NISTIR 5240

MEASUREMENT OF ROOM CONDITIONS AND RESPONSE OF SPRINKLERS AND SMOKE DETECTORS DURING A SIMULATED TWO-BED HOSPITAL PATIENT ROOM FIRE

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ABSTRACT

A series of experiments are reported in which a wood crib was burned within a simulated two bed hospital patient room in order to measure the activation times of various types of quick and standard response sprinklers and ionization and photoelectric smoke detectors at several locations in the room simulating multiple options for protection of the space. Gas and surface temperatures, heat flux, carbon dioxide, carbon monoxide, and oxygen concentrations were continuously measured in order to access the tenability of the room. Of the parameters measured, temperature was the best indicator of the tenability of the space. Temperature at time of activation of the quick response sprinklers was at or below 77 °C (171 °F) at the five foot level and at or below 48 °C (118 °F) at the three foot level between the patient beds, in all tests with the exception of the shielded fire scenario where temperatures at the five and three foot levels reached 111 °C (232 °F), and 78 °C (172 °F) respectively. An initial detector activation was received between 232-377 seconds prior to activation of the first sprinkler, and 552-722 seconds prior to activation of the QR-EC sidewall sprinkler.

Key words: Sprinklers; fire research; fire tests; sprinkler response; smoke detectors; hospital fires; life safety

1.0 INTRODUCTION

Advances in sprinkler technology have led to the development of quick response (QR) sprinklers which, due to their lower thermal inertia, actuate earlier in the fire growth than standard response sprinklers of the same temperature rating. By initiating earlier fire suppression, quick response sprinklers, when properly applied, can reduce the quantity of heat and combustion products generated, thus offering the potential for providing both life safety and property protection.

The National Institute of Standards and Technology (NIST), formally the National Bureau of Standards, performed studies of sprinklered patient room fires in the late 1970's as part of a five year life safety/fire safety research program.[1,2] Some of the experiments simulated a link with lower thermal inertia than existed commercially for sprinklers at that time.[1] The results showed that the amount of smoke and other products of combustion was greatly reduced by means of the low thermal inertia sprinkler. More recent studies utilized quick response sprinklers in office configurations [3] and hotels.[4] These experiments showed that quick response sprinklers can substantially improve life safety and property protection in these occupancies as well.

In occupancies such as hospitals, where the patient may be non-ambulatory, rapid fire detection and suppression may be able to suppress fire growth sufficiently to maintain survivable conditions even in the room in which the fire originated. Options for protection of a hospital patient room include the use of conventional sprinklers, quick response sprinklers, smoke detectors, or a combination of sprinklers and smoke detectors. Requirements for installation of sprinklers and/or smoke detectors in these facilities are being considered within the National Fire Protection Association (NFPA) standards development process. The Life Safety Code, NFPA 101 [5], currently requires automatic sprinkler protection utilizing quick response sprinklers for patient sleeping rooms of new health care occupancies. Automatic sprinkler protection is also required in some existing health care occupancies depending of the type of building construction and the number of floors in the building. In these cases, either standard or quick response sprinklers are acceptable. [5]

The National Institutes of Health (NIH) has expressed a need to develop criteria which ensure adequate, cost effective fire protection for hospital patient rooms. The Building and Fire Research Laboratory (BFRL) of NIST under the sponsorship of NIH conducted a series of experiments in a full-scale simulated two-bed hospital patient room. The experiments provided information for evaluating the effectiveness of automatic sprinklers and smoke detectors in response to a nominally 60 kW flaming fire. Smoldering fires were not included in this study, as these have been addressed in previous work.[6] A data bank of measured fire conditions and activation times of various automatic sprinklers and smoke detectors at several locations within the room was generated. The tests addressed the type and location of sprinkler heads in the hospital patient room, demonstrated the effect of privacy curtains around the beds, the effect of the door opening position, and the effect of a shielded fire.

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[1] To simulate the rapid response, the gas temperature near the sprinkler was continuously monitored during the fire test. The sprinkler valve was opened at 10 s after the time the center ceiling gas temperature reached the operating temperature of the sprinkler.

This research effort was expanded in scope beyond the original study of sprinkler response through the cooperation of Simplex Time Recorder Co. who, on behalf of the detector industry, provided for the measured smoke detector performance in these hospital patient room fires.

2.0 EXPERIMENTAL FACILITY

A typical two-bed hospital patient room at the National Institutes of Health (NIH) hospital was selected with the assistance of the NIH fire protection staff as a model for this study. The simulated room constructed at NIST maintained the major features and dimensions of the NIH room. The simulated room included the primary patient area, as well as an entrance way and a bathroom.

A plan view of the room and corridor is shown in figure 1. The room and corridor were fabricated using 92 mm (3-5/8 in) 25 gauge steel wall studs, and 152 mm (6 in) 25 gauge steel ceiling joists. The walls and ceiling were 16 mm (5/8 in) fire rated drywall, covered with a layer of 13 mm (1/2 in) non-combustible calcium silicate board, in place of the paper-covered gypsum board used in the hospital. This fully non-combustible board allowed the use of the simulated patient room for repeated fire tests.

An opening in the ceiling 1.03 m (40 1/2 in) wide at the north end of the corridor was provided to allow smoke and products of combustion to vent to a plenum. The plenum volume was sufficient to prevent buildup of combustion products in the corridor outside the patient room door, thereby simulating a much longer corridor than constructed.

A 47.0 ℓ/s (100 cfm) ceiling exhaust fan was installed in the bathroom as shown in figure 1. Fresh air was drawn through a 0.15 m (6 in) diameter pipe penetrating the west wall of the patient room. The air in-flow was diffused by a 0.28 m (11 in) high x 0.24 m (9-1/2 in) wide flat plate downstream of the pipe outlet, 9.5 mm (3/8 in) from the wall. Patient beds were simulated using bed frames provided by NIH with a 13 mm (1/2 in) non-combustible calcium silicate board used in place of mattress and bedding.

A privacy curtain was installed in the primary patient area of the hospital room midway between the two patient beds. A picture of the privacy curtain is shown in figure 2. The privacy curtain was made of a woven polyester, and was a solid fabric curtain with 48 cm (19 in) of mesh at the top. Each mesh rectangle measured 0.95 x 0.6 cm (3/8 x 1/4 in) The privacy curtain was hung from a metal track attached to the ceiling using plastic hooks. This installation is in accordance with NFPA 13, Standard for the Installation of Sprinkler Systems.[7] When the privacy curtain was drawn between the beds, it separated thermocouple tree TR1, and sprinkler S3, the quick response pendent on the ceiling in the center of the room, from the crib fire.

2.1 Automatic Sprinklers

In accordance with NFPA 13, there are a number of options for the type and location of sprinklers which may be used in a hospital patient room. Sprinkler location is a function of the type of sprinkler used and the size of the area to be protected. In consultation with the sponsor and an ad hoc advisory committee, six options utilizing quick response sprinklers were selected for inclusion in this study. These options are as follows, with the locations of the automatic sprinklers shown in figure 3:

1) two quick response pendent sprinklers on the ceiling, one above the foot of each patient bed at locations S2 and S4;

2) one quick response extended coverage (QR-EC) pendent sprinkler on the ceiling in the center of the room at location S3;

3) two quick response sidewall sprinklers on the south wall, one over the head of each patient bed at locations S11 and S12;

4) two quick response sidewall sprinklers on the north wall, one across from the foot of each patient bed at locations S5 and S7;

5) one quick response extended coverage sidewall sprinkler on the east wall furthest from the fire at location S1;

6) two concealed quick response pendent sprinklers on the ceiling, one above the foot of each patient bed, at locations S9 and S10.

In addition, two standard response sprinklers were installed to obtain information about relative sprinkler response times.

1) one standard response pendent sprinkler on the ceiling, above the foot of patient bed #1, at location S8;

2) one standard response sidewall sprinkler on the north wall, across from the foot of patient bed #2, at location S6.

All sprinklers were installed in accordance with NFPA 13 and the listing information provided by the manufacturer. Pendent sprinklers were installed so that the distance from the sprinkler deflector to the ceiling was 5 cm (2 in), except for the concealed pendents whose assemblies were mounted flush with the ceiling. All sidewall sprinklers were installed with the deflector 15 cm (6 in) down from the ceiling and approximately 5 cm (2 in) out from the wall.

Sprinklers were 1.27 cm (1/2 in) orifice sprinklers with a K factor of 0.79 $(\ell/\text{min/kPa})^{1/2}$ (5.5 $(\text{gpm/psi})^{1/2}$). All sprinklers utilized frangible glass bulbs for sensing elements and, with the exception of the concealed quick response sprinklers, had operating temperatures of 68 °C (155 °F). The quick response and extended coverage sprinklers had 2.8 mm (0.11 in) diameter bulbs with a response time index (RTI) of 39 $m^{1/2} \cdot s^{1/2}$ (70 $ft^{1/2} \cdot s^{1/2}$). The standard response sprinklers had 8.0 mm (0.31 in) diameter bulbs with an RTI of 167 $m^{1/2} \cdot s^{1/2}$ (300 $ft^{1/2} \cdot s^{1/2}$). The extended coverage sidewall was a QR-EC sidewall sprinkler equipped with a fast response link and was Underwriters Laboratories (UL) listed as a quick response sprinkler.

Concealed sprinklers were recessed into the ceiling and concealed by a flat cover plate. The model used in the test series has a 57 °C (135 °F), 3.0 mm diameter glass bulb in a standard style sprinkler frame with a drop down deflector. The cover plate is attached to the skirt using 57 °C (135 °F) temperature solder. When the ceiling temperature rises, the solder holding the cover plate fuses, thus releasing the plate and exposing the sprinkler inside to the hot ceiling flow. The subsequent shattering of the sprinkler bulb opens the waterway and causes the deflector to drop into position to distribute the discharging water. Concealed quick response sprinklers were U.L. listed as quick response sprinklers. The RTI was not available from the manufacturer for these sprinklers.

The scope of this study did not permit a sufficient number of experiments to fully examine all of the sprinkler installation options. In consultation with the sponsor and an ad hoc advisory committee, it was decided that only the extended coverage sidewall sprinkler on the east wall of the patient room furthest from the fire (location S1) would be connected to the water supply. Gas burner tests previously performed in the room indicated that this was the slowest of the quick response sprinklers to activate, and therefore it provided for the greatest buildup of heat and products of combustion in the room prior to the initiation of fire suppression. In each of the tests, the QR-EC sidewall sprinkler was charged with water. The coverage area for the QR-EC sidewall sprinkler was the entire living area of the hospital patient room, 4.57 × 3.53 m (15 × 11.5 ft). The flow to the sprinkler was set at 1.64 ℓ/s (29 gpm) at 191 kPa (27.8 psi) as specified by the manufacturer. Flow was manually controlled using a rotameter and a pressure gauge. The activation time for the QR-EC sidewall sprinkler was determined by the observation of the initiation of water flow.

The activation times of the remaining eleven sprinklers, which were not connected to the water supply, were measured using the air pressure drop in the sprinkler supply lines. Each of the sprinklers was individually piped to an air pressure detection switch. The pressure detection switch for each sprinkler was electrically connected to an elapsed time clock. Prior to the start of an experiment, the piping to each of these sprinklers was pressurized with air at 172 kPa (25 psig). During testing, the activation of a sprinkler connected to an air pressure detection switch resulted in the discharge of the air in the piping and operation of the pressure switch, which stopped the elapsed time clock.

Water application densities for the QR-EC sidewall sprinkler were measured at the fire location (on the load cell), using two collection pans with dimensions of 0.36 by 0.36 m (14 by 14 in). The average water application density in each of the pans was measured with the QR-EC sidewall sprinkler operating at a flow rate of 1.64 ℓ/s (29 gpm) as specified by the manufacturer. Average water application densities at the fire location were 162 mm/s (0.07 gpm/ft^2) without the privacy curtain, and 138 mm/s (0.06 gpm/ft^2) with the privacy curtain drawn between the beds.

2.2 Smoke Detectors

To protect this room in accordance with NFPA 72E, Standard on Automatic Fire Detectors [8], one smoke detector is needed in the room. This detector could have an ionization or a photoelectric sensor and could be located on the ceiling or on a sidewall. If the detector is installed on the ceiling, there must not be less than 100 mm (4 in) between a sidewall and the near edge. If the detector is installed on a sidewall, there must be between 100 mm and 300 mm (4 in and 12 in) from the ceiling to the top of the detector. In consultation with the sponsor and an ad hoc advisory committee, four detector locations were selected for inclusion in this study. These locations are listed below and shown in figure 4.

A) On the south wall between the beds
B) On the east wall furthest from the fire
C) On the ceiling near the room door
D) On the ceiling in the center of the room

At each of the four locations selected for study, a group of detectors were installed. Each group consisted of an ionization detector, a photoelectric detector, and a photoelectric sensor that produced an analog signal. Installation, calibration and test data from smoke detector groups were provided by Simplex Time Recorder Co., on behalf of the detector industry. Groups A and B were mounted on sidewalls below the ceiling; groups C and D were mounted on the ceiling. Odd numbered detectors, D1,

D3, D5, and D7 were photoelectric detectors with a sensitivity of nominally 8.6 percent per meter (2.6 percent per foot). Even numbered detectors, D2, D4, D6, and D8, were ionization detectors with a sensitivity of nominally 3.3 percent per meter (1 percent per foot). DSA, DSB, DSC, and DSD were the photoelectric sensors with a sensitivity of nominally 3.3 percent per meter (1 percent per foot), reporting an analog signal to the fire alarm panel.

2.3 Instrumentation

Thermocouples were installed to measure gas and surface temperatures within the room. Thermocouples, type K chromel-alumel, 28 gauge, were installed as shown in figure 5. One vertical array of ten thermocouples, TR1, was located between the patient beds, close to the head of patient bed number two, with thermocouples located at 0.61, 0.76, 0.91, 1.2, 1.4, 1.5, 1.7, 2.0, 2.3, and 2.4 meters above the floor. A second vertical array of six thermocouples, TR2, was located approximately 1.1 m (3 ft 7 in) from the doorway to the corridor with thermocouples located at 0.46, 0.76, 1.1, 1.4, 1.7, and 2.0 meters above the floor. A thermocouple was placed at each patient head location, at the center of the bed, 0.15 m (6 in) above the surface. At each of the eight sprinkler locations shown in figure 3, a thermocouple and thermocouple attached to a brass disk of known RTI= 58 $(m\text{-}s)^{1/2}$ ($(105\ ft\text{-}s)^{1/2}$), were placed to measure gas temperature at the sprinkler link and to obtain continuous thermal response data from a simulated sprinkler link of known RTI, respectively. A thermocouple was placed at each detector group. Another thermocouple was placed 0.05 m (2 in) below the ceiling in the center of the bathroom, and one thermocouple was placed 0.05 m (2 in) below the ceiling directly over the fire plume. The uncertainty in the thermocouple readings is $\pm$ 2.2 °C. [9]

Continuous measurements for carbon monoxide (CO), carbon dioxide (CO_2), and oxygen (O_2) gas concentrations were made at elevations above the floor of 1.52 m (5 ft) (approximate head height for a person standing in the room), and at 0.91 m (3 ft) (approximate head height for a person lying in bed), between the patient beds as shown in figure 6. At both locations, gas sampling occurred at a rate of approximately 0.04 ℓ/s (5 cfh). The gas samples were drawn to analyzers through 6 mm (1/4 in) copper tubing. Gases were passed through dry ice and desiccant traps to remove condensable vapors and particulate matter before entering CO, CO_2, and O_2 analyzers in series. CO and CO_2 concentrations were measured with non-dispersive IR meters manufactured by Infrared Industries, with a range of 0-2 percent CO, and 0-20 percent CO_2. O_2 concentrations were measured with paramagnetic O_2 meters manufactured by Sybron Taylor with a range of 0-25 percent.[2]

Water-cooled heat flux meters measured the total heat flux to each patient head location. The meter at the patient bed #1, nearest the fire, was installed facing the fire, whereas the heat flux meter at patient bed #2 was installed pointing towards the ceiling, since it was expected that this location would receive a higher flux from the hot layer than from the flames. A radiometer was located between the patient bed furthest from the fire and the bathroom wall, 0.33 m (13 in) above the floor, facing upward to measure radiation only from the ceiling and the hot gas layer. Locations of heat flux meters are shown in figure 6.

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[2] Certain commercial equipment, instruments, or materials are identified in this paper in order to adequately specify the experimental procedure. Such identification does not imply recommendation or endorsement by the National Institute of Standards and Technology, nor does it imply that the materials or equipment identified are necessarily the best available for the purpose.

3.0 FUEL

A wood crib was chosen as the fuel package for the series of flaming fire tests. Wood cribs are used frequently in fire suppression research and standard testing. Cribs provide a challenge to the sprinkler in that they contain both shielded and exposed fuel surfaces.[10,11]

In selecting a fire, it was theorized that there exists a flaming fire size that challenges the tenability of the space, in that it burns for a while allowing the accumulation of smoke and toxic gases before the temperature is sufficient to activate the sprinklers. A large fire would activate the sprinklers rapidly when conditions were less severe in the room, and a small fire would not endanger the room occupants. It was determined through gas burner tests that a 60 kW steady state fire with the door closed posed the greatest challenge to the tenability of the space. An open door case was run to show a comparison, although such a fire probably would not reach untenable conditions in a ventilated room.

Oxygen consumption calorimetry tests in an instrumented hood [12] were used to determine what size wood crib would produce a nominal 60 kW rate of heat release. Before testing, each wood crib was oven dried until the moisture content was between 4 and 5 percent. Heptane, (100 mℓ), with a burning time of approximately 300 seconds, was used to ignite the wood crib. The selected wood crib fuel array is illustrated in figure 7. Each crib used measured 0.61 $\times$ 0.46 $\times$ 0.15 m high (24 $\times$ 18 $\times$ 6 in high), weighed between 7.5 - 8.2 kg (16.5-18 lbs), and was constructed of 38 mm (1-1/2 in) sticks, spaced 38 mm (1-1/2 in) apart. The fuel was chosen to provide a prescribed amount of heat (not smoke) for the sprinkler study.

Cribs were burned on a load cell to obtain mass loss rate data for each test; this data was later used to estimate the rate of heat released from each fire over the course of the test. A value for the heat release rate was calculated by multiplying the mass loss rate by the net heat of combustion of wood, 12 MJ/kg.[13] This assumes that the heat of combustion does not change with the charring of the wood or the heat feedback from the upper layer, which are adequate assumptions for these fires. The heat release rate was similar for all tests, peaking around 90 kW. Heat release rate curves are given in figure 8. The rate of heat release was similar for all fires. In the experiments, most sprinklers operated well before the fire reached its peak heat release rate. Heat release rates from the room fires are compared to a free burn of the wood crib fuel package. A heat release rate curve was not obtained for the shielded fire test.

4.0 TEST SCENARIOS

Test scenarios were selected in consultation with the sponsor and the ad hoc advisory committee. Test scenarios were selected to address the location and type of sprinklers in the hospital patient room, the effect of privacy curtains around the beds, the effect of a shielded fire, the performance of a sidewall sprinkler, and the effect of the room door position on small flaming fires in a hospital patient room. In all four tests, the bathroom door remained fully open. In the closed door tests, there was still a space of 2.0 mm under the door, providing for some leakage.

The four test scenarios are identified as follows:

1) Closed door test

In the first test conducted, the room door remained closed throughout the test duration. The room was protected by an extended coverage sidewall sprinkler installed on the east wall furthest from the wood crib fire at location S1, as shown in figure 3. This test was designed to provide activation orders of the various sprinklers and detectors in terms of location and type, and conditions in the room at time of activation of each sprinkler.

2) Closed door privacy curtain test

In the second test, the room door also remained fully closed throughout the test duration. The privacy curtain midway between the beds was closed. Details of the privacy curtain installation are given above in the experimental facility section. The room was protected by an extended coverage sidewall sprinkler installed on the east wall furthest from the fire at location S1, as shown in figure 3. This test was designed to measure the effect of a privacy curtain on the activation time of the various sprinklers, the ability of the extended coverage sidewall sprinkler to extinguish a fire on the other side of the curtain, and the effect of the privacy curtain on the conditions within the room at time of activation.

3) Open door privacy curtain test

This test set-up replicated that of the previous test, with the same curtain between the beds, except the room door was fully open instead of fully closed. The room was protected by an extended coverage sidewall sprinkler installed on the east wall furthest from the crib fire at location S1 as shown in figure 3. This test was designed to measure the effect of the room door opening position on the activation times of the sprinklers and detectors and on the conditions at activation.

4) Closed door shielded fire test

Test four was conducted with the room door closed. A non-combustible horizontal shield was placed 0.23 m (9 in) above the crib, to measure the effect of the shield on crib suppression and conditions within the room. The shield is pictured in figure 9. The shield was 68 cm (27 in) above floor level, which is 18 cm (7 in) above the top of the crib. It measured 0.76 x 0.91 m (2.5 x 3 ft), and completely covered the top of the crib. The room was protected by an extended coverage sidewall sprinkler installed on the east wall furthest from the crib fire at location S1 as shown in figure 3. The purpose of the closed door shielded fire test was to determine the performance of the sidewall sprinkler in the case where there was no direct water impingement on the burning fuel. The room conditions were measured before and after water flow from the QR-EC sidewall sprinkler.

5.0 TEST DESCRIPTIONS

5.1 Closed door test

Table 1 lists the order of sprinkler and smoke detector actuation and the temperatures measured on thermocouple array TR1, between the patient beds at elevations of 1.5 m (5 ft) and 0.91 m (3 ft) above the floor. Figure 10 shows temperatures in the room measured on the thermocouple array between the patient beds and on the thermocouple array in the patient room entrance way.

The heptane pool fire was ignited between the two sticks furthest from the bed lengthwise and in the center of the crib width wise as shown in figure 7. The ignition location remained the same for all four tests. Test observations show that at the time of alarm of the first detector, an ionization type on the

south wall between the beds, the flame height was 0.15 m (0.5 ft) above the surface of the crib, the heptane was burning but the crib had not yet become involved. The smoke layer was not yet visible.

At the time of activation of the first sprinkler, a QR sidewall over the head of the patient bed closest to the fire, the flame height was 0.60 m (2 ft) above the crib, 1 m (3.3 ft) above the floor. The first four of nine sticks in the crib were fully involved, and the heptane had burned out. The visible smoke layer had not yet reached the position in the room being visually monitored, 1.5 m (5 ft) above the floor.

The visible smoke layer reached 1.5 m (5 ft) above floor level between 380 and 400 seconds after ignition, prior to activation of both the QR-EC sidewall sprinkler, on the east wall near the bathroom, and the first photoelectric smoke detector which activated at 439 seconds.

The QR-EC sidewall sprinkler activated 579 seconds after ignition. The visible smoke layer was 0.36 m (1.2 ft) above floor level at the time of activation of the QR-EC sidewall sprinkler. Two-thirds of the crib was fully involved at this time, the flame height was approximately 0.61 m (2 ft) above the surface of the crib.

Visual test records indicate that water flow from the QR-EC sidewall sprinkler reduced the fire to approximately half its size within the first 20 seconds, and provided full extinguishment of visible flaming of the crib in approximately 120 seconds. The temperature in the room reached a maximum of 133 °C (271 °F), just prior to water flow, measured on thermocouple array TR1, between the beds, at an elevation of 2.3 m (7.5 ft) above the floor. The temperature at 1.5 m (5 ft) above the floor reached 76 °C (169 °F) and the temperature at 0.91 m (3 ft) above the floor reached 40 °C (104 °F) just prior to water flow.

5.2 Closed door privacy curtain test

Table 2 lists the order of sprinkler and smoke detector operation and the temperatures measured on the thermocouple array TR1, between the patient beds at elevations of 0.91 m (3 ft) and 1.5 m (5 ft) above the floor. Figure 11 shows temperatures in the room measured on the thermocouple array between the patient beds and the thermocouple array in the patient room entrance way. With the privacy curtain drawn, thermocouple array TR1, between the beds, was located on the opposite side of the privacy curtain from the fire.

The heptane pool fire was ignited as shown in figure 7. Test observations show that at the time of alarm of the first detector, an ionization type on the south wall between the beds, the flame height was 0.23 m (0.75 ft) above the surface of the crib, 0.74 m (3.2 ft) above floor level. The fire was mostly heptane with a small amount of crib involvement.

At the time of activation of the first sprinkler, a QR sidewall over the head of the patient bed closest to the fire, three sticks of the crib were fully involved, the flame height was 0.61 m (2 ft) above the crib and the heptane had burned out.

At the time of activation of the photoelectric detectors, all of which alarmed within 16 seconds of each other, five sticks of the crib were fully involved. The visible smoke layer had reached the floor just prior, about 570 seconds after ignition.

The QR-EC sidewall sprinkler (S1), activated 762 seconds after ignition, slightly more than 180 seconds after the smoke layer reached the floor. At this time, 6 of the nine crib sticks were fully involved, and the flame height was approximately 0.61 m (2 ft) above the crib surface.

Visual test records indicate that water flow from the QR-EC sidewall sprinkler reduced the fire to approximately half its size within the first 30 seconds, in 210 seconds, the fire was reduced to approximately 10 percent, and in a little over 240 seconds, the sprinkler was able to extinguish the fire. This was about twice the time to extinguishment of visible flame without the privacy curtain. The temperature in the room reached a maximum of 133 °C (271 °F), measured on thermocouple array TR1, between the beds, 2.3 m (7.5 ft) above floor level just prior to water flow. The temperature at 1.5 m (5 ft) above the floor reached 77 °C (171 °F) and the temperature at 0.91 m (3 ft) above the floor reached 48 °C (118 °F) just prior to water flow.

5.3 Open door privacy curtain test

Table 3 lists the order of sprinkler and smoke detector operation and the temperatures measured on the thermocouple array TR1, between the patient beds at elevations of 0.91 m (3 ft) and 1.5 m (5 ft) above the floor. Figure 12 shows temperatures in the room measured on the thermocouple array between the patient beds and the thermocouple array in the patient room entrance way. With the privacy curtain drawn, thermocouple array TR1, between the beds, was located on the opposite side of the privacy curtain as the fire.

The heptane pool fire was ignited as shown in figure 7. Test observations show that at the time of alarm of the first detector, an ionization type on the south wall between the beds, the flame height was 0.38-0.46 m (1.25 - 1.5 ft) above the surface of the crib, 0.88 - 0.97 m (2.9 - 3.2 ft) above floor level. The fire was mostly heptane with very little crib involvement.

At the time of activation of the first sprinkler, a QR sidewall over the head of the patient bed closest to the fire, three sticks of the crib were fully involved, the flame height was 0.68 m (2.25 ft) above the crib and the heptane had burned out. At the time of activation of the first photoelectric detector, on the ceiling in the center of the room, four sticks of the crib were fully involved.

The QR-EC sidewall sprinkler activated 820 seconds after ignition. At this time, six of the nine crib sticks were fully involved, and the flame height was approximately 0.61 m (2 ft) above the crib surface. Visual test records indicate that water flow from the QR-EC sidewall sprinkler reduced the fire to half the visible flame within 210 seconds after the sprinkler activated, the flame was reduced to 10 percent, and in a little over 240 seconds, the sprinkler was able to extinguish the fire. The temperature in the room reached a maximum of 131 °C (268 °F), just prior to water flow, measured on the thermocouple array, TR1 between the beds, 2.3 m (7.5 ft) above floor level. The temperature at 1.5 m (5 ft) above the floor reached 59 °C (138 °F) and the temperature at 0.91 m (3 ft) above the floor reached 31 °C (88 °C) just prior to water flow.

5.4 Closed door shielded fire test

Table 4 lists the order of sprinkler and smoke detector operation and the temperatures measured on the thermocouple array TR1, between the patient beds at elevations of 0.91 m (3 ft) and 1.5 m (5 ft) above the floor. Figure 13 shows the temperatures in the room measured on the thermocouple array between the patient beds and the thermocouple array in the patient room entrance way.

The heptane pool fire was ignited as shown in figure 7. The flame reached the top of the shield in under 10 seconds, and started to extend out and around the shield in approximately 90 seconds. At the time of activation of the first smoke detector, an ionization type on the south wall between the beds, the fire was mostly heptane. At this time the visible smoke layer had not yet reached the position in the room being visually monitored, 1.5 m (5 ft) above the floor.

At the time of activation of the first sprinkler, a QR sidewall over the head of the patient bed closest to the fire, the heptane had burned out, the first four of the nine sticks were fully involved. The visible smoke layer was just above the position in the room being visually monitored, 1.5 m (5 ft) above the floor.

The smoke layer reached the 1.5 m (5 ft) position at 390 seconds, and by 450 seconds, the visible smoke reached the top of the foot boards on the beds, 0.76 m (2.5 ft) above the floor. At approximately 480 seconds from ignition, the smoke layer had reached the bottom of the foot boards, 0.36 m (1.2 ft) off the floor, and by 570 seconds the smoke layer reached the floor.

The QR-EC sidewall sprinkler (S1), activated 700 seconds after ignition. At this time, the smoke layer had dropped to the floor level. The flame height at this time was 0.61 m (2 ft) above the surface of the crib which was fully involved. The heptane had burned out 300 seconds after ignition.

Visual test records indicate that water flow from the QR-EC sidewall sprinkler reduced the fire to approximately half its size, the QR-EC sidewall sprinkler, however, was not able to extinguish the fire. Sprinkler flow was allowed to continue for 1260 seconds after activation and then the fire was manually extinguished. The temperature in the room reached a maximum of 135 °C (275 °F) just prior to water flow, measured on thermocouple array TR1 between the patient beds, 2.3 m (7.5 ft) above the floor. The temperature at 1.5 m (5 ft) above the floor reached 111 °C (232 °F) and the temperature at 0.91 m (3 ft) above the floor reached 78 °C (172 °F) just prior to water flow.

6.0 RESULTS AND DISCUSSION

Temperature, heat flux, carbon dioxide, carbon monoxide, and oxygen concentrations were continuously measured in order to assess tenability of the hospital patient room. Temperature at head height for a person standing in the room (1.5 m), and for a person lying in bed (0.91 m) are discussed relative to the activation times of each device. A discussion of the gas concentrations and heat flux follows. Gas concentrations are presented in terms of maximum values reached prior to sprinkler activation and after water flow from the extended coverage sidewall sprinkler. Heat flux is examined in terms of maximum values achieved at time of activation. Overall tenability of the room, in terms of each sprinkler is then evaluated with TENAB, a subroutine of HAZARD I.[14] Time/temperature data at the sprinkler location from preignition to completion of the test is reported in the Appendix. Numbering of thermocouples and disks at sprinkler locations follows that of figure 5.

6.1 General observations

1) In all cases except the completely shielded fire, the QR-EC sidewall sprinkler was able to extinguish the fire. In the closed door test, the sprinkler was able to completely extinguish the fire in approximately 120 seconds, in each of the privacy curtain tests, extinguishment of visible flame was achieved in a little over 240 seconds. In the shielded fire scenario, the sprinkler was not able to extinguish the fire. The fire was manually extinguished 1260 seconds after the initiation of water flow from the sprinkler.

2) The ionization detectors in all locations responded well in advance of any of the automatic sprinklers. The initial detector activation was received between 232-377 seconds prior to activation of the first sprinkler, and 552-722 seconds prior to activation of the QR-EC sidewall sprinkler.

3) Concealed quick response sprinklers (S9,S10), UL listed as quick response sprinklers, took between 55 and 158 seconds longer to operate than their quick response counterparts (S2, S4). Concealed sprinklers took between 60 to 90 seconds to operate after the release of the cover plate from the sprinkler assembly.

4) Concealed quick response sprinkler, S10, operated between 8 and 99 seconds in advance of the standard response sprinkler 0.1 m away (S8), except in the case of the shielded fire test, where sprinkler S8 responded 16 seconds in advance of sprinkler S10.

5) The standard response pendent sprinkler (S8), operated in advance of the QR-EC sidewall sprinkler (S1) in all fire tests.

6) In these tests, photoelectric detectors responded much slower than the ionization detectors, and in some cases, one or more quick response sprinklers activated prior to response of any of the photoelectric detectors.

7) Oxygen concentrations did not drop below 19%, carbon dioxide concentrations did not go above 2%, and carbon monoxide concentrations did not exceed 500 ppm.

8) Temperature at time of activation of the quick response sprinklers was at or below 77 °C (171 °F) at the five foot level and below 48 °C (118 °F) at the three foot level between the patient beds, in all tests with the exception of the shielded fire scenario where temperatures at the five and three foot levels reached 111 °C (232 °F), and 78 °C (172 °F) respectively.

6.2 Time and Temperature at Time of Activation

6.2.1 Quick response sprinklers

Test results show that the first sprinkler to operate was always S12, the quick response (QR) sidewall sprinkler on the south wall, over the head of the patient bed closest to the fire (figure 3). The QR-EC sidewall sprinkler, S1, on the east wall at the far end of the room furthest from the flaming wood crib fire, was in all four tests the slowest of the quick response sprinklers to operate. In all four tests, the QR-EC sidewall sprinkler at location S1 operated after the standard pendent at S8 above the foot of patient bed number one. S6, the standard sidewall, across the foot of patient bed #2, did not activate prior to water flow from the QR-EC sidewall, except in the shielded fire test.

For most of the quick response sprinklers tested the temperature at the 1.5 m (5 ft) elevation at the time of activation of the sprinkler did not exceed 77 °C (171 °F), and did not exceed 48 °C (118 °F) at the 0.91 m (3 ft) elevation. The only exception to this was in the shielded fire test, where the temperature at the time of activation of the QR-EC sidewall sprinkler was 111 °C (232 °F) at the 1.5 m (5 ft) elevation, and 78 °C (172 °F) at the 0.91 m (3 ft) elevation.

6.2.2 Concealed quick response sprinklers

Table 5 shows the comparison of response times between the standard response pendant at location S8, and the concealed quick response sprinkler at location S10. It also shows the difference in response times between the concealed quick response sprinklers at locations S10 and S9, and their quick response exposed sprinklers at locations S4 and S2. In general, the concealed quick response sprinklers took between 55 seconds and 158 seconds longer to operate in response to this fire than their quick response counterparts. In the open door privacy curtain test, however, the concealed quick response sprinkler at location S10 operated 23 seconds faster than its quick response counterpart at location S4. This can be attributed to the fact that the concealed quick response sprinklers have operating temperatures of 57 °C (135 °F) for each the bulb and cover plate solder, whereas both the quick response pendent and the standard response pendent have operating temperatures of 68 °C (155 °F). In the open door scenario where there is a slower build-up of temperature in the room than in the closed door test, the sprinkler link has time to heat to 57 °C after the cover plate drops off before the QR link heats to 68 °C. The concealed quick response pendent sprinkler at S10 operated between 8 and 99 seconds in advance of its standard response counterpart at S8. An exception to this can be seen in the shielded fire test, where the standard response sprinkler activated 16 seconds in advance of the concealed quick response pendent 0.10 m (4 in) away. The concealed quick response sprinklers in the closed door tests took approximately 60 seconds to operate after their cover plates dropped off, this time increased to approximately 90 seconds in the open door test.

The largest difference in temperature at the time of activation of the concealed quick response sprinklers compared to their quick response counterparts occurred in the closed door test. The 1.5 m (5 ft) temperature at the time of activation of the concealed quick response sprinkler at location S10 was 64 °C (146 °F) compared to 49 °C (121 °F) at the time of activation of the quick response sprinkler at location S4. The corresponding 0.91 m (3 ft) temperatures were 35 °C (95 °F) and 29 °C (84 °F) respectively. At the time of activation of the concealed quick response sprinkler at location S9, the 1.5 m (5 ft) temperature was 75 °C (168 °F) compared to 53 °C (128 °F) at the time of activation of S2 its quick response counterpart. The corresponding 0.91 m (3 ft) temperatures were 40 °C (103 °F) and 31 °C (88 °F) respectively as can be seen in table 1.

6.2.3 Standard response sprinklers

The standard response pendent sprinkler at S8 operated 76 to 142 seconds slower than its quick response counterpart at S4, and 8 to 99 seconds slower than it's concealed quick response counterpart at S10 as shown in table 5. It is interesting to note that in all four tests, the standard pendent at S8 responded prior to the QR-EC sidewall sprinkler at S1. In all but the shielded fire test, the standard response sidewall sprinkler (S6) on the north wall across from the foot of the patient bed furthest from the fire, did not activate during the test due to cooling by water flow from the prior activating QR-EC sidewall sprinkler on the east wall at S1.

The standard pendent at location S8 operated after its quick response and concealed quick response counterparts, sprinklers S4 and S10 respectively in all except the shielded fire test. The greatest difference in temperature occurred in the closed door test. The temperature at the 1.5 m (5 ft) level at the time of activation of the standard response sprinkler at location S8 was 70 °C (158 °F) compared to

49 °C (120 °F) at the time of activation of S4, it's quick response counterpart. The corresponding 0.91 m (3 ft) temperatures were 39 °C (102 °F) and 29 °C (84 °F) respectively as can be seen in table 1.

6.2.4 Ionization Detectors

Data for smoke detector/sensor response presented in tables 1-4 showed that in all of the fire tests, the ionization detectors in all locations responded in advance of any of the automatic sprinklers. The initial detector activation was received between 232-377 seconds prior to activation of the first sprinkler, and 552-722 seconds prior to activation of the QR-EC sidewall sprinkler. The first detector to respond was the ionization detector at Group A, located on the south wall between the beds. This was followed by the ionization detector at Group D, located on the ceiling in the center of the room. This sequence remained the same for all tests. There was a 77 to 130 second time span from the time of activation of the first ionization detector to the time of activation of the fourth ionization detector.

Temperature at the time of activation of the ionization smoke detectors was at or below 34 °C (93 °F) at the 1.5 m (5 ft) elevation and at or below 29 °C (84 °F) at the 0.91 m (3 ft) elevation for all four detector locations tested in all four fire tests. The temperature of the gas stream in the detector area at the time of activation of the ionization detectors was only 3 °C - 7 °C above ambient temperature, which was 22 °C.

6.2.5 Photoelectric Detectors/Sensors

The photoelectric detectors/sensors were slower to respond than the ionization detectors, and did not in all cases actuate in advance of the quick response sprinklers. This is in part due to the ignition source/fuel type. Heptane was used to ignite the wood crib which was chosen to provide a prescribed amount of heat not smoke. The first photoelectric detector to respond was, in two out of the four tests, D7, on the ceiling in the center of the room. In each of the four tests, there was between 16 to 56 seconds between the time to alarm of the first photoelectric detector and the time to alarm of the fourth photoelectric detector.

Temperature at the 1.5 m (5 ft) elevation at time of activation of the photoelectric detectors ranged from 32 °C (89 °F), at the time of activation of D7, on the ceiling in the center of the room, during the open door, sprinkler protection privacy curtain test, to 56 °C (133 °F), at the time of activation of D5, on the ceiling, near room door during the closed door test. Temperatures at the 0.91 m (3 ft) elevation at the time of activation of the photoelectric detectors ranged from 27 °C (81 F°), at the time of activation of all four photoelectric detectors in the open door privacy curtain test, to 40 °C (104 °F) at the time of activation of D5, on the ceiling, near the room door, during the shielded fire test.

6.3 Gas Concentrations

Continuous measurements of oxygen, carbon monoxide, and carbon dioxide were taken at the 1.5 m (5 ft) and 0.91 m (3 ft) elevations between the patient beds as shown in figure 6. Concentrations of oxygen and carbon dioxide followed the expected trends, with the carbon dioxide concentration increasing in relationship to the decrease in oxygen concentration. Oxygen concentration remained greater than 19 percent in all of the fire tests, and the carbon dioxide concentrations reached a maximum of two percent. Carbon dioxide and carbon monoxide concentrations are reported in table 6, before and after sprinkler activation. Carbon monoxide levels were at the baseline, within the measurable uncertainty of the gas

meters which is less than 100 ppm, for the closed door test, and the closed door privacy curtain test. In the open door privacy curtain test, CO reached a maximum of 100 ppm before water flow and a maximum of 400 ppm just after water flow from the QR-EC sidewall sprinkler. In the closed door shielded fire test, CO levels reached a maximum of 400 ppm before water flow and a maximum of 500 ppm after water flow from the QR-EC sidewall sprinkler.

6.4 Heat Flux

Measured heat flux at each patient location is presented in table 6. The fluxes reported for the patient beds are total flux, radiation and convection. The flux meter over patient bed #1 was installed facing the fire, whereas the flux meter placed over patient bed #2, was installed facing the ceiling. Flux is specific to the location relative to the fire. The total flux measured at patient bed #2, facing the ceiling, is lower for the open door test than the closed door tests, as there is little development of a hot layer in the open door case. Heat flux is somewhat a function of the fuel. The radiation measurement from the ceiling hot gas layer was 0.1 kW/m^2 for the closed door tests. No ceiling radiation was measured for the open door test.

6.5 Tenability, HAZARD I, and the N-Gas model

The tenability of the room can be determined from the above presented data in terms of which sprinklers actuated before the patient's life was threatened. To determine this, one must know the effect of temperature, heat flux, and gas concentration on the patient.

In 1989, the Center for Fire Research at the National Institute of Standards and Technology released HAZARD I, a method for quantifying the hazards to occupants of buildings from fires. HAZARD I uses a sequence of computer software procedures to calculate the development of hazardous conditions over time, to calculate the time needed by building occupants to escape under those conditions, and to estimate the resulting loss of life based on assumed occupant behavior and tenability criteria. The module of HAZARD I which calculates the impact of exposure to the occupants is called TENAB.

Years of research and review of current literature went into determining the tenability criteria for TENAB. This report does not review that literature. However, a summary of previous research into tenability criteria, an extensive list of references, and the basis for the threshold values used and the derivation of the equations on which the toxicity calculation is based, are provided in the technical reference volume in the chapter on tenability limits.[14] In TENAB, lethality is determined from temperature and toxicity, along with potential incapacitation from burns due to radiant heat exposure.

In HAZARD I, death from temperature exposure is taken to occur at 100 °C. Heat flux is not a lethality condition. The fractional exposure dose (FED), a toxicity parameter, is introduced. The FED represents the fraction of the lethal concentration that an individual has been exposed to over time. The FED parameter combines the effects and interactions of the gases CO, CO_2, and HCN, along with the effect of diminished oxygen. The model on which the FED calculation is based is referred to as the N-Gas model. The FED parameter is calculated as a function of the average concentrations of carbon monoxide, carbon dioxide, and oxygen over the time interval of exposure. Incapacitation of a human being is taken to occur when the FED parameter equals 0.5, and death is taken to occur when the FED parameter equals 1.0. The uncertainty in the FED values determined from animal experiments range from no deaths observed at FED values below 0.9, to death of all animals exposed at FED values greater than 1.3.

FED values calculated with TENAB are zero for all tests in this series. This means that TENAB does not predict any deaths due to toxicity for these room fires. This is due to the fact that the measured concentration of carbon monoxide is less than 1700 ppm, which is the threshold value. The carbon dioxide term is a "correction" to the carbon monoxide term, and becomes zero when the carbon monoxide term is zero. In TENAB, the oxygen concentration must drop below 9.2 percent to affect the breathing of the patient.

The temperature criterion for death, 100 °C, is exceeded only in the shielded fire test. In this test, the temperature criterion is exceeded at the 1.52 m (5 ft) level, by the sprinkler at location S6, the standard sidewall across the foot of bed #2, and the sprinkler at location S1, the EC sidewall on the east wall near the bathroom. At these sprinkler locations, the temperature reaches 108 °C, and 111 °C, respectively. Temperatures at the 0.91 m (3 ft) level at these sprinkler locations remained below 100 °C, at 75 °C and 78 °C, respectively.

7.0 CONCLUSION

Sprinklers in all locations tested actuated before the patient's life would be threatened by this nominally 60 kW fire for the closed door, closed door privacy curtain, and open door privacy curtain tests. However, in the shielded fire test, the sprinklers at locations S6 and S1, the standard sidewall across from the foot of patient bed #2, and the EC sidewall, on the east wall near the bathroom, respectively, activated after the life safety criterion in HAZARD I with regard to temperature was exceeded. Ionization and photoelectric detectors in all locations alarmed before the patient's life would be threatened for all fire test scenarios conducted.

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Table 1 - Activation times, Closed door test

Device Number	Description	Activation Time min: s	Activation Time s	1.5 m (5 ft) Elevation Between Beds Temp °C	0.91 m (3 ft) Elevation Between Beds Temp °C
D2	ion, south wall, between beds	0:27	27	22	22
D6	ion, ceiling, center of room	0:36	36	22	22
D4	ion, east wall, bathroom	2:13	133	24	22
D6	ion, ceiling, near room door	2:37	157	25	23
S12	QR sidewall, overhead bed #1	5:58	358	38	26
S4	QR pendent, above foot bed #1	7:02	422	49	29
S11	QR sidewall, overhead bed #2	7:11	439	50	29
D7	photo, ceiling, center of room	7:40	439	52	30
DSC	photo sensor, ceiling, near room door	7:20	440	52	30
S3	QR-EC pendent, center of room	7:20	449	52	30
D3	photo, east wall, bathroom	7:21	441	53	31
S2	QR pendent, above foot bed #2	7:29	449	53	31
DSD	photo sensor, ceiling, center of room	7:33	453	54	31
DSB	photo sensor, east wall, bathroom	7:37	457	55	31
D5	photo, ceiling, near room door	7:40	460	56	31
S5	QR sidewall, across foot bed #1	8:27	507	63	35
S10	QR concealed pendent, above foot bed #1	8:28	508	64	35
S7	QR sidewall, across foot bed #2	8:59	539	49	37
S8	standard pendent, above foot bed #1	9:09	539	70	39
S9	QR concealed pendent, above foot bed #2	9:22	562	75	40
S1	QR-EC sidewall, east wall, bathroom	9:39	579	76	40
S6	standard sidewall, across foot bed #2	–	–	–	–
D1 n/a	photo, south wall, between beds	–	–	–	–
DSA	photo sensor, south wall, between beds	–	–	–	–

Table 2 - Activation times, Closed door privacy curtain test

Device Number	Description	Activation Time min: s	Activation Time s	1.5 m (5 ft) Elevation Between Beds Temp °C	0.91 m (3 ft) Elevation Between Beds Temp °C
D2	ion, south wall, between beds	0:40	40	25	25
D8	ion, ceiling, center of room	2:03	123	27	25
D4	ion, east wall, bathroom	2:05	125	27	25
D6	ion, ceiling, near room door	2:44	164	28	25
S12	QR sidewall, overhead bed #1	6:57	619	42	30
D5	photo, ceiling, near room door	9:29	569	54	31
S11	QR sidewall, overhead bed #2	9:35	570	54	32
D7	photo, ceiling, center of room	9:35	575	54	35
D4	photo, east wall, bathroom	9:41	581	54	36
D1	photo, south wall, between beds	9:45	585	68	36
S4	QR pendent, above foot bed #1	10:19	619	58	37
DSD	photo sensor, ceiling, center of room	10:33	633	58	38
DSC	photo sensor, ceiling, near room door	10:48	648	61	39
S5	QR sidewall, across foot bed #1	10:50	695	61	39
DSA	photo sensor, south wall, between beds	10:52	652	61	39
S3	QR-EC pendent, center of room	10:59	659	62	40
DSB	photo sensor, east wall, bathroom	11:05	665	63	40
S2	QR pendent, above foot bed #2	11:12	672	63	40
S10	QR concealed pendent, above foot bed #1	11:27	687	67	41
S7	QR sidewall across foot bed #2	11:34	694	67	41
S8	standard pendent, above foot bed #1	11:35	695	68	41
S9	QR concealed pendent, above foot bed #2	12:33	753	77	48
S1	QR-EC sidewall, east wall, bathroom	12:42	762	77	48
S6 n/a	standard sidewall, across foot bed #2	–	–	–	–

Table 3 - Activation times, Open door privacy curtain test

Device Number	Description	Activation Time min: s	Activation Time s	1.5 m (5 ft) Elevation Between Beds Temp °C	0.91 m (3 ft) Elevation Between Beds Temp °C
D2	ion, south wall, between beds	1:57	117	27	26
D8	ion, ceiling, center of room	2:19	139	27	26
D3	ion, east wall, bathroom	2:24	144	28	26
D6	ion, ceiling, near room door	3:14	194	28	26
S12	QR sidewall, overhead bed #1	5:49	349	31	27
D7	photo, ceiling, center of room	6:53	413	32	27
D1	photo, south wall, between beds	7:01	421	32	27
DSA	photo sensor, south wall, between beds	7:18	438	32	29
DSD	photo sensor, ceiling, center of room	7:22	442	32	27
D8	photo, ceiling, near room door	7:25	445	32	27
DSB	photo sensor, east wall, bathroom	7:27	447	33	27
D3	photo, east wall, bathroom	7:49	469	33	27
DSC	photo sensor, ceiling, near room door	8:02	482	34	27
S10	QR concealed pendent, above foot bed #1	8:17	497	35	28
S4	QR pendent, above foot bed #1	8:49	520	35	28
S11	QR sidewall, overhead bed #2	9:03	543	36	28
S4	QR-EC pendent, center of room	9:17	557	35	28
S2	QR pendent, above foot bed #2	9:49	596	33	28
S8	standard pendent, above foot bed #1	9:56	596	37	39
S7	QR sidewall, across foot bed #2	10:32	632	39	29
S5	QR sidewall, across foot bed #1	10:34	634	39	29
S9	QR concealed pendent, above foot bed #2	10:56	656	41	29
S1	QR-EC sidewall, east wall, bathroom	13.40	820	59	31
S6 n/a	standard sidewall, across foot bed #2	–	–	–	–

Table 4 - Activation times, Closed door shielded fire test

Device Number	Description	Activation Time min: s	Activation Time s	1.5 m 5(ft) Elevation Between Beds Temp °C	0.91 m (3 ft) Elevation Between Beds Temp °C
D2	ion, south wall, between beds	1:07	67	29	29
D3	ion, ceiling, center of room	1:39	99	31	27
D3	ion, east wall, bathroom	2:20	140	30	27
D6	ion, ceiling, near room door	2:47	167	34	27
D1	photo, south wall, between beds	5:01	301	42	33
D7	photo ceiling, center of room	5:15	315	46	34
DSA	photo sensor, south wall, between beds	5:16	316	47	34
DSD	photo sensor, ceiling, center of room	5:20	320	48	34
DSB	photo sensor, east wall, bathroom	5:20	320	48	34
D3	photo, east wall, bathroom	5:23	323	38	34
D5	photo, ceiling, near room door	5:53	353	53	40
DSC	photo sensor, ceiling, near room door	6:00	360	51	38
S12	QR sidewall, overhead bed #1	6:06	366	53	38
S4	QR pendent, above foot bed #1	6:18	378	57	38
S4	QR-EC pendent, center of room	8:15	495	53	53
S8	standard pendent, above foot bed #1	6:00	520	72	59
S7	QR sidewall, across foot bed #2	8:44	524	71	54
S10	QR concealed pendent, above foot bed #1	8:56	536	72	58
S11	QR sidewall, overhead bed #2	8:56	548	72	58
S2	QR pendent, above foot bed #2	9:04	544	74	59
S5	QR sidewall, across foot bed #1	9:08	548	47	59
S9	QR concealed pendent, above foot bed #2	9:59	599	89	66
S6	standard sidewall, across foot bed #2	11:15	675	108	75
S1 n/a	QR-EC sidewall, east wall, bathroom	11:40	700	111	78

Table 5. Comparison of response time: Concealed quick response, quick response, and standard response sprinklers

	Δ Response time (s)			
	Std-QR S8-S4	Std-CQR S8-S10	CQR-QR S10-S4	CQR-QR S9-S2
Closed door test	127	41	68	113
Closed door privacy curtain test	76	8	68	81
Open door privacy curtain test	76	68	-23 *	67
Closed door shielded fire test	142	-16	158	55

QR = quick response
CQR = concealed quick response
Std = standard response

* - a negative number indicates that the first listed sprinkler activated first

Table 6. Summary of test results: Gas sampling and heat flux data

	Gas Sampling Data				Heat Flux Data	
	% CO_2 max		CO, ppm max		Bed 1 total flux	Bed 2 total flux
	prior to spkr activation (after activation)				kW/m^2	kW/m^2
	1.5 m	0.91 m	1.5 m	0.91 m		
Closed door test	0.64% (0.57%)	0.64% (1.37%)	0.0 ppm (100 ppm)	0.0 ppm (200 ppm)	2.3	0.4
Closed door privacy curtain test	1.40% (1.12%)	0.36% (0.56%)	100 ppm (200 ppm)	0.0 ppm (0.0 ppm)	2.3	0.5
Open door privacy curtain test	0.55% (0.65%)	0.33% (1.0%)	100 ppm (400 ppm)	0.0 ppm (200 ppm)	3.9	0.1
Closed door shielded fire test	1.93%	1.2%	400 ppm (500 ppm)	0.0 ppm (200 ppm)	2.8	1.0

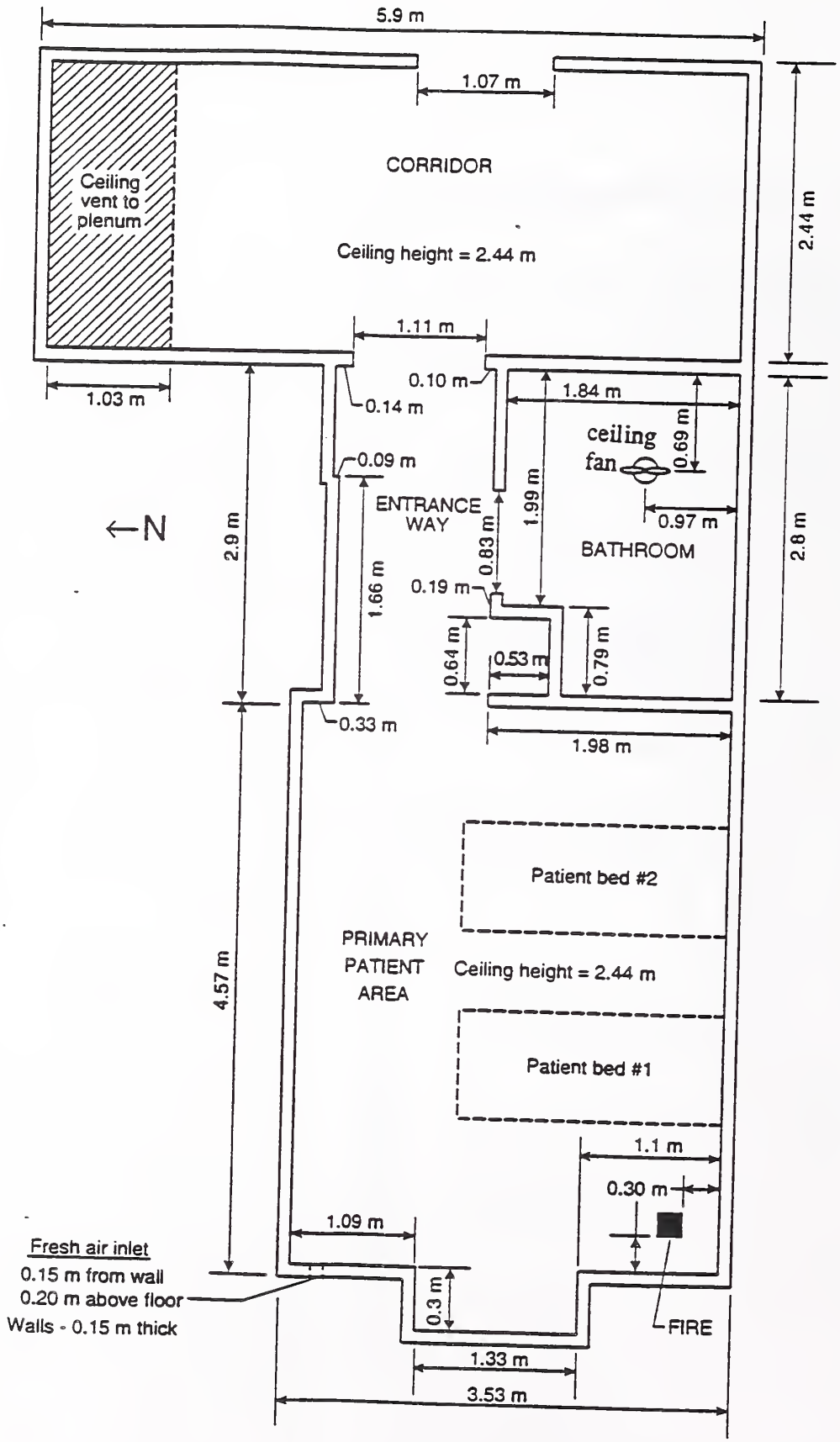

Figure 1. Plan view of simulated hospital patient room and corridor

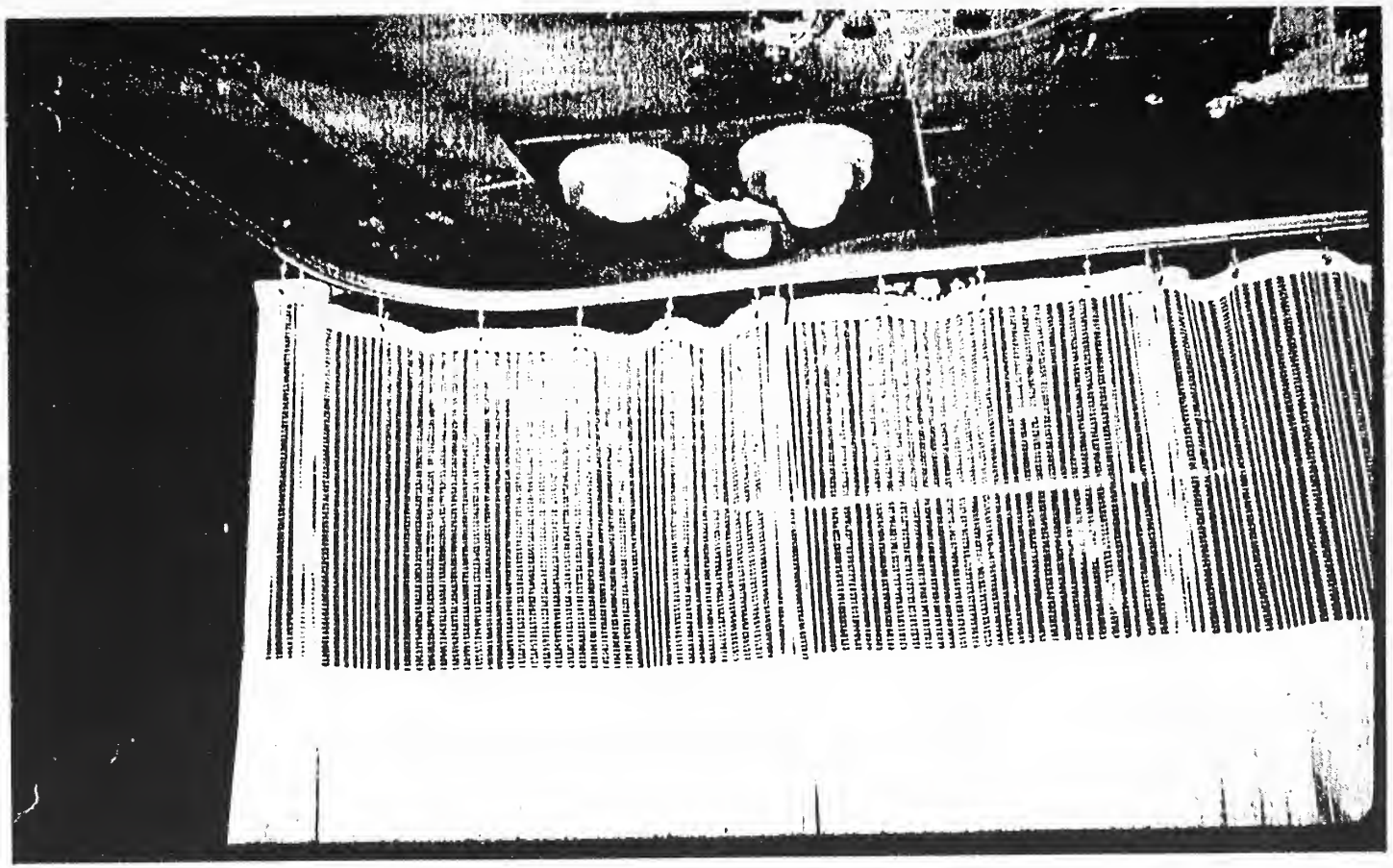

Figure 2. Photograph of privacy curtain

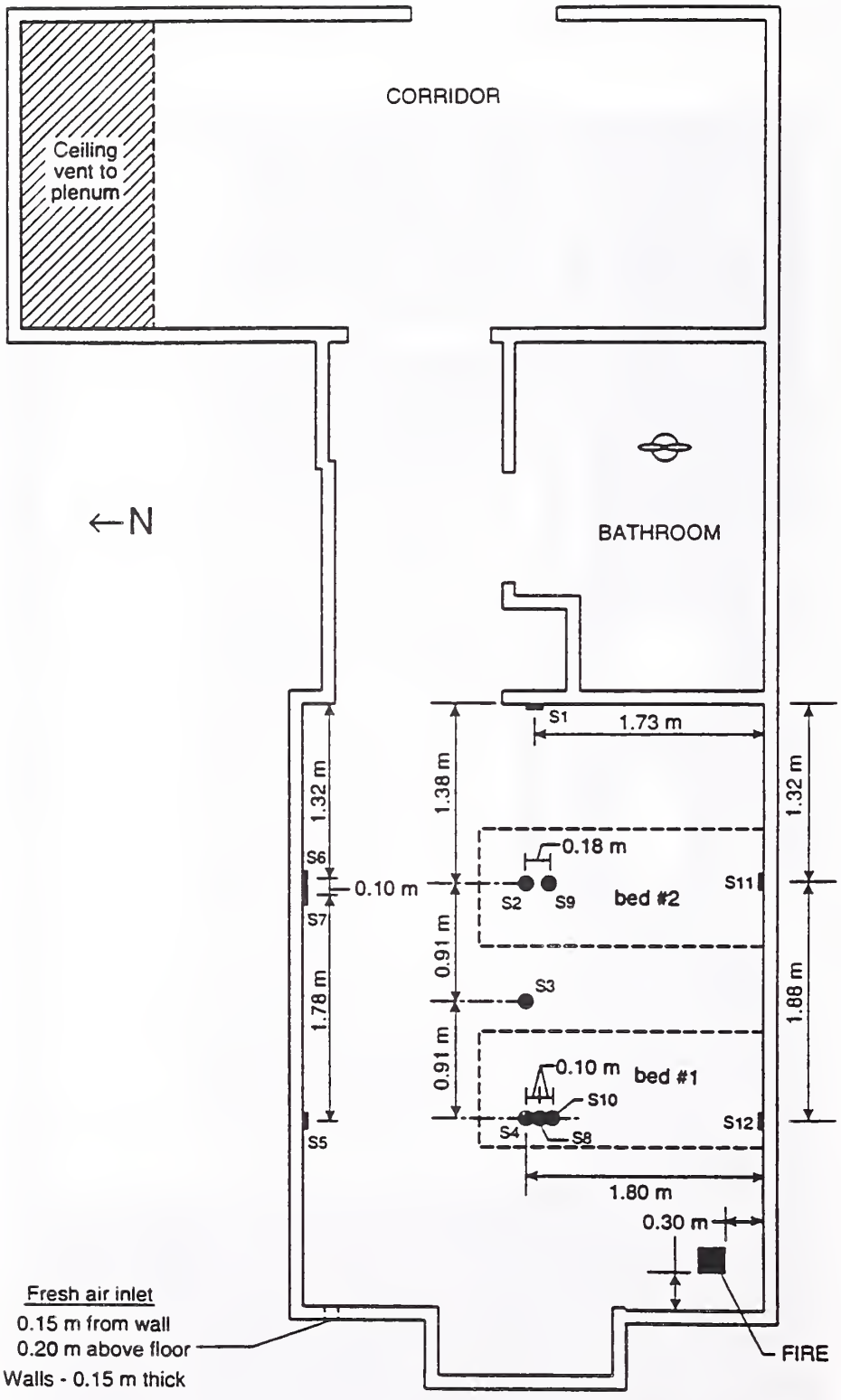

Figure 3. Locations of automatic sprinklers

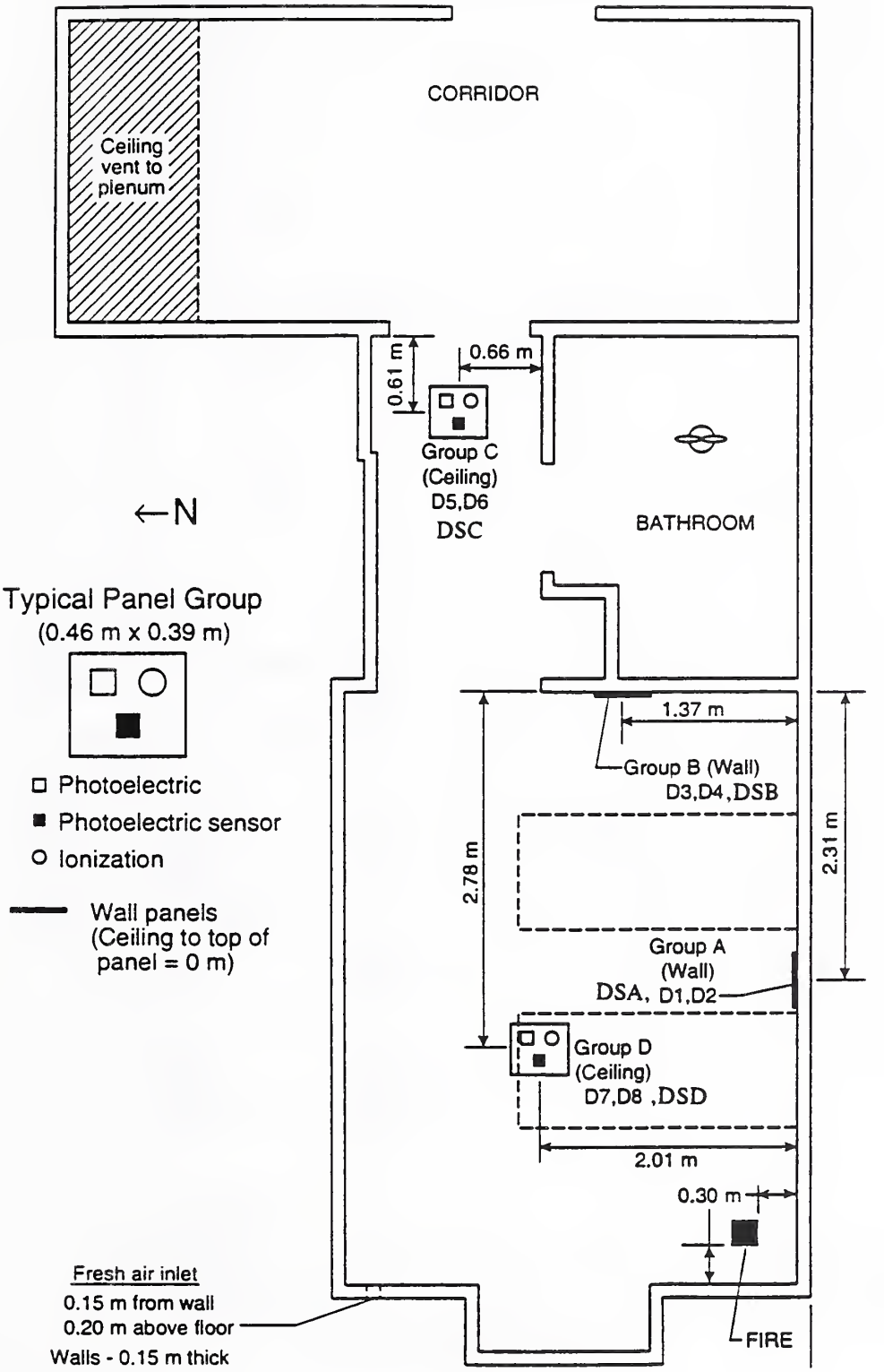

Figure 4. Locations of smoke detectors

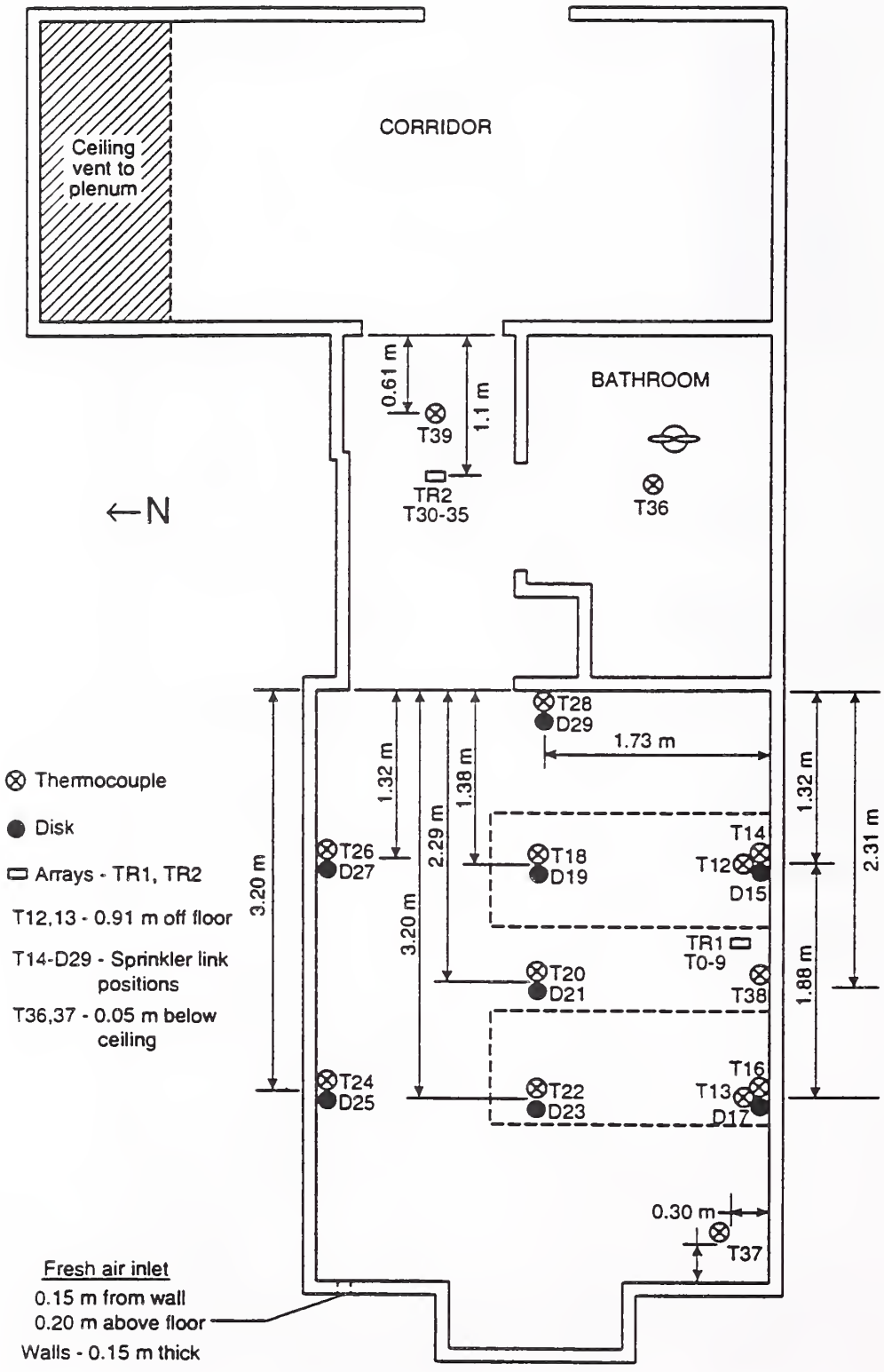

Figure 5. Thermocouple and disk locations

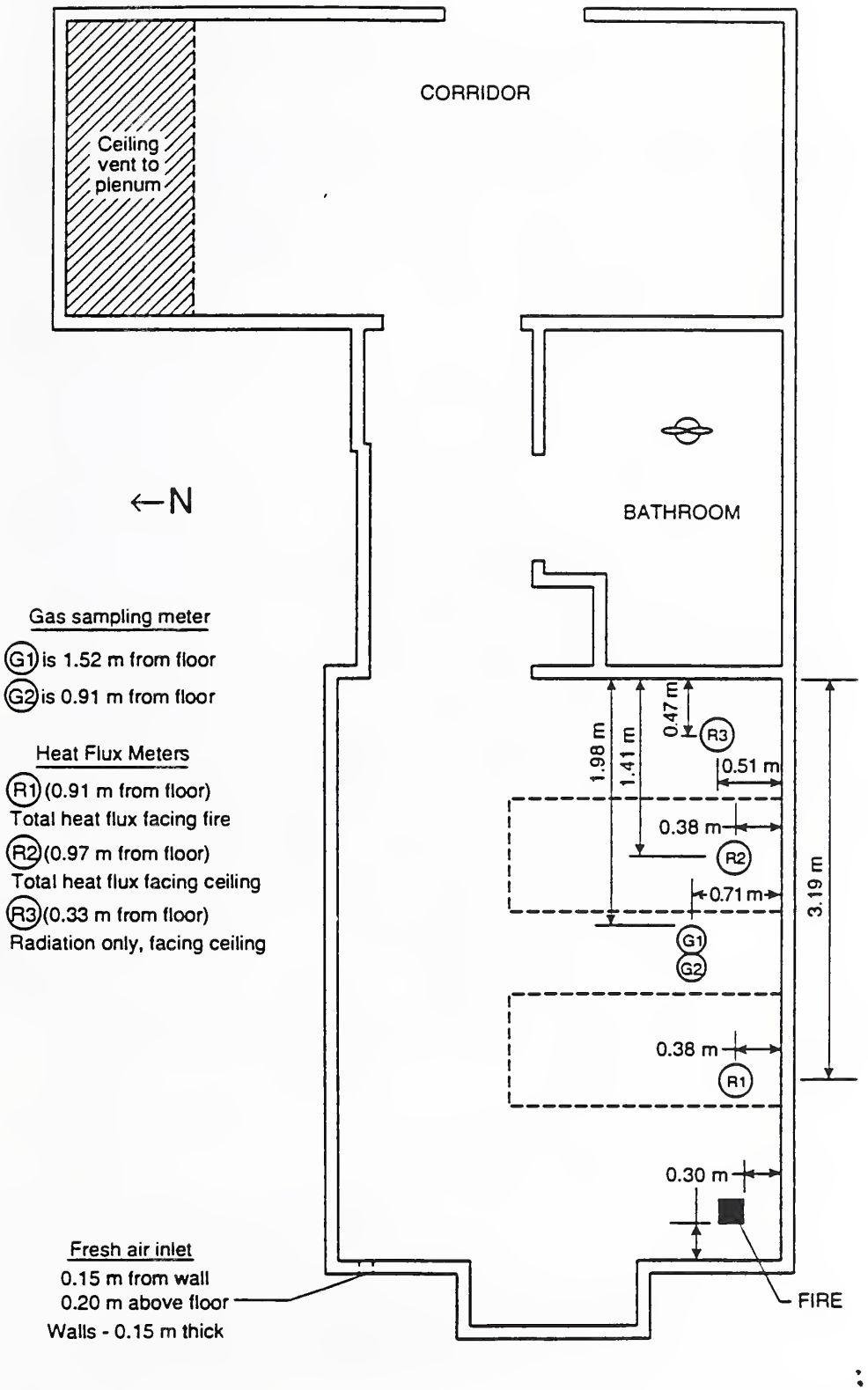

Figure 6. Gas sampling and heat flux meter locations

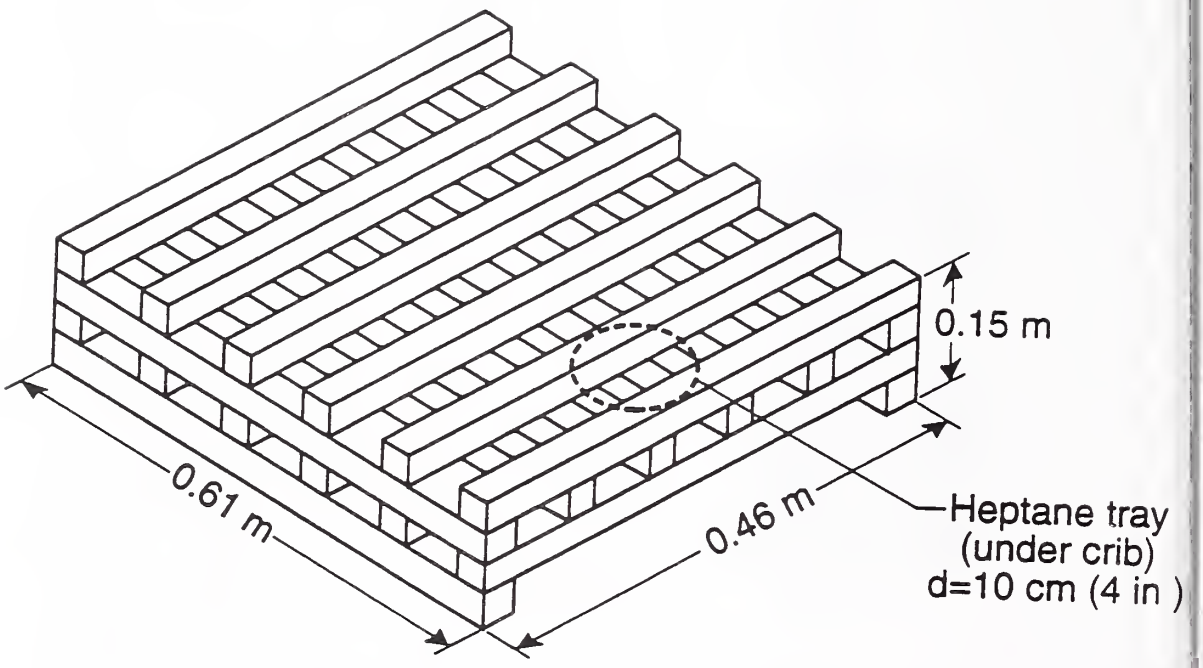

Figure 7. Test fuel source - wood crib

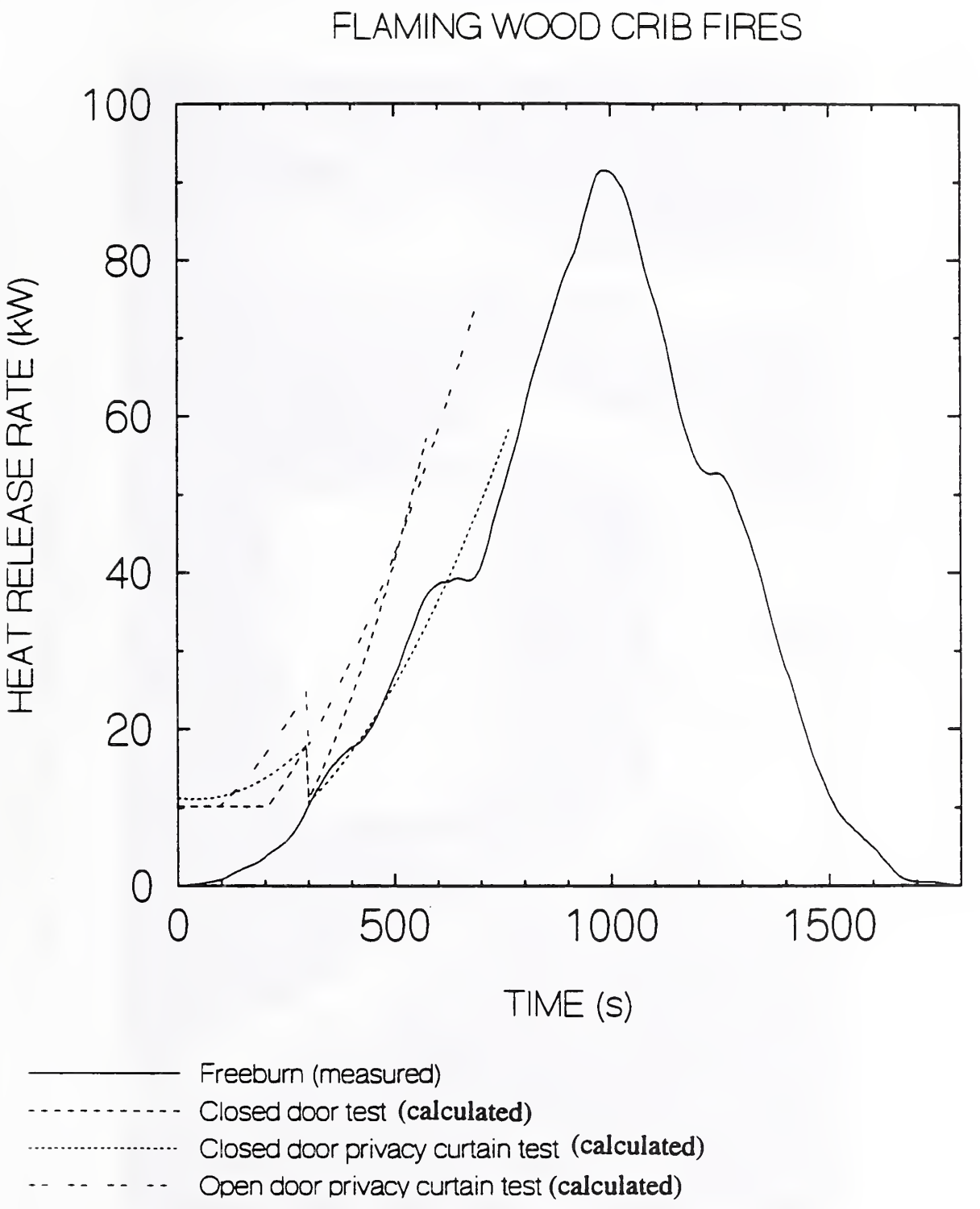

Figure 8. Heat release rate curves

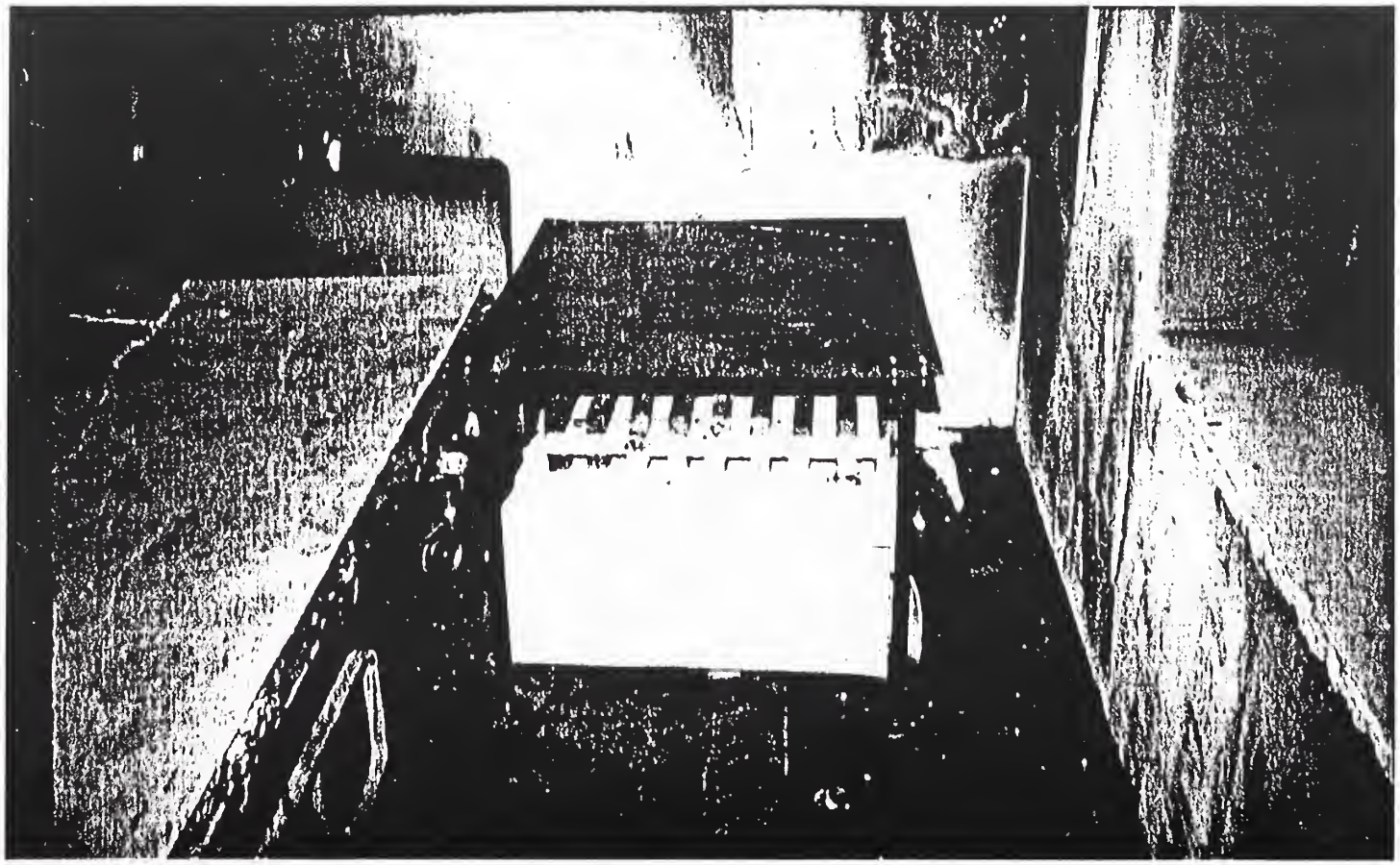

Figure 9. Photograph of shielded fire scenario

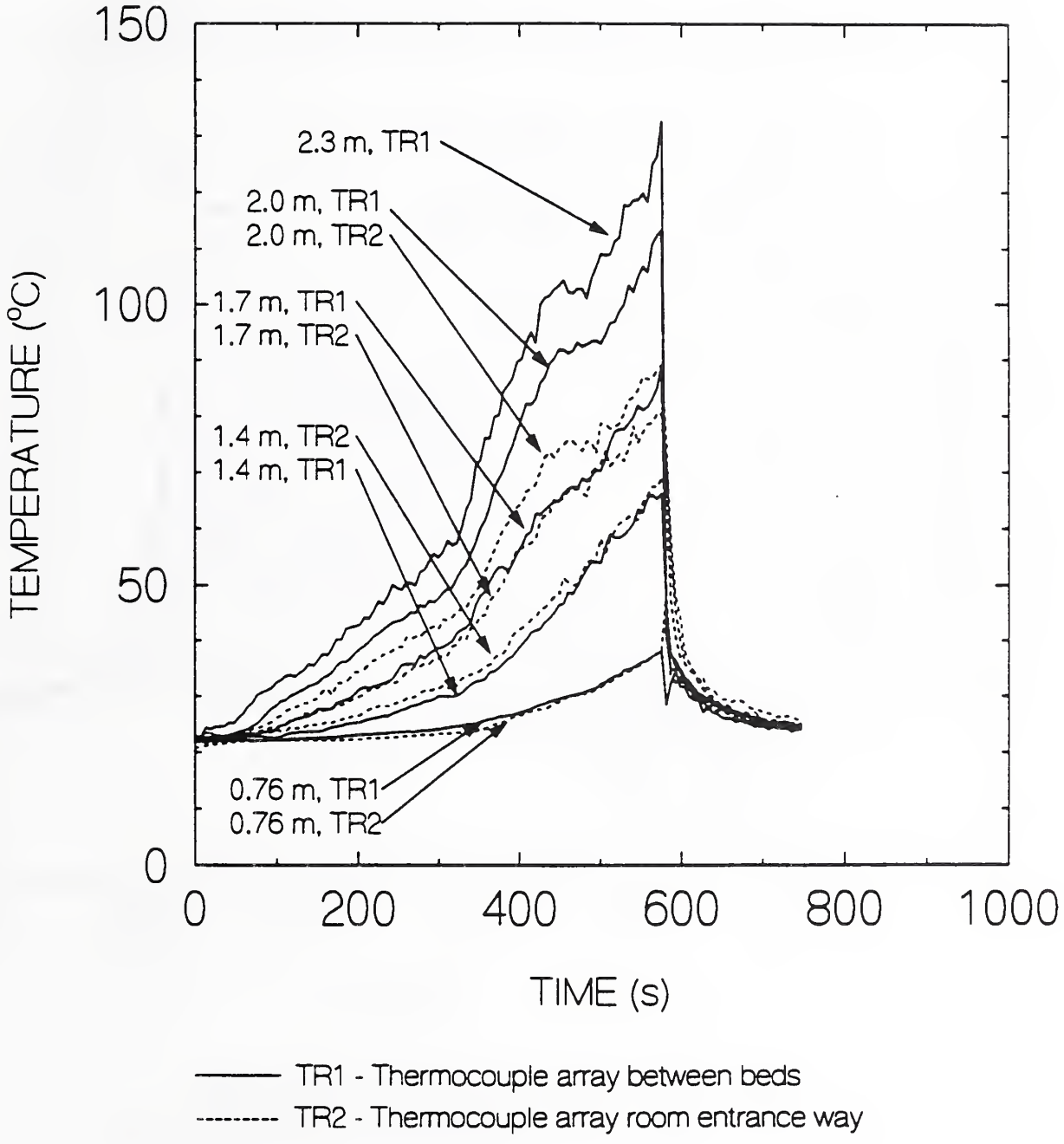

Figure 10. Temperatures in room, closed door test

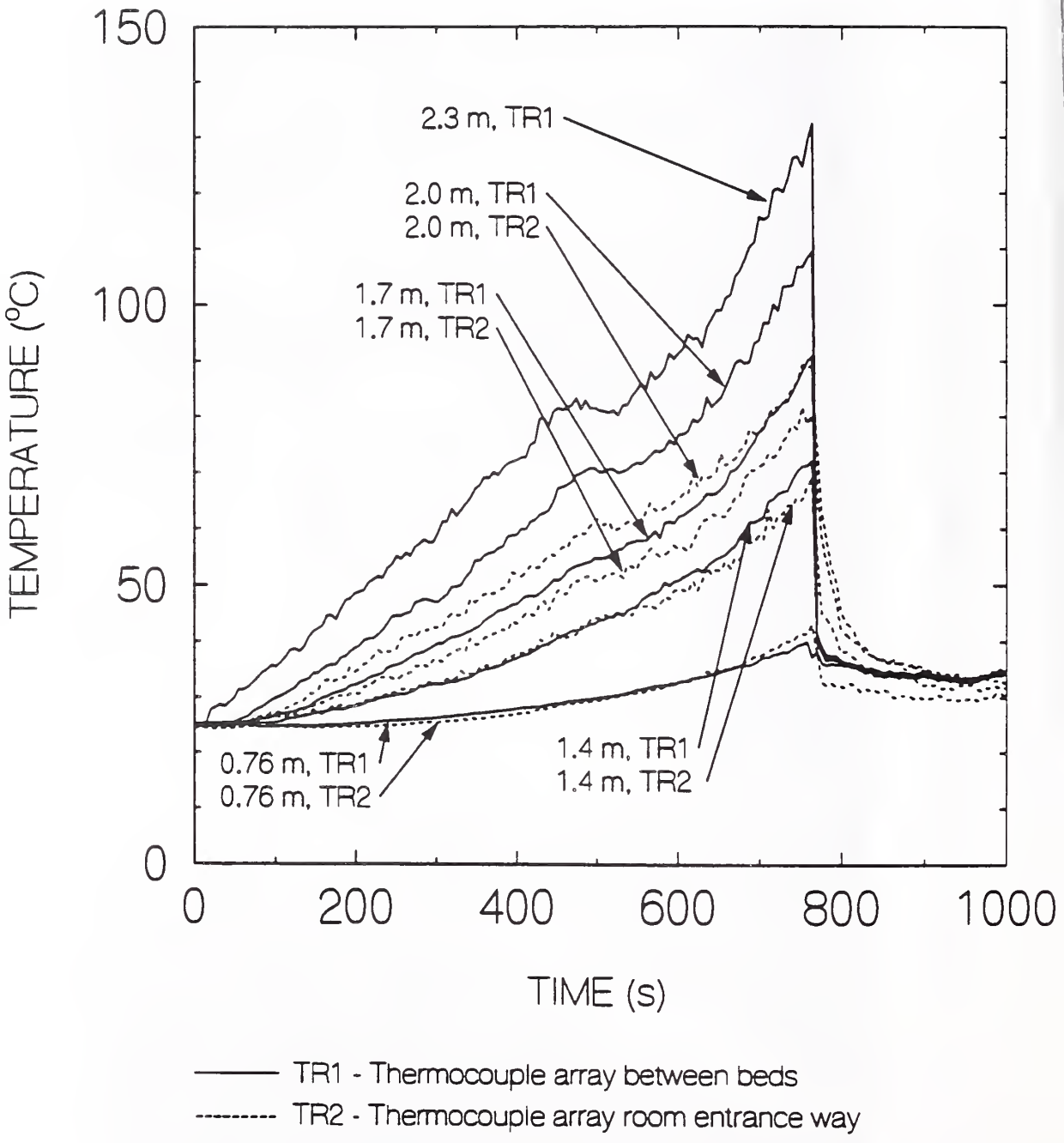

Figure 11. Temperatures in room, closed door privacy curtain test

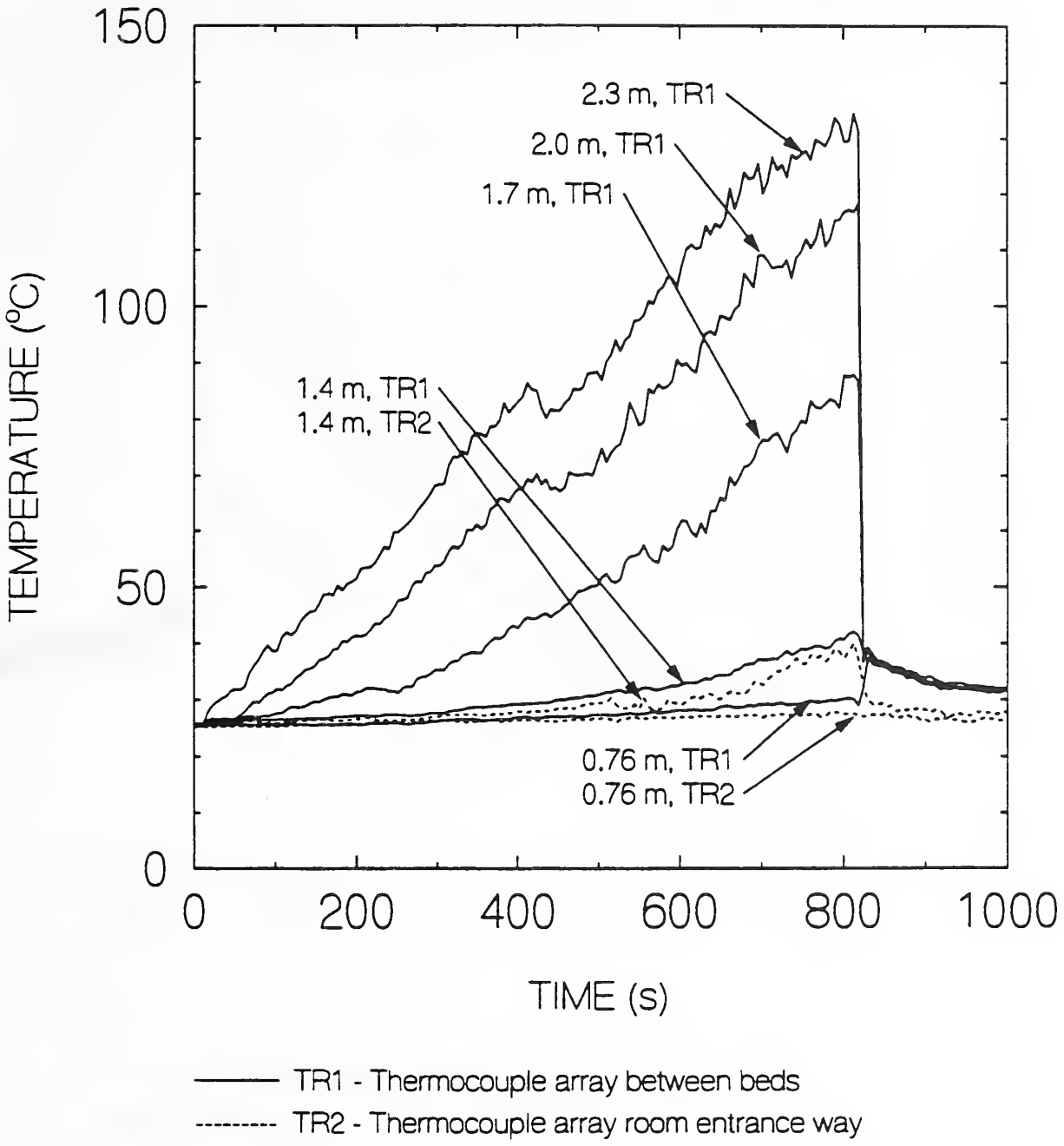

Figure 12. Temperatures in room, open door privacy curtain test

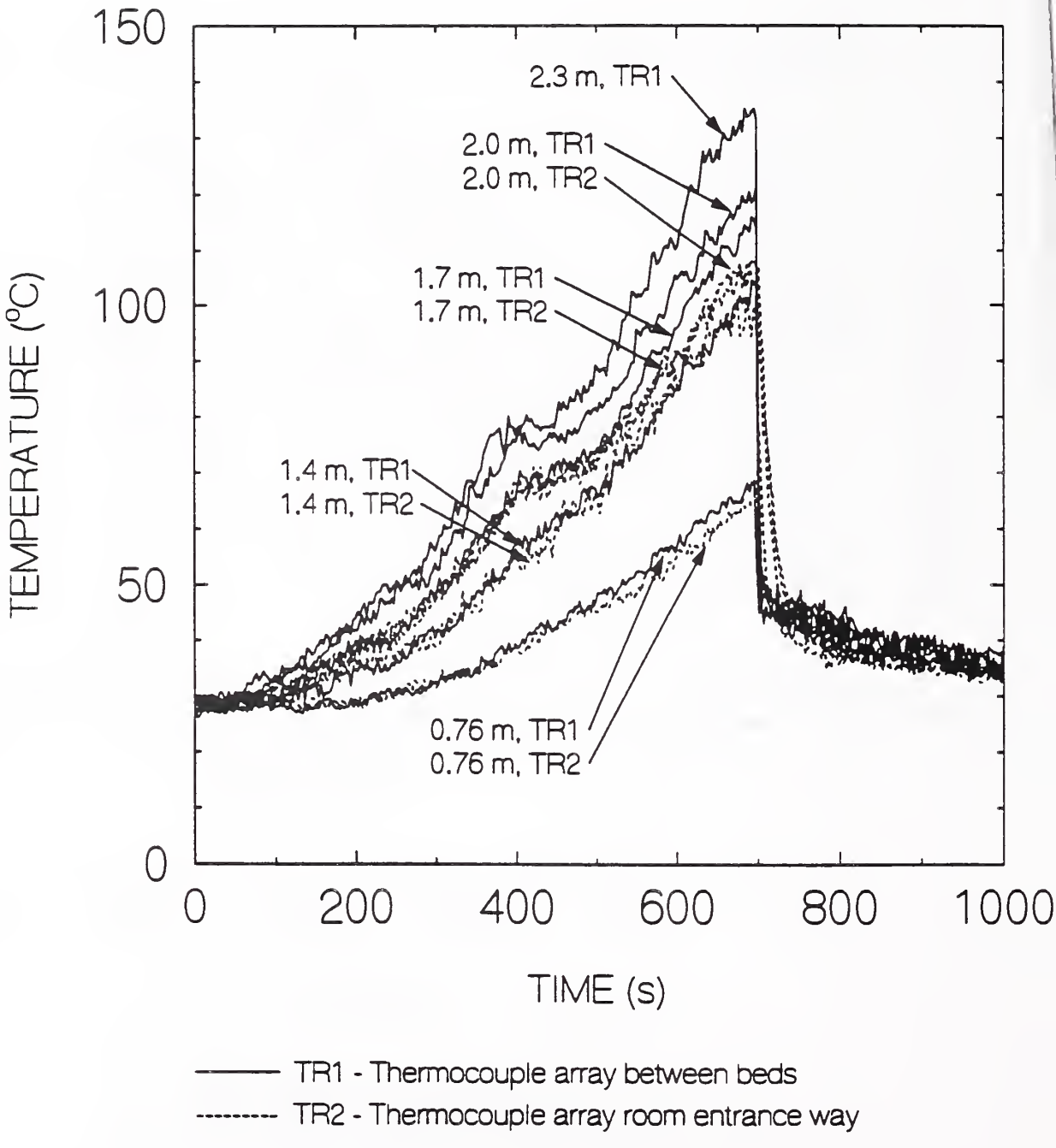

Figure 13. Temperatures in room, closed door shielded fire test

10.0 APPENDIX

The Appendix contains time/temperature data at sprinkler locations from preignition to completion of the test. Numbering of thermocouples and disks at sprinkler locations follows the nomenclature of figure 5. Also included are the time/temperature data at the four smoke detector groups shown in figure 4. Smoke detector groups A - D are denoted PAN A - PAN D in the Appendix respectively.

CLOSED DOOR TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
-45	22	22	22	22	22	22	21	22	22	22
-38	22	22	22	22	23	22	22	22	22	22
-32	22	22	22	22	23	22	22	22	22	22
-26	22	22	22	22	22	22	22	22	22	22
-20	22	22	22	22	23	22	22	22	22	22
-15	22	22	22	22	23	22	22	22	22	22
-9	22	22	22	22	23	22	22	22	22	22
-3	22	22	22	22	23	22	22	22	22	22
1	22	22	22	22	23	22	22	22	22	22
7	22	22	24	23	23	22	22	22	22	22
13	22	22	24	23	23	22	22	22	24	22
19	23	22	25	24	23	22	23	22	24	23
24	24	23	26	24	23	23	23	23	24	23
30	24	23	27	25	23	23	25	23	25	23
36	25	23	28	26	24	23	26	23	26	23
42	25	23	29	26	25	23	26	24	26	24
47	25	23	30	27	26	24	27	24	27	25
53	25	24	31	28	26	24	27	25	27	25
59	27	24	32	29	27	25	29	25	29	26
65	28	25	34	30	28	25	30	26	30	26
70	28	25	34	31	29	26	31	27	29	27
76	29	26	35	32	30	27	31	27	31	28
82	29	26	36	33	30	27	32	28	32	28
87	31	27	37	34	31	28	33	29	32	29
93	31	27	37	35	31	28	33	29	33	30

CLOSED DOOR TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
99	31	28	38	35	31	29	33	30	34	30
105	32	29	39	36	32	29	34	30	34	31
110	33	29	39	37	32	30	34	31	35	32
116	33	30	41	38	32	30	35	31	35	32
122	34	30	40	38	33	31	35	32	36	33
128	34	31	41	39	33	31	36	32	34	33
133	34	31	42	40	34	32	36	33	35	34
139	35	32	42	40	36	32	37	34	36	34
145	35	32	43	41	35	33	37	34	37	35
151	36	33	44	42	36	33	38	35	38	35
156	37	33	46	43	36	34	40	35	39	36
162	37	34	46	43	37	34	41	36	42	37
168	38	34	47	44	38	35	41	37	39	37
173	39	35	48	45	38	35	41	37	42	38
179	40	36	50	46	39	36	42	38	42	39
185	41	37	50	47	40	37	43	39	45	40
191	41	37	51	48	40	37	44	39	44	41
196	42	38	52	49	40	38	44	40	44	42
202	42	38	52	50	42	38	44	41	47	43
208	43	39	53	51	43	39	46	41	45	43
213	44	40	54	51	43	40	49	42	48	44
219	43	40	56	53	44	41	48	43	48	45
225	45	41	57	54	45	41	47	44	50	46
231	45	42	56	54	45	42	49	44	51	47
237	47	42	59	55	45	42	49	45	51	48

CLOSED DOOR TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
242	48	43	59	56	45	43	49	46	53	49
248	48	44	59	57	45	43	52	46	54	50
254	48	44	61	58	45	44	52	47	51	50
259	49	45	62	59	48	45	51	47	53	50
265	48	45	62	59	48	45	52	48	54	51
271	50	46	64	60	48	46	53	49	55	52
277	52	47	63	61	49	46	53	49	54	52
282	52	48	65	62	49	47	54	50	55	53
288	51	48	67	63	50	47	55	50	56	53
294	53	49	69	64	50	48	57	51	58	55
299	53	49	69	65	51	48	55	52	56	55
305	55	50	72	67	52	49	60	53	59	56
311	56	51	71	68	55	50	59	54	61	57
317	57	52	74	69	55	51	60	54	65	59
322	58	53	78	71	56	52	61	55	63	60
328	61	54	78	73	59	53	67	57	69	62
334	63	56	83	75	60	55	70	59	72	64
340	67	57	86	78	63	56	70	61	73	66
345	69	59	90	82	65	58	72	63	77	69
351	72	61	97	86	66	60	74	65	83	72
357	73	63	96	89	70	62	78	67	82	74
363	75	65	99	91	74	64	80	69	84	76
368	78	68	104	95	73	66	79	70	85	78
374	77	69	106	97	75	68	83	72	89	81
380	82	72	105	99	78	70	84	74	93	83

CLOSED DOOR TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
385	83	73	110	102	75	71	89	76	95	86
391	87	76	111	103	76	73	88	77	92	87
397	90	78	111	105	78	74	88	79	94	89
403	89	80	116	107	81	76	91	81	97	91
408	92	82	118	109	84	78	96	83	102	93
414	93	84	121	112	84	79	96	85	100	95
420	92	85	120	113	86	81	97	87	102	96
426	96	87	120	115	88	83	98	88	104	98
431	96	89	123	116	87	85	101	90	102	99
437	99	90	125	118	88	86	98	91	104	101
443	100	92	126	120	90	87	97	91	105	102
448	99	93	121	118	85	87	100	92	104	103
454	99	93	117	117	87	87	97	93	104	103
460	100	94	121	118	90	88	99	93	102	103
466	98	94	123	118	88	87	97	93	100	102
471	99	95	119	118	91	88	99	93	103	103
477	99	95	121	117	88	88	101	94	108	104
483	101	96	125	118	91	88	101	95	106	105
489	103	97	128	120	91	88	103	95	108	106
494	104	98	131	122	93	89	102	96	110	107
500	106	99	131	124	92	89	100	96	109	107
506	108	101	133	126	94	90	104	97	110	108
512	107	102	137	128	97	91	112	99	118	111
517	110	103	135	129	97	92	111	101	118	112
523	115	105	137	131	99	93	111	102	118	113

CLOSED DOOR TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
529	113	106	143	133	100	94	113	104	125	115
535	117	107	146	136	107	97	115	105	121	117
540	118	109	147	138	106	98	118	107	122	119
546	117	110	146	140	106	99	118	109	132	122
552	119	111	152	142	108	101	120	110	132	124
557	120	113	149	143	109	102	124	112	129	125
563	123	114	153	145	107	103	122	113	133	126
569	123	115	155	147	109	104	124	115	134	128
575	127	117	159	149	111	105	125	116	137	130
580	49	80	45	81	33	32	35	44	111	125
586	37	46	40	45	36	32	42	45	83	113
592	35	38	37	41	34	32	42	45	80	104
598	32	34	33	36	31	30	42	45	69	95
603	32	32	32	33	31	29	40	43	64	88
609	31	31	32	32	29	28	41	41	55	80
615	29	30	30	30	30	28	47	40	52	73
620	29	29	29	30	28	27	44	39	53	68
626	28	29	30	30	28	27	46	38	50	64
632	27	28	29	30	27	26	42	37	47	60
638	27	28	28	29	26	25	44	36	50	58
643	27	27	27	28	27	25	42	35	45	55
649	26	27	27	28	26	25	42	35	44	52
655	26	27	27	27	25	25	39	34	42	50
661	26	26	26	27	25	24	34	33	44	49
666	25	26	26	26	26	24	33	32	40	47

CLOSED DOOR TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
672	25	26	26	26	25	24	32	31	40	45
678	25	26	25	26	25	24	34	31	39	44
683	25	25	27	26	24	23	32	29	36	42
689	25	25	24	25	24	23	29	29	35	41
695	24	25	25	25	24	23	26	27	35	40
701	25	24	25	25	24	23	27	27	34	39
706	24	24	24	24	24	23	28	27	33	38
712	24	24	24	24	24	23	28	28	33	37
718	24	24	24	24	24	23	25	27	32	36
724	24	24	23	24	24	23	25	26	32	35
729	24	24	24	23	24	23	25	25	31	34
735	24	24	24	24	24	23	25	25	31	34
741	23	24	23	23	24	23	25	25	30	33
746	24	24	23	24	24	23	25	25	30	33

CLOSED DOOR TEST

THERMOCOUPLE AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
-45	22	22	22	22	22	22	22	22	22	21
-38	22	22	22	22	22	22	22	22	22	22
-32	22	22	22	22	22	22	22	22	22	22
-26	22	22	22	22	22	22	22	22	22	22
-20	22	22	22	22	22	22	22	22	22	22
-15	22	22	22	22	22	22	22	22	22	22
-9	22	22	22	22	22	22	22	22	22	22
-3	22	22	22	22	22	22	22	22	22	22
1	22	22	22	22	22	22	22	22	22	22
7	22	22	22	22	22	22	23	22	22	22
13	22	22	22	22	22	22	24	22	22	22
19	22	22	22	22	22	22	24	22	22	23
24	23	22	22	22	22	22	25	22	22	23
30	24	22	23	22	22	22	25	22	22	25
36	25	23	24	22	23	22	26	23	22	26
42	25	23	25	22	23	22	27	23	22	26
47	26	23	25	23	23	22	27	23	23	27
53	27	24	26	23	24	23	28	24	23	27
59	28	24	26	23	25	23	29	25	23	29
65	28	25	27	24	25	23	31	25	23	30
70	29	25	27	24	26	24	31	26	23	31
76	30	25	28	24	27	24	31	27	24	31
82	30	26	28	25	27	25	32	27	25	32
87	30	26	29	25	28	25	33	28	25	33
93	30	26	29	25	29	26	33	29	25	33

CLOSED DOOR TEST

THERMOCOUPLE AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
99	31	27	30	26	29	26	34	29	26	33
105	31	27	30	26	29	26	34	29	26	34
110	32	28	30	27	29	27	35	29	26	34
116	32	28	31	27	30	27	36	30	26	35
122	33	28	31	27	30	27	35	30	27	35
128	34	29	32	28	30	28	36	30	27	36
133	34	29	33	28	30	28	37	30	27	36
139	35	30	33	29	31	28	37	31	27	37
145	36	30	33	29	32	29	37	32	28	37
151	36	31	34	29	32	29	39	32	28	38
156	37	31	34	30	33	30	39	33	28	40
162	38	32	35	30	33	30	40	33	28	41
168	39	33	36	31	34	30	40	34	29	41
173	40	33	36	31	34	31	42	34	30	41
179	40	34	37	32	35	31	43	35	29	42
185	42	35	38	32	36	32	43	36	30	43
191	41	35	39	33	37	32	44	37	30	44
196	41	36	39	33	36	33	45	36	30	44
202	41	36	39	34	38	33	45	38	31	44
208	44	37	40	34	38	34	46	38	32	46
213	45	37	41	35	38	34	47	38	32	49
219	44	38	42	35	38	35	48	38	33	48
225	45	39	43	36	40	35	48	40	33	47
231	46	39	43	36	40	36	49	40	34	49
237	47	40	43	37	39	36	51	39	33	49

CLOSED DOOR TEST

THERMOCOUPLE AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
242	46	40	44	37	40	37	51	40	34	49
248	47	40	44	38	41	37	51	41	35	52
254	48	41	44	38	42	38	53	42	35	52
259	48	41	46	39	42	38	53	42	35	51
265	49	42	45	39	44	39	53	44	36	52
271	48	42	46	40	44	39	54	44	37	53
277	50	43	47	40	45	40	55	45	37	53
282	50	43	47	41	45	41	55	45	37	54
288	51	44	47	41	45	41	57	45	38	55
294	53	45	48	41	46	42	59	46	38	57
299	52	45	50	42	46	42	59	46	38	55
305	54	46	50	43	47	43	61	47	39	60
311	57	47	51	43	47	43	61	47	40	59
317	56	48	53	44	50	44	63	50	41	60
322	58	49	53	45	49	44	66	49	40	61
328	59	50	54	45	51	45	67	51	41	67
334	62	51	57	47	53	47	70	53	42	70
340	65	53	58	48	54	48	74	54	43	70
345	68	54	61	49	58	49	75	58	45	72
351	68	55	63	50	58	50	79	58	46	74
357	73	57	64	52	61	52	78	61	47	78
363	73	59	70	53	62	53	83	62	48	80
368	77	61	71	55	63	55	84	63	51	79
374	79	63	73	57	64	56	88	64	52	83
380	78	64	74	58	64	57	90	64	51	84

CLOSED DOOR TEST

THERMOCOUPLE AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
385	83	67	74	60	68	58	91	68	53	89
391	84	68	75	61	68	60	91	68	54	88
397	86	70	79	63	71	61	93	71	56	88
403	88	72	79	64	73	63	96	73	57	91
408	91	74	83	66	73	64	97	73	58	96
414	93	76	87	67	76	66	101	76	57	96
420	95	78	82	69	78	67	102	78	60	97
426	95	79	85	70	78	69	103	78	61	98
431	95	81	87	71	79	70	104	79	62	101
437	95	82	89	73	79	71	107	79	62	98
443	96	83	88	74	82	72	104	82	62	97
448	95	84	89	75	81	73	103	81	65	100
454	98	85	88	75	81	74	103	81	63	97
460	97	86	89	76	80	74	101	80	65	99
466	94	86	87	76	81	74	103	81	65	97
471	93	86	86	76	80	75	104	80	63	99
477	97	86	87	77	80	75	104	80	63	101
483	98	87	86	77	81	76	108	81	61	101
489	99	87	90	78	83	77	108	83	64	103
494	100	88	93	78	85	77	113	85	65	102
500	101	89	94	79	84	78	113	84	64	100
506	56	80	91	80	84	79	113	84	67	104
512	68	57	97	81	85	79	116	85	65	112
517	98	53	96	82	89	81	117	89	67	111
523	106	53	100	83	91	82	118	91	69	111

CLOSED DOOR TEST

THERMOCOUPLE AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
529	107	56	100	84	89	82	124	89	70	113
535	107	64	103	86	92	83	127	92	71	115
540	107	71	103	87	95	84	125	95	70	118
546	111	77	99	87	95	86	127	95	72	118
552	114	82	108	88	96	87	129	96	75	120
557	114	87	106	89	98	88	128	98	75	124
563	118	90	109	91	98	89	131	98	77	122
569	123	95	110	92	101	90	134	101	77	124
575	122	97	108	93	104	92	128	104	78	125
580	38	44	38	69	22	22	34	22	79	35
586	42	42	38	46	21	22	36	21	73	42
592	38	39	33	38	21	21	33	21	61	42
598	37	36	31	34	20	21	31	20	56	42
603	31	33	30	32	21	21	30	21	52	40
609	33	32	29	31	20	21	29	20	48	41
615	31	32	28	30	20	20	29	20	45	47
620	29	30	28	29	20	20	28	20	43	44
626	29	29	28	28	21	21	27	21	41	46
632	27	28	27	28	20	21	27	20	40	42
638	27	27	26	27	21	21	26	21	39	44
643	27	27	27	27	20	21	26	20	38	42
649	29	27	26	26	20	20	26	20	35	42
655	26	27	26	26	20	20	25	20	36	39
661	26	26	26	26	21	21	25	21	36	34
666	27	26	25	25	20	20	25	20	36	33

CLOSED DOOR TEST

THERMOCOUPLE AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
672	25	25	25	25	20	20	25	20	36	32
678	25	25	24	25	20	20	25	20	35	34
683	24	24	25	25	20	20	24	20	35	32
689	25	24	24	24	20	20	24	20	34	29
695	24	24	24	24	20	20	23	20	34	26
701	24	24	24	24	20	20	24	20	33	27
706	24	24	24	24	20	20	23	20	33	28
712	24	24	24	24	20	20	24	20	33	28
718	24	24	24	24	20	20	23	20	33	25
724	24	24	23	23	20	20	23	20	32	25
729	23	23	24	23	20	21	23	20	31	25
735	24	23	24	23	21	21	24	21	31	25
741	24	23	23	23	21	21	23	21	32	25
746	24	23	23	23	21	21	23	21	32	25

CLOSED DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
-54	24	24	24	24	25	25	24	24	24	24
-48	24	24	25	24	25	25	24	24	24	24
-42	24	24	25	24	25	25	24	24	24	24
-37	24	24	25	24	25	25	24	24	24	24
-31	24	24	25	24	25	25	24	24	24	24
-25	24	24	25	24	25	25	24	24	24	24
-19	24	24	25	24	25	25	24	24	24	24
-14	24	24	25	24	25	25	24	24	24	24
-8	24	24	25	24	25	25	24	24	24	24
-2	25	24	25	24	25	25	24	24	24	24
3	25	24	25	24	25	25	24	24	24	24
8	25	24	27	25	25	25	24	24	25	25
14	25	24	30	26	25	25	25	24	27	25
20	26	25	30	27	25	25	27	25	26	25
26	27	25	31	27	26	25	27	25	27	25
31	28	25	31	28	28	25	28	25	28	26
37	28	26	32	29	28	26	29	26	28	26
43	28	26	34	30	29	26	29	26	28	27
49	29	26	34	31	29	27	30	27	28	27
54	30	27	36	32	31	27	30	27	29	27
60	30	27	37	32	31	28	31	28	30	28
66	31	28	37	33	32	28	31	28	30	28
72	32	28	38	34	32	28	32	28	31	29
77	33	29	39	35	32	29	32	29	32	29
83	34	30	39	36	32	29	33	29	31	29

CLOSED DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
89	34	30	38	36	33	30	34	30	32	30
95	34	31	40	37	34	30	34	30	33	31
100	35	31	41	38	34	30	35	31	33	31
106	35	32	42	39	35	31	36	31	34	32
112	36	32	44	40	36	32	35	32	35	32
118	38	33	45	41	37	32	36	32	35	33
123	38	34	45	42	37	33	37	33	36	33
129	38	34	46	42	37	33	38	33	37	34
135	39	35	47	43	37	33	38	34	37	35
141	39	36	48	44	38	34	38	34	38	35
146	40	36	49	45	39	35	39	35	38	36
152	41	37	50	46	39	35	40	35	40	37
158	41	37	51	47	41	36	41	36	42	38
164	42	38	51	47	42	36	42	37	41	39
169	43	39	51	48	42	37	42	37	40	39
175	43	39	53	49	44	38	44	38	43	40
181	44	40	54	50	44	38	45	39	45	41
187	45	40	55	51	45	39	46	40	44	42
192	45	41	56	51	45	40	46	40	44	42
198	46	42	56	52	47	41	47	41	43	43
204	47	42	58	53	46	41	47	42	46	43
210	47	43	59	54	47	42	48	42	45	44
215	48	44	59	55	47	42	48	43	47	45
221	49	44	60	56	48	43	49	43	47	45
227	50	45	60	56	47	43	49	44	52	47

CLOSED DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
233	49	45	61	57	48	44	50	45	50	47
238	49	46	62	58	50	44	51	45	51	48
244	51	47	66	60	50	45	51	46	50	49
250	52	47	65	60	51	45	51	47	48	49
256	53	48	65	61	51	46	52	47	50	50
261	53	48	67	62	51	46	53	48	51	50
267	53	49	67	63	52	47	53	48	52	51
273	54	50	67	63	54	48	54	49	53	51
279	55	50	66	64	54	48	54	49	54	52
284	56	51	69	64	54	49	55	50	55	53
290	55	51	69	65	54	49	56	51	56	53
296	56	52	70	66	54	49	56	51	56	54
301	59	53	70	66	55	50	57	52	56	54
307	59	54	71	67	55	50	56	52	57	55
313	59	54	74	69	56	51	57	53	60	56
319	61	55	75	69	57	51	59	53	62	57
324	61	56	75	70	59	52	60	54	63	58
330	62	57	75	71	59	53	62	55	62	59
336	64	57	79	73	60	54	63	56	66	61
342	63	58	78	73	60	54	61	56	66	62
348	65	59	82	75	61	55	62	57	67	63
353	65	60	79	75	63	55	63	58	64	63
359	65	60	79	76	62	56	66	59	67	64
365	65	61	83	77	63	57	65	59	66	65
371	66	61	79	77	64	57	66	60	67	66

CLOSED DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
376	67	62	83	78	64	58	65	60	65	66
382	68	63	85	80	65	58	67	61	69	67
388	70	64	86	80	64	59	68	62	72	68
394	71	65	86	81	66	59	69	62	70	68
399	71	65	84	82	67	60	70	63	71	69
405	72	66	90	84	67	60	70	64	70	70
411	71	66	89	84	68	61	70	64	70	70
416	73	67	91	85	68	62	71	65	75	71
422	73	68	89	84	69	62	71	66	76	72
428	77	69	94	86	71	63	72	66	78	74
434	77	70	94	88	71	64	73	67	80	75
439	77	71	98	90	74	65	75	67	79	76
445	78	71	99	92	75	66	74	68	82	77
451	79	72	98	92	73	66	78	69	79	78
457	80	73	97	93	76	67	77	70	81	79
462	79	74	100	94	76	68	77	71	83	80
468	80	74	97	94	75	68	78	72	80	80
474	80	75	96	94	74	69	77	72	80	80
480	79	75	96	94	75	69	77	72	81	81
485	78	75	97	94	76	69	75	72	81	81
491	78	75	93	93	76	69	77	72	79	81
497	79	75	93	92	75	70	76	73	81	81
503	79	75	92	92	75	70	76	73	82	81
508	79	75	94	92	74	70	76	73	86	82
514	78	75	94	92	74	70	77	73	80	82

CLOSED DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
520	80	76	95	92	76	70	77	73	81	82
526	77	75	95	92	76	70	78	74	85	82
531	79	75	99	94	76	70	77	74	83	83
537	80	76	98	94	74	70	81	74	84	84
543	82	76	99	95	78	71	80	75	86	84
549	82	77	99	95	76	71	80	75	86	84
554	84	78	101	97	80	72	81	76	87	85
560	83	78	104	98	82	72	83	76	89	86
566	84	79	102	98	82	73	81	77	88	87
572	41	63	104	99	79	74	81	77	91	87
577	44	55	103	99	82	74	84	78	93	88
583	64	54	107	100	83	75	85	79	92	89
589	79	59	109	101	81	75	85	79	93	90
595	80	64	106	102	86	76	86	80	96	92
600	81	68	110	104	82	76	87	81	97	93
606	83	71	109	104	86	77	88	81	94	93
612	84	74	109	105	86	78	87	82	96	94
618	87	77	113	106	87	78	86	82	99	95
623	87	80	113	107	88	79	88	83	100	95
629	86	81	113	108	89	80	89	83	103	97
635	89	83	117	110	87	80	90	84	105	98
641	92	85	117	111	91	81	94	85	106	100
646	97	87	118	113	92	82	94	86	104	101
652	97	88	119	113	95	84	95	87	105	102
658	98	90	122	115	94	84	98	89	109	103

CLOSED DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
664	101	91	123	117	94	85	98	89	105	104
669	103	93	128	119	98	86	101	90	113	106
675	103	94	125	120	99	87	104	92	118	109
681	107	96	131	122	98	88	104	93	121	111
687	106	97	131	123	102	89	105	95	116	112
692	111	100	129	124	101	90	106	96	121	114
698	111	101	137	128	104	92	109	98	118	114
704	114	103	141	131	107	93	111	99	123	116
710	113	104	141	133	113	95	112	101	120	117
716	114	105	143	135	111	97	114	102	127	119
721	116	107	144	136	111	98	114	104	128	120
727	117	108	145	138	111	99	113	105	131	123
733	119	109	148	140	110	100	117	107	131	124
739	121	111	148	141	113	101	118	108	129	125
745	124	113	153	144	115	102	118	109	135	127
751	126	114	153	145	120	104	120	110	137	130
757	127	116	155	147	117	105	119	111	135	131
763	124	114	51	118	42	49	61	63	123	130
769	62	103	42	46	37	36	46	46	118	126
775	46	92	39	41	35	34	38	42	101	116
780	41	82	39	40	34	33	44	41	101	112
786	39	73	39	37	34	33	43	41	90	106
792	39	68	35	36	33	33	36	38	87	99
798	39	63	37	36	34	33	41	39	84	82
804	38	59	37	35	33	32	39	39	86	77

CLOSED DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
810	37	55	36	35	33	32	36	38	83	78
816	37	52	35	34	32	32	38	38	79	71
822	37	49	36	34	33	32	39	38	76	67
827	36	47	36	35	32	31	38	37	80	70
833	36	45	34	34	32	31	37	37	79	72
839	36	43	34	33	32	31	38	37	78	73
845	36	42	34	33	32	31	40	37	73	72
851	35	41	34	33	32	31	38	37	81	74
857	35	40	35	33	32	31	37	36	71	73
862	35	39	34	33	32	31	36	36	78	74
868	35	38	33	33	31	31	35	35	80	75
874	35	38	35	33	32	31	40	36	73	74
880	35	37	34	33	32	31	33	35	76	74
886	35	36	34	33	32	31	40	36	76	74
892	35	36	35	33	32	31	37	36	75	74
898	35	35	34	33	32	31	35	35	64	73
904	35	35	34	33	31	31	36	35	73	73
909	35	35	34	33	31	31	37	36	72	72
915	34	35	33	32	31	31	36	36	73	72
921	34	35	34	32	31	31	36	36	74	72
927	33	34	33	32	31	30	34	35	71	71
933	34	34	34	32	31	31	35	34	74	71
939	33	34	32	32	31	30	33	33	70	70
945	33	34	34	32	31	30	33	34	68	72
951	33	33	33	32	31	31	37	34	75	72

CLOSED DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
957	33	33	33	32	31	31	34	34	72	72
962	33	33	34	32	32	31	36	34	72	71
968	34	33	35	33	32	32	36	35	71	71
974	34	33	34	33	33	33	35	35	68	70
980	34	34	33	33	33	33	33	34	67	69
986	34	34	33	33	33	33	34	34	67	68
992	34	34	33	33	33	33	33	33	61	65
997	34	34	34	33	34	33	34	34	55	62
1003.0	34	34	34	33	34	33	34	34	54	60
1009.0	33	33	34	34	34	34	34	34	52	58
1015.0	33	33	34	34	34	34	34	34	49	56
1021.0	34	33	34	34	34	34	34	34	48	54
1027.0	34	34	34	34	34	34	34	34	47	53
1032.0	33	34	34	34	34	34	34	34	47	52
1038.0	34	34	34	34	34	34	34	34	47	51
1044.0	34	34	34	34	34	34	33	34	48	50
1050.0	34	34	34	34	34	34	34	34	47	49
1056.0	34	34	34	34	34	34	34	34	46	48
1062.0	34	34	34	34	34	34	34	34	47	48
1067.0	34	34	34	34	34	34	34	34	45	47
1073.0	34	34	34	34	34	34	34	34	47	47
1079.0	34	34	34	34	34	34	34	34	43	46
1085.0	34	34	34	34	34	34	34	34	43	45
1091.0	34	34	34	34	34	34	33	34	43	44
1097.0	34	34	34	34	34	34	33	33	42	43

CLOSED DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
1102.0	34	34	34	34	34	34	33	33	41	42
1108.0	34	34	34	34	34	34	34	34	40	42
1114.0	34	34	34	34	34	34	33	34	41	41
1120.0	34	34	34	34	34	34	33	33	40	41
1126.0	33	34	34	34	34	34	33	33	41	40
1132.0	33	33	34	34	34	34	33	33	40	40
1137.0	33	33	34	34	34	34	33	33	41	40
1143.0	34	34	34	34	34	33	33	33	39	39
1149.0	33	33	34	34	33	34	33	33	39	39
1155.0	33	33	34	34	34	34	33	33	39	39
1161.0	34	33	34	34	34	34	33	33	39	39
1167.0	33	33	33	34	34	34	33	33	38	38
1172.0	34	33	34	34	34	34	33	33	38	38
1178.0	34	33	33	34	33	33	33	33	37	38
1184.0	33	33	34	34	34	33	33	33	38	38
1190.0	33	33	33	34	34	33	33	33	37	37
1196.0	33	33	33	33	33	33	33	33	38	37
1202.0	33	33	33	33	34	33	33	33	37	37
1207.0	32	33	33	33	33	33	33	33	36	37
1213.0	33	33	33	33	33	33	33	33	36	36
1219.0	33	33	33	33	33	33	33	33	37	36
1225.0	33	33	33	33	33	33	33	33	36	36
1231.0	33	33	33	33	33	33	33	33	36	36
1237.0	33	33	33	33	33	33	33	33	36	36
1242.0	33	33	33	33	33	33	33	33	35	36

CLOSED DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
1248.0	33	33	33	33	33	33	33	33	34	35
1254.0	33	33	33	33	33	33	33	33	35	35
1260.0	33	33	33	33	33	33	33	33	34	35
1266.0	33	33	33	33	33	33	33	33	34	35
1272.0	33	33	33	33	33	33	33	33	34	35
1277.0	33	33	33	33	33	33	33	33	34	35
1283.0	32	32	33	33	33	33	33	33	35	35
1289.0	33	32	33	33	33	33	33	33	35	35
1295.0	32	32	33	33	33	33	33	33	33	35
1301.0	32	32	33	33	33	33	33	33	34	34
1307.0	32	32	33	33	33	33	33	33	34	34
1312.0	32	32	33	33	33	33	33	33	34	34

CLOSED DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
-54	24	24	24	24	24	24	24	24	24	24
-48	25	24	24	24	24	24	24	24	24	24
-42	25	24	24	24	24	24	24	24	24	24
-37	25	24	24	24	24	24	24	24	24	24
-31	25	24	24	24	24	24	24	24	24	24
-25	25	24	24	24	24	24	24	24	24	24
-19	24	24	24	24	24	24	24	24	24	24
-14	24	24	24	24	24	24	24	24	24	24
-8	25	24	24	24	24	24	24	24	24	24
-2	25	24	24	24	24	24	24	24	24	24
3	25	24	24	24	24	24	24	24	24	24
8	25	24	24	24	24	24	24	24	24	24
14	25	24	24	24	24	24	26	24	24	25
20	25	25	24	24	24	24	27	24	24	27
26	25	25	24	24	24	24	28	24	24	27
31	26	25	26	25	24	24	29	24	24	28
37	27	25	26	25	24	24	30	24	24	29
43	27	25	27	25	25	24	31	25	24	29
49	28	26	27	26	25	24	31	25	25	30
54	30	26	28	26	26	25	33	26	25	30
60	30	27	28	26	25	25	34	25	25	31
66	31	27	29	27	26	25	34	26	26	31
72	31	27	29	27	27	25	34	27	26	32
77	31	28	29	27	26	25	35	26	26	32
83	32	28	30	28	26	25	34	26	26	33

CLOSED DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
89	32	29	30	28	26	25	35	26	26	34
95	33	29	30	28	27	26	37	27	27	34
100	34	29	31	29	28	26	37	28	27	35
106	34	30	32	29	27	26	39	27	27	36
112	35	30	32	29	28	26	39	28	28	35
118	35	31	33	30	28	27	40	28	28	36
123	36	32	33	30	28	27	41	28	28	37
129	37	32	34	31	28	27	41	28	28	38
135	38	33	34	31	29	27	42	29	29	38
141	38	33	35	32	28	28	42	28	30	38
146	39	34	35	32	29	28	44	29	30	39
152	39	34	36	33	29	28	44	29	30	40
158	41	35	37	33	30	28	45	30	29	41
164	40	35	37	34	30	29	45	30	30	42
169	41	36	38	34	31	29	45	31	31	42
175	41	36	39	35	33	29	46	33	31	44
181	42	37	39	35	33	30	47	33	32	45
187	43	38	40	36	35	31	48	35	32	46
192	43	38	40	36	35	31	50	35	32	46
198	45	39	41	37	34	31	50	34	32	47
204	44	39	42	37	33	32	52	33	33	47
210	45	40	42	38	35	32	52	35	33	48
215	44	40	43	39	35	32	53	35	33	48
221	45	40	44	39	35	32	53	35	34	49
227	46	41	43	39	35	33	52	35	34	49

CLOSED DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
233	47	42	44	40	36	33	54	36	35	50
238	48	42	45	40	36	33	55	36	35	51
244	49	43	45	41	39	34	57	39	35	51
250	51	44	45	41	40	34	57	40	35	51
256	50	44	45	42	40	34	57	40	36	52
261	49	45	46	42	40	35	58	40	37	53
267	50	45	47	43	38	35	58	38	36	53
273	51	45	47	43	39	35	59	39	37	54
279	50	46	47	43	39	35	58	39	37	54
284	52	46	48	44	40	36	58	40	37	55
290	54	47	48	44	41	36	60	41	38	56
296	54	47	49	45	43	37	61	43	37	56
301	55	48	50	45	43	37	62	43	38	57
307	54	48	50	46	43	38	63	43	38	56
313	56	49	51	46	40	38	65	40	38	57
319	56	50	51	47	42	38	64	42	40	59
324	57	50	53	48	44	39	67	44	41	60
330	57	51	53	48	44	39	66	44	41	62
336	58	51	53	49	46	40	70	46	41	63
342	60	52	53	49	47	41	69	47	41	61
348	61	53	55	50	46	41	70	46	43	62
353	60	53	55	50	48	42	69	48	42	63
359	60	54	56	51	48	42	69	48	43	66
365	61	54	56	51	48	43	71	48	44	65
371	63	55	58	52	49	43	69	49	43	66

CLOSED DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
376	63	55	59	53	48	44	73	48	42	65
382	64	56	60	54	51	45	72	51	44	67
388	65	57	60	54	49	45	75	49	44	68
394	65	57	60	55	49	45	73	49	44	69
399	67	58	59	55	51	46	76	51	43	70
405	67	59	60	55	50	47	79	50	48	70
411	65	59	61	56	51	47	79	51	47	70
416	65	59	61	56	51	47	80	51	47	71
422	68	60	63	57	50	48	79	50	48	71
428	68	61	64	58	51	49	83	51	47	72
434	70	61	64	58	52	49	85	52	49	73
439	72	62	65	59	52	50	86	52	48	75
445	73	64	67	60	54	51	87	54	50	74
451	74	65	69	61	54	51	86	54	50	78
457	76	66	68	62	57	52	85	57	49	77
462	73	66	70	63	57	52	86	57	49	77
468	76	67	70	63	56	53	86	56	51	78
474	76	67	70	64	55	53	83	55	50	77
480	76	68	69	64	56	53	85	56	50	77
485	75	68	70	65	56	54	84	56	52	75
491	75	68	71	65	55	53	82	55	52	77
497	75	68	70	66	54	54	83	54	52	76
503	77	69	69	65	56	54	83	56	53	76
508	75	69	69	66	55	54	84	55	51	76
514	75	69	69	65	56	54	85	56	52	77

CLOSED DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
520	75	69	69	65	58	55	84	58	52	77
526	77	69	70	66	59	55	84	59	53	78
531	76	69	70	66	57	55	86	57	52	77
537	78	70	71	66	56	55	88	56	52	81
543	77	70	72	67	58	55	89	58	52	80
549	78	70	72	67	57	56	89	57	53	80
554	82	72	72	67	59	56	89	59	54	81
560	79	72	74	68	58	57	92	58	52	83
566	84	73	74	68	60	57	91	60	55	81
572	79	73	74	69	61	57	91	61	54	81
577	80	73	74	69	59	58	91	59	55	84
583	83	74	76	70	58	58	93	58	54	85
589	83	74	75	70	60	58	95	60	56	85
595	81	74	77	71	60	59	94	60	56	86
600	84	75	79	71	61	59	96	61	57	87
606	83	76	77	72	60	59	97	60	58	88
612	86	76	79	72	60	60	99	60	56	87
618	89	78	81	73	61	60	100	61	59	86
623	89	78	81	74	62	61	102	62	59	88
629	88	79	82	75	65	61	102	65	60	89
635	90	80	84	76	63	62	101	63	59	90
641	90	80	84	76	63	62	104	63	60	94
646	92	81	85	77	66	63	105	66	62	94
652	93	83	85	78	66	63	107	66	62	95
658	93	83	86	79	65	64	109	65	65	98

CLOSED DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
664	95	84	86	80	66	65	111	66	65	98
669	94	85	88	80	68	65	112	68	64	101
675	98	86	87	81	69	66	119	69	65	104
681	100	87	91	82	69	67	116	69	68	104
687	105	89	92	83	70	68	119	70	68	105
692	101	90	93	84	70	68	121	70	68	106
698	104	91	96	85	72	69	123	72	70	109
704	105	92	96	87	72	70	126	72	68	111
710	104	93	99	88	74	71	127	74	72	112
716	108	95	100	90	75	72	130	75	72	114
721	108	96	102	91	77	73	130	77	72	114
727	113	98	102	92	75	74	132	75	74	113
733	115	99	103	93	77	75	133	77	73	117
739	116	101	104	94	81	76	133	81	75	118
745	117	102	107	96	79	77	136	79	73	118
751	114	103	109	97	82	78	135	82	76	120
757	118	105	106	98	81	79	137	81	78	119
763	96	104	107	97	26	28	42	26	78	61
769	75	96	71	91	30	31	39	30	77	46
775	71	89	59	82	29	30	37	29	68	38
780	62	82	51	75	28	29	36	28	59	44
786	56	76	49	69	29	30	35	29	57	43
792	44	68	45	63	29	31	35	29	54	36
798	44	62	43	58	29	30	35	29	52	41
804	44	58	41	54	29	31	34	29	49	39

CLOSED DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
810	42	54	42	51	29	30	34	29	48	36
816	41	51	40	47	28	30	34	28	47	38
822	42	48	39	45	28	30	34	28	45	39
827	41	47	38	43	28	29	34	28	44	38
833	39	45	39	42	28	30	33	28	42	37
839	39	43	38	41	28	29	33	28	42	38
845	39	43	38	40	28	30	33	28	41	40
851	39	42	38	39	28	29	33	28	40	38
857	40	42	38	39	28	29	33	28	40	37
862	39	41	38	38	29	30	33	29	39	36
868	38	41	37	38	29	30	33	29	39	35
874	38	40	37	37	29	30	33	29	39	40
880	43	41	39	37	29	30	33	29	38	33
886	39	40	37	37	29	30	33	29	38	40
892	38	40	37	36	29	30	33	29	38	37
898	39	40	36	36	29	29	33	29	38	35
904	37	39	36	36	28	29	33	28	38	36
909	37	39	36	35	28	29	32	28	38	37
915	38	39	36	35	28	29	32	28	37	36
921	38	38	36	35	28	29	32	28	37	36
927	39	39	36	35	28	29	32	28	37	34
933	37	38	35	35	28	29	32	28	37	35
939	40	39	36	35	28	29	32	28	37	33
945	38	38	36	35	28	29	32	28	36	33
951	36	38	36	35	28	29	32	28	36	37

CLOSED DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
957	40	38	36	35	29	29	32	29	36	34
962	40	37	35	34	30	31	32	30	36	36
968	39	38	36	35	31	32	33	31	36	36
974	40	38	38	35	32	32	33	32	36	35
980	40	38	36	35	32	32	33	32	36	33
986	36	37	35	35	32	33	33	32	36	34
992	35	37	35	35	32	33	33	32	36	33
997	35	36	35	35	33	33	33	33	36	34
1003	34	36	34	34	33	33	33	33	36	34
1009	35	35	34	34	33	33	33	33	36	34
1015	35	35	34	34	33	33	33	33	36	34
1021	35	35	35	34	33	33	34	33	35	34
1027	34	35	34	34	33	33	33	33	35	34
1032	34	35	34	34	33	33	33	33	35	34
1038	34	35	34	34	33	33	33	33	35	34
1044	35	35	34	34	33	33	34	33	35	33
1050	34	34	34	34	33	33	33	33	35	34
1056	34	34	34	34	33	33	33	33	34	34
1062	35	34	34	34	33	33	33	33	34	34
1067	34	34	34	34	33	33	33	33	34	34
1073	34	34	34	34	33	33	33	33	34	34
1079	34	34	34	34	33	33	33	33	34	34
1085	34	34	34	34	33	33	33	33	34	34
1091	34	34	34	34	33	33	33	33	34	33
1097	34	34	34	34	33	33	33	33	34	33

CLOSED DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
1102	34	34	34	34	33	33	33	33	34	33
1108	34	34	34	34	33	33	33	33	34	34
1114	34	34	34	34	33	33	33	33	34	33
1120	34	34	34	34	33	33	33	33	34	33
1126	34	34	34	34	33	33	33	33	34	33
1132	34	34	34	34	33	33	33	33	34	33
1137	34	34	34	34	33	33	33	33	33	33
1143	34	34	34	34	33	33	33	33	33	33
1149	34	34	34	34	33	33	33	33	33	33
1155	34	34	34	34	33	33	33	33	34	33
1161	34	34	34	34	33	33	33	33	33	33
1167	34	34	34	34	33	33	33	33	33	33
1172	34	34	34	33	33	33	33	33	33	33
1178	34	34	33	33	33	33	33	33	33	33
1184	34	34	34	34	33	33	33	33	32	33
1190	34	34	34	34	33	33	33	33	32	33
1196	34	34	33	33	33	33	33	33	33	33
1202	34	34	33	33	33	33	33	33	33	33
1207	34	34	33	33	33	33	33	33	33	33
1213	34	34	33	33	33	33	33	33	33	33
1219	33	33	33	33	33	33	33	33	33	33
1225	34	33	33	33	33	33	33	33	33	33
1231	33	33	33	33	33	33	33	33	32	33
1237	33	33	33	33	33	33	33	33	32	33
1242	33	33	33	33	33	33	33	33	32	33

CLOSED DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
1248	33	33	33	33	33	33	33	33	32	33
1254	33	33	33	33	33	33	33	33	32	33
1260	33	33	33	33	33	33	33	33	32	33
1266	33	33	33	33	33	33	33	33	32	33
1272	33	33	33	33	33	33	33	33	32	33
1277	33	33	33	33	33	33	33	33	32	33
1283	33	33	33	33	33	33	33	33	32	33
1289	33	33	33	33	33	33	33	33	32	33
1295	33	33	33	33	33	33	33	33	32	33
1301	33	33	33	33	33	33	33	33	32	33
1307	33	33	33	33	33	33	33	33	32	33
1312	33	33	33	33	33	33	33	33	32	33

OPEN DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
-42	25	25	25	25	26	25	24	25	25	25
-34	25	25	25	25	26	25	25	25	25	25
-29	25	25	25	25	26	25	25	25	25	25
-23	25	25	25	25	26	25	25	25	25	25
-17	25	25	25	25	26	25	25	25	25	25
-11	25	25	25	25	25	25	25	25	25	25
-6	25	25	25	25	25	25	25	25	25	25
-0	25	25	25	25	26	25	25	25	25	25
5	25	25	25	25	26	25	25	25	25	25
10	25	25	28	26	26	25	25	25	28	25
16	26	25	31	27	26	25	26	25	28	26
22	28	25	32	28	26	25	28	26	29	26
28	28	26	33	28	28	26	28	26	30	27
33	29	26	34	29	29	26	29	26	30	27
39	29	27	36	30	29	27	30	27	32	28
45	30	27	37	31	30	27	30	27	32	29
50	31	27	37	32	32	28	31	28	34	29
56	31	28	38	33	32	28	32	29	35	30
62	31	28	41	35	32	28	33	29	35	31
68	33	29	42	36	33	29	33	30	36	32
73	34	30	44	37	34	30	34	30	36	32
79	35	30	44	38	35	30	35	31	37	33
85	37	31	45	39	35	31	35	31	38	34
91	37	32	45	40	35	31	35	32	39	34
97	37	33	47	41	36	31	37	32	38	35

OPEN DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
102	39	33	48	42	37	32	36	33	40	36
108	39	34	48	43	37	32	37	33	41	36
114	40	35	47	44	38	33	38	34	43	37
119	40	35	48	44	38	33	39	35	42	38
125	41	36	49	45	39	34	39	35	43	39
131	42	37	49	46	40	34	39	35	44	39
137	42	37	52	47	41	35	41	36	45	40
142	43	38	53	48	40	35	41	37	44	41
148	44	39	53	49	41	36	42	37	44	41
154	45	40	55	50	42	37	43	38	47	42
160	46	40	58	51	42	37	43	38	46	43
165	47	41	57	52	43	37	44	39	49	44
171	47	42	58	53	43	38	44	40	50	45
177	47	42	59	54	44	38	46	40	49	45
182	48	43	58	54	45	39	46	41	50	46
188	49	44	59	55	44	39	46	42	51	47
194	49	44	60	56	46	40	46	42	53	47
200	49	45	61	56	46	40	47	43	51	48
205	50	45	62	57	46	41	48	43	52	48
211	51	46	62	58	49	42	48	44	53	49
217	51	46	64	58	49	43	49	44	58	50
223	52	47	65	59	49	43	51	45	56	51
228	53	48	65	60	50	44	51	46	58	52
234	54	49	70	62	51	44	52	47	58	53
240	55	49	67	62	51	45	53	47	59	54

OPEN DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
246	56	50	71	64	52	45	53	48	58	54
251	57	51	70	65	52	46	52	48	61	55
257	57	52	70	65	54	47	56	49	61	56
263	58	52	72	66	55	48	57	50	61	57
268	59	53	73	67	57	49	56	51	64	58
274	60	54	74	68	58	49	58	52	63	58
280	61	54	74	69	57	50	59	52	68	60
286	63	55	79	71	58	51	59	53	66	61
291	62	56	77	71	59	51	60	54	67	62
297	63	57	78	72	60	52	59	54	67	63
303	64	57	80	74	59	53	61	55	67	63
308	65	58	79	74	56	52	61	56	68	64
314	67	59	81	75	60	53	62	56	70	65
320	68	60	85	77	62	54	64	57	71	66
326	69	61	87	78	65	55	64	58	74	67
331	70	62	86	79	66	56	65	59	75	68
337	70	63	87	80	66	57	66	59	75	69
343	72	64	87	82	68	58	68	60	76	70
349	72	65	89	82	67	59	67	61	76	71
354	73	66	81	76	68	60	67	61	77	71
360	72	66	88	78	67	60	69	62	83	73
366	74	67	91	81	69	61	71	63	80	74
372	74	68	90	82	70	62	72	64	82	75
377	76	68	90	84	70	62	73	65	81	76
383	77	69	95	86	70	63	72	66	87	78

OPEN DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
389	77	70	94	87	74	64	74	67	83	78
395	78	71	98	89	73	64	74	68	84	79
400	77	71	98	90	72	65	74	68	85	80
406	80	72	98	91	74	65	75	69	83	80
412	81	73	94	91	75	66	78	70	85	80
417	79	73	96	91	74	66	76	70	84	80
423	79	74	95	91	73	66	75	70	84	81
429	78	73	90	90	72	67	74	70	84	81
435	76	73	91	90	71	66	75	70	79	80
440	75	73	90	89	73	67	77	71	81	80
446	76	73	95	89	73	67	74	71	84	81
452	76	73	95	90	72	67	75	71	83	81
458	77	73	92	89	72	67	75	71	82	80
463	78	73	91	89	70	67	75	71	84	81
469	79	73	95	90	75	67	76	72	87	82
475	79	73	100	92	76	68	78	72	87	83
480	80	74	101	93	76	69	77	73	87	83
486	82	75	103	95	78	69	78	73	87	83
492	82	75	101	95	79	70	79	74	89	84
498	82	76	100	96	78	70	80	74	92	86
504	82	76	104	97	78	71	80	75	93	87
509	83	77	106	98	76	71	82	76	95	88
515	85	77	107	99	80	72	83	76	93	89
521	88	79	110	101	82	73	86	78	95	89
526	87	79	108	102	84	73	86	78	97	90

OPEN DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
532	87	80	110	103	85	74	85	79	95	91
538	89	81	112	104	85	75	87	80	99	93
544	70	71	112	105	87	76	91	82	102	94
549	58	52	111	106	87	77	91	83	103	95
555	86	51	118	108	90	78	93	84	105	97
561	90	57	116	110	91	79	92	85	106	99
567	90	63	122	112	90	80	93	86	107	100
573	91	69	120	113	92	81	94	86	105	101
579	92	74	120	114	93	82	99	88	107	102
584	93	77	122	115	93	83	97	89	111	104
590	95	81	123	116	95	81	98	90	107	104
596	95	83	122	117	93	82	98	91	111	105
602	97	85	122	117	95	84	101	92	114	107
608	101	87	127	119	96	84	102	93	114	108
614	102	89	126	120	99	86	104	95	114	109
619	101	91	130	122	102	87	103	95	121	111
625	103	92	133	123	100	88	103	96	116	111
631	106	94	133	125	100	89	106	97	115	112
637	104	95	134	126	101	90	106	98	119	113
643	109	97	136	128	99	90	104	98	120	113
649	107	98	134	128	98	91	105	98	119	114
655	110	99	137	129	102	92	109	99	123	116
660	110	100	143	132	104	92	110	101	120	116
666	108	100	142	133	106	94	109	101	123	117
672	112	102	142	134	106	94	108	101	123	118

OPEN DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
678	115	103	144	136	106	95	110	102	123	119
684	114	104	145	136	105	95	111	103	124	120
690	114	105	142	137	108	96	111	104	127	121
695	117	106	142	138	108	97	109	104	123	121
701	114	106	143	138	107	97	113	104	130	122
707	117	107	149	140	106	97	111	105	128	123
713	117	108	149	141	110	99	116	106	133	125
719	118	108	145	140	113	100	116	107	130	125
725	115	108	143	140	110	100	115	108	131	126
730	114	108	146	141	112	101	116	108	131	127
736	116	108	149	142	111	101	116	109	129	127
742	118	109	147	142	111	101	115	109	131	127
748	117	109	153	145	112	101	117	109	132	128
754	116	110	138	142	112	102	117	110	130	128
759	116	109	148	143	115	103	117	110	128	128
765	119	110	149	143	114	103	116	110	132	129
771	120	111	151	144	112	104	120	111	134	130
777	123	112	148	145	109	103	120	112	137	130
783	122	112	153	146	113	104	119	112	137	131
789	123	113	156	148	115	104	123	113	140	133
794	122	114	153	148	116	105	120	114	140	135
800	120	114	149	147	112	105	121	114	140	135
806	122	114	156	148	116	105	125	115	142	136
812	123	114	151	148	118	106	125	116	142	136
818	115	111	144	132	40	59	71	77	140	137

OPEN DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
823	38	67	128	82	40	43	93	78	125	134
829	37	45	104	60	42	44	92	83	118	128
835	36	39	50	56	35	40	91	86	109	123
841	35	37	49	50	35	37	86	85	97	115
847	36	36	49	49	34	36	86	84	93	110
853	35	35	48	48	34	35	72	80	83	102
858	34	35	47	47	39	36	66	76	76	96
864	35	35	45	45	34	34	67	72	73	90
870	34	35	43	43	33	34	55	68	65	84
876	33	34	44	44	33	33	49	65	62	79
882	33	34	44	43	34	33	55	62	63	75
888	33	34	44	43	34	34	52	56	60	71
894	33	33	42	42	32	32	55	55	62	69
899	32	33	43	42	31	32	45	54	59	66
905	32	33	42	41	33	32	48	54	59	64
911	32	33	41	41	31	31	48	53	54	61
917	32	32	40	40	31	31	46	49	55	60
923	31	32	38	39	31	31	46	47	53	58
929	31	32	34	36	31	31	48	46	54	57
935	32	32	34	35	30	31	49	45	48	55
940	32	32	34	34	31	31	46	44	48	54
946	31	32	34	34	31	31	39	43	49	53
952	31	32	33	34	31	31	40	42	50	52
958	31	31	33	34	31	31	46	43	51	52
964	31	31	32	33	31	31	39	41	51	52

OPEN DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
970	31	31	32	33	31	31	42	41	48	51
976	31	31	32	33	30	30	40	40	50	50
982	31	31	32	32	30	30	39	39	48	50
987	31	31	32	32	30	30	37	38	45	49
993	31	31	32	32	31	31	41	38	47	48
999	31	31	33	32	31	31	42	38	46	48
1005	32	31	33	33	32	32	40	38	47	47
1011	32	32	33	33	33	32	38	37	42	47
1017	32	32	34	33	33	33	36	37	45	46
1023	33	32	34	34	34	34	35	36	43	45
1028	34	33	35	34	35	35	36	36	44	45
1034	34	33	35	35	35	35	36	36	42	45
1040	35	34	35	35	35	35	36	36	42	44
1046	35	34	36	36	36	36	35	35	42	44
1052	35	35	36	36	36	36	35	35	43	43
1058	35	35	36	36	36	36	36	36	42	43
1064	35	35	37	37	36	36	36	36	41	42
1069	35	35	37	37	36	37	36	36	41	42
1075	36	35	37	37	37	37	36	36	41	42
1081	37	36	37	37	36	37	36	36	42	42
1087	36	36	37	37	37	37	38	37	41	42
1093	36	36	37	37	36	37	37	37	40	42
1099	37	36	37	37	36	37	37	37	40	41
1104	36	36	37	38	37	37	36	37	41	41
1110	37	36	37	38	37	37	36	37	40	41

OPEN DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
1116	37	36	37	38	37	37	36	36	39	40
1122	37	37	37	38	37	37	36	36	40	40
1128	36	37	38	38	37	37	36	36	39	40
1134	36	37	38	38	37	37	37	37	40	40
1139	36	36	38	38	37	37	37	37	39	40
1145	37	37	38	38	37	38	37	37	40	40
1151	37	37	38	38	37	38	37	37	38	39
1157	37	37	38	38	38	38	37	37	39	39
1163	37	37	38	38	38	38	37	37	39	39
1169	37	37	38	38	37	37	36	36	39	39
1175	37	37	38	38	37	37	36	36	39	39
1180	37	37	38	38	37	37	37	37	38	39
1186	37	37	38	38	37	37	37	37	39	39
1192	37	37	38	38	38	38	37	37	38	38
1198	37	37	38	38	37	38	37	37	38	38
1204	37	37	38	38	37	38	37	37	38	38
1210	38	37	38	38	38	38	37	37	38	38
1215	38	37	38	38	38	38	37	37	38	38
1221	38	37	38	38	37	38	37	37	38	38
1227	38	38	38	38	38	38	37	37	38	38
1233	38	38	38	38	37	38	37	37	38	38
1239	37	38	38	38	37	38	37	37	38	38
1245	37	38	38	38	38	38	37	37	38	38
1251	37	37	38	38	38	38	37	37	38	38
1256	37	37	38	38	37	38	37	37	38	38

OPEN DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
1262	37	37	38	38	37	37	37	37	38	38
1268	37	37	38	38	37	38	37	37	38	38
1274	37	37	38	38	38	38	37	37	38	38
1280	37	37	38	38	37	38	37	37	38	38
1286	37	37	38	38	38	38	37	37	38	38
1291	37	37	38	38	38	38	37	37	38	38
1297	37	37	38	38	38	38	37	37	38	38
1303	38	37	38	38	37	38	37	37	38	38
1309	37	37	38	38	38	38	37	37	38	38
1315	37	37	38	38	37	38	37	37	38	38
1321	37	37	38	38	37	37	37	37	37	38
1327	37	37	38	38	37	37	37	37	37	38
1332	37	37	38	38	37	38	37	37	37	38
1338	37	37	38	38	37	38	37	37	38	37
1344	37	37	38	38	37	38	37	37	37	38
1350	37	37	38	38	37	37	37	37	37	37
1356	37	37	38	38	37	38	37	37	37	37
1362	37	38	38	38	37	37	37	37	37	37
1367	37	37	38	38	37	37	37	37	37	37
1373	37	37	38	38	37	38	37	37	38	38
1379	37	37	38	38	38	38	37	37	37	37
1385	37	37	38	38	37	38	37	37	37	37
1391	37	37	38	38	37	38	37	37	37	37
1397	37	37	38	38	37	38	37	37	37	37
1402	37	37	38	38	37	38	37	37	37	37

OPEN DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
1408	37	37	38	38	37	37	37	37	38	37
1414	37	37	38	38	38	38	37	37	37	37
1420	37	37	38	38	38	38	37	37	38	37
1426	37	37	38	38	38	38	37	37	37	37
1432	37	37	38	38	38	38	37	37	37	37
1437	37	37	38	38	38	38	37	37	37	37
1443	37	37	38	38	37	38	37	37	37	37
1449	37	37	38	38	38	38	37	37	37	37
1455	38	38	38	38	37	38	37	37	37	37
1461	37	38	38	38	37	37	37	37	37	37
1467	37	37	38	38	37	37	37	37	37	37
1473	37	37	38	38	37	37	37	37	37	37
1479	37	38	38	38	37	37	37	37	38	37
1484	37	37	38	38	37	37	37	37	37	37
1490	37	37	38	38	37	37	37	37	38	37
1496	37	37	38	38	37	37	37	37	37	37
1502	37	37	38	38	37	38	37	37	37	37
1508	37	37	38	38	38	38	37	37	37	37
1514	37	37	38	38	37	38	37	37	37	37
1519	37	38	38	38	37	37	37	37	37	37
1525	37	37	38	38	37	37	37	37	37	37
1531	37	37	38	38	37	37	37	37	37	37
1537	37	37	38	38	37	37	37	37	37	37
1543	37	37	38	38	38	38	37	37	37	37
1549	38	38	38	38	37	38	37	37	37	37

OPEN DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
1554	37	38	38	38	38	38	37	37	37	37
1560	37	37	38	38	37	37	37	37	37	37
1566	38	38	38	38	37	38	37	37	37	37
1572	37	37	38	38	37	37	37	37	37	37
1578	37	37	38	38	37	37	37	37	37	37
1584	37	37	38	38	37	37	37	37	38	37
1590	37	37	38	38	37	37	37	37	37	37
1595	37	37	38	38	37	37	36	36	37	37
1601	37	37	38	38	37	37	37	36	37	37
1607	38	38	38	38	37	37	37	36	37	37
1613	37	38	38	38	37	37	37	37	37	37
1619	37	38	38	38	37	37	37	37	37	37
1625	37	37	38	38	37	37	37	36	37	37

OPEN DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
-42	25	25	25	25	24	24	24	24	26	24
-34	25	25	25	25	24	24	25	24	26	25
-29	25	25	25	25	24	24	25	24	26	25
-23	25	25	25	25	25	24	25	25	26	25
-17	25	25	25	25	24	24	25	24	26	25
-11	25	25	25	25	24	24	25	24	26	25
-6	25	25	25	25	24	24	24	24	26	25
-0	25	25	25	25	24	24	24	24	26	25
5	25	25	25	25	24	24	25	24	26	25
10	25	25	25	25	24	24	26	24	26	25
16	25	25	25	25	24	24	28	24	26	26
22	26	25	25	25	25	24	29	25	26	28
28	27	25	27	25	25	24	30	25	26	28
33	28	25	28	25	26	24	30	26	26	29
39	28	25	28	26	26	24	31	26	26	30
45	29	25	29	26	27	24	32	27	26	30
50	30	26	30	27	28	25	33	28	26	31
56	30	26	30	27	28	25	33	28	26	32
62	31	26	31	27	28	25	35	28	27	33
68	31	26	31	28	30	25	37	30	27	33
73	32	27	32	28	31	25	38	31	28	34
79	32	27	32	29	31	26	38	31	28	35
85	33	27	33	29	32	26	38	32	28	35
91	34	27	34	30	33	26	39	33	29	35
97	34	28	35	30	33	27	40	33	29	37

OPEN DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
102	34	28	35	31	33	27	40	33	29	36
108	35	28	35	31	33	27	41	33	29	37
114	35	29	36	32	35	28	41	35	29	38
119	38	29	36	32	35	28	42	35	30	39
125	37	29	38	33	35	28	43	35	30	39
131	37	29	38	33	35	29	44	35	30	39
137	38	30	38	34	36	29	44	36	30	41
142	39	30	38	34	37	29	45	37	31	41
148	38	30	39	35	38	30	47	38	31	42
154	39	31	39	35	38	30	47	38	31	43
160	40	31	40	36	39	31	48	39	33	43
165	40	31	41	36	40	31	48	40	33	44
171	41	32	42	37	40	32	48	40	33	44
177	41	32	42	37	41	32	48	41	34	46
182	42	32	42	38	41	32	49	41	34	46
188	42	33	42	38	42	33	51	42	34	46
194	43	34	44	39	42	33	51	42	34	46
200	44	34	45	39	43	34	51	43	35	47
205	44	34	46	40	43	34	52	43	35	48
211	44	35	46	40	44	34	53	44	35	48
217	45	35	47	41	44	35	54	44	35	49
223	45	35	47	42	44	35	55	44	35	51
228	47	36	48	42	44	36	55	44	36	51
234	48	36	48	43	45	36	58	45	37	52
240	48	37	50	44	46	36	57	46	37	53

OPEN DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
246	51	37	52	44	46	37	59	46	37	53
251	51	38	52	45	47	37	59	47	38	52
257	51	38	54	46	49	38	59	49	39	56
263	52	39	53	46	49	38	61	49	38	57
268	55	39	52	47	49	39	61	49	39	56
274	53	40	55	48	50	39	62	50	40	58
280	53	40	55	48	51	40	64	51	41	59
286	54	41	56	49	51	40	65	51	41	59
291	55	41	57	50	53	41	65	53	41	60
297	57	42	59	50	53	41	66	53	41	59
303	56	42	58	51	53	42	69	53	42	61
308	57	43	58	52	54	42	68	54	42	61
314	57	43	60	52	54	43	70	54	43	62
320	58	44	60	53	55	43	70	55	43	64
326	59	44	63	54	57	44	72	57	44	64
331	60	45	63	55	57	44	71	57	44	65
337	62	45	63	55	58	45	74	58	45	66
343	62	46	63	56	60	46	76	60	47	68
349	63	46	64	56	60	46	76	60	46	67
354	64	47	66	57	62	47	73	62	47	67
360	66	47	66	58	60	48	74	60	47	69
366	67	48	67	59	61	48	77	61	49	71
372	66	49	68	59	64	49	77	64	48	72
377	68	49	69	60	62	49	78	62	49	73
383	67	50	69	61	64	50	79	64	49	72

OPEN DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
389	67	50	70	62	65	50	80	65	49	74
395	67	51	70	62	65	51	83	65	51	74
400	67	51	70	63	66	52	83	66	50	74
406	67	51	71	63	66	52	82	66	50	75
412	68	52	72	64	67	53	82	67	51	78
417	69	52	71	64	67	53	83	67	53	76
423	69	52	72	64	66	54	81	66	53	75
429	67	53	71	65	67	54	77	67	52	74
435	66	53	71	65	66	54	80	66	52	75
440	67	53	70	65	65	54	79	65	52	77
446	69	54	69	65	65	55	79	65	51	74
452	68	54	70	65	66	55	81	66	51	75
458	69	54	70	65	65	55	79	65	52	75
463	70	54	71	65	65	55	80	65	52	75
469	69	55	72	65	68	56	83	68	52	76
475	68	55	72	65	67	56	86	67	52	78
480	70	55	74	66	68	56	85	68	54	77
486	71	55	75	67	69	57	88	69	53	78
492	70	56	72	67	69	57	86	69	54	79
498	72	56	74	67	70	57	87	70	56	80
504	74	57	76	68	69	58	90	69	55	80
509	75	57	78	68	72	58	90	72	54	82
515	72	57	80	69	71	58	92	71	57	83
521	72	58	79	70	72	59	91	72	57	86
526	76	58	81	71	74	59	94	74	57	86

OPEN DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
532	77	59	83	72	74	60	94	74	59	85
538	77	59	82	72	74	60	96	74	58	87
544	81	60	80	73	76	61	96	76	59	91
549	79	61	82	73	77	62	99	77	60	91
555	81	61	84	74	78	62	100	78	60	93
561	82	62	89	76	77	63	100	77	61	92
567	83	63	88	77	78	63	102	78	63	93
573	83	63	90	78	80	64	104	80	61	94
579	82	64	88	79	81	64	103	81	62	99
584	86	64	89	79	83	65	105	83	63	97
590	84	65	91	80	82	66	103	82	64	98
596	86	66	89	81	82	66	104	82	65	98
602	85	66	93	82	82	67	105	82	65	101
608	88	67	91	82	83	67	110	83	65	102
614	89	68	95	83	83	68	109	83	67	104
619	93	69	95	84	84	68	109	84	67	103
625	88	69	96	85	86	69	111	86	67	103
631	92	70	97	86	86	70	113	86	67	106
637	95	62	98	86	86	70	117	86	68	106
643	96	61	98	87	88	71	115	88	68	104
649	99	63	103	88	89	72	115	89	70	105
655	98	65	101	89	92	73	117	92	70	109
660	98	67	103	90	90	73	122	90	72	110
666	99	68	100	91	92	74	120	92	71	109
672	100	70	103	91	94	75	124	94	73	108

OPEN DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
678	102	71	107	92	92	76	122	92	73	110
684	101	73	106	93	93	76	121	93	74	111
690	102	74	106	94	95	77	125	95	75	111
695	105	75	108	95	97	78	122	97	74	109
701	103	76	107	96	93	78	122	93	74	113
707	104	78	110	96	94	79	127	94	72	111
713	105	79	112	98	98	80	128	98	74	116
719	106	79	111	98	95	80	126	95	78	116
725	104	80	108	98	96	80	124	96	76	115
730	108	81	107	98	98	81	127	98	77	116
736	105	81	109	99	99	81	132	99	77	116
742	107	82	111	99	96	82	126	96	77	115
748	106	82	112	100	97	82	130	97	78	117
754	111	83	108	100	97	83	124	97	77	117
759	106	83	111	100	98	83	128	98	79	117
765	110	84	111	100	100	84	130	100	77	116
771	111	84	113	101	98	84	133	98	79	120
777	112	85	115	102	97	85	127	97	79	120
783	111	86	112	102	99	85	136	99	81	119
789	114	86	113	102	102	86	134	102	82	123
794	116	88	117	103	103	87	130	103	83	120
800	112	88	117	104	102	87	134	102	80	121
806	115	89	116	104	103	87	135	103	79	125
812	118	90	116	105	101	88	132	101	83	125
818	52	79	92	97	0	----	40	32	84	71

OPEN DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
823	54	71	40	59	0	----	42	34	86	93
829	66	67	39	46	0	----	38	33	78	92
835	49	51	38	40	0	----	36	33	70	91
841	45	44	37	37	0	----	35	32	63	86
847	43	42	36	37	32	----	34	32	56	86
853	39	38	36	36	33	----	34	33	52	72
858	37	37	36	36	32	----	36	32	49	66
864	36	36	35	35	32	----	34	32	48	67
870	34	35	35	35	31	----	33	31	45	55
876	35	35	34	35	30	----	33	30	43	49
882	34	34	34	34	30	----	33	30	43	55
888	33	35	33	34	30	----	32	30	42	52
894	33	34	34	34	29	----	32	29	42	55
899	33	33	33	34	29	----	31	29	42	45
905	32	33	33	33	29	----	32	29	42	48
911	33	32	31	33	29	----	31	29	42	48
917	31	32	32	32	29	----	31	29	40	46
923	32	32	31	32	30	----	31	30	40	46
929	32	32	32	32	30	----	31	30	39	48
935	31	31	32	32	30	----	31	30	39	49
940	32	31	32	32	30	----	31	30	38	46
946	32	32	32	32	30	----	31	30	37	39
952	31	31	32	32	30	----	31	30	37	40
958	31	31	32	32	29	----	31	29	38	46
964	31	31	32	32	29	----	30	29	38	39

OPEN DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
970	30	31	32	32	29	——	30	29	37	42
976	32	31	31	32	29	——	30	29	35	40
982	30	31	31	32	29	——	30	29	36	39
987	33	31	31	31	30	——	31	30	36	37
993	31	31	31	31	31	——	31	31	36	41
999	32	31	31	31	32	——	31	32	36	42
1005	31	31	31	31	34	——	32	34	35	40
1011	32	32	32	31	35	——	33	35	33	38
1017	33	32	32	32	36	——	34	36	33	36
1023	33	33	33	32	37	——	34	37	34	35
1028	34	33	33	32	38	——	35	38	34	36
1034	34	34	33	33	38	——	35	38	34	36
1040	34	34	34	33	39	——	36	39	35	36
1046	35	34	34	33	0	——	36	39	35	35
1052	35	35	34	34	0	——	36	39	34	35
1058	35	35	34	34	0	——	36	38	34	36
1064	35	35	35	34	0	——	36	39	33	36
1069	35	35	35	34	0	——	36	39	33	36
1075	35	35	35	35	0	——	36	39	33	36
1081	36	35	35	35	0	——	37	39	34	36
1087	36	35	35	35	0	——	37	39	34	38
1093	36	36	35	35	0	——	37	39	35	37
1099	36	36	35	35	0	——	37	39	34	37
1104	35	36	35	35	0	——	37	39	34	36
1110	36	36	35	35	0	——	37	39	33	36

OPEN DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
1116	35	36	35	35	0	----	37	39	33	36
1122	36	36	35	35	0	----	37	39	33	36
1128	36	36	36	35	0	----	37	39	33	36
1134	36	36	35	35	0	----	37	40	33	37
1139	36	36	35	35	0	----	37	40	33	37
1145	36	36	34	35	0	----	37	40	33	37
1151	36	36	35	35	0	----	37	40	33	37
1157	36	36	35	35	0	----	37	40	33	37
1163	36	36	36	35	0	----	37	40	33	37
1169	36	36	36	36	0	----	38	40	33	36
1175	36	36	36	36	0	----	38	40	33	36
1180	36	36	36	36	0	----	37	40	33	37
1186	36	36	36	36	0	----	38	40	33	37
1192	37	36	36	36	0	----	38	40	33	37
1198	36	36	36	36	0	----	38	40	32	37
1204	37	36	36	36	0	----	38	40	32	37
1210	36	36	36	36	0	----	38	39	34	37
1215	37	36	36	36	0	----	38	40	33	37
1221	36	37	36	36	0	----	38	40	33	37
1227	36	36	36	36	0	----	38	40	33	37
1233	37	37	36	36	0	----	38	40	33	37
1239	36	36	36	36	0	----	38	40	33	37
1245	36	36	36	36	0	----	38	40	33	37
1251	37	37	36	36	0	----	38	40	33	37
1256	36	37	35	36	0	----	38	40	33	37

OPEN DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
1262	36	36	36	36	0	-----	38	40	33	37
1268	37	37	36	36	0	-----	38	40	33	37
1274	36	37	36	36	0	-----	38	40	32	37
1280	36	36	36	36	0	-----	38	40	33	37
1286	37	37	36	36	0	-----	38	40	33	37
1291	36	37	36	36	0	-----	38	40	33	37
1297	37	37	36	36	0	-----	38	40	34	37
1303	37	37	36	36	0	-----	38	40	33	37
1309	36	36	36	36	0	-----	38	40	33	37
1315	37	36	36	36	0	-----	38	40	33	37
1321	36	36	35	36	0	-----	38	40	32	37
1327	37	37	36	36	0	-----	38	40	33	37
1332	36	36	35	36	0	-----	37	39	32	37
1338	37	37	36	36	0	-----	38	40	32	37
1344	36	37	36	36	0	-----	38	40	33	37
1350	36	36	36	36	0	-----	38	40	32	37
1356	37	37	36	36	0	-----	38	40	33	37
1362	36	36	35	36	0	-----	38	39	32	37
1367	36	36	35	35	0	-----	38	40	32	37
1373	36	36	35	35	0	-----	38	39	32	37
1379	36	36	35	35	0	-----	38	39	32	37
1385	37	36	36	36	0	-----	38	40	32	37
1391	36	36	35	35	0	-----	38	40	32	37
1397	37	36	35	35	0	-----	38	39	32	37
1402	36	36	35	35	0	-----	38	40	32	37

OPEN DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
1408	36	36	35	35	0	----	38	39	32	37
1414	37	36	36	35	0	----	38	39	32	37
1420	36	36	35	35	0	----	38	39	33	37
1426	36	36	36	35	0	----	38	39	33	37
1432	36	36	35	36	0	----	37	39	33	37
1437	36	36	35	35	0	----	38	39	32	37
1443	37	37	36	36	0	----	38	40	32	37
1449	36	36	36	36	0	----	37	38	32	37
1455	37	37	36	36	0	----	38	39	32	37
1461	36	36	36	36	0	----	38	39	33	37
1467	36	36	36	36	0	----	38	39	32	37
1473	37	36	36	36	0	----	38	40	34	37
1479	36	36	35	36	0	----	38	39	33	37
1484	36	36	35	36	0	----	38	39	32	37
1490	36	36	36	36	0	----	38	39	32	37
1496	36	36	35	36	0	----	38	39	32	37
1502	36	36	36	36	0	----	38	39	32	37
1508	36	36	35	35	0	----	38	39	32	37
1514	36	36	36	35	0	----	38	39	32	37
1519	36	36	35	36	0	----	38	39	33	37
1525	36	36	36	36	0	----	38	39	32	37
1531	37	36	36	36	0	----	37	39	32	37
1537	36	36	36	36	0	----	37	39	32	37
1543	36	36	36	36	0	----	38	39	32	37
1549	37	37	36	36	0	----	38	39	32	37

OPEN DOOR PRIVACY CURTAIN TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
1554	36	37	36	36	0	----	38	39	32	37
1560	37	37	36	36	0	----	37	39	32	37
1566	37	37	36	36	0	----	37	39	32	37
1572	36	36	36	36	0	----	37	39	32	37
1578	36	36	35	36	0	----	38	39	33	37
1584	36	36	36	36	0	----	37	39	33	37
1590	36	36	35	36	0	----	37	39	32	37
1595	36	36	36	36	0	----	38	39	32	36
1601	36	36	35	36	0	----	37	39	32	37
1607	36	36	35	35	0	----	38	39	31	37
1613	36	36	36	35	0	----	37	39	31	37
1619	36	36	36	36	0	----	37	39	31	37
1625	36	36	36	36	0	----	37	39	32	37

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
-53	29	27	29	26	29	27	28	27	28	27
-49	27	29	26	30	27	29	27	29	27	29
-46	27	29	26	30	27	29	27	28	27	29
-43	29	27	29	26	28	27	28	27	29	27
-40	28	27	28	27	28	28	27	28	28	28
-37	29	27	29	26	28	27	28	27	29	27
-35	27	29	26	30	27	29	27	28	27	29
-32	28	27	28	27	28	28	28	28	28	28
-29	27	29	26	30	27	29	27	28	27	29
-26	28	27	28	27	28	28	28	28	28	28
-23	29	27	29	26	29	27	28	27	28	27
-20	27	29	26	30	27	29	27	28	27	29
-17	29	27	28	26	28	27	28	27	28	27
-15	29	27	29	26	29	27	28	27	29	27
-12	28	27	28	26	29	27	29	27	29	27
-9	29	27	28	26	28	27	28	27	28	27
-6	29	27	29	26	29	27	29	27	29	27
-3	28	28	28	28	29	28	28	27	29	27
-0	29	27	29	26	29	27	28	27	28	27
1	28	27	29	26	29	27	29	27	30	27
4	28	28	28	27	29	28	29	27	30	27
7	27	29	28	30	28	29	28	28	28	29
10	28	27	30	27	28	28	29	28	29	27
13	27	28	30	29	28	28	29	28	29	27
16	28	28	29	30	27	29	28	29	28	29

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
19	28	28	30	29	28	28	28	28	29	27
22	28	29	30	30	28	29	28	28	30	29
24	29	29	31	30	28	29	29	29	29	30
27	29	28	31	29	29	28	29	28	30	28
30	29	29	31	31	29	29	29	29	29	30
33	31	28	32	28	30	28	30	29	31	29
36	31	28	34	28	31	28	31	28	32	28
39	29	29	32	32	30	29	30	29	30	31
41	31	28	34	29	31	29	32	29	32	29
44	29	30	32	32	31	30	31	30	31	31
47	31	28	35	30	33	29	32	29	32	29
50	31	28	35	30	32	29	32	29	32	29
53	31	30	34	32	32	30	32	30	32	30
56	31	29	34	31	32	30	32	30	32	30
59	31	31	34	33	32	31	32	31	32	31
61	31	31	35	34	32	30	32	30	33	31
64	31	31	34	35	31	31	32	31	32	32
67	33	29	37	31	33	30	34	30	34	30
70	31	31	35	35	32	32	32	32	32	33
73	33	30	38	33	33	31	33	31	33	31
76	33	30	39	34	32	31	33	32	33	33
79	34	30	40	33	32	30	33	31	35	31
82	33	30	38	34	33	31	33	32	35	33
84	34	30	39	34	33	31	34	32	35	32
87	35	31	39	34	34	31	35	31	37	32

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
90	34	31	39	34	33	31	34	32	37	33
93	35	31	40	34	34	31	35	31	37	33
96	33	32	38	37	34	32	34	33	36	35
99	35	31	41	35	36	31	35	32	38	34
101	35	32	41	35	36	32	36	32	39	34
104	35	31	41	35	37	32	36	32	40	34
107	36	32	41	36	36	33	37	33	39	35
110	35	32	42	37	36	33	37	33	39	35
113	33	34	39	40	34	34	35	34	38	38
116	34	34	41	40	35	34	36	35	40	38
118	35	33	43	38	37	33	38	34	40	36
121	34	34	42	40	37	34	37	34	40	38
124	34	34	41	41	37	35	37	35	41	39
127	35	35	41	41	37	35	38	36	39	39
130	35	35	42	41	37	35	38	36	40	40
133	35	35	43	42	37	36	38	36	40	40
136	37	34	45	40	39	35	40	35	42	38
138	36	36	44	43	38	36	38	37	40	40
141	38	34	46	39	39	35	41	35	43	38
144	38	34	47	40	39	35	40	36	44	39
147	38	35	46	41	39	35	40	36	42	39
150	38	35	46	42	39	36	41	38	43	41
153	40	35	46	41	40	36	42	37	43	40
156	40	35	48	41	41	36	42	37	45	40
158	40	35	48	41	40	36	42	38	47	41

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
161	41	36	46	41	40	37	41	38	45	41
164	40	36	47	42	42	37	42	38	46	42
167	40	36	49	42	42	37	43	38	47	41
170	39	38	49	45	41	38	42	39	45	43
173	40	38	48	45	42	38	42	40	45	42
176	40	39	47	46	42	39	42	40	46	44
179	40	38	49	46	41	39	43	41	45	45
181	41	39	49	47	43	40	44	41	46	45
184	41	39	47	47	43	40	43	41	49	45
187	41	40	49	48	42	40	43	41	47	46
190	41	40	49	48	42	40	44	41	48	46
193	43	39	52	46	44	39	45	40	50	44
196	42	41	49	49	43	41	44	42	48	47
199	44	39	51	46	44	40	45	41	49	45
201	44	40	51	48	43	41	45	42	49	47
204	44	40	53	47	44	40	46	42	53	46
207	43	41	52	50	44	42	45	43	50	49
210	45	41	52	49	44	41	45	43	52	49
213	44	41	52	50	45	42	46	43	53	49
216	46	41	55	48	45	41	46	43	51	48
219	46	41	57	49	48	41	48	43	53	48
221	47	41	56	49	48	41	48	43	53	48
224	47	41	57	49	47	42	48	43	53	49
227	47	43	56	53	46	43	46	45	52	51
230	48	42	58	50	48	42	48	44	56	50

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
233	49	43	58	51	47	43	49	44	55	51
236	48	43	59	52	48	43	49	45	55	51
238	50	43	59	52	49	43	50	45	55	51
241	50	44	61	53	50	44	51	45	55	51
244	48	46	60	56	47	45	49	47	53	53
247	49	46	61	57	47	45	48	47	55	53
250	50	46	59	56	47	45	49	46	58	52
253	51	45	61	54	47	44	51	46	57	52
256	49	47	60	58	47	46	49	47	58	55
258	50	47	61	58	49	46	53	48	58	55
261	52	46	62	55	49	45	52	47	60	54
264	52	47	63	56	50	45	53	48	61	54
267	51	48	60	59	50	46	52	49	61	57
270	51	49	62	60	49	47	51	49	58	57
273	52	47	63	57	51	46	53	49	64	56
275	51	49	63	59	50	47	52	49	65	58
278	50	49	61	61	50	48	53	50	63	60
281	51	50	62	61	50	48	54	51	63	60
284	54	48	63	58	52	47	58	50	66	59
287	52	49	64	60	53	48	55	52	64	61
290	53	50	68	62	53	49	56	52	66	62
293	56	49	68	60	55	48	57	51	68	61
295	55	50	69	62	54	49	58	53	68	63
298	55	51	69	64	55	50	58	53	69	64
301	56	50	70	63	56	50	58	54	70	64

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
304	57	51	72	63	56	50	61	54	71	64
307	57	51	72	63	59	50	62	54	69	64
310	58	51	72	64	58	51	63	56	72	66
313	57	53	74	67	59	53	61	57	71	67
315	59	52	78	66	61	52	64	56	73	66
318	57	54	76	70	60	54	62	58	72	69
321	60	55	76	71	60	54	63	59	73	69
324	63	54	79	68	62	54	65	58	77	68
327	60	56	79	72	62	55	66	59	79	70
330	61	57	77	73	63	56	64	60	76	72
332	65	56	79	71	64	56	66	60	79	71
335	63	58	83	76	62	57	66	62	78	74
338	66	57	87	74	63	56	69	61	80	72
341	64	60	85	78	62	58	66	63	80	76
344	65	60	83	78	64	59	68	63	82	76
347	65	61	86	79	64	59	68	63	86	78
350	68	61	89	80	65	59	70	64	84	77
353	67	62	88	82	65	60	70	65	88	80
355	70	61	91	79	68	59	73	65	89	79
358	70	62	92	80	66	60	72	66	88	80
361	70	62	93	81	71	61	73	66	92	81
364	74	63	93	82	70	62	74	67	88	82
367	73	63	44	64	71	62	76	68	90	82
370	71	66	43	63	70	64	74	69	89	85
372	74	65	46	58	73	63	77	69	89	84

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
375	75	67	78	60	71	64	77	70	92	86
378	74	67	91	64	74	65	78	71	93	88
381	73	66	91	65	78	65	80	71	96	87
384	71	68	93	71	75	67	77	72	96	89
387	73	69	98	75	74	67	77	72	94	89
390	76	68	97	74	76	67	80	72	99	88
392	74	70	91	79	75	69	80	74	96	91
395	73	69	93	79	74	69	77	74	95	90
398	73	70	96	83	74	69	78	75	93	91
401	74	71	94	84	73	70	78	75	99	93
404	73	71	94	85	75	70	78	75	97	93
407	76	70	94	83	76	70	82	75	93	92
409	75	72	90	87	74	71	79	76	89	92
412	77	70	92	84	76	69	80	75	91	90
415	75	71	89	86	76	71	78	76	89	92
418	76	70	88	84	75	70	79	75	88	90
421	74	70	88	83	77	70	79	75	88	89
424	74	70	91	84	78	71	78	75	94	90
427	73	72	90	87	77	72	79	77	93	92
429	74	70	95	85	77	71	80	75	91	89
432	74	72	92	88	75	73	80	77	91	92
435	75	73	94	89	75	73	81	77	93	92
438	76	71	95	87	76	72	82	76	94	90
441	74	72	94	89	74	72	81	77	95	91
444	75	73	94	91	76	73	80	78	92	92

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
447	75	74	93	91	77	73	80	78	91	92
449	75	74	92	91	75	74	82	79	93	93
452	76	72	100	89	77	73	84	79	97	93
455	77	74	95	92	78	74	84	80	94	94
458	78	72	97	89	81	73	84	78	97	92
461	75	74	93	93	80	75	84	80	96	94
464	76	74	94	92	78	74	84	80	94	94
466	77	73	99	91	79	74	86	80	99	95
469	78	73	101	91	80	74	86	80	97	93
472	79	73	101	92	79	74	88	80	100	94
475	80	74	103	93	80	74	87	81	103	95
478	80	74	104	93	81	74	87	81	101	95
481	79	76	101	96	81	76	88	83	97	96
484	80	76	101	98	84	77	87	83	96	97
486	80	76	105	98	83	77	86	83	99	97
489	82	76	107	98	84	77	90	83	103	97
492	81	77	104	99	83	78	87	84	102	99
495	81	77	102	98	85	78	90	84	102	97
498	83	78	104	101	84	79	90	85	106	101
501	84	77	105	97	86	78	93	85	104	99
504	82	78	104	101	85	79	91	86	103	101
506	83	77	107	99	87	79	93	86	105	100
509	83	78	110	101	86	80	92	87	104	102
512	86	80	110	103	86	80	94	87	105	101
515	88	81	109	104	85	81	93	88	106	103

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
518	87	82	115	106	88	82	94	89	107	104
521	90	82	116	105	88	81	96	89	109	102
523	89	82	116	105	89	82	96	89	110	103
526	87	83	118	108	91	83	95	89	113	105
529	91	83	124	107	93	83	97	89	112	104
532	94	84	121	108	96	84	99	90	111	105
535	90	85	120	112	91	85	96	92	112	108
538	49	84	126	111	91	84	102	91	112	105
540	60	85	124	112	94	84	101	92	116	107
543	67	87	127	115	94	86	102	94	111	109
546	78	88	126	117	92	86	103	95	118	110
549	77	89	127	119	95	87	100	96	114	111
552	82	90	129	118	99	88	102	95	115	110
555	84	90	125	119	99	89	106	97	116	112
558	91	91	126	120	100	90	107	98	119	113
560	98	92	136	121	103	90	108	98	123	113
563	99	93	135	122	103	91	107	99	121	114
566	102	94	132	122	104	92	107	99	124	115
569	101	93	132	121	105	92	112	100	126	116
572	102	95	136	124	102	94	110	101	122	117
575	103	96	135	125	104	94	108	101	122	117
578	103	95	136	124	104	94	110	101	127	118
580	103	97	138	127	104	95	109	102	123	120
583	103	97	133	127	106	96	112	103	125	120
586	103	97	139	127	108	96	113	104	129	121

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
589	105	98	138	126	110	97	116	104	128	120
592	105	98	137	127	112	98	113	105	129	121
595	102	99	141	131	110	100	112	106	132	125
597	103	100	139	132	109	100	113	106	131	125
600	106	101	136	132	111	101	117	107	130	125
603	108	100	150	131	112	101	114	107	136	125
606	110	103	144	135	114	102	116	109	133	128
609	110	103	148	135	115	103	120	110	132	126
612	109	103	143	136	117	104	119	111	130	128
615	112	103	147	135	118	104	117	110	132	127
617	113	105	150	139	115	106	120	112	132	130
620	117	105	151	138	115	105	121	112	136	129
623	117	106	157	139	117	105	117	112	140	130
626	116	108	156	144	116	108	122	114	141	133
629	117	107	152	141	117	107	122	114	142	132
632	117	108	156	143	119	108	122	115	144	135
635	119	109	162	144	122	108	122	114	145	134
637	122	110	155	144	121	109	124	115	145	135
640	120	111	163	148	117	110	125	117	141	137
643	121	113	156	148	121	111	127	117	148	137
646	123	113	156	149	124	112	124	118	143	139
649	123	115	156	150	122	113	127	119	144	139
652	123	115	156	150	124	113	128	120	141	139
654	124	114	164	149	123	113	124	119	142	137
657	123	115	165	151	124	114	124	119	142	139

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
660	124	117	164	155	123	115	125	121	146	141
663	125	116	162	152	126	114	128	120	141	138
666	125	118	165	156	124	116	128	122	142	141
669	125	118	167	156	128	116	131	123	148	141
672	124	118	166	157	127	117	131	123	149	142
674	125	119	165	157	126	117	133	124	146	142
677	121	119	159	158	128	119	130	125	144	143
680	127	120	162	158	125	118	128	124	145	143
683	128	120	168	159	128	120	129	125	143	143
686	131	120	160	155	129	119	133	124	146	142
689	127	122	161	158	128	120	134	126	148	145
692	127	121	164	156	129	120	133	126	148	144
694	127	120	163	156	128	120	131	126	153	144
697	101	104	110	158	46	79	94	94	146	145
700	53	66	114	150	49	62	103	93	132	140
703	49	60	117	148	48	62	105	96	118	139
706	45	54	93	143	52	60	105	97	119	134
709	46	47	99	136	54	56	103	97	110	130
711	42	49	85	133	51	58	93	97	103	128
714	44	44	89	125	54	53	90	95	102	122
717	45	44	86	122	52	54	85	94	94	119
720	45	42	77	117	53	53	82	92	88	114
723	41	45	87	114	47	52	81	91	94	112
726	41	45	87	112	48	52	81	90	91	109
728	44	41	83	106	50	50	75	87	86	104

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
731	41	44	79	106	47	52	77	87	88	103
734	43	41	70	100	50	49	78	84	86	98
737	40	44	74	98	45	49	75	84	82	96
740	40	44	83	99	47	50	75	83	83	96
743	40	44	62	95	45	50	70	81	77	93
746	44	40	65	89	49	45	70	78	79	89
748	44	40	65	87	51	46	70	77	74	86
751	39	44	77	90	45	50	64	75	69	86
754	44	40	76	84	49	45	66	74	70	82
757	41	43	67	84	49	48	68	74	70	82
760	43	39	63	76	51	45	66	71	67	78
763	43	40	57	74	47	44	63	70	64	76
766	39	43	55	75	46	48	64	70	65	77
768	38	43	54	73	44	47	63	70	67	76
771	41	41	51	70	46	45	62	68	63	73
774	43	39	55	67	47	43	60	66	62	71
777	39	43	45	68	42	46	58	66	61	72
780	41	40	51	63	46	44	58	64	63	69
783	41	39	44	60	46	44	60	64	61	70
786	42	38	47	55	46	42	55	62	60	66
788	41	40	43	53	45	44	57	62	63	67
791	41	38	42	51	45	41	57	60	59	64
794	38	42	39	53	40	43	53	61	59	66
797	41	38	43	48	46	40	57	59	61	63
800	37	42	39	50	38	45	54	60	60	65

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
803	37	41	40	47	41	44	54	59	58	64
806	37	41	39	47	40	44	52	58	55	63
808	37	41	41	46	39	43	55	58	53	61
811	37	41	41	47	40	43	56	58	61	62
814	39	38	42	43	41	40	54	57	58	61
817	40	37	45	43	44	39	55	56	57	59
820	40	37	47	46	42	39	58	56	65	60
823	36	40	44	49	41	42	58	57	61	61
826	36	40	46	51	37	41	54	57	61	61
829	39	36	41	45	44	38	56	55	60	59
832	35	40	40	47	40	43	56	57	57	60
834	35	40	38	46	39	42	52	56	56	60
837	36	39	38	44	41	43	55	56	58	60
840	35	40	37	44	38	43	51	55	55	59
843	36	39	39	43	39	41	51	54	56	59
846	38	38	40	40	41	39	55	54	59	57
849	37	38	40	40	41	39	52	54	58	57
852	36	39	38	41	40	41	53	54	55	58
854	39	35	42	39	41	37	54	53	54	56
857	38	35	41	38	40	36	53	53	53	55
860	39	35	40	38	41	36	53	53	52	55
863	38	35	40	38	42	37	52	52	51	54
866	39	35	41	38	41	36	52	52	51	54
869	39	35	41	37	38	35	50	51	51	53
872	39	35	41	37	41	35	50	51	51	52

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
875	34	39	37	41	35	40	48	52	50	54
877	37	36	39	38	41	37	50	51	54	53
880	34	39	36	41	38	41	48	51	49	53
883	34	39	36	41	37	41	47	51	51	54
886	38	36	40	38	40	37	47	50	49	51
889	35	39	36	41	36	40	45	50	45	52
892	34	39	36	41	36	40	44	50	45	51
895	38	36	39	38	40	37	45	48	46	49
898	35	39	36	40	37	40	45	49	46	51
901	35	39	36	41	37	41	45	49	46	51
903	38	35	39	36	41	37	46	47	46	48
906	38	34	39	36	41	36	46	46	46	48
909	38	35	39	36	40	36	44	46	44	47
912	38	35	38	36	40	36	44	46	46	47
915	38	34	39	35	40	35	44	45	45	46
918	38	34	39	35	38	34	44	45	46	46
921	38	34	39	35	39	34	46	45	48	46
924	38	34	39	35	41	35	45	45	46	46
926	37	34	39	35	41	35	46	45	47	46
929	37	34	39	35	40	35	44	44	45	45
932	33	38	35	39	35	38	43	45	45	47
935	33	38	34	39	35	39	43	46	45	47
938	34	36	36	37	37	36	42	44	45	45
941	32	38	33	39	36	39	43	45	43	47
944	33	38	34	39	36	40	43	45	42	46

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
947	35	36	36	37	37	38	44	45	43	46
950	36	34	37	35	36	34	44	44	46	44
953	36	34	37	34	36	34	44	44	45	44
956	33	37	33	38	35	37	42	45	43	46
959	32	37	34	39	35	38	42	44	42	46
961	36	33	38	34	37	33	44	43	44	44
964	32	37	34	38	33	37	42	44	43	46
967	36	33	37	34	37	34	41	43	43	43
970	36	33	37	34	38	34	43	42	44	43
973	36	33	38	34	38	34	42	42	43	43
976	36	32	38	33	39	34	43	42	44	43
979	36	32	38	34	39	34	43	42	44	43
981	32	36	33	37	35	37	41	43	42	44
984	32	36	33	37	34	38	41	43	41	44
987	36	33	37	33	38	34	43	42	44	42
990	32	36	34	37	35	37	42	43	43	44
993	32	36	34	38	33	37	42	43	44	45
996	32	36	34	37	33	36	43	43	44	45
999	33	36	33	37	32	36	42	43	44	45
1002	32	36	33	37	32	36	42	43	43	45
1004	36	32	37	33	39	32	44	42	45	43
1007	31	36	33	38	34	37	42	43	43	45
1010	35	33	36	34	37	35	42	43	43	44
1013	32	35	34	37	33	37	41	43	41	44
1016	32	36	33	37	32	36	41	43	41	44

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
1019	34	34	35	36	34	35	41	42	41	44
1022	36	32	37	33	36	31	42	41	41	41
1025	35	32	37	33	37	33	42	41	41	43
1027	33	35	34	36	35	35	40	42	44	44
1030	35	33	36	34	36	32	43	41	44	42
1033	32	36	33	37	34	36	40	42	41	44
1036	32	36	33	37	34	37	40	42	41	43
1039	32	36	33	37	33	36	41	42	43	43
1042	32	36	33	37	33	37	40	42	41	44
1045	32	36	32	37	31	36	41	42	41	43
1048	31	36	33	37	32	35	40	42	42	43
1050	31	36	32	37	33	36	41	42	42	43
1053	35	32	36	33	37	33	42	41	43	41
1056	32	35	33	37	33	36	41	42	41	43
1059	32	35	33	37	34	37	40	42	40	43
1062	32	35	32	37	33	36	40	42	40	43
1065	31	36	32	37	31	36	40	42	41	43
1068	35	32	36	32	37	32	41	41	42	41
1071	35	32	35	33	35	33	41	41	41	41
1073	31	36	32	37	33	36	43	42	44	44
1076	35	32	37	33	38	33	45	41	44	41
1079	34	33	35	34	36	35	43	42	43	43
1082	35	32	35	33	37	34	43	42	43	41
1085	35	31	36	32	37	33	41	41	42	41
1088	35	31	36	32	38	33	43	41	45	41

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
1091	31	36	33	37	34	37	42	42	42	43
1094	33	34	34	36	35	37	42	42	43	43
1096	32	34	34	36	35	36	42	42	43	43
1099	32	34	34	35	36	35	44	42	46	43
1102	35	31	36	32	37	33	44	42	44	42
1105	32	35	33	36	34	36	41	42	44	44
1108	32	34	33	35	34	35	42	42	45	43
1111	32	35	33	35	36	35	43	42	47	43
1114	31	36	33	37	34	37	45	43	49	46
1117	32	35	33	36	35	38	45	44	46	46
1119	31	35	33	37	35	38	47	44	47	46
1122	32	35	34	36	36	36	45	43	46	44
1125	35	32	36	33	38	34	45	43	46	44
1128	32	35	34	38	32	37	44	44	46	47
1131	32	35	34	37	35	35	47	44	48	45
1134	35	32	37	34	38	33	47	44	47	45
1137	32	35	34	37	34	37	45	45	45	46
1140	36	31	38	33	38	33	46	43	44	44
1142	35	31	37	34	38	34	45	44	45	45
1145	36	31	37	33	38	33	44	43	47	44
1148	36	31	37	33	36	32	44	43	44	44
1151	36	32	36	34	35	33	42	43	43	46
1154	35	33	36	34	35	32	44	43	46	44
1157	35	32	36	33	35	31	44	43	48	44
1160	33	35	33	37	35	36	43	44	45	46

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
1163	31	36	33	37	34	36	46	44	49	47
1165	33	33	36	35	38	34	47	44	50	46
1168	32	35	34	37	34	37	45	45	48	47
1171	32	35	34	36	36	35	46	44	47	45
1174	32	36	33	37	33	37	43	45	47	48
1177	36	32	37	33	40	34	50	45	51	46
1180	35	32	37	34	38	35	50	45	49	46
1183	35	32	37	34	35	33	46	45	46	46
1186	36	32	36	34	35	33	44	44	46	46
1188	33	34	35	35	37	34	43	44	45	46
1191	34	34	35	36	35	36	46	45	44	47
1194	36	32	38	33	39	33	46	44	46	45
1197	32	36	34	37	35	37	47	45	47	47
1200	33	35	34	37	34	37	48	46	49	48
1203	33	35	35	37	35	35	46	45	46	47
1206	34	33	35	34	37	34	44	44	45	45
1208	32	36	33	37	33	37	44	45	43	47
1211	32	36	34	37	35	37	47	46	46	47
1214	32	36	35	38	35	37	47	46	45	47
1217	36	32	38	34	39	34	47	45	45	45
1220	36	32	38	33	38	34	46	45	46	45
1223	37	32	37	34	39	34	44	44	45	45
1226	36	33	37	34	38	34	43	44	44	44
1229	36	32	38	35	38	34	44	44	48	46
1232	36	32	38	34	39	34	45	44	49	45

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
1234	33	35	36	37	36	35	44	44	46	46
1237	33	35	34	37	35	36	46	45	46	46
1240	33	34	36	36	36	35	46	44	46	46
1243	34	34	37	35	38	35	48	45	46	45
1246	32	36	33	38	33	37	43	45	44	47
1249	33	36	34	37	36	36	45	45	45	46
1252	33	35	34	36	37	35	45	44	48	45
1255	33	35	34	36	36	37	45	45	46	47
1257	33	35	34	37	36	37	44	45	45	47
1260	33	36	34	37	36	38	46	45	47	47
1263	36	32	37	33	40	35	47	44	53	47
1266	36	32	38	34	40	35	48	45	51	47
1269	36	32	39	34	39	35	50	45	49	47
1272	35	32	37	34	38	35	48	45	47	46
1275	32	36	35	38	37	38	46	46	45	48
1278	33	35	34	37	34	38	44	46	46	48
1280	36	32	37	34	37	33	46	45	50	46
1283	32	36	34	38	35	37	43	46	47	48
1286	32	36	34	37	36	38	46	46	48	48
1289	32	36	34	37	36	38	48	46	49	48
1292	32	37	34	39	34	38	47	46	49	49
1295	36	32	39	34	36	33	50	46	51	48
1298	36	32	38	34	39	34	49	46	49	47
1301	32	36	34	39	35	39	47	47	47	49
1303	36	32	38	34	39	35	48	46	47	47

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATIONS - °C

TIME	T14	D15	T16	D17	T18	D19	T20	D21	T22	D23
1306	36	33	38	34	38	34	48	46	49	47

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATION - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
-53	29	27	28	27	----	----	28	29	28	28
-49	26	28	27	28	----	----	28	24	28	27
-46	26	28	27	28	----	----	28	24	29	27
-43	29	27	29	27	----	----	28	29	28	28
-40	27	28	27	28	----	----	27	24	30	27
-37	29	27	29	27	----	----	28	29	27	28
-35	26	28	27	28	----	----	28	24	29	27
-32	28	28	27	28	----	----	27	24	30	28
-29	26	28	27	28	----	----	27	24	29	27
-26	27	28	27	28	----	----	27	24	30	28
-23	29	27	28	27	----	----	27	28	29	28
-20	26	28	27	28	----	----	28	24	29	27
-17	29	28	28	27	----	----	27	26	29	28
-15	29	27	28	27	----	----	28	28	28	28
-12	29	27	29	27	----	----	28	29	27	29
-9	29	28	28	27	----	----	27	26	29	28
-6	29	27	28	27	----	----	28	28	28	29
-3	29	27	29	27	----	----	29	29	27	28
-0	29	27	28	27	----	----	27	27	29	28
1	30	27	29	27	----	----	28	29	27	29
4	29	27	29	27	----	----	29	29	27	29
7	27	28	28	28	----	----	28	25	28	28
10	29	27	28	27	----	----	29	29	27	29
13	29	27	28	27	----	----	28	29	28	29
16	26	29	27	29	----	----	28	23	29	28

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATION - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
19	29	28	28	27	——	——	30	28	27	28
22	27	28	28	28	——	——	29	26	27	28
24	27	29	27	29	——	——	29	24	29	29
27	29	27	28	27	——	——	31	29	27	29
30	26	29	27	29	——	——	29	24	29	29
33	29	28	28	28	——	——	30	25	29	30
36	30	27	29	27	——	——	31	30	27	31
39	27	29	28	29	——	——	30	25	29	30
41	30	28	29	28	——	——	31	29	29	32
44	28	28	29	29	——	——	31	27	27	31
47	30	27	30	27	——	——	32	31	28	32
50	30	28	30	28	——	——	32	30	29	32
53	29	28	30	28	——	——	33	31	28	32
56	30	27	30	28	——	——	33	31	28	32
59	28	28	30	29	——	——	32	29	28	32
61	29	28	31	28	——	——	33	31	28	32
64	28	29	29	29	——	——	32	26	30	32
67	31	27	31	28	——	——	33	32	28	34
70	28	29	29	30	——	——	32	27	30	32
73	31	29	30	29	——	——	33	29	30	33
76	30	29	30	30	——	——	33	27	30	33
79	32	29	31	29	——	——	35	31	28	33
82	30	29	30	30	——	——	33	27	31	33
84	31	29	31	30	——	——	34	27	31	34
87	32	29	33	29	——	——	34	31	31	35

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATION - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
90	31	30	32	30	——	——	34	28	31	34
93	33	29	33	29	——	——	35	31	29	35
96	31	30	32	31	——	——	34	27	31	34
99	34	29	33	30	——	——	36	31	29	35
101	34	29	34	30	——	——	36	34	29	36
104	34	29	35	30	——	——	37	34	29	36
107	34	30	34	31	——	——	35	31	31	37
110	35	30	35	30	——	——	37	33	29	37
113	33	31	34	32	——	——	36	28	30	35
116	32	32	34	33	——	——	36	28	31	36
118	36	30	36	31	——	——	38	33	30	38
121	35	31	35	32	——	——	38	33	30	37
124	33	32	35	33	——	——	37	30	31	37
127	33	32	35	33	——	——	38	30	30	38
130	33	32	35	33	——	——	38	31	32	38
133	34	33	36	34	——	——	37	30	32	38
136	37	31	38	32	——	——	41	35	31	40
138	34	33	36	34	——	——	38	30	33	38
141	38	31	38	32	——	——	40	36	31	41
144	38	32	38	33	——	——	40	34	31	40
147	38	32	38	33	——	——	41	34	31	40
150	36	33	37	35	——	——	40	31	34	41
153	38	33	38	34	——	——	40	33	34	42
156	38	32	39	34	——	——	40	36	33	42
158	38	33	39	34	——	——	41	35	33	42

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATION - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
161	38	33	38	35	----	----	40	33	34	41
164	38	34	40	35	----	----	40	34	35	42
167	40	33	41	35	----	----	42	36	33	43
170	39	34	40	35	----	----	43	37	32	42
173	40	34	40	35	----	----	44	37	33	42
176	38	35	39	37	----	----	44	36	33	42
179	37	36	39	37	----	----	42	32	35	43
181	38	35	41	37	----	----	44	37	33	44
184	39	35	41	37	----	----	44	37	34	43
187	39	36	41	38	----	----	44	35	35	43
190	40	37	41	38	----	----	44	33	35	44
193	43	35	43	37	----	----	45	37	34	45
196	40	37	43	39	----	----	45	33	35	44
199	43	36	44	37	----	----	46	38	34	45
201	41	38	43	39	----	----	43	32	36	45
204	44	37	43	38	----	----	46	37	34	46
207	40	39	42	40	----	----	45	32	36	45
210	41	38	42	40	----	----	44	34	36	45
213	41	38	43	40	----	----	47	36	35	46
216	43	38	43	40	----	----	47	38	37	46
219	43	38	45	40	----	----	47	39	37	48
221	45	38	46	39	----	----	48	40	36	48
224	44	38	46	40	----	----	48	40	37	48
227	41	40	45	42	----	----	48	35	38	46
230	45	39	46	40	----	----	50	39	36	48

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATION - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
233	45	39	45	41	----	----	49	38	38	49
236	45	40	47	42	----	----	49	36	38	49
238	46	40	47	41	----	----	51	40	38	50
241	46	39	48	41	----	----	52	41	37	51
244	43	41	46	43	----	----	51	35	38	49
247	43	41	47	43	----	----	51	35	39	48
250	45	41	49	42	----	----	51	41	37	49
253	46	40	48	42	----	----	51	40	37	51
256	44	42	47	44	----	----	51	35	39	49
258	47	42	48	43	----	----	52	41	38	53
261	49	41	48	43	----	----	51	41	39	52
264	50	41	50	43	----	----	52	43	38	53
267	49	42	51	44	----	----	51	43	38	52
270	47	43	51	46	----	----	51	39	40	51
273	50	42	52	44	----	----	53	43	38	53
275	50	43	53	45	----	----	55	44	39	52
278	49	44	51	47	----	----	54	41	41	53
281	50	45	53	47	----	----	54	41	39	54
284	52	44	55	46	----	----	55	46	39	58
287	51	46	53	48	----	----	53	41	42	55
290	52	46	54	49	----	----	56	41	42	56
293	53	45	56	48	----	----	56	45	43	57
295	53	47	55	50	----	----	57	42	44	58
298	53	47	58	50	----	----	57	44	44	58
301	54	48	58	51	----	----	56	41	46	58

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATION - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
304	56	47	58	50	----	----	57	46	45	61
307	59	47	60	50	----	----	59	49	44	62
310	56	49	60	52	----	----	59	46	46	63
313	57	50	60	53	----	----	61	44	46	61
315	60	49	61	51	----	----	62	49	45	64
318	56	51	60	54	----	----	63	44	47	62
321	55	51	60	54	----	----	63	45	47	63
324	60	50	61	53	----	----	66	50	45	65
327	61	51	63	54	----	----	65	50	45	66
330	61	53	62	55	----	----	67	45	45	64
332	64	52	65	54	----	----	68	52	47	66
335	60	53	66	57	----	----	69	47	48	66
338	65	52	67	56	----	----	68	52	48	69
341	62	55	66	58	----	----	67	46	50	66
344	62	55	66	59	----	----	67	47	50	68
347	65	55	68	59	----	----	69	51	49	68
350	67	56	69	59	----	----	70	51	50	70
353	65	57	69	61	----	----	69	49	51	70
355	70	57	70	60	----	----	69	56	51	73
358	72	58	70	61	----	----	71	53	52	72
361	71	58	72	61	----	----	75	58	50	73
364	71	60	71	62	----	----	73	55	53	74
367	73	60	74	63	----	----	73	57	53	76
370	70	62	73	65	----	----	72	53	54	74
372	72	61	75	64	----	----	74	58	55	77

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATION - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
375	71	62	76	66	----	----	75	56	55	77
378	69	62	74	66	----	----	75	55	55	78
381	73	62	77	65	----	----	76	60	53	80
384	74	63	79	67	----	----	78	64	53	77
387	74	63	79	67	----	----	79	62	54	77
390	77	63	79	68	----	----	79	62	56	80
392	73	64	78	69	----	----	76	57	56	80
395	75	64	76	68	----	----	78	62	58	77
398	75	66	78	70	----	----	80	62	58	78
401	73	66	78	70	----	----	79	61	59	78
404	75	67	78	71	----	----	79	60	59	78
407	76	67	79	71	----	----	77	58	58	82
409	75	67	78	72	----	----	78	60	59	79
412	78	66	79	70	----	----	79	67	57	80
415	74	68	78	72	----	----	77	62	60	78
418	74	67	78	72	----	----	76	60	59	79
421	74	67	78	71	----	----	77	62	57	79
424	73	67	78	71	----	----	78	62	59	78
427	72	68	76	73	----	----	77	60	58	79
429	75	67	76	71	----	----	79	68	56	80
432	73	69	77	73	----	----	80	62	57	80
435	73	69	79	73	----	----	80	63	57	81
438	75	68	79	72	----	----	81	66	57	82
441	76	68	79	72	----	----	83	66	57	81
444	73	70	77	73	----	----	81	63	58	80

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATION - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
447	75	70	77	73	----	----	82	62	58	80
449	73	70	76	73	----	----	81	61	59	82
452	74	70	76	73	----	----	82	64	60	84
455	74	70	78	74	----	----	83	62	60	84
458	76	69	80	72	----	----	83	69	60	84
461	74	70	80	74	----	----	82	65	62	84
464	73	70	78	74	----	----	83	64	60	84
466	75	70	81	74	----	----	84	65	61	86
469	78	70	79	73	----	----	84	64	62	86
472	78	70	81	73	----	----	84	65	60	88
475	77	70	81	74	----	----	86	63	62	87
478	77	70	83	74	----	----	86	66	61	87
481	78	71	81	74	----	----	87	66	62	88
484	76	72	83	76	----	----	87	64	64	87
486	76	71	84	75	----	----	89	71	62	86
489	78	71	83	75	----	----	91	73	61	90
492	78	73	82	77	----	----	88	67	62	87
495	80	71	85	76	----	----	90	70	62	90
498	78	73	84	77	----	----	89	64	64	90
501	82	72	85	76	----	----	89	70	64	93
504	79	74	86	78	----	----	91	66	65	91
506	84	73	85	78	----	----	90	70	64	93
509	80	74	86	78	----	----	92	70	67	92
512	81	73	88	78	----	----	97	73	64	94
515	83	75	86	80	----	----	95	67	67	93

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATION - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
518	82	76	88	80	-----	-----	97	67	67	94
521	86	75	88	79	-----	-----	99	74	64	96
523	88	75	88	79	-----	-----	99	74	67	96
526	85	76	91	80	-----	-----	101	73	68	95
529	88	76	94	80	-----	-----	103	76	68	97
532	88	77	93	82	-----	-----	101	74	69	99
535	84	78	93	84	-----	-----	103	74	70	96
538	89	77	95	83	-----	-----	106	77	69	102
540	91	78	95	83	-----	-----	107	76	69	101
543	88	79	94	85	-----	-----	108	71	70	102
546	90	80	93	86	-----	-----	108	72	71	103
549	88	81	94	86	-----	-----	110	72	73	100
552	92	80	95	85	-----	-----	110	78	71	102
555	91	82	96	88	-----	-----	105	75	72	106
558	94	83	98	88	-----	-----	109	76	73	107
560	94	82	100	87	-----	-----	115	80	72	108
563	92	83	99	88	-----	-----	114	81	73	107
566	97	83	98	88	-----	-----	115	81	73	107
569	97	84	99	88	-----	-----	113	81	75	112
572	99	86	99	90	-----	-----	115	79	74	110
575	102	85	102	90	-----	-----	116	84	75	108
578	101	86	102	90	-----	-----	113	82	78	110
580	94	87	102	92	-----	-----	116	83	79	109
583	99	88	103	93	-----	-----	113	79	78	112
586	96	88	104	93	-----	-----	118	80	76	113

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATION - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
589	100	87	105	93	----	----	117	83	75	116
592	100	88	106	93	----	----	119	88	75	113
595	99	90	106	96	----	----	118	83	77	112
597	101	90	109	96	----	----	122	88	77	113
600	100	90	110	97	----	----	122	88	77	117
603	105	90	109	96	----	----	126	88	79	114
606	101	91	109	98	----	----	126	85	82	116
609	103	91	109	98	----	----	126	92	80	120
612	102	92	108	99	----	----	126	88	83	119
615	104	92	110	98	----	----	128	94	82	117
617	106	94	108	100	----	----	127	87	84	120
620	105	93	110	100	----	----	130	85	85	121
623	105	93	113	100	----	----	131	90	80	117
626	107	95	111	102	----	----	131	90	83	122
629	111	95	115	101	----	----	130	92	84	122
632	106	97	116	103	----	----	131	91	85	122
635	110	96	118	102	----	----	136	97	82	122
637	112	96	117	103	----	----	135	97	84	124
640	112	99	117	106	----	----	137	90	88	125
643	114	98	115	104	----	----	134	93	87	127
646	117	101	115	106	----	----	134	90	89	124
649	113	102	119	107	----	----	136	93	88	127
652	115	101	118	107	----	----	137	93	83	128
654	124	102	116	107	----	----	139	93	88	124
657	119	102	117	108	----	----	137	93	89	124

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATION - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
660	120	104	119	109	—	—	139	93	90	125
663	119	103	119	108	—	—	138	98	92	128
666	115	105	117	110	—	—	139	94	90	128
669	117	104	117	109	—	—	141	94	87	131
672	115	105	118	109	—	—	144	96	90	131
674	120	105	120	109	—	—	141	101	88	133
677	117	106	122	111	—	—	140	97	89	130
680	118	106	119	110	—	—	144	101	88	128
683	117	107	117	111	—	—	142	97	95	129
686	119	105	119	110	—	—	141	101	93	133
689	118	107	117	111	—	—	143	98	92	134
692	117	108	123	112	—	—	143	98	96	133
694	118	107	123	111	—	—	142	97	94	131
697	64	90	110	108	—	—	66	34	91	94
700	72	86	95	103	—	—	53	39	91	103
703	89	91	99	104	—	—	50	35	92	105
706	89	88	96	100	—	—	54	40	86	105
709	77	85	78	95	—	—	47	40	79	103
711	72	83	80	95	—	—	49	33	75	93
714	75	77	75	88	—	—	49	38	70	90
717	55	77	64	86	—	—	47	34	71	85
720	55	73	61	79	—	—	50	35	67	82
723	53	70	59	75	—	—	46	33	64	81
726	53	67	58	72	—	—	46	33	63	81
728	51	61	55	67	—	—	48	34	61	75

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATION - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
731	49	60	54	66	—	—	47	33	59	77
734	54	52	53	58	—	—	45	38	56	78
737	50	52	53	56	—	—	51	38	55	75
740	44	50	48	56	—	—	52	34	54	75
743	44	49	47	54	—	—	45	35	53	70
746	45	44	48	49	—	—	46	39	54	70
748	48	43	50	48	—	—	49	38	53	70
751	43	47	46	50	—	—	52	34	51	64
754	47	43	48	46	—	—	47	36	51	66
757	42	47	43	49	—	—	46	32	51	68
760	47	42	47	44	—	—	42	38	48	66
763	46	41	46	42	—	—	42	38	48	63
766	41	43	41	45	—	—	43	33	48	64
768	42	43	43	45	—	—	44	33	46	63
771	43	41	43	42	—	—	43	36	44	62
774	46	41	43	41	—	—	40	36	46	60
777	40	44	40	44	—	—	41	32	45	58
780	43	40	42	40	—	—	42	36	44	58
783	39	42	39	43	—	—	38	32	46	60
786	45	40	43	39	—	—	41	36	42	55
788	39	42	39	42	—	—	38	31	43	57
791	42	38	43	39	—	—	41	36	42	57
794	39	41	38	41	—	—	40	31	42	53
797	43	37	41	38	—	—	41	36	43	57
800	37	42	38	40	—	—	41	32	43	54

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATION - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
803	36	42	37	42	——	——	37	31	45	54
806	36	41	36	41	——	——	38	31	44	52
808	40	40	39	39	——	——	40	34	43	55
811	36	40	38	39	——	——	40	33	42	56
814	40	40	38	40	——	——	36	32	44	54
817	41	37	41	37	——	——	39	35	43	55
820	40	37	39	38	——	——	36	34	44	58
823	36	41	36	41	——	——	38	31	45	58
826	36	41	35	41	——	——	36	30	44	54
829	41	36	40	36	——	——	39	35	43	56
832	38	39	38	38	——	——	40	34	41	56
834	36	40	36	40	——	——	37	31	41	52
837	35	40	36	40	——	——	35	30	41	55
840	36	40	35	40	——	——	37	30	42	51
843	37	38	38	38	——	——	39	32	40	51
846	39	36	39	36	——	——	40	35	39	55
849	41	37	40	36	——	——	39	33	39	52
852	35	40	35	40	——	——	34	30	41	53
854	41	36	40	36	——	——	38	34	39	54
857	40	36	40	35	——	——	38	34	40	53
860	41	36	39	36	——	——	36	34	41	53
863	39	37	38	37	——	——	35	33	43	52
866	40	36	39	36	——	——	36	34	41	52
869	40	36	39	35	——	——	38	35	40	50
872	39	36	39	35	——	——	38	35	40	50

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATION - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
875	36	40	35	39	——	——	37	31	40	48
877	39	35	38	35	——	——	39	35	40	50
880	35	38	36	37	——	——	38	33	40	48
883	34	39	34	39	——	——	35	31	41	47
886	40	35	39	35	——	——	39	36	39	47
889	34	40	33	39	——	——	35	31	41	45
892	34	39	34	38	——	——	36	32	42	44
895	38	35	38	34	——	——	39	36	40	45
898	34	39	34	39	——	——	35	31	42	45
901	33	39	34	39	——	——	35	31	42	45
903	38	35	37	35	——	——	35	34	42	46
906	38	34	38	34	——	——	36	34	41	46
909	37	34	36	34	——	——	35	34	41	44
912	37	35	36	35	——	——	35	33	41	44
915	38	33	37	34	——	——	36	34	41	44
918	39	33	38	33	——	——	37	34	40	44
921	38	34	37	34	——	——	36	34	40	46
924	37	34	37	34	——	——	34	33	41	45
926	38	33	38	33	——	——	36	34	40	46
929	38	33	37	33	——	——	36	34	39	44
932	33	37	34	37	——	——	36	30	38	43
935	33	38	32	37	——	——	34	30	38	43
938	36	33	36	33	——	——	37	33	37	42
941	32	37	32	37	——	——	34	30	40	43
944	32	37	33	36	——	——	33	30	40	43

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATION - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
947	33	36	33	36	----	----	32	29	41	44
950	38	33	37	32	----	----	37	33	38	44
953	35	34	35	34	----	----	33	31	38	44
956	31	37	32	37	----	----	32	29	39	42
959	32	37	32	37	----	----	33	29	39	42
961	36	32	36	33	----	----	34	32	38	44
964	31	37	32	37	----	----	33	28	39	42
967	36	33	35	33	----	----	33	32	39	41
970	37	32	36	31	----	----	36	34	38	43
973	37	32	36	32	----	----	36	34	38	42
976	36	31	36	32	----	----	36	34	37	43
979	37	32	36	32	----	----	34	33	37	43
981	31	35	32	35	----	----	35	30	37	41
984	31	36	31	36	----	----	33	29	38	41
987	35	31	36	31	----	----	36	33	36	43
990	32	34	33	34	----	----	35	29	36	42
993	31	36	31	36	----	----	32	28	38	42
996	33	34	33	34	----	----	36	31	36	43
999	32	36	31	36	----	----	31	28	37	42
1002	31	36	31	36	----	----	32	28	38	42
1004	36	32	35	32	----	----	33	33	38	44
1007	31	36	31	36	----	----	32	28	38	42
1010	31	35	32	35	----	----	32	29	39	42
1013	31	36	31	36	----	----	32	29	39	41
1016	30	36	31	36	----	----	32	28	39	41

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATION - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
1019	31	35	31	35	—	—	31	28	38	41
1022	36	31	36	31	—	—	35	33	36	42
1025	32	34	33	34	—	—	32	29	38	42
1027	31	35	31	35	—	—	31	28	38	40
1030	36	32	35	31	—	—	36	33	34	43
1033	30	36	31	36	—	—	32	29	36	40
1036	31	36	31	35	—	—	33	29	37	40
1039	31	35	32	34	—	—	34	29	36	41
1042	30	36	31	36	—	—	32	28	37	40
1045	31	36	31	35	—	—	32	28	36	41
1048	31	35	32	35	—	—	33	29	36	40
1050	31	34	31	35	—	—	33	29	35	41
1053	36	31	36	31	—	—	35	33	34	42
1056	31	36	31	35	—	—	31	29	36	41
1059	31	36	31	36	—	—	31	28	37	40
1062	31	36	31	36	—	—	31	28	36	40
1065	30	36	31	35	—	—	31	28	37	40
1068	34	31	34	31	—	—	32	32	36	41
1071	35	32	34	33	—	—	31	31	36	41
1073	30	36	31	35	—	—	32	28	37	43
1076	35	31	34	31	—	—	32	32	36	45
1079	33	34	33	34	—	—	31	29	37	43
1082	36	33	34	32	—	—	32	31	36	43
1085	35	31	35	31	—	—	35	33	35	41
1088	35	31	35	31	—	—	35	33	34	43

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATION - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
1091	31	34	32	34	----	----	34	30	34	42
1094	31	35	31	35	----	----	31	28	36	42
1096	34	33	34	32	----	----	35	33	34	42
1099	34	32	34	31	----	----	35	32	34	44
1102	36	31	34	31	----	----	34	32	34	44
1105	32	34	33	33	----	----	35	31	34	41
1108	32	32	33	31	----	----	35	32	35	42
1111	34	32	34	31	----	----	35	32	35	43
1114	31	35	31	35	----	----	33	29	36	45
1117	31	36	31	36	----	----	31	28	37	45
1119	31	36	31	35	----	----	32	28	37	47
1122	36	32	35	32	----	----	36	32	35	45
1125	35	33	34	33	----	----	32	32	36	45
1128	32	36	31	36	----	----	31	28	36	44
1131	36	32	35	32	----	----	35	32	34	47
1134	37	33	35	32	----	----	32	32	36	47
1137	32	36	31	36	----	----	31	28	36	45
1140	36	31	36	31	----	----	35	32	35	46
1142	35	33	34	33	----	----	32	30	37	45
1145	36	32	35	31	----	----	32	33	37	44
1148	36	32	35	31	----	----	35	33	35	44
1151	32	35	32	35	----	----	32	29	37	42
1154	36	32	36	31	----	----	36	33	34	44
1157	36	32	35	31	----	----	36	33	34	44
1160	31	36	31	36	----	----	31	28	36	43

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATION - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
1163	33	35	33	35	----	----	35	31	35	46
1165	36	32	35	32	----	----	36	32	34	47
1168	32	36	32	36	----	----	31	28	37	45
1171	37	33	35	32	----	----	36	32	34	46
1174	31	37	31	36	----	----	32	28	36	43
1177	36	33	35	32	----	----	33	33	36	50
1180	37	32	36	31	----	----	36	33	34	50
1183	37	33	34	32	----	----	32	31	36	46
1186	35	34	34	33	----	----	33	32	36	44
1188	36	32	35	32	----	----	36	32	34	43
1191	31	36	31	35	----	----	31	28	36	46
1194	37	32	36	31	----	----	35	33	33	46
1197	33	34	34	33	----	----	36	32	33	47
1200	33	36	31	36	----	----	32	28	35	48
1203	35	34	35	33	----	----	36	32	33	46
1206	37	32	35	31	----	----	36	33	33	44
1208	31	36	32	35	----	----	35	30	33	44
1211	31	36	31	36	----	----	32	28	36	47
1214	32	36	32	35	----	----	33	29	35	47
1217	36	32	35	31	----	----	34	33	34	47
1220	36	33	35	33	----	----	33	31	35	46
1223	35	33	35	33	----	----	34	31	36	44
1226	36	32	36	31	----	----	36	33	34	43
1229	35	34	34	34	----	----	32	31	36	44
1232	37	32	36	32	----	----	34	33	34	45

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATION - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
1234	34	33	35	32	----	----	36	32	33	44
1237	34	33	34	32	----	----	36	32	33	46
1240	37	33	35	32	----	----	36	33	33	46
1243	36	33	35	32	----	----	36	32	33	48
1246	31	37	31	36	----	----	33	28	35	43
1249	35	34	34	33	----	----	36	32	33	45
1252	36	33	35	32	----	----	36	32	33	45
1255	32	36	32	35	----	----	32	29	35	45
1257	32	36	31	35	----	----	32	29	35	44
1260	32	36	31	36	----	----	33	28	36	46
1263	37	33	35	32	----	----	35	32	34	47
1266	37	33	35	32	----	----	34	33	34	48
1269	37	33	35	32	----	----	34	33	34	50
1272	36	34	34	32	----	----	33	32	35	48
1275	33	35	33	34	----	----	37	30	33	46
1278	32	36	31	36	----	----	32	28	36	44
1280	37	32	36	31	----	----	36	33	33	46
1283	32	36	32	35	----	----	35	29	34	43
1286	33	36	32	35	----	----	34	29	34	46
1289	34	34	34	32	----	----	36	33	33	48
1292	32	37	32	36	----	----	33	28	35	47
1295	37	33	36	33	----	----	33	32	35	50
1298	36	33	35	32	----	----	33	32	35	49
1301	32	37	31	36	----	----	32	28	35	47
1303	36	33	35	32	----	----	34	32	35	48

CLOSED DOOR SHIELDED FIRE TEST

THERMOCOUPLES AND DISKS AT SPRINKLER AND DETECTOR LOCATION - °C

TIME	T24	D25	T26	D27	T28	D29	PAN A	PAN B	PAN C	PAN D
1306	37	32	36	31	-----	-----	37	33	33	48

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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.)

A series of experiments are reported in which a wood crib was burned within a simulated two-bed hospital patient room in order to measure the activation times of various types of quick and standard response sprinklers and ionization and photoelectric smoke detectors at several locations in the room simulating multiple options for protection of the space. Gas and surface temperatures, heat flux, carbon dioxide, carbon monoxide, and oxygen concentrations were continuously measured in order to access the tenability of the room. Of the parameters measured, temperature was the best indicator of the tenability of the space. Temperature at time of activation of the quick response sprinklers was at or below 77 °C (171 °F) at the 1.52 m (5 ft.) level and at or below 48 °C (118 °F) at the 0.91 m (3 ft.) level between the patient beds, in all experiments conducted with the exception of the shielded fire scenario in which temperatures at the five and three foot levels reached 111 °C (232 °F), and 78 °C (172 °F) respectively. The initial detector activation was received between 232-377 seconds prior to activation of the first sprinkler, and 552 - 722 seconds prior to activation of the QR-EC sidewall sprinkler.

12. KEY WORDS (6 TO 12 ENTRIES; ALPHABETICAL ORDER; CAPITALIZE ONLY PROPER NAMES; AND SEPARATE KEY WORDS BY SEMICOLONS)
Sprinklers, fire tests, sprinkler response, smoke detectors, hospital fires, life safety

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