300.94	873.24	2055.0
	25	32.63	40.60	57.74	89.76	133.41	189.44	301.62	426.36	585.49	1702.9	4010.8
1500	15	22.18	23.92	26.60	30.33	35.81	44.48	66.97	93.91	128.35	369.99	868.77
	20	27.67	31.49	37.86	49.23	69.47	98.04	155.52	219.43	300.94	873.24	2055.0
	25	33.68	41.58	58.16	89.77	133.41	189.44	301.62	426.36	585.49	1702.9	4010.8
1600	15	22.90	24.67	27.36	31.09	36.50	44.93	67.01	93.91	128.35	369.99	868.77
	20	28.55	32.38	38.70	49.76	69.55	98.04	155.52	219.43	300.94	873.24	2055.0
	25	34.71	42.54	58.63	89.79	133.41	189.44	301.62	426.36	585.49	1702.9	4010.8
1700	15	23.60	25.39	28.10	31.84	37.18	45.40	67.06	93.92	128.35	369.99	868.77
	20	29.41	33.26	39.52	50.31	69.66	98.05	155.52	219.43	300.94	873.24	2055.0
	25	35.71	43.48	59.15	89.81	133.41	189.44	301.62	426.36	585.49	1702.9	4010.8
1800	15	24.29	26.10	28.83	32.57	37.86	45.90	67.13	93.92	128.35	369.99	868.77
	20	30.25	34.11	40.34	50.89	69.79	98.05	155.52	219.43	300.94	873.24	2055.0
	25	36.69	44.41	59.70	89.85	133.41	189.44	301.62	426.36	585.49	1702.9	4010.8
1900	15	24.97	26.79	29.54	33.29	38.54	46.42	67.23	93.92	128.35	369.99	868.77
	20	31.07	34.94	41.14	51.49	69.95	98.06	155.52	219.43	300.94	873.24	2055.0
	25	37.65	45.33	60.28	89.90	133.41	189.44	301.62	426.36	585.49	1702.9	4010.8
2000	15	25.62	27.46	30.24	33.99	39.21	46.95	67.34	93.92	128.35	369.99	868.77
	20	31.87	35.76	41.93	52.10	70.15	98.07	155.52	219.43	300.94	873.24	2055.0
	25	38.58	46.23	60.88	89.97	133.41	189.44	301.62	426.36	585.49	1702.9	4010.8

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 60.0 Ft (RADIUS = 42.4 Ft)³
 FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
100	15	44.57	105.54	190.82	305.79	456.58	650.12	1037.6	1468.5	2018.3	5879.3	13855.
	20	101.76	246.49	448.66	721.13	1078.5	1537.1	2455.4	3476.7	4779.8	13931.	32835.
	25	196.06	478.86	873.75	1405.9	2103.8	2999.5	4793.0	6787.6	9332.5	27206.	64127.
200	15	44.57	105.54	190.82	305.79	456.58	650.12	1037.6	1468.5	2018.3	5879.3	13855.
	20	101.76	246.49	448.66	721.13	1078.5	1537.1	2455.4	3476.7	4779.8	13931.	32835.
	25	196.06	478.86	873.75	1405.9	2103.8	2999.5	4793.0	6787.6	9332.5	27206.	64127.
300	15	44.64	105.54	190.82	305.79	456.58	650.12	1037.6	1468.5	2018.3	5879.3	13855.
	20	101.76	246.49	448.66	721.13	1078.5	1537.1	2455.4	3476.7	4779.8	13931.	32835.
	25	196.06	478.86	873.75	1405.9	2103.8	2999.5	4793.0	6787.6	9332.5	27206.	64127.
400	15	45.00	105.54	190.82	305.79	456.58	650.12	1037.6	1468.5	2018.3	5879.3	13855.
	20	101.76	246.49	448.66	721.13	1078.5	1537.1	2455.4	3476.7	4779.8	13931.	32835.
	25	196.06	478.86	873.75	1405.9	2103.8	2999.5	4793.0	6787.6	9332.5	27206.	64127.
500	15	45.78	105.54	190.82	305.79	456.58	650.12	1037.6	1468.5	2018.3	5879.3	13855.
	20	101.76	246.49	448.66	721.13	1078.5	1537.1	2455.4	3476.7	4779.8	13931.	32835.
	25	196.06	478.86	873.75	1405.9	2103.8	2999.5	4793.0	6787.6	9332.5	27206.	64127.
600	15	46.91	105.54	190.82	305.79	456.58	650.12	1037.6	1468.5	2018.3	5879.3	13855.
	20	101.77	246.49	448.66	721.13	1078.5	1537.1	2455.4	3476.7	4779.8	13931.	32835.
	25	196.06	478.86	873.75	1405.9	2103.8	2999.5	4793.0	6787.6	9332.5	27206.	64127.
700	15	48.25	105.54	190.82	305.79	456.58	650.12	1037.6	1468.5	2018.3	5879.3	13855.
	20	101.78	246.49	448.66	721.13	1078.5	1537.1	2455.4	3476.7	4779.8	13931.	32835.
	25	196.06	478.86	873.75	1405.9	2103.8	2999.5	4793.0	6787.6	9332.5	27206.	64127.
800	15	49.71	105.54	190.82	305.79	456.58	650.12	1037.6	1468.5	2018.3	5879.3	13855.
	20	101.81	246.49	448.66	721.13	1078.5	1537.1	2455.4	3476.7	4779.8	13931.	32835.
	25	196.06	478.86	873.75	1405.9	2103.8	2999.5	4793.0	6787.6	9332.5	27206.	64127.
900	15	51.23	105.54	190.82	305.79	456.58	650.12	1037.6	1468.5	2018.3	5879.3	13855.
	20	101.88	246.49	448.66	721.13	1078.5	1537.1	2455.4	3476.7	4779.8	13931.	32835.
	25	196.06	478.86	873.75	1405.9	2103.8	2999.5	4793.0	6787.6	9332.5	27206.	64127.
1000	15	52.77	105.55	190.82	305.79	456.58	650.12	1037.6	1468.5	2018.3	5879.3	13855.
	20	102.01	246.49	448.66	721.13	1078.5	1537.1	2455.4	3476.7	4779.8	13931.	32835.
	25	196.06	478.86	873.75	1405.9	2103.8	2999.5	4793.0	6787.6	9332.5	27206.	64127.

TIME TO ACTUATE HEAT DETECTOR, MINUTES

SPACING = 60.0 Ft (RADIUS = 42.4 Ft)
FIRE GROWTH: SLOW (ALPHA = .00278 BTU/s³)

RESPONSE TIME INDEX (Ft*s) ^{1/2}	RATE OF RISE °F/min	CEILING HEIGHT, Ft										
		4	8	12	16	20	24	30	35	40	60	80
1100	15	54.32	105.56	190.82	305.79	456.58	650.12	1037.6	1468.5	2018.3	5879.3	13855.
	20	102.22	246.49	448.66	721.13	1078.5	1537.1	2455.4	3476.7	4779.8	13931.	32835.
	25	196.06	478.86	873.75	1405.9	2103.8	2999.5	4793.0	6787.6	9332.5	27206.	64127.
1200	15	55.85	105.60	190.82	305.79	456.58	650.12	1037.6	1468.5	2018.3	5879.3	13855.
	20	102.53	246.49	448.66	721.13	1078.5	1537.1	2455.4	3476.7	4779.8	13931.	32835.
	25	196.06	478.86	873.75	1405.9	2103.8	2999.5	4793.0	6787.6	9332.5	27206.	64127.
1300	15	57.36	105.65	190.82	305.79	456.58	650.12	1037.6	1468.5	2018.3	5879.3	13855.
	20	102.94	246.49	448.66	721.13	1078.5	1537.1	2455.4	3476.7	4779.8	13931.	32835.
	25	196.06	478.86	873.75	1405.9	2103.8	2999.5	4793.0	6787.6	9332.5	27206.	64127.
1400	15	58.86	105.74	190.82	305.79	456.58	650.12	1037.6	1468.5	2018.3	5879.3	13855.
	20	103.46	246.49	448.66	721.13	1078.5	1537.1	2455.4	3476.7	4779.8	13931.	32835.
	25	196.06	478.86	873.75	1405.9	2103.8	2999.5	4793.0	6787.6	9332.5	27206.	64127.
1500	15	60.33	105.86	190.82	305.79	456.58	650.12	1037.6	1468.5	2018.3	5879.3	13855.
	20	104.08	246.49	448.66	721.13	1078.5	1537.1	2455.4	3476.7	4779.8	13931.	32835.
	25	196.06	478.86	873.75	1405.9	2103.8	2999.5	4793.0	6787.6	9332.5	27206.	64127.
1600	15	61.78	106.03	190.82	305.79	456.58	650.12	1037.6	1468.5	2018.3	5879.3	13855.
	20	104.79	246.49	448.66	721.13	1078.5	1537.1	2455.4	3476.7	4779.8	13931.	32835.
	25	196.07	478.86	873.75	1405.9	2103.8	2999.5	4793.0	6787.6	9332.5	27206.	64127.
1700	15	63.20	106.25	190.82	305.79	456.58	650.12	1037.6	1468.5	2018.3	5879.3	13855.
	20	105.57	246.49	448.66	721.13	1078.5	1537.1	2455.4	3476.7	4779.8	13931.	32835.
	25	196.08	478.86	873.75	1405.9	2103.8	2999.5	4793.0	6787.6	9332.5	27206.	64127.
1800	15	64.60	106.52	190.82	305.79	456.58	650.12	1037.6	1468.5	2018.3	5879.3	13855.
	20	106.43	246.49	448.66	721.13	1078.5	1537.1	2455.4	3476.7	4779.8	13931.	32835.
	25	196.09	478.86	873.75	1405.9	2103.8	2999.5	4793.0	6787.6	9332.5	27206.	64127.
1900	15	65.98	106.84	190.82	305.79	456.58	650.12	1037.6	1468.5	2018.3	5879.3	13855.
	20	107.34	246.49	448.66	721.13	1078.5	1537.1	2455.4	3476.7	4779.8	13931.	32835.
	25	196.12	478.86	873.75	1405.9	2103.8	2999.5	4793.0	6787.6	9332.5	27206.	64127.
2000	15	67.34	107.21	190.82	305.79	456.58	650.12	1037.6	1468.5	2018.3	5879.3	13855.
	20	108.31	246.49	448.66	721.13	1078.5	1537.1	2455.4	3476.7	4779.8	13931.	32835.
	25	196.16	478.86	873.75	1405.9	2103.8	2999.5	4793.0	6787.6	9332.5	27206.	64127.

U.S. DEPT. OF COMM. BIBLIOGRAPHIC DATA SHEET (See instructions)	1. PUBLICATION OR REPORT NO. NBS/SP-712	2. Performing Organ. Report No.	3. Publication Date April 1986
4. TITLE AND SUBTITLE Evaluating Thermal Fire Detection Systems [English Units]			
5. AUTHOR(S) David W. Stroup, David D. Evans, Phyllis Martin			
6. PERFORMING ORGANIZATION (If joint or other than NBS, see instructions) National Bureau of Standards Department of Commerce Gaithersburg, MD 20899			7. Contract/Grant No. 8. Type of Report & Period Covered Final
9. SPONSORING ORGANIZATION NAME AND COMPLETE ADDRESS (Street, City, State, ZIP) Same as item 6.			
10. SUPPLEMENTARY NOTES Library of Congress Catalog Card Number: 86-600519 <input type="checkbox"/> Document describes a computer program; SF-185, FIPS Software Summary, is attached.			
11. ABSTRACT (A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here) This report presents a methodology for evaluating heat detection systems installed in buildings. Previous work for use primarily in designing new thermal fire detection systems was used as a starting point. The previous work was enhanced and supplemented to make it more useful for evaluating existing systems. The resulting equations were programmed into a user interactive computer program. This program is available in both BASIC and FORTRAN and will run on mainframes as well as personal computers. In addition, a modified version of the FORTRAN program was used to develop an extensive set of tables listing detector activation times for given building geometries, detector characteristics, and fire growth rates. These tables are useful for quick evaluation of alternative heat detector installations. Finally, practical examples are included to illustrate the use of the tables and computer programs.			
12. KEY WORDS (Six to twelve entries; alphabetical order; capitalize only proper names; and separate key words by semicolons) fire alarm systems; fire detection; fire detection systems; fire hazard assessment; fire protection; fire suppression; heat detectors; sprinkler systems			
13. AVAILABILITY <input checked="" type="checkbox"/> Unlimited <input type="checkbox"/> For Official Distribution. Do Not Release to NTIS <input checked="" type="checkbox"/> Order From Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. <input type="checkbox"/> Order From National Technical Information Service (NTIS), Springfield, VA. 22161			14. NO. OF PRINTED PAGES 557 15. Price

NBS *Technical Publications*

Periodical

Journal of Research—The Journal of Research of the National Bureau of Standards reports NBS research and development in those disciplines of the physical and engineering sciences in which the Bureau is active. These include physics, chemistry, engineering, mathematics, and computer sciences. Papers cover a broad range of subjects, with major emphasis on measurement methodology and the basic technology underlying standardization. Also included from time to time are survey articles on topics closely related to the Bureau's technical and scientific programs. Issued six times a year.

Nonperiodicals

Monographs—Major contributions to the technical literature on various subjects related to the Bureau's scientific and technical activities.

Handbooks—Recommended codes of engineering and industrial practice (including safety codes) developed in cooperation with interested industries, professional organizations, and regulatory bodies.

Special Publications—Include proceedings of conferences sponsored by NBS, NBS annual reports, and other special publications appropriate to this grouping such as wall charts, pocket cards, and bibliographies.

Applied Mathematics Series—Mathematical tables, manuals, and studies of special interest to physicists, engineers, chemists, biologists, mathematicians, computer programmers, and others engaged in scientific and technical work.

National Standard Reference Data Series—Provides quantitative data on the physical and chemical properties of materials, compiled from the world's literature and critically evaluated. Developed under a worldwide program coordinated by NBS under the authority of the National Standard Data Act (Public Law 90-396).

NOTE: The Journal of Physical and Chemical Reference Data (JPCRD) is published quarterly for NBS by the American Chemical Society (ACS) and the American Institute of Physics (AIP). Subscriptions, reprints, and supplements are available from ACS, 1155 Sixteenth St., NW, Washington, DC 20056.

Building Science Series—Disseminates technical information developed at the Bureau on building materials, components, systems, and whole structures. The series presents research results, test methods, and performance criteria related to the structural and environmental functions and the durability and safety characteristics of building elements and systems.

Technical Notes—Studies or reports which are complete in themselves but restrictive in their treatment of a subject. Analogous to monographs but not so comprehensive in scope or definitive in treatment of the subject area. Often serve as a vehicle for final reports of work performed at NBS under the sponsorship of other government agencies.

Voluntary Product Standards—Developed under procedures published by the Department of Commerce in Part 10, Title 15, of the Code of Federal Regulations. The standards establish nationally recognized requirements for products, and provide all concerned interests with a basis for common understanding of the characteristics of the products. NBS administers this program as a supplement to the activities of the private sector standardizing organizations.

Consumer Information Series—Practical information, based on NBS research and experience, covering areas of interest to the consumer. Easily understandable language and illustrations provide useful background knowledge for shopping in today's technological marketplace.

Order the above NBS publications from: Superintendent of Documents, Government Printing Office, Washington, DC 20402.

Order the following NBS publications—FIPS and NBSIR's—from the National Technical Information Service, Springfield, VA 22161.

Federal Information Processing Standards Publications (FIPS PUB)—Publications in this series collectively constitute the Federal Information Processing Standards Register. The Register serves as the official source of information in the Federal Government regarding standards issued by NBS pursuant to the Federal Property and Administrative Services Act of 1949 as amended, Public Law 89-306 (79 Stat. 1127), and as implemented by Executive Order 11717 (38 FR 12315, dated May 11, 1973) and Part 6 of Title 15 CFR (Code of Federal Regulations).

NBS Interagency Reports (NBSIR)—A special series of interim or final reports on work performed by NBS for outside sponsors (both government and non-government). In general, initial distribution is handled by the sponsor; public distribution is by the National Technical Information Service, Springfield, VA 22161, in paper copy or microfiche form.

U.S. Department of Commerce
National Bureau of Standards
Gaithersburg, MD 20899

Official Business
Penalty for Private Use \$300