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Table of Recommended Rate Constants for Chemical Reactions Occurring in Combustion

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U.S. DEPARTMENT OF COMMERCE

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by

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TABLE OF RECOMMENDED RATE CONSTANTS FOR CHEMICAL* REACTIONS OCCURRING IN COMBUSTION

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A table of recommended rate constants for gas phase chemical reactions occurring in combustion is presented. Specifically, it gives in tabular form the values of the parameters for the modified Arrhenius equation $k = AT^{B}exp(-E/RT)$. The table covers reactions occurring in the combustion, oxidation and decomposition of aliphatic saturated or unsaturated C_1 to C_{10} hydrocarbons, alcohols, aldehydes, ketones, thiols, ethers, peroxides, amines, amides and their free radicals, as well as the reactions of O, O_2, H, H_2, OH, H_2O, H_2O_2, N, N_2, NO, N_2O, NO_2, N_2O_4, N_2O_5, S, S_2, SH, SO, SO_2, SOH, NS, with each other. The table includes 169 first order reactions 782 second order reactions and 57 third order reactions. There are 1770 entries covering 1008 distinct chemical reactions. These recommendations have been taken from eleven evaluations and critical reviews published between 1970 and 1976. The papers examined by the evaluators extend from the nineteen fifties up to - and including - 1975.

Keywords: Arrhenius parameters, chemical kinetics, combustion, decomposition, free radicals, gas phase, hydrocarbons, hydrogen, nitrogen, oxygen, rate of reaction, sulfur.

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INTRODUCTION

This publication consists of a table of recommended reaction rate constants for the combustion, oxidation and decomposition reactions of aliphatic saturated and unsaturated hydrocarbons, their oxygenated sulfur and amino derivatives, as well as for the reactions of hydrogen, nitrogen, oxygen, sulfur and their inorganic derivatives with each other. The table is a compilation of recommended rate constants given in eleven critical reviews on the kinetics of combustion, oxidation and decomposition reactions, published between 1970 and 1976. Its purpose is to provide the kineticists and kinetic modelers with a comprehensive and easy-to-consult reference book on the kinetic data for combustion and oxidation processes. The table gives 1008 recommended reaction rate constants from these eleven sources. A summary of the content of the table is given in the following listing of quotations from each source.

SOURCE	# RECOMMENDED RATE CONSTANTS
BAULCH et al (1972)	40
BAULCH et al (1973)	64
BAULCH et al (1976)	36
BENSON and O'NEAL (1970)	167
BENSON et al (1975)	119
ENGLEMAN (1976)	123
HERRON and HUIE (1973)	46
KERR and PARSONAGE (1972)	185
KERR and PARSONAGE (1976)	181
KONDRATIEV (1970)	37
LLOYD (1974)	10
TOTAL	1008

For ease of reference the bimolecular and termolecular reactions included in the table are listed separately under each reactant, so that a grouping

of the reaction according to the first reactant is obtained. As a result, the total number of tabulated entries is 1770, although the real number of distinct chemical reactions is 1008.

The presentation of kinetic data is standardized and simplified as much as possible. Rate constants are expressed in the modified Arrhenius equation $k = AT^{B}\exp(-E/RT)$. In general uncertainties are given only for the rate constant k itself and not for the individual parameters in this equation. Sometimes an uncertainty is given for the value of E/R. This uncertainty is only of secondary importance and has been included in the uncertainty stated for the value of the rate constant. Rate constants are expressed in units of s^{-1}, $cm^{3}mol^{-1}s^{-1}$, and $cm^{6}mol^{-2}s^{-1}$ for reactions of first, second and third order respectively.

For the readers who prefer other kinetic units than the standard ones, two conversion tables for equivalent second and - respectively - third order rate constant units are appended at the end of this publication.

The arrangement of the tables is described in detail below, in the "Guidelines for the User".

It is hoped that this table of kinetic data will serve as a handy and easy to use reference book for all the kineticists and kinetic modelers interested in combustion and oxidation processes.

This publication is not the result of the effort of a single person, but of the whole staff of Chemical Kinetics Information Center. My thanks to all of them.

In particular, I wish to thank Dr. David Garvin, Chief of the Chemical Thermodynamics Division, and Dr. Robert F. Hampson, Jr., Director of the Chemical Kinetics Information Center, for their more than helpful suggestions and constant guidance; Dr. Wing Tsang, Chief of the Chemical Kinetics Division, for his encouragement in having this table published;

Mr. James G. Koch, Supervisor, for putting the tables into a printable computer form; Mrs. Bettijoyce Molino and Mrs. Carla G. Messina from the Office of Standard Reference Data for applying the OMNIDATA and GPSDIC programs to the present tables; Mrs. Geraldine Zumwalt and Mrs. Janice L. Jones for punching and typing a difficult typescript, full of digits and numbers, with particular care.

GUIDELINES FOR THE USER

General

As pointed out above, the presentation of the kinetic data in this publication is an attempt to simplify and standardize them. In that respect, the choice of standard units for rate constants was easy; it was found that the most commonly used units for gas phase rate constants are the cubic centimeter, the mole and the second. The choice of a standard form for uncertainty limits is somewhat more complicated, but when a series of recommended rate constants is to be presented in a tabular form, the uncertainty limits can not be omitted, for an uncertainty assigned to the recommended value of a rate constant is an estimate by the evaluator of the absolute accuracy of the preferred value. It is to be emphasized that in the present tables the concern is with the overall uncertainty of a reaction rate constant and not with the expression of precision of a set of experimental measurements. Most of the uncertainty limits included in this table are uniform within the respective temperature range indicated. However, for a limited number of reactions, the data warrant or require variable limits. In such cases, a note under the respective data indicates for which interval of the temperature range there is a change in the uncertainty limits.

It is thought that the uncertainty limits expressed in the form of lower and upper k factors - f and F, respectively - are the most suitable for

tabulation. Thus, if k_o is the central value of a rate constant the limits of reliability for the rate constant k_o are defined by the relationship:

$$fk_o < k < Fk_o \qquad (1)$$

i.e. multiplication of the central value k_o by f and F gives respectively the lower and upper reliability limits of the rate constant. In this standardized formulation of uncertainty limits, the value of f is less than unity and the value of F is greater than unity.

However the k factors are not the only way to express the uncertainty limits of a rate constant and different authors use different forms to indicate the degree of reliability of a recommended rate constant. It follows that certain mathematical relationships are needed to translate the different forms of uncertainty limits into the standard form used in this table (lower and upper k factors). The transformation formulas are given and discussed below.

In general there are two ways to state uncertainty limits: 1) by factors and by algebraic addends

Uncertainty expressed by factors.

Beside the standard form of uncertainty limits expressed by the lower and upper factors f and F, as defined by the above given relationship (1), there is another form which expresses the uncertainty limits by a unique factor. Thus, if k_o is the central value of a rate constant, the statement that k_o is uncertain to a factor of F means that the uncertainty limits are defined by the relationship:

$$k_o/F < k < k_oF \qquad (2)$$

which shows that division and multiplication of the central value k_o by F gives respectively the lower and upper reliability limits of the rate

constant. By comparing relationships (1) and (2), it is obvious that in the case of an uncertainty expressed by an unique F the upper factor is equal to the unique factor itself, while the lower factor f is the reciprocal of F:

$$f = 1/F \qquad (3)$$

Uncertainty expressed by algebraic addends.

There are three types of uncertainty limits for rate constants expressed as algebraic addends, which are currently used by kineticists: a). Uncertainty appended to one of the Arrhenius factors (A, B, or E/R); b). Uncertainty appended to $\log_{10} k_o$; and c). Uncertainty expressed as a percentage of k_o. With respect to the type a) uncertainties, the B factor uncertainties have been eliminated as being unimportant, while the uncertainties for the E/R factor may be omitted because they are of secondary importance and are included in the k factors. Therefore, the only uncertainty of type a) considered below is the one appended to the coefficient of the A factor.

a). Uncertainty appended to the coefficient of A factor. In scientific notation, the A factor is of the form:

$$A = a \times 10^n \qquad (4)$$

where a is a numerical coefficient less than 10 and n is the power of 10. If an uncertainty $\pm a'$ is appended to the coefficient a, the A factor takes the form:

$$A = (a \pm a') \times 10^n \qquad (5)$$

If lower and upper factors (f and F) are wanted instead, the A factor takes the form:

$$A = fa \times 10^n \qquad (6)$$

or

$$A = Fa \times 10^n \qquad (7)$$

Comparison of (6) and (7) to (5) leads to the relationships: $fa = a - a'$ and $Fa = a + a'$ from which the following formulas are obtained:

$$f = 1 - a'/a \tag{8}$$

and

$$F = 1 + a'/a \tag{9}$$

Formulas (8) and (9) are the relationships needed to transform an uncertainty appended to the coefficient of the A factor into one using a k factor. A numerical example follows:

$A = (2.0 \pm 0.5) \times 10^{14}$ therefore: $a = 2.0$ and $a' = 0.5$

$a'/a = 0.5/2.0 = 0.25$ and the k factors are: $f = 1 - 0.25 = 0.75$

and $F = 1 + 0.25 = 1.25$

b). Uncertainty appended to $\log_{10} k_o$. If k_o is the central value of a rate constant, C its logarithm to the base 10 and D the uncertainty expressed as an algebraic addend to C, then the following relationship is true:

$$\log_{10} k = C \pm D \tag{10}$$

where $C = \log_{10} k_o$. If D is put in logarithmic form, say:

$$D = \log_{10} F \tag{11}$$

then relationship (10) becomes:

$$\log_{10} k = \log_{10} k_o \pm \log_{10} F \tag{12}$$

which can take the form:

$$\log_{10} k_o/F < \log_{10} k < \log_{10} Fk_o$$

or

$$k_o/F < k < Fk_o \tag{13}$$

Replacing 1/F by f, relationship (1) is obtained. It is obvious that the k factors f and F are the antilogarithms of -D and D, respectively:

$$f = \text{antilog}(-D) = 10^{-D} \tag{14}$$

$$F = \text{antilog} D = 10^{D} \tag{15}$$

Formulas (14) and (15) are the relationships needed to transform the type b uncertainties into reliability limits expressed by k factors. A numerical example follows:

$\log_{10} k = 14.23 \pm 0.3$ therefore: $f = 10^{-0.3} = 0.5$ and $F = 10^{0.3} = 2.0$

c). Uncertainty expressed in percentage of k_o. Some kineticists prefer to use percentage for defining the uncertainty limits of a rate constant. Thus, the statement that a rate constant is $\pm$ p% uncertain means that the uncertainty limits of k_o are defined by the relationship:

$$k_o - (p/100)k_o < k < k_o + (p/100)k_o$$

or

$$(1 - p/100)k_o < k < (1 + p/100)k_o \qquad (16)$$

Replacing the percentage by the rate, defined as r = p/100, relationship (16) becomes:

$$(1 - r)k_o < k < (1 + r)k_o \qquad (17)$$

Comparison of relationships (17) and (1) leads to the following formulas:

$$f = 1 - r \qquad (18)$$

and

$$F = 1 + r \qquad (19)$$

which are the relationships needed to transform the type c uncertainties into reliability limits expressed by k factors. A numerical example follows:

$k = 3.7 \times 10^{12} \pm 20\%$ therefore p = 20% and r = 0.2

Thus: $f = 1 - 0.2 = 0.8$

and $F = 1 + 0.2 = 1.2$

When a percent error has been stated as > 100%, the F factor is determined first, according to relationship (19) then, instead of relationship (18), one simply sets: f = 1/F. E.g.: for a 150% error, r = 1.5, F = 1 + r = 2.5 and f = 1/F = 0.4.

The above given relationships: (3), (8) and (9), (14) and (15), (18) and (19) can be used in reverse by the reader who prefers other types of uncertainty limits than the standard k factors, f and F. However a word of caution is necessary. In contrast with the standard uncertainty limits, other types of uncertainties for rate constants using a unique factor or algebraic addend have a constraint imposed upon them. Thus, the uncertainties expressed by a unique algebraic addend are required to be symmetrical with respect to the central value to which they are appended, while the uncertainty expressed by a unique factor, F, indicates in fact that the upper factor F and the lower factor f are required to be inverse to each other ($f = 1/F$). No such constraints are imposed on the standard uncertainty limits used here and for that reason this type of uncertainty has been found most suitable for tabulation purposes. Why some evaluators prefer uncertainty limits with constraints is not clear. It would seem more logical if the lower and upper uncertainty limits were studied each independently from each other, without imposing any constraints on them. Probably it is a matter of convenience to express an uncertainty in the form - say - : $\log_{10} k = C \pm D$ rather than by the inequality: $fk_o < k < Fk_o$.

If the transformation of the standard uncertainty limits into uncertainties with constraints is desired, some adjustments may be necessary according to the case. The following examples, for transformation of standard uncertainty into a unique factor uncertainty, are an illustration of the necessary adjustments:

1). Standard factors: $f = 0.5$ and $F = 2.0$ It is obvious that $f = 1/F$ and no adjustment is necessary.

2). Standard factors: $f = 0.8$ and $F = 1.2$ In this case, f and F are not inverse to each other. Indeed $f' = 1/F = 0.83$ while $F' = 1/f = 1.25$.

The two pairs of factors, ($f' = 0.83$; $F = 1.2$ and $f = 0.8$; $F' = 1.25$) are quite close. However, it is safer to choose the pair 0.8 and 1.25, by enlarging slightly the uncertainty range.

3). Standard factors: $f = 0.6$ and $F = 1.4$ In this case, not only the factors are not inverse to each other, but the difference is significant: $f' = 1/F = 0.71$ and $F' = 1/f = 1.67$.

The two pairs of factors, ($f' = 0.71$; $F = 1.4$ and $f = 0.6$; $F' = 1.67$) are significantly different. Again, it is safer to choose the pair 0.6 and 1.67, by enlarging the uncertainty range. And, since the concepts of uncertainty and reliability are opposite to each other, enlargement of the uncertainty range will result in a decrease in reliability.

The same adjustments may be necessary for transformation of k factors uncertainties into another type of uncertainties.

Arrangement of the table

This publication is in two parts:

Part I. The table, arranged in six columns including the chemical reactions, temperature range, the parameters A, B and E/R for the modified Arrhenius equation $k = AT^{B}\exp(-E/RT)$ and the uncertainty limits expressed as k factors f and F.

Part II. The bibliography of part I, including the full references for the 11 critical reviews from which the present table was compiled. Following the bibliography, two conversion tables for equivalent second and - respectively - third order rate constant units are appended.

Column 1 includes the chemical reactions indicating both the reactants and the products. In the same column, under each chemical reaction, the names of the reactants are given. The chemical nomenclature adopted is the one used in the Chemical Substance Indexes of Chemical Abstracts.

Alternative neames are not given. The chemical names of the products are not given. The line with chemical names is indented with respect to the line above it. Under the chemical names, the short reference of reviewer's book or article is given. It includes the last two digits of publication's year, followed by the first three letters of author's name. If two authors are given, a slash separates each author's three letters. Again, the short reference line is indented with respect to the line above it. E.g.:

73 HER/HUI indicates the review of rate constants for the reactions between aliphatic hydrocarbons and atomic oxygen, published by Herron and Huie in 1973.

In the same line with the short reference, but spaced out, the order of reaction is indicated by the words "Reaction order:" followed by one of the digits 1, 2, or 3. As pointed out in the introduction, the order of reaction helps to establish the proper standard units for the reactions, as follows:

1 for first order reactions ..... s^{-1}

2 for second order reactions ..... $cm^3 mol^{-1} s^{-1}$

3 for third order reactions ..... $cm^6 mol^{-2} s^{-1}$

Following the reaction order, -on the same line-, the presence of an inert reaction partner ("third body") is indicated by the letter M: followed by its chemical formula. E.g.: M:Ar or M:CO_2. No indication is given if M is undefined, or if the reaction does not include M. In all, there are 112 reactions with M specified.

For 124 reactions, no Arrhenius parameters are indicated. Instead, for each of these 124 reactions, the ratio of the rate constant with

respect to the rate of a reference reaction - taken as unity - is given. This information follows the reaction order information, on the same line, and is indicated by the symbol k/k_{ref}: followed by a number.

E.g.: k/k_{ref}: 0.59.

The last line of column 1, placed under the line including the short reference and reaction order information, begins with the heading NOTE:. It is given only when necessary and might include information about the dependence of k factors on temperature range, or the reaction taken as reference when the ratio k/k_{ref} is given in the previous line, or other information pertinent to the reaction indicated above. The rate constant, k_{ref}, for the reference reaction indicated in the note (by the same author) can be found in the table in the proper place. For a certain number of reactions taken from Baulch, et al. (1972, 1973, and 1976) the relationship $k_1 = K\, k_{-1}$ included in the note indicates that the respective rate constant was calculated from the equilibrium constant K and the rate constant k_{-1} of the reverse reaction. In such cases, the author usually gives the rate constant of the reverse reaction immediately after the data for the forward reaction. The arrangement of the present table (based on the standard order, as described below in the following paragraph) does not allow the forward rate constant of a reaction to be followed immediately by its reverse reaction data. The reader will have to locate the rate constant of a reverse reaction (by the same author) in its proper place in the table.

Column 2, with the heading T/K, indicates in degrees Kelvin the temperature range of validity of the recommended rate parameters. For some reactions only one temperature is given, meaning that the reaction was

studied only at one temperature. If no temperature at all is indicated, it means that the kinetic parameters of the corresponding reaction are valid throughout the normal temperature range for combustion. The data estimated by Benson and Golden in their report "Estimating the Kinetics of Combustion" are in this category. The temperatures are alined with the short reference and the reaction order information.

Column 3, with the heading A, gives the value of A for the equation $k = AT^{B}\exp(-E/RT)$ in short scientific notation. In other words, it appears as a number less than 10, followed by a parenthesis including an integer preceded by the sign +, or -. The number less than 10 is the coefficient of the A factor, while the integer inside the parenthesis is the exponent of 10. Therefore, e.g., 3.5 (+ 14) should be read as $3.5 \times 10^{+14}$. The coefficient of the A factor has no more than one digit after the decimal point. The units of the A factor are the same as for the rate constant k_1 according to the order of the respective reaction, as shown above on page 11 of this introduction. For those cases when the recommended value is only for one temperature, the entry under this column is in fact the value of the rate constant k at this temperature. As for the temperatures, the data for the A factor are alined with the short reference and reaction order information. If a dash appears in this column, it means that no A factor value was reported by the evaluator for the corresponding reaction.

Column 4, with the heading B, gives the value of B for the equation $k = AT^{B}\exp(-E/RT)$. The value of B is usually low and varies from 0 to about 3 or 4. It may be negative, or positive. The negative values of B are preceded by the sign -, while the positive values are without sign. No more than one digit is given after the decimal dot. If in this column

a dash appears instead of a figure, it means that no B value was reported by the evaluator for the corresponding reaction. As for the temperature and A factor, the data for B are alined with the short reference and reaction order information.

Column 5, with the heading E/R, indicates the value of E/R for the equation $k = AT^{B}\exp(-E/RT)$. Since E is the activation energy in cal mol^{-1} and R the gas constant with a value of 1.987 cal mol^{-1} K^{-1}, it follows that the units of E/R are degrees K. The values given in column 5 for E/R may vary from 0 to over 100000 degrees K. The E/R values may be positive or negative. The negative values are preceded by -, while the positive values are without sign. Some of the E/R values included in the table are followed by an uncertainty with plus or minus sign. As pointed out in the introduction, these uncertainties may be ignored, as being included in the lower and upper k factors indicated in the right column of the table. If in this column a dash appears instead of a figure, it means that no E/R value was reported by the evaluator. As for the data from the previous columns, the values for the E/R factor are alined with the short reference and reaction order information.

Column 6, with the heading "k factors" and two subheadings, "f" and "F", indicates the two uncertainty k factors, the lower factor f in the left subcolumn and the upper factor F in the right subcolumn. To find the uncertainty limits of a reaction, its rate constant is to be multiplied by the two factors, as shown above in relation (1): $fk_o < k < Fk_o$. The values of both factors are always positive. If no uncertainty limits are indicated by the evaluator, both subcolumns of the column 6 are left blank. As for the data from the previous columns, the k factors are alined with the short reference and reaction order information.

Ordering of chemical reactions.

The general rule for ordering the chemical equations of the reactions listed in column 1 of the table is the standard order of arrangement as described in NBS Technical Note 270-3 pp. 5, 6, and 22*). This rule is applied to the first reactants of the reactions listed in the table, as well as to the reactants following the first. The first reactant of a reaction takes precedence over the following ones. The compounds listed as reactants may include the atoms O, H, S, N, and C, either each of them separately, or several, in any possible combination. The standard order of arrangement, when applied to these five atomic species, will result in the sequence O, H, S, N, C, each atom in it taking precedence over the following ones. When applied to the first reactants listed in the table, the standard order of arrangement will result in a sequence of five chemical systems, whose order of precedence is as follows:

1). O system, 2). H-O system, 3). S-O-H system, 4). N-O-H-S system, and 5). C-O-H-S-N system.

In each system, the first atom is underlined to show that the compounds containing this atom only, should be listed first. It is to be noted that the atomic species following the underlined atom are in standard order, while the underlined atom itself should be put at the end if the standard order were to be followed. As it will be shown below, this exception to the standard rule, - which is apparent only but not real, - is due to

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*). Wagman, D. D., Evans, W. H., Parker, V. B., Halow, I., Bailey, S. M., and Schumm, R. H., "Selected Values of Chemical Thermodynamic Properties," NBS Tech. Note 270-3 pgs. 5, 16, 22 (1968).

the fact that all the compounds containing the atoms of a system with the exception of the underlined atom, are already listed in the previous systems. In each of these five chemical systems, the order of the compounds listed in the table as first reactants is as follows:

1). O system: O, O_2, O_3.

2). H-O system: H, H_2, OH, HO_2, H_2O, H_2O_2.

3). S-O-H system: S, S_2, SO, SO_2, SO_3, SH, SH_2, SOH.

4). N-O-H-S system: N, N_2, NO, NO_2, NO_3, N_2O, N_2O_4, N_2O_5, NH, NH_2, NH_3, N_2H_4, HN_3, HNO, HNO_3, NS.

5). C-O-H-S-N system: C_1 compounds: C, CO, CO_2, CH, CH_2, CH_3, CH_4, CHO, HCHO, CH_3O., CH_3OH, CH_3OOH, CS, CS_2, COS, CH_3S, CH_3SH, CN, $C(NO_2)_4$, CHN, CH_3NH_2, CH=N≡N, CH_3NHNH_2, CH_3NO, CH_3NO_2, CH_3NO_3, CH_3ONH_2.

C_2 compounds: C_2, C_2O, CH≡CH, CH_2=CH_2, CH_3CH_2·, CH_3CH_3, CH_2=C=O, etc.

C_3 compounds, etc., up to C_{10} compounds follow, being ordered according to the same pattern.

It is clear now that, for instance, the compounds included in the S-O-H system contain at least one sulfur atom, while the compounds containing only H, or O atoms, or both, are already listed in the previous two systems (O-system and H-O system). It is to be noted that for the C-O-H-S-N system the standard order is applied in a slightly different way: the compounds are first grouped according to the number of C atoms, then the rule for the standard order of arrangement is applied for each group apart. This is necessary as a result of the very large number of organic compounds.

The standard order is applied in the same way for the second, or third reactants of chemical reactions. Since the reactants of a chemical equation

can be switched around, a number of bimolecular and termolecular reactions are inserted in the table in two - and respectively - three places. E.g.: Reaction $CH_4 + O \rightarrow CH_3\cdot + OH$, is inserted in the C-O-H-S-N system. This reaction may also be written as $O + CH_4 \rightarrow OH + CH_3\cdot$ and, as such, is listed in the O system. The advantage of such a procedure is obvious: referring to the example just given the reader will find the reaction between methane and oxygen listed with CH_4 as first reactant if he is interested in the reactions of methane, or listed with O as first reactant, if he is interested in the reactions of oxygen atom. The bimolecular reactions are the largest group of reactions included in the table. There are about 750 reactions listed in the table, having as reactants two distinct chemical compounds. Since each of these reactions is inserted twice, the number of entries for them will amount to about 1500. Only a small number of termolecular reactions has three distinct reactants. As an example, one of them is $NO + NO_2 + O_2 \rightarrow N_2O_5$. This reaction will also be inserted under the forms: $NO_2 + NO + O_2 \rightarrow N_2O_5$ and $O_2 + NO + NO_2 \rightarrow N_2O_5$. A number of second and third order reactions includes a second and - respectively - third body M. For this group of reactions, M will always be placed after all the other reactants, which means that the second order reactions with M as reactant will be inserted in the table only once, while the third order reactions with M as reactant will be inserted only twice. E.g.: Reaction $O_3 + M \rightarrow O + O_2 + M$ is inserted in the table only once, while reaction $NO + O + M \rightarrow NO_2 + M$ is inserted as such, and also under the form $O + NO + M \rightarrow NO_2 + M$.

Most of the chemical reactions included in the table are balanced. A number of reactions are only apparently unbalanced. For instance, reaction

$$CH_3CH_2CH_2CH_3 + H \rightarrow CH_3CH_2CH_2CH_2\cdot + CH_3CH_2CH(\cdot)\ CH_3 + H_2 \quad (20)$$

has a rate constant which in fact the sum of the rate constants for the two reactions

$$CH_3CH_2CH_2CH_3 + H \rightarrow CH_3CH_2CH_2CH_2\cdot + H_2 \quad (21)$$

and $$CH_3CH_2CH_2CH_3 + H \rightarrow CH_3CH_2CH(\cdot)CH_3 + H_2 \quad (22)$$

Since the Arrhenius parameters listed in the table refer to the total rate constant, the reaction is listed in the table under the form (20) rather than in two separate forms. In some instances, a reaction is balanced, but the alkyl radicals formed as products are not specified. E.g.:

$$CH_3\cdot + (CH_3)_2CHCH(CH_3)CH(CH_3)_2 \rightarrow CH_4 + [C_8H_{17}\cdot] \quad (23)$$

The unspecified octyl radical inserted in square brackets as product in equation (23) represents all primary, secondary and tertiary octyl radicals that could be formed by abstraction of a H atom from the reactant 2,3,4-Trimethyl-pentane. There are a number of reactions with the products totally unspecified. In such a case, the word "products" appears after the arrow:

$$(CH_3)_2C = CHCH_3 + N \rightarrow \text{products} \quad (24)$$

Display of Chemical Reactions and Formulae

A chemical reaction equation should show as clearly as possible the formation of products from the reactants. For that reason, the reactions listed in the table are written on the basis of semi-structural formulas.

Straight chain hydrocarbons. All saturated normal hydrocarbons up to, and including n-pentane, are written so as to show separately each methyl and methylene group in the chain: CH_4, CH_3CH_3, $CH_3CH_2CH_3$, $CH_3CH_2CH_2CH_3$, $CH_3CH_2CH_2CH_2CH_3$.

The higher hydrocarbons, from n-hexane to n-decane, are written in a more condensed form to facilitate the counting of the number of methylene groups in the chain: $CH_3(CH_2)_4CH_3$, $CH_3(CH_2)_5CH_3$, $CH_3(CH_2)_6CH_3$, $CH_3(CH_2)_7CH_3$, $CH_3(CH_2)_8CH_3$.

The unsaturated hydrocarbons are written so as to show the position of each double or triple bond in the molecule. E.g.:

Ethyne (Acetylene)	$CH{\equiv}CH$
1,2-Propadiene (Allene)	$CH_2{=}C{=}CH_2$
1,3-Butadiyne	$CH{\equiv}CC{\equiv}CH$
cis-2-Pentene	$cis\text{-}CH_3CH_2CH{=}CHCH_3$
1-Heptene	$CH_3(CH_2)_4CH{=}CH_2$

Alkyl radicals. The unpaired electron of each alkyl radical is always indicated. E.g.:

Methyl free radical	$CH_3\cdot$
Ethyl, 1-methyl-, free radical (Isopropyl)	$(CH_3)_2CH\cdot$
Methyl, hydroxy-, free radical	$\cdot CH_2OH$

If the unpaired electron of an alkyl radical belongs to a carbon in the middle of the chain, it is indicated inside a parenthesis following the carbon atom. E.g.:

Propyl, 1-methyl-, free radical (sec-Butyl)	$CH_3CH_2CH(\cdot)CH_3$
Butyl, 1,1-dimethyl-, free radical (2-Methyl-2-pentyl)	$CH_3CH_2CH_2C(\cdot)(CH_3)_2$
Methyl, oxo-, free radical (Formyl) is written:	$\cdot CHO$

Oxy free radicals. If the oxygen atom of an oxy radical is attached to the terminal carbon atom, the radical is written in the usual manner: CH_3O. If the oxygen atom of the oxy radical is attached to a C atom in the middle of the chain, then the oxygen atom, together with the unpaired electron, are inside a parenthesis following the C atom: $(CH_3)_2C(O\cdot)CH_2CH_3$.

Peroxo, and other free radicals. The rules for writing peroxo, and other free radicals are the same as for the oxy free radicals: $CH_3O_2\cdot$, $CH_3S\cdot$.

Atoms, like O, H, S, N, and simple radicals like OH, SH, NH, CH, CH_2, are written without dot. Hydroperoxyl free radical is written $HO_2\cdot$ (with dot).

Sources of Recommended Rate Constants

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Lloyd, A. C., "Evaluated and Estimated Kinetic Data for Gas Phase Reactions of the Hydroperoxyl Radical," Int. J. Chem. Kinet. 6, 169-228 (1974).

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
$O + O + M \rightarrow O_2 + M$						
OXYGEN ATOM						
76 BAU/DRY REACTION ORDER: 3. M: Ar	190-4000	1.9(+13)	0	-900±175	0.8	1.2
NOTE: k FACTORS CHANGING TO: f = 0.4; F = 1.6 AT 4000K.						
M: N_2	190-400	1.0(+14)	0	-720	0.5	1.5
M: O_2	2000-10000	4.7(+23)	-2.5	0	0.4	2.5
NOTE: $k_1 = Kk_{-1}$. k FACTORS CHANGING TO: f = 0.5; F = 2.0 AT ≈ 8000K.						

$O + O_2 \rightarrow O_2 + O$						
OXYGEN ATOM + OXYGEN MOLECULE						
76 HEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		

$O + O_2 + M \rightarrow O_3 + M$						
OXYGEN ATOM + OXYGEN MOLECULE						
76 BAU/DRY REACTION ORDER: 3. M: O_2	300	2.2(+14)	-	-	0.8	1.2
NOTE: M eff: O_2(1.5)						
M: AR	300	1.5(+14)	-	-	0.8	1.3
NOTE: M eff: Ar(1.0)						
M: N_2	300	2.1(+14)	-	-	0.8	1.2
NOTE: M eff: N_2(1.4)						

$O + O_3 \rightarrow O_2 + O_2$						
OXYGEN ATOM + OZONE						
76 BAU/DRY REACTION ORDER: 2.	200-500	5.2(+12)	0	2090±260	0.5	1.5
NOTE: k FACTORS CHANGING TO: f = 0.6; F = 3.0 AT ≈ 1000K						

$O + H + M \rightarrow OH + M$						
OXYGEN + HYDROGEN ATOMS						
76 ENG REACTION ORDER: 3.	1500-2500	7.9(+15)	0	0	0.1	10.

$O + H_2 \rightarrow OH + H$						
OXYGEN ATOM + HYDROGEN MOLECULE						
72 BAU/DRY REACTION ORDER: 2.	400-2000	1.8(+10)	1.0	4480±150	0.7	1.3

$O + D_2 \rightarrow OD + D$						
OXYGEN ATOM + DEUTERIUM MOLECULE						
72 BAU/DRY REACTION ORDER: 2.	416-968	2.0(+13)	0	5500	0.5	2.0

$O + OH \rightarrow O_2 + H$						
OXYGEN ATOM + HYDROXYL FREE RADICAL						
72 BAU/DRY REACTION ORDER: 2.	300	2.3(+13)	-	-	0.6	1.4
76 ENG	1500-2500	2.5(+13)	0	0	0.5	2.0

$O + OH \rightarrow O_2 + H$						
OXYGEN ATOM + HYDROXYL FREE RADICAL						
75 HEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		

$O + OH + M \rightarrow HO_2 + M$						
OXYGEN ATOM + HYDROXYL FREE RADICAL						
76 ENG REACTION ORDER: 3.	1500-2500	1.0(+17)	0	0	0.01	100.

$O + OH \rightarrow OH + O$						
OXYGEN ATOM + HYDROXYL FREE RADICAL						

CHEMICAL REACTIONS	T/K	A	B	E/R (in ^{o}K)	k factors f	F
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	4000		
$O + H_2O \rightarrow OH + OH$						
OXYGEN ATOM + WATER						
72 BAU/DRY REACTION ORDER: 2.	300-2000	6.8(+13)	0	9240±200	0.7	1.5
$O + S_2 \rightarrow SO + S$						
OXYGEN ATOM + SULFUR DIMER						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$O + SO \rightarrow O_2 + S$						
OXYGEN ATOM + SULFUR MONOXIDE						
75 BEN/GOL REACTION ORDER: 2.		2.0(+11)	0.5	2770		
$O + SO \rightarrow SO + O$						
OXYGEN ATOM + SULFUR MONOXIDE						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$O + SO + M \rightarrow SO_2 + M$						
OXYGEN ATOM + SULFUR MONOXIDE						
76 BAU/DRY REACTION ORDER: 3. M: Ar	298	6.7(+16)	-	-	0.7	1.3
$O + SO_2 \rightarrow O_2 + SO$						
OXYGEN ATOM + SULFUR DIOXIDE						
76 BAU/DRY REACTION ORDER: 2.	440-2100	1.3(+14)	-0.5	5980	0.3	1.7
NOTE: $k_1 = Kk_{-1}$						
$O + SH \rightarrow H + SO$						
OXYGEN ATOM + MERCAPTO FREE RADICAL						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$O + SH \rightarrow OH + S$						
OXYGEN ATOM + MERCAPTO FREE RADICAL						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0	4000		
$O + N + M \rightarrow NO + M$						
OXYGEN ATOM + NITROGEN ATOM						
73 BAU/DRY REACTION ORDER: 3. M: N_2	200-400	6.4(+16)	-0.5	0		
$O + N_2 \rightarrow NO + N$						
OXYGEN ATOM + NITROGEN MOLECULE						
73 BAU/DRY REACTION ORDER: 2.	2000-5000	7.6(+13)	0	38000±150	0.5	2.0
NOTE: $k_1 = Kk_{-1}$						
$O + N_2 + M \rightarrow N_2O + M$						
OXYGEN ATOM + NITROGEN MOLECULE						
73 BAU/DRY REACTION ORDER: 3. M: Ar	1300-2500	1.4(+13)	0	10400±1500	0.7	1.5
$O + NO \rightarrow O_2 + N$						
OXYGEN ATOM + NITROGEN OXIDE(NO)						
73 BAU/DRY REACTION ORDER: 2.	1000-3000	1.5(+ 9)	1.0	19500±150	0.7	1.3
NOTE: $k_1 = Kk_{-1}$. k FACTORS CHANGING TO: f = 0.5; F = 2.0 AT 3000K						

CHEMICAL REACTIONS		T/K	A	B	E/R (in °K)	k factors f	F

$O + NO \rightarrow NO + O$							
OXYGEN ATOM + NITROGEN OXIDE(NO)							
75 BEN/GOL REACTION ORDER: 2.			6.3(+11)	0.5	0		

$O + NO + M \rightarrow NO_2 + M$							
OXYGEN ATOM + NITROGEN OXIDE(NO)							
73 BAU/DRY REACTION ORDER: 3.	M: O_2	200-500	1.1(+15)	0	-940±50	0.8	1.2
NOTE: M eff: O_2(1.0) AT 297K							
	M: Ar	200-500	1.1(+14)	0	-940±50	0.8	1.2
Ar(0.1) AT 297K							
	M: H_2O	200-500	6.7(+15)	0	-940±15	0.8	1.2
H_2O(6.1) AT 297K							
	M: D_2O	200-500	5.5(+15)	0	-940±50	0.8	1.2
D_2O(5.0) AT 297K							
	M: SF_6	200-500	2.9(+15)	0	-940±50	0.8	1.2
SF_6(2.6) AT 297K							
	M: N_2	200-500	1.5(+15)	0	-940±50	0.8	1.2
N_2(1.4) AT 297K							
	M: N_2O	200-500	2.3(+15)	0	-940±50	0.8	1.2
N_2O(2.1) AT 297K							
	M: CO_2	200-500	2.3(+15)	0	-940±50	0.8	1.2
CO_2(2.1) AT 297K							
	M: CH_4	200-500	2.4(+15)	0	-940±50	0.8	1.2
CH_4(2.2) AT 297K							
	M: CF_4	200-500	2.4(+15)	0	-940±50	0.8	1.2
CF_4(2.2) AT 297K							

$O + NO_2 \rightarrow O_2 + NO$							
OXYGEN ATOM + NITROGEN OXIDE(NO_2)							
73 BAU/DRY REACTION ORDER: 2.		300-550	1.0(+13)	0	300±100	0.8	1.3

$O + NO_2 \rightarrow O_2 + NO$							
OXYGEN ATOM + NITROGEN OXIDE(NO_2)							
76 ENG REACTION ORDER: 2.		1500-2500	1.0(+13)	0	500±250	0.5	2.0

$O + NO_2 + M \rightarrow NO_3 + M$							
OXYGEN ATOM + NITROGEN OXIDE(NO_2)							
73 BAU/DRY REACTION ORDER: 3.	M: N_2	295	2.3(+16)	-	-	0.4	2.5
NOTE: k_0 (LOW PRESSURE).							
REACTION ORDER: 2.	M: N_2	295	1.1(+13)	-	-	0.4	2.5
NOTE: LIMITING HIGH PRESSURE k_∞							

$O + N_2O \rightarrow O_2 + N_2$							
OXYGEN ATOM + NITROGEN OXIDE(N_2O)							
73 BAU/DRY REACTION ORDER: 2.		1200-2000	1.0(+14)	0	14100±2000	0.4	2.5

$O + N_2O \rightarrow NO + NO$							
OXYGEN ATOM + NITROGEN OXIDE(N_2O)							
73 BAU/DRY REACTION ORDER: 2.		1200-2000	1.0(+14)	0	14100±1500	0.5	2.0

$O + NH \rightarrow OH + N$							
OXYGEN ATOM + IMIDOGEN FREE RADICAL							

CHEMICAL REACTIONS	T/K	A	B	E/R (in ^{o}K)	k factors f	k factors F
75 BEN/G6L REACTION 6RDER: 2.		6.3(+11)	0.5	4000		
6 + NH → N6 + H						
6XYGEN ATOM + IMIDOGEN FREE RADICAL						
75 BEN/G6L REACTION 6RDER: 2.		6.3(+11)	0.5	0		
6 + NH + M → HN6 + M						
6XYGEN ATOM + IMIDOGEN FREE RADICAL						
76 ENG REACTION 6RDER: 3.	1500-2500	1.0(+16)	-0.5	0±2500	0.3	3.2
6 + NH_3 → 6H + NH_2						
6XYGEN ATOM + AMMONIA						
73 BAU/DRY REACTION 6RDER: 2.	300-1000	1.5(+12)	0	3000±300	0.5	1.5
6 + HN6 → 6H + N6						
6XYGEN ATOM + NITROSYL HYDRIDE						
76 ENG REACTION 6RDER: 2.	1500-2500	5.0(+11)	0.5	0±2500	0.3	3.2
6 + HN6 → 6_2 + NH						
6XYGEN ATOM + NITROSYL HYDRIDE						
76 ENG REACTION 6RDER: 2.	1500-2500	1.0(+11)	0.5	3500±2500	0.3	3.2
6 + HN6 → $N6_2$ + H						
6XYGEN ATOM + NITROSYL HYDRIDE						
76 ENG REACTION 6RDER: 2.	1500-2500	5.0(+10)	0.5	0±2500	0.3	3.2
6 + NS → S6 + N						
6XYGEN ATOM + NITROGEN SULFIDE(NS)						
75 BEN/G6L REACTION 6RDER: 2.		6.3(+11)	0.5	4000		
6 + NS → N6 + S						
6XYGEN ATOM + NITROGEN SULFIDE(NS)						
75 BEN/G6L REACTION 6RDER: 2.		6.3(+11)	0.5	0		
6 + C + M → C6 + M						
6XYGEN ATOM + CARBON ATOM						
76 BAU/DRY REACTION 6RDER: 3.	7000-15000	3.3(+26)	-3.1	2114	0.3	1.8
NOTE: M = Ar, OR C6 $k_1 = Kk_{-1}$						
6 + C6 → 6_2 + C						
6XYGEN ATOM + CARBON MONOXIDE						
75 BEN/G6L REACTION 6RDER: 2.		1.0(+12)	0.5	69300		
6 + C6 → C6 + 6						
6XYGEN ATOM + CARBON MONOXIDE						
75 BEN/G6L REACTION 6RDER: 2.		6.3(+11)	0.5	0		
6 + C6 + M → $C6_2$ + M						
6XYGEN ATOM + CARBON MONOXIDE						
76 BAU/DRY REACTION 6RDER: 3. M: C6	250-500	2.4(+15)	0	2184±280	0.8	1.2
NOTE: k FACTORS CHANGING TO: f = 0.5; F = 1.2 AT 500K.						
6 + $C6_2$ → 6_2 + C6						

CHEMICAL REACTIONS	T/K	A	B	E/R (in ^{o}K)	k factors f	k factors F
OXYGEN ATOM + CARBON DIOXIDE						
76 BAU/DRY REACTION ORDER: 2.	1500-3000	1.7(+13)	0	26500±2500	0.5	2.0
NOTE: k FACTORS CHANGING TO: f = 0.5; F = 1.5 AT 3000K.						
$k_1 = Kk_{-1}$						

O + CH → OH + C						
OXYGEN ATOM + METHYLIDYNE FREE RADICAL						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	4000		

O + CH → CO + H						
OXYGEN ATOM + METHYLIDYNE FREE RADICAL						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		

O + CH + M → CHO + M						
OXYGEN ATOM + METHYLIDYNE FREE RADICAL						
76 ENG REACTION ORDER: 3.	1500-2500	1.0(+16)	-0.5	0±2500	0.3	3.2

O + $:CH_2$ → H + $\cdot$CHO						
OXYGEN ATOM + METHYLENE FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	5.0(+11)	0.5	2000±2500	0.3	3.2

O + $:CH_2$ → OH + CH						
OXYGEN ATOM + METHYLENE FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	2.0(+11)	0.7	13100±2500	0.3	3.2

O + $CH_3\cdot$ → H + HCHO						
OXYGEN ATOM + METHYL FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	5.0(+13)	0	0	0.5	2.0

O + CH_4 → OH + $CH_3\cdot$						
OXYGEN ATOM + METHANE						
73 BER/HUI REACTION ORDER: 2.	350-1000	2.1(+13)	0	4550	0.7	1.3
76 ENG	1500-2500	2.0(+13)	0	4530±500	0.6	1.6

O + $\cdot$CHO → H + CO_2						
OXYGEN ATOM + METHYL, OXO-, FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	3.2(+11)	0	0±1500		
NOTE: k ESTIMATED.						

O + $\cdot$CHO → OH + CO						
OXYGEN ATOM + METHYL, OXO-, FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	3.2(+11)	1.0	250±1500		
NOTE: k ESTIMATED.						

O + HCHO → OH + $\cdot$CHO						
OXYGEN ATOM + FORMALDEHYDE						
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+11)	1.0	1750±1000	0.5	1.2

O + HCHO → products						
OXYGEN ATOM + FORMALDEHYDE						
73 BER/HUI REACTION ORDER: 2.	300	9.0(+10)	-	-	0.7	1.3

O + HCDO → products						

CHEMICAL REACTIONS	T/K	A	B	E/R (in ^{o}K)	k factors f	k factors F
OXYGEN ATOM + FORMALDEHYDE-d						
73 BER/HUI REACTION ORDER: 2.	300	4.9(+10)	-	-		

$O + CH_3O \rightarrow OH + ECHO$						
OXYGEN ATOM + METHOXY FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+14)	0	0±1500		
NOTE: k ESTIMATED						

$O + CS \rightarrow C + SO$						
OXYGEN ATOM + CARBON MONOSULFIDE FREE RADICAL						
75 BEN/GOL REACTION ORDER: 2.		1.6(+12)	0.5	28940		

$O + CS \rightarrow CO + S$						
OXYGEN ATOM + CARBON MONOSULFIDE FREE RADICAL						
76 BAU/DRY REACTION ORDER: 2.	300	1.3(+13)	-	-	0.5	1.5
75 BEN/GOL		6.3(+11)	0.5	0		

$O + CS_2 \rightarrow S + COS$						
OXYGEN ATOM + CARBON DISULFIDE						
76 BAU/DRY REACTION ORDER: 2.	302	2.2(+11)	-	-	0.5	1.5

$O + CS_2 \rightarrow SO + CS$						
OXYGEN ATOM + CARBON DISULFIDE						
76 BAU/DRY REACTION ORDER: 2.	200-1000	2.2(+13)	0	700±150	0.7	1.3

$O + COS \rightarrow SO + CO$						
OXYGEN ATOM + CARBON OXIDE SULFIDE						
76 BAU/DRY REACTION ORDER: 2.	190-1200	1.6(+13)	0	2250±250	0.5	1.5
NOTE: k FACTORS CHANGING TO: f = 0.3; F = 3.0 ABOVE 600K.						

$O + CN \rightarrow C + NO$						
OXYGEN ATOM + CYANOGEN FREE RADICAL						
75 BEN/GOL REACTION ORDER: 2.		1.3(+12)	0.5	14545		

$O + CN \rightarrow CO + N$						
OXYGEN ATOM + CYANOGEN FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+12)	0	0±2500	0.3	3.2

$O + C_2 \rightarrow CO + C$						
OXYGEN ATOM + CARBON DIMER						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		

$O + CH{\equiv}CH \rightarrow$ products						
OXYGEN ATOM + ETHYNE						
73 BER/HUI REACTION ORDER: 2.	200-700	1.4(+13)	0	1500	0.8	1.2

$O + CH_2{=}CH_2 \rightarrow cy\text{-}CH_2CH_2O$						
OXYGEN ATOM + ETHENE						
73 BER/EUI REACTION ORDER: 2.	200-500	3.3(+12)	0	565	0.8	1.2

$O + CH_3CH_3 \rightarrow OH + CH_2CH_2O$						
OXYGEN ATOM + ETHANE						
73 BER/EUI REACTION ORDER: 2.	298-650	2.5(+13)	0	3200	0.7	1.3

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F

O + CH_2=C=O → products						
OXYGEN ATOM + ETHENONE						
73 BEB/BUI REACTION ORDER: 2.	298	5.3(+11)	-	-	0.7	1.3

O + CH_3CHO → products						
OXYGEN ATOM + ACETALDEHYDE						
73 BEB/BUI REACTION ORDER: 2.	298-500	1.4(+13)	0	1140	0.5	2.0

O + cy-CH_2CH_2O → products						
OXYGEN ATOM + OXIRANE						
73 BEB/BUI REACTION ORDER: 2.	298	7.0(+8)	-	-	0.6	1.5

O + CH_3CH_2OH → products						
OXYGEN ATOM + ETHANOL						
73 BEB/BUI REACTION ORDER: 2.	298	8.7(+10)	-	-	0.6	1.5

O + CH_3OCH_3 → products						
OXYGEN ATOM + METHANE, OXYBIS-						
73 BEB/BUI REACTION ORDER: 2.	200-500	5.9(+12)	0	1520	0.7	1.3

O + CH_3C≡CH → products						
OXYGEN ATOM + PROPYNE						
73 BEB/BUI REACTION ORDER: 2.	298	4.0(+11)	-	-	0.5	2.0

O + CH_3CH=CH_2 → cy-$(CH_3)CHCH_2O$						
OXYGEN ATOM + 1-PROPENE						
73 BEB/BUI REACTION ORDER: 2.	200-500	2.5(+12)	0	38	0.8	1.2

O + $CH_3CH_2CH_3$ → OH + $CH_3CH_2CH_2$. + $(CH_3)_2CH$.						
OXYGEN ATOM + PROPANE						
73 BEB/BUI REACTION ORDER: 2.	298	9.0(+9)	-	-	0.7	2

O + $(CH_3)_2CHOH$ → products						
OXYGEN ATOM + 2-PROPANOL						
73 BEB/BUI REACTION ORDER: 2.	298	1.3(+11)	-	-	0.6	1.5

O + $(CH_3)_2C$=CH_2 → cy-$(CH_3)_2CCH_2O$						
OXYGEN ATOM + 1-PROPENE, 2-METHYL-						
73 BEB/BUI REACTION ORDER: 2.	298	1.2(+13)	-	-	0.7	1.3

O + CH≡CC≡CH → products						
OXYGEN ATOM + 1,3-BUTADIYNE						
73 BEB/BUI REACTION ORDER: 2.	300	9.0(+11)	-	-	0.7	1.4

O + CH_2=$CHCH$=CH_2 → products						
OXYGEN ATOM + 1,3-BUTADIENE						
73 BEB/BUI REACTION ORDER: 2.	298-400	3.4(+12)	0	-380	0.7	1.3

O + CH_3CH_2CH=CH_2 → cy-$(CH_3CH_2)CHCH_2O$						
OXYGEN ATOM + 1-BUTENE						
73 BEB/BUI REACTION ORDER: 2.	298	2.3(+12)	-	-	0.8	1.2

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
$\dot{O}$ + cis-$CH_3CH{=}CHCH_3$ → products OXYGEN ATOM + cis-2-BUTENE 73 HBR/BUI REACTION ORDER: 2.	250-500	5.9(+12)	0	-165	0.8	1.2
$\dot{O}$ + trans-$CH_3CH{=}CHCH_3$ → products OXYGEN ATOM + trans-2-BUTENE 73 HBR/BUI REACTION ORDER: 2.	298	1.4(+13)	-	-	0.7	1.3
$\dot{O}$ + $CH_3CH_2CH_2CH_3$ → OH + $CH_3CH_2CH_2CH_2\dot{}$ OXYGEN ATOM + BUTANE 73 HBR/BUI REACTION ORDER: 2.	298-650	3.0(+13)	0	2920	0.7	1.3
$\dot{O}$ + $CH_3CH_2CH_2CH_3$ → OH + $CH_3CH_2CH(\dot{})CH_3$ OXYGEN ATOM + BUTANE 73 HBR/BUI REACTION ORDER: 2.	298-650	4.3(+13)	0	2410	0.7	1.3
$\dot{O}$ + $CH_3CH_2CH_2CH{=}CH_2$ → cy-$(CH_3CH_2CH_2)CHCH_2\dot{O}$ OXYGEN ATOM + 1-PENTENE 73 HBR/BUI REACTION ORDER: 2.	298	2.8(+12)	-	-	0.7	1.3
$\dot{O}$ + cis-$CH_3CH_2CH{=}CHCH_3$ → products OXYGEN ATOM + cis-2-PENTENE 73 HBR/BUI REACTION ORDER: 2.	298	1.1(+13)	-	-	0.7	1.3
$\dot{O}$ + $(CH_3)_2C{=}CHCH_3$ → products OXYGEN ATOM + 2-BUTENE, 2-METHYL- 73 HBR/BUI REACTION ORDER: 2.	298-400	3.9(+12)	0	-680	0.8	1.2
$\dot{O}$ + $CH_3CH_2CH_2CH_2CH_3$ → OH + $CH_3CH_2CH_2CH_2CH_2\dot{}$ OXYGEN ATOM + PENTANE 73 HBR/BUI REACTION ORDER: 2.	298-650	2.9(+13)	0	2920	0.7	1.3
$\dot{O}$ + $CH_3CH_2CH_2CH_2CH_3$ → OH + $CH_3CH_2CH_2CH(\dot{})CH_3$ + $CH_3CH_2CH(\dot{})CH_2CH_3$ OXYGEN ATOM + PENTANE 73 HBR/BUI REACTION ORDER: 2.	298-650	8.0(+13)	0	2320	0.7	1.3
$\dot{O}$ + $(CH_3)_2CHCH_2CH_3$ → OH + $(CH_3)_2C(\dot{})CH_2CH_3$ + $(CH_3)_2CHCH(\dot{})CH_3$ + $(CH_3)_2CHCH_2CH_2\dot{}$ + $CH_2CH(CH_3)CH_2CH_3$ OXYGEN ATOM + BUTANE, 2-METHYL- 73 HBR/BUI REACTION ORDER: 2.	307	8.0(+10)	-	-	0.7	1.4
$\dot{O}$ + $(CH_3)_4C$ → OH + $(CH_3)_3CCH_2\dot{}$ OXYGEN ATOM + PROPANE, 2,2-DIMETHYL- 73 HBR/BUI REACTION ORDER: 2.	298-650	5.9(+13)	0	2920	0.7	1.4
$\dot{O}$ + $CH_3CH_2CH_2CH_2CH{=}CH_2$ → cy-$(CH_3CH_2CH_2CH_2)CHCH_2\dot{O}$ OXYGEN ATOM + 1-HEXENE 73 HBR/BUI REACTION ORDER: 2.	298	3.1(+12)	-	-	0.7	1.3
$\dot{O}$ + $(CH_3)_2C{=}C(CH_3)_2$ → products OXYGEN ATOM + 2-BUTENE, 2,3-DIMETHYL- 73 HBR/BUI REACTION ORDER: 2.	298-400	3.4(+12)	0	-790	0.8	1.2

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F

$\dot{O}$ + $CH_3(CH_2)_4CH_3$ → $\dot{O}H$ + $CH_3(CH_2)_4CH_2\bullet$						
ÖXYGEN ATÖM + HEXANE						
73 HER/HUI REACTIÖN ÖRDER: 2.	298-650	2.9(+13)	0	2920	0.7	1.3

$\dot{O}$ + $CH_3(CH_2)_4CH_3$ → $\dot{O}H$ + $CH_3CH(\bullet)CH_2CH_2CH_2CH_3$ + $CH_3CH_2CH(\bullet)CH_2CH_2CH_3$						
ÖXYGEN ATÖM + HEXANE						
73 HER/HUI REACTIÖN ÖRDER: 2.	298-650	1.1(+14)	0	2250	0.8	1.3

$\dot{O}$ + $(CH_3)_2CHCH(CH_3)_2$ → $\dot{O}H$ + $CH_2CH(CH_3)CH(CH_3)_2$						
ÖXYGEN ATÖM + BUTANE, 2,3-DIMETHYL-						
73 HER/HUI REACTIÖN ÖRDER: 2.	298-650	5.9(+13)	0	2920	0.7	1.3

$\dot{O}$ + $(CH_3)_2CHCH(CH_3)_2$ → $\dot{O}H$ + $(CH_3)_2C(\bullet)CH(CH_3)_2$						
ÖXYGEN ATÖM + BUTANE, 2,3-DIMETHYL-						
73 HER/HUI REACTIÖN ÖRDER: 2.	298-650	3.1(+13)	0	1650	0.7	1.3

$\dot{O}$ + $CH_3(CH_2)_5CH_3$ → $\dot{O}H$ + $CH_3(CH_2)_5CH_2\bullet$						
ÖXYGEN ATÖM + HEPTANE						
73 HER/HUI REACTIÖN ÖRDER: 2.	298-650	2.9(+13)	0	2920	0.7	1.3

$\dot{O}$ + $CH_3(CH_2)_5CH_3$ → $\dot{O}H$ + $CH_3(CH_2)_4CH(\bullet)CH_3$ + $CH_3(CH_2)_3CH(\bullet)(CH_2)_2CH_3$ + $CH_3(CH_2)_2CH(\bullet)(CH_2)_2CH_3$						
ÖXYGEN ATÖM + HEPTANE						
73 HER/HUI REACTIÖN ÖRDER: 2.	298-650	1.2(+14)	0	2190	0.7	1.3

$\dot{O}$ + $(CH_3)_3C(CH_2)_2CH_3$ → products						
ÖXYGEN ATÖM + PENTANE, 2,2-DIMETHYL-						
73 HER/HUI REACTIÖN ÖRDER: 2.	307	6.5(+10)	-	-	0.7	1.4

$\dot{O}$ + $(CH_3)_2CHCH_2CH(CH_3)_2$ → products						
ÖXYGEN ATÖM + PENTANE, 2,4-DIMETHYL-						
73 HER/HUI REACTIÖN ÖRDER: 2.	307	1.0(+11)	-	-	0.7	1.4

$\dot{O}$ + $CH_3(CH_2)_6CH_3$ → $\dot{O}H$ + $CH_3(CH_2)_6CH_2\bullet$						
ÖXYGEN ATÖM + ÖCTANE						
73 HER/HUI REACTIÖN ÖRDER: 2.	298-650	2.9(+13)	0	2920	0.7	1.3

$\dot{O}$ + $CH_3(CH_2)_6CH_3$ → $\dot{O}H$ + $CH_3(CH_2)_5CH(\bullet)CH_3$ + $CH_3(CH_2)_4CH(\bullet)CH_2CH_3$ + $CH_3(CH_2)_3CH(\bullet)(CH_2)_2CH_3$						
ÖXYGEN ATÖM + ÖCTANE						
73 HER/HUI REACTIÖN ÖRDER: 2.	298-650	9.3(+13)	0	2030	0.7	1.3

$\dot{O}$ + $(CH_3)_3CCH_2CH(CH_3)_2$ → products						
ÖXYGEN ATÖM + PENTANE, 2,2,4-TRIMETHYL-						
73 HER/HUI REACTIÖN ÖRDER: 2.	307	5.5(+10)	-	-	0.6	1.5

$\dot{O}$ + $(CH_3)_2CHCH(CH_3)CH(CH_3)_2$ → products						
ÖXYGEN ATÖM + PENTANE, 2,3,4-TRIMETHYL-						
73 HER/HUI REACTIÖN ÖRDER: 2.	307	3.0(+10)	-	-	0.6	1.5

$\dot{O}$ + $(CH_3)_3CC(CH_3)_3$ → products						

CHEMICAL REACTIONS		T/K	A	B	E/R (in °K)	k factors f	k factors F
OXYGEN ATOM + BUTANE, 2,2,3,3-TETRAMETHYL-							
73 BER/BUI	REACTION ORDER: 2.	307	8.0(+9)	-	-	0.6	1.5
$O_2 + O \rightarrow O + O_2$							
OXYGEN MOLECULE + OXYGEN ATOM							
75 BEN/GOL	REACTION ORDER: 2.		6.3(+11)	0.5	0		
$O_2 + O + M \rightarrow O_3 + M$							
OXYGEN MOLECULE + OXYGEN ATOM							
76 BAU/DRY	REACTION ORDER: 3. M: O_2	300	2.2(+14)	-	-	0.8	1.2
NOTE: M eff: O_2(1.5)	M: Ar	300	1.5(+14)	-	-	0.8	1.3
Ar(1.0)	M: N_2	300	2.1(+14)	-	-	0.8	1.2
N_2(1.4)							
$O_2 + H \rightarrow O + OH$							
OXYGEN MOLECULE + HYDROGEN ATOM							
72 BAU/DRY	REACTION ORDER: 2.	700-2500	2.2(+14)	0	8450±250	0.7	1.3
72 KON		310-2060	1.5(+14)	0	8420±125	0.9	1.2
$O_2 + D \rightarrow O + OD$							
OXYGEN MOLECULE + DEUTERIUM ATOM							
72 BAU/DRY	REACTION ORDER: 2.	800-1000	8.9(+13)	-	7500		
$O_2 + H + M \rightarrow HO_2 + M$							
OXYGEN MOLECULE + HYDROGEN ATOM							
72 BAU/DRY	REACTION ORDER: 3. M: H_2	300-2000	1.5(+15)	0	-500±250	0.5	1.5
NOTE: M eff: H_2(1.0)	M: 02	300-2000	5.9(+14)	0	-500±250	0.5	1.5
O_2(0.4)	M: H_2O	300-2000	9.5(+15)	0	-500±250	0.5	1.5
H_2O(6.4)	M: He	300-2000	4.4(+14)	0	-500±250	0.5	1.5
He(0.3). $k_1 = Kk_{-1}$	M: Ar	300-2000	4.4(+14)	0	-500±250	0.5	1.5
Ar(0.3). $k_1 = Kk_{-1}$	M: N_2	300-2000	5.9(+14)	0	-500±250	0.5	1.5
N_2(0.4)	M: CO_2	300-2000	2.2(+15)	0	-500±250	0.5	1.5
CO_2(1.5)							
$O_2 + H_2 \rightarrow OH + OH$							
OXYGEN MOLECULE + HYDROGEN MOLECULE							
76 ENG	REACTION ORDER: 2.	1500-2500	2.5(+12)	0	19630±5000	0.1	10.
$O_2 + H_2 \rightarrow HO_2 + H$							
OXYGEN MOLECULE + HYDROGEN MOLECULE							
72 BAU/DRY	REACTION ORDER: 2.	290-800	5.5(+13)	0	29100±350	0.4	2.5
$O_2 + S \rightarrow O + SO$							
OXYGEN MOLECULE + SULFUR ATOM							
76 BAU/DRY	REACTION ORDER: 2.	250-450	1.4(+12)	0	0±50	0.3	1.7

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F

O_2 + SO → O + SO_2						
OXYGEN MOLECULE + SULFUR MONOXIDE						
76 BAU/DRY REACTION ORDER: 2.	440-2100	4.5(+11)	0	3250±590	0.3	1.7

O_2 + N → O + NO						
OXYGEN MOLECULE + NITROGEN ATOM						
73 BAU/DRY REACTION ORDER: 2.	300-3000	6.4(+9)	1.0	3150±150	0.7	1.3
NOTE: k FACTORS CHANGING TO: f = 0.5; F = 2.0 AT 3000K.						

O_2 + N_2 → O + N_2O						
OXYGEN MOLECULE + NITROGEN MOLECULE						
73 BAU/DRY REACTION ORDER: 2.	1200-2000	6.3(+13)	0	55200±2000	0.4	2.5
NOTE: $k_1 = Kk_{-1}$						

O_2 + NO → O + NO_2						
OXYGEN MOLECULE + NITROGEN OXIDE(NO)						
73 BAU/DRY REACTION ORDER: 2.	300-550	1.7(+12)	0	23400	0.8	1.3
NOTE: $k_1 = Kk_{-1}$						

O_2 + NO + NO → NO_2 + NO_2						
OXYGEN MOLECULE + NITROGEN OXIDE(NO)						
73 BAU/DRY REACTION ORDER: 3.	273-660	1.2(+9)	0	-530±100	0.5	1.5

O_2 + NO + NO_2 → NO_2 + NO_3						
OXYGEN MOLECULE + NITROGEN OXIDE(NO) + NITROGEN OXIDE(NO_2)						
73 BAU/DRY REACTION ORDER: 3.	300-500	2.9(+7)	0	-400±500	0.4	2.5

O_2 + C → O + CO						
OXYGEN MOLECULE + CARBON ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		

O_2 + CO → O + CO_2						
OXYGEN MOLECULE + CARBON MONOXIDE						
76 BAU/DRY REACTION ORDER: 2.	1500-3000	2.5(+12)	0	24000±2500	0.5	2.0
NOTE: k FACTORS CHANGING TO: f = 0.5; F = 1.5 AT 3000K.						

O_2 + CH → O + •CHO						
OXYGEN MOLECULE + METHYLIDYNE FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	5.0(+11)	0.5	3000±2500	0.3	3.2

O_2 + CH_2 → O + HCHO						
OXYGEN MOLECULE + METHYLENE FREE RADICAL						
76 ENG REACTION ORDER: 2.		5.0(+11)	0.5	3500±2500	0.3	3.2

O_2 + CH_3• → O + CH_3O•						
OXYGEN MOLECULE + METHYL FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	3.2(+12)	0	15100±1500		
NOTE: k ESTIMATED.						

O_2 + CH_3• → OH + HCHO						
OXYGEN MOLECULE + METHYL FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	3.2(+13)	0	10000±5000	0.3	3.2

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F

$O_2 + CH_3O \rightarrow HO_2 + :CH_2$						
OXYGEN MOLECULE + METHYL FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	3.2(+12)	0	34975±1500		
NOTE: k ESTIMATED						

$O_2 + CHO \rightarrow HO_2 + CO$						
OXYGEN MOLECULE + METHYL, OXO-, FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	1.6(+12)	0	3500±1500		
NOTE: k ESTIMATED.						

$O_2 + CH_3O \rightarrow HO_2 + HCHO$						
OXYGEN MOLECULE + METHOXY FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+12)	0	3000±1500		
NOTE: k ESTIMATED.						

$O_2 + CN \rightarrow CO + NO$						
OXYGEN MOLECULE + CYANOGEN FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	3.2(+11)	0	0±5000	0.3	3.2

$O_2 + M \rightarrow O + O + M$						
OXYGEN MOLECULE						
76 BAU/DRY REACTION ORDER: 2.	2500-8000	3.5(+25)	-2.5	59380	0.5	2.0
M: O2	2000-10000	9.8(+24)	-2.5	59380	0.4	2.5
NOTE: k FACTORS CHANGING TO: f = 0.5; F = 2.0 AT ≥ 8000K.						
M: Ar	3000-18000	1.8(+18)	-1.0	59380±4900	0.5	2.0

$O_3 + O \rightarrow O_2 + O_2$						
OZONE + OXYGEN ATOM						
76 BAU/DRY REACTION ORDER: 2.	200-500	5.2(+12)	0	2090±260	0.5	1.5
NOTE: k FACTORS CHANGING TO: f = 0.3; F = 3.0 AT ≥ 1000K						

$O_3 + H \rightarrow O_2 + OH$						
OZONE + HYDROGEN ATOM						
76 BAU/DRY REACTION ORDER: 2.	300	1.6(+13)	-	-	0.5	2.0

$O_3 + OH \rightarrow O_2 + HO_2$						
OZONE + HYDROXYL FREE RADICAL						
76 BAU/DRY REACTION ORDER: 2.	300	3.9(+10)	-	-	0.5	1.5

$O_3 + HO_2 \rightarrow O_2 + O_2 + OH$						
OZONE + HYDROPEROXYL FREE RADICAL						
76 BAU/DRY REACTION ORDER: 2.	298	9.1(+ 8)	-	-	0.5	1.5

$O_3 + H_2S \rightarrow SO_2 + H_2O$						
OZONE + HYDROGEN SULFIDE						
76 BAU/DRY REACTION ORDER: 2.	298	4.0(+ 2)	-	-	0.1	10.

$O_3 + NO \rightarrow O_2 + NO_2$						
OZONE + NITROGEN OXIDE(NO)						
73 BAU/DRY REACTION ORDER: 2.	200-350	8.9(+11)	0	1330±130	0.5	1.5

$O_3 + NO_2 \rightarrow O_2 + NO_3$						

CHEMICAL REACTIONS		T/K	A	B	E/R (in °K)	k factors f	F
OZONE + NITROGEN OXIDE(NO_2)							
73 BAU/DRY	REACTION ORDER: 2.	286-302	5.9(+12)	0	3500	0.5	2.0

$O_3 + M \rightarrow O + O_2 + M$							
OZONE							
76 BAU/DRY	REACTION ORDER: 2. M: Ar	200-1000	2.48(+14)	0	11430±120	0.8	1.3

$H + O + M \rightarrow OH + M$							
HYDROGEN ATOM + OXYGEN ATOM							
76 ENG	REACTION ORDER: 3.	1500-2500	7.9(+15)	0	0	0.1	10.

$H + O_2 \rightarrow OH + O$							
HYDROGEN ATOM + OXYGEN MOLECULE							
72 BAU/DRY	REACTION ORDER: 2.	700-2500	2.2(+14)	0	8450±250	0.7	1.3

$D + O_2 \rightarrow OD + O$							
DEUTERIUM ATOM + OXYGEN MOLECULE							
72 BAU/DRY	REACTION ORDER: 2.	800-1000	8.9(+13)	0	7500		

$H + O_2 + M \rightarrow HO_2 + M$							
HYDROGEN ATOM + OXYGEN MOLECULE							
72 BAU/DRY	REACTION ORDER: 3. M: H_2	300-2000	1.5(+15)	0	-500±250	0.5	1.5
NOTE: M eff: H_2(1.0)							
	M: O_2	300-2000	5.9(+14)	0	-500±250	0.5	1.5
O_2(0.4)							
	M: H_2O	300-2000	9.5(+15)	0	-500±250	0.5	1.5
H_2O(6.4)							
	M: He	300-2000	4.4(+14)	0	-500±250	0.5	1.5
He(0.3). $k_1 = Kk_{-1}$							
	M: Ar	300-2000	4.4(+14)	0	-500±250	0.5	1.5
Ar(0.3). $k_1 = Kk_{-1}$							
	M: N_2	300-2000	5.9(+14)	0	-500±250	0.5	1.5
N_2(0.4)							
	M: CO_2	300-2000	2.2(+15)	0	-500±250	0.5	1.5
CO_2(1.5)							

$H + O_3 \rightarrow OH + O_2$							
HYDROGEN ATOM + OZONE							
76 BAU/DRY	REACTION ORDER: 2.	300	1.6(+13)	-	-	0.5	2.0

$H + H + M \rightarrow H_2 + M$							
HYDROGEN ATOM							
72 BAU/DRY	REACTION ORDER: 3. M: H_2	300	3.0(+15)	-	-	0.5	1.5
	M: H_2	2500-5000	2.6(+15)	-1.0	0	0.4	2.5
NOTE: M eff: H_2(1.0)							
	M: Ar	2500-5000	6.4(+17)	-1.0	0	0.4	2.5
Ar(0.25). $k_1 = Kk_{-1}$							

$H + H_2 \rightarrow H_2 + H$							
HYDROGEN ATOM + HYDROGEN MOLECULE							
75 BEN/GOL	REACTION ORDER: 2.		6.3(+11)	0.5	4000		

$H + D_2 \rightarrow DH + D$							

CHEMICAL REACTIONS		T/K	A	B	E/R (in °K)	k factors f	F
HYDROGEN ATOM + DEUTERIUM MOLECULE							
72 KON	REACTION ORDER: 2.	368-1000	3.1(+13)	0	4485±250	0.6	1.6

$D + H_2 \rightarrow DH + H$							
DEUTERIUM ATOM + HYDROGEN MOLECULE							
72 KON	REACTION ORDER: 2.	400-1000	5.0(+13)	0	3890±40	0.9	1.1

$H + OH \rightarrow H_2 + O$							
HYDROGEN ATOM + HYDROXYL FREE RADICAL							
72 BAU/DRY	REACTION ORDER: 2.	400-2000	8.3(+9)	1.0	3500±150	0.7	1.3

$H + OH \rightarrow OH + H$							
HYDROGEN ATOM + HYDROXYL FREE RADICAL							
75 BEN/GOL	REACTION ORDER: 2.		6.3(+11)	0.5	0		

$H + OH + M \rightarrow H_2O + M$							
HYDROGEN ATOM + HYDROXYL FREE RADICAL							
72 BAU/DRY	REACTION ORDER: 3. M: H_2O	1000-3000	1.4(+23)	-2.0	0	0.7	1.5
NOTE: M eff: H_2O(1.0). $k_1 = Kk_{-1}$							
	M: Ar	1000-3000	8.4(+21)	-2.0	0	0.5	2.0
Ar(0.06)							
	M: N_2	1000-3000	2.2(+22)	-2.0	0	0.5	2.0
N_2(0.16)							

$H + HO_2 \rightarrow O + H_2O$							
HYDROGEN ATOM + HYDROPEROXYL FREE RADICAL							
74 LLO	REACTION ORDER: 2.	300-1000	5. (+13)	0	500	0.3	3.2
NOTE: E ESTIMATED.							
76 ENG		1500-2500	1.0(+13)	0	500±500	0.1	1.0

$H + HO_2 \rightarrow H_2 + O_2$							
HYDROGEN ATOM + HYDROPEROXYL FREE RADICAL							
72 BAU/DRY	REACTION ORDER: 2.	290-800	2.5(+13)	0	350±350	0.4	2.5
76 ENG		1500-2500	2.5(+13)	0	350±350	0.5	2.0

$H + HO_2 \rightarrow OH + OH$							
HYDROGEN ATOM + HYDROPEROXYL FREE RADICAL							
72 BAU/DRY	REACTION ORDER: 2.	290-800	2.5(+14)	0	950±350	0.5	2.0
76 ENG		1500-2500	2.5(+14)	0	950±500	0.5	2.0

$H + H_2O \rightarrow OH + H_2$							
HYDROGEN ATOM + WATER							
72 BAU/DRY	REACTION ORDER: 2.	300-2500	9.3(+13)	0	10250±100	0.5	1.5
NOTE: ERROR LIMITS ARE 50% FOR UPPER T'S.							

$H + H_2O_2 \rightarrow H_2 + HO_2$							
HYDROGEN ATOM + HYDROGEN PEROXIDE							
72 BAU/DRY	REACTION ORDER: 2.	300-800	1.7(+12)	0	1900±250	0.5	2.0

$H + S_2 \rightarrow SH + S$							
HYDROGEN ATOM + SULFUR DIMER							
75 BEN/GOL	REACTION ORDER: 2.		7.9(+12)	0.5	8355		

CHEMICAL REACTIONS	T/K	A	B	E/R (in ^{o}K)	k factors f	k factors F
H + SO → OH + S						
HYDROGEN ATOM + SULFUR MONOXIDE						
75 BEN/GOL REACTION ORDER: 2.		4.0(+12)	0.5	11200		
H + SO → SH + O						
HYDROGEN ATOM + SULFUR MONOXIDE						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	19930		
H + SO_2 + M → HSO_2 + M						
HYDROGEN ATOM + SULFUR DIOXIDE						
76 HAU/DRY REACTION ORDER: 3.	1660-2120	5.1(+15)	-	-	0.5	1.5
H + SH → H_2 + S						
HYDROGEN ATOM + MERCAPTO FREE RADICAL						
76 BAU/DRY REACTION ORDER: 2.	298	1.5(+13)	-	-	0.5	1.5
H + SH → SH + H						
HYDROGEN ATOM + MERCAPTO FREE RADICAL						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
H + H_2S → H_2 + SH						
HYDROGEN ATOM + HYDROGEN SULFIDE						
76 HAU/DRY REACTION ORDER: 2.	190-470	7.8(+12)	0	860±50	0.5	1.5
H + N + M → NH + M						
HYDROGEN ATOM + NITROGEN ATOM						
76 ENG REACTION ORDER: 3.	1500-2500	2.5(+17)	-0.5	0±1000	0.1	10.
H + N_2 → NH + N						
HYDROGEN ATOM + NITROGEN MOLECULE						
75 BEN/GOL REACTION ORDER: 2.		2.0(+13)	0.5	75945		
H + NO → OH + N						
HYDROGEN ATOM + NITROGEN OXIDE(NO)						
75 BEN/GOL REACTION ORDER: 2.		2.5(+12)	0.5	24460		
H + NO → NH + O						
HYDROGEN ATOM + NITROGEN OXIDE(NO)						
75 BEN/GOL REACTION ORDER: 2.		5.0(+12)	0.5	38200		
H + NO + M → HNO + M						
HYDROGEN ATOM + NITROGEN OXIDE(NO)						
73 HAU/DRY REACTION ORDER: 3.	230-700	5.4(+15)	0	-300±100	0.5	1.5
H + NO + M → HNO + M						
HYDROGEN ATOM + NITROGEN OXIDE(NO)						
76 ENG REACTION ORDER: 3. M: H_2	1500-2500	5.0(+15)	0	-300±150	0.5	2.0
H + NO_2 → OH + NO						
HYDROGEN ATOM + NITROGEN OXIDE(NO_2)						
73 BAU/DRY REACTION ORDER: 2.	298-630	3.5(+14)	0	740±500	0.5	1.5
NOTE: k FACTORS CHANGING TO: f = 0.5; F = 2.0 AT T = 633K						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
$H + NO_2 \rightarrow OH + NO$						
HYDROGEN ATOM + NITROGEN OXIDE(NO_2)						
76 ENG — REACTION ORDER: 2.	1500-2500	3.2(+14)	0	750±500	0.5	2.0
$H + N_2O \rightarrow OH + N_2$						
HYDROGEN ATOM + NITROGEN OXIDE(N_2O)						
73 BAU/DRY — REACTION ORDER: 2.	700-2500	7.6(+13)	0	7600±500	0.5	1.5
$H + N_2O \rightarrow NH + NO$						
HYDROGEN ATOM + NITROGEN OXIDE(N_2O)						
76 ENG — REACTION ORDER: 2.	1500-2500	1.0(+11)	0.5	15100±2500	0.3	3.2
$H + NH \rightarrow H_2 + N$						
HYDROGEN ATOM + IMIDOGEN FREE RADICAL						
75 BEN/GOL — REACTION ORDER: 2.		6.3(+11)	0.5	4000		
$H + NH \rightarrow NH + H$						
HYDROGEN ATOM + IMIDOGEN FREE RADICAL						
75 BEN/GOL — REACTION ORDER: 2.		6.3(+11)	0.5	0		
$H + NH_2 + M \rightarrow NH_3 + M$						
HYDROGEN ATOM + AMIDOGEN FREE RADICAL						
73 BAU/DRY — REACTION ORDER: 3. M: Ar	2000-3000	4.8(+14)	0	-8300±2500	0.5	2.0
NOTE: $k_1 = Kk_{-1}$						
$H + NH_2NH_2 \rightarrow H_2 + NH_2NH.$						
HYDROGEN ATOM + HYDRAZINE						
73 BAU/DRY — REACTION ORDER: 2.	250-500	1.3(+13)	0	1260±100	0.5	2.0
$H + HNO \rightarrow H_2 + NO$						
HYDROGEN ATOM + NITROSYL HYDRIDE						
73 BAU/DRY — REACTION ORDER: 2.	2000	4.8(+12)	-	-	0.5	1.5
$H + HNO \rightarrow OH + NH$						
HYDROGEN ATOM + NITROSYL HYDRIDE						
76 ENG — REACTION ORDER: 2.	1500-2500	2.0(+11)	0.5	11600±2500	0.3	3.2
$H + NS \rightarrow SH + N$						
HYDROGEN ATOM + NITROGEN SULFIDE(NO)						
75 BEN/GOL — REACTION ORDER: 2.		2.5(+12)	0.5	15700		
$H + NS \rightarrow NH + S$						
HYDROGEN ATOM + NITROGEN SULFIDE(NO)						
75 BEN/GOL — REACTION ORDER: 2.		2.5(+12)	0.5	20735		
$H + CO \rightarrow CH + C$						
HYDROGEN ATOM + CARBON MONOXIDE						
75 BEN/GOL — REACTION ORDER: 2.		2.0(+13)	0.5	77755		
$H + CO \rightarrow CH + O$						
HYDROGEN ATOM + CARBON MONOXIDE						
75 BEN/GOL — REACTION ORDER: 2.		2.5(+13)	0.5	88020		

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
H + CO + M → •CHO + M						
HYDROGEN ATOM + CARBON MONOXIDE						
76 BAU/DRY REACTION ORDER: 3. M: H_2	298-773	6.9(+14)	0	850±500	0.7	1.3
NOTE: k FACTORS CHANGING TO: f = 0.5; F = 2.0 AT 773K.						
76 ENG	1500-2500	1.6(+20)	-1.5	0	0.3	3.2

H + CO_2 → OH + CO						
HYDROGEN ATOM + CARBON DIOXIDE						
76 BAU/DRY REACTION ORDER: 2.	1000-3000	1.5(+14)	0	13300±150	0.8	1.2

H + CH → H_2 + C						
HYDROGEN ATOM + METHYLIDYNE FREE RADICAL						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	4000		

H + CH → CH + H						
HYDROGEN ATOM + METHYLIDYNE FREE RADICAL						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		

H + CH + M → CH_2 + M						
HYDROGEN ATOM + METHYLIDYNE FREE RADICAL						
76 ENG REACTION ORDER: 3.	1500-2500	1.0(+19)	-1.0	0	0.3	3.2

H + CH_2 → H_2 + CH						
HYDROGEN ATOM + METHYLENE FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	3.2(+11)	0.7	2500±2500	0.3	3.2

H + CH_4 → H_2 + CH_3•						
HYDROGEN ATOM + METHANE						
76 ENG REACTION ORDER: 2.	1500-2500	6.3(+13)	0	5990±150	0.5	2.0

D + CH_4 → DH + CH_3•						
DEUTERIUM ATOM + METHANE						
72 KON REACTION ORDER: 2.	523-673	8.3(+12)	0	5100		

H + •CHO → H_2 + CO						
HYDROGEN ATOM + METHYL, OXO-, FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	1.6(+12)	0.5	0±2500	0.3	3.2

H + HCHO → H_2 + •CHO						
HYDROGEN ATOM + FORMALDEHYDE						
76 ENG REACTION ORDER: 2.	1500-2500	1.3(+10)	1.0	1600	0.3	3.2

H + CH_3O• → H_2 + HCHO						
HYDROGEN ATOM + METHOXY FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+14)	0	0±1500		
NOTE: k ESTIMATED.						

H + CS → C + SH						
HYDROGEN ATOM + CARBON MONOSULFIDE FREE RADICAL						
75 BEN/GOL REACTION ORDER: 2.		2.0(+13)	0.5	48870		

H + CS → CH + S						
HYDROGEN ATOM + CARBON MONOSULFIDE FREE RADICAL						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
75 BEN/GGL REACTION ORDER: 2.		1.3(+13)	0.5	50930		
H + COS → BS + CO						
HYDROGEN ATOM + CARBON OXIDE SULFIDE						
76 HAU/DRY REACTION ORDER: 2.	298	1.3(+10)	-	-	0.8	1.3
H + CN → C + NH						
HYDROGEN ATOM + CYANOGEN FREE RADICAL						
75 BEN/GGL REACTION ORDER: 2.		1.0(+13)	0.5	52745		
H + CN → CH + N						
HYDROGEN ATOM + CYANOGEN FREE RADICAL						
75 HEN/GGL REACTION ORDER: 2.		6.3(+12)	0.5	49775		
H + CN + M → HCN + M						
HYDROGEN ATOM + CYANOGEN FREE RADICAL						
76 ENG REACTION ORDER: 3.	1500-2500	3.2(+16)	-0.5	0±2500	0.3	3.2
H + C_2 → CH + C						
HYDROGEN ATOM + CARBON DIMER						
75 HEN/GGL REACTION ORDER: 2.		1.6(+13)	0.5	30450		
H + CH_2=CH_2 → CH_3CH_2.						
HYDROGEN ATOM + ETHENE						
72 KER/PAR REACTION ORDER: 2.	298	9.3(+13)	0	1410		
H + CH_2=CH_2 + M → CH_3CH_2. + M						
HYDROGEN ATOM + ETHENE						
72 KON REACTION ORDER: 3.	298-813	5.6(+17)	0.5	495		
H + CH_3CH_3 → H_2 + CH_3CH_2.						
HYDROGEN ATOM + ETHANE						
72 KON REACTION ORDER: 2.	285-1440	1.0(+14)	0	4815±70	0.8	1.2
H + CH_3C≡CH → CH_3CH=CH + CH_3C(.)=CH_2						
HYDROGEN ATOM + 1-PROPYNE						
72 KES/PAR REACTION ORDER: 2.	298	0.5(+11)	-	-		
NOTE: k TAKEN AS LOWER LIMIT.						
H + CH_3CH=CH_2 → $CH_3CH_2CH_2$.						
HYDROGEN ATOM + 1-PROPENE						
72 KER/PAR REACTION ORDER: 2.	298	7.2(+12)	0	1460		
NOTE: TENTATIVE k VALUE.						
H + CH_3CH=CH_2 → CH_3CH(.)CH_3						
HYDROGEN ATOM + 1-PROPENE						
72 KHR/PAR REACTION ORDER: 2.	298	7.2(+12)	0	605		
NOTE: ARRHENIUS PARAMETERS ARE MINIMUM VALUES OF THEIR HIGH-PRESSURE LIMITS.						
H + $CH_3CH_2CH_3$ → H_2 + $(CH_3)_2CH$. + $CH_3CH_2CH_2$.						
HYDROGEN ATOM + PROPANE						
72 KON REACTION ORDER: 2.	333-933	1.0(+13)	0	3130±180	0.7	1.4

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f F

$H + (CH_3)_2CO \rightarrow H_2 + CH_3C(O)CH_2\bullet$					
HYDROGEN ATOM + 2-PROPANONE					
72 KON REACTION ORDER: 2.	298-873	4.6(+13)	0	4220±20	

$H + CH_2{=}CHCH{=}CH_2 \rightarrow CH_2{=}CHCH(\bullet)CH_3 + CH_2{=}CHCH_2CH_2\bullet$					
HYDROGEN ATOM + 1,3-BUTADIENE					
72 KER/PAR REACTION ORDER: 2.	298	4.10(+13)	0	655	
NOTE: AVERAGED RATE CONSTANT.					

$H + CH_2{=}CHCH{=}CH_2 \rightarrow CH_2{=}CHCH(\bullet)CH_3 + CH_2{=}CHCH_2CH_2\bullet$					
HYDROGEN ATOM + 1,3-BUTADIENE					
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 4.9	300	-	-	-	
NOTE: k_{ref}: $H + CH_3CH{=}CH_2$					

$H + CH_3CH_2CH{=}CH_2 \rightarrow CH_3CH_2CH(\bullet)CH_3 + CH_3CH_2CH_2CH_2\bullet$					
HYDROGEN ATOM + 1-BUTENE					
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 1.03	300	-	-	-	
NOTE: k_{ref}: $H + CH_3CH{=}CH_2$					
	298	8.7(+11)	-	-	

$H + CH_3CH_2CH{=}CH_2 \rightarrow CH_3CH_2CH_2CH_2\bullet$					
HYDROGEN ATOM + 1-BUTENE					
72 KER/PAR REACTION ORDER: 2.	298	5.0(+10)	-	-	
NOTE: CALCULATED ON THE BASIS OF 5.7% NON-TERMINAL ADDITION OF H TO 1-BUTENE.					

$H + CH_3CH_2CH{=}CH_2 \rightarrow CH_3CH_2CH(\bullet)CH_3$					
HYDROGEN ATOM + 1-BUTENE					
72 KER/PAR REACTION ORDER: 2.	298	8.1(+11)	-	-	
NOTE: CALCULATED ON THE BASIS OF 5.7% NON-TERMINAL ADDITION OF H TO 1-BUTENE.					

$H + cis\text{-}CH_3CH{=}CHCH_3 \rightarrow CH_3CH_2CH(\bullet)CH_3$					
HYDROGEN ATOM + cis-2-BUTENE					
72 KER/PAR REACTION ORDER: 2.	298	4.6(+11)	-	-	
NOTE: NO KINETIC DATA ON REVERSE RADICAL DECOMPOSITION.					
k/k_{ref}: 0.47	300	-	-	-	
NOTE: k_{ref}: $H + CH_3CH{=}CH_2$.					

$H + trans\text{-}CH_3CH{=}CHCH_3 \rightarrow CH_3CH_2CH(\bullet)CH_3$					
HYDROGEN ATOM + trans-2-BUTENE					
72 KER/PAR REACTION ORDER: 2.	298	5.6(+11)	-	-	
NOTE: AVERAGE k					
k/k_{ref}: 0.59	300	-	-	-	
NOTE: k_{ref}: $H + CH_3CH{=}CH_2$.					

$H + (CH_3)_2C{=}CH_2 \rightarrow (CH_3)_3C\bullet$					
HYDROGEN ATOM + 1-PROPENE, 2-METHYL-					
72 KER/PAR REACTION ORDER: 2.	298	3.10(+13)	0	755	

$H + (CH_3)_2C{=}CH_2 \rightarrow (CH_3)_2CHCH_2\bullet$					
HYDROGEN ATOM + 1-PROPENE, 2-METHYL-					

CHEMICAL REACTIONS	T/K	A	B	E/R (in ^{o}K)	k factors f	F
72 KER/PAR REACTION ORDER: 2.	298	1.3(+11)	-	-		
NOTE: CALCULATED ON THE BASIS OF 0.5% NON-TERMINAL ADDITION OF H TO $(CH_3)_2C{=}CH_2$.						

$H + (CH_3)_2C{=}CH_2 \rightarrow (CH_3)_3C\cdot + (CH_3)_2CHCH_2\cdot$						
HYDROGEN ATOM + 1-PROPENE, 2-METHYL-						
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 2.52	300	-	-	-		
NOTE: k_{ref}: $H + CH_3CH{=}CH_2$						

$H + CH_3CH_2CH_2CH_3 \rightarrow H_2 + CH_3CH_2CH(\cdot)CH_3 + CH_3CH_2CH_2CH_2\cdot$						
HYDROGEN ATOM + BUTANE						
72 KON REACTION ORDER: 2.	320-930	4.1(+12)	0	2637±320	0.5	2.0

$H + (CH_3)_3CH \rightarrow H_2 + (CH_3)_3C\cdot + (CH_3)_2CHCH_2\cdot$						
HYDROGEN ATOM + PROPANE, 2-METHYL-						
72 KON REACTION ORDER: 2.	300-800	1.9(+13)	0	2680±85	0.8	1.2

$H + CH_3CH_2CH_2CH{=}CH_2 \rightarrow CH_3CH_2CH_2CH(\cdot)CH_3$						
$+ CH_3CH_2CH_2CH_2CH_2\cdot$						
HYDROGEN ATOM + 1-PENTENE						
72 KER/PAR REACTION ORDER: 2.	298	8.3(+11)	-	-		
k/k_{ref}: 0.89	300	-	-	-		
NOTE: k_{ref}: $H + CH_3CH{=}CH_2$.						

$H + cis\text{-}CH_3CH_2CH{=}CHCH_3 \rightarrow CH_3CH_2CH(\cdot)CH_2CH_3$						
$+ CH_3CH_2CH_2CH(\cdot)CH_3$						
HYDROGEN ATOM + cis-2-PENTENE						
72 KER/PAR REACTION ORDER: 2.	298	3.8(+11)	-	-		
k/k_{ref}: 0.39	300	-	-	-		
NOTE: k_{ref}: $H + CH_3CH{=}CH_2$.						

$H + trans\text{-}CH_3CH_2CH{=}CHCH_3 \rightarrow CH_3CH_2CH(\cdot)CH_2CH_3$						
$+ CH_3CH_2CH_2CH(\cdot)CH_3$						
HYDROGEN ATOM + trans-2-PENTENE						
72 KER/PAR REACTION ORDER: 2.	298	4.1(+11)	-	-		
k/k_{ref}: 0.44	300	-	-	-		
NOTE: k_{ref}: $H + CH_3CH{=}CH_2$.						

$H + CH_3CH_2C(CH_3){=}CH_2 \rightarrow CH_3CH_2C(\cdot)(CH_3)_2$						
$+ CH_3CH_2CH(CH_3)CH_2\cdot$						
HYDROGEN ATOM + 1-BUTENE, 2-METHYL-						
72 KER/PAR REACTION ORDER: 2.	298	9.1(+11)	-	-		

$D + CH_3CH_2C(CH_3){=}CH_2 \rightarrow CH_3CH_2C(\cdot)(CH_3)CH_2D$						
$+ CH_3CH_2CD(CH_3)CH_2\cdot$						
DEUTERIUM ATOM + 1-BUTENE, 2-METHYL-						
72 KER/PAR REACTION ORDER: 2.	298	2.0(+12)	-	-		

$H + (CH_3)_2CHCH{=}CH_2 \rightarrow (CH_3)_2CHCH(\cdot)CH_3$						
$+ (CH_3)_2CHCH_2CH_2\cdot$						
HYDROGEN ATOM + 1-BUTENE, 3-METHYL-						
72 KER/PAR REACTION ORDER: 2.	298	7.4(+11)	-	-		

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F
D + $(CH_3)_2CHCH{=}CH_2$ → $(CH_3)_2CHCH(\bullet)CH_2D$ + $(CH_3)_2CHCHDCH_2\bullet$						
DEUTERIUM ATOM + 1-BUTENE, 3-METHYL-						
72 KER/PAR REACTION ORDER: 2.	298	7.6(+11)	-	-		
H + $(CH_3)_2C{=}CHCH_3$ → $(CH_3)_2CHCH(\bullet)CH_3$ + $(CH_3)_2C(\bullet)CH_2CH_3$						
HYDROGEN ATOM + 2-BUTENE, 2-METHYL-						
72 KER/PAR REACTION ORDER: 2.	298	9.1(+11)	-	-		
k/k_{ref}: 1.03	300	-	-	-		
NOTE: k_{ref}: H + $CH_3CH{=}CH_2$						
H + $(CH3)_2C{=}C(CH3)_2$ → $(CH3)_2CHC(\bullet)(CH3)_2$						
HYDROGEN ATOM + 2-BUTENE, 2,3-DIMETHYL-						
72 KER/PAR REACTION ORDER: 2.	298	7.8(+11)	-	-		
k/k_{ref}: 0.84	300	-	-	-		
NOTE: k_{ref}: H + $CH_3CH{=}CH_2$						
H + $(CH_3)_3CC(CH_3){=}CH_2$ → $(CH_3)_3CCH(CH_3)CH_2\bullet$ + $(CH_3)_3CC(\bullet)(CH_3)_2$						
HYDROGEN ATOM + 1-BUTENE, 2,3,3,-TRIMETHYL-						
72 KHE/PAR REACTION ORDER: 2.	298	1.6(+12)	-	-		
NOTE: TENTATIVE VALUE BASED ON REACTION: H + $(CH_3)_2C{=}CH_2$						
H_2 + O → H + OH						
HYDROGEN MOLECULE + OXYGEN ATOM						
72 BAU/DRY REACTION ORDER: 2.	400-2000	1.8(+10)	1.0	4480±150	0.7	1.3
D_2 + O → D + OD						
DEUTERIUM MOLECULE + OXYGEN ATOM						
72 BAU/DRY REACTION ORDER: 2.	416-968	2.0(+13)	0	5500	0.5	2.0
H_2 + O_2 → H + $HO_2\bullet$						
HYDROGEN MOLECULE + OXYGEN MOLECULE						
72 BAU/DRY REACTION ORDER: 2.	290-800	5.5(+13)	0	29100±350	0.4	2.5
H_2 + O_2 → OH + OH						
HYDROGEN MOLECULE + OXYGEN MOLECULE						
76 ENG REACTION ORDER: 2.	1500-2500	2.5(+12)	0	19630±5000	0.1	10.
H_2 + H → H + H_2						
HYDROGEN MOLECULE + HYDROGEN ATOM						
75 HEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	4000		
H_2 + D → H + HD						
HYDROGEN MOLECULE + DEUTERIUM ATOM						
72 KON REACTION ORDER: 2.	400-1000	5.0(+13)	0	3890±40	0.9	1.1
D_2 + H → D + DH						
DEUTERIUM MOLECULE + HYDROGEN ATOM						
72 KON REACTION ORDER: 2.	1000	3.1(+13)	0	4485±250	0.6	1.6

CHEMICAL REACTIONS	T/K	A	B	E/R (in ^{O}K)	k factors f	k factors F
H_2 + OH → H + H_2O						
HYDROGEN MOLECULE + HYDROXYL FREE RADICAL						
72 BAU/DRY REACTION ORDER: 2.	300-2500	2.2(+13)	0	2590±100	0.8	1.2
NOTE: k FACTORS CHANGING TO: f = 0.5: F = 1.5 FOR T :300K T >300K						

D_2 + OH → D + DHO						
DEUTERIUM MOLECULE + HYDROXYL FREE RADICAL						
72 KON REACTION ORDER: 2.	300-623	1.9(+13)	0	2904±280	0.5	2.0

H_2 + HO_2 → H + H_2O_2						
HYDROGEN MOLECULE + HYDROPEROXYL FREE RADICAL						
72 BAU/DRY REACTION ORDER: 2.	300-800	7.3(+11)	0	9400±250	0.5	2.0

H_2 + S → H + SH						
HYDROGEN MOLECULE + SULFUR ATOM						
76 BAU/DRY REACTION ORDER: 2.	298	1.3(-1)	-	-	0.5	1.5
NOTE: $k_1 = Kk_{-1}$						
75 BEN/GOL		2.5(+12)	0.5	13640		

H_2 + N → H + NH						
HYDROGEN MOLECULE + NITROGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		2.5(+12)	0.5	18700		

H_2 + C → H + CH						
HYDROGEN MOLECULE + CARBON ATOM						
75 BEN/GOL REACTION ORDER: 2.		1.6(+12)	0.5	15700		

H_2 + CO_2 → H_2O + CO						
HYDROGEN MOLECULE + CARBON DIOXIDE						
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+9)	0.5	7550±2500	0.3	3.2

H_2 + CH_2 → H + CH_3.						
HYDROGEN MOLECULE + METHYLENE FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	3.2(+12)	0	3525±1500		
NOTE: k ESTIMATED.						

H_2 + CH_3. → H + CH_4						
HYDROGEN MOLECULE + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	370-700	8.5(+11)	0	5500±500	0.7	1.3

H_2 + CD_3. → H + CD_3H						
HYDROGEN MOLECULE + METHYL-D_3-FREE RADICAL						
72 KON REACTION ORDER: 2.	400-570	7.4(+11)	0	5250±235	0.6	1.7

DH + CH_3. → H + CH_3D						
DEUTERIUM HYDRIDE + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	400-700	2.4(+11)	0	5635±500	0.5	1.5

DH + CH_3. → D + CH_4						
DEUTERIUM HYDRIDE + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	400-700	2.1(+11)	0	5300±500	0.5	1.5

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F
$D_2 + CH_3\cdot \rightarrow D + CH_3D$ DEUTERIUM MOLECULE + METHYL FREE RADICAL 76 KEE/PAR REACTION ORDER: 2.	300-700	7.1(+11)	0	5990±250	0.7	1.3
$H_2 + CN \rightarrow H + HCN$ HYDROGEN MOLECULE + CYANOGEN FREE RADICAL 76 ENG REACTION ORDER: 2. NOTE: k ESTIMATED.	1500-2500	3.2(+12)	0	2500±1500		
$H_2 + CH_3CH_2\cdot \rightarrow H + CH_3CH_3$ HYDROGEN MOLECULE + ETHYL FREE RADICAL 72 KON REACTION ORDER: 2.	473-823	3.0(+11)	0	5435		
$H_2 + M \rightarrow H + H + M$ HYDROGEN MOLECULE 72 BAU/DRY REACTION ORDER: 2. M: Ar NOTE: $k_1 = Kk_{-1}$	2500-5000	2.2(+14)	0	48300±2000	0.5	2.0
$OH + O \rightarrow O + OH$ HYDROXYL FREE RADICAL + OXYGEN ATOM 75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	4000		
$OH + O \rightarrow H + O_2$ HYDROXYL FREE RADICAL + OXYGEN ATOM 72 BAU/DRY REACTION ORDER: 2. NOTE: k_1 CALCULATED FROM $k_{-1}K$ IS: 1.3×10^{13} cc.mole^{-1}s^{-1}	300	2.3(+13)	-	-	0.6	1.4
$OH + O \rightarrow H + O_2$ HYDROXYL FREE RADICAL + OXYGEN ATOM 76 ENG REACTION ORDER: 2.	1500-2500	2.5(+13)	0	0	0.5	2.0
$OH + O + M \rightarrow HO_2 + M$ HYDROXYL FREE RADICAL + OXYGEN ATOM 76 ENG REACTION ORDER: 3.	1500-2500	1.0(+17)	0	0	0.01	100.
$OH + O_3 \rightarrow HO_2\cdot + O_2$ HYDROXYL FREE RADICAL + OZONE 76 BAU/DRY REACTION ORDER: 2.	300	3.9(+10)	-	-	0.5	1.5
$OH + H \rightarrow O + H_2$ HYDROXYL FREE RADICAL + HYDROGEN ATOM 72 BAU/DRY REACTION ORDER: 2.	400-2000	8.3(+ 9)	1.0	3500±150	0.7	1.3
$OH + H \rightarrow H + OH$ HYDROXYL FREE RADICAL + HYDROGEN ATOM 75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$OH + H + M \rightarrow H_2O + M$ HYDROXYL FREE RADICAL + HYDROGEN ATOM 72 BAU/DRY REACTION ORDER: 3. M: H_2O NOTE: M eff: H_2O(1.0). $k_1 = Kk_{-1}$	1000-3000	1.4(+23)	-2.0	0	0.7	1.5
M: Ar Ar(0.06)	1000-3000	8.4(+21)	-2.0	0	0.5	2.0

CHEMICAL REACTIONS	T/K	A	B	E/R (in ^{o}K)	k factors f	k factors F
M: N_2	1000-3000	2.2(+22)	-2.0	0	0.5	2.0
N_2(0.16)						

OH + H_2 → H_2O + H						
HYDROXYL FREE RADICAL + HYDROGEN MOLECULE						
72 HAU/DRY REACTION ORDER: 2.	300-2500	2.2(+13)	0	2590±100	0.8	1.2
NOTE: k FACTORS CHANGING TO: f = 0.5; F = 1.5 FOR T >300K						

OH + D_2 → DHO + D						
HYDROXYL FREE RADICAL + DEUTERIUM MOLECULE						
72 KON REACTION ORDER: 2.	300-623	1.9(+13)	0	2904±280	0.5	2.0

OH + OH → HO_2 + H						
HYDROXYL FREE RADICAL						
72 HAU/DRY REACTION ORDER: 2.	290-800	1.2(+13)	0	20200±350	0.5	2.0

OH + OH → H_2O + O						
HYDROXYL FREE RADICAL						
72 HAU/DRY REACTION ORDER: 2.	300-2000	6.3(+12)	0	550±200	0.7	1.5

OH + OH + M → H_2O_2 + M						
HYDROXYL FREE RADICAL						
72 HAU/DRY REACTION ORDER: 3. M: N_2	700-1500	9.1(+14)	0	2550±1000	0.8	1.3
NOTE: k FACTORS CHANGING TO: f = 0.5; F = 2.0 AT 1500K.						

OH + H_2O_2 → H_2O + HO_2						
HYDROXYL FREE RADICAL + HYDROGEN PEROXIDE						
72 HAU/DRY REACTION ORDER: 2.	300-800	1.0(+13)	0	910±150	0.5	1.5

OH + S → O + SH						
HYDROXYL FREE RADICAL + SULFUR ATOM						
75 HEN/GOL REACTION ORDER: 2.		1.3(+12)	0.5	12700		

OH + S → H + SO						
HYDROXYL FREE RADICAL + SULFUR ATOM						
75 HEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		

OH + H_2S → H_2O + HS						
HYDROXYL FREE RADICAL + HYDROGEN SULFIDE						
76 HAU/DRY REACTION ORDER: 2.	298-900	6.3(+12)	0	200±150	0.7	1.3
NOTE: k FACTORS INCREASING TO: f = 0.5; F = 1.5 AT 900K.						

OH + N → O + NH						
HYDROXYL FREE RADICAL + NITROGEN ATOM						
75 HEN/GOL REACTION ORDER: 2.		1.3(+12)	0.5	17765		

OH + N → H + NO						
HYDROXYL FREE RADICAL + NITROGEN ATOM						
75 HEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		

OH + N + M → HNO + M						
HYDROXYL FREE RADICAL + NITROGEN ATOM						

CHEMICAL REACTIONS	T/K	A	B	E/R (in ^{o}K)	k factors f	k factors F
76 ENG REACTION ORDER: 3.	1500-2500	1.0(+15)	-0.5	0		
$OH + NO_2 + M \rightarrow HNO_3 + M$						
HYDROXYL FREE RADICAL + NITROGEN OXIDE(NO_2)						
73 BAU/DRY REACTION ORDER: 3.	300	5.0(+17)	-	-	0.4	1.6
$OH + N_2O \rightarrow HO_2 + N_2$						
HYDROXYL FREE RADICAL + NITROGEN OXIDE(N_2O)						
76 ENG REACTION ORDER: 2.	1500-2500	3.2(+13)	0	7550		
NOTE: k ESTIMATED.						
$OH + NH \rightarrow H_2O + N$						
HYDROXYL FREE RADICAL AND IMIDOGEN FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	5.0(+11)	0.5	1000±2500	0.3	3.2
$OH + HNO \rightarrow H_2O + NO$						
HYDROXYL FREE RADICAL + NITROSYL HYDRIDE						
73 BAU/DRY REACTION ORDER: 2.	2000	3.6(+13)	-	-	0.5	1.5
$OH + HNO_3 \rightarrow H_2O + NO_3$						
HYDROXYL FREE RADICAL + NITRIC ACID						
73 BAU/DRY REACTION ORDER: 2.	300	8.0(+10)	-	-	0.5	2.0
$OH + C \rightarrow O + CH$						
HYDROXYL FREE RADICAL + CARBON ATOM						
75 BEN/GOL REACTION ORDER: 2.		7.9(+11)	0.5	14800		
$OH + C \rightarrow H + CO$						
HYDROXYL FREE RADICAL + CARBON ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$OH + CO \rightarrow H + CO_2$						
HYDROXYL FREE RADICAL + CARBON MONOXIDE						
76 BAU/DRY REACTION ORDER: 2.	250-2000	1.5(+7)	1.3	-385	0.8	1.2
NOTE: k FACTORS OVER 1000K: f = 0.5; F = 1.5. RECOMMENDED k FOR 250-2500K: $\log(k)_{ccmol^{-1}s^{-1}} = 10.83 + 3.94^{-4}T$						
$OH + CH \rightarrow H + {}^{\bullet}CHO$						
HYDROXYL FREE RADICAL AND METHYLIDYNE FREE RADICAL						
76 ENG REACTION ORDER: 2.		5.0(+11)	0.5	5000±2500	0.3	3.2
$OH + CH_2 \rightarrow O + CH_3{}^{\bullet}$						
HYDROXYL FREE RADICAL AND METHYLENE FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	5.0(+11)	0.5	3000±2500	0.3	3.2
$OH + CH_2 \rightarrow H + HCO$						
HYDROXYL FREE RADICAL AND METHYLENE FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+13)	0	2517		
NOTE: k ESTIMATED.						
$OH + CH_2 \rightarrow H_2O + CH$						
HYDROXYL FREE RADICAL AND METHYLENE FREE RADICAL						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
76 ENG REACTION ORDER: 2.	1500-2500	5.0(+11)	0.5	3000±2500	0.3	3.2
OH + CH_3. → H + CH_3O.						
HYDROXYL FREE RADICAL AND METHYL FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	6.3(+12)	0	0		
OH + CH_3. → H_2O + CH_2						
HYDROXYL FREE RADICAL AND METHYL FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	6.3(+10)	0.7	1000±2500	0.3	3.2
OH + CH_4 → H_2O + CH_3.						
HYDROXYL FREE RADICAL + METHANE						
76 ENG REACTION ORDER: 2.	1500-2500	3.2(+13)	0	2500±250	0.5	2.0
OH + .CHO → H_2O + CO						
HYDROXYL FREE RADICAL + METHYL, OXO-, FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	3.2(+10)	1.0	0±1500		
NOTE: k ESTIMATED.						
OH + CH_3O. → H_2O + HCHO						
HYDROXYL FREE RADICAL + METHOXY FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	3.2(+13)	0	0±1500		
NOTE: k ESTIMATED.						
OH + HCHO → H_2O + .CHO						
HYDROXYL FREE RADICAL + FORMALDEHYDE						
76 ENG REACTION ORDER: 2.	1500-2500	3.2(+10)	1.0	0±1500	0.5	2.0
OH + .CN → O + HCN						
HYDROXYL FREE RADICAL + CYANOGEN FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	3.2(+12)	0	1500±1500		
OH + HCN → H_2O + .CN						
HYDROXYL FREE RADICAL + HYDROCYANIC ACID						
76 ENG REACTION ORDER: 2.	1500-2500	2.0(+11)	0.6	2500±2500	0.3	3.2
OH + CH≡CH → H_2O + CH≡CH.						
HYDROXYL FREE RADICAL + ETHYNE						
72 KGN REACTION ORDER: 2.	300-2000	7.6(+12)	0	2335±400	0.5	2.1
OH + CH_2=CH_2 → H_2O + CH_2=CH.						
HYDROXYL FREE RADICAL + ETHENE						
72 KGN REACTION ORDER: 2.	3500-1400	1.6(+14)	0	2831±445	0.4	2.4
OH + CH_2=CH_2 → .CH_2CH_2OH						
HYDROXYL FREE RADICAL + ETHENE						
72 KER/PAR REACTION ORDER: 2.	300	1.1(+12)	-	-	0.8	1.3
OH + CH_3CH_3 → H_2O + CH_3CH_2.						
HYDROXYL FREE RADICAL + ETHANE						
72 KGN REACTION ORDER: 2.	302-793	1.3(+14)	0	1998		
OH + CH_3CH=CH_2 → CH_3CH(.)CH_2OH + CH_3CH(OH)CH_2.						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
HYDROXYL FREE RADICAL + 1-PROPENE						
72 KER/PAR REACTION ORDER: 2.	300	6.6(+12)	-	-		
NOTE: ADDITION TO TERMINAL CARBON OF DOUBLE BOND IS PROBABLY 95%						
$HO_2 + O_3 \rightarrow OH + O_2 + O_2$						
HYDROPEROXYL FREE RADICAL + OZONE						
76 BAU/DRY REACTION ORDER: 2.	298	9.1(+ 8)	-	-	0.5	1.5
$HO_2 + H \rightarrow O_2 + H_2$						
HYDROPEROXYL FREE RADICAL + HYDROGEN ATOM						
72 BAU/DRY REACTION ORDER: 2.	290-800	2.5(+13)	0	350±350	0.4	2.5
76 ENG	1500-2500	2.5(+13)	0	350±500	0.5	2.0
$HO_2 + H \rightarrow H_2O + O$						
HYDROPEROXYL FREE RADICAL + HYDROGEN ATOM						
74 LLO REACTION ORDER: 2.	300-1000	5. (+13)	0	500	0.3	3.2
NOTE: E ESTIMATED.						
$HO_2 + H \rightarrow OH + OH$						
HYDROPEROXYL FREE RADICAL + HYDROGEN ATOM						
72 BAU/DRY REACTION ORDER: 2.	290-800	2.5(+14)	0	950±350	0.5	2.0
76 ENG	1500-2500	2.5(+14)	0	956±500	0.5	2.0
$HO_2 + H \rightarrow H_2O + O$						
HYDROPEROXYL FREE RADICAL + HYDROGEN ATOM						
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+13)	0	500±500	0.1	10.
$HO_2 + H_2 \rightarrow H_2O_2 + H$						
HYDROPEROXYL FREE RADICAL + HYDROGEN MOLECULE						
72 BAU/DRY REACTION ORDER: 2.	300-800	7.3(+11)	0	9400±250	0.5	2.0
$HO_2 + HO_2 \rightarrow H_2O_2 + O_2$						
HYDROPEROXYL FREE RADICAL						
74 LLO REACTION ORDER: 2.	300-1000	1.0(+13)	0	500	0.5	2.0
NOTE: E ESTIMATED. k FACTORS ARE LARGER AT T>300K.						
$HO_2 + H_2O \rightarrow H_2O_2 + OH$						
HYDROPEROXYL FREE RADICAL + WATER						
72 BAU/DRY REACTION ORDER: 2.	300-800	2.8(+13)	0	16500±500	0.5	1.5
$HO_2 + SO_2 \rightarrow OH + SO_3$						
HYDROPEROXYL FREE RADICAL + SULFUR DIOXIDE						
74 LLO REACTION ORDER: 2.	300	5.2(+ 8)	-	-	0.9	1.2
$HO_2 + N \rightarrow O_2 + NH$						
HYDROPEROXYL FREE RADICAL + NITROGEN ATOM						
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+11)	0	0±2500	0.3	3.2
$HO_2 + CO \rightarrow OH + CO_2$						
HYDROPEROXYL FREE RADICAL + CARBON MONOXIDE						
76 BAU/DRY REACTION ORDER: 2.	700-1000	1.5(+14)	0	11900±1000	0.3	3.0
$HO_2 + CH \rightarrow O_2 + CH_2$						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
HYDROPEROXYL FREE RADICAL AND METHYLIDYNE FREE RADICAL 76 ENG REACTION ORDER: 2.	1500-2500	1.0(+10)	0.5	7550±2500	0.3	3.2
HO_2 + CH → OH + •CHO HYDROPEROXYL FREE RADICAL AND METHYLIDYNE FREE RADICAL 76 ENG REACTION ORDER: 2.	1500-2500	5.0(+11)	0.5	3000±2500	0.3	3.2
HO_2 + CH_3• → O_2 + CH_4 HYDROPEROXYL FREE RADICAL AND METHYL FREE RADICAL 76 ENG REACTION ORDER: 2.	1500-2500	1.0(+11)	0.5	3000±2500	0.3	3.2
HO_2 + •CHO → O_2 + HCHO HYDROPEROXYL FREE RADICAL + METHYL, OXO-, FREE RADICAL 76 ENG REACTION ORDER: 2. NOTE: k ESTIMATED.	1500-2500	1.0(+14)	0	1500±1500		
HO_2 + HCHO → H_2O_2 + •CHO HYDROPEROXYL FREE RADICAL + FORMALDEHYDE 74 LLO REACTION ORDER: 2. NOTE: k FACTORS ARE: f = 0.1; F = 10. AT 300 K.	300-800	1.0(+12)	0	4000	0.7	1.5
HO_2 + CH_2=CH_2 → products HYDROPEROXYL FREE RADICAL + ETHENE 74 LLO REACTION ORDER: 2. NOTE: RATIO DATA VERSUS k_{ref} FOR HO_2 + CO → OH + CO_2. k FACTORS MIGHT BE HIGHER.	300	1.0(+ 7)	-	-	0.1	10.
HO_2 + CH_3CH_3 → H_2O_2 + CH_3CH_2• HYDROPEROXYL RADICAL + ETHANE 74 LLO REACTION ORDER: 2. NOTE: E ESTIMATED. UPPER LIMIT RECOMMENDED. k_{ref} IS FOR HO_2 + CO → OH + CO_2.	300-1000	1.0(+12)	0	7000	0.1	10.
HO_2 + $CH_3CH_2CH_3$ → H_2O_2 + $(CH_3)_2CH$• HYDROPEROXYL FREE RADICAL + PROPANE 74 LLO REACTION ORDER: 2. NOTE: UPPER LIMIT RECOMMENDED. RATIO DATA VERSUS k_{ref} FOR HO_2 + HO_2 → H_2O_2 + O_2	300-1000	2.0(+11)	0	5300	0.1	10.
HO_2 + $(CH_3)_2C$=CH_2 → products HYDROPEROXYL FREE RADICAL + 1-PROPENE, 2-METHYL- 74 LLO REACTION ORDER: 2. NOTE: SUGGESTED k VALUE.	300	1.0(+ 8)	-	-	0.1	10.
HO_2 + $CH_3CH_2CH_2CH_3$ → H_2O_2 + CH_3CH_2CH(•)CH_3 HYDROPEROXYL FREE RADICAL + BUTANE 74 LLO REACTION ORDER: 2. NOTE: UPPER LIMIT RECOMMENDED. RATIO DATA VERSUS kref FOR HO_2 + HO_2 → H_2O_2 + O_2	300-1000	5.0(+11)	0	5285	0.1	10.
HO_2 + $(CHO)_3CH$ → H_2O_2 + $(CH_3)_3C$• HYDROPEROXYL FREE RADICAL + PROPANE, 2-METHYL 74 LLO REACTION ORDER: 2.	300-1000	1.0(+11)	0	3500	0.1	10.

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F
NOTE: UPPER LIMIT RECOMMENDED. RATIO DATA VERSUS k_{ref} FOR $HO_2 + HO_2 \rightarrow H_2O_2 + O_2$						

$HO_2 + M \rightarrow H + O_2 + M$						
HYDROPEROXYL FREE RADICAL						
72 HAU/DRY REACTION ORDER: 2.	300-2000	2.1(+15)	0	23000±250	0.5	1.5
NOTE: M = AR, OR He. $k_1 = 1k_{-1}$						

$H_2O + O \rightarrow OH + OH$						
WATER + OXYGEN ATOM						
72 HAU/DRY REACTION ORDER: 2.	300-2000	6.8(+13)	0	9240±200	0.7	1.5

$H_2O + H \rightarrow H_2 + OH$						
WATER + HYDROGEN ATOM						
72 HAU/DRY REACTION ORDER: 2.	300-2500	9.3(+13)	0	10250±100	0.5	1.5
NOTE: GIVEN k FACTORS ARE FOR HIGH T'S.						

$H_2O + HO_2 \rightarrow OH + H_2O_2$						
WATER + HYDROPEROXYL FREE RADICAL						
72 HAU/DRY REACTION ORDER: 2.	300-800	2.8(+13)	0	16500±500	0.5	1.5

$H_2O + NH \rightarrow H_2 + NO$						
WATER + IMIDOGEN FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+11)	0.5	1500±2500	0.3	3.2

$H_2O + CH_3 \rightarrow OH + CH_4$						
WATER + METHYL FREE RADICAL						
76 KEE/PAR REACTION ORDER: 2.	1273-1773	7.1(+12)	0	12900±1000	0.5	2.0
NOTE: TENTATIVE k VALUE.						

$H_2O + M \rightarrow H + OH + M$						
WATER						
72 HAU/DRY REACTION ORDER: 2. M: H_2O	2000-6000	2.2(+16)	0	52900±2500	0.7	1.5
NOTE: M eff: H_2O(1.0). $k_1 = 1k_{-1}$ M: Ar	2000-6000	1.3(+15)	0	52900±2500	0.5	2.0
Ar(0.06) M: N_2	2000-6000	3.5(+15)	0	52900±2500	0.5	2.0
N_2(0.16)						

$H_2O_2 + H \rightarrow HO_2 + H_2$						
HYDROGEN PEROXIDE + HYDROGEN ATOM						
72 HAU/DRY REACTION ORDER: 2.	300-800	1.7(+12)	0	1900±250	0.5	2.0

$H_2O_2 + OH \rightarrow HO_2 + H_2O$						
HYDROGEN PEROXIDE + HYDROXYL FREE RADICAL						
72 HAU/DRY REACTION ORDER: 2.	300-800	1.0(+13)	0	910±150	0.5	1.5

$H_2O_2 + M \rightarrow OH + OH + M$						
HYDROGEN PEROXIDE						
72 HAU/DRY REACTION ORDER: 2. M: N_2	700-1500	1.20(+17)	0	22900±1000	0.8	1.3
NOTE: k FACTORS CHANGING TO: f = 0.5; F = 2.0 AT 1500K.						

$S + O_2 \rightarrow SO + O$						

CHEMICAL REACTIONS	T/K	A	B	E/R (in ^{o}K)	k factors f	F
SULFUR ATOM + OXYGEN MOLECULE						
76 BAU/DRY REACTION ORDER: 2.	250-450	1.4(+12)	0	0.0+50	0.5	1.5
$S + B_2 \rightarrow SB + B$						
SULFUR ATOM + HYDROGEN MOLECULE						
76 BAU/DRY REACTION ORDER: 2.	298	1.3(-1)	-	-	0.5	1.5
NOTE: $k_1 = Kk_{-1}$						
75 BEN/GOL		2.5(+12)	0.5	13640		
$S + OH \rightarrow SO + B$						
SULFUR ATOM + HYDROXYL FREE RADICAL						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$S + OH \rightarrow SB + O$						
SULFUR ATOM + HYDROXYL FREE RADICAL						
75 BEN/GOL REACTION ORDER: 2.		1.3(+12)	0.5	12700		
$S + S_2 \rightarrow S_2 + S$						
SULFUR ATOM + SULFUR DIMER						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$S + SO \rightarrow S_2 + O$						
SULFUR ATOM + SULFUR MONOXIDE						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	11500		
$S + SO \rightarrow SO + S$						
SULFUR ATOM + SULFUR MONOXIDE						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$S + SH \rightarrow S_2 + B$						
SULFUR ATOM + MERCAPTO FREE RADICAL						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$S + SH \rightarrow SB + S$						
SULFUR ATOM + MERCAPTO FREE RADICAL						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	4000		
$S + N_2 \rightarrow NS + N$						
SULFUR ATOM + NITROGEN MOLECULE						
75 BEN/GOL REACTION ORDER: 2.		4.0(+12)	0.5	55200		
$S + NO \rightarrow SO + N$						
SULFUR ATOM + NITROGEN OXIDE (NO)						
75 BEN/GOL REACTION ORDER: 2.		4.0(+11)	0.5	17260		
$S + NO \rightarrow NS + O$						
SULFUR ATOM + NITROGEN OXIDE (NO)						
75 BEN/GOL REACTION ORDER: 2.		1.0(+12)	0.5	17465		
$S + NH \rightarrow SB + N$						
SULFUR ATOM + IMIDOGEN FREE RADICAL						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	4000		

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F
S + NH → NS + H						
SULFUR ATOM + IMIDOGEN FREE RADICAL						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
S + NS → S_2 + N						
SULFUR ATOM + NITROGEN SULFIDE(NS)						
75 BEN/GOL REACTION ORDER: 2.		2.0(+11)	0.5	10870		
S + NS → NS + S						
SULFUR ATOM + NITROGEN SULFIDE(NS)						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
S + CO → SO + C						
SULFUR ATOM + CARBON MONOXIDE						
75 BEN/GOL REACTION ORDER: 2.		4.0(+12)	0.5	66530		
S + CO → CS + O						
SULFUR ATOM + CARBON MONOXIDE						
75 BEN/GOL REACTION ORDER: 2.		1.3(+12)	0.5	37600		
S + CH → SH + C						
SULFUR ATOM + METHYLIDYNE FREE RADICAL						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	4000		
S + CH → CS + H						
SULFUR ATOM + METHYLIDYNE FREE RADICAL						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
S + CS → S_2 + C						
SULFUR ATOM + CARBON MONOSULFIDE FREE RADICAL						
75 BEN/GOL REACTION ORDER: 2.		1.6(+12)	0.5	40463		
S + CS → CS + S						
SULFUR ATOM + CARBON MONOSULFIDE FREE RADICAL						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
S + CS + M → CS_2 + M						
SULFUR ATOM + CARBON MONOSULFIDE FREE RADICAL						
76 BAU/DRY REACTION ORDER: 3.	1800-3700	8.7(+13)	0	4370	0.5	1.5
NOTE: $k_1 = Kk_{-1}$						
S + CS_2 → S_2 + CS						
SULFUR ATOM + CARBON DISULFIDE						
76 BAU/DRY REACTION ORDER: 2.	298	3.9(+11)	-	-	0.5	1.5
S + COS → S_2 + CO						
SULFUR ATOM + CARBON OXIDE SULFIDE						
76 BAU/DRY REACTION ORDER: 2.	230-2600	1.7(+12)	0	2050±230	0.3	3.0
S + CN → NS + C						
SULFUR ATOM + CYANOGEN FREE RADICAL						
75 BEN/GOL REACTION ORDER: 2.		2.0(+12)	0.5	32010		

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f F
S + CN → CS + N					
SULFUR ATOM + CYANOGEN FREE RADICAL					
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0	
S + C_2 → CS + C					
SULFUR ATOM + CARBON DIMER					
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0	
S + CH≡CH → CY-CH=CHS					
SULFUR ATOM + ETHYNE					
72 KER/PAR REACTION ORDER: 2.	298	1.7(+11)	-	-	
S + CH_2=CH_2 → cy-CH_2CH_2S					
SULFUR ATOM + ETHENE					
72 KER/PAR REACTION ORDER: 2.	298	8.1(+11)	-	-	
S + CH_3C≡CH → cy-(CH_3)C=CHS					
SULFUR ATOM + 1-PROPYNE					
72 KER/PAR REACTION ORDER: 2.	298	1.1(+12)	-	-	
S + CH_3CH=CH_2 → cy-(CH_3)$CHCH_2S$					
SULFUR ATOM + 1-PROPENE					
72 KER/PAR REACTION ORDER: 2.	298	5.8(+12)	-	-	
k/k_{ref}: 6.9	298	-	-	-	
NOTE: k_{ref}: S + CH_2=CH_2					
S*(^{1}D) + CH_3CH=CH_2 → CY-(CH_3)$CHCH_2S$					
SULFUR ATOM (^{1}D) + 1-PROPENE					
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 1.7	300	-	-	-	
NOTE: k_{ref}: S*(^{1}D) + CH_2=CH_2					
S + CH_3C≡CCH_3 → cy-(CH_3)C=C(CH_3)S					
SULFUR ATOM + 2-BUTYNE					
72 KER/PAR REACTION ORDER: 2.	298	1.9(+13)	-	-	
S + CH_2=CH-CH=CH_2 → cy-(CH_2=CH)$CHCH_2S$					
SULFUR ATOM + 1,3-BUTADIENE					
72 KER/PAR REACTION ORDER: 2.	298	6.0(+13)	-	-	
S + CH_3CH_2CH=CH_2 → cy-(CH_3CH_2)$CHCH_2S$					
SULFUR ATOM + 1-BUTENE					
72 KER/PAR REACTION ORDER: 2.	298	9.3(+12)	-	-	
k/k_{ref}: 10.0	298	-	-	-	
NOTE: k_{ref}: S + CH_2=CH_2					
S + cis-CH_3CH=CHCH$_3$ → cy-(CH_3)CHCH(CH_3)S					
SULFUR ATOM + cis-2-BUTENE					
72 KER/PAR REACTION ORDER: 2.	298	1.4(+13)	-	-	
k/k_{ref}: 16.0	298	-	-	-	
NOTE: k_{ref}: S + CH_2=CH_2					
S + trans-CH_3CH=CHCH$_3$ → cy-(CH_3)CHCH(CH_3)S					

CHEMICAL REACTIONS	T/K	A	B	E/R (in ^{o}K)	k factors f F
SULFUR ATOM + trans-2-BUTENE					
72 KEB/PAR REACTION ORDER: 2.	298	1.4(+13)	-	-	
k/k_{ref}: 20.0	298	-	-	-	
NOTE: k_{ref}: S + CH_2=CH_2					

S + $(CH_3)_2C$=CH_2 → cy-$(CH_3)_2CCH_2S$					
SULFUR ATOM + 1-PROPENE, 2-METHYL					
72 KEB/PAR REACTION ORDER: 2.	298	4.0(+13)	-	-	
k/k_{ref}: 50.0	298	-	-	-	
NOTE: k_{ref}: S + CH_2=CH_2					

$S^*(^1D)$ + $(CH_3)_2C$=CH_2 → cy-$(CH_3)_2CCH_2S$					
SULFUR ATOM (^1D) + 1-PROPENE, 2-METHYL-					
72 KEB/PAR REACTION ORDER: 2. k/k_{ref}: 3.5	300	-	-	-	
NOTE: k_{ref}: $S^*(^1D)$ + CH_2=CH_2					

S + $CH_3(CH_2)_2CH$=CH_2 → cy-$CH_3(CH_2)CHCH_2S$					
SULFUR ATOM + 1-PENTENE					
72 KEB/PAR REACTION ORDER: 2.	298	8.1(+12)	-	-	

S + $CH_3CH_2C(CH_3)$=CH_2 → cy-$CH_3CH_2C(CH_3)CH_2S$					
SULFUR ATOM + 1-BUTENE, 2-METHYL-					
72 KEB/PAR REACTION ORDER: 2.	298	7.4(+13)	-	-	

S + $(CH_3)_2C$=$CHCH_3$ → cy-$(CH_3)_2CCH(CH_3)S$					
SULFUR ATOM + 2-BUTENE, 2-METHYL-					
72 KEB/PAR REACTION ORDER: 2.	298	6.5(+13)	-	-	
k/k_{ref}: 56.	298	-	-	-	
NOTE: k_{ref}: S + CH_2=CH_2					

S + $(CH_3)_2C$=$C(CH_3)_2$ → cy-$(CH_3)_2CC(CH_3)_2S$					
SULFUR ATOM + 2-BUTENE, 2,3-DIMETHYL-					
72 KEB/PAR REACTION ORDER: 2.	298	8.5(+13)	-	-	

S_2 + O → S + SO					
SULFUR DIMER + OXYGEN ATOM					
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0	

S_2 + H → S + SH					
SULFUR DIMER + HYDROGEN ATOM					
75 BEN/GOL REACTION ORDER: 2.		7.9(+12)	0.5	8355	

S_2 + S → S + S_2					
SULFUR DIMER + SULFUR ATOM					
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0	

S_2 + N → S + NS					
SULFUR DIMER + NITROGEN ATOM					
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	4000	

S_2 + C → S + CS					
SULFUR DIMER + CARBON ATOM					

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$SO + O \rightarrow O + SO$						
SULFUR MONOXIDE + OXYGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$SO + O \rightarrow S + O_2$						
SULFUR MONOXIDE + OXYGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		2.0(+11)	0.5	2770		
$SO + O + M \rightarrow SO_2 + M$						
SULFUR MONOXIDE + OXYGEN ATOM						
76 BAU/DRY REACTION ORDER: 3.	298	6.7(+13)	-	-	0.7	1.3
$SO + O_2 \rightarrow SO_2 + O$						
SULFUR MONOXIDE + OXYGEN MOLECULE						
76 BAU/DRY REACTION ORDER: 2.	440-2100	4.5(+11)	0	3250±590	0.3	1.7
$SO + H \rightarrow O + SH$						
SULFUR MONOXIDE + HYDROGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	19930		
$SO + H \rightarrow S + OH$						
SULFUR MONOXIDE + HYDROGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		4.0(+12)	0.5	11200		
$SO + S \rightarrow O + S_2$						
SULFUR MONOXIDE + SULFUR ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	11500		
$SO + S \rightarrow S + SO$						
SULFUR MONOXIDE + SULFUR ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$SO + N \rightarrow O + NS$						
SULFUR MONOXIDE + NITROGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		1.6(+12)	0.5	8254		
$SO + N \rightarrow S + NO$						
SULFUR MONOXIDE + NITROGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	4000		
$SO + C \rightarrow O + CS$						
SULFUR MONOXIDE + CARBON ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$SO + C \rightarrow S + CO$						
SULFUR MONOXIDE + CARBON ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$SO_2 + O \rightarrow SO + O_2$						
SULFUR DIOXIDE + OXYGEN ATOM						
76 BAU/DRY REACTION ORDER: 2.	440-2100	1.3(+14)	-0.5	5980	0.3	1.7

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
NOTE: $k_1 = Kk_{-1}$						
$SO_2 + H + M \rightarrow HSO_2 + M$						
SULFUR DIOXIDE + HYDROGEN ATOM						
76 BAU/DRY REACTION ORDER: 3.	1660-2120	5.1(+15)	-	-	0.5	1.5
$SO_2 + HO_2 \rightarrow SO_3 + OH$						
SULFUR DIOXIDE + HYDROPEROXYL FREE RADICAL						
74 LLO REACTION ORDER: 2.	300	5.2(+8)	-	-	0.9	1.2
NOTE: RATIO DATA VERSUS k_{ref} FOR REACTION $HO_2 + HO_2 \rightarrow H_2O_2 + O_2$.						
SH + O → S + OH						
MERCAPTO FREE RADICAL + OXYGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	4000		
SH + O → SO + H						
MERCAPTO FREE RADICAL + OXYGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
SH + H → S + H_2						
MERCAPTO FREE RADICAL + HYDROGEN ATOM						
76 BAU/DRY REACTION ORDER: 2.	298	1.5(+13)	-	-	0.5	1.5
SH + H → H + SH						
MERCAPTO FREE RADICAL + HYDROGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
SH + S → H + S_2						
MERCAPTO FREE RADICAL + SULFUR ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
SH + S → S + SH						
MERCAPTO FREE RADICAL + SULFUR ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	4000		
SH + SH → H_2S + S						
MERCAPTO FREE RADICAL						
76 BAU/DRY REACTION ORDER: 2.	295	7.8(+12)	-	-	0.5	1.5
SH + N → H + NS						
MERCAPTO FREE RADICAL + NITROGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	403		
SH + N → S + NH						
MERCAPTO FREE RADICAL + NITROGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	9060		
SH + C → H + CS						
MERCAPTO FREE RADICAL + CARBON ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
SH + C → S + CH						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
MERCAPTO FREE RADICAL + CARBON ATOM						
75 BEN/GOL REACTION ORDER: 2.		4.0(+11)	0.5	6090		

$H_2S + O_3 \rightarrow H_2O + SO_2$						
HYDROGEN SULFIDE + OZONE						
76 BAU/DRY REACTION ORDER: 2.	298	4.0(+2)	-	-	0.1	10.

$H_2S + H \rightarrow SH + H_2$						
HYDROGEN SULFIDE + HYDROGEN ATOM						
76 BAU/DRY REACTION ORDER: 2.	190-470	7.8(+12)	0	860±50	0.5	1.5

$H_2S + OH \rightarrow SH + H_2O$						
HYDROGEN SULFIDE + HYDROXYL FREE RADICAL						
76 BAU/DRY REACTION ORDER: 2.	298-900	6.3(+12)	0	200±150	0.7	1.3
NOTE: k FACTORS CHANGING TO: f = 0.5; F = 1.5 AT 900K.						

$H_2S + CH_3 \rightarrow SH + CH_4$						
HYDROGEN SULFIDE + METHYL FREE RADICAL						
76 KEE/PAR REACTION ORDER: 2.	300-600	2.00(+11)	0	2065±150	0.4	2.5
NOTE: TENTATIVE k VALUE.						

$N + O + M \rightarrow NO + M$						
NITROGEN ATOM + OXYGEN ATOM						
73 BAU/DRY REACTION ORDER: 3. M: N_2	200-400	6.4(+16)	-0.5	0	0.5	1.5

$N + O_2 \rightarrow NO + O$						
NITROGEN ATOM + OXYGEN MOLECULE						
73 BAU/DRY REACTION ORDER: 2.	300-3000	6.4(+9)	1.0	3150±150	0.7	1.3
NOTE: k FACTORS CHANGING TO: f = 0.5; F = 2.0 AT 3000K.						

$N + H + M \rightarrow NH + M$						
NITROGEN ATOM + HYDROGEN ATOM						
76 ENG REACTION ORDER: 3.	1500-2500	2.5(+17)	-0.5	0±1000		

$N + H_2 \rightarrow NH + H$						
NITROGEN ATOM + HYDROGEN MOLECULE						
75 BEN/GOL REACTION ORDER: 2.		2.5(+12)	0.5	18700		

$N + OH \rightarrow NO + H$						
NITROGEN ATOM + HYDROXYL FREE RADICAL						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		

$N + OH \rightarrow NH + O$						
NITROGEN ATOM + HYDROXYL FREE RADICAL						
75 BEN/GOL REACTION ORDER: 2.		1.3(+12)	0.5	17765		

$N + OH + M \rightarrow HNO + M$						
NITROGEN ATOM + HYDROXYL FREE RADICAL						
76 ENG REACTION ORDER: 3.	1500-2500	1.00(+15)	-0.5	0		

$N + HO_2 \rightarrow NH + O_2$						
NITROGEN ATOM + HYDROPEROXYL FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	1.00(+11)	0	0±2500	0.3	3.2

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F

$N + S_2 \rightarrow NS + S$						
NITROGEN ATOM + SULFUR DIMER						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	4000		

$N + SO \rightarrow NO + S$						
NITROGEN ATOM + SULFUR MONOXIDE						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	4000		

$N + SO \rightarrow NS + O$						
NITROGEN ATOM + SULFUR MONOXIDE						
75 BEN/GOL REACTION ORDER: 2.		1.6(+12)	0.5	8254		

$N + SH \rightarrow NH + S$						
NITROGEN ATOM + MERCAPTO FREE RADICAL						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	9060		

$N + SH \rightarrow NS + H$						
NITROGEN ATOM + MERCAPTO FREE RADICAL						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	403		

$N + N + M \rightarrow N_2 + M$						
NITROGEN ATOM						
73 BAU/DRY REACTION ORDER: 3. M: N_2	100-600	3.0(+14)	0	- 500±50	0.5	1.5
NOTE: k FACTORS RANGE: 200-600K, BUT MIGHT INCREASE AT LOWER T'S.						

$N + N_2 \rightarrow N_2 + N$						
NITROGEN ATOM + NITROGEN MOLECULE						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	4000		

$N + NO \rightarrow N_2 + O$						
NITROGEN ATOM + NITROGEN OXIDE(NO)						
73 BAU/DRY REACTION ORDER: 2.	300-5000	1.6(+13)	0	0	0.8	1.2
NOTE: k FACTORS CHANGE TO: f = 0.5; F = 2.0 ABOVE 2000K.						

$N + NO \rightarrow NO + N$						
NITROGEN ATOM + NITROGEN OXIDE(NO)						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	4000		

$N + NO_2 \rightarrow N_2 + O_2$						
NITROGEN ATOM + NITROGEN OXIDE(NO_2)						
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+12)	0	0±1500		

$N + NO_2 \rightarrow NO + NO$						
NITROGEN ATOM + NITROGEN OXIDE(NO_2)						
76 ENG REACTION ORDER: 2.	1500-2500	4.0(+12)	0	0±1500	0.2	5.0

$N + NO_2 \rightarrow N_2O + O$						
NITROGEN ATOM + NITROGEN OXIDE(NO_2)						
76 ENG REACTION ORDER: 2.	1500-2500	5.0(+12)	0	0±1500	0.5	2.0

$N + N_2O \rightarrow NO + N_2$						

CHEMICAL REACTIONS	T/K	A	B	E/R (in ^{o}K)	k factors f	F
NITROGEN ATOM + NITROGEN OXIDE(N_2O)						
76 ENG REACTION ORDER: 2.	1500-2500	5.0(+ 8)	0	5000±2500	0.3	3.2
$N + NH \rightarrow N_2 + H$						
NITROGEN ATOM + IMIDOGEN FREE RADICAL						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$N + NH \rightarrow NH + N$						
NITROGEN ATOM + IMIDOGEN FREE RADICAL						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	4000		
$N + HNO \rightarrow H + N_2O$						
NITROGEN ATOM + NITROSYL HYDRIDE						
76 ENG REACTION ORDER: 2.	1500-2500	5.0(+10)	0.5	1500±2500		
$N + HNO \rightarrow NH + NO$						
NITROGEN ATOM + NITROSYL HYDRIDE						
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+11)	0.5	1000±2500		
$N + NS \rightarrow N_2 + S$						
NITROGEN ATOM + NITROGEN SULFIDE(NS)						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$N + NS \rightarrow NS + N$						
NITROGEN ATOM + NITROGEN SULFIDE(NS)						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	4000		
$N + CO \rightarrow NC + O$						
NITROGEN ATOM + CARBON MONOXIDE						
75 BEN/GOL REACTION ORDER: 2.		5.0(+12)	0.5	57300		
$N + CO \rightarrow CN + O$						
NITROGEN ATOM + CARBON MONOXIDE						
75 BEN/GOL REACTION ORDER: 2.		3.2(+12)	0.5	38800		
$N + CO_2 \rightarrow NO + CO$						
NITROGEN ATOM + CARBON DIOXIDE						
76 ENG REACTION ORDER: 2.	1500-2500	2.00(+11)	0.5	1500±10000	0.1	10.
$N + CH \rightarrow NH + C$						
NITROGEN ATOM + METHYLIDYNE FREE RADICAL						
75 BEN/GOL REACTION ORDER: 2.		1.0(+12)	0.5	6995		
$N + CH \rightarrow CN + H$						
NITROGEN ATOM + METHYLIDYNE FREE RADICAL						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$N + CH_2 \rightarrow NH + CH$						
NITROGEN ATOM + METHYLIDYNE FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	6.3(+11)	0.7	20400±2500	0.3	3.2
$N + \cdot CHO \rightarrow O + HCN$						
NITROGEN ATOM + FORMYL FREE RADICAL						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f F
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+14)	0	0	
NOTE: k ESTIMATED.					

N + •CHO → NH + CO					
NITROGEN ATOM + FORMYL FREE RADICAL					
76 ENG REACTION ORDER: 2.	1500-2500	2.0(+11)	0.5	1000±2500	

N + CH_3O• → NH + HCHO					
NITROGEN ATOM + METHOXY FREE RADICAL					
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+14)	0	0±1500	

N + CS → C + NS					
NITROGEN ATOM + CARBON MONOSULFIDE FREE RADICAL					
75 BEN/GOL REACTION ORDER: 2.		4.0(+12)	0.5	37200	

N + CS → •CN + S					
NITROGEN ATOM + CARBON MONOSULFIDE FREE RADICAL					
75 BEN/GOL REACTION ORDER: 2.		1.3(+12)	0.5	1160	

N + CN → N_2 + C					
NITROGEN ATOM + CYANOGEN FREE RADICAL					
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0	

N + C_2 → •CN + C					
NITROGEN ATOM + CARBON DIMER					
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0	

N + CH≡CH → C_2H_2N					
NITROGEN ATOM + ETHYNE					
72 KER/PAR REACTION ORDER: 2.	440	2.0(+ 9)	-	-	
NOTE: UPPER LIMIT.					

N + CH_2=CH_2 → products					
NITROGEN ATOM + ETHENE					
72 KER/PAR REACTION ORDER: 2.	320-550	2.0(+10)	0	353	

N + CH_3C≡CH → products					
NITROGEN ATOM + 1-PROPYNE					
72 KER/PAR REACTION ORDER: 2.	320-550	6.9(+10)	0	745	
k/k_{ref}: 6.5	435	-	-	-	
NOTE: k_{ref}: N + CH≡CH.					

N + CH_3CH=CH_2 → products					
NITROGEN ATOM + 1-PROPENE					
72 KER/PAR REACTION ORDER: 2.	320-550	1.2(+11)	0	655	
k/k_{ref}: 2.8	435	-	-	-	
NOTE: k_{ref}: N + CH_2=CH_2					

N + CH_3CH_2C≡CH → products					
NITROGEN ATOM + 1-BUTYNE					
72 KER/PAR REACTION ORDER: 2.	320-550	3.5(+11)	0	1125	
k/k_{ref}: 13.0	435	-	-	-	
NOTE: k_{ref}: N + CH≡CH					

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f F

N + $CH_3C{\equiv}CCH_3$ → products					
NITROGEN ATOM + 2-BUTYNE					
72 KER/PAR REACTION ORDER: 2.	320-550	1.9(+11)	0	926	
k/k_{ref}: 12.0	435	-	-	-	
NOTE: k_{ref}: N + $CH{\equiv}CH$.					

N + $CH_2{=}CHCH{=}CH_2$ → products					
NITROGEN ATOM + 1,3-BUTADIENE					
72 KER/PAR REACTION ORDER: 2.	340	3.5(+10)	-	-	

N + $CH_3CH_2CH{=}CH_2$ → products					
NITROGEN ATOM + 1-BUTENE					
72 KER/PAR REACTION ORDER: 2.	320-550	1.6(+11)	0	660	
k/k_{ref}: 3.4	435	-	-	-	
NOTE: k_{ref}: N + $CH_2{=}CH_2$.					

N + cis-$CH_3CH{=}CHCH_3$ → products					
NITROGEN ATOM + cis-2-BUTENE					
72 KER/PAR REACTION ORDER: 2.	320-550	2.3(+11)	0	995	
k/k_{ref}: 2.4	435	-	-	-	
NOTE: k_{ref}: N + $CH_2{=}CH_2$					

N + trans-$CH_3CH{=}CHCH_3$ → products					
NITROGEN ATOM + trans-2-BUTENE					
72 KER/PAR REACTION ORDER: 2.	320-550	3.4(+11)	0	1055	
k/k_{ref}: 3.0	435	-	-	-	
NOTE: k_{ref}: N + $CH_2{=}CH_2$					

N + $(CH_3)_2C{=}CH_2$ → products					
NITROGEN ATOM + 1-PROPENE, 2-METHYL-					
72 KER/PAR REACTION ORDER: 2.	320-550	7.8(+10)	0	277	
k/k_{ref}: 4.1	435	-	-	-	
NOTE: k_{ref}: N + $CH_2{=}CH_2$					

N + $CH_3CH_2CH_2C{\equiv}CH$ → products					
NITROGEN ATOM + 1-PENTYNE					
72 KER/PAR REACTION ORDER: 2.	320-550	3.0(+11)	0	1047	
k/k_{ref}: 14.0	435	-	-	-	
NOTE: k_{ref}: N. + $CH{\equiv}CH$					

N + $(CH_3)_2C{=}CHCH_3$ → products					
NITROGEN ATOM + 2-BUTENE, 2-METHYL-					
72 KER/PAR REACTION ORDER: 2.	320-550	9.3(+10)	0	433	
k/k_{ref}: 3.5	435	-	-	-	
NOTE: k_{ref}: N + $CH_2{=}CH_2$					

N + $CH_3CH_2CH_2CH_2C{\equiv}CH$ → products					
NITROGEN ATOM + 1-HEXYNE					
72 KER/PAR REACTION ORDER: 2.	320-55	4.6(+11)	0	1233	
k/k_{ref}: 14.0	435	-	-	-	
NOTE: k_{ref}: N + $CH{\equiv}CH$					

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F
$N + CH_3CH_2C{\equiv}CCH_2CH_3 \rightarrow$ products						
NITROGEN ATOM + 3-HEXYNE						
72 KER/PAR REACTION ORDER: 2.	320-550	3.4(+11)	0	1102		
k/k_{ref}: 14.0	435	-	-	-		
NOTE: k_{ref}: $N + CH{\equiv}CH$						

$N + (CH_3)_2C{=}C(CH_3)_2 \rightarrow$ products						
NITROGEN ATOM + 2-BUTENE, 2,3-DIMETHYL-						
72 KER/PAR REACTION ORDER: 2.	320-550	1.7(+11)	0	690		
k/k_{ref}: 3.5	435	-	-	-		
NOTE: k_{ref}: $N + CH_2{=}CH_2$						

$N_2 + O \rightarrow N + NO$						
NITROGEN MOLECULE + OXYGEN ATOM						
73 BAU/DRY REACTION ORDER: 2.	2000-5000	7.6(+13)	0	38000±150	0.5	2.0
NOTE: $k_1 = Kk_{-1}$						

$N_2 + O + M \rightarrow N_2O + M$						
NITROGEN MOLECULE + OXYGEN ATOM						
73 BAU/DRY REACTION ORDER: 3. M: Ar	1300-2500	1.4(+13)	0	10400±1500	0.7	1.5

$N_2 + O_2 \rightarrow N_2O + O$						
NITROGEN MOLECULE + OXYGEN MOLECULE						
73 BAU/DRY REACTION ORDER: 2.	1200-2000	6.3(+13)	0	55200±2000	0.4	2.5
NOTE: $k_1 = Kk_{-1}$						

$N_2 + H \rightarrow N + NH$						
NITROGEN MOLECULE + HYDROGEN ATOM						
75 HEN/GOL REACTION ORDER: 2.		2.0(+13)	0.5	75945		

$N_2 + S \rightarrow N + NS$						
NITROGEN MOLECULE + SULFUR ATOM						
75 HEN/GOL REACTION ORDER: 2.		4.0(+12)	0.5	55200		

$N_2 + N \rightarrow N + N_2$						
NITROGEN MOLECULE + NITROGEN ATOM						
75 HEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	4000		

$N_2 + C \rightarrow N + CN$						
NITROGEN MOLECULE + CARBON ATOM						
75 HEN/GOL REACTION ORDER: 2.		1.3(+12)	0.5	22750		

$N_2 + CH \rightarrow N + HCN$						
NITROGEN MOLECULE + METHYLIDYNE FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+11)	0	9560		
NOTE: REVISED ESTIMATE.						

$N_2 + CH \rightarrow NH + CN$						
NITROGEN MOLECULE + METHYLIDYNE FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	3.2(+14)	0	46300±10000		
NOTE: k ESTIMATED.						

$N_2 + CH_2 \rightarrow NH + HCN$						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
NITROGEN MOLECULE + METHYLENE FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+14)	0	35230±10000		
NOTE: k ESTIMATED.						

$N_2 + M \rightarrow N + N + M$						
NITROGEN MOLECULE						
76 ENG REACTION ORDER: 2. M: N_2	1500-2500	4.0(+21)	-1.6	13240±500		
73 BAU/DRY	6000-15000	3.7(+21)	-1.6	113200±500	0.3	3.0

$NO + O \rightarrow O + NO$						
NITROGEN OXIDE(NO) + OXYGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		

$NO + O \rightarrow N + O_2$						
NITROGEN OXIDE(NO) + OXYGEN ATOM						
73 BAU/DRY REACTION ORDER: 2.	1000-3000	1.5(+9)	1.0	19500±150	0.7	1.3
NOTE: k FACTORS INCREASING TO: f = 0.5; F = 2.0 AT 3000K.						
$k_1 = Kk_{-1}$						

$NO + O + M \rightarrow NO_2 + M$						
NITROGEN OXIDE(NO) + OXYGEN ATOM						
73 BAU/DRY REACTION ORDER: 3. M: O_2	200-500	1.1(+15)	0	-940±50	0.8	1.2
NOTE: M eff: O_2(1.0) AT 297K						
M: Ar	200-500	1.1(+14)	0	-940±50	0.8	1.2
Ar(0.1) AT 297K						
M: H_2O	200-500	6.7(+15)	0	-940±50	0.8	1.2
H_2O(6.1) AT 297K						
M: D_2O	200-500	5.5(+15)	0	-940±50	0.8	1.2
D_2O(5.0) AT 297K						
M: SF_6	200-500	2.9(+15)	0	-940±50	0.8	1.2
SF_6(2.6) AT 297K						
M: N_2	200-500	1.5(+15)	0	-940±50	0.8	1.2
N_2(1.4) AT 297K						
M: N_2O	200-500	2.3(+15)	0	-940±50	0.8	1.2
N_2O(2.1) AT 297K						
M: CO_2	200-500	2.3(+15)	0	-940±50	0.8	1.2
CO_2(2.1) AT 297K						
M: CH_4	200-500	2.4(+15)	0	-940±50	0.8	1.2
CH_4(2.2) AT 297K						
M: CF_4	200-500	2.4(+15)	0	-940±50	0.8	1.2
CF_4(2.2) AT 297K						

$NO + O_2 \rightarrow NO_2 + O$						
NITROGEN OXIDE(NO) + OXYGEN MOLECULE						
73 BAU/DRY REACTION ORDER: 2.	300-550	1.7(+12)	0	23400	0.8	1.3
NOTE: $k_1 = Kk_{-1}$						

$NO + O_3 \rightarrow NO_2 + O_2$						
NITROGEN OXIDE(NO) + OZONE						
73 BAU/DRY REACTION ORDER: 2.	200-350	8.9(+11)	0	1330±130	0.5	1.5

$NO + H \rightarrow O + NH$						
NITROGEN OXIDE(NO) + HYDROGEN ATOM						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F
75 BEN/GOL REACTION ORDER: 2.		5.0(+12)	0.5	38200		

NO + H → N + OH						
NITROGEN OXIDE(NO) + HYDROGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		2.5(+12)	0.5	24460		

NO + H + M → HNO + M						
NITROGEN OXIDE(NO) + HYDROGEN ATOM						
73 BAU/DRY REACTION ORDER: 3. M: H_2	230-700	5.4(+15)	0	-300±100	0.5	1.5
76 ENG M: H_2	1500-2500	5.0(+15)	0	-300±150	0.5	2.0

NO + S → O + NS						
NITROGEN OXIDE(NO) + SULFUR ATOM						
75 BEN/GOL REACTION ORDER: 2.		1.0(+12)	0.5	17465		

NO + S → N + SO						
NITROGEN OXIDE(NO) + SULFUR ATOM						
75 BEN/GOL REACTION ORDER: 2.		4.0(+11)	0.5	17260		

NO + N → O + N_2						
NITROGEN OXIDE(NO) + NITROGEN ATOM						
73 BAU/DRY REACTION ORDER: 2.	300-5000	1.6(+13)	-	-	0.8	1.2
NOTE: k FACTORS CHANGING TO: f = 0.5; F = 2.0 ABOVE 2000K						

NO + N → N + NO						
NITROGEN OXIDE(NO) + NITROGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	4000		

NO + NO → N_2 + O_2						
NITROGEN OXIDE(NO_2) + OXYGEN MOLECULE						
72 KON REACTION ORDER: 2.	1370-4300	1.3(+14)	0	38060±720	0.7	1.5

NO + NO → N_2O + O						
NITROGEN OXIDE (NO)						
73 BAU/DRY REACTION ORDER: 2.	1200-2000	1.3(+12)	0	32100±1500	0.5	2.0

NO + NO + O_2 → NO_2 + NO_2						
NITROGEN OXIDE(NO) + OXYGEN MOLECULE						
73 BAU/DRY REACTION ORDER: 3.	273-660	1.2(+ 9)	0	-530±100	0.5	1.5

NO + NO_2 → N_2O + O_2						
NITROGEN OXIDE(NO) + NITROGEN OXIDE(NO_2)						
76 ENG REACTION ORDER: 2.	1500-2500	1.0 (+12)	0	30200	0.01	100.

NO + NO_2 + O_2 → NO_2 + NO_3						
NITROGEN OXIDE(NO) + NITROGEN OXIDE(NO_2) + OXYGEN MOLECULE						
73 BAU/DRY REACTION ORDER: 3.	300-500	2.9(+ 7)	0	-400±500	0.4	2.5

NO + NO_3 → NO_2 + NO_2						
NITROGEN OXIDE(NO) + NITROGEN OXIDE(NO_3)						
72 KON REACTION ORDER: 2.	298-547	1.5(+14)	0	1163±115	0.7	1.4

CHEMICAL REACTIONS	T/K	A	B	E/R (in ^{o}K)	k factors f	k factors F

$NO + N_2O \rightarrow NO_2 + N_2$						
NITROGEN OXIDE(NO) + NITROGEN OXIDE(N_2O)						
76 ENG REACTION ORDER: 2.	1500-2500	2.0(+14)	0	25000	0.1	1.0

$NO + HNO \rightarrow N_2O + OH$						
NITROGEN OXIDE(NO) + NITROSYL HYDRIDE						
76 ENG REACTION ORDER: 2.	1500-2500	2.0(+12)	0	13000±2500	0.5	2.0

$NO + C \rightarrow O + CN$						
NITROGEN OXIDE(NO) + CARBON ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		

$NO + C \rightarrow N + CO$						
NITROGEN OXIDE(NO) + CARBON ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	4000		

$NO + CH \rightarrow O + HCN$						
NITROGEN OXIDE(NO) + METHYLIDYNE FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	2.0(+12)	0	0±1000		
NOTE: kESTIMATED.						

$NO + CH \rightarrow N + {}^{\bullet}CHO$						
NITROGEN OXIDE(NO) + METHYLIDYNE FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	1.6(+13)	0	5000±3000		
NOTE: k ESTIMATED.						

$NO + CH_2 \rightarrow N + HCHO$						
NITROGEN OXIDE(NO) + METHYLENE FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	2.0(+12)	0	3500±2000		
NOTE: k ESTIMATED.						

$NO + {}^{\bullet}CHO \rightarrow HNO + CO$						
NITROGEN OXIDE(NO) + FORMYL FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	2.0(+11)	0.5	1000±2500	0.3	3.2

$NO + CN \rightarrow N_2 + CO$						
NITROGEN OXIDE(NO) + CYANOGEN FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	3.2(+11)	0	0±2500	0.3	3.2

$NO + M \rightarrow N + O + M$						
NITROGEN OXIDE(NO)						
76 ENG REACTION ORDER: 2.	1500-2500	4.0(+20)	-1.5	75500±2500	0.3	3.2
NOTE: M = Ar, OR N_2 OR O_2. GIVEN WITH CAUTION.						
72 KON M: Ar	3000-8000	8.00(+ 2)	-1.5	75500		

$NO_2 + O \rightarrow NO + O_2$						
NITROGEN OXIDE(NO_2) + OXYGEN ATOM						
73 BAU/DRY REACTION ORDER: 2.	300-550	1.0(+13)	0	300±100	0.8	1.3
76 ENG	1500-2500	1.0(+13)	0	500±250	0.5	2.0

$NO_2 + O + M \rightarrow NO_3 + M$						
NITROGEN OXIDE(NO_2) + OXYGEN ATOM						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
73 BAU/DRY REACTION ORDER: 2. M: N_2	295	1.1(+13)	-	-	0.4	2.5
NOTE: LIMITING HIGH PRESSURE k						
REACTION ORDER: 3.	295	2.3(+16)	-	-	0.4	2.5
k_0 (LOW PRESSURE).						

$NO_2 + O_3 \rightarrow NO_3 + O_2$						
NITROGEN OXIDE(NO_2) + OZONE						
73 BAU/DRY REACTION ORDER: 2.	286-302	5.9(+12)	0	3500	0.5	2.0

$NO_2 + H \rightarrow NO + OH$						
NITROGEN OXIDE(NO_2) + HYDROGEN ATOM						
73 BAU/DRY REACTION ORDER: 2.	298-630	3.5(+14)	0	740±500	0.5	1.5
NOTE: k FACTORS CHANGING TO: f = 0.5; F = 2.0 AT 633K.						
76 ENG	1500-2500	3.2(+14)	0	750±500	0.5	2.0

$NO_2 + OH + M \rightarrow HNO_3 + M$						
NITROGEN OXIDE(NO_2) + HYDROXYL FREE RADICAL						
73 BAU/DRY REACTION ORDER: 3. M: He	300	5.0(+17)	-	-	0.4	1.6

$NO_2 + N \rightarrow O + N_2O$						
NITROGEN OXIDE(NO_2) + NITROGEN ATOM						
76 ENG REACTION ORDER: 2.	1500-2500	5.0(+12)	0	0±1500	0.5	2.0

$NO_2 + N \rightarrow O_2 + N_2$						
NITROGEN OXIDE(NO_2) + NITROGEN ATOM						
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+12)	0	0±1500	0.5	2.0

$NO_2 + N \rightarrow NO + NO$						
NITROGEN OXIDE(NO_2) + NITROGEN ATOM						
76 ENG REACTION ORDER: 2.	1500-2500	4.0(+12)	0	0±1500	0.2	5.0

$NO_2 + NO \rightarrow O_2 + N_2O$						
NITROGEN OXIDE(NO_2) + NITROGEN OXIDE(NO)						
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+12)	0	30200	0.01	100.

$NO_2 + NO + O_2 \rightarrow NO_3 + NO_2$						
NITROGEN OXIDE(NO_2) + NITROGEN OXIDE(NO) + OXYGEN MOLECULE						
73 BAU/DRY REACTION ORDER: 3.	300-500	2.9(+ 7)	0	-400±500	0.4	2.5

$NO_2 + NO_2 \rightarrow NO + NO + O_2$						
NITROGEN OXIDE(NO_2)						
73 BAU/DRY REACTION ORDER: 2.	600-2000	2.0(+12)	0	13500±100	0.7	1.3
NOTE: k FACTORS INCREASING SLIGHTLY ABOVE 1000K.						

$NO_2 + NO_2 + M \rightarrow N_2O_4 + M$						
NITROGEN OXIDE(NO_2)						
73 BAU/DRY REACTION ORDER: 3. M: N_2	250-350	1.1(+13)	0	-1040	0.7	1.3
NOTE: CORRECTED k VALUE (PERSONAL COMMUNICATION FROM DR. FAULCH TO DR. BAMPSON). $k_1 = Kk_{-1}$						

$NO_2 + NO_3 \rightarrow NO + NO_2 + O_2$						
NITROGEN OXIDE(NO_2) + NITROGEN OXIDE(NO_3)						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F
73 BAU/DRY REACTION ORDER: 2.	300-850	1.4(+11)	0	1610±500	0.4	2.5
$NO_2 + NO_3 + M \rightarrow N_2O_5 + M$						
NITROGEN OXIDE(NO_2) + NITROGEN OXIDE(NO_3)						
73 BAU/DRY REACTION ORDER: 2.	300	2.3(+12)	-	-	0.4	2.5
NOTE: LIMITING HIGH PRESSURE k						
M IS A N_2O_5 + NO MIXTURE						
REACTION ORDER: 3.	300	1.0(+18)	-	-	0.5	2.0
k_0(LOW PRESSURE). M IS A N_2O_5 + NO MIXTURE.						
$NO_2 + NH \rightarrow NO + HNO$						
NITROGEN OXIDE(NO_2) + IMIDOGEN FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	2.0(+11)	0.5	2500±2500	0.3	3.2
$NO_2 + CO \rightarrow NO + CO_2$						
NITROGEN OXIDE(NO_2) + CARBON MONOXIDE						
72 KON REACTION ORDER: 2.	500-800	1.9(+12)	0	14726±385	0.5	1.9
76 ENG	1500-2500	2.00(+12)	0	15000±1500	0.5	2.0
$NO_2 + M \rightarrow NO + O + M$						
NITROGEN OXIDE(NO_2)						
73 BAU/DRY REACTION ORDER: 2. M: Ar	1400-2400	1.1(+16)	0	33000±750	0.8	1.3
$NO_3 + NO \rightarrow NO_2 + NO_2$						
NITROGEN OXIDE(NO_3) + NITROGEN OXIDE(NO)						
72 KON REACTION ORDER: 2.	298-547	1.5(+14)	0	1160±120	0.7	1.4
$NO_3 + NO_2 \rightarrow NO_2 + NO + O_2$						
NITROGEN OXIDE(NO_3) + NITROGEN OXIDE(NO_2)						
73 BAU/DRY REACTION ORDER: 2.	300-850	1.4(+11)	0	1600±500	0.4	2.5
$NO_3 + NO_2 + M \rightarrow N_2O_5 + M$						
NITROGEN OXIDE(NO_3) + NITROGEN OXIDE(NO_2)						
72 BAU/DRY REACTION ORDER: 2.	300	2.3(+12)	-	-	0.4	2.5
NOTE: LIMITING HIGH-PRESSURE k. M IS A N_2O_5 + NO MIXTURE.						
$k_1 = Kk_{-1}$						
REACTION ORDER: 3.	300	1.0(+18)	-	-	0.5	2.0
k_0(LOW PRESSURE). M IS A N_2O_5 + NO MIXTURE.						
$NO_3 + M \rightarrow NO + O_2 + M$						
NITROGEN OXIDE(NO_3)						
72 KON REACTION ORDER: 2. M: NO_2	500-1100	1.9(+11)	0	1990±110	0.8	1.3
$N_2O + O \rightarrow N_2 + O_2$						
NITROGEN OXIDE(N_2O) + OXYGEN ATOM						
73 BAU/DRY REACTION ORDER: 2.	1200-2000	1.0(+14)	0	14100±2000	0.4	2.5
$N_2O + O \rightarrow NO + NO$						
NITROGEN OXIDE(N_2O) + OXYGEN ATOM						
73 BAU/DRY REACTION ORDER: 2.	1200-2000	1.0(+14)	0	14000±1500	0.5	2.0
72 KON	900-2300	3.6(+13)	0	13700		
$N_2O + H \rightarrow N_2 + OH$						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
NITROGEN OXIDE(N_2O) + HYDROGEN ATOM						
73 BAU/DRY REACTION ORDER: 2.	700-2500	7.6(+13)	0	7600±500	0.5	1.5
$N_2O + H \rightarrow NO + NH$						
NITROGEN OXIDE(N_2O) + HYDROGEN ATOM						
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+11)	0.5	15100±2500	0.3	3.2
$N_2O + OH \rightarrow N_2 + HO_2$						
NITROGEN OXIDE(N_2O) + HYDROXYL FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	3.2(+13)	0	7550		
NOTE: k ESTIMATED.						
$N_2O + N \rightarrow N_2 + NO$						
NITROGEN OXIDE(N_2O) + NITROGEN ATOM						
76 ENG REACTION ORDER: 2.	1500-2500	5.0(+ 8)	0	5000±2500	0.3	3.2
$N_2O + NO \rightarrow N_2 + NO_2$						
NITROGEN OXIDE(N_2O) + NITROGEN OXIDE(NO)						
76 ENG REACTION ORDER: 2.	1500-2500	2.0(+14)	0	25165	0.1	10.
$N_2O + CO \rightarrow N_2 + CO_2$						
NITROGEN OXIDE(N_2O) + CARBON MONOXIDE						
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+11)	0	10000±1500	0.5	2.0
$N_2O + M \rightarrow N_2 + O + M$						
NITROGEN OXIDE(N_2O)						
73 BAU/DRY REACTION ORDER: 2.	1300-2500	5.0(+14)	0	29000±1500	0.7	1.5
$N_2O_4 \rightarrow NO_2 + NO_2$						
NITROGEN OXIDE(N_2O_4)						
70 BEN/O'N REACTION ORDER: 1.	253-301	1.0(+16)	0	6600		
$N_2O_4 + M \rightarrow NO_2 + NO_2 + M$						
NITROGEN OXIDE(N_2O_4)						
73 BAU/DRY REACTION ORDER: 2. M: N_2	250-350	2.5(+17)	0	5550±500	0.7	1.3
$N_2O_5 + M \rightarrow NO_2 + NO_3 + M$						
NITROGEN OXIDE (N_2O_5)						
73 BAU/DRY REACTION ORDER: 1.	300-340	5.7(+14)	0	10600	0.4	2.5
NOTE: LIMITING HIGH-PRESSURE k. M IS A N_2O_5 + NO MIXTURE. REACTION ORDER: 2.		1.3(+19)	0	9700	0.5	2.0
k_0(LOW PRESSURE). M IS A N_2O_5 + NO MIXTURE.						
$NH + O \rightarrow H + NO$						
IMIDOGEN FREE RADICAL + OXYGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$NH + O \rightarrow N + OH$						
IMIDOGEN FREE RADICAL + OXYGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	4000		
$NH + O + M \rightarrow HNO + M$						
IMIDOGEN FREE RADICAL + OXYGEN ATOM						

CHEMICAL REACTIONS	T/K	A	B	E/R (in ^{o}K)	k factors f	k factors F
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+16)	-0.5	0±2500	0.3	3.2
$NH + H \rightarrow B + NB$						
IMIDOGEN FREE RADICAL + HYDROGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$NH + H \rightarrow N + H_2$						
IMIDOGEN FREE RADICAL + HYDROGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	4000		
$NH + OH \rightarrow N + H_2O$						
IMIDOGEN FREE RADICAL + HYDROXYL FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	5.0(+11)	0.5	1000±2500	0.3	3.2
$NH + H_2O \rightarrow BNO + H_2$						
IMIDOGEN FREE RADICAL + WATER						
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+11)	0.5	1500±2500	0.3	3.2
$NH + S \rightarrow B + NS$						
IMIDOGEN FREE RADICAL + SULFUR ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$NH + S \rightarrow N + SB$						
IMIDOGEN FREE RADICAL + SULFUR ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	4000		
$NH + N \rightarrow B + N_2$						
IMIDOGEN FREE RADICAL + NITROGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$NH + N \rightarrow N + NH$						
IMIDOGEN FREE RADICAL + NITROGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	4000		
$NH + NO_2 \rightarrow BNO + NO$						
IMIDOGEN FREE RADICAL + NITROGEN OXIDE(NO_2)						
76 ENG REACTION ORDER: 2.	1500-2500	2.0(+11)	0.5	2500±2500	0.3	3.2
$NH + NH \rightarrow B_2 + N_2$						
IMIDOGEN FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+13)	0	0	0.1	10.
$NH + C \rightarrow B + CN$						
IMIDOGEN FREE RADICAL + CARBON ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$NH + C \rightarrow N + CB$						
IMIDOGEN FREE RADICAL + CARBON ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	4000		
$NH + CN \rightarrow N + HCN$						
IMIDOGEN FREE RADICAL + CYANOGEN FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+11)	0.5	1000±25000		

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F

$NH_2 + H + M \rightarrow NH_3 + M$						
AMIDOGEN FREE RADICAL + HYDROGEN ATOM						
73 BAU/DRY REACTION ORDER: 3. M: Ar	2000-3000	4.8(+14)	0	-8300±2500	0.5	2.0
NOTE: $k_1 = Kk_{-1}$						

$NH_3 + O \rightarrow NH_2 + OH$						
AMMONIA + OXYGEN ATOM						
73 BAU/DRY REACTION ORDER: 2.	300-1000	1.5(+12)	0	3020±300	0.5	1.5

$NH_3 + CH_3\cdot \rightarrow NH_2 + CH_4$						
AMMONIA + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	350-650	1.0(+11)	0	5100±500	0.3	1.3

$ND_3 + CH_3\cdot \rightarrow ND_2 + CH_3D$						
AMMONIA-D_3 + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	350-500	1.0(+11)	0	5535±500	0.3	1.3

$NH_3 + M \rightarrow H + NH_2 + M$						
AMMONIA						
73 BAU/DRY REACTION ORDER: 2. M: Ar	2000-3000	9.2(+15)	0	42400±2500	0.5	2.0

$NH_2NH_2 + H \rightarrow NH_2NH\cdot + H_2$						
HYDRAZINE + HYDROGEN ATOM						
73 BAU/DRY REACTION ORDER: 2.	250-500	1.3(+13)	0	1260±100	0.5	2.0

$NH_2NH_2 + CH_3\cdot \rightarrow NH_2NH\cdot + CH_4$						
HYDRAZINE + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	350-500	1.0(+11)	0	2515±500	0.5	2.0

$ND_2ND_2 + CH_3\cdot \rightarrow ND_2ND\cdot + CH_3D$						
HYDRAZINE-D4 + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	350-500	7.2(+10)	0	3200±500	0.5	2.0

$NH_2NH_2 + M \rightarrow NH_2\cdot + NH_2\cdot + M$						
HYDRAZINE						
73 BAU/DRY REACTION ORDER: 2. M: Ar	1250-1400	8.0(+13)	0	27700±1000	0.3	3.0
NOTE: LIMITING HIGH PRESSURE k.						

$NH_2NH_2 + M \rightarrow NH_2\cdot + NH_2\cdot + M$						
HYDRAZINE						
73 BAU/DRY REACTION ORDER: 2. M: Ar	1250-1400	4.0(+15)	0	20600±1000	0.3	3.0
NOTE: k_0(LOW PRESSURE).						

$HN_3 + CH_3\cdot \rightarrow N_3\cdot + CH_4$						
HYDRAZOIC ACID + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	300-400	1.0(+11)	0	2100±500	0.5	2.0
NOTE: TENTATIVE k VALUE.						

$HNO + O \rightarrow H + NO_2$						
NITROSYL HYDRIDE + OXYGEN ATOM						
76 ENG REACTION ORDER: 2.	1500-2500	5.0(+10)	0.5	0±2500	0.3	3.2

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F
HNO + O → NO + OH						
NITROSYL HYDRIDE + OXYGEN ATOM						
76 ENG REACTION ORDER: 2.	1500-2500	5.0(+11)	0.5	0±2500	0.3	3.2
HNO + O → NH + O_2						
NITROSYL HYDRIDE + OXYGEN ATOM						
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+11)	0.5	3500±2500	0.3	3.2
HNO + H → NO + H_2						
NITROSYL HYDRIDE + HYDROGEN ATOM						
73 BAU/DRY REACTION ORDER: 2.	2000	4.8(+12)	-	-	0.5	1.5
HNO + H → NH + OH						
NITROSYL HYDRIDE + HYDROGEN ATOM						
76 ENG REACTION ORDER: 2.	1500-2500	2.0(+11)	0.5	11600±2500	0.3	3.2
HNO + OH → NO + H_2O						
NITROSYL HYDRIDE + HYDROXYL FREE RADICAL						
73 BAU/DRY REACTION ORDER: 2.	2000	3.6(+13)	-	-	0.5	1.5
HNO + N → NO + NH						
NITROSYL HYDRIDE + NITROGEN ATOM						
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+11)	0.5	1000±2500	0.3	3.2
HNO + N → N_2O + H						
NITROSYL HYDRIDE + NITROGEN ATOM						
76 ENG REACTION ORDER: 2.	1500-2500	5.0(+10)	0.5	1500±2500	0.3	3.2
HNO + NO → OH + N_2O						
NITROSYL HYDRIDE + NITROGEN OXIDE(NO)						
76 ENG REACTION ORDER: 2.	1500-2500	2.0(+12)	0	13100±2500	0.5	2.0
HNO + CO → NH + CO_2						
NITROSYL HYDRIDE + CARBON MONOXIDE						
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+11)	0.5	3500±2500	0.3	3.2
HNO + CH → NO + CH_2						
NITROSYL HYDRIDE + METHYLIDYNE FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	6.3(+11)	0.5	0±2500	0.3	3.2
HNO + CH_2 → NO + CH_3.						
NITROSYL HYDRIDE + METHYLENE FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	6.3(+11)	0.5	0±2500	0.3	3.2
HNO + CH_3. → NO + CH_4						
NITROSYL HYDRIDE + METHYL FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	5.0(+11)	0.5	0±2500	0.3	3.2
HNO + .CHO → NO + HCHO						
NITROSYL HYDRIDE + METHYL, OXO-, FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	3.2(+11)	0.5	0±2500	0.3	3.2
HNO + CN → NO + HCN						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
NITROSYL HYDRIDE + CYANOGEN FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	4.00(+11)	0.5	0±2500	0.3	3.2
$HNO_3 + OH \rightarrow NO_3 + H_2O$						
NITRIC ACID + HYDROXYL FREE RADICAL						
73 BAU/DRY REACTION ORDER: 2.	300	8.0(+10)	-	-	0.5	2.0
$HNO_3 + M \rightarrow NO_2 + OH + M$						
NITRIC ACID						
73 BAU/DRY REACTION ORDER: 2. M: Ar	800-1200	1.6(+15)	0	15400±1500	0.4	2.5
NS + O → S + NO						
NITROGEN SULFIDE(NS) + OXYGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
NS + O → N + SO						
NITROGEN SULFIDE(NS) + OXYGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	4000		
NS + H → S + NH						
NITROGEN SULFIDE(NS) + HYDROGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		2.5(+12)	0.5	20735		
NS + H → N + SH						
NITROGEN SULFIDE(NS) + HYDROGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		2.5(+12)	0.5	15700		
NS + S → S + NS						
NITROGEN SULFIDE(NS) + SULFUR ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
NS + S → N + S_2						
NITROGEN SULFIDE(NS) + SULFUR ATOM						
75 BEN/GOL REACTION ORDER: 2.		2.0(+11)	0.5	10870		
NS + N → S + N_2						
NITROGEN SULFIDE(NS) + NITROGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
NS + N → N + NS						
NITROGEN SULFIDE(NS) + NITROGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	4000		
NS + C → S + •CN						
NITROGEN SULFIDE(NS) + CARBON ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
NS + C → N + CS						
NITROGEN SULFIDE(NS) + CARBON ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	4000		
C + O + M → CO + M						
CARBON ATOM + OXYGEN ATOM						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
76 BAU/DRY REACTION ORDER: 3. NOTE: M = Ar, OR CO $k_1 = Kk_{-1}$	7000-14000	3.3(+26)	-3.1	-2114	0.3	1.8
$C + O_2 \rightarrow CO + O$						
CARBON ATOM + OXYGEN MOLECULE						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$C + H_2 \rightarrow CH + H$						
CARBON ATOM + HYDROGEN MOLECULE						
75 BEN/GOL REACTION ORDER: 2.		1.6(+12)	0.5	15700		
$C + OH \rightarrow CO + H$						
CARBON ATOM + HYDROXYL FREE RADICAL						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$C + OH \rightarrow CH + O$						
CARBON ATOM + HYDROXYL FREE RADICAL						
75 BEN/GOL REACTION ORDER: 2.		7.9(+11)	0.5	14800		
$C + S_2 \rightarrow CS + S$						
CARBON ATOM + SULFUR DIMER						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$C + SO \rightarrow CO + S$						
CARBON ATOM + SULFUR MONOXIDE						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$C + SO \rightarrow CS + O$						
CARBON ATOM + SULFUR MONOXIDE						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$C + SH \rightarrow CH + S$						
CARBON ATOM + MERCAPTO FREE RADICAL						
75 BEN/GOL REACTION ORDER: 2.		4.0(+11)	0.5	6090		
$C + SH \rightarrow CS + H$						
CARBON ATOM + MERCAPTO FREE RADICAL						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$C + N_2 \rightarrow CN + N$						
CARBON ATOM + NITROGEN MOLECULE						
75 BEN/GOL REACTION ORDER: 2.		1.3(+12)	0.5	22750		
$C + NO \rightarrow CO + N$						
CARBON ATOM + NITROGEN OXIDE(NO)						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	4000		
$C + NO \rightarrow CN + O$						
CARBON ATOM + NITROGEN OXIDE(NO)						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$C + NH \rightarrow CH + N$						
CARBON ATOM + IMIDOGEN FREE RADICAL						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
75 BEN/GGL REACTION ORDER: 2.		6.3(+11)	0.5	4000		

$C + NH \rightarrow CN + H$						
CARBON ATOM + IMIDOGEN FREE RADICAL						
75 BEN/GGL REACTION ORDER: 2.		6.3(+11)	0.5	0		

$C + NS \rightarrow CS + N$						
CARBON ATOM ATOM + NITRIC SULFIDE						
75 BEN/GGL REACTION ORDER: 2.		6.3(+11)	0.5	4000		

$C + NS \rightarrow CN + S$						
CARBON ATOM + NITRIC SULFIDE						
75 BEN/GGL REACTION ORDER: 2.		6.3(+11)	0.5	0		

$C + CO \rightarrow C_2 + O$						
CARBON ATOM + CARBON MONOXIDE						
75 BEN/GGL REACTION ORDER: 2.		1.0(+12)	0.5	58025		

$C + CH \rightarrow CH + C$						
CARBON ATOM + METHYLIDYNE FREE RADICAL						
75 BEN/GGL REACTION ORDER: 2.		6.3(+11)	0.5	4000		

$C + CH \rightarrow C_2 + H$						
CARBON ATOM + METHYLIDYNE FREE RADICAL						
75 BEN/GGL REACTION ORDER: 2.		6.3(+11)	0.5	0		

$C + CS \rightarrow CS + C$						
CARBON ATOM + CARBON MONOSULFIDE FREE RADICAL						
75 BEN/GGL REACTION ORDER: 2.		6.3(+11)	0.5	0		

$C + CS \rightarrow C_2 + S$						
CARBON ATOM + CARBON MONOSULFIDE FREE RADICAL						
75 BEN/GGL REACTION ORDER: 2.		5.0(+11)	0.5	20435		

$C + CN \rightarrow CN + C$						
CARBON ATOM + CYANOGEN FREE RADICAL						
75 BEN/GGL REACTION ORDER: 2.		6.3(+11)	0.5	0		

$C + CN \rightarrow C_2 + N$						
CARBON ATOM + CYANOGEN FREE RADICAL						
75 BEN/GGL REACTION ORDER: 2.		2.5(+11)	0.5	19300		

$C + C_2 \rightarrow C_2 + C$						
CARBON ATOM + CARBON DIMER						
75 BEN/GGL REACTION ORDER: 2.		6.3(+11)	0.5	0		

$CO + O \rightarrow O + CO$						
CARBON MONOXIDE + OXYGEN ATOM						
75 BEN/GGL REACTION ORDER: 2.		6.3(+11)	0.5	0		

$CO + O + M \rightarrow CO_2 + M$						
CARBON MONOXIDE + OXYGEN ATOM						
76 BAU/DRY REACTION ORDER: 3. M: CO	250-500	2.4(+15)	0	2180±280	0.8	1.2

CHEMICAL REACTIONS	T/K	A	B	E/R (in ^{o}K)	k factors f	F
NOTE: k FACTORS CHANGING TO: f = 0.5; F = 2.0 AT 500K.						

$CO + O \rightarrow C + O_2$						
CARBON MONOXIDE + OXYGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		1.0(+12)	0.5	69300		

$CO + O_2 \rightarrow CO_2 + O$						
CARBON MONOXIDE + OXYGEN MOLECULE						
76 BAU/DRY REACTION ORDER: 2.	1500-3000	2.5(+12)	0	24000±2500	0.5	2.0
NOTE: k FACTORS CHANGING TO: f = 0.5; F = 1.5 AT 3000K.						

$CO + H \rightarrow O + CH$						
CARBON MONOXIDE + HYDROGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		2.5(+13)	0.5	88020		

$CO + H \rightarrow C + OH$						
CARBON MONOXIDE + HYDROGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		2.0(+13)	0.5	77755		

$CO + H + M \rightarrow \cdot CHO + M$						
CARBON MONOXIDE + HYDROGEN ATOM						
76 BAU/DRY REACTION ORDER: 3. M: H_2	298-773	7.2(+14)	0	850±500	0.7	1.3
NOTE: k FACTORS CHANGING TO: f = 0.5; F = 2.0 AT 773K.						

$CO + H + M \rightarrow \cdot CHO + M$						
CARBON MONOXIDE + HYDROGEN ATOM						
76 ENG REACTION ORDER: 3.	1500-2500	1.6(+20)	-1.5	0	0.3	3.2

$CO + OH \rightarrow CO_2 + H$						
CARBON MONOXIDE + HYDROXYL FREE RADICAL						
76 BAU/DRY REACTION ORDER: 2.	250-2000	1.5(+ 7)	1.3	-385	0.8	1.2
NOTE: k FACTORS OVER 1000K: f = 0.5; F = 1.5.						
RECOMMENDED k FOR 250-2500K:						
$\log k(cm^3 mole^{-1} s^{-1}) = 10.83 + 3.94 \times 10^{-4} T$						

$CO + HO_2 \rightarrow CO_2 + OH$						
CARBON MONOXIDE + HYDROPEROXYL FREE RADICAL						
76 BAU/DRY REACTION ORDER: 2.	700-1000	1.5(+14)	0	11900±1000	0.3	3.0

$CO + S \rightarrow O + CS$						
CARBON MONOXIDE + SULFUR ATOM						
75 BEN/GOL REACTION ORDER: 2.		1.3(+12)	0.5	37600		

$CO + S \rightarrow C + SO$						
CARBON MONOXIDE + SULFUR ATOM						
75 BEN/GOL REACTION ORDER: 2.		4.0(+12)	0.5	66530		

$CO + N \rightarrow O + CN$						
CARBON MONOXIDE + NITROGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		3.2(+12)	0.5	38800		

$CO + N \rightarrow C + NO$						
CARBON MONOXIDE + NITROGEN ATOM						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
75 BEN/GOL REACTION ORDER: 2.		5.0(+12)	0.5	57300		

$CO + NO_2 \rightarrow CO_2 + NO$						
CARBON MONOXIDE + NITROGEN OXIDE(NO_2)						
72 KON REACTION ORDER: 2.	500-800	1.9(+12)	0	14726±385	0.5	1.9
76 ENG	1500-2500	2.0(+12)	0	15000±1500	0.5	2.0

$CO + N_2O \rightarrow CO_2 + N_2$						
CARBON MONOXIDE + NITROGEN OXIDE(N_2O)						
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+11)	0	10000±1500	0.5	2.0

$CO + HNO \rightarrow CO_2 + NH$						
CARBON MONOXIDE + NITROSYL HYDRIDE						
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+11)	0.5	3500±2500	0.3	3.2

$CO + C \rightarrow O + C_2$						
CARBON MONOXIDE + CARBON ATOM						
75 BEN/GOL REACTION ORDER: 2.		1.0(+12)	0.5	58025		

$CO + CH_3\cdot \rightarrow CH_3C(O)\cdot$						
CARBON MONOXIDE + METHYL FREE RADICAL						
72 KON REACTION ORDER: 2.	273-400	3.8(+8)	0	1965		

$CO + M \rightarrow C + O + M$						
CARBON MONOXIDE						
76 BAU/DRY REACTION ORDER: 2.	7000-15000	8.8(+29)	-3.5	128700±1800	0.3	1.8
NOTE: k FACTORS CHANGING TO: f = 0.5; F = 1.5 OVER 10000K. M = Ar OR CO						

$CO_2 + O \rightarrow CO + O_2$						
CARBON DIOXIDE + OXYGEN ATOM						
76 BAU/DRY REACTION ORDER: 2.	1500-3000	1.7(+13)	0	26500±2500	0.5	2.0
NOTE: k FACTORS CHANGING TO: f = 0.5; F = 1.5 AT 3000K. $k_1 = Ek_{-1}$						

$CO_2 + H \rightarrow CO + OH$						
CARBON DIOXIDE + HYDROGEN ATOM						
76 BAU/DRY REACTION ORDER: 2.	1000-3000	1.5(+14)	0	13300±150	0.8	1.2

$CO_2 + H_2 \rightarrow CO + H_2O$						
CARBON DIOXIDE + HYDROGEN MOLECULE						
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+9)	0.5	7550±2500	0.3	3.2

$CO_2 + N \rightarrow CO + NO$						
CARBON DIOXIDE + NITROGEN ATOM						
76 ENG REACTION ORDER: 2.	1500-2500	2.0(+11)	0.5	15000±10000	0.1	1.0

$CO_2 + CH \rightarrow CO + \cdot CHO$						
CARBON DIOXIDE + METHYLIDYNE FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+10)	0.5	3000±2500	0.3	3.2

$CO_2 + M \rightarrow CO + O + M$						
CARBON DIOXIDE						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+15)	0	50000±2500	0.5	2.0
CH + O → H + CO METHYLIDYNE FREE RADICAL + OXYGEN ATOM 75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
CH + O → C + OH METHYLIDYNE FREE RADICAL + OXYGEN ATOM 75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	4000		
CH + O + M → •CHO + M METHYLIDYNE FREE RADICAL + OXYGEN ATOM 76 ENG REACTION ORDER: 3.	1500-2500	1.0(+16)	-0.5	0±2500	0.3	3.2
CH + O_2 → •CHO + O METHYLIDYNE FREE RADICAL + OXYGEN MOLECULE 76 ENG REACTION ORDER: 2.	1500-2500	5.0(+11)	0.5	3000±2500	0.3	3.2
CH + H → H + CH METHYLIDYNE FREE RADICAL + HYDROGEN ATOM 75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
CH + H → C + H_2 METHYLIDYNE FREE RADICAL + HYDROGEN ATOM 75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	4000		
CH + H + M → CH_2 + M METHYLIDYNE FREE RADICAL + HYDROGEN ATOM 76 ENG REACTION ORDER: 3.	1500-2500	1.00(+19)	-1.0	0	0.3	3.2
CH + OH → •CHO + H METHYLIDYNE FREE RADICAL + HYDROPEROXYL FREE RADICAL 76 ENG REACTION ORDER: 2.	1500-2500	5.0(+11)	0.5	5000±2500	0.3	3.2
CH + HO_2 → CH_2 + O_2 METHYLIDYNE FREE RADICAL + HYDROPEROXYL FREE RADICAL 76 ENG REACTION ORDER: 2.	1500-2500	1.0(+10)	0.5	7550±2500	0.3	3.2
CH + HO_2 → •CHO + OH METHYLIDYNE FREE RADICAL + HYDROPEROXYL FREE RADICAL 76 ENG REACTION ORDER: 2.	1500-2500	5.0(+11)	0.5	3000±2500	0.3	3.2
CH + S → H + CS METHYLIDYNE FREE RADICAL + SULFUR ATOM 75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
CH + S → C + SH METHYLIDYNE FREE RADICAL + SULFUR ATOM 75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	4000		
CH + N → H + CN METHYLIDYNE FREE RADICAL + NITROGEN ATOM 75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		

CHEMICAL REACTIONS	T/K	A	B	E/R (in ^{o}K)	k factors f	F
$CH + N \rightarrow C + NH$ METHYLIDYNE FREE RADICAL + NITROGEN ATOM 75 BHN/GOL REACTION ORDER: 2.		1.0(+12)	0.5	6995		
$CH + N_2 \rightarrow CN + NH$ METHYLIDYNE FREE RADICAL + NITROGEN MOLECULE 76 ENG REACTION ORDER: 2. NOTE: k ESTIMATED.	1500-2500	3.2(+14)	0	46300±10000		
$CH + N_2 \rightarrow HCN + N$ METHYLIDYNE FREE RADICAL + NITROGEN MOLECULE 76 ENG REACTION ORDER: 2. NOTE: REVISED ESTIMATE.	1500-2500	1.0(+11)	0	9560		
$CH + NO \rightarrow \cdot CHO + N$ METHYLIDYNE FREE RADICAL + NITROGEN OXIDE(NO) 76 ENG REACTION ORDER: 2. NOTE: k ESTIMATED.	1500-2500	1.6(+13)	0	5000±3000		
$CH + NO \rightarrow HCN + O$ METHYLIDYNE FREE RADICAL + NITROGEN OXIDE(NO) 76 ENG REACTION ORDER: 2. NOTE: k ESTIMATED.	1500-2500	2.0(+12)	0	0±1000		
$CH + HNO \rightarrow CH_2 + NO$ METHYLIDYNE FREE RADICAL + NITROSYL HYDRIDE 76 ENG REACTION ORDER: 2.	1500-2500	6.3(+11)	0.5	0±2500	0.3	3.2
$CH + C \rightarrow H + C_2$ METHYLIDYNE FREE RADICAL + CARBON ATOM 75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$CH + C \rightarrow C + CH$ METHYLIDYNE FREE RADICAL + CARBON ATOM 75 BHN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	4000		
$CH + CO_2 \rightarrow \cdot CHO + CO$ METHYLIDYNE FREE RADICAL + CARBON DIOXIDE 76 ENG REACTION ORDER: 2.	1500-2500	1.0(+10)	0.5	3000±2500	0.3	3.2
$CH + CH_4 \rightarrow CH_2 + CH_3\cdot$ METHYLIDYNE FREE RADICAL + METHANE 76 ENG REACTION ORDER: 2.	1500-2500	2.5(+11)	0.7	3000±2500	0.3	3.2
$CH + \cdot CHO \rightarrow CH_2 + CO$ METHYLIDYNE FREE RADICAL + METHYL, OXO-, FREE RADICAL 76 ENG REACTION ORDER: 2.	1500-2500	3.2(+10)	0.7	500±2500	0.3	3.2
$CH + HCHO \rightarrow CH_2 + \cdot CHO$ METHYLIDYNE FREE RADICAL + FORMALDEHYDE 76 ENG REACTION ORDER: 2.	1500-2500	1.0(+11)	0.7	2000±2500	0.3	3.2

CHEMICAL REACTIONS	T/K	A	B	E/R (in ^{o}K)	k factors f	F
CH_2 • O → CH • OH METHYLENE FREE RADICAL • OXYGEN ATOM 76 ENG REACTION ORDER: 2.	1500-2500	2.0(+11)	0.7	13000±2500	0.3	3.2
CH_2 • O → •CHO • H METHYLENE FREE RADICAL • OXYGEN ATOM 76 ENG REACTION ORDER: 2.	1500-2500	5.0(+11)	0.5	2000±2500	0.3	3.2
CH_2 • O_2 → HCHO • O METHYLENE FREE RADICAL • OXYGEN ATOM 76 ENG REACTION ORDER: 2.	1500-2500	5.0(+11)	0.5	3500±2500	0.3	3.2
CH_2 • H → CH • H_2 METHYLENE FREE RADICAL • HYDROGEN ATOM 76 ENG REACTION ORDER: 2.	1500-2500	3.2(+11)	0.7	2500±2500	0.3	3.2
CH_2 • H_2 → CH_3• • H METHYLENE FREE RADICAL • HYDROGEN MOLECULE 76 ENG REACTION ORDER: 2. NOTE: k ESTIMATED.	1500-2500	3.2(+12)	0	3525±1500		
CH_2 • OH → CH • H_2O METHYLENE FREE RADICAL • HYDROXYL FREE RADICAL 76 ENG REACTION ORDER: 2.	1500-2500	5.0(+11)	0.5	3000±2500	0.3	3.2
CH_2 • OH → CH_3• • O METHYLENE FREE RADICAL • HYDROXYL FREE RADICAL 76 ENG REACTION ORDER: 2.	1500-2500	5.0(+11)	0.5	3000±2500	0.3	3.2
CH_2 • OH → HCHO • H METHYLENE FREE RADICAL • HYDROXYL FREE RADICAL 76 ENG REACTION ORDER: 2. NOTE: k ESTIMATED.	1500-2500	1.0(+13)	0	2500		
CH_2 • N → CH • NH METHYLENE FREE RADICAL • NITROGEN ATOM 76 ENG REACTION ORDER: 2.	1500-2500	6.3(+11)	0.7	20400±2500	0.3	3.2
CH_2 • N_2 → HCN • NH METHYLENE FREE RADICAL • NITROGEN MOLECULE 76 ENG REACTION ORDER: 2. NOTE: k ESTIMATED.	1500-2500	1.0(+14)	0	35230±10000		
CH_2 • NO → HCHO • N METHYLENE FREE RADICAL • NITROGEN OXIDE(NO) 76 ENG REACTION ORDER: 2. NOTE: k ESTIMATED.	1500-2500	2.0(+12)	0	3500±2000		
CH_2 • HNO → CH_3• • NO METHYLENE FREE RADICAL • NITROSYL HYDRIDE 76 ENG REACTION ORDER: 2.	1500-2500	6.3(+11)	0.5	0±2500	0.3	3.2
CH_2 • CH_2 → CH • CH_3•						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F
METHYLENE FREE RADICAL 76 ENG REACTION ORDER: 2.	1500-2500	5.0(+11)	0.5	3000±2500	0.3	3.2
CH_2 + CH_4 → CH_3. + CH_3. METHYLENE FREE RADICAL + METHANE 76 ENG REACTION ORDER: 2.	1500-2500	1.3(+12)	0.7	10000±2500	0.3	3.2
CH_2 + .CHO → CH_3. + CO METHYLENE FREE RADICAL + METHYL, OXO-, FREE RADICAL 76 ENG REACTION ORDER: 2.	1500-2500	3.2(+10)	0.7	500±2500	0.3	3.2
CH_2 + HCHO → CH_3. + CHO METHYLENE FREE RADICAL + FORMALDEHYDE 76 ENG REACTION ORDER: 2. NOTE: k ESTIMATED.	1500-2500	2.0(+11)	0	3270±1500		
CH_2 + CN → CH + HCN METHYLENE FREE RADICAL + CYANOGEN FREE RADICAL 76 ENG REACTION ORDER: 2. NOTE: k ESTIMATED.	1500-2500	3.2(+12)	0	2500±1500		
$^1CH_2$ + $CH_3CH=CH_2$ → products METHYLENE FREE RADICAL + 1-PROPENE 72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 1.27 NOTE: k_{ref}: $^1CH_2$ + $CH_2=CH_2$	297	-	-	-		
$^3CH_2$ + $CH_3CH=CH_2$ → products METHYLENE FREE RADICAL + 1-PROPENE 72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 1.0 NOTE: k_{ref}: $^3CH_2$ + $CH_2=CH_2$	297	-	-	-		
$^1CH_2$ + $CH_3CH_2CH=CH_2$ → products METHYLENE FREE RADICAL + 1-BUTENE 72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 1.63 NOTE: k_{ref}: $^1CH_2$ + $CH_2=CH_2$	297	-	-	-		
$^3CH_2$ + $CH_3CH_2CH=CH_2$ → products METHYLENE FREE RADICAL + 1-BUTENE 72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 1.6 NOTE: k_{ref}: $^3CH_2$ + $CH_2=CH_2$	297	-	-	-		
$^1CH_2$ + cis-$CH_3CH=CHCH_3$ → products METHYLENE FREE RADICAL + cis-2-BUTENE 72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 1.37 NOTE: k_{ref}: $^1CH_2$ + $CH_2=CH_2$	297	-	-	-		
$^3CH_2$: + cis-$CH_3CH=CHCH_3$ → products METHYLENE FREE RADICAL + cis-2-BUTENE 72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 0.94 NOTE: k_{ref}: $^3CH_2$ + $CH_2=CH_2$	297	-	-	-		

CHEMICAL REACTIONS	T/K	A	B	E/R (in ^{o}K)	k factors f	F
$^{1}CH_2$ + trans-$CH_3CH{=}CHCH_3$ → products METHYLENE FREE RADICAL + trans-2-BUTENE 72 KEB/PAR REACTION ORDER: 2. k/k_{ref}: 1.39 NOTE: k_{ref}: $^{1}CH_2$ + $CH_2{=}CH_2$	297	-	-	-		
$^{3}CH_2$ + trans-$CH_3CH{=}CHCH_3$ → products METHYLENE FREE RADICAL + trans-2-BUTENE 72 KEB/PAR REACTION ORDER: 2. k/k_{ref}: 0.89 NOTE: k_{ref}: $^{3}CH_2$ + $CH_2{=}CH_2$	297	-	-	-		
$^{1}CH_2$ + $(CH_3)_2C{=}CH_2$ → products METHYLENE FREE RADICAL + 1-PROPENE, 2-METHYL- 72 KEB/PAR REACTION ORDER: 2. k/k_{ref}: 1.96 NOTE: k_{ref}: $^{1}CH_2$ + $CH_2{=}CH_2$	297	-	-	-		
$^{3}CH_2$ + $(CH_3)_2C{=}CH_2$ → products METHYLENE FREE RADICAL + 1-PROPENE, 2-METHYL- 72 KEB/PAR REACTION ORDER: 2. k/k_{ref}: 2.86 NOTE: k_{ref}: $^{3}CH_2$ + $CH_2{=}CH_2$	297	-	-	-		
$^{1}CH_2$ + $(CH_3)_2C{=}CHCH_3$ → products METHYLENE FREE RADICAL + 2-BUTENE, 2-METHYL- 72 KEB/PAR REACTION ORDER: 2. k/k_{ref}: 2.12 NOTE: k_{ref}: $^{1}CH_2$ + $CH_2{=}CH_2$	297	-	-	-		
$^{3}CH_2$ + $(CH_3)_2C{=}CHCH_3$ → products METHYLENE FREE RADICAL + 2-BUTENE, 2-METHYL- 72 KEB/PAR REACTION ORDER: 2. k/k_{ref}: 1.83 NOTE: k_{ref}: $^{3}CH_2$ + $CH_2{=}CH_2$	297	-	-	-		
$^{1}CH_2$ + $(CH_3)_2C{=}C(CH_3)_2$ → products METHYLENE FREE RADICAL + 2-BUTENE, 2,3-DIMETHYL- 72 KEB/PAR REACTION ORDER: 2. k/k_{ref}: 2.16 NOTE: k_{ref}: $^{1}CH_2$ + $CH_2{=}CH_2$	297	-	-	-		
$^{3}CH_2$ + $(CH_3)_2C{=}C(CH_3)_2$ → products METHYLENE FREE RADICAL + 2-BUTENE, 2,3-DIMETHYL- 72 KEB/PAR REACTION ORDER: 2. k/k_{ref}: 2.74 NOTE: k_{ref}: $^{3}CH_2$ + $CH_2{=}CH_2$	297	-	-	-		
CH_3. + O → HCHO + H METHYL FREE RADICAL + OXYGEN ATOM 76 ENG REACTION ORDER: 2.	1500-2500	5.0(+13)	0	0	0.5	2.0
CH_3. + O_2 → CH_2 + HO_2 METHYL FREE RADICAL + OXYGEN MOLECULE 76 ENG REACTION ORDER: 2. NOTE: k ESTIMATED.	1500-2500	3.2(+12)	0	34975±1500		

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F
$CH_3\bullet + O_2 \rightarrow HCHO + OH$ METHYL FREE RADICAL + OXYGEN MOLECULE 76 ENG REACTION ORDER: 2.	1500-2500	3.2(+13)	0	10000±5000	0.3	3.2
$CH_3\bullet + O_2 \rightarrow CH_3O\bullet + O$ METHYL FREE RADICAL + OXYGEN MOLECULE 76 ENG REACTION ORDER: 2. NOTE: k ESTIMATED.	1500-2500	3.2(+12)	0	15100±1500		
$CH_3\bullet + H_2 \rightarrow CH_4 + H\bullet$ METHYL FREE RADICAL + HYDROGEN MOLECULE 72 KER/PAR REACTION ORDER: 2.	370-700	8.5(+11)	0	5500±500	0.7	1.3
$CH_3\bullet + HD \rightarrow CH_3D + H\bullet$ METHYL FREE RADICAL + DEUTERIUM HYDRIDE 76 KER/PAR REACTION ORDER: 2.	400-700	2.4(+11)	0	5635±500	0.5	1.5
$CH_3\bullet + HD \rightarrow CH_4 + D\bullet$ METHYL FREE RADICAL + DEUTERIUM HYDRIDE 76 KER/PAR REACTION ORDER: 2.	400-700	2.1(+11)	0	5300±500	0.5	1.5
$CH_3\bullet + D_2 \rightarrow CH_3D + D\bullet$ METHYL FREE RADICAL + DEUTERIUM MOLECULE 76 KER/PAR REACTION ORDER: 2.	300-700	7.1(+11)	0	5990±250	0.7	1.3
$CD_3\bullet + H_2 \rightarrow CD_3H + H\bullet$ METHYL-D_3 FREE RADICAL + HYDROGEN MOLECULE 72 KGN REACTION ORDER: 2.	400-570	7.4(+11)	0	5250±235	0.6	1.7
$CH_3\bullet + OH \rightarrow CH_2 + H_2O$ METHYL FREE RADICAL + HYDROXYL FREE RADICAL 76 ENG REACTION ORDER: 2.	1500-2500	6.3(+10)	0.4	1000±2500	0.3	3.2
$CH_3\bullet + OH \rightarrow CH_3O\bullet + H$ METHYL FREE RADICAL + HYDROXYL FREE RADICAL 76 ENG REACTION ORDER: 2. NOTE: k ESTIMATED.	1500-2500	6.3(+12)	0	0		
$CH_3\bullet + HO_2 \rightarrow CH_4 + O_2$ METHYL FREE RADICAL + HYDROPEROXYL FREE RADICAL 76 ENG REACTION ORDER: 2.	1500-2500	1.0(+11)	0.5	3000±2500	0.3	3.2
$CH_3\bullet + H_2O \rightarrow CH_4 + \bullet OH$ METHYL FREE RADICAL + WATER 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	1273-1773	7.1(+12)	0	12900±1000	0.5	2.0
$CH_3\bullet + H_2S \rightarrow CH_4 + SH$ METHYL FREE RADICAL + HYDROGEN SULFIDE 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	300-600	2.0(+11)	0	2065±750	0.4	2.5
$CH_3\bullet + NH_3 \rightarrow CH_4 + NH_2$						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
METHYL FREE RADICAL + AMMONIA 76 KER/PAR REACTION ORDER: 2.	350-650	1.0(+11)	0	5100±500	0.3	1.8
$CH_3\bullet + ND_3 \rightarrow CH_3D + ND_2$ METHYL FREE RADICAL + AMMONIA-d_3 76 KER/PAR REACTION ORDER: 2.	350-500	1.0(+11)	0	5535±500	0.3	1.8
$CH_3\bullet + NH_2NH_2 \rightarrow CH_4 + NH_2NH\bullet$ METHYL FREE RADICAL + HYDRAZINE 76 KER/PAR REACTION ORDER: 2.	350-500	1.0(+11)	0	2500±500	0.5	2.0
$CH_3\bullet + ND_2ND_2 \rightarrow CH_3D + ND_2ND\bullet$ METHYL FREE RADICAL + HYDRAZINE-d_4 76 KER/PAR REACTION ORDER: 2.	350-500	7.2(+10)	0	3200±500	0.5	2.0
$CH_3\bullet + HN_3 \rightarrow CH_4 + N_3$ METHYL FREE RADICAL + HYDRAZOIC ACID 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	300-400	1.0(+11)	0	2100±500	0.5	2.0
$CH_3\bullet + HNO \rightarrow CH_4 + NO$ METHYL FREE RADICAL + NITROSYL HYDRIDE 76 KER/PAR REACTION ORDER: 2.	1500-2500	5.0(+11)	0.5	0±2500	0.3	3.2
$CH_3\bullet + CO \rightarrow CH_3C(O)\bullet$ METHYL FREE RADICAL + CARBON MONOXIDE 72 KGN REACTION ORDER: 2.	273-400	3.8(+8)	0	1968		
$CH_3\bullet + CH_4 \rightarrow CH_4 + CH_3\bullet$ METHYL FREE RADICAL + METHANE 76 KER/PAR REACTION ORDER: 2.	450-800	4.0(+11)	0	7045±250	0.7	1.3
$CH_3\bullet + CHD_3 \rightarrow CH_4 + CD_3\bullet$ METHYL FREE RADICAL + METHANE-d_3 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	400-650	1.1(+11)	0	6995±250	0.7	1.3
$CH_3\bullet + CD_4 \rightarrow CH_3D + CD_3\bullet$ METHYL FREE RADICAL + METHANE-d_4 76 KER/PAR REACTION ORDER: 2.	400-650	2.5(+11)	0	7700±500	0.5	1.5
$CD_3\bullet + CH_3D \rightarrow CD_4 + CH_3\bullet$ METHYL-d_3-FREE RADICAL + METHANE-d 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	400-650	5.0(+10)	0	7200±500	0.5	1.5
$CD_3\bullet + CD_4 \rightarrow CD_4 + CD_3\bullet$ METHYL-d_3-FREE RADICAL + METHANE-d_4 72 KGN REACTION ORDER: 2.	473-623	4.1(+12)	0	8960±250		
$CH_3\bullet + \bullet CHO \rightarrow CH_4 + CO$ METHYL FREE RADICAL + METHYL, OXO-, FREE RADICAL 76 ENG REACTION ORDER: 2.	1500-2500	3.2(+11)	0.5	0±2500	0.3	3.2

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F

$CH_3\bullet + HCHO \rightarrow CH_4 + \bullet CHO$						
METHYL FREE RADICAL + FORMALDEHYDE						
76 KEE/PAR REACTION ORDER: 2.	300-500	1.1(+11)	0	3070±500	0.5	1.5

$CH_3\bullet + HCHO \rightarrow CH_4 + \bullet CHO$						
METHYL FREE RADICAL + FORMALDEHYDE						
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+10)	0.5	3000±2500	0.3	3.2

$CH_3\bullet + DCDO \rightarrow CH_3D + \bullet CDO$						
METHYL FREE RADICAL + FORMALDEHYDE-d_2						
76 KEE/PAR REACTION ORDER: 2.	300-500	1.4(+11)	0	3975±500	0.5	1.5

$CH_3\bullet + CH_3OH \rightarrow CH_4 + CH_3O\bullet$						
METHYL FREE RADICAL + METHANOL						
76 KEE/PAR REACTION ORDER: 2.	350-550	6.2(+10)	0	4900±500	0.6	1.4

$CH_3\bullet + CH_3OH \rightarrow CH_4 + \bullet CH_2OH$						
METHYL FREE RADICAL + METHANOL						
76 KEE/PAR REACTION ORDER: 2.	350-500	1.9(+11)	0	5035±500	0.6	1.4

$CH_3\bullet + CH_3OH \rightarrow CH_4 + CH_3O\bullet + \bullet CH_2OH$						
METHYL FREE RADICAL + METHANOL						
76 KEE/PAR REACTION ORDER: 2.	350-550	2.3(+11)	0	4900±500	0.6	1.4

$CH_3\bullet + CD_3OH \rightarrow CH_3D + \bullet CD_2OH$						
METHYL FREE RADICAL + METHAN-d_3-OL						
76 KEE/PAR REACTION ORDER: 2.	370-550	2.0(+11)	0	5940±500	0.6	1.4

$CH_3\bullet + CD_3OH \rightarrow CH_4 + CD_3O\bullet$						
METHYL FREE RADICAL + METHAN-d_3-OL						
76 KEE/PAR REACTION ORDER: 2.	370-550	6.2(+10)	0	4900±500	0.6	1.4

$CD_3\bullet + CH_3OD \rightarrow CD_3H + \bullet CH_2OD$						
METHYL-d_3 FREE RADICAL + METHANOL-d						
76 KEE/PAR REACTION ORDER: 2.	400-500	1.9(+11)	0	5000±500	0.5	2.0

$CD_3\bullet + CH_3OD \rightarrow CD_4 + CH_3O\bullet$						
METHYL-d_3 FREE RADICAL + METHANOL-d						
76 KEE/PAR REACTION ORDER: 2.	400-500	3.2(+10)	0	5700±1000	0.5	2.0
NOTE: GIVEN WITH CAUTION						

$CH_3\bullet + CH_3SH \rightarrow CH_4 + CH_3S\bullet + \bullet CH_2SH$						
METHYL FREE RADICAL + METHANETHIOL						
76 KEE/PAR REACTION ORDER: 2.	303	1.2(+ 8)	-	-	0.5	2.0

$CH_3\bullet + CD_3SH \rightarrow CH_4 + CD_3S\bullet$						
METHYL FREE RADICAL + METHANE-d_3-THIOL						
76 KEE/PAR REACTION ORDER: 2.	400-500	1.1(+11)	0	2050±500	0.5	2.0

$CH_3\bullet + CD_3SH \rightarrow CH_3D + \bullet CD_2SH$						
METHYL FREE RADICAL + METHANE-d_3-THIOL						
76 KEE/PAR REACTION ORDER: 2.	400-500	7.6(+10)	0	4200±250	0.5	2.0

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F

$CH_3\bullet + CN \rightarrow CH_2 + HCN$ METHYL FREE RADICAL + CYANOGEN FREE RADICAL 76 ENG REACTION ORDER: 2.	1500-2500	1.0(+11)	0.7	1500±2500	0.3	3.2

$CH_3\bullet + CH_3NH_2 \rightarrow CH_4 + \bullet CH_2NH_2$ METHYL FREE RADICAL + METHANAMINE 72 KON REACTION ORDER: 2.	388-617	5.4(+11)	0	5020±500	0.3	3.0

$CH_3\bullet + CH_3NH_2 \rightarrow CH_4 + CH_3NH\bullet + \bullet CH_2NH_2$ METHYL FREE RADICAL + METHANAMINE 76 KEE/PAR REACTION ORDER: 2.	350-650	2.1(+11)	0	4330±500	0.7	1.3

$CH_3\bullet + CH_3ND_2 \rightarrow CH_4 + \bullet CH_2ND_2$ METHYL FREE RADICAL + METHANAMINE-d_2 76 KEE/PAR REACTION ORDER: 2.	350-450	1.4(+11)	0	4530±500	0.7	1.3

$CH_3\bullet + CH_3ND_2 \rightarrow CH_3D + CH_3ND$ METHYL FREE RADICAL + METHANAMINE-d_2 76 KEE/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-450	2.0(+11)	0	5135±1000	0.5	1.5

$CH_3\bullet + CD_3NH_2 \rightarrow CH_4 + CD_3NH\bullet$ METHYL FREE RADICAL + METHAN-d_3-AMINE 76 KEE/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	400-500	2.0(+11)	0	4530±750	0.5	2.0

$CH_3\bullet + CD_3NH_2 \rightarrow CH_3D + \bullet CD_2NH_2$ METHYL FREE RADICAL + METHAN-d_3-AMINE 76 KEE/PAR REACTION ORDER: 2.	400-500	7.2(+10)	0	5100±500	0.5	1.5

$CH_3\bullet + CH_3NHNH_2 \rightarrow CH_4 + CH_3N(\bullet)NH_2 + CH_3NHNH\bullet + \bullet CH_2NHNH_2$ METHYL FREE RADICAL + HYDRAZINE, METHYL- 76 KEE/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	420	6.3(+8)	-	-		

$CH_3\bullet + HCONH_2 \rightarrow CH_4 + HCONH\bullet + \bullet CONH_2$ METHYL FREE RADICAL + FORMAMIDE 76 KEE/PAR REACTION ORDER: 2.	350-500	3.6(+10)	0	3300±500	0.5	1.5

$CH_3\bullet + HCOND_2 \rightarrow CH_4 + \bullet COND_2$ METHYL FREE RADICAL + FORMAMIDE-N,N-d_2 76 KEE/PAR REACTION ORDER: 2.	350-500	5.5(+10)	0	3575±500	0.5	2.0

$CH_3\bullet + HCOND_2 \rightarrow CH_3D + HCOND$ METHYL FREE RADICAL + FORMAMIDE-N,N-d_2 76 KEE/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-500	2.0(+11)	0	4900±500	0.5	2.0

$CH_3\bullet + CH_3NO_2 \rightarrow CH_4 + \bullet CH_2NO_2$ METHYL FREE RADICAL + METHANE, NITRO- 76 KEE/PAR REACTION ORDER: 2.	300-500	1.0(+11)	0	5100±750	0.5	2.5

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F
NOTE: TENTATIVE k VALUE.						

$CH_3\bullet + CH_3ONH_2 \rightarrow CH_4 + CH_3ONH\bullet$						
METHYL FREE RADICAL + HYDROXYLAMINE, O-METHYL-						
76 KER/PAR REACTION ORDER: 2.	300-500	5.0(+10)	0	2265±500	0.5	1.5

$CH_3\bullet + CH_3ONH_2 \rightarrow CH_3D + CH_3ONH\bullet$						
METHYL FREE RADICAL + HYDROXYLAMINE-N,N-d_2, O-METHYL-						
76 KER/PAR REACTION ORDER: 2.	300-500	3.5(+10)	0	2970±500	0.5	1.5

$CH_3\bullet + CH{\equiv}CH \rightarrow CH_4 + CH{\equiv}C\bullet$						
METHYL FREE RADICAL + ETHYNE						
76 KER/PAR REACTION ORDER: 2.	473-773	-	-	7100		
NOTE: GIVEN WITH CAUTION.						

$CH_3\bullet + CH{\equiv}CH \rightarrow CH_3CH{=}CH\bullet$						
METHYL FREE RADICAL + ETHYNE						
72 KER/PAR REACTION ORDER: 2.	371-479	2.5(+11)	0	3900		

$CH_3\bullet + CH_2{=}CH_2 \rightarrow CH_4 + CH_2{=}CH\bullet$						
METHYL FREE RADICAL + ETHENE						
76 KER/PAR REACTION ORDER: 2.	350-650	4.2(+11)	0	5600±500	0.5	1.5

$CH_3\bullet + CH_2{=}CH_2 \rightarrow CH_3CH_2CH_2\bullet$						
METHYL FREE RADICAL + ETHENE						
72 KER/PAR REACTION ORDER: 2.	353-453	3.3(+11)	0	3900		

$CH_3\bullet + CH_2{=}CH_2 \rightarrow CH_3CH_2CH_2\bullet + (CH_3)_2CH\bullet$						
METHYL FREE RADICAL + ETHENE						
72 KGN REACTION ORDER: 2.	350-705	2.0(+11)	0	3575±105	0.8	1.3

$CH_3\bullet + CH_3CH_3 \rightarrow CH_4 + CH_3CH_2\bullet$						
METHYL FREE RADICAL + ETHANE						
76 KER/PAR REACTION ORDER: 2.	400-800	5.6(+11)	0	5840±250	0.7	1.3

$CH_3\bullet + CD_3CD_3 \rightarrow CH_3D + CD_3CD_2\bullet$						
METHYL FREE RADICAL + ETHANE-d_6						
76 KER/PAR REACTION ORDER: 2.	500-900	5.6(+11)	0	6600±250	0.7	1.3

$CD_3\bullet + CH_3CH_3 \rightarrow CD_3H + CH_3CH_2\bullet$						
METHYL-d_3 FREE RADICAL + ETHANE						
72 KGN REACTION ORDER: 2.	390-800	1.0(+12)	0	6085±165	0.7	1.4

$CD_3\bullet + CH_3CD_3 \rightarrow CD_3H + CD_3CH_2\bullet$						
METHYL-d_3 FREE RADICAL + ETHANE-1,1,1-d_3						
76 KER/PAR REACTION ORDER: 2.	500-750	3.0(+11)	0	5900±250	0.7	1.3

$CD_3\bullet + CH_3CD_3 \rightarrow CD_4 + CH_3CD_2$						
METHYL-d_3 FREE RADICAL + ETHANE-1,1,1-d_3						
76 KER/PAR REACTION ORDER: 2.	500-750	4.3(+11)	0	6845±250	0.7	1.3

$CD_3\bullet + CD_3CD_3 \rightarrow CD_4 + CD_3CD_2\bullet$						
METHYL-d_3 FREE RADICAL + ETHANE-d_6						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F
72 KGN REACTION ORDER: 2.	550-760	4.6(+11)	0	6405		

$CH_3\bullet$ + CH_3CHO → CH_4 + $CH_3C(O)\bullet$						
METHYL FREE RADICAL + ACETALDEHYDE						
76 KER/PAR REACTION ORDER: 2.	300-525	8.5(+10)	0	3000±250	0.4	1.6

$CH_3\bullet$ + CH_3CDO → CH_3D + $CH_3C(O)\bullet$						
METHYL FREE RADICAL + ACETALDEHYDE-1-d						
76 KER/PAR REACTION ORDER: 2.	300-500	1.0(+11)	0	3975±500	0.5	1.5

$CH_3\bullet$ + cy-CH_2CH_2O → CH_4 + cy-$CH_2CH(\bullet)O$						
METHYL FREE RADICAL + OXIRANE						
76 KER/PAR REACTION ORDER: 2.	350-500	2.5(+11)	0	5435±750	0.5	2.0
NOTE: TENTATIVE k VALUE.						

$CH_3\bullet$ + $HCOOCH_3$ → CH_4 + $\bullet COOCH_3$						
METHYL FREE RADICAL + FORMIC ACID METHYL ESTER						
76 KER/PAR REACTION ORDER: 2.	350-550	2.0(+11)	0	4900±500	0.5	1.5

$CH_3\bullet$ + $HCOOCH_3$ → CH_4 + $HCOOCH_2\bullet$						
METHYL FREE RADICAL + FORMIC ACID METHYL ESTER						
76 KER/PAR REACTION ORDER: 2.	350-550	1.6(+11)	0	5635±500	0.5	1.5

$CH_3\bullet$ + $HCOOCH_3$ → CH_4 + $\bullet COOCH_3$ + $HCOOCH_2$						
METHYL FREE RADICAL + FORMIC ACID METHYL ESTER						
76 KER/PAR REACTION ORDER: 2.	350-550	3.0(+11)	0	4980±500	0.5	1.5

$CH_3\bullet$ + $DCOOCH_3$ → CH_3D + $\bullet COOCH_3$						
METHYL FREE RADICAL + FORMIC-d ACID METHYL ESTER						
76 KER/PAR REACTION ORDER: 2.	350-550	2.5(+11)	0	5900±500	0.5	1.5

$CH_3\bullet$ + $DCOOCH_3$ → CH_4 + $DCOOCH_2\bullet$						
METHYL FREE RADICAL + FORMIC-d ACID METHYL ESTER						
76 KER/PAR REACTION ORDER: 2.	350-550	1.6(+11)	0	5635±500	0.5	1.5
NOTE: TENTATIVE k VALUE.						

$CH_3\bullet$ + CH_3COOD → CH_4 + $\bullet CH_2COOD$						
METHYL FREE RADICAL + ACETIC ACID-d						
76 KER/PAR REACTION ORDER: 2.	300-600	1.6(+11)	0	5135±500	0.6	1.4

$CH_3\bullet$ + CH_3CH_2OH → CH_4 + $CH_3CH_2O\bullet$						
METHYL FREE RADICAL + ETHANOL						
76 KER/PAR REACTION ORDER: 2.	400-625	7.9(+10)	0	4730±500	0.6	1.4

$CH_3\bullet$ + CH_3CH_2OH → CH_4 + $CH_3CH(\bullet)OH$						
METHYL FREE RADICAL + ETHANOL						
76 KER/PAR REACTION ORDER: 2.	400-625	4.00(+11)	0	4900±500	0.6	1.4

$CH_3\bullet$ + CH_3CH_2OH → CH_4 + $CH_3CH_2O\bullet$ + $CH_3CH(\bullet)OH$ + $\bullet CH_2CH_2OH$						
METHYL FREE RADICAL + ETHANOL						
76 KER/PAR REACTION ORDER: 2.	400-625	5.1(+11)	0	4900±500	0.6	1.4

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
$CH_3\bullet + CH_3CD_2OH \rightarrow CH_4 + CH_3CD_2O\bullet + \bullet CH_2CD_2OH$ METHYL FREE RADICAL + ETHAN-1,1-d_2-OL 76 KER/PAR REACTION ORDER: 2.	400-550	7.1(+10)	0	4530±500	0.6	1.4
$CH_3\bullet + CH_3CD_2OH \rightarrow CH_3D + CH_3CD(\bullet)OH$ METHYL FREE RADICAL + ETHAN-1,1-d_2-OL 76 KER/PAR REACTION ORDER: 2.	400-550	4.1(+11)	0	5735±500	0.6	1.4
$CD_3\bullet + CH_3CH_2OD \rightarrow CD_3H + CH_3CH(\bullet)OD + \bullet CH_2CH_2OD$ METHYL-d_3 FREE RADICAL + ETHANOL-d 76 KER/PAR REACTION ORDER: 2.	400-525	4.4(+11)	0	4900±500	0.6	1.4
$CD_3\bullet + CH_3CH_2OD \rightarrow CD_4 + CH_3CH_2O\bullet$ METHYL-d_3 FREE RADICAL + ETHANOL-d 76 KER/PAR REACTION ORDER: 2.	400-525	6.2(+10)	0	5135±500	0.5	2.0
$CH_3\bullet + CH_3OCH_3 \rightarrow CH_4 + CH_3OCH_2\bullet$ METHYL FREE RADICAL + METHANE, OXYBIS- 76 KER/PAR REACTION ORDER: 2.	300-550	4.2(+11)	0	5035±500	0.5	1.5
$CH_3\bullet + CH_3OOCH_3 \rightarrow CH_4 + CH_3OOCH_2\bullet$ METHYL FREE RADICAL + PEROXIDE, DIMETHYL- 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-500	4.2(+11)	0	5000±1000	0.3	3.0
$CD_3\bullet + cy\text{-}CH_2CH_2S \rightarrow CD_3H + cy\text{-}CH_2CH(\bullet)S$ METHYL-d_3 FREE RADICAL + THIIRANE 76 KER/PAR REACTION ORDER: 2.	300-500	2.2(+11)	0	4800±500	0.5	2.0
$CH_3\bullet + CH_3CH_2SH \rightarrow CH_4 + CH_3CH_2S\bullet + CH_3CH(\bullet)SH + \bullet CH_2CH_2SH$ METHYL FREE RADICAL + ETHANETHIOL 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	303	3.5(+7)	-	-	0.5	2.0
$CH_3\bullet + CH_3CN \rightarrow CH_4 + \bullet CH_2CN$ METHYL FREE RADICAL + ACETONITRILE 76 KER/PAR REACTION ORDER: 2.	350-600	5.4(+11)	0	5100±500	0.5	1.5
$CH_3\bullet + CH_3CH_2NH_2 \rightarrow CH_4 + CH_3CH_2NH\bullet + CH_3CH(\bullet)NH_2 + \bullet CH_2CH_2NH_2$ METHYL FREE RADICAL + ETHANAMINE 76 KER/PAR REACTION ORDER: 2.	350-500	2.9(+11)	0	4200±500	0.5	2.0
$CH_3\bullet + CH_3CH_2NH_2 \rightarrow CH_4 + CH_3CH_2NH\bullet$ METHYL FREE RADICAL + ETHANAMINE 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-500	2.0(+11)	0	4600±500	0.5	2.0
$CH_3\bullet + CD_3CH_2NH_2 \rightarrow CH_4 + CH_3D + CD_3CH(\bullet)NH_2 + \bullet CD_2CH_2NH_2$ METHYL FREE RADICAL + ETHAN-2,2,2-d_3-AMINE 76 KER/PAR REACTION ORDER: 2.	350-500	2.9(+11)	0	4200±500	0.5	2.0

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F
$CH_3\bullet + CD_3CH_2NH_2 \rightarrow CH_4 + CD_3CH\bullet NH_2$ METHYL FREE RADICAL + ETHAN-2,2,2-d_3-AMINE 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	423	4.0(+5)	-	-		
$CH_3\bullet + (CH_3)_2NH \rightarrow CH_4 + (CH_3)_2N\bullet + \bullet CH_2NHCH_3$ METHYL FREE RADICAL + METHANAMINE, N-METHYL- 76 KER/PAR REACTION ORDER: 2.	350-650	1.6(+11)	0	3500±500	0.5	2.0
$CH_3\bullet + (CH_3)_2NH \rightarrow CH_4 + (CH_3)_2N\bullet$ METHYL FREE RADICAL + METHANAMINE, N-METHYL- 76 KER/PAR REACTION ORDER: 2.	350-650	6.5(+10)	0	3200±500	0.5	2.0
$CH_3\bullet + (CH_3)_2ND \rightarrow CH_4 + \bullet CH_2NDCH_3$ METHYL FREE RADICAL + METHANAMINE-D, N-METHYL- 76 KER/PAR REACTION ORDER: 2.	350-500	2.9(+11)	0	4400±500	0.5	1.5
$CH_3\bullet + (CH_3)_2ND \rightarrow CH_3D + (CH_3)_2N\bullet$ METHYL FREE RADICAL + METHANAMINE-D, N-METHYL- 76 KER/PAR REACTION ORDER: 2.	350-500	1.0(+11)	0	4300±500	0.5	1.5
$CH_3\bullet + CH_3N{=}NCH_3 \rightarrow CH_4 + \bullet CH_2N{=}NCH_3$ METHYL FREE RADICAL + DIAZENE, DIMETHYL- 76 KER/PAR REACTION ORDER: 2.	300-500	1.1(+11)	0	3975+250	0.7	1.3
$CH_3\bullet + CH_3N{=}NCH_3 \rightarrow (CH_3)_2NN(\bullet)CH_3$ METHYL FREE RADICAL + DIAZENE, DIMETHYL- 72 KCN REACTION ORDER: 2.	300-450	5.0(+10)	0	3040±355	0.4	2.6
$CD_3\bullet + CD_3N{=}NCD_3 \rightarrow CD_4 + CD_2N{=}NCD_3$ METHYL-d_3 FREE RADICAL + DIAZENE, DI(METHYL-d_3)- 76 KER/PAR REACTION ORDER: 2.	300-500	6.6(+10)	0	4125±500	0.5	1.5
$CH_3\bullet + NH_2CH_2CH_2NH_2 \rightarrow CH_4 + \bullet NHCH_2CH_2NH_2$ $+ NH_2CH(\bullet)CH_2NH_2$ METHYL FREE RADICAL + 1,2-ETHANEDIAMINE 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-500	3.8(+11)	0	4200±500	0.5	2.0
$CH_3\bullet + NH_2CH_2CH_2NH_2 \rightarrow CH_4 + \bullet NHCH_2CH_2NH_2$ METHYL FREE RADICAL + 1,2-ETHANEDIAMINE 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-500	2.0(+11)	0	4430±500	0.5	2.0
$CH_3\bullet + ND_2CH_2CH_2ND_2 \rightarrow CH_4 + ND_2CH(\bullet)CH_2ND_2$ METHYL FREE RADICAL + 1,2-ETHANEDI(AMINE-d_2) 76 KER/PAR REACTION ORDER: 2.	350-500	2.0(+11)	0	4000±500	0.5	2.0
$CH_3\bullet + ND_2CH_2CH_2ND_2 \rightarrow CH_3D + \bullet NDCH_2CH_2ND_2$ METHYL FREE RADICAL + 1,2-ETHANEDI(AMINE-d_2) 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-500	3.2(+11)	0	5100±500	0.5	2.0

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F
$CH_3\bullet + (CH_3)_2NNH_2 \rightarrow CH_4 + (CH_3)_2NNH$ METHYL FREE RADICAL + HYDRAZINE, 1,1-DIMETHYL- 76 KER/PAR REACTION ORDER: 2.	350-500	1.7(+11)	0	2870±500	0.5	1.5
$CH_3\bullet + (CH_3)_2NNH_2 \rightarrow CH_4 + (CH_3)_2NNH\bullet + \bullet CH_2N(CH_3)NH_2$ METHYL FREE RADICAL + HYDRAZINE, 1,1-DIMETHYL- 76 KER/PAR REACTION ORDER: 2.	350-500	2.4(+11)	0	2970±500	0.5	1.5
$CH_3\bullet + (CH_3)_2NND_2 \rightarrow CH_4 + \bullet CH_2N(CH_3)ND\bullet$ METHYL FREE RADICAL + HYDRAZINE-d_2, 1,1-DIMETHYL- 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-500	3.2(+11)	0	4125±750	0.5	2.0
$CH_3\bullet + (CH_3)_2NND_2 \rightarrow CH_3D + (CH_3)_2NND\bullet$ METHYL FREE RADICAL + HYDRAZINE-d_2, 1,1-DIMETHYL- 76 KER/PAR REACTION ORDER: 2.	350-500	2.1(+11)	0	3400±500	0.5	1.5
$CH_3\bullet + CH_3NHNHCH_3 \rightarrow CH_4 + CH_3N(\bullet)NHCH_3 + \bullet CH_2NHNHCH_3$ METHYL FREE RADICAL + HYDRAZINE, 1,2-DIMETHYL- 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-500	2.5(+11)	0	2400±250	0.5	2.0
$CH_3\bullet + CH_3NDNDCH_3 \rightarrow CH_3D + CH_3N(\bullet)NDCH_3$ METHYL FREE RADICAL + HYDRAZINE-1,2-d_2, 1,2-DIMETHYL- 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-500	2.0(+11)	0	2700±500	0.5	2.0
$CH_3\bullet + HCONHCH_3 \rightarrow CH_4 + \bullet CONHCH_3 + HCON(\bullet)CH_3 + HCONHCH_2\bullet$ METHYL FREE RADICAL + FORMAMIDE, N-METHYL- 76 KER/PAR REACTION ORDER: 2.	400-600	7.9(+10)	0	3800±500	0.5	1.5
$CH_3\bullet + CH_3CONH_2 \rightarrow CH_4 + CH_3CONH\bullet + \bullet CH_2CONH_2$ METHYL FREE RADICAL + ACETAMIDE 76 KER/PAR REACTION ORDER: 2.	350-600	2.1(+11)	0	5235±500	0.5	1.5
$CH_3\bullet + CH_3CONH_2 \rightarrow CH_4 + \bullet CH_2CONH_2$ METHYL FREE RADICAL + ACETAMIDE 76 KER/PAR REACTION ORDER: 2.	350-600	1.0(+11)	0	5200±500	0.5	1.5
$CD_3\bullet + CD_3CONH_2 \rightarrow CD_3H + CD_3CONH\bullet$ METHYL FREE RADICAL + ACETAMIDE-2,2,2-d_3 76 KER/PAR REACTION ORDER: 2.	350-600	1.1(+11)	0	5235±500	0.5	1.5
$CD_3\bullet + CD_3CONH_2 \rightarrow CD_4 + \bullet CD_2CONH_2$ METHYL FREE RADICAL + ACETAMIDE-2,2,2-d_3 76 KER/PAR REACTION ORDER: 2.	350-600	1.4(+11)	0	5800±500	0.5	1.5
$CH_3\bullet + CH_3C{\equiv}CH \rightarrow (CH_3)_2C{=}CH\bullet + CH_3C(\bullet){=}CHCH_3$ METHYL FREE RADICAL + 1-PROPYNE 72 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE. CH_3 ADDITION OCCURS PREDOMINANTLY AT TERMINAL C ATOM.	379-465	5.0(+11)	0	4400		

CHEMICAL REACTIONS	T/K	A	B	E/R (in ^{o}K)	k factors f	k factors F
$CH_3\bullet + CH_2{=}C{=}CH_2 \rightarrow CH_3CH_2C(\bullet){=}CH_2$						
METHYL FREE RADICAL + 1,2-PROPADIENE						
72 KER/PAR REACTION ORDER: 2.	373-483	2.0(+11)	0	4100		
$CH_3\bullet + CH_3CH{=}CH_2 \rightarrow CH_4 + CH_3C(\bullet){=}CH_2$						
METHYL FREE RADICAL + 1-PROPENE						
76 KER/PAR REACTION ORDER: 2.	350-600	1.4(+11)	0	4430±500	0.6	1.4
$CH_3\bullet + CH_3CH{=}CH_2 \rightarrow CH_4 + [C_3H_5\bullet]$						
METHYL FREE RADICAL + 1-PROPENE						
72 KCN REACTION ORDER: 2.	350-580	3.2(+10)	0	3775±300	0.5	2.0
$CH_3\bullet + CH_3CH{=}CH_2 \rightarrow CH_3CH_2CH(\bullet)CH_3 + (CH_3)_2CHCH_2\bullet$						
METHYL FREE RADICAL + 1-PROPENE						
72 KER/PAR REACTION ORDER: 2.	353-453	1.7(+11)	0	3700		
k/k_{ref}: 0.72	453	-	-	-		
NOTE: k_{ref}: $CH_3\bullet + CH_2{=}CH_2$						
$CH_3\bullet + CH_3CH_2CH_3 \rightarrow CH_4 + (CH_3)_2CH\bullet$						
METHYL FREE RADICAL + PROPANE						
76 KER/PAR REACTION ORDER: 2.	550-750	2.0(+11)	0	4830±250	0.7	1.3
$CD_3\bullet + CH_3CD_2CH_3 \rightarrow CD_3H + CH_3CD_2CH_2\bullet$						
METHYL-d_3 FREE RADICAL + PROPANE-2,2-d_2						
76 KER/PAR REACTION ORDER: 2.	550-750	4.4(+11)	0	5735±250	0.7	1.3
$CD_3 + CH_3CD_2CH_3 \rightarrow CD_4 + (CH_3)_2CD\bullet$						
METHYL-d_3 FREE RADICAL + PROPANE-2,2-d_2						
76 KER/PAR REACTION ORDER: 2.	550-750	2.5(+11)	0	5735±250	0.7	1.3
$CH_3\bullet + CH_3CH_2CHO \rightarrow CH_4 + CH_3CH_2C(O)\bullet$						
METHYL FREE RADICAL + PROPANAL						
76 KER/PAR REACTION ORDER: 2.	350-500	1.0(+11)	0	2970±500	0.4	1.6
NOTE: TENTATIVE k VALUE.						
$CH_3\bullet + (CH_3)_2CO \rightarrow CH_4 + CH_3C(O)CH_2\bullet$						
METHYL FREE RADICAL + 2-PROPANONE						
76 KER/PAR REACTION ORDER: 2.	350-700	3.5(+11)	0	4900±250	0.8	1.3
$CD_3\bullet + (CD_3)_2CO \rightarrow CD_4 + CD_3C(O)CD_2\bullet$						
METHYL-d_3 FREE RADICAL + 2-PROPANONE-1,1,1,3,3,3-d_6						
76 KER/PAR REACTION ORDER: 2.	350-800	4.8(+11)	0	5735±250	0.8	1.3
$CH_3\bullet + HCOOCH_2CH_3 \rightarrow CH_4 + \bullet COOCH_2CH_3 + HCOOCH(\bullet)CH_3$						
METHYL FREE RADICAL + FORMIC ACID ETHYL ESTER						
76 KER/PAR REACTION ORDER: 2.	350-500	2.5(+11)	0	5100±500	0.5	2.0
NOTE: TENTATIVE k VALUE.						
$CH_3\bullet + CH_3COOCH_3 \rightarrow CH_4 + \bullet CH_2COOCH_3 + CH_3COOCH_2\bullet$						
METHYL FREE RADICAL + ACETIC ACID METHYL ESTER						
76 KER/PAR REACTION ORDER: 2.	350-600	2.1(+11)	0	5035±500	0.5	1.5

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F
$CH_3\bullet + CH_3COOCD_3 \rightarrow CH_4 + \bullet CH_2COOCD_3$ METHYL FREE RADICAL + ACETIC ACID METHYL-d_3 ESTER 76 KER/PAR REACTION ORDER: 2.	350-650	1.9(+11)	0	5035±500	0.4	1.6
$CH_3\bullet + CD_3COOCH_3 \rightarrow CH_4 + CD_3COOCH_2\bullet$ METHYL FREE RADICAL + ACETIC-d_3 ACID METHYL ESTER 76 KER/PAR REACTION ORDER: 2.	400-600	1.7(+11)	0	5990±500	0.5	1.5
$CH_3\bullet + CH_3OCOOCH_3 \rightarrow CH_4 + \bullet CH_2OCOOCH_3$ METHYL FREE RADICAL + CARBONIC ACID DIMETHYL ESTER 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-500	3.2(+11)	0	5800±750	0.5	2.0
$CH_3\bullet + (CH_3)_2CDOH \rightarrow CH_3D + (CH_3)_2C(\bullet)OH$ METHYL FREE RADICAL + 2-PROPAN-2-d-OL 76 KER/PAR REACTION ORDER: 2.	400-525	1.9(+11)	0	4900±500	0.6	1.4
$CD_3\bullet + (CH_3)_2CHOD \rightarrow CD_3H + (CH_3)_2C(\bullet)OD + \bullet CH_2CH(CH_3)OD$ METHYL-d_3 FREE RADICAL + 2-PROPANOL-d 76 KER/PAR REACTION ORDER: 2.	400-525	1.5(+11)	0	3975±500	0.6	1.4
$CH_3\bullet + cy\text{-}CH_2CH_2CH_2S \rightarrow CH_4 + cy\text{-}CH_2CH(\bullet)CH_2S$ METHYL FREE RADICAL + THIETANE 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	300-450	3.2(+11)	0	4630±750	0.5	2.0
$CH_3\bullet + (CH_3)_2CHSH \rightarrow CH_4 + (CH_3)_2CHS\bullet + (CH_3)_2C(\bullet)SH$ $+ \bullet CH_2CH(CH_3)SH$ METHYL FREE RADICAL + 2-PROPANETHIOL 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	303	4.1(+7)	-	-	0.5	2.0
$CD_3\bullet + CH_3CH_2CN \rightarrow CD_3H + CH_3CH(\bullet)CN + \bullet CH_2CH_2CN$ METHYL-d_3 FREE RADICAL + PROPANENITRILE 76 KER/PAR REACTION ORDER: 2.	400-600	3.6(+11)	0	4330±500	0.5	1.5
$CH_3\bullet + (CH_3)_3N \rightarrow CH_4 + \bullet CH_2N(CH_3)_2$ METHYL FREE RADICAL + METHANAMINE,N,N-DIMETHYL- 76 KER/PAR REACTION ORDER: 2.	350-600	4.7(+11)	0	4600±500	0.7	1.3
$CH_3\bullet + HCON(CH_3)_2 \rightarrow CH_4 + \bullet CON(CH_3)_2 + HCO\text{-}(CH_3)NCH_2\bullet$ METHYL FREE RADICAL + FORMAMIDE, N,N-DIMETHYL- 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	400-600	6.3(+10)	0	3600±500	0.5	1.5
$CH_3\bullet + CH_3CH_2C{\equiv}CH \rightarrow CH_4 + CH_3CH(\bullet)C{\equiv}CH$ $+ \bullet CH_2CH_2C{\equiv}CH + CH_3CH_2C{\equiv}C\bullet$ METHYL FREE RADICAL + 1-BUTYNE 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	456-620	1.9(+12)	0	5135±500	0.6	1.4
$CH_3\bullet + CH_3C{\equiv}CCH_3 \rightarrow CH_4 + CH_3C{\equiv}CCH_2\bullet$ METHYL FREE RADICAL + 2-BUTYNE						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F
76 KEE/PAR REACTION ORDER: 2.	486-619	1.1(+12)	0	4900±500	0.6	1.4
NOTE: TENTATIVE k VALUE.						
$CH_3\cdot + CH_3{-}CH{=}CH{-}CH_2 \rightarrow CH_3CH_2CH(\cdot)CH{=}CH_2$						
METHYL FREE RADICAL + 1,3-BUTADIENE						
72 KEE/PAR REACTION ORDER: 2.	353-453	8.1(+10)	0	2065		
$CH_3\cdot + CH_2{=}CH{-}CH{=}CH_2 \rightarrow CH_3CH_2CH(\cdot)CH{=}CH_2$ + $\cdot CH_2CH(CH_3)CH{=}CH_2$						
METHYL FREE RADICAL + 1,3-BUTADIENE						
72 KEE/PAR REACTION ORDER: 2. k/k_{ref}: 12.0	453	-	-	-		
NOTE: k_{ref}: $CH_3\cdot + CH_2{=}CH_2$						
$CH_3\cdot + CH_3CH_2CH{=}CH_2 \rightarrow CH_4 + CH_3CH(\cdot)CH{=}CH_2$						
METHYL FREE RADICAL + 1-BUTENE						
76 KEE/PAR REACTION ORDER: 2.	350-650	2.5(+11)	0	4200±500	0.6	1.4
$CH_3\cdot + CH_3CH_2CH{=}CH_2 \rightarrow CH_3CH_2CH(\cdot)CHCH_3$ + $CH_3CH_2CH(CH_3)CH_2\cdot$						
METHYL FREE RADICAL + 1-BUTENE						
72 KEE/PAR REACTION ORDER: 2.	353-453	1.0(+11)	0	3600		
k/k_{ref}: 0.7	453	-	-	-		
NOTE: k_{ref}: $CH_3\cdot + CH_2{=}CH_2$						
$CH_3\cdot + cis{-}CH_3CH{=}CHCH_3 \rightarrow CH_4 + CH_3CH{=}CHCH_2\cdot$						
METHYL FREE RADICAL + cis-2-BUTENE						
76 KEE/PAR REACTION ORDER: 2.	350-650	1.8(+11)	0	4100±500	0.6	1.4
$CH_3\cdot + cis{-}CH_3CH{=}CHCH_3 \rightarrow (CH_3)_2CHCH(\cdot)CH_3$						
METHYL FREE RADICAL + cis-2-BUTENE						
72 KEE/PAR REACTION ORDER: 2.	353-453	4.5(+10)	0	3675		
k/k_{ref}: 0.2	453	-	-	-		
NOTE: k_{ref}: $CH_3\cdot + CH_2{=}CH_2$						
$CH_3\cdot + trans{-}CH_3CH{=}CHCH_3 \rightarrow CH_4 + CH_3CH{=}CHCH_2\cdot$						
METHYL FREE RADICAL + trans-2-BUTENE						
76 KEE/PAR REACTION ORDER: 2.	350-500	1.0(+12)	0	4830±500	0.6	1.4
$CH_3\cdot + trans{-}CH_3CH{=}CHCH_3 \rightarrow (CH_3)_2CHCH(\cdot)CH_3$						
METHYL FREE RADICAL + trans-2-BUTENE						
72 KEE/PAR REACTION ORDER: 2.	353-453	1.4(+11)	0	4075		
k/k_{ref}: 0.4	453	-	-	-		
NOTE: k_{ref}: $CH_3\cdot + CH_2{=}CH_2$						
$CH_3\cdot + (CH_3)_2C{=}CH_2 \rightarrow CH_4 + \cdot CH_2C(CH_3){=}CH_2$						
METHYL FREE RADICAL + 1-PROPENE, 2-METHYL-						
76 KEE/PAR REACTION ORDER: 2.	350-600	3.0(+11)	0	4500±500	0.6	1.4
$CH_3\cdot + (CH_3)_2C{=}CH_2 \rightarrow (CH_3)_3CCH_2\cdot + (CH_3)_2C(\cdot)CH_2CH_3$						
METHYL FREE RADICAL + 1-PROPENE, 2-METHYL-						
72 KEE/PAR REACTION ORDER: 2.	353-453	1.4(+11)	0	3475		
k/k_{ref}: 1.1	453	-	-	-		
NOTE: k_{ref}: $CH_3\cdot + CH_2{=}CH_2$						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F

$CH_3 + CH_3CH_2CH_2CH_3 \rightarrow CH_4 + CH_3CH_2CH(\bullet)CH_3$ METHYL FREE RADICAL + BUTANE 76 KER/PAR REACTION ORDER: 2.	350-750	4.0(+11)	0	4830±250	0.7	1.3

$CH_3\bullet + CH_3CH_2CH_2CH_3 \rightarrow CH_4 + CH_3CH_2CH(\bullet)CH_3 + CH_3CH_2CH_2CH_2\bullet$ METHYL FREE RADICAL + BUTANE 72 KGN REACTION ORDER: 2.	350-500	1.6(+11)	0	4540±150	0.7	1.4

$CD_3\bullet + CH_3CD_2CD_2CH_3 \rightarrow CD_3H + CH_3CD_2CD_2CH_2\bullet$ METHYL-d_3 FREE RADICAL + BUTANE-2,2,3,3-d_4 76 KER/PAR REACTION ORDER: 2.	600-750	4.8+11)	0	5735±250	0.7	1.3

$CD_3\bullet + CH_3CD_2CD_2CH_3 \rightarrow CD_4 + CH_3CD_2CD(\bullet)CH_3$ METHYL-d_3 FREE RADICAL + BUTANE-2,2,3,3-d_4 76 KER/PAR REACTION ORDER: 2.	600-750	4.5(+11)	0	5735±250	0.7	1.3

$CH_3\bullet + (CH_3)_3CH \rightarrow CH_4 + (CH_3)_3C\bullet + (CH_3)_2CHCH_2\bullet$ METHYL FREE RADICAL + PROPANE, 2-METHYL- 76 KER/PAR REACTION ORDER: 2.	300-500	8.3(+10)	0	4000±500	0.5	2.0

$CH_3\bullet + (CH_3)_3CH \rightarrow CH_4 + (CH_3)_3C\bullet$ METHYL FREE RADICAL + PROPANE, 2-METHYL- 76 KER/PAR REACTION ORDER: 2.	550-750	9.6(+10)	0	3975±250	0.7	1.3

$CD_3\bullet + (CH_3)_3CD \rightarrow CD_3H + (CH_3)_2CDCH_2\bullet$ METHYL-d_3 FREE RADICAL + PROPANE-2-d, 2-METHYL- 76 KER/PAR REACTION ORDER: 2.	550-750	6.0(+11)	0	5735±250	0.7	1.3

$CD_3\bullet + (CH_3)_3CD \rightarrow CD_4 + (CH_3)_3C\bullet$ METHYL-d_3 FREE RADICAL + PROPANE-2-d, 2-METHYL- 76 KER/PAR REACTION ORDER: 2.	550-750	1.2(+11)	0	4800±250	0.7	1.3

$CH_3\bullet + CH_3CH{=}CHCHO \rightarrow CH_4 + CH_3CH{=}CHC(O)\bullet$ METHYL FREE RADICAL + 2-BUTENAL 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-500	1.0(+11)	0	3400±500	0.4	2.5

$CH_3\bullet + CH_3COCOCH_3 \rightarrow CH_4 + CH_3COCOCH_2\bullet$ METHYL FREE RADICAL + 2,3-BUTANEDIONE 76 KER/PAR REACTION ORDER: 2.	300-800	2.2(+11)	0	4300±500	0.5	1.5

$CH_3\bullet + (CH_3CO)_2O \rightarrow CH_4 + CH_3COOCCH_2\bullet$ METHYL FREE RADICAL + ACETIC ACID ANHYDRIDE 76 KER/PAR REACTION ORDER: 2.	300-500	1.8(+11)	0	4830±500	0.6	1.4

$CH_3\bullet + CH_3CH_2CH_2CHO \rightarrow CH_4 + CH_3CH_2CH_2C(O)\bullet$ METHYL FREE RADICAL + BUTANAL 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-500	1.0(+11)	0	2970±500	0.4	1.6

$CH_3\bullet + (CH_3)_2CHCHO \rightarrow CH_4 + (CH_3)_2CHC(O)\bullet$						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F
METHYL FREE RADICAL + PROPANAL, 2-METHYL-						
76 KER/PAR REACTION ORDER: 2.	350-500	1.0(+11)	0	2970±500	0.4	1.6
NOTE: TENTATIVE k VALUE.						

$CH_3\bullet + CH_3CH_2COCH_3 \rightarrow CH_4 + CH_3CH(\bullet)COCH_3 + \bullet CH_2CH_2COCH_3 + CH_3CH_2COCH_2\bullet$						
METHYL FREE RADICAL + 2-BUTANONE						
76 KER/PAR REACTION ORDER: 2.	300-500	8.2(+10)	0	3700±500	0.5	1.5

$CH_3\bullet + HCOOCH_2CH_2CH_3 \rightarrow CH_4 + \bullet COOCH_2CH_2CH_3$						
METHYL FREE RADICAL + FORMIC ACID PROPYL ESTER						
72 KGN REACTION ORDER: 2.	347-455	1.3(+10)	0	3675		

$CH_3\bullet + HCOOCH_2CH_2CH_3 \rightarrow CH_4 + \bullet COOCH_2CH_2CH_3 + HCOOCH(\bullet)CH_2CH_3 + HCOOCH_2CH(\bullet)CH_3 + HCOOCH_2CH_2CH_2\bullet$						
METHYL FREE RADICAL + FORMIC ACID PROPYL ESTER						
76 KER/PAR REACTION ORDER: 2.	350-500	2.5(+11)	0	5000±500	0.5	2.0
NOTE: TENTATIVE k VALUE.						

$CH_3\bullet + HCOOCH(CH_3)_2 \rightarrow CH_4 + \bullet COOCH(CH_3)_2 + HCOOC(\bullet)(CH_3)_2 + HCOOCH(CH_3)CH_2\bullet$						
METHYL FREE RADICAL + FORMIC ACID 1-METHYLETHYL ESTER						
76 KER/PAR REACTION ORDER: 2.	350-500	2.5(+11)	0	4980±500	0.5	2.0
NOTE: TENTATIVE k VALUE.						

$CH_3\bullet + CH_3CH_2OCH_2CH_3 \rightarrow CH_4 + CH_3CH_2OCH(\bullet)CH_3 + CH_3CH_2OCH_2CH_2\bullet$						
METHYL FREE RADICAL + ETHANE, 1,1'-OXYBIS-						
76 KER/PAR REACTION ORDER: 2.	400-500	2.5(+11)	0	4200±750	0.5	2.0
NOTE: TENTATIVE k VALUE.						

$CH_3\bullet + (CH_3)_3CSH \rightarrow CH_4 + (CH_3)_3CS\bullet + \bullet CH_2C(CH_3)_2SH$						
METHYL FREE RADICAL + 2-PROPANETHIOL, 2-METHYL-						
76 KER/PAR REACTION ORDER: 2.	303	5.9(+7)	-	-	0.5	2.0
NOTE: TENTATIVE k VALUE.						

$CH_3\bullet + CH_3CH{=}NN{=}CHCH_3 \rightarrow CH_4 + CH_3C(\bullet){=}NN{=}CHCH_3 + \bullet CH_2CH{=}NN{=}CHCH_3$						
METHYL FREE RADICAL + ACETALDEHYDE ETHYLIDENEHYDRAZONE						
76 KER/PAR REACTION ORDER: 2.	350-600	2.5(+11)	0	3975±500	0.5	2.0

$CH_3\bullet + CH_3CH_2CH_2CH_2NH_2 \rightarrow CH_4 + CH_3CH_2CH_2CH_2NH\bullet + CH_3CH_2CH_2CH(\bullet)NH_2 + \bullet CH_2CH_2CH_2CH_2NH_2$						
METHYL FREE RADICAL + 1-BUTANAMINE						
76 KER/PAR REACTION ORDER: 2.	426	3.2(+7)	-	-	0.5	2.0
NOTE: TENTATIVE k VALUE.						

$CH_3\bullet + (CH_3CH_2)_2NH \rightarrow CH_4 + (CH_3CH_2)_2N\bullet + CH_3CH(\bullet)NHCH_2CH_3 + \bullet CH_2CH_2NHCH_2CH_3$						
METHYL FREE RADICAL + ETHANAMINE, N-ETHYL-						
76 KER/PAR REACTION ORDER: 2.	350-500	2.2(+11)	0	3550±500	0.5	2.0
NOTE: TENTATIVE K VALUE.						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
$CH_3\bullet + CH_3CH_2N(CH_3)_2 \rightarrow CH_4 + CH_3CH(\bullet)N(CH_3)_2 + CH_2CH_2N(CH_3)_2 + CH_3CH_2N(CH_3)CH_2\bullet$ METHYL FREE RADICAL + ETHANAMINE, N,N-DIMETHYL- 76 KER/PAR REACTION ORDER: 2.	420	2.6(+7)	-	-	0.5	2.0
NOTE: TENTATIVE k VALUE.						
$CH_3 + CH_3CON(CH_3)_2 \rightarrow CH_4 + \bullet CH_2CON(CH_3)_2 + CH_3CON(CH_3)CH_2\bullet$ METHYL FREE RADICAL + ACETAMIDE, N,N-DIMETHYL- 76 KER/PAR REACTION ORDER: 2.	350-600	2.0(+11)	0	4200±500	0.5	1.5
$CH_3\bullet + CH_3CON(CH_3)_2 \rightarrow CH_4 + CH_3CON(CH_3)CH_2\bullet$ METHYL FREE RADICAL + ACETAMIDE, N,N-DIMETHYL- 76 KER/PAR REACTION ORDER: 2.	350-600	1.6(+11)	0	4125±500	0.5	1.5
NOTE: TENTATIVE k VALUE.						
$CH_3\bullet + CH_3(CH_2)_2CH=CH_2 \rightarrow CH_4 + CH_3CH_2CH(\bullet)CH=CH_2$ METHYL FREE RADICAL + 1-PENTENE 76 KER/PAR REACTION ORDER: 2.	450-650	4.5(+11)	0	4500±500	0.6	1.4
$CH_3\bullet + cis\text{-}CH_3CH_2CH=CHCH_3 \rightarrow CH_3CH_2CH(\bullet)CH(CH_3)_2$ METHYL FREE RADICAL + cis-2-PENTENE 72 KER/PAR REACTION ORDER: 2.	298	-	-	4060		
$CH_3\bullet + cis\text{-}CH_3CH_2CH=CHCH_3 \rightarrow CH_3CH_2CH(CH_3)CH(\bullet)CH_3$ METHYL FREE RADICAL + cis-2-PENTENE 72 KER/PAR REACTION ORDER: 2.	298	-	-	4125		
$CH_3\bullet + (CH_3)_2CHCH=CH_2 \rightarrow (CH_3)_2CHCH(\bullet)CH_2CH_3$ METHYL FREE RADICAL + 1-BUTENE, 3-METHYL- 72 KER/PAR REACTION ORDER: 2.	298	-	-	3500		
$CH_3\bullet + (CH_3)_2CHCH=CH_2 \rightarrow CH_4 + (CH_3)_2C(\bullet)CH=CH_2$ METHYL FREE RADICAL + 1-BUTENE, 3-METHYL- 76 KER/PAR REACTION ORDER: 2.	450-600	4.4(+11)	0	4225±7500	0.5	1.5
$CH_3\bullet + (CH_3)_2C=CHCH_3 \rightarrow CH_4 + (CH_3)_2C=CH_2CH_2\bullet + \bullet CH_2C(CH_3)=CHCH_3$ METHYL FREE RADICAL + 2-BUTENE, 2-METHYL- 76 KER/PAR REACTION ORDER: 2.	400-500	4.9(+11)	0	4300±500	0.5	1.5
NOTE: TENTATIVE k VALUE.						
$CH_3\bullet + (CH_3)_2C=CHCH_3 \rightarrow (CH_3)_3CCH(\bullet)CH_3 + (CH_3)_2C(\bullet)CH(CH_3)_2$ METHYL FREE RADICAL + 2-BUTENE, 2-METHYL- 72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 0.4	453	-	-	-		
NOTE: k_{ref}: $CH_3\bullet + CH_2=CH_2$	403-455	1.4(+10)	0	3070		
TENTATIVE k VALUE.						
$CH_3\bullet + CH_3CH_2CH_2CH_2CH_3 \rightarrow CH_4 + CH_3CH_2CH_2CH_2CH_2\bullet$ METHYL FREE RADICAL + PENTANE						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
76 KEB/PAR REACTION ORDER: 2.	350-800	4.8(+11)	0	5800±250	0.7	1.3
NOTE: TENTATIVE k VALUE.						
$CH_3\bullet + CH_3CH_2CH_2CH_2CH_3 \rightarrow CH_4 + CH_3CH_2CH(\bullet)CH_2CH_3 + CH_3CH_2CH_2CH(\bullet)CH_3$						
METHYL FREE RADICAL + PENTANE						
76 KEB/PAR REACTION ORDER: 2.	350-800	6.0(+11)	0	4830±250	0.7	1.3
NOTE: TENTATIVE k VALUE.						
$CH_3\bullet + (CH_3)_2CHCH_2CH_3 \rightarrow CH_4 + (CH_3)_2C(\bullet)CH_2CH_3$						
METHYL FREE RADICAL + BUTANE, 2-METHYL-						
76 KEB/PAR REACTION ORDER: 2.	350-750	9.6(+10)	0	3975±250	0.7	1.3
NOTE: TENTATIVE k VALUE.						
$CH_3\bullet + (CH_3)_2CHCH_2CH_3 \rightarrow CH_4 + (CH_3)_2CHCH(\bullet)CH_3$						
METHYL FREE RADICAL + BUTANE, 2-METHYL-						
76 KEB/PAR REACTION ORDER: 2.	350-750	2.0(+11)	0	4830±250	0.7	1.3
NOTE: TENTATIVE k VALUE.						
$CH_3\bullet + (CH_3)_2CHCH_2CH_3 \rightarrow CH_4 + (CH_3)_2CHCH_2CH_2\bullet + \bullet CH_2CH(CH_3)CH_2CH_3$						
METHYL FREE RADICAL + BUTANE, 2-METHYL-						
76 KEB/PAR REACTION ORDER: 2.	350-750	7.1(+11)	0	5800±250	0.7	1.3
NOTE: TENTATIVE k VALUE.						
$CH_3\bullet + (CH_3)_4C \rightarrow CH_4 + (CH_3)_3CCH_2\bullet$						
METHYL FREE RADICAL + PROPANE, 2,2-DIMETHYL-						
76 KEB/PAR REACTION ORDER: 2.	400-600	8.3(+11)	0	5940±350	0.6	1.4
$CH_3\bullet + CH_3CH_2CH_2CH_2CHO \rightarrow CH_4 + CH_3CH_2CH_2CH_2C(O)\bullet$						
METHYL FREE RADICAL + PENTANAL						
76 KEB/PAR REACTION ORDER: 2.	350-500	1.0(+11)	0	3000±500	0.4	1.6
NOTE: TENTATIVE k VALUE.						
$CH_3\bullet + CH_3CH_2CH(CH_3)CHO \rightarrow CH_4 + CH_3CH_2CH(CH_3)C(O)\bullet$						
METHYL FREE RADICAL + BUTANAL, 2-METHYL-						
76 KEB/PAR REACTION ORDER: 2.	350-500	1.0(+11)	0	3200±500	0.5	2.0
NOTE: TENTATIVE k VALUE.						
$CH_3\bullet + (CH_3)_2CHCH_2CH_3 \rightarrow CH_4 + (CH_3)_2CHCH_2C(O)\bullet$						
METHYL FREE RADICAL + BUTANAL, 3-METHYL-						
76 KEB/PAR REACTION ORDER: 2.	350-500	1.0(+11)	0	3070±500	0.4	1.6
NOTE: TENTATIVE k VALUE.						
$CH_3\bullet + (CH_3)_3CCHO \rightarrow CH_4 + (CH_3)_3CC(O)\bullet$						
METHYL FREE RADICAL + PROPANAL, 2,2-DIMETHYL-						
76 KEB/PAR REACTION ORDER: 2.	350-500	1.0(+11)	0	3170±500	0.5	2.0
NOTE: TENTATIVE k VALUE.						
$CH_3\bullet + (CH_3CH_2)_2CO \rightarrow CH_4 + CH_3CH(\bullet)COCH_2CH_3 + \bullet CH_2CH_2CONH_2CH_3$						
METHYL FREE RADICAL + 3-PENTANONE						
76 KEB/PAR REACTION ORDER: 2.	300-450	1.9(+11)	0	3675±500	0.5	1.5

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
$CH_3\bullet + (CH_3CD_2)_2CO \rightarrow CH_4 + CH_3CD_2COCD_2CH_2\bullet$ METHYL FREE RADICAL + 3-PENTANONE-2,2,4,4-d_4 76 KER/PAR REACTION ORDER: 2.	500-600	2.0(+11)	0	5535±500	0.5	2.0
$CH_3\bullet + (CH_3CD_2)_2CO \rightarrow CH_3D + CH_3CD_2COCD(\bullet)CH_3$ METHYL FREE RADICAL + 3-PENTANONE-2,2,4,4-d_4 76 KER/PAR REACTION ORDER: 2.	500-600	1.3(+11)	0	4200±500	0.5	2.0
$CH_3\bullet + HCOO(CH_2)_3CH_3 \rightarrow CH_4 + \bullet COO(CH_2)_3CH_3$ $+ HCOOCH(\bullet)(CH_2)_2CH_3 + HCOOCH_2CH(\bullet)CH_2CH_3$ $+ HCOOCH_2CH_2CH(\bullet)CH_3 + HCOO(CH_2)_3CH_2$ METHYL FREE RADICAL + FORMIC ACID BUTYL ESTER 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-500	2.5(+11)	0	4980±500	0.5	2.0
$CH_3\bullet + CH_3CH_2COOCH_2CH_3 \rightarrow CH_4 + CH_3CH(\bullet)COOCH_2CH_3$ $+ CH_3CH_2COOCH(\bullet)CH_3 + \bullet CH_2CH_2COOCH_2CH_3$ $+ CH_3CH_2COOCH_2CH_2\bullet$ METHYL FREE RADICAL + PROPANOIC ACID ETHYL ESTER 76 KER/PAR REACTION ORDER: 2.	300-650	2.5(+11)	0	4125+500	0.5	1.5
$CH_3\bullet + (CH_3CH_2)_2NCH_3 \rightarrow CH_4 + CH_3CH(\bullet)N(CH_2CH_3)CH_3$ $+ \bullet CH_2CH_2N(CH_2CH_3)CH_3 + (CH_3CH_2)_2NCH_2\bullet$ METHYL FREE RADICAL + ETHANAMINE, N-ETHYL-N-METHYL- 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	420	3.0(+ 7)	-	-	0.5	2.0
$CH_3\bullet + (CH_3)_2NCON(CH_3)_2 \rightarrow CH_4 + \bullet CH_2N(CH_3)CON(CH_3)_2$ METHYL FREE RADICAL + UREA TETRAMETHYL- 76 KER/PAR REACTION ORDER: 2.	350-550	2.0(+11)	0	3975±500	0.5	1.5
$CH_3\bullet + cis\text{-}CH_3CH_2CH_2CH{=}CHCH_3 \rightarrow CH_3CH_2CH_2CH(\bullet)CH(CH_3)_2$ METHYL FREE RADICAL + cis-2-HEXENE 72 KER/PAR REACTION ORDER: 2.	298	-	-	4060		
$CH_3\bullet + cis\text{-}CH_3CH_2CH_2CH{=}CHCH_3 \rightarrow CH_3CH_2CH_2CH(CH_3)CH(\bullet)CH_3$ METHYL FREE RADICAL + cis-2-HEXENE 72 KER/PAR REACTION ORDER: 2.	298	-	-	4150		
$CH_3\bullet + CH_3CH_2CH_2C(CH_3){=}CH_2 \rightarrow CH_3CH_2CH_2C(\bullet)(CH_3)CH_2CH_3$ METHYL FREE RADICAL + 1-PENTENE, 2-METHYL- 72 KER/PAR REACTION ORDER: 2.	298	-	-	3450		
$CH_3\bullet + cis\text{-}(CH_3)_2CHCH{=}CHCH_3 \rightarrow (CH_3)_2CHCH(\bullet)CH(CH_3)_2$ METHYL FREE RADICAL + cis-2-PENTENE, 4-METHYL- 72 KER/PAR REACTION ORDER: 2.	298	-	-	4390		
$CH_3\bullet + (CH_3)_2C{=}C(CH_3)_2 \rightarrow CH_4 + (CH_3)_2C{=}(CH_3)CCH_2\bullet$ METHYL FREE RADICAL + 2-BUTENE, 2-3-DIMETHYL- 76 KER/PAR REACTION ORDER: 2.	403-614	7.8(+11)	0	4400±500	0.6	1.4
$CH_3\bullet + (CH_3)_2C{=}C(CH_3)_2 \rightarrow (CH_3)_3CC(\bullet)(CH_3)_2$						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F
METHYL FREE RADICAL + 2-BUTENE, 2-3-DIMETHYL-						
72 KER/PAR REACTION ORDER: 2.	403-453	1.0(+10)	0	3400		
NOTE: TENTATIVE k VALUE.						
k/k_{ref}: 0.2	453	-	-	-		
NOTE: k_{ref}: $CH_3\cdot + CH_2{=}CH_2$						

$CH_3\cdot + CH_3(CH_2)_4CH_3 \rightarrow CH_4 + CH_3(CH_2)_4CH_2\cdot$						
METHYL FREE RADICAL + HEXANE						
76 KER/PAR REACTION ORDER: 2.	350-800	4.8(+11)	0	5800±250	0.7	1.3
NOTE: TENTATIVE k VALUE.						

$CH_3\cdot + CH_3(CH_2)_4CH_3 \rightarrow CH_4 + CH_3CH_2CH(\cdot)CH_2CH_2CH_3$ + $CH_3CH_2CH_2CH_2CH(\cdot)CH_3$						
METHYL FREE RADICAL + HEXANE						
76 KER/PAR REACTION ORDER: 2.	350-800	7.9(+11)	0	4830±250	0.7	1.3
NOTE: TENTATIVE k VALUE.						

$CH_3\cdot + (CH_3)_2CHCH(CH_3)_2 \rightarrow CH_4 + \cdot CH_2CH(CH_3)CH(CH_3)_2$						
METHYL FREE RADICAL + BUTANE, 2,3-DIMETHYL-						
76 KER/PAR REACTION ORDER: 2.	350-750	9.5(+11)	0	5800±250	0.7	1.3
NOTE: TENTATIVE k VALUE.						

$CH_3\cdot + (CH_3)_2CHCH(CH_3)_2 \rightarrow CH_4 + (CH_3)_2C(\cdot)CH(CH_3)_2$						
METHYL FREE RADICAL + BUTANE, 2,3-DIMETHYL-						
76 KER/PAR REACTION ORDER: 2.	350-750	1.9(+11)	0	3975±250	0.7	1.3
NOTE: TENTATIVE k VALUE.						

$CH_3\cdot + (CH_3)_2CHCH(CH_3)_2 \rightarrow CH_4 + (CH_3)_2CHC(\cdot)(CH_3)_2$ + $\cdot CH_3CH(CH_3)CH(CH_3)_2$						
METHYL FREE RADICAL + BUTANE, 2,3-DIMETHYL-						
72 KCN REACTION ORDER: 2.	300-500	5.0(+10)	0	3445		

$CD_3\cdot + (CH_3)_2CHCH(CH_3)_2 \rightarrow CD_3H + (CH_3)_2C(\cdot)CH(CH_3)_2$ + $\cdot CH_2CH(CH_3)CH(CH_3)_2$						
METHYL-d_3 FREE RADICAL + BUTANE, 2,3-DIMETHYL-						
72 KCN REACTION ORDER: 2.	439-566	4.7(+11)	0	4525		

$CH_3\cdot + (CH_3)_2CHOCH(CH_3)_2 \rightarrow CH_4 + (CH_3)_2C(\cdot)OCH(CH_3)_2$ + $\cdot CH_2CH(CH_3)OCH(CH_3)_2$						
METHYL FREE RADICAL + PROPANE, 2,2'-OXYBIS-						
76 KER/PAR REACTION ORDER: 2.	400-600	2.1(+11)	0	4100±500	0.5	2.0

$CH_3\cdot + (CH_3)_2CHOOCH(CH_3)_2 \rightarrow CH_4 + (CH_3)_2C(\cdot)OOCH(CH_3)_2$ + $\cdot CH_2CH(CH_3)OOCH(CH_3)$						
METHYL FREE RADICAL + PEROXIDE, BIS(1-METHYLETHYL)-						
76 KER/PAR REACTION ORDER: 2.	300-450	2.3(+11)	0	4100±500	0.5	1.5

$CH_3\cdot + CH_3CH{=}NC(CH_3)_3 \rightarrow CH_4 + CH_3C(\cdot){=}NC(CH_3)_3$ + $\cdot CH_2CH{=}NC(CH_3)_3$ + $CH_3CH{=}NC(CH_3)_2CH_2\cdot$						
METHYL FREE RADICAL + PROPANIMINE, N-ETHYLIDENE-2-METHYL-						
76 KER/PAR REACTION ORDER: 2.	350-500	8.9(+10)	0	3925±500	0.5	1.5

CHEMICAL REACTIONS	T/K	A	B	E/R (in ^{o}K)	k factors f	k factors F
$CH_3\bullet + (CH_3)_2CHNHCH(CH_3)_2 \rightarrow CH_4 + (CH_3)_2CHN(\bullet)CH(CH_3)_2 + (CH_3)_2C(\bullet)NHCH(CH_3)_2$ METHYL FREE RADICAL + 2-PROPANAMINE, N-(1-METHYLETHYL)- 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-500	2.0(+11)	0	3370±750	0.5	2.0
$CH_3\bullet + (CH_3CH_2)_3N \rightarrow CH_4 + CH_3CH(\bullet)N(CH_2CH_3)_2 + \bullet CH_2CH_2N(CH_2CH_3)_2$ METHYL FREE RADICAL + ETHANAMINE, N,N-DIETHYL- 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-600	5.0(+11)	0	4000±500	0.5	2.0
$CH_3\bullet + (CH_3CH_2)_3CH \rightarrow CH_4 + (CH_3CH_2)_3C\bullet$ METHYL FREE RADICAL + PENTANE, 3-ETHYL- 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-750	9.5(+10)	0	3975±250	0.7	1.3
$CH_3\bullet + (CH_3CH_2)_3CH \rightarrow CH_4 + (CH_3CH_2)_2CHCH(\bullet)CH_3$ METHYL FREE RADICAL + PENTANE, 3-ETHYL- 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-750	6.0(+11)	0	4830±250	0.7	1.3
$CH_3\bullet + (CH_3CH_2)_3CH \rightarrow CH_4 + (CH_3CH_2)_2CHCH_2CH_2\bullet$ METHYL FREE RADICAL + PENTANE, 3-ETHYL- 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-750	7.1(+11)	0	5800±250	0.7	1.3
$CH_3\bullet + CH_3(CH_2)_6CH_3 \rightarrow CH_4 + CH_3(CH_2)_6CH_2\bullet$ METHYL FREE RADICAL + OCTANE 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-800	4.8(+11)	0	5800±250	0.7	1.3
$CH_3\bullet + CH_3(CH_2)_6CH_3 \rightarrow CH_4 + CH_3(CH_2)_3CH(\bullet)CH_2CH_2CH_3 + CH_3(CH_2)_4CH(\bullet)CH_2CH_3 + CH_3(CH_2)_5CH(\bullet)CH_3$ METHYL FREE RADICAL + OCTANE 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-800	1.2(+12)	0	4830±250	0.7	1.3
$CH_3\bullet + (CH_3)_3CCH_2CH(CH_3)_2 \rightarrow CH_4 + (CH_3)_3CCH(\bullet)CH(CH_3)_2$ METHYL FREE RADICAL + PENTANE, 2,2,4-TRIMETHYL- 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-750	2.0(+11)	0	4830±250	0.7	1.3
$CH_3\bullet + (CH_3)_3CCH_2CH(CH_3)_2 \rightarrow CH_4 + (CH_3)_3CCH_2C(\bullet)(CH_3)_2$ METHYL FREE RADICAL + PENTANE, 2,2,4-TRIMETHYL- 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-750	9.5(+10)	0	3975±250	0.7	1.3
$CH_3\bullet + (CH_3)_3CCH_2CH(CH_3)_2 \rightarrow CH_4 + (CH_3)_3CCH_2CH(CH_3)CH_2\bullet + \bullet CH_2C(CH_3)_2CH_2CH(CH_3)_2$ METHYL FREE RADICAL + PENTANE, 2,2,4-TRIMETHYL- 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-750	1.2(+12)	0	5800±250	0.7	1.3

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
$CH_3\bullet + (CH_3)_2CHCH(CH_3)CH(CH_3)_2 \rightarrow CH_4 + \bullet CH_2CH(CH_3)CH(CH_3)CH(CH_3)_2$ METHYL FREE RADICAL + PENTANE, 2,3,4-TRIMETHYL- 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-750	1.2(+12)	0	5800±250	0.7	1.3
$CH_3\bullet + (CH_3)_2CHCH(CH_3)CH(CH_3)_2 \rightarrow CH_4 + (CH_3)_2CHC(\bullet)(CH_3)CH(CH_3)_2 + (CH_3)C(\bullet)CH(CH_3)CH(CH_3)_2$ METHYL FREE RADICAL + PENTANE, 2,3,4-TRIMETHYL- 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-750	2.9(+11)	0	3975±250	0.7	1.3
$CH_3\bullet + (CH_3)_2CHCH(CH_3)CH(CH_3)_2 \rightarrow CH_4 + [C_8H_{17}\bullet]$ METHYL FREE RADICAL + PENTANE, 2,3,4-TRIMETHYL- 72 KON REACTION ORDER: 2.	414-605	4.7(+11)	0	4575		
$CH_3 + (CH_3)_3CC(CH_3)_3 \rightarrow CH_4 + \bullet CH_2C(CH_3)_2C(CH_3)_3$ METHYL FREE RADICAL + BUTANE, 2,2,3,3-TETRAMETHYL- 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-800	1.4(+12)	0	5800±250	0.7	1.3
$CH_3\bullet + (CH_3)_3COOC(CH_3)_3 \rightarrow CH_4 + \bullet CH_2C(CH_3)_2COOC(CH_3)_3$ METHYL FREE RADICAL + PEROXIDE, BIS(1,1-DIMETHYLETHYL)- 76 KER/PAR REACTION ORDER: 2.	350-500	1.8(+12)	0	5900±750	0.3	3.0
$CH_4 \rightarrow CH_3\bullet + H$ METHANE 70 BEN/O'N REACTION ORDER: 1.	1200-1800	2.0(+15)	0	52340		
$CH_4 + O \rightarrow CH_3\bullet + OH$ METHANE + OXYGEN ATOM 73 EBR/HUI REACTION ORDER: 2.	350-1000	2.1(+13)	0	4550	0.7	1.3
$CH_4 + O \rightarrow CH_3\bullet + OH$ METHANE + OXYGEN ATOM 76 ENG REACTION ORDER: 2.	1500-2500	2.0(+13)	0	4530±500	0.6	1.6
$CH_4 + H \rightarrow CH_3\bullet + H_2$ METHANE + HYDROGEN ATOM 76 ENG REACTION ORDER: 2.	1500-2500	6.3(+13)	0	5990±150	0.5	2.0
$CH_4 + D \rightarrow CH_3\bullet + HD$ METHANE + DEUTERIUM ATOM 72 KON REACTION ORDER: 2.	523-673	8.3(+12)	0	5100		
$CH_4 + OH \rightarrow CH_3\bullet + H_2O$ METHANE + HYDROXYL FREE RADICAL 76 ENG REACTION ORDER: 2.	1500-2500	3.2(+13)	0	2500±250	0.5	2.0
$CH_4 + CH \rightarrow CH_3\bullet + :CH_2$ METHANE + METHYLIDYNE FREE RADICAL 76 ENG REACTION ORDER: 2.	1500-2500	2.5(+11)	0.7	3000±2500	0.3	3.2

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
$CH_4 + CH_2 \rightarrow CH_3\bullet + CH_3\bullet$ METHANE + METHYLENE FREE RADICAL 76 ENG REACTION ORDER: 2.	1500-2500	1.3(+12)	0.7	10000±2500	0.3	3.2
$CH_4 + CH_3\bullet \rightarrow CH_3\bullet + CH_4$ METHANE + METHYL FREE RADICAL 76 KEE/PAR REACTION ORDER: 2.	450-800	4.0(+11)	0	7045±250	0.7	1.3
$CH_3D + CD_3\bullet \rightarrow CH_3\bullet + CD_4$ METHANE-d + METHYL-d_3 FREE RADICAL 76 KEE/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	400-650	5.0(+10)	0	7200±500	0.5	1.5
$CHD_3 + CH_3\bullet \rightarrow CD_3\bullet + CH_4$ METHANE-d_3 + METHYL FREE RADICAL 76 KEE/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	400-650	1.1(+11)	0	6995±250	0.7	1.3
$CD_4 + CH_3\bullet \rightarrow CD_3\bullet + CDH_3$ METHANE-d_4 + METHYL FREE RADICAL 76 KEE/PAR REACTION ORDER: 2.	370-550	2.5(+11)	0	7700±500	0.5	1.5
$CD_4\bullet + CD_3\bullet \rightarrow CD_3\bullet + CD_4$ METHANE-d_4 + METHYL-d_3 FREE RADICAL 72 KON REACTION ORDER: 2.	473-623	4.1(+12)	0	8960±250		
$CH_4 + CN \rightarrow HCN + CH_3\bullet$ METHANE + CYANOGEN FREE RADICAL 76 ENG REACTION ORDER: 2.	1500-2500	3.2(+11)	0.7	2500±2500	0.3	3.2
$CH_4 + M \rightarrow CH_3\bullet + H + M$ METHANE 76 ENG REACTION ORDER: 2.	1500-2500	2.0(+17)	0	44035±1000	0.5	2.0
$\bullet CHO \rightarrow CO + H$ METHYL, OXO-, FREE RADICAL 70 BEN/O'N REACTION ORDER: 1.	298	5.0(+13)	0	9560		
$\bullet CHO + O \rightarrow CO_2 + H$ METHYL, OXO-, FREE RADICAL + OXYGEN ATOM 76 ENG REACTION ORDER: 2. NOTE: k ESTIMATED.	1500-2500	3.2(+11)	0	0±1500		
$\bullet CHO + O \rightarrow CO + OH$ METHYL, OXO-, FREE RADICAL + OXYGEN ATOM 76 ENG REACTION ORDER: 2. NOTE: k ESTIMATED.	1500-2500	3.2(+11)	1.0	250±1500		
$\bullet CHO + O_2 \rightarrow CO + HO_2$ METHYL, OXO-, FREE RADICAL + OXYGEN MOLECULE 76 ENG REACTION ORDER: 2. NOTE: k ESTIMATED.	1500-2500	1.6(+12)	0	1500±2500		

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F

$\cdot CHO + H \rightarrow CO + H_2$ METHYL, OXO-, FREE RADICAL + HYDROGEN ATOM 76 ENG REACTION ORDER: 2.	1500-2500	1.6(+12)	0.5	0±2500	0.3	3.2

$\cdot CHO + OH \rightarrow CO + H_2O$ METHYL, OXO-, FREE RADICAL + HYDROXYL FREE RADICAL 76 ENG REACTION ORDER: 2. NOTE: k ESTIMATED.	1500-2500	3.2(+10)	1.0	0±1500		

$\cdot CHO + HO_2 \rightarrow HCHO + O_2$ METHYL, OXO-, FREE RADICAL + HYDROPEROXYL FREE RADICAL 76 ENG REACTION ORDER: 2. NOTE: k ESTIMATED.	1500-2500	1.0(+14)	0	1500±1500		

$\cdot CHO + N \rightarrow HCN + O$ METHYL, OXO-, FREE RADICAL + NITROGEN ATOM 76 ENG REACTION ORDER: 2. NOTE: k ESTIMATED.	1500-2500	1.0(+14)	0	0±1000		

$\cdot CHO + N \rightarrow CO + NH$ METHYL, OXO-, FREE RADICAL + NITROGEN ATOM 76 ENG REACTION ORDER: 2.	1500-2500	2.0(+11)	0.5	1000±2500	0.3	3.2

$\cdot CHO + NO \rightarrow CO + HNO$ METHYL, OXO-, FREE RADICAL + NITROGEN OXIDE(NO) 76 ENG REACTION ORDER: 2.	1500-2500	2.0(+11)	0.5	1000±2500	0.3	3.2

$\cdot CHO + HNO \rightarrow HCHO + NO$ METHYL, OXO-, FREE RADICAL + NITROSYL HYDRIDE 76 ENG REACTION ORDER: 2.	1500-2500	3.2(+11)	0.5	0±2500	0.3	3.2

$\cdot CHO + CH \rightarrow CO + CH_2$ METHYL, OXO-, FREE RADICAL + METHYLIDYNE FREE RADICAL 76 ENG REACTION ORDER: 2.	1500-2500	3.2(+10)	0.7	500±2500	0.3	3.2

$\cdot CHO + CH_2 \rightarrow CO + CH_3\cdot$ METHYL, OXO-, FREE RADICAL + METHYLENE FREE RADICAL 76 ENG REACTION ORDER: 2.	1500-2500	3.2(+10)	0.7	500±2500	0.3	3.2

$\cdot CHO + CH_3\cdot \rightarrow CO + CH_4$ METHYL, OXO-, FREE RADICAL + METHYL FREE RADICAL 76 ENG REACTION ORDER: 2.	1500-2500	3.2(+11)	0.5	0±2500	0.3	3.2

$\cdot CHO + \cdot CHO \rightarrow HCHO + CO$ METHYL, OXO-, FREE RADICAL 76 ENG REACTION ORDER: 2.	1500-2500	1.6(+11)	0.5	0±2500	0.3	3.2

$\cdot CHO + CN \rightarrow HCN + CO$ METHYL, OXO-, FREE RADICAL + CYANOGEN FREE RADICAL 76 ENG REACTION ORDER: 2.	1500-2500	2.0(+11)	0.5	0±2500	0.3	3.2

$HCHO + O \rightarrow \cdot CHO + OH$						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
FORMALDEHYDE + OXYGEN ATOM						
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+11)	1.0	1750±1000	0.5	2.0
HCHO + O → products						
FORMALDEHYDE + OXYGEN ATOM						
73 BER/BUI REACTION ORDER: 2.	300	9.0(+10)	-	-	0.7	1.3
HCDO + O → products						
FORMALDEHYDE-d + OXYGEN ATOM						
73 BER/BUI REACTION ORDER: 2.	300	4.9(+10)	-	-	0.7	1.3
$HCHO + H \rightarrow {}^{\bullet}CHO + H_2$						
FORMALDEHYDE + HYDROGEN ATOM						
76 ENG REACTION ORDER: 2.	1500-2500	1.3(+10)	1.0	1600	0.3	3.2
$HCHO + OH \rightarrow {}^{\bullet}CHO + H_2O$						
FORMALDEHYDE + HYDROXYL FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	3.2(+10)	1.0	0±1500	0.5	2.0
$HCHO + HO_2 \rightarrow {}^{\bullet}CHO + H_2O_2$						
FORMALDEHYDE + HYDROPEROXYL FREE RADICAL						
74 LLC REACTION ORDER: 2.	300-800	1.0(+12)	0	4000	0.7	1.5
NOTE: k FACTORS ARE: f = 0.1; F = 10. AT 300K.						
$HCHO + CH \rightarrow {}^{\bullet}CHO + CH_2$						
FORMALDEHYDE + METHYLIDYNE FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+11)	0.7	2000±2500	0.3	3.2
$HCHO + CH_2 \rightarrow {}^{\bullet}CHO + CH_3{}^{\bullet}$						
FORMALDEHYDE + METHYLENE FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	2.0(+11)	0	3270±1500	-	-
NOTE: k ESTIMATED.						
$HCHO + CH_3{}^{\bullet} \rightarrow {}^{\bullet}CHO + CH_4$						
FORMALDEHYDE + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	300-500	1.1(+11)	0	3070±500	0.5	1.5
76 ENG	1500-2500	1.0(+10)	0.5	3000±2500	0.3	3.2
$DCDO + CH_3{}^{\bullet} \rightarrow {}^{\bullet}CDO + CH_3D$						
FORMALDEHYDE-d + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	300-500	1.4(+11)	0	3975±500	0.5	1.5
HCHO + CN → ·CHO + HCN						
FORMALDEHYDE + CYANOGEN FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	1.3(+11)	0.7	1500±2500	0.3	3.2
HCHO + M → ·CHO + H + M						
FORMALDEHYDE						
76 ENG REACTION ORDER: 2.	1500-2500	3.2(+17)	0	43800±2500	0.3	3.2
$^{\bullet}CH_2OH \rightarrow HCHO + H$						
METHYL, HYDROXY-, FREE RADICAL						
70 BEN/O'N REACTION ORDER: 2.	673-773	1.1(+13)	0	14600		

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F

$CH_3O\cdot + O \rightarrow HCHO + OH$ METHOXY FREE RADICAL + OXYGEN ATOM 76 ENG REACTION ORDER: 2. NOTE: k ESTIMATED.	1500-2500	1.0(+14)	0	0±1500		

$CH_3O\cdot + O_2 \rightarrow HCHO + HO_2$ METHOXY FREE RADICAL + OXYGEN MOLECULE 76 ENG REACTION ORDER: 2. NOTE: k ESTIMATED.	1500-2500	1.0(+12)	0	3000±1500		

$CH_3O\cdot + H \rightarrow HCHO + H_2$ METHOXY FREE RADICAL + HYDROGEN ATOM 76 ENG REACTION ORDER: 2. NOTE: k ESTIMATED.	1500-2500	1.0(+14)	0	0±1500		

$CH_3O\cdot + OH \rightarrow HCHO + H_2O$ METHOXY FREE RADICAL + HYDROXY FREE RADICAL 76 ENG REACTION ORDER: 2. NOTE: k ESTIMATED.	1500-2500	3.2(+13)	0	0±1500		

$CH_3O\cdot + N \rightarrow HCHO + NH$ METHOXY FREE RADICAL + NITROGEN ATOM 76 ENG REACTION ORDER: 2.	1500-2500	1.0(+14)	0	0±1500		

$CH_3O\cdot + M \rightarrow HCHO + H + M$ METHOXY FREE RADICAL 76 ENG REACTION ORDER: 2. NOTE: k ESTIMATED.	1500-2500	4.0(+40)	-1.5	11375±1500		

$CH_3OH + CH_3\cdot \rightarrow \cdot CH_2OH + CH_4$ METHANOL + METHYL FREE RADICAL 76 KHR/PAR REACTION ORDER: 2.	350-500	1.9(+11)	0	5035±500	0.6	1.4

$CH_3OH + CH_3\cdot \rightarrow CH_3O\cdot + CH_4$ METHANOL + METHYL FREE RADICAL 76 KHR/PAR REACTION ORDER: 2.		6.2(+10)	0	4900±500	0.6	1.4

$CH_3OH + CH_3\cdot \rightarrow CH_3O\cdot + \cdot CH_2OH + CH_4$ METHANOL + METHYL FREE RADICAL 76 KHR/PAR REACTION ORDER: 2.	350-550	2.3(+11)	0	4930±500	0.6	1.4

$CH_3OD + CD_3\cdot \rightarrow \cdot CH_2OD + CD_3H$ METHANOL-d + METHYL-d_3 FREE RADICAL 76 KHR/PAR REACTION ORDER: 2.	400-500	1.9(+11)	0	5000±500	0.5	2.0

$CH_3OD + CD_3\cdot \rightarrow CH_3O\cdot + CD_4$ METHANOL-d + METHYL-d_3 FREE RADICAL 76 KHR/PAR REACTION ORDER: 2. NOTE: GIVEN WITH CAUTION.	400-500	3.2(+10)	0	5700±1000	0.5	2.0

$CD_3OH + CH_3\cdot \rightarrow \cdot CD_2OH + CH_3D$. METHAN-$d_3$-OL + METHYL FREE RADICAL						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F
76 KEE/PAR REACTION ORDER 2.	370-550	2.0(+11)	0	5940±500		
$CD_3OH + CH_3\cdot \rightarrow CD_3O\cdot + CH_4$						
METHAN-d_3-OL + METHYL FREE RADICAL						
76 KEE/PAR REACTION ORDER: 2.	370-550	6.2(+10)	0	4900±500	0.6	1.4
$CH_3OOH \rightarrow CH_3O\cdot + OH$						
HYDROPEROXIDE, METHYL						
70 BEN/C'N REACTION ORDER: 1.	565-651	7.9(+14)	0	21640		
NOTE: RATE CONSTANTS MAY BE SLIGHTLY LOW.						
$CS + O \rightarrow S + CO$						
CARBON MONOSULFIDE FREE RADICAL + OXYGEN ATOM						
76 BAU/DRY REACTION ORDER: 2.	300	1.3(+13)	-	-	0.5	1.5
$CS + O \rightarrow S + CO$						
CARBON MONOSULFIDE FREE RADICAL + OXYGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$CS + O \rightarrow SO + C$						
CARBON MONOSULFIDE FREE RADICAL + OXYGEN						
75 BEN/GOL REACTION ORDER: 2.		1.6(+12)	0.5	28940		
$CS + H \rightarrow S + CH$						
CARBON MONOSULFIDE FREE RADICAL + HYDROGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		1.3(+13)	0.5	50930		
$CS + H \rightarrow SH + C$						
CARBON MONOSULFIDE FREE RADICAL + HYDROGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		2.0(+13)	0.5	48870		
$CS + S \rightarrow S + CS$						
CARBON MONOSULFIDE FREE RADICAL + SULFUR ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$CS + S \rightarrow C + S_2$						
CARBON MONOSULFIDE FREE RADICAL + SULFUR ATOM						
75 BEN/GOL REACTION ORDER: 2.		1.6(+12)	0.5	40463		
$CS + S + M \rightarrow CS_2 + M$						
CARBON MONOSULFIDE FREE RADICAL + SULFUR ATOM						
76 BAU/DRY REACTION ORDER: 3.	1800-3700	8.7(+13)	0	4370	0.5	1.5
NOTE: $k_1 = Kk_{-1}$						
$CS + N \rightarrow S + \cdot CN$						
CARBON MONOSULFIDE FREE RADICAL + NITROGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		1.3(+12)	0.5	1160		
$CS + N \rightarrow C + NS$						
CARBON MONOSULFIDE FREE RADICAL + NITROGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		4.0(+12)	0.5	37200		
$CS + C \rightarrow S + C_2$						

CHEMICAL REACTIONS	T/K	A	B	E/R (in ^{o}K)	k factors f	F
CARBON MONOSULFIDE FREE RADICAL + CARBON ATOM						
75 BEN/GOL REACTION ORDER: 2.		5.0(+11)	0.5	20435		

CS + C → C + CS						
CARBON MONOSULFIDE FREE RADICAL + CARBON ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		

CS_2 + O → CS + SO						
CARBON DISULFIDE + OXYGEN ATOM						
76 BAU/DRY REACTION ORDER: 2.	200-1000	2.2(+13)	0	700	0.7	1.3

CS_2 + O → COS + S						
CARBON DISULFIDE + OXYGEN ATOM						
76 BAU/DRY REACTION ORDER: 2.	302	2.2(+11)	-	-	0.5	1.5

CS_2 + S → CS + S_2						
CARBON DISULFIDE + SULFUR ATOM						
76 BAU/DRY REACTION ORDER: 2.	298	3.9(+11)	-	-	0.5	1.5

CS_2 + M → CS + S + M						
CARBON DISULFIDE						
76 BAU/DRY REACTION ORDER: 2. M: AR	1800-3700	2.6(+15)	0	38960±9000	0.5	1.5

COS + O → CO + SO						
CARBON OXIDE SULFIDE + OXYGEN ATOM						
76 BAU/DRY REACTION ORDER: 2.	190-1200	1.6(+13)	0	2250±250	0.5	1.5
NOTE: k FACTORS CHANGING TO: f = 0.3; F = 3.0 ABOVE 300K.						

COS + H → CO + HS						
CARBON OXIDE SULFIDE						
76 BAU/DRY REACTION ORDER: 2.	298	1.3(+10)	-	-	0.8	1.3

COS + S → CO + S_2						
CARBON OXIDE SULFIDE + SULFUR ATOM						
76 BAU/DRY REACTION ORDER: 2.	230-2600	1.7(+12)	0	2050±230	0.3	3.0

CH_3S. + CH≡CH → $CH_3SCH{=}CH$.						
METHYLTHIO FREE RADICAL + ETHYNE						
72 KER/PAR REACTION ORDER: 2.	298-333	7.9(+ 7)	-	-		

CH_3S. + $CH_2{=}CH_2$ → $CH_3SCH_2CH_2$.						
METHYLTHIO FREE RADICAL + ETHENE						
72 KER/PAR REACTION ORDER: 2.	298	4.8(+ 8)	-	-		

CH_3S. + $CH_3CH{=}CHCH_3$ → $CH_3CH(SCH_3)CH(.)CH_3$						
METHYLTHIO FREE RADICAL + 2-BUTENE						
72 KER/PAR REACTION ORDER: 2.	298-333	1.6(+ 9)	-	-		
NOTE: cis-trans EQUILIBRIUM - WEIGHTED k.						

CH_3SH → CH_3. + SH						
METHANETHIOL						
70 BEN/O'N REACTION ORDER: 1.	1005-1102	3.2(+15)	0	38550		

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F
$CH_3SH + CH_3 \rightarrow CH_3S\cdot + \cdot CH_2SH + CH_4$ METHANETHIOL + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	303	1.2(+8)	-	-	0.5	2.0
$CD_3SH + CH_3\cdot \rightarrow CD_3S\cdot + CH_4$ METHANE-d_3-THIOL + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	400-500	1.1(+11)	0	2065±500	0.5	2.0
$CD_3SH + CH_3\cdot \rightarrow \cdot CD_2SH + CH_3D$ METHANE-d_3-THIOL + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	400-500	7.6(+10)	0	4200±250	0.5	2.0
$CN + O \rightarrow N + CO$ CYANOGEN FREE RADICAL + OXYGEN ATOM 76 ENG REACTION ORDER: 2.	1500-2500	1.0(+12)	0	0±2500	0.3	3.2
$CN + O \rightarrow NO + C$ CYANOGEN FREE RADICAL + OXYGEN ATOM 75 BEN/GOL REACTION ORDER: 2.		1.3(+12)	0.5	14545		
$CN + O_2 \rightarrow NO + CO$ CYANOGEN FREE RADICAL + OXYGEN MOLECULE 76 ENG REACTION ORDER: 2.	1500-2500	3.2(+11)	0	0±5000	0.3	3.2
$CN + H \rightarrow N + CH$ CYANOGEN FREE RADICAL + HYDROGEN ATOM 75 BEN/GOL REACTION ORDER: 2.		6.3(+12)	0.5	49775		
$CN + H \rightarrow NH + C$ CYANOGEN FREE RADICAL + HYDROGEN ATOM 75 BEN/GOL REACTION ORDER: 2.		1.0(+13)	0.5	52745		
$CN + H + M \rightarrow HCN + M$ CYANOGEN FREE RADICAL + HYDROGEN ATOM 76 ENG REACTION ORDER: 3.	1500-2500	3.2(+16)	-0.5	0±2500	0.3	3.2
$CN + H_2 \rightarrow HCN + H$ CYANOGEN FREE RADICAL + HYDROGEN MOLECULE 76 ENG REACTION ORDER: 2. NOTE: k ESTIMATED.	1500-2500	3.2(+12)	0	2500±1500		
$CN + OH \rightarrow HCN + O$ CYANOGEN FREE RADICAL + HYDROXYL FREE RADICAL 76 ENG REACTION ORDER: 2. NOTE: k ESTIMATED.	1500-2500	3.2(+12)	0	1500±1500		
$CN + S \rightarrow N + CS$ CYANOGEN FREE RADICAL + SULFUR ATOM 75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$CN + S \rightarrow C + NS$ CYANOGEN FREE RADICAL + SULFUR ATOM 75 BEN/GOL REACTION ORDER: 2.		2.0(+12)	0.5	32010		

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
$CN + N \rightarrow C + N_2$						
CYANOGEN FREE RADICAL + NITROGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$CN + NO \rightarrow CO + N_2$						
CYANOGEN FREE RADICAL + NITROGEN OXIDE(NO)						
76 ENG REACTION ORDER: 2.	1500-2500	3.2(+11)	0	0±2500	0.3	3.2
$CN + NH \rightarrow HCN + N$						
CYANOGEN FREE RADICAL + IMIDOGEN FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+11)	0.5	1000±2500	0.3	3.2
$CN + HNO \rightarrow HCN + NO$						
CYANOGEN FREE RADICAL + NITROSYL HYDRIDE						
76 ENG REACTION ORDER: 2.	1500-2500	4.0(+11)	0.5	0±2500	0.3	3.2
$CN + C \rightarrow N + C_2$						
CYANOGEN FREE RADICAL + CARBON ATOM						
75 BEN/GOL REACTION ORDER: 2.		2.5(+11)	0.5	19300		
$CN + C \rightarrow C + CN$						
CYANOGEN FREE RADICAL + CARBON ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$CN + CH_2 \rightarrow HCN + CH$						
CYANOGEN FREE RADICAL + METHYLENE FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	3.2(+12)	0	2500±1500		
NOTE: k ESTIMATED.						
$CN + CH_3\bullet \rightarrow HCN + CH_2$						
CYANOGEN FREE RADICAL + METHYL FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	1.0(+11)	0.7	1500±2500		
$CN + CH_4 \rightarrow HCN + CH_3$						
CYANOGEN FREE RADICAL + METHANE						
76 ENG REACTION ORDER: 2.	1500-2500	3.2(+11)	0.7	2500±2500	0.3	3.2
$CN + \bullet CHO \rightarrow CO + HCN$						
CYANOGEN FREE RADICAL + METHYL, OXO-, FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	2.0(+11)	0.5	0±2500	0.3	3.2
$CN + HCHO \rightarrow HCN + CHO$						
CYANOGEN FREE RADICAL + FORMALDEHYDE						
76 ENG REACTION ORDER: 2.	1500-2500	1.3(+11)	0.7	1500±2500	0.3	3.2
$C(NO_2)_4 \rightarrow \bullet C(NO_2)_3 + NO_2$						
METHANE, TETRANITRO-						
70 BEN/O'N REACTION ORDER: 1.	443-506	3.4(+17)	0	20575		
$HCN + OH \rightarrow CN + H_2O$						
HYDROCYANIC ACID + HYDROXYL FREE RADICAL						
76 ENG REACTION ORDER: 2.	1500-2500	2.0(+11)	0.6	2500±2500	0.3	3.2

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F

$CH_3NH_2 + CH_3\bullet \rightarrow CH_3NH\bullet + \bullet CH_2NH_2 + CH_4$ METHANAMINE + METHYL FREE RADICAL 76 KEE/PAR REACTION ORDER: 2.	350-650	2.1(+11)	0	4330±500	0.7	1.3

$CH_3NH_2 + CH_3\bullet \rightarrow \bullet CH_2NH_2 + CH_4$ METHANAMINE + METHYL FREE RADICAL 72 KON REACTION ORDER: 2.	388-617	5.4(+11)	0	5020±500	0.3	3.0

$CH_3ND_2 + CH_3\bullet \rightarrow CH_3ND\bullet + CH_3D$ METHANAMINE-d_2 + METHYL FREE RADICAL 76 KEE/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-450	2.0(+11)	0	5135±1000	0.5	1.5

$CH_3ND_2 + CH_3\bullet \rightarrow \bullet CH_2ND_2 + CH_4$ METHANAMINE-d_2 + METHYL FREE RADICAL 76 KEE/PAR REACTION ORDER: 2.	350-450	1.4(+11)	0	4530±500	0.7	1.3

$CD_3NH_2 + CH_3\bullet \rightarrow \bullet CD_2NH_2 + CH_3D$ METHAN-d_3-AMINE + METHYL FREE RADICAL 72 KEE/PAR REACTION ORDER: 2.	400-500	7.2(+10)	0	5100±500	0.5	1.5

$CD_3NH_2 + CH_3\bullet \rightarrow CD_3NH\bullet + CH_4$ METHAN-d_3-AMINE + METHYL FREE RADICAL 76 KEE/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	400-500	2.0(+11)	0	4530±750	0.5	2.0

$CH_2{=}N{=}N \rightarrow CH_2 + N_2$ METHANE, DIAZO- 70 HEN/O'N REACTION ORDER: 1.	498-723	1.0(+13)	0	17600		

$CH_3NHNH_2 \rightarrow CH_3NH\bullet + NH_2$ HYDRAZINE, METHYL- 70 HEN/O'N REACTION ORDER: 1. NOTE: SUSPECT ARRHENIUS FACTORS.	746-862	5.0(+16)	-	32600		

$CH_3NHNH_2 + CH_3\bullet \rightarrow CH_3N(\bullet)NH_2 + CH_3NHNH\bullet$ $+ \bullet CH_2NHNH_2 + CH_4$ HYDRAZINE, METHYL-, + METHYL FREE RADICAL 76 KEE/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	420	6.3(+ 8)	-	-		

$CH_3NO \rightarrow CH_2{=}NOH$ METHANE, NITROSO- 70 HEN/O'N REACTION ORDER: 1.	633-698	7.9(+12)	0	19800		

$HCONH_2 + CH_3\bullet \rightarrow HCONH\bullet + \bullet CONH_2 + CH_4$ FORMAMIDE + METHYL FREE RADICAL 76 KEE/PAR REACTION ORDER: 2.	350-500	3.6(+10)	0	3300±5000	0.5	1.5

$HCOND_2 + CH_3\bullet \rightarrow HCOND\bullet + CH_3D$ FORMAMIDE-N,N-d_2 + METHYL FREE RADICAL 76 KEE/PAR REACTION ORDER: 2.	350-500	2.0(+11)	0	4900±500	0.5	2.0

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
NOTE: TENTATIVE k VALUE.						
$HCOND_2 + CH_3\cdot \rightarrow \cdot COND_2 + CH_4$						
FORMAMIDE-N,N-d_2 + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	350-500	5.5(+10)	0	3575±500	0.5	2.0
$CH_3ONO \rightarrow CH_3O\cdot + NO$						
NITROUS ACID METHYL ESTER						
70 KEN/O'N REACTION ORDER: 1.	453-513	4.0(+15)	0	20700		
$CH_3NO_2 \rightarrow CH_3\cdot + NO_2$						
METHANE, NITRO-						
70 KEN/O'N REACTION ORDER: 1.	660	4.0(+15)	0	29700		
$CH_3NO_2 + CH_3\cdot \rightarrow \cdot CH_2NO_2 + CH_4$						
METHANE, NITRO- + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	300-500	1.0(+11)	0	5100±750	0.4	2.5
NOTE: TENTATIVE k VALUE.						
$CH_3ONO_2 \rightarrow CH_3O\cdot + NO_2$						
NITRIC ACID METHYL ESTER						
70 KEN/O'N REACTION ORDER: 1.	483-513	3.2(+15)	0	20030		
$CH_3ONH_2 + CH_3\cdot \rightarrow CH_3ONH\cdot + CH_4$						
HYDROXYLAMINE, O-METHYL-, + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	300-500	5.0(+10)	0	2265±500	0.5	1.5
$CH_3ONO_2 + CH_3\cdot \rightarrow CHO_3NO\cdot + CH_3D$						
HYDROXYLAMINE-N,N-d_2, O-METHYL, + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	300-500	3.5(+10)	0	2970±500	0.5	1.5
$C_2 + O \rightarrow C + CO$						
CARBON DIMER + OXYGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$C_2 + H \rightarrow C + CH$						
CARBON DIMER + HYDROGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		1.6(+13)	0.5	30450		
$C_2 + S \rightarrow C + CS$						
CARBON DIMER + SULFUR ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$C_2 + N \rightarrow C + CN$						
CARBON DIMER + NITROGEN ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$C_2 + C \rightarrow C + C_2$						
CARBON DIMER + CARBON ATOM						
75 BEN/GOL REACTION ORDER: 2.		6.3(+11)	0.5	0		
$CCO + CH{\equiv}CH \rightarrow$ products						
CARBON OXIDE(C_2O) + ETHYNE						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f F
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 0.3	304	-	-	-	
NOTE: k_{ref}: CCO + CH_2=CH_2					

CCO + CH_3CH=CH_2 → CO + CH_3CH=C=CH_2					
CARBON OXIDE(C_2O) + 1-PROPENE					
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 5.7	297	-	-	-	
NOTE: k_{ref}: CCO + CH_2=CH_2					

CCO + CH_3C≡CCH_3 → products					
CARBON OXIDE(C_2O) + 2-BUTYNE					
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 8.5	304	-	-	-	
NOTE: k_{ref}: CCO + CH_2=CH_2					

CCO + CH_2=$CHCH$=CH_2 → CO + CH_2=C=$CHCH$=CH_2					
CARBON OXIDE(C_2O) + 1,3-BUTADIENE					
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 210.	298	-	-	-	
NOTE: k_{ref}: CCO + CH_2=CH_2					

CCO + CH_3CH_2CH=CH_2 → CH_3CH_2CH=C=CH_2 + CO					
CARBON OXIDE(C_2O) + 1-BUTENE					
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 7.0	298	-	-	-	
NOTE: k_{ref}: CCO + CH_2=CH_2					

CCO + cis-CH_3CH=$CHCH_3$ → CO + cis-CH_3CH=C=$CHCH_3$					
CARBON OXIDE(C_2O) + cis-2-BUTENE					
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 9.1	297	-	-	-	
NOTE: k_{ref}: CCO + CH_2=CH_2					

CCO + trans-CH_3CH=$CHCH_3$ → CO + trans-CH_3CH=C=$CHCH_3$					
CARBON OXIDE(C_2O) + trans-2-BUTENE					
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 10.6	297	-	-	-	
NOTE: k_{ref}: CCO + CH_2=CH_2					

CCO + $(CH_3)_2C$=CH_2 → CO + $(CH_3)_2C$=C=CH_2					
CARBON OXIDE(C_2O) + 1-PROPENE, 2-METHYL-					
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 50.0	297	-	-	-	
NOTE: k_{ref}: CCO + CH_2=CH_2					

CCO + $(CH_3)_2C$=$CHCH_3$ → CO + $(CH_3)_2C$=C=$CHCH_3$					
CARBON OXIDE(C_2O) + 2-BUTENE, 2-METHYL-					
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 100.	298	-	-	-	
NOTE: k_{ref}: CCO + CH_2=CH_2					

CCO + $(CH_3)_2C$=$C(CH_3)_2$ → CO + $(CH_3)_2C$=C=$C(CH_3)_2$					
CARBON OXIDE(C_2O) + 2-BUTENE, 2,3-DIMETHYL-					
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 250.	298	-	-	-	
NOTE: k_{ref}: CCO + CH_2=CH_2					

CCO + $(CH_3)_2C$=C=$C(CH_3)_2$ → CO + $(CH_3)_2C$=C=$C(CH_3)_2$					
CARBON OXIDE(C_2O) + 2,3-PENTADIENE, 2,4-DIMETHYL-					
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 113.	304	-	-	-	
NOTE: k_{ref}: CCO + CH_2=CH_2					

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
$CH{\equiv}CH + O \rightarrow$ products						
ETHYNE + OXYGEN ATOM						
73 HER/BUI REACTION ORDER: 2.	200-700	1.4(+13)	0	1500	0.8	1.2
$CH{\equiv}CH + OH \rightarrow CH{\equiv}C\cdot + H_2O$						
ETHYNE + HYDROXYL FREE RADICAL						
72 KOM REACTION ORDER: 2.	300-2000	7.6(+12)	0	2335±400	0.5	2.1
$CH{\equiv}CH + S \rightarrow$ cy-CH=CHS						
ETHYNE + SULFUR ATOM						
72 KER/PAR REACTION ORDER: 2.	298	1.7(+11)	-	-		
$CH{\equiv}CH + N \rightarrow C_2H_2N$						
ETHYNE + NITROGEN ATOM						
72 KER/PAR REACTION ORDER: 2.	440	2.0(+9)	-	-		
NOTE: UPPER LIMIT.						
$CH{\equiv}CH + CH_3\cdot \rightarrow CH{\equiv}C\cdot + CH_4$						
ETHYNE + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	473-773	-	-	7100		
NOTE: GIVEN WITH CAUTION.						
$CH{\equiv}CH + CH_3\cdot \rightarrow CH_3C{\equiv}CH\cdot$						
ETHYNE + METHYL FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	371-479	2.5(+11)	0	3900		
$CH{\equiv}CH + CH_3S\cdot \rightarrow CH_3SC{\equiv}CH\cdot$						
ETHYNE + METHYLTHIO FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	298-333	7.9(+7)	-	-		
$CH{\equiv}CH + CCO \rightarrow$ products						
ETHYNE + CARBON OXIDE(C_2O)						
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 0.3	304	-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2 + CCO$						
$CH{\equiv}CH + CH_3CH_2\cdot \rightarrow CH_3CH_2C{\equiv}CH\cdot$						
ETHYNE + ETHYL FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	373-473	5.0(+10)	0	3500		
$CH{\equiv}CH + (CH_3)_2CH\cdot \rightarrow (CH_3)_2CHC{\equiv}CH\cdot$						
ETHYNE + ETHYL, 1-METHYL-, FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.		5.0(+10)	0	3475		
NOTE: TENTATIVE k VALUE.						
$CH{\equiv}CH + (CH_3)_3C\cdot \rightarrow (CH_3)_3CC{\equiv}CH\cdot$						
ETHYNE + ETHYL, 1,1-DIMETHYL-, FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	363-577	1.0(+11)	0	3875		
NOTE: TENTATIVE k VALUE.						
cis-CDH=CDH → trans-CDH=CHD						
cis-ETHENE-1,2-d_2						
70 BEN/G'N REACTION ORDER: 1.	723-823	1.0(+13)	0	32700		

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
$CH_2{=}CH_2 + O \rightarrow cy\text{-}CH_2CH_2O$ ETHENE + OXYGEN ATOM						
73 HER/HUI REACTION ORDER: 2.	200-500	3.3(+12)	0	565	0.8	1.2
$CH_2{=}CH_2 + H \rightarrow CH_3CH_2\cdot$ ETHENE + HYDROGEN ATOM						
72 KER/PAR REACTION ORDER: 2.	298	9.3(+13)	0	1410		
$CH_2{=}CH_2 + H + M \rightarrow CH_3CH_2\cdot + M$ ETHENE + HYDROGEN ATOM						
72 KGN REACTION ORDER: 3. M: H_2	298-813	5.6(+17)	0.5	495		
$CH_2{=}CH_2 + OH \rightarrow CH_2{=}CH\cdot + H_2O$ ETHENE + HYDROXYL FREE RADICAL						
72 KGN REACTION ORDER: 2.	3500-1400	1.6(+14)	0	2831±445	0.4	2.4
$CH_2{=}CH_2 + OH \rightarrow \cdot CH_2CH_2OH$ ETHENE + HYDROXYL FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.		1.1(+12)	-	-	0.8	1.3
$CH_2{=}CH_2 + HO_2 \rightarrow$ products ETHENE + HYDROPEROXYL FREE RADICAL						
74 LLO REACTION ORDER: 2.	300	1.0(+ 7)	-	-	0.1	10.
NOTE: RATIO DATA VERSUS kref. FOR $HO_2 + CO \rightarrow CO_2 + OH$ k FACTORS MIGHT BE HIGH.						
$CH_2{=}CH_2 + S \rightarrow cy\text{-}CH_2CH_2S$ ETHENE + SULFUR ATOM						
72 KER/PAR REACTION ORDER: 2.	298	8.1(+11)	-	-		
$CH_2{=}CH_2 + N \rightarrow$ products ETHENE + NITROGEN ATOM						
72 KER/PAR REACTION ORDER: 2.	320-550	2.0(+10)	0	353		
$CH_2{=}CH_2 + CH_3\cdot \rightarrow CH_2{=}CH\cdot + CH_4$ ETHENE + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	350-650	4.2(+11)	0	5600±500	0.5	1.5
$CH_2{=}CH_2 + CH_3\cdot \rightarrow CH_3CH_2CH_2\cdot$ ETHENE + METHYL FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	353-453	3.3(+11)	0	3900		
$CH_2{=}CH_2 + CH_3\cdot \rightarrow CH_3CH_2CH_2\cdot + (CH_3)_2CH\cdot$ ETHENE + METHYL FREE RADICAL						
72 KGN REACTION ORDER: 2.	350-705	2.0(+11)	0	3575±105	0.8	1.3
$CH_2{=}CH_2 + CH_3S\cdot \rightarrow CH_3SCH_2CH_2\cdot$ ETHENE + METHYLTHIO FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	298	4.8(+ 8)	-	-		
$CH_2{=}CH_2 + CH_3CH_2\cdot \rightarrow CH_3CH_2CH_2CH_2\cdot$ ETHENE + ETHYL FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	348-482	1.6(+11)	0	3675		

CHEMICAL REACTIONS	T/K	A	B	E/R (in ^{o}K)	k factors f	F
$CH_2{=}CH_2 + CH_3CH_2CH_2\bullet \rightarrow CH_3CH_2CH_2CH_2CH_2\bullet$						
ETHENE + PROPYL FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	375-503	1.9(+10)	0	3070		
NOTE: TENTATIVE k VALUE.						
$CH_2{=}CH_2 + (CH_3)_2CH\bullet \rightarrow (CH_3)_2CHCH_2CH_2\bullet$						
ETHENE + ETHYL, 1-METHYL-, FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	340-457	6.9(+10)	0	3475		
$CH_2{=}CH_2 + CH_3CH_2CH_2\bullet \rightarrow CH_3(CH_2)_4CH_2\bullet$						
ETHENE + BUTYL FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	352-405	2.3(+10)	0	3370		
NOTE: TENTATIVE k VALUE.						
$CH_2{=}CH_2 + (CH_3)_3C\bullet \rightarrow (CH_3)_3CCH_2CH_2\bullet$						
ETHENE + ETHYL, 1,1-DIMETHYL-, FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	300-650	2.8(+10)	0	3575		
$CH_2{=}CH_2 + (CH_3)_2CHCH_2CH_2\bullet \rightarrow (CH_3)_2CH(CH_2)_3CH_2\bullet$						
ETHENE + BUTYL, 3-METHYL-, FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	340-413	1.2(+10)	0	3235		
NOTE: TENTATIVE k VALUE.						
$CH_3CH_2\bullet \rightarrow CH_2{=}CH_2 + H$						
ETHYL FREE RADICAL						
72 KGN REACTION ORDER: 1.	673-893	2.3(+14)	0	19990±355	0.6	1.6
$CH_3CH_2\bullet + H_2 \rightarrow CH_3CH_3 + H$						
ETHYL FREE RADICAL + HYDROGEN MOLECULE						
72 KGN REACTION ORDER: 2.	473-823	3.0(+11)	0	5435		
$CH_3CH_2\bullet + CH{\equiv}CH \rightarrow CH_3CH_2CH{=}CH\bullet$						
ETHYL FREE RADICAL + ETHYNE						
72 KER/PAR REACTION ORDER: 2.	373-473	5.0(+10)	0	3500		
$CH_3CH_2\bullet + CH_2{=}CH_2 \rightarrow CH_3CH_2CH_2CH$						
ETHYL FREE RADICAL + ETHENE						
72 KER/PAR REACTION ORDER: 2.	348-482	1.6(+11)	0	3675		
$CH_3CH_2\bullet + CH_2{=}C{=}CH_2 \rightarrow CH_3CH_2CH_2C(\bullet){=}CH_2$						
ETHYL FREE RADICAL + 1,2-PROPADIENE						
72 KER/PAR REACTION ORDER: 2.	379-465	3.2(+11)	0	4630		
$CH_3CH_2\bullet + CH_2{=}CHCH_2OH \rightarrow CH_3CH_2CH(\bullet)CH_2OH$						
$+ \bullet CH_2CH(CH_2CH_3)CH_2OH$						
ETHYL FREE RADICAL + 2-PROPEN-1-OL						
72 KER/PAR REACTION ORDER: 2.	323-415	1.9(+11)	0	3901		
$CH_3CH_2\bullet + CH_2{=}CHCN \rightarrow CH_3CH_2CH_2CH(\bullet)CN + \bullet CH_2CH(CH_2CH_3)CN$						
ETHYL FREE RADICAL + 2-PROPENENITRILE						
72 KER/PAR REACTION ORDER: 2.	323-454	6.2(+10)	0	1700		

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F
$CH_3CH_2\bullet$ + $CH_3CH_2CH{=}CH_2$ → $CH_3CH_2CH_2CH(\bullet)CH_2CH_3$						
ETHYL FREE RADICAL + 1-BUTENE						
72 KER/PAR REACTION ORDER: 2.	298	-	-	3675		
$CH_3CH_2\bullet$ + cis-$CH_3CH{=}CHCH_3$ → $CH_3CH(CH_2CH_3)CH(\bullet)CH_3$						
ETHYL FREE RADICAL + cis-2-BUTENE						
72 KER/PAR REACTION ORDER: 2.	298	-	-	4265		
$CH_3CH_2\bullet$ + trans-$CH_3CH{=}CHCH_3$ → $CH_3CH(CH_2CH_3)CH(\bullet)CH_3$						
ETHYL FREE RADICAL + trans-2-BUTENE						
72 KHR/PAR REACTION ORDER: 2.	298	-	-	4350		
$CH_3CH_2\bullet$ + $CH_3COOCH{=}CH_2$ → $CH_3COOCH(\bullet)CH_2CH_2CH_3$ + $CH_3COOCH(CH_2CH_3)CH_2\bullet$						
ETHYL FREE RADICAL + ACETIC ACID ETHENYL ESTER						
72 KER/PAR REACTION ORDER: 2.	303-417	7.8(+10)	0	3475		
$CH_3CH_2\bullet$ + cis-$CH_3CH{=}CHCN$ → $CH_3CH(CH_2CH_3)CH(\bullet)CN$ + $CH_3CH(\bullet)CH(CH_2CH_3)CN$						
ETHYL FREE RADICAL + cis-2-BUTENENITRILE						
72 KER/PAR REACTION ORDER: 2.	323-454	1.5(+10)	0	2500		
$CH_3CH_2\bullet$ + trans-$CH_3CH{=}CHCN$ → $CH_3CH(CH_2CH_3)CH(\bullet)CN$ + $CH_3CH(\bullet)CH(CH_2CH_3)CN$						
ETHYL FREE RADICAL + trans-2-BUTENENITRILE						
72 KER/PAR REACTION ORDER: 2.	323-754	3.1(+10)	0	2600		
$CH_3CH_2\bullet$ + $CH_2{=}C(CH_3)CN$ → $CH_3CH_2CH_2C(\bullet)(CH_3)CN$ + $CH_2C(CH_3)(CH_2CH_3)CN$						
ETHYL FREE RADICAL + 2-PROPENENITRILE, 2-METHYL-						
72 KER/PAR REACTION ORDER: 2.	312-400	2.5(+11)	0	2300		
$CH_3CH_2\bullet$ + cis-$CH_3CH_2CH{=}CHCH_3$ → $CH_3CH_2CH(CH_2CH_3)CH(\bullet)CH_3$						
ETHYL FREE RADICAL + cis-2-PENTENE						
72 KER/PAR REACTION ORDER: 2.	298	-	-	4300		
NOTE: CRITICAL ENERGY OF REACTION.						
$CH_3CH_2\bullet$ + $(CH_3)_2CHCH{=}CH_2$ → $(CH_3)_2CHCH(\bullet)CH_2CH_2CH_3$						
ETHYL FREE RADICAL + 1-BUTENE, 3-METHYL-						
72 KER/PAR REACTION ORDER: 2.	298	-	-	3620		
NOTE: CRITICAL ENERGY OF REACTION.						
$CH_3CH_2\bullet$ + $CH_3COCH_2CH{=}CH_2$ → $CH_3COCH_2CH(\bullet)CH_2CH_2CH_3$ + $CH_3COCH_2CH(CH_2CH_3)CH_2\bullet$						
ETHYL FREE RADICAL + ACETIC ACID 2-PROPENYL ESTER						
72 KER/PAR REACTION ORDER: 2.	308-448	2.5(+11)	0	3900		
$CH_3CH_2\bullet$ + $CH_3CH_2COCH_2CH_3$ → CH_3CH_3 + $\bullet CH_2CH_2COCH_2CH_3$						
ETHYL FREE RADICAL + 3-PENTANONE						
72 KGN REACTION ORDER: 2.	300-520	2.8(+11)	0	3986+100	0.4	2.2
$CH_3CH_2\bullet$ + $CH_2{=}C(CH_3)C(CH_3){=}CH_2$ → $CH_3CH_2CH_2C(\bullet)(CH_3)C(CH_3){=}CH_2$						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F
• $\cdot CH_2C(CH_2)(CH_2CH_3)C(CH_3)=CH_2$						
ETHYL FREE RADICAL • 1,3-BUTADIENE, 2,3-DIMETHYL-						
72 KER/PAR REACTION ORDER: 2.	318-414	1.6(+11)	0	2265		
$CH_3CH_2\cdot + CH_3(CH_2)_3CH=CH_2 \rightarrow CH_3(CH_2)_3CH(\cdot)CH_2CH_2CH_3$						
$\cdot CH_3(CH_2)_3CH(CH_2CH_3)CH_2\cdot$						
ETHYL FREE RADICAL • 1-HEXENE						
72 KER/PAR REACTION ORDER: 2.	338-435	3.9(+10)	0	3400		
$CH_3CH_2\cdot + CH_3CH_2COOCH_2CH=CH_2 \rightarrow CH_3CH_2COOCH_2CH(\cdot)CH_2CH_2CH_3$						
$\cdot CH_3CH_2COOCH_2CH(CH_2CH_3)CH_2\cdot$						
ETHYL FREE RADICAL • PROPANOIC ACID 2-PROPENYL ESTER						
72 KER/PAR REACTION ORDER: 2.	352-435	2.5(+11)	0	3875		
$CH_3CH_2\cdot + CH_2=CHO(CH_2)_3CH_3 \rightarrow CH_3CH_2CH_2CH(\cdot)O(CH_2)_3CH_3$						
$\cdot CH_2CH(CH_2CH_3)O(CH_2)_3CH_3$						
ETHYL FREE RADICAL • BUTANE, 1-ETHENYLOXY-						
72 KER/PAR REACTION ORDER: 2.	303-435	2.5(+10)	0	3070		
$CH_3CH_2\cdot + CH_3(CH_2)_4C\equiv CH \rightarrow CH_3((CH_2)_4C(\cdot)=CHCH_2CH_3$						
$\cdot CH_3(CH_2)_4C(CH_2CH_3)=CH\cdot$						
ETHYL FREE RADICAL • 1-HEPTYNE						
72 KER/PAR REACTION ORDER: 2.	300-455	3.9(+11)	0	4430		
$CH_3CH_2\cdot + CH_3(CH_2)_4CH=CH_2 \rightarrow CH_3(CH_2)_4CH(\cdot)CH_2CH_2CH_3$						
$\cdot CH_3(CH_2)_4CH(CH_2CH_3)CH_2\cdot$						
ETHYL FREE RADICAL • 1-HEPTENE						
72 KER/PAR REACTION ORDER: 2.	359-439	6.2(+10)	0	3500		
$CH_3CH_2\cdot + (CH_3)_3CC(CH_3)=CH_2 \rightarrow$						
$CH_3C(CH_3)_2C(\cdot)(CH_3)CH_2CH_2CH_3$						
$\cdot CH_3C(CH_3)_2C(CH_3)(CH_2CH_3)CH_2\cdot$						
ETHYL FREE RADICAL • 1-HUTENE, 2,3,3-TRIMETHYL-						
72 KER/PAR REACTION ORDER: 2.	322-364	7.8(+ 9)	0	2800		
$CH_3CH_2\cdot + (CH_3)_2C=CHCH=C(CH_3)_2 \rightarrow$						
$(CH_3)_2C(CH_2CH_3)CH(\cdot)CH=C(CH_3)_2$						
$\cdot (CH_3)_2C(\cdot)CH(CH_2CH_3)CH=C(CH_3)_2$						
ETHYL FREE RADICAL • 2,4-HEXADIENE, 2,5-DIMETHYL-						
72 KER/PAR REACTION ORDER: 2.	328-420	6.2(+10)	0	3300		
$CH_3CH_2\cdot + CH_3(CH_2)_5CH=CH_2 \rightarrow CH_3(CH_2)_5CH(\cdot)CH_2CH_2CH_3$						
$\cdot CH_3(CH_2)_5CH(CH_2CH_3)CH_2\cdot$						
ETHYL FREE RADICAL • 1-OCTENE						
72 KER/PAR REACTION ORDER: 2.	339-425	1.2(+11)	0	3825		
$CH_3CH_2\cdot + (CH_3)_3CCH_2C(CH_3)=CH_2 \rightarrow$						
$(CH_3)_3CCH_2C(\cdot)(CH_3)CH_2CH_2CH_3$						
$\cdot (CH_3)_3CCH_2C(CH_3)(CH_2CH_3)CH_2\cdot$						
ETHYL FREE RADICAL • 1-PENTENE, 2,4,4-TRIMETHYL-						
72 KER/PAR REACTION ORDER: 2.	309-364	1.9(+10)	0	2870		
$CH_3CH_3 \rightarrow CH_3\cdot + CH_3\cdot$						

CHEMICAL REACTIONS	T/K	A	B	E/R (in ^{o}K)	k factors f	F
ETHANE						
70 BEN/G'N REACTION ORDER: 1.	298-858	5.6(+16)	0	45045		
$CH_3CH_3 + G \rightarrow CH_3CH_2\cdot + GH$						
ETHANE + OXYGEN ATOM						
73 BER/HUI REACTION ORDER: 2.		2.5(+13)	0	3200	0.7	1.3
$CH_3CH_3 + H \rightarrow CH_3CH_2\cdot + H_2$						
ETHANE + HYDROGEN ATOM						
72 KON REACTION ORDER: 2.	285-1440	1.0(+14)	0	4815±70	0.8	1.2
$CH_3CH_3 + OH \rightarrow CH_3CH_2\cdot + H_2O$						
ETHANE + HYDROXYL FREE RADICAL						
72 KON REACTION ORDER: 2.		1.3(+14)	0	1998		
$CH_3CH_3 + HO_2 \rightarrow CH_3CH_2\cdot + H_2O_2$						
ETHANE + HYDROPEROXYL FREE RADICAL						
74 LLO REACTION ORDER: 2.	300-1000	1.0(+12)	0	7000	0.1	10.
NOTE: UPPER LIMIT RECOMMENDED. RATIO DATA VERSUS k_{ref} FOR $HO_2 + CO \rightarrow HC + CO_2$						
$CH_3CH_3 + CH_3\cdot \rightarrow CH_3CH_2\cdot + CH_4$						
ETHANE + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.		5.6(+11)	0	5840±250	0.7	1.3
$CH_3CH_3 + CD_3\cdot \rightarrow CH_3CH_2\cdot + CD_3H$						
ETHANE + METHYL-d_3 FREE RADICAL						
72 KON REACTION ORDER: 2.	390-800	1.0(+12)	0	6085±165	0.7	1.4
$CH_3CD_3 + CD_3\cdot \rightarrow CH_3CD_2\cdot + CD_4$						
ETHANE-1,1,1-d_3 + METHYL-d_3 FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	500-750	4.3(+11)	0	6845±250	0.7	1.3
$CD_3CH_3 + CD_3\cdot \rightarrow CD_3CH_2\cdot + CD_3H$						
ETHANE-1,1,1-d_3 + METHYL-d_3 FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.		3.0(+11)	0	5900±250	0.7	1.3
$CD_3CD_3 + CH_3\cdot \rightarrow CD_3CD_2\cdot + CH_3D$						
ETHANE-d_6 + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	500-900	5.6(+11)	0	6600±250	0.7	1.3
$CD_3CD_3 + CD_3\cdot \rightarrow CD_3CD_2\cdot + CD_4$						
ETHANE-d_3 + METHYL-d_3 FREE RADICAL						
72 KON REACTION ORDER: 2.		4.6(+11)	0	6405		
$CH_2{=}C{=}O + O \rightarrow$ products						
ETHENONE + OXYGEN ATOM						
73 BER/HUI REACTION ORDER: 2.	298	5.3(+11)	-	-	0.7	1.3
$HOOC\text{-}COOH \rightarrow HCOOH + CO_2$						
ETHANEDIOIC ACID						
70 BEN/G'N REACTION ORDER: 1.	390-420	7.9(+11)	0	15100		

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
$CH_3C(O)\cdot \rightarrow CH_3\cdot + CO$ ETHYL, 1-OXO-, FREE RADICAL 72 KON REACTION ORDER: 1.	273-413	1.5(+10)	0	6790±115	0.7	1.4
$CH_3C(O)\cdot \rightarrow CH_3\cdot + CO$ ETHYL, 1-OXO-, FREE RADICAL 70 BHN/O'N REACTION ORDER: 1.		2.0(+10)	0	7550		
$CH_3CHO + O \rightarrow$ products ACETALDEHYDE + OXYGEN ATOM 73 BER/HUI REACTION ORDER: 2.	298-500	1.4(+13)	0	1140	0.5	2.0
$CH_3CHO + CH_3\cdot \rightarrow CH_3C(O)\cdot + CH_4$ ACETALDEHYDE + METHYL FREE RADICAL 76 KHR/PAR REACTION ORDER: 2.	300-525	8.5(+10)	0	3000±250	0.4	1.6
$CH_3CDO + CH_3\cdot \rightarrow CH_3C(O)\cdot + CH_3D$ ACETALDEHYDE-1-d + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	300-500	1.0(+11)	0	3975±500	0.5	1.5
cy-CH_2CH_2O + O → products OXIRANE + OXYGEN ATOM 73 BHR/HUI REACTION ORDER: 2.	298	7.0(+ 8)	-	-	0.6	1.5
cy-$CH_2CH_2O + CH_3\cdot \rightarrow$ cy-$CH_2CH(\cdot)O + CH_4$ OXIRANE + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	350-500	2.5(+11)	0	5435±750	0.5	2.0
$HCOOCH_3 + CH_3\cdot \rightarrow \cdot COOCH_3 + CH_4$ FORMIC ACID METHYL ESTER + METHYL FREE RADICAL 76 KHR/PAR REACTION ORDER: 2.	350-550	2.0(+11)	0	4900±500	0.5	1.5
$HCOOCH_3 + CH_3\cdot \rightarrow HCOOCH_2\cdot + CH_4$ FORMIC ACID METHYL ESTER + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	350-550	1.6(+11)	0	5635±500	0.5	1.5
$HCOOCH_3 + CH_3\cdot \rightarrow \cdot COOCH_3 + HCOOCH_3\cdot + CH_4$ FORMIC ACID METHYL ESTER + METHYL FREE RADICAL 76 KHR/PAR REACTION ORDER: 2.	350-550	3.0(+11)	0	4980±500	0.5	1.5
$DCOOCH_3 + CH_3\cdot \rightarrow \cdot COOCH_3 + CH_3D$ FORMIC-d ACID METHYL ESTER + METHYL FREE RADICAL 76 KHR/PAR REACTION ORDER: 2.	350-550	2.5(+11)	0	5900±500	0.5	1.5
$DCOOCH_3 + CH_3\cdot \rightarrow DCOOCH_2\cdot + CH_4$ FORMIC-d ACID METHYL ESTER + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2. NOTH: TENTATIVE k VALUE.		1.6(+11)	0	5635±500	0.5	1.5
$CH_3COOH \rightarrow CH_2{=}C{=}O + H_2O$ ACETIC ACID 70 BEN/O'N REACTION ORDER: 1. NOTE: SUSPECT VALUE.	773-973	8.9(+12)	0	33970		

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F

$CH_3COOD + CH_3^\bullet \rightarrow {}^\bullet CH_2COOD + CH_4$						
ACETIC ACID-d + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	300-600	1.6(+11)	0	5135±500	0.6	1.4

$CH_3CH_2O^\bullet \rightarrow CH_3^\bullet + HCHO$						
ETHOXY FREE RADICAL						
70 BEN/O'N REACTION ORDER: 1.	488-468	2.5(+13)	0	8805		

$CH_3CH_2OH + O \rightarrow$ products						
ETHANOL + OXYGEN ATOM						
73 BER/BUI REACTION ORDER: 2.	298	8.7(+10)	-	-	0.6	1.5

$CH_3CH_2OH + CH_3^\bullet \rightarrow CH_3CH_2O^\bullet + CH_4$						
ETHANOL + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	400-625	7.9(+10)	0	4730±500	0.6	1.4

$CH_3CH_2OH + CH_3^\bullet \rightarrow CH_3C^\bullet HOH + CH_4$						
ETHANOL + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	400-625	4.0(+11)	0	4900±500	0.6	1.4

$CH_3CH_2OH + CH_3^\bullet \rightarrow CH_3CH_2O^\bullet + CH_3CH^\bullet OH + {}^\bullet CH_2CH_2OH + CH_4$						
ETHANOL + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	400-625	5.1(+11)	0	4900±500	0.6	1.4

$CH_3CD_2OH + CH_3^\bullet \rightarrow CH_3CD^\bullet OH + CH_3D$						
ETHAN-1,1-d_2-OL + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	400-550	4.1(+11)	0	5735±500	0.6	1.4

$CH_3CD_2OH + CH_3^\bullet \rightarrow CH_3CD_2O^\bullet + {}^\bullet CH_2CD_2OH + CH_4$						
ETHAN-1,1-d_2-OL + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	400-550	7.1(+10)	0	4530±500	0.6	1.4

$CH_3CH_2OD + CD_3^\bullet \rightarrow CH_3CH_2O^\bullet + CD_4$						
ETHANOL-d + METHYL-d_3 FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	400-525	6.2(+10)	0	5135±500	0.5	2.0

$CH_3CH_2OD + CD_3^\bullet \rightarrow CH_3CH^\bullet OD + {}^\bullet CH_2CH_2OD + CD_3H$						
ETHANOL-d + METHYL-d_3 FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	400-525	4.4(+11)	0	4900±500	0.6	1.4

$CH_3OCH_3 \rightarrow CH_3O^\bullet + CH_3^\bullet$						
METHANE, OXYBIS-						
70 BEN/O'N REACTION ORDER: 1.	750-820	1.0(+16)	0	40765		

$CH_3OCH_3 + O \rightarrow$ products						
METHANE, OXYBIS- + OXYGEN ATOM						
73 BER/BUI REACTION ORDER: 2.	200-500	5.9(+12)	0	1520	0.7	1.3

$CH_3OCH_3 + CH_3^\bullet \rightarrow CH_3OCH_2^\bullet + CH_4$						
METHANE, OXYBIS- + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	300-550	4.2(+11)	0	5035±500	0.5	1.5

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
$CH_3OOCH_3 \rightarrow CH_3O\bullet + CH_3O\bullet$ PEROXIDE, DIMETHYL- 70 BEN/C'N REACTION ORDER: 1.	393-452	4.0(+15)	0	18570		
$CH_3OOCH_3 + CH_3\bullet \rightarrow CH_3OOCH_2\bullet + CH_4$ PEROXIDE, DIMETHYL- + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-500	4.2(+11)	0	5000±1000	0.3	3.0
$CH_3CH_2OOH \rightarrow CH_3CH_2O\bullet + OH$ HYDROPEROXYDE, ETHYL- 70 BEN/C'N REACTION ORDER: 1. NOTE: k PROBABLY RELIABLE.	553-653	2.2(+15)	0	21640		
$cy\text{-}CH_2CH_2S + CD_3\bullet \rightarrow cy\text{-}CH_2CH(\bullet)S + CD_3H$ THYIRANE + METHYL-d_3 FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	300-500	2.2(+11)	0	4800±500	0.5	2.0
$CH_3CH_2SH \rightarrow CH_2{=}CH_2 + H_2S$ ETHANETHIOL 70 BEN/C'N REACTION ORDER: 1.	785-938	1.0(+13)	0	25900		
$CH_3CH_2SH \rightarrow CH_3CH_2\bullet + \bullet SH$ ETHANETHIOL 70 BEN/C'N REACTION ORDER: 1.	785-938	6.3(+15)	0	36336		
$CH_3CH_2SH + CH_3\bullet \rightarrow CH_3CH_2S\bullet + CH_3CH(\bullet)SH + \bullet CH_2CH_2SH + CH_4$ ETHANETHIOL + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	303	3.5(+7)	-	-	0.5	2.0
$CH_3SO_2CH_3 \rightarrow CH_3SO_2\bullet + CH_3$ METHANE, SULFONYLBIS- 70 BEN/C'N REACTION ORDER: 1.	783-913	2.0(+14)	0	30500		
$CH_3NC \rightarrow CH_3CN$ METHANE, ISOCYANO- 70 BEN/C'N REACTION ORDER: 1.	472-533	4.0(+13)	0	19325		
$CH_3CN + CH_3\bullet \rightarrow \bullet CH_2CH + CH_4$ ACETONITRILE + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	350-600	5.4(+11)	0	5100±500	0.7	1.5
$CH_3CH_2NH_2 + CH_3\bullet \rightarrow CH_3CH_2NH\bullet + CH_3CH(\bullet)NH_2 + \bullet CH_2CH_2NH_2 + CH_4$ ETHANAMINE + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	350-500	2.9(+11)	0	4200±500	0.5	2.0
$CH_3CH_2NH_2 + CH_3\bullet \rightarrow CH_3CH_2NH\bullet + CH_4$ ETHANAMINE + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-500	2.0(+11)	0	4600±500	0.5	2.0

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F

$CD_3CH_2NH_2 + CH_3\bullet \rightarrow CH_4 + CH_3D + CD_3CH(\bullet)NH_2 + \bullet CD_2CH_2NH_2$						
ETHAN-2,2,2-d_3-AMINE + METHYL FREE RADICAL						
76 KHR/PAR REACTION ORDER: 2.	350-500	2.9(+11)	0	4200±500	0.5	2.0

$CD_3CH_2NH_2 + CH_3 \rightarrow CD_3CH_2NH\bullet + CH_4$						
ETHAN-2,2,2-d_3-AMINE + METHYL FREE RADICAL						
76 KHR/PAR REACTION ORDER: 2.	423	4.0(+5)	-	-		
NOTE: TENTATIVE k VALUE.						

$(CH_3)_2NH + CH_3\bullet \rightarrow (CH_3)_2N\bullet + \bullet CH_2NH(CH_3) + CH_4$						
METHANAMINE, N-METHYL- + METHYL FREE RADICAL						
76 KHR/PAR REACTION ORDER: 2.	350-650	1.6(+11)	0	3500±500	0.5	2.0

$(CH_3)_2NH + CH_3\bullet \rightarrow (CH_3)_2N\bullet + CH_4$						
METHANAMINE, N-METHYL- + METHYL FREE RADICAL						
76 KHR/PAR REACTION ORDER: 2.	350-650	6.5(+10)	0	3200±500	0.5	2.0

$(CH_3)_2ND + CH_3\bullet \rightarrow CH_2NDCH_3 + CH_4$						
METHANAMINE-d, N-METHYL-, + METHYL FREE RADICAL						
76 KHR/PAR REACTION ORDER: 2.	350-500	2.9(+11)	0	4400±500	0.5	1.5

$(CH_3)_2ND + CH_3\bullet \rightarrow (CH_3)_2N\bullet + CH_3D$						
METHANAMINE-d, N-METHYL-, + METHYL FREE RADICAL						
76 KHR/PAR REACTION ORDER: 2.	350-500	1.0(+11)	0	4300±500	0.5	1.5

$CH_3N{=}NCH_3 \rightarrow CH_3\bullet + CH_3N{=}N\bullet$						
DIAZENE, DIMETHYL-						
70 BEN/C'N REACTION ORDER: 1.	552-600	3.2(+16)	0	26400		

$CH_3N{=}NCH_3 + CH_3\bullet \rightarrow CH_2N{=}NCH_3 + CH_4$						
DIAZENE, DIMETHYL- + METHYL FREE RADICAL						
76 KHR/PAR REACTION ORDER: 2.	300-500	1.1(+11)	0	3975±250		

$CH_3N{=}NCH_3 + CH_3\bullet \rightarrow (CH_3)_2NN(\bullet)CH_3$						
DIAZENE, DIMETHYL- + METHYL FREE RADICAL						
72 KGN REACTION ORDER: 2.	300-450	5.0(+10)	0	3040±355		

$CD_3N{=}NCD_3 + CD_3\bullet \rightarrow \bullet CD_2N{=}NCD_3 + CD_4$						
DIAZENE, DI(METHYL-d_3)-, + METHYL-d_3 FREE RADICAL						
76 KHR/PAR REACTION ORDER: 2.	300-500	6.6(+10)	0	4125±500		

$NH_2CH_2CH_2NH_2 + CH_3\bullet \rightarrow \bullet NHCH_2CH_2NH_2$						
$+ NH_2CH(\bullet)CH_2NH_2 + CH_4$						
ETHANEDIAMINE + METHYL FREE RADICAL						
76 KHR/PAR REACTION ORDER: 2.	350-500	3.8(+11)	0	4200±500		

$NH_2CH_2CH_2NH_2 + CH_3\bullet \rightarrow \bullet NHCH_2CH_2NH_2 + CH_4$						
ETHANEDIAMINE + METHYL FREE RADICAL						
76 KHR/PAR REACTION ORDER: 2.	350-500	2.0(+11)	0	4430±500		
NOTE: TENTATIVE k VALUE.						

$ND_2CH_2CH_2ND_2 + CH_3\bullet \rightarrow \bullet NDCH_2CH_2ND_2 + CH_3D$						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f F
ETHANDI(AMINE-d_2) + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	350-500	3.2(+11)	0	5100±500	
NOTE: TENTATIVE k VALUE.					
$ND_2CH_2CH_2ND_2 + CH_3\bullet \rightarrow ND_2CH(\bullet)CH_2ND_2 + CH_4$ ETHANEDI(AMINE-d_2) + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	350-500	2.0(+11)	0	4025±500	
$(CH_3)_2NNH_2 + CH_3\bullet \rightarrow (CH_3)_2NNH\bullet + CH_4$ HYDRAZINE, 1,1-DIMETHYL-, + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	350-500	1.7(+11)	0	2870±500	
$(CH_3)_2NNH_2 + CH_3\bullet \rightarrow (CH_3)_2NNH\bullet + \bullet CH_2N(CH_3)NH_2 + CH_4$ HYDRAZINE, 1,1-DIMETHYL-, + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	350-500	2.4(+11)	0	2970±500	
$(CH_3)_2NND_2 + CH_3\bullet \rightarrow (CH_3)_2NND\bullet + CH_3D$ HYDRAZINE-d_2, 1,1-DIMETHYL- + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	350-500	2.1(+11)	0	3400±500	
$(CH_3)_2NND_2 + CH_3\bullet \rightarrow CH_2N(CH_3)ND_2 + CH_4$ HYDRAZINE-d_2, 1,1-DIMETHYL- + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	350-500	3.2(+11)	0	4125±750	
NOTE: TENTATIVE k VALUE.					
$CH_3NHNHCH_3 + CH_3\bullet \rightarrow CH_3N(\bullet)NHCH_3 + \bullet CH_2NHNHCH_3 + CH_4$ HYDRAZINE, 1,2-DIMETHYL-, + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	350-500	2.5(+11)	0	2400±250	
NOTE: TENTATIVE k VALUE.					
$CH_3NDNDCH_3 + CH_3\bullet \rightarrow CH_3N(\bullet)NDCH_3 + CH_3D$ HYDRAZINE-d_2, 1,2-DIMETHYL + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	350-500	2.0(+11)	0	2700±500	
NOTE: TENTATIVE k VALUE.					
$CH_3CH{=}NOH \rightarrow CH_3CH{=}N\bullet + OH$ ACETALDEHYDE, OXIME 70 BEN/C'N REACTION ORDER: 1.	603-713	6.8(+12)	0	23655	
$HCONHCH_3 + CH_3\bullet \rightarrow \bullet CONHCH_3 + HCON(\bullet)CH_3$ $+ HCONHCH_2\bullet + CH_4$ FORMAMIDE, N-METHYL-, + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	400-600	7.9(+10)	0	3800±500	
$CH_3CONH_2 + CH_3\bullet \rightarrow CH_3CONH\bullet + \bullet CH_2CONH_2 + CH_4$ ACETAMIDE + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	350-600	2.1(+11)	0	5235±500	
$CH_3CONH_2 + CH_3\bullet \rightarrow \bullet CH_2CONH_2 + CH_4$ ACETAMIDE + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	350-600	1.0(+11)	0	5200±500	
$CD_3CONH_2 + CD_3\bullet \rightarrow \bullet CD_2CONH_2 + CD_4$					

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
ACETAMIDE-2,2,2-d_3 + METHYL-d_3 FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	350-600	1.4(+11)	0	5800±500		
$CD_3CONH_2 + CD_3 \rightarrow CD_3CONH\bullet + CD_3H$ ACETAMIDE-2,2,2-d_3 + METHYL-d_3 FREE RADICAL 76 KHR/PAR REACTION ORDER: 2.	350-600	1.1(+11)	0	5235±500		
$CH_3CH_2NO_2 \rightarrow CH_2{=}CH_2 + HONO$ ETHANE, NITRO- 70 HBN/O'N REACTION ORDER: 1.	583-715	2.5(+12)	0	22645		
$CH_3CH_2ONO \rightarrow CH_3CH_2O\bullet + NO$ NITROUS ACID ETHYL ESTER 70 HBN/O'N REACTION ORDER: 1.	484-505	1.2(+16)	0	20400		
$CH_3CH_2ONO_2 \rightarrow CH_3CH_2O\bullet + NO_2$ NITRIC ACID ETHYL ESTER 70 HBN/O'N REACTION ORDER: 1.	434-474	3.2(+16)	0	19830		
$O_2NOCH_2CH_2ONO_2 \rightarrow$ products 1,2-ETHANEDIOL, DINITRATE 70 HBN/O'N REACTION ORDER: 1.	358-378	7.9(+15)	0	19630		
$CH_3N(O)N(O)CH_3 \rightarrow CH_3NO + CH_3NO$ DIAZENE, DIMETHYL-1,2-DIOXIDE- 70 HBN/O'N REACTION ORDER: 1.	374-404	2.5(+13)	0	11600		
$CH_3C{\equiv}CH + O \rightarrow$ products 1-PROPYNE + OXYGEN ATOM 73 BER/HUI REACTION ORDER: 2.	298	4.0(+11)	-	-	0.5	2.0
$CH_3C{\equiv}CH + H \rightarrow CH_3CH{=}CH\bullet + CH_3C(\bullet){=}CH_2$ 1-PROPYNE + HYDROGEN ATOM 72 KHR/PAR REACTION ORDER: 2. NOTE: k TAKEN AS LOWER LIMIT.	298	2.5(+11)	-	-		
$CH_3C{\equiv}CH + S \rightarrow$ cy-$CH_3C{=}CHS$ 1-PROPYNE + SULFUR ATOM 72 KHR/PAR REACTION ORDER: 2.	298	1.1(+12)	-	-		
$CH_3C{\equiv}CH + N \rightarrow$ products 1-PROPYNE + NITROGEN ATOM 72 KER/PAR REACTION ORDER: 2.	320-550	6.9(+10)	0	745		
$CH_3C{\equiv}CH + N \rightarrow$ products 1-PROPYNE + NITROGEN ATOM 72 KER/PAR REACTION ORDER: 2. NOTE: k_{ref}: CHCH + N	435	-	-	-		
$CH_3C{\equiv}CH + CH_3\bullet \rightarrow (CH_3)_2C{=}CH\bullet + CH_3C(\bullet){=}CHCH_3$ 1-PROPYNE + METHYL FREE RADICAL 72 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE. CH_3 ADDITION OCCURS	379-465	5.0(+11)	0	4400		

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F
PREDOMINANTLY AT TERMINAL C ATOM.						

$CH_3C{\equiv}CH + (CH_3)_2CH\bullet \rightarrow (CH_3)_2CHCH{=}C(\bullet)CH_3$						
1-PROPYNE + ETHYL, 1-METHYL-, FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	360-439	1.9(+ 9)	0	2870		
NOTE: SUSPECT k VALUE.						

$CH_3C{\equiv}CH + (CH_3)_3C\bullet \rightarrow (CH_3)_3CC(CH_3){=}CH\bullet$ + $(CH_3)_3CCH{=}C(\bullet)CH_3$						
1-PROPYNE + ETHYL-, 1,1-DIMETHYL-, FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	360-439	5.0(+ 8)	0	2770		
NOTE: SUSPECT k VALUE.						

$CH_2{=}C{=}CH_2 + CH_3\bullet \rightarrow CH_3CH_2C(\bullet){=}CH_2$						
1,2-PROPADIENE + METHYL FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	373-483	2.0(+11)	0	4100		

$CH_3{-}C{=}CH_2 + CH_3CH_2\bullet \rightarrow CH_3CH_2CH_2C(\bullet)CH_2$						
1,2-PROPADIENE + ETHYL FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	379-465	3.2(+11)	0	4630		

$CH_2{=}C{=}CH_2 + (CH_3)_2CH\bullet \rightarrow (CH_3)_2CHCH_2C(\bullet){=}CH_2$						
1,2-PROPADIENE + ETHYL, 1-METHYL-, FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	366-473	3.6(+10)	0	3660		
NOTE: TENTATIVE k VALUE.						

$CH_3CH{=}CH_2 \rightarrow CH_2{=}CHCH_2\bullet + H$						
1-PROPENE						
70 BEN/C'N REACTION ORDER: 1.	953-1143	2.0(+15)	0	44900		

$CH_3CH{=}CH_2 + O \rightarrow cy\text{-}(CH_3)CHCH_2O$						
1-PROPENE + OXYGEN ATOM						
73 KER/HUI REACTION ORDER: 2.	200-500	2.5(+12)	0	38	0.8	1.2

$CH_3CH{=}CH_2 + H \rightarrow CH_3CH_2CH_2\bullet$						
1-PROPENE + HYDROGEN ATOM						
72 KER/PAR REACTION ORDER: 2.	298	11.2(+12)	0	1460		
NOTE: TENTATIVE k VALUE.						

$CH_3CH{=}CH_2 + H \rightarrow CH_3CH(\bullet)CH_3$						
1-PROPENE + HYDROGEN ATOM						
72 KER/PAR REACTION ORDER: 2.	298	7.2(+12)	0	600		
NOTE: ARRHENIUS PARAMETERS ARE MINIMUM VALUES OF THEIR HIGH PRESSURE LIMITS.						

$CH_3CH{=}CH_2 + OH \rightarrow CH_3CH(\bullet)CH_2OH + CH_3CH(OH)CH_2\bullet$						
1-PROPENE + HYDROXYL FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	300	6.6(+12)	-	-		
NOTE: ADDITION TO TERMINAL CARBON OF DOUBLE BOND IS PROBABLY 95%.						

$CH_3CH{=}CH_2 + S \rightarrow cy\text{-}(CH_3)CHCH_2S$						
1-PROPENE + SULFUR ATOM						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
72 KER/PAR REACTION ORDER: 2.	298	5.8(+12)	-	-		
$CH_3CH{=}CH_2 + S \rightarrow cy\text{-}(CH_3)CHCH_2S$						
1-PROPENE + SULFUR ATOM						
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 6.9	298	-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2 + S$						
$CH_3CH{=}CH_2 + S^*(^1D) \rightarrow cy\text{-}(CH_3)CHCH_2S$						
1-PROPENE + SULFUR ATOM(^1D)						
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 1.7	300	-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2 + S^*(^1D)$						
$CH_3CH{=}CH_2 + N \rightarrow$ products						
1-PROPENE + NITROGEN ATOM						
72 KER/PAR REACTION ORDER: 2.	320-550	1.2(+11)	0	655		
$CH_3CH{=}CH_2 + N \rightarrow$ products						
1-PROPENE + NITROGEN ATOM						
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 2.8	435	-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2 + N$						
$CH_3CH{=}CH_2 + {}^1CH_2 \rightarrow$ products						
1-PROPENE + METHYLENE FREE RADICAL						
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 1.27	297	-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2 + {}^1CH_2$						
$CH_3CH{=}CH_2 + {}^3CH_2 \rightarrow$ products						
1-PROPENE + METHYLENE FREE RADICAL						
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 1.0	297	-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2 + {}^3CH_2$						
$CH_3CH{=}CH_2 + CH_3\bullet \rightarrow CH_3C(\bullet){=}CH_2 + CH_4$						
1-PROPENE + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	350-600	1.4(+11)	0	4430±500		
$CH_3CH{=}CH_2 + CH_3\bullet \rightarrow [C_3H_5\bullet] + CH_4$						
1-PROPENE + METHYL FREE RADICAL						
72 KGN REACTION ORDER: 2.	350-580	3.2(+10)	0	3775±300		
$CH_3CH{=}CH_2 + CH_3\bullet \rightarrow CH_3CH_2CH(\bullet)CH_3 + (CH_3)_2CHCH_2\bullet$						
1-PROPENE + METHYL FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	353-453	1.7(+11)	0	3770		
$CH_3CH{=}CH_2 + CH_3\bullet \rightarrow CH_3CH_2CH(\bullet)CH_3 + (CH_3)_2CHCH_2\bullet$						
1-PROPENE + METHYL FREE RADICAL						
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 0.72	453	-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2 + CH_3$						
$CH_3CH{=}CH_2 + CCO \rightarrow CH_3CH{=}C{=}CH_2 + CO$						
1-PROPENE + CARBON OXIDE(C_2O)						
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 5.7	297	-	-	-		

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f F
NOTE: k_{ref}: $CH_2{=}CH_2$ + CCC					

$CH_3CH{=}CH_2$ + $CH_3CH_2CH(\bullet)CH_3$ → $CH_3CH_2CH(CH_3)CH(CH_3)CH_2\bullet$ + $CH_3CH_2CH(CH_3)CH_2CH(\bullet)CH_3$					
1-PROPENE + PROPYL, 1-METHYL-, FREE RADICAL					
72 KER/PAR REACTION ORDER: 2.	381-412	6.3(+10)	0	3725	
NOTE: TENTATIVE k VALUE.					

$CH_3CH_2CH_2\bullet$ → $CH_3\bullet$ + $CH_2{=}CH_2$					
1-PROPYL FREE RADICAL					
72 KON REACTION ORDER: 1.	300-750	5.8(+14)	0	16880±350	

$CH_3CH_2CH_2\bullet$ → $CH_3\bullet$ + $CH_2{=}CH_2$					
1-PROPYL FREE RADICAL					
70 BEN/D'N REACTION ORDER: 1.	297-564	4.0(+13)	0	16660	

$CH_3CH_2CH_2\bullet$ → $CH_3CH{=}CH_2$ + H					
1-PROPYL FREE RADICAL					
70 BEN/D'N REACTION ORDER: 1.	298-723	6.3(+13)	0	1 9100	

$CH_3CH_2CH_2\bullet$ + $CH_2{=}CH_2$ → $CH_3CH_2CH_2CH_2CH_2\bullet$					
1-PROPYL FREE RADICAL + ETHENE					
72 KON REACTION ORDER: 2.	375-503	1.9(+10)	0	3070	
NOTE: TENTATIVE k VALUE					

$CH_3CH_2CH_2\bullet$ + $CH_3CH_2CH{=}CH_2$ → $CH_3CH_2CH(\bullet)CH_2CH_2CH_2CH_3$					
1-PROPYL FREE RADICAL + 1-BUTENE					
72 KER/PAR REACTION ORDER: 2.	298	-	-	3630	

$CH_3CH_2CH_2\bullet$ + cis-$CH_3CH{=}CHCH_3$ → $CH_3CH(CH_2CH_2CH_3)CH(\bullet)CH_3$					
1-PROPYL FREE RADICAL + cis-2-BUTENE					
72 KER/PAR REACTION ORDER: 2.	298	-	-	4370	

$CH_3CH_2CH_2\bullet$ + trans-$CH_3CH{=}CHCH_3$ → $CH_3CH(CH_2CH_2CH_3)CH(\bullet)CH_3$					
1-PROPYL FREE RADICAL + trans-2-BUTENE					
72 KER/PAR REACTION ORDER: 2.	298	-	-	4515	

$CH_3CH_2CH_2\bullet$ + $CH_3CH_2CH_2CH{=}CH_2$ → $CH_3CH_2CH_2CH(\bullet)CH_2CH_2CH_2CH_3$					
1-PROPYL FREE RADICAL + 1-PENTENE					
72 KER/PAR REACTION ORDER: 2.	298	-	-	3410	

$(CH_3)_2CH\bullet$ → CH_3 + $CH_2{=}CH_2$					
ETHYL, 1-METHYL-, FREE RADICAL					
72 KON REACTION ORDER: 1.	690-814	1.9(+11)	0	16045±1150	

$(CH_3)_2CD\bullet$ → $CH_3CD{=}CH_2$ + H.					
ETHYL-1-d, 1-METHYL-, FREE RADICAL					
70 BEN/D'N REACTION ORDER: 1.	673-777	2.00(+14)	0	20800	

$(CH_3)_2CH\bullet$ + $CH{\equiv}CH$ → $(CH_3)_2CHCH{=}CH\bullet$					
ETHYL, 1-METHYL, FREE RADICAL + ETHYNE					

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
72 KER/PAR REACTION ORDER: 2.	363-577	5.0(+10)	0	3475		
NOTE: TENTATIVE k VALUE.						

$(CH_3)_2CH\bullet + CH_2{=}CH_2 \rightarrow (CH_3)_2CHCH_2CH_2\bullet$						
ETHYL, 1-METHYL-, FREE RADICAL + ETHENE						
72 KER/PAR REACTION ORDER: 2.	340-457	6.9(+10)	0	3475		

$(CH_3)_2CH\bullet + CH_3C{\equiv}CH \rightarrow (CH_3)_2CHCH{=}C(\bullet)CH_3$						
ETHYL, 1-METHYL-, FREE RADICAL + 1-PROPYNE						
72 KER/PAR REACTION ORDER: 2.	360-439	1.90(+9)	0	2870		
NOTE: SUSPECT k VALUE.						

$(CH_3)_2CH\bullet + CH_2{=}C{=}CH_2 \rightarrow (CH_3)_2CHCH_2C(\bullet){=}CH_2$						
ETHYL, 1-METHYL-, FREE RADICAL + 1,2-PROPADIENE						
72 KER/PAR REACTION ORDER: 2.	366-473	3.6(+10)	0	3600		
NOTE: TENTATIVE k VALUE.						

$(CH_3)_2CH\bullet + CH_3CH_2CH{=}CH_2 \rightarrow (CH_3)_2CHCH_2CH(\bullet)CH_2CH_3$						
ETHYL, 1-METHYL-, FREE RADICAL + 1-BUTENE						
72 KER/PAR REACTION ORDER: 2.	298	-	-	3480		
NOTE: CRITICAL ENERGY OF REACTION.						

$(CH_3)_2CH\bullet + cis\text{-}CH_3CH{=}CHCH_3 \rightarrow CH_3CH[CH(CH_3)_2]CH(\bullet)CH_3$						
ETHYL, 1-METHYL-, FREE RADICAL + cis-2-BUTENE						
72 KER/PAR REACTION ORDER: 2.	298	-	-	3950		

$(CH_3)_2CH\bullet + trans\text{-}CH_3CH{=}CHCH_3 \rightarrow CH_3CH[CH(CH_3)_2]CH(\bullet)CH_3$						
ETHYL, 1-METHYL-, FREE RADICAL + trans-2-BUTENE						
72 KER/PAR REACTION ORDER: 2.	298	-	-	4065		
NOTE: CRITICAL ENERGY OF REACTION.						

$CH_3CH_2CH_3 + O \rightarrow$ products						
PROPANE + OXYGEN ATOM						
73 BER/BUI REACTION ORDER: 2.	298	9.0(+9)	-	-	0.7	2.0

$CH_3CH_2CH_3 + H \rightarrow (CH_3)_2CH\bullet + CH_3CH_2CH_2\bullet + H_2$						
PROPANE + HYDROGEN ATOM						
72 KON REACTION ORDER: 2.	333-933	1.0(+13)	0	3130±180		

$CH_3CH_2CH_3 + HO_2 \rightarrow (CH_3)_2CH\bullet + H_2O_2$						
PROPANE + HYDROPEROXYL FREE RADICAL						
74 LLO REACTION ORDER: 2.	300-1000	2.0(+11)	0	5300		
NOTE: UPPER LIMIT RECOMMENDED. RATIO DATA VERSUS k_{ref} FOR $HO_2 + HO_2 \rightarrow H_2O_2 + O_2$						

$CH_3CH_2CH_3 + CH_3\bullet \rightarrow (CH_3)_2CH\bullet + CH_4$						
PROPANE + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	550-750	2.0(+11)	0	4820±250		

$CH_3CD_2CH_3 + CD_3\bullet \rightarrow (CH_3)_2CD\bullet + CD_4$						
PROPANE-2,2-d_2 + METHYL-d_3 FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	550-750	2.5(+11)	0	5735±250		

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f F
$CH_3CD_2CH_3$ + CD_3• → $CH_3CD_2CH_2$• + CD_3H PROPANE-2,2-d_2 + METHYL-d_3 FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	550-750	4.4(+11)	0	5735±250	
CH_3COCH_2• → CH_3• + CH_2=C=O PROPYL, 2-OXO-, FREE RADICAL 70 BEN/O'N REACTION ORDER: 1.	365-435	3.2(+12)	0	20130	
CH_3CH_2CHO + CH_3• → CH_3CH_2C(O)• + CH_4 PROPANOL + METHYL FREE RADICL 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-500	1.0(+11)	0	2970±500	
$(CH_3)_2CO$ → CH_3C(O)• + CH_3• I-PROPANONE 70 BEN/O'N REACTION ORDER: 1.	990-1101	1.8(+16)	0	40765	
$(CH_3)_2CO$ + H → CH_3COCH_2• + H_2 2-PROPANONE + HYDROGEN ATOM 72 KON REACTION ORDER: 2.	298-873	4.6(+13)	0	4220±20	
$(CH_3)_2CO$ + CH_3 → CH_3COCH_2• + CH_4 2-PROPANONE + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	350-700	3.5(+11)	0	4900±250	
$(CD_3)_2CO$ + CD_3• → CD_3COCD_2• + CD_4 2-PROPANONE-1,1,1,3,3,3-d_6 + METHYL-d_3 FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	350-800	4.8(+11)	0	5735±250	
CH_2=$CHCH_2OH$ + CH_3CH_2• → $CH_3CH_2CH_2CH$(•)CH_2OH + •$CH_2CH(CH_2CH_3)CH_2OH$ 2-PROPEN-1-OL + ETHYL FREE RADICAL 72 KER/PAR REACTION ORDER: 2.	323-415	1.9(+11)	0	3901	
$HCOOCH_2CH_3$ → $HCOOH$ + CH_2=CH_2 FORMIC ACID ETHYL ESTER 70 BEN/O'N REACTION ORDER: 1.	648-920	2.5(+12)	0	24300	
$HCOOCH_2CH_3$ + CH_3• → •$COOCH_2CH_2$ + $HCOOCH$(•)CH_3 + CH_4 FORMIC ACID ETHYL ESTER + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-500	2.5(+11)	0	5100±500	
CH_3COOCH_3 + CH_3• → •CH_2COOCH_3 + CH_3COOCH_2• + CH_4 ACETIC ACID METHYL ESTER + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	350-600	2.1(+11)	0	5035±500	
CH_3COOCD_3 + CH_3• → •CH_2COOCD_3 + CH_4 ACETIC ACID METHYL-d_3 ESTER + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	350-650	1.9(+11)	0	5035±500	
CD_3COOCH_3 + CH_3• → CD_3COOCH_2 + CH_4 ACETIC-d_3 ACID METHYL ESTER + METHYL FREE RADICAL					

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F
76 KER/PAR REACTION ORDER: 2.	400-600	1.7(+11)	0	5990±500		
$CH_3OCOOCH_3 + CH_3\bullet \rightarrow \bullet CH_2OCOOCH_3 + CH_4$						
CARBONIC ACID DIMETHYL ESTER + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	350-500	3.2(+11)	0	5800±750		
$(CH_3)_2CHOH + O \rightarrow$ products						
2-PROPANOL + OXYGEN ATOM						
73 HER/HUI REACTION ORDER: 2.	298	1.3(+11)	-	-	0.6	1.5
$(CH_3)_2CDOH + CH_3\bullet \rightarrow (CH_3)_2C(\bullet)OH + CH_3D$						
2-PROPAN-2-d-OL + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	400-525	1.9(+11)	0	4990±500		
$(CH_3)_2CHOD + CD_3\bullet \rightarrow (CH_3)_2C(\bullet)OD + \bullet CH_2CH(CH_3)OD + CD_3H$						
2-PROPANOL-d + METHYL-d_3 FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	400-525	1.5(+11)	0	3975±500		
$(CH_3)_2CHOOH \rightarrow (CH_3)_2CHO\bullet + OH$						
HYDROPEROXIDE, 1-METHYLETHYL						
70 HEN/O'N REACTION ORDER: 1.	553-653	3.2(+15)	0	21640		
$cy\text{-}CH_2CH_2CH_2S + CH_3 \rightarrow cy\text{-}CH_2CH(\bullet)CH_2S + CH_4$						
THIETANE + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	300-450	3.2(+11)	0	4630±750		
NOTE: TENTATIVE k VALUE.						
$(CH_3)_2CHSH + CH_3\bullet \rightarrow (CH_3)_2CHS\bullet + (CH_3)_2C(\bullet)SH$						
$+ \bullet CH_2CH(CH_3)SH + CH_4$						
2-PROPANETHIOL + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	303	4.1(+7)	-	-		
NOTE: TENTATIVE k VALUE.						
$CH_2{=}CHCN + CH_3CH_2\bullet \rightarrow CH_3CH_2CH_2CH(\bullet)CN + \bullet CH_2CH(CH_2CH_3)CN$						
2-PROPENENITRILE + ETHYL FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	323-454	6.2(+10)	0	1700		
$CH_3CH_2CN \rightarrow CH_3\bullet + \bullet CH_2CN$						
PROPANENITRILE						
70 HEN/O'N REACTION ORDER: 1.	958-1038	1.3(+14)	0	36600		
$CH_3CH_2CN + CD_3\bullet \rightarrow CH_3CH(\bullet)CN + \bullet CH_2CH_2CN + CD_3H$						
PROPANENITRILE + METHYL-d_3 FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	400-600	3.6(+11)	0	4330±500		
$(CH_3)_3N + CH_3\bullet \rightarrow \bullet CH_2N(CH_3)_2 + CH_4$						
METHANAMINE, N,N-DIMETHYL-, + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	350-600	4.7(+11)	0	4600±500		
$O_2NOCH_2CH(ONO_2)CH_2ONO_2 \rightarrow$ products						
1,2,3-PROPANETRIOL, TRINITRATE						
70 HEN/O'N REACTION ORDER: 1.	348-378	1.3(+17)	0	20300		

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
$O_2NOCH_2CH(ONO_2)CH_3$ → products						
1,2-PROPANEDIOL, DINITRATE						
70 BEN/O'N REACTION ORDER: 1.	353-373	1.6(+15)	0	18800		

$O_2NOCH_2CH_2CH_2ONO_2$ → products						
1,3-PROPANEDIOL, DINITRATE						
70 BEN/O'N REACTION ORDER: 1.	358-383	1.6(+15)	0	19175		

$HCON(CH_3)_2 + CH_3\bullet$ → $CON(CH_3)_2 + HCO-(CH_3)NCH_2\bullet + CH_4$						
FORMAMIDE, N,N-DIMETHYL-, + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	400-600	6.3(+10)	0	3600±500		
NOTE: TENTATIVE k VALUE.						

$CH_3CH_2CH_2NO_2$ → $CH_3CH=CH_2 + HONO$						
PROPANE, 1-NITRO-						
70 BEN/O'N REACTION ORDER: 1.	687-733	2.50(+13)	0	24005		

$CH_3CH(NO_2)CH_3$ → $CH_3CH=CH_2 + HONO$						
PROPANE, 2-NITRO-						
70 BEN/O'N REACTION ORDER: 1.	800-1000	2.0(+11)	0	20130		

$CH_3CH_2CH_2ONO$ → $CH_3CH_2CH_2O\bullet + NO$						
NITROUS ACID PROPYL ESTER						
70 BEN/O'N REACTION ORDER: 1.	443-483	1.6(+16)	0	20230		

$(CH_3)_2CHONO$ → $(CH_3)_2CHO\bullet + NO$						
NITROUS ACID, 1-METHYL ETHYL ESTER						
70 BEN/O'N REACTION ORDER: 1.	443-483	3.2(+16)	0	18600		

$CH{\equiv}CC{\equiv}CH + O$ → products						
1,3-BUTADIYNE + OXYGEN ATOM						
73 BER/BUI REACTION ORDER: 2.	300	9.0(+11)	-	-	0.7	1.4

$CH_3CH_2C{\equiv}CH + N$ → products						
1-BUTYNE + NITROGEN ATOM						
72 KER/PAR REACTION ORDER: 2.	320-550	3.5(+11)	0	1125		
k/k_{ref}: 13.0	435	-	-	-		
NOTE: k_{ref}: $CH{\equiv}CH + N$						

$CH_3CH_2C{\equiv}CH + CH_3\bullet$ → $CH_3CH(\bullet)C{\equiv}CH + \bullet CH_2CH_2C{\equiv}CH$ + $CH_3CH_2C{\equiv}C\bullet + CH_4$						
1-BUTYNE + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	456-620	1.9(+12)	0	5135±500		
NOTE: TENTATIVE k VALUE.						

$CH_3C{\equiv}CCH_3 + S$ → cy-$(CH_3)C=C(CH_3)S$						
2-BUTYNE + SULFUR ATOM						
72 KER/PAR REACTION ORDER: 2.	298	1.9(+13)	-	-		

$CH_3C{\equiv}CCH_3 + N$ → products						
2-BUTYNE + NITROGEN ATOM						
72 KER/PAR REACTION ORDER: 2.	320-550	1.9(+11)	0	926		
k/k_{ref}: 12.0	435	-	-	-		

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F
NOTE: k_{ref}: $CH{\equiv}CH + N$						

$CH_3C{\equiv}CCH_3 + CH_3\bullet \rightarrow CH_3C{\equiv}CH_2\bullet + CH_4$						
2-BUTYNE + METHYL FREE RADICAL						
76 KHB/PAR REACTION ORDER: 2.	486-619	1.1(+12)	0	4900±500		
NOTE: TENTATIVE k VALUE.						

$CH_3C{\equiv}CCH_3 + CCO \rightarrow$ products						
2-BUTYNE + CARBON OXIDE(C_2O)						
72 KHB/PAR REACTION ORDER: 2. k/k_{ref}: 8.5	304	-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2 + CCO$						

$CH_2{=}CHCH{=}CH_2 + O \rightarrow$ products						
1,3-BUTADIENE + OXYGEN ATOM						
73 KHB/MOL REACTION ORDER: 2.	298-400	3.4(+12)	0	- 380	0.7	1.3

$CH_2{=}CHCH{=}CH_2 + H \rightarrow CH_2{=}CHCH(\bullet)CH_3 + CH_2{=}CHCH_2CH_2\bullet$						
1,3-BUTADIENE + HYDROGEN ATOM						
72 KHB/PAR REACTION ORDER: 2.	298	4.10(+13)	0	655		
NOTE: AVERAGED k.						
k/k_{ref}: 4.9	300	-	-	-		
NOTE: k_{ref}: $CH_3CH{=}CH_2 + H$						

$CH_2{=}CHCH{=}CH_2 + S \rightarrow$ cy-$(CH_2{=}CH)CHCH_2S$						
1,3-BUTADIENE + SULFUR ATOM						
72 KHB/PAR REACTION ORDER: 2.	298	6.0(+13)	-	-		

$CH_2{=}CHCH{=}CH_2 + N \rightarrow$ products						
1,3-BUTADIENE + NITROGEN ATOM						
72 KHB/PAR REACTION ORDER: 2.	340	3.5(+10)	-	-		

$CH_2{=}CHCH{=}CH_2 + {}^1CH_2 \rightarrow$ products						
1,3-BUTADIENE + METHYLENE FREE RADICAL						
72 KHB/PAR REACTION ORDER: 2. k/k_{ref}: 3.2	297	-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2 + {}^1CH_2$ ASSUMING 10% $^3CH_2$						

$CH_2{=}CHCH{=}CH_2 + CH_3\bullet \rightarrow CH_3CH_2CH(\bullet)CH{=}CH_2\bullet$						
1,3-BUTADIENE + METHYL FREE RADICAL						
72 KHB/PAR REACTION ORDER: 2.	353-453	8.1(+10)	0	2065		

$CH_2{=}CHCH{=}CH_2 + CH_3\bullet \rightarrow CH_3CH_2CH(\bullet)CH{=}CH_2$						
$+ \bullet CH_2CH(CH_3)CH{=}CH_2$						
1,3-BUTADIENE + METHYL FREE RADICAL						
72 KHB/PAR REACTION ORDER: 2. k/k_{ref}: 12.0	435	-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2 + CH_3\bullet$						

$CH_2{=}CHCH{=}CH_2 + CCO \rightarrow CH_2{=}C{=}CHCH{=}CH_2 + CO$						
1,3-BUTADIENE + CARBON OXIDE(C_2O)						
72 KHB/PAR REACTION ORDER: 2. k/k_{ref}: 210.	298	-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2 + CCO$						

$CH_3CH_2CH{=}CH_2 + O \rightarrow$ cy-$(CH_3CH_2)CHCH_2O$						
1-BUTENE + OXYGEN ATOM						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
73 HER/HUI REACTION ORDER: 2.	298	2.3(+12)	-	-	0.8	1.2
$CH_3CH_2CH=CH_2$ + H → $CH_3CH_2CH(\bullet)CH_3$ + $CH_3CH_2CH_2CH_2\bullet$						
1-BUTENE + HYDROGEN ATOM						
72 KER/PAR REACTION ORDER: 2.	298	8.7(+11)	-	-		
k/k_{ref}: 1.03	300	-	-	-		
NOTE: k_{ref}: $CH_3CH=CH_2$ + H						
$CH_3CH_2CH=CH_2$ + H → $CH_3CH_2CH_2CH_2\bullet$						
1-BUTENE + HYDROGEN ATOM						
72 KER/PAR REACTION ORDER: 2.	298	5.0(+10)	-	-		
NOTE: CALCULATED ON THE BASIS OF 5.7% NON-TERMINAL ADDITION OF H TO 1-BUTANE.						
$CH_3CH_2CH=CH_2$ + H → $CH_3CH_2CH(\bullet)CH_3$						
1-BUTENE + HYDROGEN ATOM						
72 KER/PAR REACTION ORDER: 2.	298	8.1(+11)	-	-		
NOTE: CALCULATED ON THE BASIS OF 5.7% NON-TERMINAL ADDITION OF H TO 1-BUTENE.						
$CH_3CH_2CH=CH_2$ + S → cy-$(CH_3CH_2)CHCH_2S$						
1-BUTENE + SULFUR ATOM						
72 KER/PAR REACTION ORDER: 2.	298	9.3(+12)	-	-		
k/k_{ref}: 10.0	298	-	-	-		
NOTE: k_{ref}: $CH_2=CH_2$ + S						
$CH_3CH_2CH=CH_2$ + N → products						
1-BUTENE + NITROGEN ATOM						
72 KER/PAR REACTION ORDER: 2.	320-550	1.6(+11)	0	660		
k/k_{ref}: 3.4	435	-	-	-		
NOTE: k_{ref}: $CH_2=CH_2$ + N						
$CH_3CH_2CH=CH_2$ + $^1CH_2$: → products						
1-BUTENE + METHYLENE FREE RADICAL						
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 1.63	297	-	-	-		
NOTE: k_{ref}: $CH_2=CH_2$ + $^1CH_2$						
$CH_3CH_2CH=CH_2$ + $^3CH_2$ → products						
1-BUTENE + METHYLENE FREE RADICAL						
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 1.6	297	-	-	-		
NOTE: k_{ref}: $CH_2=CH_2$ + $^3CH_2$						
$CH_3CH_2CH=CH_2$ + $CH_3\bullet$ → $CH_3CH(\bullet)CH=CH_2$ + CH_4						
1-BUTENE + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	350-650	2.5(+11)	0	4200±500	0.6	1.4
$CH_3CH_2CH=CH_2$ + $CH_3\bullet$ → $CH_3CH_2CH(\bullet)CH_2CH_3$ + $CH_3CH_2CH(CH_3)CH_2\bullet$						
1-BUTENE + METHYL FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	353-453	1.0(+11)	0	3600		
k/k_{ref}: 12.0	453	-	-	-		
NOTE: k_{ref}: $CH_2=CH_2$ + $CH_3\bullet$						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F

$CH_3CH_2CH{=}CH_2$ + CCO → $CH_3CH_2CH{=}C{=}CH_2$ + CO						
1-BUTENE + CARBON OXIDE(C_2O)						
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 7.0	298	-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2$ + CCO						

$CH_3CH_2CH{=}CH_2$ + CH_3CH_2• → $CH_3CH_2CH_2CH(•)CH_2CH_3$						
1-BUTENE + ETHYL FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	298	-	-	3675		

$CH_3CH_2CH{=}CH_2$ + $CH_3CH_2CH_2$• → $CH_3CH_2CH(•)CH_2CH_2CH_2CH_3$						
1-BUTENE + PROPYL FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	298	-	-	3630		

$CH_3CH_2CH{=}CH_2$ + $(CH_3)_2CH$• → $(CH_3)_2CHCH_2CH(•)CH_2CH_3$						
1-BUTENE + ETHYL, 1-METHYL-, FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	298	-	-	3480		

$CH_2{=}CHCH_2CH_3$(+M) → $CH_2{=}CHCH_2$• + CH_3•(+M)						
1-BUTENE						
70 KEN/O'N REACTION ORDER: 1.	900-1051	1.00(+16)	0	36900		
NOTE: k ESTIMATED.						

$CH_3CH{=}CHCH_3$ + CH_3S• → $CH_3CH(SCH_3)CH(•)CH_3$						
2-BUTENE + METHYLTHIO FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	298-333	1.6(+9)	-	-		
NOTE: cis-trans EQUILIBRIUM - WEIGHTED k.						
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cis-$CH_3CH{=}CHCH_3$ → trans-$CH_3CH{=}CHCH_3$						
cis-2-BUTENE						
70 KEN/O'N REACTION ORDER: 1.	686-742	6.00(+13)	0	31600		
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cis-$CH_3CH{=}CHCH_3$ + O → products						
cis-2-BUTENE + OXYGEN ATOM						
73 KER/BUI REACTION ORDER: 2.	250-500	5.9(+12)	0	- 165	0.8	1.2
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cis-$CH_3CH{=}CHCH_3$ + H → $CH_3CH_2CH(•)CH_3$						
cis-2-BUTENE + HYDROGEN ATOM						
72 KER/PAR REACTION ORDER: 2.	208	4.6(+11)	-	-		
NOTE: NO KINETIC DATA ON REVERSE RADICAL DECOMPOSITION.						
k/k_{ref}: 0.47	300	-	-	-		
NOTE: k_{ref}: $CH_3CH{=}CH_2$ + H						
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cis-$CH_3CH{=}CHCH_3$ + S → cy-$(CH_3CH)CH(CH_3)S$						
cis-2-BUTENE + SULFUR ATOM						
72 KER/PAR REACTION ORDER: 2.	298	1.4(+13)	-	-		
k/k_{ref}: 16.0	298	-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2$ + S						
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cis-$CH_3CH{=}CHCH_3$ + N → products						
cis-2-BUTENE + NITROGEN ATOM						
72 KER/PAR REACTION ORDER: 2.	320-550	2.3(+11)	0	995		
k/k_{ref}: 2.4	435	-	-	-		

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F
NOTE: k_{ref}: $CH_2{=}CH_2$ + N						
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cis-$CH_3CH{=}CHCH_3$ + $^1CH_2$: → products						
cis-2-BUTENE + METHYLENE FREE RADICAL						
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 1.37	297	-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2$ + $^1CH_2$						
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cis-$CH_3CH{=}CHCH_3$ + $^3CH_2$ → products						
cis-2-BUTENE + METHYLENE FREE RADICAL						
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 0.94	297	-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2$ + $^3CH_2$						
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cis-$CH_3CH{=}CHCH_3$ + CH_3• → $CH_3CH{=}CHCH_2$• + CH_4						
cis-2-BUTENE + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	350-650	1.8(+11)	0	4100±500		
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cis-$CH_3CH{=}CHCH_3$ + CH_3• → $(CH_3)_2CHCH(\bullet)CH_3$						
cis-2-BUTENE + METHYL FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	353-453	4.5(+10)	0	3675		
k/k_{ref}: 0.2	453	-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2$ + CH_3•						
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cis-$CH_3CH{=}CHCH_3$ + CCO → cis-$CH_3CH{=}C{=}CHCH_3$ + CO						
cis-2-BUTENE + CARBON OXIDE(C_2O)						
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 9.1	297	-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2$ + CCO						
---						
cis-$CH_3CH{=}CHCH_3$ + CH_3CH_2• → $CH_3CH(CH_2CH_3)CH(\bullet)CH_3$						
cis-2-BUTENE + ETHYL FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	298	-	-	4265		
NOTE: CRITICAL ENERGY OF REACTION.						
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cis-$CH_3CH{=}CHCH_3$ + $CH_3CH_2CH_2$• → $CH_3CH(CH_2CH_2CH_3)CH(\bullet)CH_3$						
cis-2-BUTENE + PROPYL FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	298	-	-	4370		
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cis-$CH_3CH{=}CHCH_3$ + $(CH_3)_2CH$• → $CH_3CH[CH(CH_3)_2]CH(\bullet)CH_3$						
cis-2-BUTENE + ETHYL, 1-METHYL-, FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	298	-	-	3950		
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trans-$CH_3CH{=}CHCH_3$ + O → products						
trans-2-BUTENE + OXYGEN ATOM						
73 HER/HUI REACTION ORDER: 2.	298	1.4(+13)	-	-	0.7	1.3
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trans-$CH_3CH{=}CHCH_3$ + H → $CH_3CH_2CH(\bullet)CH_3$						
trans-2-BUTENE + HYDROGEN ATOM						
72 KER/PAR REACTION ORDER: 2.	298	5.6(+11)	-	-		
NOTE: AVERAGE k.						
k/k_{ref}: 0.59	300	-	-	-		
NOTE: k_{ref}: $CH_3CH{=}CH_2$ + H						
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trans-$CH_3CH{=}CHCH_3$ + S → cy-$(CH_3CH)CH(CH_3)S$						

CHEMICAL REACTIONS	T/K	A	B	E/R (in ^{o}K)	k factors f F
trans-2-BUTENE + SULFUR ATOM					
72 KHR/PAR REACTION ORDER: 2.	298	1.4(+13)	-	-	
k/k_{ref}: 20.0	298	-	-	-	
NOTE: k_{ref}: $CH_2{=}CH_2$ + S					
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trans-$CH_3CH{=}CHCH_3$ + N → products					
trans-2-BUTENE + NITROGEN ATOM					
72 KHR/PAR REACTION ORDER: 2.	320-550	3.4(+11)	0	1055	
k/k_{ref}: 3.0	435	-	-	-	
NOTE: k_{ref}: $CH_2{=}CH_2$ + N					
---					
trans-$CH_3CH{=}CHCH_3$ + $^{1}CH_2$ → products					
trans-2-BUTENE + METHYLENE FREE RADICAL					
72 KHR/PAR REACTION ORDER: 2. k/k_{ref}: 1.39	297	-	-	-	
NOTE: k_{ref}: $CH_2{=}CH_2$ + $^{1}CH_2$					
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trans-$CH_3CH{=}CHCH_3$ + $^{3}CH_2$ → products					
trans-2-BUTENE + METHYLENE FREE RADICAL					
72 KHR/PAR REACTION ORDER: 2. k/k_{ref}: 0.89	297	-	-	-	
NOTE: k_{ref}: $CH_2{=}CH_2$ + $^{3}CH_2$					
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trans-$CH_3CH{=}CHCH_3$ + CH_3• → $CH_3CH{=}CHCH_2$• + CH_4					
trans-2-BUTENE + METHYL FREE RADICAL					
76 KHR/PAR REACTION ORDER: 2.	350-500	1.0(+12)	0	4830±500	
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trans-$CH_3CH{=}CHCH_3$ + CH_3• → $(CH_3)_2CHCH(\bullet)CH_3$					
trans-2-BUTENE + METHYL FREE RADICAL					
72 KHR/PAR REACTION ORDER: 2.	353-453	1.4(+11)	0	4075	
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trans-$CH_3CH{=}CHCH_3$ + CH_3• → $(CH_3)_2CHCH(\bullet)CH_3$					
trans-2-BUTENE + METHYL FREE RADICAL					
72 KHR/PAR REACTION ORDER: 2. k/k_{ref}: 0.4	453	-	-	-	
NOTE: k_{ref}: $CH_2{=}CH_2$ + CH_3					
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trans-$CH_3CH{=}CHCH_3$ + CCO → $CH_3CH{=}C{=}CHCH_3$ + CO					
trans-2-BUTENE + CARBON OXIDE(C_2O)					
72 KHR/PAR REACTION ORDER: 2. k/k_{ref}: 10.6	297	-	-	-	
NOTE: k_{ref}: $CH_2{=}CH_2$ + CCO					
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trans-$CH_3CH{=}CHCH_3$ + CH_3CH_2• → $CH_3CH(CH_2CH_3)CH(\bullet)CH_3$					
trans-2-BUTENE + ETHYL FREE RADICAL					
72 KHR/PAR REACTION ORDER: 2.	298	-	-	4350	
---					
trans-$CH_3CH{=}CHCH_3$ + $CH_3CH_2CH_2$• → $CH_3CH(CH_2CH_2CH_3)CH(\bullet)CH_3$					
trans-2-BUTENE + PROPYL FREE RADICAL					
72 KHR/PAR REACTION ORDER: 2.	298	-	-	4515	
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trans-$CH_3CH{=}CHCH_3$ + $(CH_3)_2CH$• → $CH_3CH[CH(CH_3)_2]CH(\bullet)CH_3$					
trans-2-BUTENE + ETHYL, 1-METHYL-, FREE RADICAL					
72 KHR/PAR REACTION ORDER: 2.	298	-	-	4065	

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F
$(CH_3)_2C{=}CH_2 \rightarrow \cdot CH_2C(CH_3){=}CH_2 + H$						
1-PROPENE, 2-METHYL-						
70 BEN/O'N REACTION ORDER: 1.	930-1082	1.0(+17)	0	44400		
$(CH_3)_2C{=}CH_2 + O \rightarrow cy\text{-}[(CH_3)_2]CCH_2O$						
1-PROPENE, 2-METHYL-, + OXYGEN ATOM						
73 BER/BUI REACTION ORDER: 2.	298	1.2(+13)	-	-	0.7	1.3
$(CH_3)_2C{=}CH_2 + H \rightarrow (CH_3)_3C\cdot$						
1-PROPENE, 2-METHYL-, + HYDROGEN ATOM						
72 KER/PAR REACTION ORDER: 2.	298	3.1(+13)	0	755		
$(CH_3)_2C{=}CH_2 + H \rightarrow (CH_3)_2CHCH_2\cdot$						
1-PROPENE, 2-METHYL-, + HYDROGEN ATOM						
72 KER/PAR REACTION ORDER: 2.	298	1.3(+11)	-	-		
NOTE: CALCULATED ON THE BASIS OF 0.5% NON-TERMINAL ADDITION OF H TO $(CH_3)_2C{=}CH_2$.						
$(CH_3)_2C{=}CH_2 + H \rightarrow (CH_3)_3C\cdot + (CH_3)_2CHCH_2\cdot$						
1-PROPENE, 2-METHYL-, + HYDROGEN ATOM						
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 2.52	300	-	-	-		
NOTE: k_{ref}: $CH_3CH{=}CH_2 + H$						
$(CH_3)_2C{=}CH_2 + HO_2 \rightarrow$ products						
1-PROPENE, 2-METHYL-, + HYDROPEROXYL FREE RADICAL						
74 ILO REACTION ORDER: 2.	300	1.0(+ 8)	-	-	0.1	10.
NOTE: SUGGESTED k VALUE.						
$(CH_3)_2C{=}CH_2 + S \rightarrow cy\text{-}[(CH_3)_2]CCH_2S$						
1-PROPENE, 2-METHYL-, + SULFUR ATOM						
72 KER/PAR REACTION ORDER: 2.	298	4.0(+13)	-	-		
k/k_{ref}: 50.0	298	-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2 + S$						
$(CH_3)_2C{=}CH_2 + S^*(^1D) \rightarrow cy\text{-}[(CH_3)_2]CCH_2S$						
1-PROPENE, 2-METHYL-, + SULFUR ATOM						
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 3.5	300	-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2 + S^*(^1D)$						
$(CH_3)_2C{=}CH_2 + N \rightarrow$ products						
1-PROPENE, 2-METHYL-, + NITROGEN ATOM						
72 KER/PAR REACTION ORDER: 2.	320-550	7.8(+10)	0	277		
$(CH_3)_2C{=}CH_2 + N \rightarrow$ products						
1-PROPENE, 2-METHYL-, + NITROGEN ATOM						
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 4.1	435	-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2 + N$						
$(CH_3)_2C{=}CH_2 + {}^1CH_2 \rightarrow$ products						
1-PROPENE, 2-METHYL-, + METHYLENE FREE RADICAL						
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 1.96	297	-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2 + {}^1CH_2$						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F

$(CH_3)_2C{=}CH_2 + {}^3CH_2 \rightarrow$ products						
1-PROPENE, 2-METHYL-, + METHYLENE FREE RADICAL						
72 KHR/PAR REACTION ORDER: 2. k/k_{ref}: 2.86	297	-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2 + {}^3CH_2$						

$(CH_3)_2C{=}CH_2 + CH_3\bullet \rightarrow \bullet CH_2C(CH_3){=}CH_2 + CH_4$						
1-PROPENE, 2-METHYL-, + METHYL FREE RADICAL						
76 KHR/PAR REACTION ORDER: 2.	350-600	3.0(+11)	0	4500±500	0.6	1.4

$(CH_3)_2C{=}CH_2 + CH_3\bullet \rightarrow (CH_3)_3CCH_2\bullet + (CH_3)_2C(\bullet)CH_2CH_3$						
1-PROPENE, 2-METHYL-, + METHYL FREE RADICAL						
72 KHR/PAR REACTION ORDER: 2.	353-453	1.4(+11)	0	3475		
k/k_{ref}: 1.1	453	-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2 + CH_3$						

$(CH_3)_2C{=}CH_2 + CCO \rightarrow (CH_3)_2C{=}C{=}CH_2 + CO$						
1-PROPENE, 2-METHYL-, + CARBON OXIDE(C_2O)						
72 KHR/PAR REACTION ORDER: 2. k/k_{ref}: 50.0	297	-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2 + CCO$						

$CH_3CH_2CH_2CH_2\bullet \rightarrow CH_3CH_2\bullet + CH_2{=}CH_2$						
BUTYL FREE RADICAL						
70 HEN/O'N REACTION ORDER: 1.	334-689	4.0(+13)	0	14600		

$CH_3CH_2CH_2CH_2\bullet + CH_2{=}CH_2 \rightarrow CH_3(CH_2)_4CH_2\bullet$						
BUTYL FREE RADICAL + ETHENE						
72 KHR/PAR REACTION ORDER: 2.	352-405	2.3(+10)	0	3370		
NOTE: TENTATIVE k VALUE.						

$CH_3CH_2CH(\bullet)CH_3 \rightarrow CH_3CH{=}CH_2 + CH_3$						
PROPYL, 1-METHYL-, FREE RADICAL						
70 HHN/O'N REACTION ORDER: 1.	523-622	1.4(+14)	0	17060		

$CH_3CH_2CH(\bullet)CH_3 + CH_3CH{=}CH_2 \rightarrow CH_3CH_2CH(CH_3)CH(CH_3)CH_2\bullet$						
$+ CH_3CH_2CH(CH_3)CH_2CH(\bullet)CH_3$						
PROPYL, 1-METHYL-, FREE RADICAL + 1-PROPENE						
72 KHR/PAR REACTION ORDER: 2.	381-412	6.3(+10)	0	3725		
NOTE: TENTATIVE k VALUE.						

$(CH_3)_2CHCH_2\bullet \rightarrow CH_3\bullet + CH_3CH{=}CH_2$						
PROPYL, 2-METHYL-, FREE RADICAL						
70 HHN/O'N REACTION ORDER: 1.	299-691	1.6(+14)	0	16455		

$(CH_3)_2CHCH_2\bullet \rightarrow (CH_3)_3C{=}CH_2 + H$						
PROPYL, 2-METHYL-, FREE RADICAL						
70 HHN/O'N REACTION ORDER: 1.	299-691	5.0(+13)	0	18420		

$(CH_3)_3C\bullet \rightarrow (CH_3)_2C{=}CH_2 + H$						
ETHYL, 1,1-DIMETHYL-, FREE RADICAL						
70 HEN/O'N REACTION ORDER: 1.	300-897	4.0(+14)	0	21700	0.2	5.0

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F
$(CH_3)_3C\bullet + CH{\equiv}CH \rightarrow (CH_3)_3CCH{=}CH\bullet$ ETHYL, 1,1-DIMETHYL-, FREE RADICAL + ETHYNE 72 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	363-577	1.0(+11)	0	3875		
$(CH_3)_3C\bullet + CH_2{=}CH_2 \rightarrow (CH_3)_3CCH_2CH_2\bullet$ ETHYL, 1,1-DIMETHYL-, FREE RADICAL + ETHENE 72 KER/PAR REACTION ORDER: 2.	300-650	2.8(+10)	0	3575		
$(CH_3)_3C\bullet + CH_3C{\equiv}CH \rightarrow (CH_3)_3CC(CH_3){=}CH\bullet + (CH_3)_3CCH{=}C(\bullet)CH_3$ ETHYL, 1,1-DIMETHYL-, FREE RADICAL + 1-PROPYNE 72 KER/PAR REACTION ORDER: 2. NOTE: SUSPECT k VALUE.	360-439	5.0(+ 8)	0	2770		
$CH_3CH_2CH_2CH_3 \rightarrow CH_3\bullet + CH_3CH_2CH_2\bullet$ BUTANE 70 HEN/O'N REACTION ORDER: 1. NOTE: k ESTIMATED.	693-803	4.0(+17)	0	43230		
$CH_3CH_2CH_2CH_3 \rightarrow CH_3CH_2\bullet + CH_3CH_2\bullet$ BUTANE 70 BEN/O'N REACTION ORDER: 1.	693-803	1.9(+17)	0	41170		
$CH_3CH_2CH_2CH_3 + O \rightarrow CH_3CH_2CH_2CH_2\bullet + OH$ BUTANE + OXYGEN ATOM 73 HER/HUI REACTION ORDER: 2.	298-650	3.0(+13)	0	2920	0.7	1.3
$CH_3CH_2CH_2CH_3 + O \rightarrow CH_3CH_2CH(\bullet)CH_3 + OH$ BUTANE + OXYGEN ATOM 73 HER/HUI REACTION ORDER: 2.	298-650	4.6(+13)	0	2410	0.7	1.3
$CH_3CH_2CH_2CH_3 + H \rightarrow CH_3CH_2CH(\bullet)CH_3 + CH_3CH_2CH_2CH_2\bullet + H_2$ BUTANE + HYDROGEN ATOM 72 KON REACTION ORDER: 2.	320-930	4.1(+12)	0	2637±320	0.5	2.0
$CH_3CH_2CH_2CH_3 + HO_2 \rightarrow CH_3CH_2CH(\bullet)CH_3 + H_2O_2$ BUTANE + HYDROPEROXYL FREE RADICAL 74 LLO REACTION ORDER: 2. NOTE: UPPER LIMIT RECOMMENDED. RATIO DATA VERSUS k_{ref} for $HO_2 + HO_2 \rightarrow H_2O_2 + O_2$	300-1000	5.0(+11)	0	5285	0.1	10.
$CH_3CH_2CH_2CH_3 + CH_3\bullet \rightarrow CH_3CH_2CH(\bullet)CH_3 + CH_3CH_2CH_2CH_2\bullet + CH_4$ BUTANE + METHYL FREE RADICAL 72 KON REACTION ORDER: 2.	350-500	1.6(+11)	0	4540±150	0.7	1.4
$CH_3CH_2CH_2CH_3 + CH_3\bullet \rightarrow CH_3CH_2CH(\bullet)CH_3 + CH_4$ BUTANE + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	350-750	4.0(+11)	0	4830±250	0.7	1.3
$CH_3CD_2CD_2CH_3 + CD_3\bullet \rightarrow CH_3CD_2CD(\bullet)CH_3 + CD_4$ BUTANE-2,2,3,3-d_4 + METHYL-d_3 FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	600-750	4.5(+11)	0	5735±250	0.7	1.3

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F

$CH_3CD_2CD_2CH_3 + CD_3\bullet \rightarrow CH_3CD_2CD_2CH_2\bullet + CD_3H$						
HUTANE-2,2,3,3-d_4 + METHYL-d_3 FREE RADICAL						
76 KHR/PAR REACTION ORDER: 2.	600-750	4.8(+11)	0	5735±250	0.7	1.3

$(CH_3)_3CH + H \rightarrow (CH_3)_3C\bullet + (CH_3)_2CHCH_2\bullet + H_2$						
PROPANE, 2-METHYL-, + HYDROGEN ATOM						
72 KON REACTION ORDER: 2.	300-800	1.9(+13)	0	2680±85	0.8	1.2

$(CH_3)_3CH + HO_2 \rightarrow (CH_3)_3C\bullet + H_2O_2$						
PROPANE, 2-METHYL-, + HYDROPEROXYL FREE RADICAL						
74 LLC REACTION ORDER: 2.	300-1000	1.0(+11)	0	3500	0.1	10.
NOTE: UPPER LIMIT RECOMMENDED. RATIO DATA VERSUS k_{ref} for $HO_2 + HO_2 \rightarrow H_2O_2 + O_2$						

$(CH_3)_3CH + CH_3\bullet \rightarrow (CH_3)_3C\bullet + CH_4$						
PROPANE, 2-METHYL-, + METHYL FREE RADICAL						
76 KHR/PAR REACTION ORDER: 2.	550-750	9.6(+10)	0	3975±250	0.7	1.3

$(CH_3)_3CH + CH_3\bullet \rightarrow (CH_3)_3C\bullet + (CH_3)_2CHCH_2\bullet + CH_4$						
PROPANE, 2-METHYL-, + METHYL FREE RADICAL						
76 KHR/PAR REACTION ORDER: 2.	300-500	8.3(+10)	0	4000±500	0.5	2.0

$(CH_3)_3CD + CD_3\bullet \rightarrow (CH_3)_3C\bullet + CD_4$						
PROPANE-2-d, 2-METHYL, + METHYL-d_3 FREE RADICAL						
76 KHR/PAR REACTION ORDER: 2.	550-750	1.2(+11)	0	4800±250	0.7	1.3

$(CH_3)_3CD + CD_3\bullet \rightarrow (CH_3)_2CDCH_2\bullet + CD_3H$						
PROPANE-2-d, 2-METHYL-, + METHYL-d_3 FREE RADICAL						
76 KHR/PAR REACTION ORDER: 2.	550-750	6.0(+11)	0	5735±250	0.7	1.3

$CH_3CH{=}CHCHO + CH_3\bullet \rightarrow CH_3CH{=}CHC(O)\bullet + CH_4$						
2-BUTENAL + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	350-500	1.0(+11)	0	3400±500	0.4	2.5
NOTE: TENTATIVE k VALUE.						

$CH_2{=}CHCH_2COOH \rightarrow CH_3CH{=}CH_2 + CO_2$						
3-BUTENOIC ACID						
70 HHN/O'N REACTION ORDER: 1.	587-651	2.2(+11)	0	20435		

$CH_3COOCH{=}CH_2 + CH_3CH_2\bullet \rightarrow CH_3COOCH(\bullet)CH_2CH_2CH_3$ + $CH_3COOCH(CH_2CH_3)CH_2\bullet$						
ACETIC ACID ETHENYL ESTER + ETHYL FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	303-417	7.8(+10)	0	3475		

$CH_3COCOCH_3 + CH_3\bullet \rightarrow CH_3COCOCH_2\bullet + CH_4$						
2,3-BUTANEDIONE + METHYL FREE RADICAL						
76 KHR/PAR REACTION ORDER: 2.	300-800	2.2(+11)	0	4300±500	0.5	1.5

$CH_3COCOCH_3 \rightarrow CH_3C(O)\bullet + CH_3C(O)\bullet$						
2,3-BUTANEDIONE						
70 BEN/O'N REACTION ORDER: 1.	626-698	1.6(+16)	0	33970		

CHEMICAL REACTIONS	T/K	A	B	E/R, (in ^{o}K)	k factors f	F
$(CH_3CO)_2O \rightarrow CH_3COOH + CH_2{=}C{=}O$						
ACETIC ACID ANHYDRIDE						
70 BEN/G'N REACTION ORDER: 1.	553-646	1.0(+12)	0	17365		

$(CH_3CO)_2O + CH_3\bullet \rightarrow CH_3COOCOCH_2\bullet + CH_4$						
ACETIC ACID ANHYDRIDE + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	300-500	1.8(+11)	0	4830±500	0.6	1.4

$CH_3C(O)OOC(O)CH_3 \rightarrow CH_3C(O)O + CH_3C(O)O\bullet$						
PEROXIDE, DIACETYL						
70 HEN/G'N REACTION ORDER: 1.	363-463	1.8(+14)	0	14845		

$CH_3CH_2COCH_3 + CH_3\bullet \rightarrow CH_3CH(\bullet)COCH_3 + \bullet CH_2CH_2COCH_3$ $+ CH_3CH_2COCH_2\bullet + CH_4$						
2-BUTANONE + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	300-500	8.2(+10)	0	3700±500	0.5	1.5

$HCOOCH_2CH_2CH_3 \rightarrow HCOOH + CH_3CH{=}CH_2$						
FORMIC ACID PROPYL ESTER						
70 HEN/G'N REACTION ORDER: 1.	613-673	1.3(+12)	0	24006		

$HCOOCH_2CH_2CH_3 + CH_3\bullet \rightarrow \bullet COOCH_2CH_2CH_3 + CH_4$						
FORMIC ACID PROPYL ESTER + METHYL FREE RADICAL						
72 KON REACTION ORDER: 2.	347-455	1.3(+10)	0	3675		

$HCOOCH_2CH_2CH_3 + CH_3\bullet \rightarrow \bullet COOCH_2CH_2CH_3 + HCOOCH(\bullet)CH_2CH_3$ $+ HCOOCH_2CH(\bullet)CH_3 + HCOOCH_2CH_2CH_2\bullet + CH_4$						
FORMIC ACID PROPYL ESTER + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	350-500	2.5(+11)	0	5000±500	0.5	2.0
NOTE: TENTATIVE k VALUE.						

$HCOOCH(CH_3)_2 \rightarrow HCOOH + CH_3CH{=}CH_2$						
FORMIC ACID 1-METHYLETHYL ESTER						
70 BEN/G'N REACTION ORDER: 1.	721-811	4.0(+12)	0	22145		

$HCOOCH(CH_3)_2 + CH_3\bullet \rightarrow \bullet COOCH(CH_3)_2 + HCOOC(\bullet)(CH_3)_2$ $+ HCOOCH(CH_3)CH_2\bullet + CH_4$						
FORMIC ACID 1-METHYLETHYL ESTER + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	350-500	2.5(+11)	0	4980±500	0.5	2.0
NOTE: TENTATIVE k VALUE.						

$CH_3COOCH_2CH_3 \rightarrow CH_3COOH + CH_2{=}CH_2$						
ACETIC ACID ETHYL ESTER						
70 BEN/G'N REACTION ORDER: 1.	725-883	3.9(+12)	0	24155		

$CH_3OCOOCH_2CH_3 \rightarrow CH_3OH + CO_2 + CH_2{=}CH_2$						
CARBONIC ACID ETHYL METHYL ESTER						
70 HEN/G'N REACTION ORDER: 1.	573-648	4.0(+12)	0	21640		

$CH_3CH(\bullet)OCH_2CH_3 \rightarrow CH_3CHO + CH_3CH_2\bullet$						
ETHYL, 1-ETHOXY-, FREE RADICAL						
70 HEN/G'N REACTION ORDER: 1.	418-453	8.1(+10)	0	11825		
NOTE: logA PROBABLY LOW.						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F

$CH_3CH(O\bullet)CH_2CH_3 \rightarrow CH_3CHO + CH_3CH_2\bullet$ ETHOXY, 1-ETHYL-, FREE RADICAL 70 BEN/O'N REACTION ORDER: 1. NOTE: ESTIMATED ARRHENIUS PARAMETERS (VERY LIKELY LOWER LIMITS).	423-463	1.0(+14)	0	8800		

$(CH_3)_3CO\bullet \rightarrow (CH_3)_2CO + CH_3\bullet$ ETHOXY, 1,1-DIMETHYL-, FREE RADICAL 70 BEN/O'N REACTION ORDER: 1. NOTE: TENTATIVE k.	393-453	3.2(+13)	0	8300		

$(CH_3)_3COH \rightarrow (CH_3)_2C{=}CH_2 + H_2O$ 2-PROPANOL, 2-METHYL- 70 BEN/O'N REACTION ORDER: 1.	1050-1300	2.5(+13)	0	31001		

$CH_3CH_2OCH_2CH_3 \rightarrow CH_3CH_2O\bullet + CH_3CH_2O\bullet$ ETHANE, 1,1'-OXYBIS- 70 BEN/O'N REACTION ORDER: 1. NOTE: k PROBABLY RELIABLE.	833-913	1.0(+18)	0	42275		

$CH_3CH_2OCH_2CH_3 + CH_3\bullet \rightarrow CH_3CH_2OCH(\bullet)CH_3 + CH_3CH_2OCH_2CH_2\bullet + CH_4$ ETHANE, 1,1'-OXYBIS-, + METHYL FREE RADICAL 76 KEB/PAR REACTION ORDER: 2.	400-500	2.5(+11)	0	4200±750	0.5	2.0

$CH_3CH_2OOCH_2CH_3 \rightarrow CH_3CH_2O\bullet + CH_3CH_2O\bullet$ PEROXIDE, DIETHYL 70 BEN/O'N REACTION ORDER: 1.	413-518	4.0(+15)	0	18770		

$(CH_3)_3COOH \rightarrow (CH_3)_3CO\bullet + OH$ HYDROPEROXIDE, 1,1-DIMETHYLETHYL 70 BEN/O'N REACTION ORDER: 1.	553-653	4.0(+15)	0	21640		

$(CH_3)_3CSH \rightarrow (CH_3)_2C{=}CH_2 + H_2S$ 2-PROPANETHIOL, 2-METHYL- 70 BEN/O'N REACTION ORDER: 1.	950-1230	2.5(+13)	0	27830		

$(CH_3)_3CSH + CH_3\bullet \rightarrow (CH_3)_3CS\bullet + \bullet CH_2C(CH_3)_2SH + CH_4$ 2-PROPANETHIOL, 2-METHYL-, + METHYL FREE RADICAL 76 KEB/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	303	5.9(+7)	-	-		

$CH_2{=}CHCH_2SO_2CH_3 \rightarrow CH_2{=}CHCH_2\bullet + CH_3SO_2\bullet$ 1-PROPENE, 3-METHYLSULFONYL- 70 BEN/O'N REACTION ORDER: 1.	633-733	1.3(+14)	0	24006		
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cis-$CH_3CH{=}CHCN \rightarrow$ trans-$CH_3CH{=}CHCN$ cis-2-BUTENENITRILE 70 BEN/O'N REACTION ORDER: 1.	573-633	5.0(+12)	0	28030		
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cis-$CH_3CH{=}CHCN + CH_3CH_2\bullet \rightarrow CH_3CH(CH_2CH_3)CH(\bullet)CN + CH_3CH(\bullet)CH(CH_2CH_3)CN$						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F
cis-2-BUTENENITRILE + ETHYL FREE RADICAL 72 KER/PAR REACTION ORDER: 2.	323-454	1.5(+10)	0	2500		
trans-$CH_3CH{=}CHCN$ + $CH_3CH_2\bullet$ → $CH_3CH(CH_2CH_3)CH(\bullet)CN$ + $CH_3CH(\bullet)CH(CH_2CH_3)CN$ trans-2-BUTENENITRILE + ETHYL FREE RADICAL 72 KER/PAR REACTION ORDER: 2.	323-754	3.1(+10)	0	2600		
$CH_2{=}C(CH_3)CN$ + $CH_3CH_2\bullet$ → $CH_3CH_2CH_2C(\bullet)(CH_3)CN$ + $\bullet CH_2C(CH_3)(CH_2CH_3)CN$ 2-PROPENENITRILE, 2-METHYL-, + ETHYL FREE RADICAL 72 KER/PAR REACTION ORDER: 2.	312-400	2.5(+11)	0	2300		
$CH_3CH{=}NN{=}CHCH_3$ + $CH_3\bullet$ → $CH_3C(\bullet){=}NN{=}CHCH_3$ + $\bullet CH_2CH{=}NN{=}CHCH_3$ + CH_4 ACETALDEHYDE ETHYLIDENEHYDRAZONE + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	350-600	2.5(+11)	0	3975±500	0.5	2.0
$CH_3CH_2N{=}NCH_2CH_3$ → $CH_3CH_2N{=}N\bullet$ + $CH_3CH_2\bullet$ DIAZENE, DIETHYL- 70 REN/C'N REACTION ORDER 1.		2.0(+16)	0	25165		
$CH_3N{=}NCH(CH_3)_2$ → $CH_3N{=}N\bullet$ + $(CH_3)_2CH\bullet$ DIAZENE, METHYL(1-METHYLETHYL)- 70 REN/C'N REACTION ORDER 1.	543-605	2.5(+16)	0	23900		
$CH_3CH_2CH_2CH_2NH_2$ + $CH_3\bullet$ → $CH_3CH_2CH_2CH_2NH\bullet$ + $CH_3CH_2CH_2CH(\bullet)NH_2$ + $\bullet CH_2CH_2CH_2CH_2NH_2$ 1-BUTANAMINE + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	426	3.2(+7)	-	-	0.5	2.0
$(CH_3CH_2)_2NH$ + $CH_3\bullet$ → $(CH_3CH_2)_2N\bullet$ + $CH_3CH(\bullet)NHCH_2CH_3$ + $\bullet CH_2CH_2NHCH_2CH_3$ + CH_4 ETHANAMINE, N-ETHYL-, + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-500	2.2(+11)	0	3550±500	0.5	2.0
$CH_3CH_2N(CH_3)_2$ + $CH_3\bullet$ → $CH_3CH(\bullet)N(CH_3)_2$ + $\bullet CH_2CH_2N(CH_3)_2$ + $CH_3CH_2N(CH_3)CH_2\bullet$ + CH_4 ETHANAMINE, N,N-DIMETHYL-, + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	420	2.6(+7)	-	-	0.5	2.0
$(CH_3)_2NN{=}NN(CH_3)_2$ → $(CH_3)_2NN{=}N\bullet$ + $(CH_3)_2N\bullet$ 2-TETRAZENE, 1,1,4,4-TETRAMETHYL- 70 REN/C'N REACTION ORDER: 1.	466-539	2.5(+14)	0	18170		
$CH_3CH_2OCH{=}CH_2$ → CH_3CHO + $CH_2{=}CH_2$ ETHENE, ETHOXY- 70 REN/C'N REACTION ORDER: 1.	640-859	4.0(+11)	0	22345		
$CH_2{=}CHCH_2CH_2OH$ → $CH_3CH{=}CH_2$ + HCHO						

CHEMICAL REACTIONS	T/K	A	B	E/R (in ^{o}K)	k factors f	F
3-BUTEN-1-OL						
70 BEN/O'N REACTION ORDER: 1.	643-685	4.5(+11)	0	20635		

$CH_3CH_2CH_2CHO + CH_3\bullet \rightarrow CH_3CH_2CH_2C(O)\bullet + CH_4$						
BUTANAL + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	350-500	1.0(+11)	0	2970±500	0.4	1.6
NOTE: TENTATIVE k VALUE.						

$(CH_3)_2CHCHO + CH_3\bullet \rightarrow (CH_3)_2CHC(O)\bullet + CH_4$						
PROPANAL, 2-METHYL-, + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	350-500	1.0(+11)	0	2970±500	0.4	1.6
NOTE: TENTATIVE k VALUE.						

$CH_3CON(CH_3)_2 + CH_3 \rightarrow CH_3CON(CH_3)CH_2\bullet + CH_4$						
ACETAMIDE, N,N-DIMETHYL-, + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	350-600	1.6(+11)	0	4125±500	0.5	1.5
NOTE: TENTATIVE k VALUE.						

$CH_3CON(CH_3)_2 + CH_3\bullet \rightarrow \bullet CH_2CON(CH_3)_2$						
$+ CH_3CON(CH_3)CH_2\bullet + CH_4$						
ACETAMIDE, N,N-DIMETHYL-, + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	350-600	2.0(+11)	0	4200±500	0.5	1.5

$CH_3CH_2CH_2CH_2ONO \rightarrow CH_3CH_2CH_2CH_2O\bullet + NO$						
NITROUS ACID BUTYL ESTER						
70 BEN/O'N REACTION ORDER: 1.	443-485	2.0(+16)	0	20400		

$CH_3CH_2CH_2C{\equiv}CH + N \rightarrow$ products						
1-PENTYNE + NITROGEN ATOM						
72 KER/PAR REACTION ORDER: 2.	320-550	3.0(+11)	0	1047		
k/k_{ref}: 14.0	435	-	-	-		
NOTE: k_{ref}: CHCH + N						

$CH_3(CH_2)_2CH{=}CH_2 + O \rightarrow cy\text{-}(CH_3CH_2CH_2)CHCH_2O$						
1-PENTENE + OXYGEN ATOM						
73 KER/RUI REACTION ORDER: 2.	298	2.8(+12)	-	-	0.7	1.3

$CH_3(CH_2)_2CH{=}CH_2 + H \rightarrow CH_3(CH_2)_2CH(\bullet)CH_3 + CH_3(CH_2)_3CH_2\bullet$						
1-PENTENE + HYDROGEN ATOM						
72 KER/PAR REACTION ORDER: 2.	298	8.3(+11)	-	-		
k/k_{ref}: 0.89	300	-	-	-		
NOTE: k_{ref}: $CH_3CH{=}CH_2 + H$						

$CH_3(CH_2)_2CH{=}CH_2 + S \rightarrow cy\text{-}[CH_3(CH_2)_2]CHCH_2S$						
1-PENTENE + SULFUR ATOM						
72 KER/PAR REACTION ORDER: 2.	298	8.1(+12)	-	-		

$CH_3(CH_2)_2CH{=}CH_2 + CH_3\bullet \rightarrow CH_3CH_2CH(\bullet)CH{=}CH_2 + CH_4$						
1-PENTENE + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	450-650	4.5(+11)	0	4500±500	0.6	1.4

$CH_3(CH_2)_2CH{=}CH_2 + CHCH_2CH_2\bullet \rightarrow CH_3(CH_2)_2CH(\bullet)CH_2(CH_2)_2CH_3$						
1-PENTENE + PROPYL FREE RADICAL						

CHEMICAL REACTIONS	T/K	A	B	E/R (in ^{o}K)	k factors f	F
72 KEE/PAR REACTION ORDER: 2.	298	-	-	3410		

$cis\text{-}CH_3CH_2CH{=}CHCH_3 + O \rightarrow$ products						
cis-2-PENTENE + OXYGEN ATOM						
73 BER/BUI REACTION ORDER: 2.	298	1.1(+13)	-	-	0.7	1.3

$cis\text{-}CH_3CH_2CH{=}CHCH_3 + H \rightarrow CH_3CH_2CH(\bullet)CH_2CH_3$						
$+ CH_3CH_2CH_2CH(\bullet)CH_3$						
cis-2-PENTENE + HYDROGEN ATOM						
72 KEE/PAR REACTION ORDER: 2.	298	3.8(+11)	-	-		
k/k_{ref}: 0.39	300	-	-	-		
NOTE: k_{ref}: $CH_3CH{=}CH_2 + H$						

$cis\text{-}CH_3CH_2CH{=}CHCH_3 + CH_3\bullet \rightarrow CH_3CH_2CH(\bullet)CH(CH_3)_2$						
cis-2-PENTENE + METHYL FREE RADICAL						
72 KEE/PAR REACTION ORDER: 2.	298	-	-	4060		

$cis\text{-}CH_3CH_2CH{=}CHCH_3 + CH_3\bullet \rightarrow CH_3CH_2CH(CH_3)CH(\bullet)CH_3$						
cis-2-PENTENE + METHYL FREE RADICAL						
72 KEE/PAR REACTION ORDER: 2.	298	-	-	4125		

$cis\text{-}CH_3CH_2CH{=}CHCH_3 + CH_3CH_2\bullet \rightarrow CH_3CH_2CH(CH_2CH_3)CH(\bullet)CH_3$						
cis-2-PENTENE + ETHYL FREE RADICAL						
72 KEE/PAR REACTION ORDER: 2.	298	-	-	4300		

$trans\text{-}CH_3CH_2CH{=}CHCH_3 + H \rightarrow CH_3CH_2CH(\bullet)CH_2CH_3$						
$+ CH_3CH_2CH_2CH(\bullet)CH_3$						
trans-2-PENTENE + HYDROGEN ATOM						
72 KEE/PAR REACTION ORDER: 2. k/k_{ref}: 0.44	300	-	-	-		
NOTE: k_{ref}: $CH_3CH{=}CH_2 + H$						
	298	4.1(+11)	-	-		

$CH_3CH_2C(CH_3){=}CH_2 + H \rightarrow CH_3CH_2C(\bullet)(CH_3)_2$						
$+ CH_3CH_2CH(CH_3)CH_2\bullet$						
1-BUTENE, 2-METHYL-, + HYDROGEN ATOM						
72 KEE/PAR REACTION ORDER: 2.	298	9.1(+11)	-	-		

$CH_3CH_2C(CH_3){=}CH_2 + D \rightarrow CH_3CH_2C(\bullet)(CH_3)CH_2D$						
$+ CH_3CH_2CD(CH_3)CH_2\bullet$						
1-BUTENE, 2-METHYL-, + DEUTERIUM ATOM						
72 KEE/PAR REACTION ORDER: 2.	298	2.0(+12)	-	-		

$CH_3CH_2C(CH_3){=}CH_2 + S \rightarrow cy\text{-}(CH_3CH_2)C(CH_3)CH_2S$						
1-BUTENE, 2-METHYL-, + SULFUR ATOM						
72 KEE/PAR REACTION ORDER: 2.	298	7.4(+13)	-	-		

$(CH_3)_2CHCH{=}CH_2 + H \rightarrow (CH_3)_2CHCH(\bullet)CH_3 + (CH_3)_2CHCH_2CH_2\bullet$						
1-BUTENE, 3-METHYL-, + HYDROGEN ATOM						
72 KEE/PAR REACTION ORDER: 2.	298	7.4(+11)	-	-		

$(CH_3)_2CHCH{=}CH_2 + D \rightarrow (CH_3)_2CHCH(\bullet)CH_2D + (CH_3)_2CHCHDCH_2\bullet$						
1-BUTENE, 3-METHYL-, + DEUTERIUM ATOM						
72 KEE/PAR REACTION ORDER: 2.	298	7.6(+11)	-	-		

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F

$(CH_3)_2CHCH{=}CH_2$ + $CH_3\bullet$ → $(CH_3)_2CHCH(\bullet)CH_2CH_3$						
1-BUTENE, 3-METHYL-, + METHYL FREE RADICAL						
72 KHR/PAR REACTION ORDER: 2.	298	-	-	3500		

$(CH_3)_2CHCH{=}CH_2$ + $CH_3\bullet$ → $(CH_3)_2C(\bullet)CH{=}CH_2$ + CH_4						
1-BUTENE, 3-METHYL-, + METHYL FREE RADICAL						
72 KHR/PAR REACTION ORDER: 2.	450-600	4.4(+11)	0	4225±750	0.5	1.5

$(CH_3)_2CHCH{=}CH_2$ + $CH_3CH_2\bullet$ → $(CH_3)_2CHCH(\bullet)CH_2CH_2CH_3$						
1-BUTENE, 3-METHYL-, + ETHYL FREE RADICAL						
72 KHR/PAR REACTION ORDER: 2.	298	-	-	3620		

$(CH_3)_2C{=}CHCH_3$ + O → products						
2-BUTENE, 2-METHYL-, + OXYGEN ATOM						
73 KHR/MOL REACTION ORDER: 2.	298-400	3.9(+12)	0	- 680	0.8	1.2

$(CH_3)_2C{=}CHCH_3$ + H → $(CH_3)_2CHC(\bullet)CH_3$ + $(CH_3)_2C(\bullet)CH_2CH_3$						
2-BUTENE, 2-METHYL-, + HYDROGEN ATOM						
73 KHR/MOL REACTION ORDER: 2.	298	9.1(+11)	-	-		
k/k_{ref}: 1.03	300	-	-	-		
NOTE: k_{ref}: $CH_3CH{=}CH_2$ + H						

$(CH_3)_2C{=}CHCH_3$ + S → cy-$[(CH_3)_2]CCH(CH_3)S$						
2-BUTENE, 2-METHYL-, + SULFUR ATOM						
72 KHR/PAR REACTION ORDER: 2.	298	6.5(+13)	-	-		
k/k_{ref}: 56.0	298	-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2$ + S						

$(CH_3)_2C{=}CHCH_3$ + N → products						
2-BUTENE, 2-METHYL-, + NITROGEN ATOM						
72 KHR/PAR REACTION ORDER: 2.	320-550	9.3(+10)	0	433		
k/k_{ref}: 3.5	435	-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2$ + N						

$(CH_3)2C{=}CHCH_3$ + $^1CH_2$ → products						
2-BUTENE, 2-METHYL-, + METHYLENE FREE RADICAL						
72 KHR/PAR REACTION ORDER: 2. k/k_{ref}: 2.12	297	-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2$ + $^1CH_2$						

$(CH_3)_2C{=}CHCH_3$ + $^3CH_2$ → products						
2-BUTENE, 2-METHYL-, + METHYL FREE RADICAL						
72 KHR/PAR REACTION ORDER: 2. k/k_{ref}: 1.83		-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2$ + $^3CH_2$						

$(CH_3)_2C{=}CHCH_3$ + $CH_3\bullet$ → $(CH_3)_2C{=}CHCH_2\bullet$ + $\bullet CH_2C(CH_3){=}CHCH_3$ + CH_4						
2-BUTENE, 2-METHYL-, + METHYL FREE RADICAL						
76 KHR/PAR REACTION ORDER: 2.	400-500	4.9(+11)	0	4300±500	0.5	1.5
NOTE: TENTATIVE k VALUE.						

$(CH_3)_2C{=}CHCH_3$ + $CH_3\bullet$ → $(CH_3)_3CCH(\bullet)CH_3$						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
$\cdot (CH_3)_2C(\cdot)CH(CH_3)_2$ 2-BUTENE, 2-METHYL-, • METHYL FREE RADICAL 72 KER/PAR REACTION ORDER: 2.	403-455	1.4(•10)	0	3070		
NOTE: TENTATIVE k VALUE.						
k/k_{ref}: 0.4	453	-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2 \cdot CH_3$						

$(CH_3)_2C{=}CHCH_3 \cdot CCO \rightarrow (CH_3)_2C{=}C{=}CHCH_3 \cdot CO$ 2-BUTENE, 2-METHYL-, • CARBON OXIDE(C_2O) 72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 100.	298	-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2 \cdot CCO$						

$(CH_3)_3CCH_2\cdot \rightarrow (CH_3)_2C{=}CH_2 \cdot CH_3\cdot$ PROPYL, 2,2-DIMETHYL-, FREE RADICAL 70 BEN/O'N REACTION ORDER: 1.	762	1.0(•14)	0	18875		

$(CH_3)_2CHCH_2CH_2\cdot \cdot CH_2{=}CH_2 \rightarrow (CH_3)_2CH(CH_2)_3CH_2\cdot$ BUTYL, 3-METHYL-, FREE RADICAL • ETHENE 72 KER/PAR REACTION ORDER: 2.	340-413	1.2(•10)	0	3235		
NOTE: TENTATIVE k VALUE.						

$CH_3CH_2CH_2CH_2CH_3 \cdot O \rightarrow CH_3CH_2CH_2CH_2CH_2\cdot \cdot OH$ PENTANE • OXYGEN ATOM 73 BER/HUI REACTION ORDER: 2.	298-650	2.9(•13)	0	2920	0.7	1.3

$CH_3CH_2CH_2CH_2CH_3 \cdot O \rightarrow CH_3CH_2CH_2CH(\cdot)CH_3$ $\cdot CH_3CH_2CH(\cdot)CH_2CH_3 \cdot OH$ PENTANE • OXYGEN ATOM 73 BER/HUI REACTION ORDER: 2.	298-650	8.0(•13)	0	2320	0.7	1.3

$CH_3CH_2CH_2CH_2CH_3 \cdot CH_3\cdot \rightarrow CH_3CH_2CH_2CH_2CH_2\cdot \cdot CH_4$ PENTANE • METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	350-800	4.8(•11)	0	5800±250	0.7	1.3
NOTE: TENTATIVE k VALUE.						

$CH_3CH_2CH_2CH_2CH_3 \cdot CH_3\cdot \rightarrow CH_3CH_2CH(\cdot)CH_2CH_3$ $\cdot CH_3CH_2CH_2CH(\cdot)CH_3 \cdot CH_4$ PENTANE • METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	350-800	6.0(•11)	0	4830±250	0.7	1.3
NOTE: TENTATIVE k VALUE.						

$(CH_3)_2CHCH_2CH_3 \cdot O \rightarrow [C_5H_{11}\cdot] \cdot OH$ BUTANE, 2-METHYL-, • OXYGEN ATOM 73 BER/HUI REACTION ORDER: 2.	307	8.0(•10)	-	-	0.7	1.4

$(CH_3)_2CHCH_2CH_3 \cdot CH_3\cdot \rightarrow (CH_3)_2C(\cdot)CH_2CH_3 \cdot CH_4$ BUTANE, 2-METHYL-, • METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	350-750	9.6(•10)	0	3975±250	0.7	1.3
NOTE: TENTATIVE k VALUE.						

$(CH_3)_2CHCH_2CH_3 \cdot CH_3\cdot \rightarrow (CH_3)_2CHCH(\cdot)CH_3 \cdot CH_4$ BUTANE, 2-METHYL-, • METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	350-750	2.0(•11)	0	4830±250	0.7	1.3

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F
NOTE: TENTATIVE k VALUE.						

$(CH_3)_2CHCH_2CH_3 + CH_3\bullet \rightarrow (CH_3)_2CHCH_2CH_2\bullet + \bullet CH_2CH(CH_3)CH_2CH_3 + CH_4$ BUTANE, 2-METHYL-, + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	350-750	7.1(+11)	0	5800±250	0.7	1.3
NOTE: TENTATIVE k VALUE.						

$(CH_3)_4C \rightarrow (CH_3)_3C\bullet + CH_3$ PROPANE, 2,2-DIMETHYL- 70 BEN/O'N REACTION ORDER: 1.	803-1200	5.0(+16)	0	40465		

$(CH_3)_4C + O \rightarrow (CH_3)_3CCH_2\bullet + OH$ PROPANE, 2,2-DIMETHYL-, + OXYGEN ATOM 73 BER/MOL REACTION ORDER: 2.	298-650	5.9(+13)	0	2920	0.7	1.4

$(CH_3)_4C + CH_3\bullet \rightarrow (CH_3)_3CCH_2\bullet + CH_4$ PROPANE, 2,2-DIMETHYL-, + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	400-600	8.3(+11)	0	5940±350	0.6	1.4

$CH_2{=}CHOCH_2CH{=}CH_2 \rightarrow CH_2{=}CHCH_2CH_2CHO$ 1-PROPENE, 3-ETHENYLOXY- 70 BEN/O'N REACTION ORDER: 1.	440-473	5.0(+11)	0	15400		

$cis\text{-}CH_3CH{=}CHCOOCH_3 \rightarrow trans\text{-}CH_3CH{=}CHCOOCH_3$ cis-2-BUTENOIC ACID METHYL ESTER 70 BEN/O'N REACTION ORDER: 1.	673-833	1.6(+11)	0	29090		

$trans\text{-}CH_3CH{=}CHCOOCH_3 \rightarrow cis\text{-}CH_3CH{=}CHCOOCH_3$ trans-2-BUTENOIC ACID METHYL ESTER 70 BEN/O'N REACTION ORDER: 1.	673-833	4.0(+12)	0	29190		

$CH_3COOCH_2CH{=}CH_2 + CH_3CH_2\bullet \rightarrow CH_3COOCH_2CH(\bullet)CH_2CH_2CH_3 + CH_3COOCH_2CH(CH_2CH_3)CH_2\bullet$ ACETIC ACID 2-PROPENYL ESTER + ETHYL FREE RADICAL 72 KER/PAR REACTION ORDER: 2.	308-448	2.5(+11)	0	3900		

$(CH_3COO)_2CH_2 \rightarrow (CH_3CO)_2O + HCHO$ METHANEDIOL, DIACETATE 70 BEN/O'N REACTION ORDER: 1.	493-578	5.0(+10)	0	18300		

$(CH_3)_2CHOCH{=}CH_2 \rightarrow CH_3CH{=}CH_2 + CH_3CHO$ PROPANE, 2-(ETHENYLOXY)- 70 BEN/O'N REACTION ORDER: 1.	720-794	3.8(+12)	0	21920		

$CH_2{=}CHCH_2CH(OH)CH_3 \rightarrow CH_3CH{=}CH_2 + CH_3CHO$ 4-PENTEN-2-OL 70 BEN/O'N REACTION ORDER: 1.	625-663	8.5(+11)	0	20600		

$CH_3CH_2CH_2CH_2CHO + CH_3\bullet \rightarrow CH_3CH_2CH_2CH_2C(O)\bullet + CH_4$ PENTANAL + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2.	350-500	1.0(+11)	0	3000±500	0.4	1.6
NOTE: TENTATIVE k VALUE.						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F

$CH_3CH_2CH(CH_3)CHO + CH_3\bullet \rightarrow CH_3CH_2CH(CH_3)C(O)\bullet + CH_4$						
BUTANAL, 2-METHYL-, + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	350-500	1.0(+11)	0	3200±500	0	2.0
NOTE: TENTATIVE k VALUE.						

$(CH_3)_2CHCH_2CHO + CH_3\bullet \rightarrow (CH_3)_2CHCH_2C(O)\bullet + CH_4$						
BUTANAL, 3-METHYL-, + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	350-500	1.0(+11)	0	3070±500	0.4	1.6
NOTE: TENTATIVE k VALUE.						

$(CH_3)_3CCHO + CH_3\bullet \rightarrow (CH_3)_3C(O)\bullet + CH_4$						
PROPANAL, 2,2-DIMETHYL-, + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	350-500	1.0(+11)	0	3170±500	0.5	2.0
NOTE: TENTATIVE k VALUE.						

$(CH_3CH_2)_2CO + CH_3\bullet \rightarrow CH_3CH(\bullet)COCH_2CH_3$						
$+ \bullet CH_2CH_2COCH_2CH_3 + CH_4$						
3-PENTANONE + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	300-450	1.9(+11)	0	3675±500	0.5	1.5

$(CH_3CD_2)_2CO + CH_3\bullet \rightarrow CH_3CD_2COCD_2CH_2\bullet + CH_4$						
3-PENTANONH-2,2,4,4-d_4 + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	500-600	2.0(+11)	0	5535±500	0.5	2.0

$(CH_3CD_2)_2CO + CH_3 \rightarrow CH_3CD_2COCD(\bullet)CH_3 + CH_4$						
3-PENTANONE-2,2,4,4-d_4 + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	500-600	1.3(+11)	0	4200±500	0.5	2.0

$(CH_3CH_2)_2CO + CH_3CH_2\bullet \rightarrow \bullet CH_23H_2COCH_2CH_3 + CH_3CH_3$						
3-PENTANONE + ETHYL FREE RADICAL						
72 KCN REACTION ORDER: 2.	300-520	2.8(+11)	0	3986±100	0.4	2.2

$HCOO(CH_2)_3CH_3 + CH_3\bullet \rightarrow \bullet COO(CH_2)_3CH_3 + HCOOCH(\bullet)(CH_2)_2CH_3$						
$+ HCOOCH_2CH(\bullet)CH_2CH_3 + HCOOCH_2CH_2CH(\bullet)CH_3$						
$+ HCOO(CH_2)_3CH_2\bullet + CH_4$						
FORMIC ACID BUTYL ESTER + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	350-500	2.5(+11)	0	4980±500	0.5	2.0
NOTE: TENTATIVE k VALUE.						

$HCOOC(CH_3)_3 \rightarrow (CH_3)_2C=CH_2 + HCOOH$						
FORMIC ACID 1,1-DIMETHYL ETHYL ESTER						
70 BAN/C'N REACTION ORDER: 1.	503-573	7.9(+12)	0	19730		

$CH_3COOCH_2CH_2CH_3 \rightarrow CH_3CH=CH_2 + CH_3COOH$						
ACETIC ACID PROPYL ESTER						
70 BEN/C'N REACTION ORDER: 1.	725-810	2.5(+12)	0	24006		
NOTE: RELIABILITY NO BETTER THAN AN ORDER OF MAGNITUDE.						

$CH_3COOCH(CH_3)_2 \rightarrow CH_3CH=CH_2 + CH_3COOH$						
ACETIC ACID 1-METHYLETHYL ESTER						
70 BEN/C'N REACTION ORDER: 1.	586-801	1.0(+13)	0	22645		

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
$CH_3CH_2COOCH_2CH_3 \rightarrow CH_3CH_2COOH + CH_2{=}CH_2$						
PROPANOIC ACID ETHYL ESTER						
70 BEN/O'N REACTION ORDER: 1.	778-875	5.6(+12)	0	24400		

$CH_3CH_2COOCH_2CH_3 + CH_3\bullet \rightarrow CH_3CH(\bullet)COOCH_2CH_3 + CH_3CH_2COOCH(\bullet)CH_3 + \bullet CH_2CH_2COOCH_2CH_3 + CH_3CH_2COOCH_2CH_2\bullet + CH_4$						
PROPANOIC ACID ETHYL ESTER + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	300-650	2.5(+11)	0	4125±500	0.5	1.5

$CH_3COOCH_2CH_2OCH_3 \rightarrow CH_2{=}CHOCH_3 + CH_3COOH$						
ACETIC ACID (2-METHOXY ETHYL) ESTER						
70 BEN/O'N REACTION ORDER: 1.	725-810	1.6(+12)	0	24460		

$CH_3CH_2OCOOCH_2CH_3 \rightarrow CH_3CH_2OH + CO_2 + CH_2{=}CH_2$						
CARBONIC ACID DIETHYL ESTER						
70 BEN/O'N REACTION ORDER: 1.	573-648	7.9(+12)	0	21800		

$(CH_3CH_2)C(CH_3)_2OH \rightarrow CH_3CH_2C(CH_3){=}CH_2 + CH_3CH{=}C(CH_3)_2 + H_2O$						
2-BUTANOL, 2-METHYL-						
70 BEN/O'N REACTION ORDER: 1.	757-799	3.2(+13)	0	30200		

$(CH_3)_3CCN \rightarrow (CH_3)_2C(\bullet)CN + CH_3\bullet$						
PROPANENITRILE, 2,2-DIMETHYL-						
70 BEN/O'N REACTION ORDER: 1.	875-925	1.4(+15)	0	35330		

$(CH_3CH_2)_2NCH_3 + CH_3\bullet \rightarrow CH_3CH(\bullet)N(CH_2CH_3CH_3 + \bullet CH_2CH_2N(CH_2CH_3)CH_3 + (CH_3CH_2)_2NCH_2\bullet + CH_4$						
ETHANAMINE, N-ETHYL-N-METHYL-, + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	420	3.0(+7)	-	-	0.5	2.0
NOTE: TENTATIVE k VALUE.						

$(CH_3)_2NCON(CH_3)_2 + CH_3\bullet \rightarrow \bullet CH_2(CH_3)NCON(CH_3)_2 + CH_4$						
UREA, TETRAMETHYL-, + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	350-550	2.0(+11)	0	3975±500	0.5	1.5

$CH_2{=}CHCH{=}CHCH{=}CH_2 \rightarrow$ cy-$CH_2CH{=}CHCH{=}CHCH_2$						
cis-1,3,5-HEXATRIENE						
70 BEN/O'N REACTION ORDER: 1.	390-463	7.1(+11)	0	15050		

$CH_3CH_2CH_2CH_2C{\equiv}CH + N \rightarrow$ products						
1-HEXYNE + NITROGEN ATOM						
72 KER/PAR REACTION ORDER: 2.	320-550	4.6(+11)	0	1233		
k/k_{ref}: 14.0	435	-	-	-		
NOTE: k_{ref}: CHCH + N.						

$CH_3CH_2C{\equiv}CCH_2CH_3 + N \rightarrow$ products						
3-HEXYNE + NITROGEN ATOM						
72 KER/PAR REACTION ORDER: 2.	320-550	3.4(+11)	0	1102		
k/k_{ref}: 14.0	435	-	-	-		
NOTE: k_{ref}: CH≡CH + N						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F
cis-CH_2=$CHCH$=$CHCH_2CH_3$ → CH_3CH=$CHCH$=$CHCH_3$						
cis-1,3-HEXADIENE						
70 BEN/G'N REACTION ORDER: 1.	474-518	6.3(+10)	0	16355		
CD_2=$CHCH_2CH_2CH$=CD_2 → CH_2=$CHCD_2CD_2CH$=CH_2						
1,5-HEXADIENE-1,1,6,6-D_4						
70 BEN/G'N REACTION ORDER: 1.	530	1.3(+11)	0	17865		
$(CH_3)_2C$=$CHCH$=CH_2 → CH_2=$C(CH_3)CH$=$CHCH_3$						
1,3-PENTADIENE, 4-METHYL-						
70 BEN/G'N REACTION ORDER: 1.	473-510	5.2(+11)	0	18199		
CH_2=$C(CH_3)C(CH_3)$=CH_2 + CH_3CH_2• →						
+ $CH_3CH_2CH_2C$(•)$(CH_3)C(CH_3)$=CH_2						
+ •$CH_2C(CH_3)(CH_2CH_3)C(CH_3)$=$CH_2$						
1,3-BUTADIENE, 2,3-DIMETHYL-, + ETHYL FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	318-414	1.6(+11)	0	2265		
cis-CH_2=$C(CH_3)CH$=$CHCH_3$ → $(CH_3)_2C$=$CHCH$=CH_2						
cis-1,3-PENTADIENE, 2-METHYL-						
70 BEN/G'N REACTION ORDER: 1.	473	1.7(+11)	0	16485		
$CH_3(CH_2)_3CH$=CH_2 + G → cy-[$CH_3(CH_2)_3$]$CHCH_2$G						
1-HEXENE + OXYGEN ATOM						
73 BER/HUI REACTION ORDER: 2.	298	3.1(+12)	-	-	0.7	1.3
$CH_3(CH_2)_3CH$=CH_2 + CH_3CH_2• → $CH_3(CH_3)_3CH$(•)$CH_2CH_2CH_3$						
+ $CH_3(CH_2)_3CH(CH_2CH_3)CH_2$•						
1-HEXENE + ETHYL FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	338-435	3.9(+10)	0	3400		
cis-$CH_3CH_2CH_2CH$=$CHCH_3$ + CH_3• → $CH_3CH_2CH_2CH$(•)$CH(CH_3)_2$						
cis-2-HEXENE + METHYL FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	298	-	-	4060		
cis-$CH_3CH_2CH_2CH$=$CHCH_3$ + CH_3• → $CH_3CH_2CH_2CH(CH_3)CH$(•)CH_3						
cis-2-HEXENE + METHYL FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	298	-	-	4150		
$CH_3CH_2CH_2C(CH_3)$=CH_2 + CH_3• → $CH_3CH_2CH_2C$(•)$(CH_3)CH_2CH_3$						
1-PENTENE, 2-METHYL-, + METHYL FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	298	-	-	3450		
cis-$(CH_3)_2CHCH$=$CHCH_3$ + CH_3• → $(CH_3)_2CHCH$(•)$CH(CH_3)_2$						
cis-2-PENTENE, 4-METHYL-, + METHYL FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	298	-	-	4390		
$(CH_3)_2C$=$C(CH_3)_2$ + G → products						
2-BUTENE, 2,3-DIMETHYL-, + OXYGEN ATOM						
73 BER/HUI REACTION ORDER: 2.	298-400	3.4(+12)	0	-790	0.8	1.2
$(CH_3)_2C$=$C(CH_3)_2$ + H → $(CH_3)_2C$(•)$CH(CH_3)_2$						
2-BUTENE, 2,3-DIMETHYL-, + HYDROGEN ATOM						

CHEMICAL REACTIONS	T/K	A	B	E/R (in ^{o}K)	k factors f	k factors F
72 KER/PAR REACTION ORDER: 2.	298	7.8(+11)	-	-		
k/k_{ref}: 0.84	300	-	-	-		
NOTE: k_{ref}: $CH_3CH{=}CH_2$ + H						

$(CH_3)_2C{=}C(CH_3)_2$ + S → cy-[$(CH_3)_2$]CC$(CH_3)_2$S						
2-BUTENE, 2,3-DIMETHYL-, + SULFUR ATOM						
72 KER/PAR REACTION ORDER: 2.	298	8.5(+13)	-	-		

$(CH_3)_2C{=}C(CH_3)_2$ + N → products						
2-BUTENE, 2,3-DIMETHYL-, + NITROGEN ATOM						
72 KER/PAR REACTION ORDER: 2.	320-550	1.7(+11)	0	690		
k/k_{ref}: 3.5	435	-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2$ + N						

$(CH_3)_2C{=}C(CH_3)_2$ + $^{1}CH_2$ → products						
2-BUTENE, 2,3-DIMETHYL-, + METHYLENE FREE RADICAL						
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 2.16	297	-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2$ + $^{1}CH_2$						

$(CH_3)_2C{=}C(CH_3)_2$ + $^{3}CH_2$ → products						
2-BUTENE, 2,3-DIMETHYL-, + METHYLENE FREE RADICAL						
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 2.74	297	-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2$ + $^{3}CH_2$						

$(CH_3)_2C{=}C(CH_3)_2$ + CH_3• → $(CH_3)_2C{=}(CH_3)CCH_2$• + CH_4						
2-BUTENE, 2,3-DIMETHYL-, + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	403-614	7.8(+11)	0	4400±500	0.6	1.4

$(CH_3)_2C{=}C(CH_3)_2$ + CH_3• → $(CH_3)_3CC(\bullet)(CH_3)_2$						
2-BUTENE, 2,3-DIMETHYL-, + METHYL FREE RADICAL						
72 KER/PAR REACTION ORDER: 2.	403-453	1.0(+10)	0	3400		
NOTE: TENTATIVE k VALUE.						
k/k_{ref}: 0.2	453	-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2$ + CH_3						

$(CH_3)_2C{=}C(CH_3)_2$ + CCO → $(CH_3)_2C{=}C{=}C(CH_3)_2$ + CO						
2-BUTENE, 2,3-DIMETHYL-, + CARBON OXIDE(C_2O)						
72 KER/PAR REACTION ORDER: 2. k/k_{ref}: 250.	298	-	-	-		
NOTE: k_{ref}: $CH_2{=}CH_2$ + CCO						

$CH_3CH(\bullet)CH_2CH_2CH_2CH_3$ → $CH_3CH{=}CH_2$ + $CH_3CH_2CH_2$•						
PENTYL, 1-METHYL-, FREE RADICAL						
70 BEN/O'N REACTION ORDER: 1.	822	2.0(+14)	0	13800		

$CH_3(CH_2)_4CH_3$ + O → $CH_3(CH_2)_4CH_2$• + OH						
HEXANE + OXYGEN ATOM						
73 BER/BUI REACTION ORDER: 2.	298-650	2.9(+13)	0	2920	0.7	1.3

$CH_3(CH_2)_4CH_3$ + O → $CH_3CH(\bullet)CH_2CH_2CH_2CH_3$ + $CH_3CH_2CH(\bullet)CH_2CH_2CH_3$ + OH						
HEXANE + OXYGEN ATOM						
73 BER/BUI REACTION ORDER: 2.	298-650	1.1(+14)	0	2250	0.7	1.3

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F

$CH_3(CH_2)_4CH_3 + CH_3\bullet \rightarrow CH_3(CH_2)_4CH_2\bullet + CH_4$						
HEXANE + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	350-800	4.8(+11)	0	5800±250	0.7	1.3
NOTE: TENTATIVE k VALUE.						

$CH_3(CH_2)_4CH_3 + CH_3\bullet \rightarrow CH_3CH_2CH(\bullet)CH_2CH_2CH_3$ + $CH_3CH_2CH_2CH_2CH(\bullet)CH_3 + CH_4$						
HEXANE + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	350-800	7.9(+11)	0	4830±250	0.7	1.3
NOTE: TENTATIVE k VALUE.						

$(CH_3)_2CHCH(CH_3)_2 \rightarrow (CH_3)_2CH\bullet + (CH_3)_2CH\bullet$						
BUTANE, 2,3-DIMETHYL-						
70 BEN/O'N REACTION ORDER: 1.	1000-1200	3.2(+16)	0	39250		

$(CH_3)_2CHCH(CH_3)_2 \rightarrow (CH_3)_2CH(\bullet)CH(CH_3)_2 + CH_3\bullet$						
BUTANE, 2,3-DIMETHYL-						
70 BEN/O'N REACTION ORDER: 1.	1000-1200	1.0(+17)	0	41800		

$(CH_3)_2CHCH(CH_3)_2 + O \rightarrow \bullet CH_2CH(CH_3)CH(CH_3)_2 + OH$						
BUTANE, 2,3-DIMETHYL-, + OXYGEN ATOM						
73 BER/BUI REACTION ORDER: 2.	298-650	5.9(+13)	0	2920	0.7	1.3

$(CH_3)_2CHCH(CH_3)_2 + O \rightarrow (CH_3)_2C(\bullet)CH(CH_3)_2 + OH$						
BUTANE, 2,3-DIMETHYL-, + OXYGEN ATOM						
73 BER/BUI REACTION ORDER: 2.	298-650	3.1(+13)	0	1650	0.7	1.3

$(CH_3)_2CHCH(CH_3)_2 + CH_3\bullet \rightarrow \bullet CH_2CH(CH_3)CH(CH_3)_2 + CH_4$						
BUTANE, 2,3-DIMETHYL-, + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	350-750	9.5(+11)	0	5800±250	0.7	1.3
NOTE: TENTATIVE k VALUE.						

$(CH_3)_2CHCH(CH_3)_2 + CH_3\bullet \rightarrow (CH_3)_2C(\bullet)CH(CH_3)_2 + CH_4$						
BUTANE, 2,3-DIMETHYL-, + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	350-750	1.9(+11)	0	3975±250	0.7	1.3
NOTE: TENTATIVE k VALUE.						

$(CH_3)_2CHCH(CH_3)_2 + CH_3\bullet \rightarrow (CH_3)_2CHC(\bullet)(CH_3)_2$ + $\bullet CH_2CH(CH_3)CH(CH_3)_2 + CH_4$						
BUTANE, 2,3-DIMETHYL-, + METHYL FREE RADICAL						
72 KGN REACTION ORDER: 2.	300-500	5.0(+10)	0	3445		

$(CH_3)_2CHCH(CH_3)_2 + CD_3\bullet \rightarrow (CH_3)_2C(\bullet)CH(CH_3)_2$ + $\bullet CH_2CH(CH_3)CH(CH_3)_2 + CD_3H$						
BUTANE, 2,3-DIMETHYL-, + METHYL-d_3 FREE RADICAL						
72 KGN REACTION ORDER: 2.	439-566	4.7(+11)	0	4525		

$CH_2=C(CH_3)OCH_2CH=CH_2 \rightarrow CH_3C(O)CH_2CH_2CH=CH_2$						
1-PROPENE, 3-(1-METHYLETHENYLOXY)-						
70 BEN/O'N REACTION ORDER: 1.	416-467	5.4(+11)	0	14745		

$CH_2=C(CH_3)CH_2OCH=CH_2 \rightarrow CH_2=C(CH_3)CH_2CH_2CHO$						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f F
1-PROPENE, 2-METHYL-3(ETHENYLOXY)-					
70 BEN/C'N REACTION ORDER: 1.	423-461	1.4(+11)	0	14645	
$CH_2{=}CHCH(CH_3)OCH{=}CH_2 \rightarrow CH_3CH{=}CHCH_2CH_2CHO$					
1-PROPENE, 3-METHYL-3(ETHENYLOXY)-					
70 BEN/C'N REACTION ORDER: 1.	423-461	2.1(+11)	0	14025	
$CH_2{=}CHC(CH_3)_2COOH \rightarrow CH_3CH{=}C(CH_3)_2 + CO_2$					
3-BUTENOIC ACID, 2,2-DIMETHYL-					
70 BEN/C'N REACTION ORDER: 1.	511-548	1.4(+11)	0	18400	
$CH_3CH_2COOCH_2CH{=}CH_2 + CH_3CH_2\bullet \rightarrow$ $CH_3CH_2COOCH_2CH(\bullet)CH_2CH_2CH_3 + CH_3CH_2COOCH_2CH(CH_2CH_3)CH_2\bullet$					
PROPANONE ACID 2-PROPENYL ESTER + ETHYL FREE RADICAL					
72 KER/PAR REACTION ORDER: 2.	352-453	2.5(+11)	0	3875	
$(CH_3COO)_2CHCH_3 \rightarrow CH_3COOCOCH_3 + CH_3CHO$					
1,1-ETHANEDIOL, DIACETATE					
70 BEN/C'N REACTION ORDER: 1.	493-541	1.9(+10)	0	16560	
$CH_3CH_2C(O)OOC(O)CH_2CH_3 \rightarrow CH_3CH_2C(O)O\bullet + CH_3CH_2C(O)O\bullet$					
PEROXIDE, BIS(1-OXOPROPYL)-					
70 BEN/C'N REACTION ORDER: 1.	373-464	2.5(+14)	0	15100	
$CH_2{=}CHCH_2C(OH)(CH_3)_2 \rightarrow CH_3CH{=}CH_2 + (CH_3)_2CO$					
4-PENTEN-2-OL, 2-METHYL-					
70 BEN/C'N REACTION ORDER: 1.	607-643	1.4(+12)	0	20500	
$CH_2{=}CHO(CH_2)_3CH_3 \rightarrow CH_3CH_2CH{=}CH_2 + CH_3CHO$					
BUTANE, 1-(ETHENYLOXY)-					
70 BEN/C'N REACTION ORDER: 1.	590-650	1.4(+11)	0	21330	
$CH_2{=}CHO(CH_2)_3CH_3 + CH_3CH_2\bullet \rightarrow CH_3CH_2CH_2CH(\bullet)O(CH_3)_3CH_3$ $+ \bullet CH_2CH(CH_2CH_3)O(CH_2)_3CH_3$					
BUTANE, 1-ETHENYLOXY-, + ETHYL FREE RADICAL					
70 BEN/C'N REACTION ORDER: 2.	303-435	2.5(+10)	0	3070	
$CH_3COO(CH_2)_3CH_3 \rightarrow CH_3CH_2CH{=}CH_2 + CH_3COOH$					
ACETIC ACID BUTYL ESTER					
72 KER/PAR REACTION ORDER: 1.	725-810	1.6(+12)	0	23150	
$CH_3COOCH(CH_3)CH_2CH_3 \rightarrow CH_3COOH + cis\text{-}CH_3CH{=}CHCH_3$ $+ trans\text{-}CH_3CH{=}CHCH_3 + CH_3CH_2CH{=}CH_2$					
ACETIC ACID 1-METHYLPEROPYL ESTER					
70 BEN/C'N REACTION ORDER: 1.	576-710	2.0(+13)	0	23450	
NOTE: 57% 1-BUTENE: trans/cis-2-BUTENE = 0.64.					
$CH_3COOCH_2CH(CH_3)_2 \rightarrow (CH_3)_2C{=}CH_2 + CH_3COOH$					
ACETIC ACID 2-METHYLPROPYL ESTER					
70 BEN/C'N REACTION ORDER: 1.	725-810	7.9(+11)	0	23800	
$CH_3COOC(CH_3)_3 \rightarrow (CH_3)_2C{=}CH_2 + CH_3COOH$					
ACETIC ACID 1,1-DIMETHYLETHYL ESTER					

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
70 BEN/C'N REACTION ORDER: 1.	514-564	1.4(+13)	0	20130		
$(CH_3)_2C(OH)CH_2COCH_3 \rightarrow (CH_3)_2CO + (CH_3)_2CO$ 2-PENTANONE, 4-HYDROXY-4-METHYL-						
70 BEN/C'N REACTION ORDER: 1.	495-528	4.3(+11)	0	16255		
$CH_3COOCH(CH_3)CH_2OCH_3 \rightarrow CH_3COOH + CH_2{=}CHCH_2OCH_3$ + cis- and trans-$CH_3CH{=}CHOCH_3$ 2-PROPANOL, 1-METHOXY-, ACETATE						
70 BEN/C'N REACTION ORDER: 1.	650-710	1.1(+13)	0	23450		
NOTE: 58% PROPENE, 3-METHOXY-						
$CH_3COOCH_2CH_2OCH_2CH_3 \rightarrow CH_2{=}CHOCH_2CH_3 + CH_3COOH$ ETHANOL, 2-ETHOXY-, ACETATE						
70 BEN/C'N REACTION ORDER: 1.	725-810	1.2(+12)	0	24100		
$(CH_3)_2CHOCH(CH_3)_2 \rightarrow CH_3CH{=}CH_2 + (CH_3)_2CHOH$ PROPANE, 2,2'-OXYBIS-						
70 BEN/C'N REACTION ORDER: 1.	696-760	4.2(+14)	0	31960		
NOTE: SUSPECT RATE CONSTANT.						
$(CH_3)_2CHOCH(CH_3)_2 + CH_3\bullet \rightarrow (CH_3)_2C(\bullet)OCH(CH_3)_2$ + $\bullet CH_2CH(CH_3)OCH(CH_3)_2 + CH_4$ PROPANE, 2,2'-OXYBIS- + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	400-600	2.1(+11)	0	4100±500	0.5	2.0
$CH_3CH_2CH_2OOCH_2CH_2CH_3 \rightarrow CH_3CH_2CH_2O\bullet + CH_3CH_2CH_2O\bullet$ PEROXIDE, DIPROPYL						
70 BEN/C'N REACTION ORDER: 1.	420-428	4.0(+15)	0	18700		
$(CH_3)_2CHOOCH(CH_3)_2 + CH_3\bullet \rightarrow (CH_3)_2C(\bullet)OOCH(CH_3)_2$ + $\bullet CH_2CH(CH_3)OOCH(CH_3)_2 + CH_2\bullet + CH_4$ PEROXIDE, BIS(1-METHYLETHYL)-, + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	300-450	2.3(+11)	0	4100±500	0.5	1.5
$CH_3CH{=}NC(CH_3)_3 + CH_3\bullet \rightarrow CH_3C(\bullet){=}NC(CH_3)_3$ + $\bullet CH_2CH{=}NC(CH_3)_3 + CH_3CH{=}NC(CH_3)_2CH_2\bullet + CH_4$ 2-PROPANIMINE, N-ETHYLIDENE-2-METHYL-, + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	350-500	8.9(+10)	0	3925±500	0.5	1.5
$(CH_3)_2CHN{=}NCH(CH_3)_2 \rightarrow (CH_3)_2CHN{=}N\bullet + (CH_3)_2CH\bullet$ DIAZENE, BIS(1-METHYLETHYL)-						
70 BEN/C'N REACTION ORDER: 1.	523-563	2.5(+16)	0	23900		
$(CH_3)_2CHNHCH(CH_3)_2 + CH_3\bullet \rightarrow (CH_3)_2CHN(\bullet)CH(CH_3)_2$ + $(CH_3)_2C(\bullet)NHCH(CH_3)_2 + CH_2CH(CH_3)NHCH(CH_3)_2 + CH_4$ 2-PROPANAMINE, N-(1-METHYLETHYL)-, + METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	350-500	2.0(+11)	0	3370±750		
NOTE: TENTATIVE k VALUE.						
$(CH_3CH_2)_3N + CH_3\bullet \rightarrow CH_3CH(\bullet)N(CH_2CH_3)_2$ + $\bullet CH_2CH_2N(CH_2CH_3)_2 + CH_4$						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F
ETHANAMINE, N,N-DIETHYL-, + METHYL FREE RADICAL 76 KHR/PAR REACTION ORDER: 2.	350-600	5.0(+11)	0	4000±500	0	2.0
NOTE: TENTATIVE k VALUE.						
$CH_2=C=CHCH_2CH_2CH=CH_2 \rightarrow CH_2=CHC(=CH_2)CH_2CH=CH_2$ 1,2,6-HEPTATRIENE 70 HEN/O'N REACTION ORDER: 1.	445-491	9.3(+9)	0	14330		
$CH_3(CH_2)_4CCH + CH_3CH_2\bullet \rightarrow CH_3(CH_2)_4C(\bullet)=CHCH_2CH_3 + CH_3(CH_2)_4C(CH_2CH_3)=CH\bullet$ 1-HEPTYNE + ETHYL FREE RADICAL 72 KER/PAR REACTION ORDER: 2.		3.9(+11)	0	4430		
$CH_2=CHCH_2CH_2CH=CHCH_3 \rightarrow CH_2CH=CH_2CH(CH_3)CH=CH_2$ 1,5-HEPTADIENE 70 HEN/O'N REACTION ORDER: 1.	451-523	1.3(+11)	0	16355		
$CH_2=CHCH(CH_3)CH_2CH=CH_2 \rightarrow CH_2=CHCH_2CH_2CH=CHCH_3$ 1,5-HEXADIENE, 3-METHYL- 70 HEN/O'N REACTION ORDER: 1.	451-523	7.1(+10)	0	17590		
$(CH_3)_2C=C=C(CH_3)_2 + CCO \rightarrow (CH_3)_2C=C=C=C(CH_3)_2 + CO$ 2,3-PENTADIENE, 2,4-DIMETHYL-, + CARBON OXIDE(C_2O) 70 HEN/O'N REACTION ORDER: 2. k/k_{ref}: 113.	304	-	-	-		
NOTE: k_{ref}: $CH_2=CH_2 + CCO$						
$CH_3(CH_2)_4CH=CH_2 + CH_3CH_2\bullet \rightarrow CH_3(CH_2)_4CH(\bullet)CH_2CH_2CH_3 + CH_3(CH_2)_4CH(CH_2CH_3)CH_2\bullet$ 1-HEPTENE + ETHYL FREE RADICAL 72 KER/PAR REACTION ORDER: 2.	359-439	6.2(+10)	0	3500		
$(CH_3)_3CC(CH_3)=CH_2 + H \rightarrow (CH_3)_3CCH(CH_3)CH_2\bullet + (CH_3)_3CC(\bullet)(CH_3)_2$ 1-BUTENE, 2,3,3-TRIMETHYL-, + HYDROGEN ATOM 72 KER/PAR REACTION ORDER: 2.	298	1.6(+12)	-	-		
NOTE: TENTATIVE k VALUE BASED ON REACTION $(CH_3)_2C=CH_2 + H$						
$CH_3C(CH_3)_2C(CH_3)=CH_2 + CH_3CH_2\bullet \rightarrow CH_3C(CH_3)_2C(\bullet)(CH_3)CH_2CH_2CH_3 + CH_3C(CH_3)_2C(CH_3)(CH_2CH_3)CH_2\bullet$ 1-BUTENE, 2,3,3-TRIMETHYL-, + ETHYL FREE RADICAL 72 KER/PAR REACTION ORDER: 2.	322-364	7.8(+9)	0	2800		
$CH_3(CH_2)_5CH_3 + O \rightarrow CH_3(CH_2)_5CH_2\bullet + OH$ HEPTANE + OXYGEN ATOM 73 HER/HUI REACTION ORDER: 2.	298-650	2.9(+13)	0	2920	0.7	1.3
$CH_3(CH_2)_5CH_3 + O \rightarrow CH_3(CH_2)_4CH(\bullet)CH_3 + CH_3(CH_2)_3CH(\bullet)(CH_2)_2CH_3 + CH_3(CH_2)_2CH(\bullet)(CH_2)_2CH_3 + OH$ HEPTANE + OXYGEN ATOM 73 HER/HUI REACTION ORDER: 2.	298-650	1.2(+14)	0	2190	0.7	1.3

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
$(CH_3)_3C(CH_2)_2CH_3$ + O → products PENTANE, 2,2-DIMETHYL-, + OXYGEN ATOM 73 BER/HUI REACTION ORDER: 2.	307	6.5(+10)	-	-	0.7	1.4
$(CH_3)_2CHCH_2CH(CH_3)_2$ + O → products PENTANE, 2,4-DIMETHYL-, + OXYGEN ATOM 73 BER/HUI REACTION ORDER: 2.	307	1.0(+11)	-	-	0.7	1.4
$(CH_3CH_2)_3CH$ + CH_3· → $(CH_3CH_2)_3C$· + CH_4 PENTANE, 3-ETHYL-, + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-750	9.5(+10)	0	3975±250	0.7	1.3
$(CH_3CH_2)_3CH$ + CH_3· → $(CH_3CH_2)_2CHCH(\cdot)CH_3$ + CH_4 PENTANE, 3-ETHYL-, + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-750	6.0(+11)	0	4830±250	0.7	1.3
$(CH_3CH_2)_3CH$ + CH_3· → $(CH_3CH_2)_2CHCH_2CH_2$· + CH_4 PENTANE, 3-ETHYL-, + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-750	7.1(+11)	0	5800±250	0.7	1.3
$(CH_3)_3CCH(CH_3)_2$ → $(CH_3)_3C$· + $(CH_3)_2CH$· BUTANE, 2,2,3-TRIMETHYL- 70 BEN/O'N REACTION ORDER: 1.	1069-1197	1.1(+16)	0	36335		
$CH_2=C(CH_3)C(CH_3)_2COOH$ → $(CH_3)_2C=C(CH_3)_2$ + CO_2 3-BUTENOIC ACID 2,2,3-TRIMETHYL- 70 BEN/O'N REACTION ORDER: 1.	447-488	7.1(+10)	0	16560		
trans-$CH_3CH=CHC(CH_3)_2COOH$ → $CH_3CH_2CH=C(CH_3)_2$ + CO_2 trans-3-PENTENOIC ACID, 2,2-DIMETHYL- 70 BEN/O'N REACTION ORDER: 1.	526-564	5.5(+11)	0	20300		
$CH_3COOCH(CH_3)CH_2CH=CH_2$ → CH_3COOH + $CH_2=CHCH_2CH=CH_2$ + cis-, and trans $CH_3CH=CHCH=CH_2$ ACETIC ACID 1-METHYL-3-BUTENYL ESTER 70 BEN/O'N REACTION ORDER: 1. NOTE: trans/cis-1,3-PENTADIENE = 7/3; 1,4-PENTADIENE/1,3-PENTADIENE = 1/2.	564-628	2.0(+13)	0	22345		
$CH_3COOCH(CH_3)CH_2COCH_3$ → $CH_3CH=CHCOCH_3$ + CH_3COOH 2-2-PENTANONE, 4-ACETYLOXY- 70 BEN/O'N REACTION ORDER: 1.	529-570	7.9(+11)	0	18800		
$(CH_3CH_2COO)_2CH_2$ → $(CH_3CH_2CO)_2O$ + HCHO METHANEDIOL, DIPROPANOATE 70 BEN/O'N REACTION ORDER: 1.	493-578	5.0(+10)	0	18300		
$CH_3COO(CH_2)_4CH_3$ → $CH_3CH_2CH_2CH=CH_2$ + CH_3COOH ACETIC ACID PENTYL ESTER 70 BEN/O'N REACTION ORDER: 1.	725-810	1.6(+12)	0	23350		

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f F

$CH_3COOCH(CH_3)CH_2CH_2CH_3 \rightarrow$ cis-, and trans-$CH_3CH{=}CHCH_2CH_3$ + $CH_3CH_2CH_2CH{=}CH_2$ + CH_3COOH					
ACETIC ACID 1-METHYL BUTYL ESTER					
70 BEN/G'N REACTION ORDER: 1.	650-710	5.0(+12)	0	21995	
NOTE: 55% 1-PENTENE.					

$CH_3COOCH(CH_2CH_3)_2 \rightarrow$ cis-, and trans-$CH_3CH{=}CHCH_2CH_3$ + CH_3COOH					
ACETIC ACID 1-ETHYLPROPYL ESTER					
70 BEN/G'N REACTION ORDER: 1.	650-710	1.2(+13)	0	22500	

$CH_3COOCH_2CH(CH_3)CH_2CH_3 \rightarrow CH_3CH_2C(CH_3){=}CH_2 + CH_3COOH$					
ACETIC ACID 2-METHYL BUTYL ESTER					
70 BEN/G'N REACTION ORDER: 1.	725-810	7.9(+11)	0	23500	

$CH_3COOC[(CH_3)_2]CH_2CH_3 \rightarrow CH_3CH_2C(CH_3){=}CH_2$ + $(CH_3)_2C{=}CHCH_3$ + CH_3COOH					
ACETIC ACID 1,1-DIMETHYL PROPYL ESTER					
70 BEN/G'N REACTION ORDER: 1.	501-562	2.5(+13)	0	20300	
NOTE: 75% 1-BUTENE, 2-METHYL-.					

$CH_3COOCH_2CH_2CH(CH_3)_2 \rightarrow (CH_3)_2CHCH{=}CH_2 + CH_3COOH$					
ACETIC ACID 3-METHYL BUTYL ESTER					
70 BEN/G'N REACTION ORDER: 1.	725-810	1.6(+12)	0	23350	

$(CH_3)_3CCOOCH_2CH_3 \rightarrow (CH_3)_3CCOOH + CH_2{=}CH_2$					
PROPANOIC ACID, 2,2-DIMETHYL-, ETHYL ESTER					
70 BEN/G'N REACTION ORDER: 1.	635-694	4.0(+12)	0	24200	

$CH_3CH_2COOC(CH_3)_3 \rightarrow (CH_3)_2C{=}CH_2 + CH_3CH_2COOH$					
PROPANOIC ACID, 1,1-DIMETHYL ETHYL ESTER					
70 BEN/G'N REACTION ORDER: 1.	513-569	6.3(+12)	0	19730	

$CH_3COOCH(CH_3)CH_2N(CH_3)_2 \rightarrow CH_2{=}CHCH_2N(CH_3)_2$ + cis-, and trans-$CH_3CH{=}CHN(CH_3)_2$ + CH_3COOH					
ACETIC ACID 1-METHYL-2-DIMETHYLAMINOETHYL ESTER					
70 BEN/G'N REACTION ORDER: 1.	650-710	6.3(+12)	0	22245	

$(CH_3)_2C{=}CHCH{=}C(CH_3)_2 + 3CH_3CH_2 \rightarrow$ $(CH_3)_2C(CH_2CH_3)CH(\bullet){=}C(CH_3)_2$ + $(CH_3)_2C(\bullet)CH(CH_2CH_3)CH{=}C(CH_3)_2$					
2,4-HEXADIENE, 2,5-DIMETHYL-, + ETHYL FREE RADICAL					
72 KEE/PAR REACTION ORDER: 2.	328-420	6.2(+10)	0	3300	

$CH_3(CH_2)_5CH{=}CH_2 + CH_3CH_2\bullet \rightarrow CH_3(CH_2)_5CH(\bullet)CH_2CH_2CH_3$ + $CH_3(CH_2)_5CH(CH_2CH_3)CH_2\bullet$					
1-OCTENE + ETHYL FREE RADICAL					
72 KEE/PAR REACTION ORDER: 2.	339-425	1.2(+11)	0	3825	

$(CH_3)_3CCH_2C(CH_3){=}CH_2 + CH_3CH_2\bullet \rightarrow$ $(CH_3)_3CCH_2C(\bullet)(CH_3)CH_2CH_2CH_3$ + $(CH_3)_3CCH_2C(CH_3)(CH_2CH_3)CH_2\bullet$					

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F
1-PENTENE, 2,4,4-TRIMETHYL-, + ETHYL FREE RADICAL 72 KER/PAR REACTION ORDER: 2.	309-364	1.9(+10)	0	2870		

$CH_3(CH_2)_6CH_3 + O \rightarrow CH_3(CH_2)_6CH_2\bullet + OH$ OCTANE + OXYGEN ATOM 73 BER/BUI REACTION ORDER: 2.	298-650	2.9(+13)	0	2920	0.7	1.3

$CH_3(CH_2)_6CH_3 + O \rightarrow CH_3(CH_2)_5CH(\bullet)CH_3$ $+ CH_3(CH_2)_4CH(\bullet)CH_2CH_3 + CH_3(CH_2)_3CH(\bullet)(CH_2)_2CH_3 + OH$ OCTANE + OXYGEN ATOM 73 BER/BUI REACTION ORDER: 2.	298-650	9.3(+13)	0	2030	0.7	1.3

$CH_3(CH_2)_6CH_3 + CH_3\bullet \rightarrow CH_3(CH_2)_6CH_2\bullet + CH_4$ OCTANE + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-800	4.8(+11)	0	5800±250	0.7	1.3

$CH_3(CH_2)_6CH_3 + CH_3\bullet \rightarrow CH_3(CH_2)_3CH(\bullet)CH_2CH_2CH_3$ $+ CH_3(CH_2)_4CH(\bullet)CH_2CH_3 + CH_3(CH_2)_5CH(\bullet)CH_3 + CH_4$ OCTANE + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-800	1.2(+12)	0	4830±250	0.7	1.3

$(CH_3)_3CCH_2CH(CH_3)_2 + O \rightarrow$ products PENTANE, 2,2,4-TRIMETHYL-, + OXYGEN ATOM 73 BER/BUI REACTION ORDER: 2.	307	5.5(+10)	-	-	0.6	1.5

$(CH_3)_3CCH_2CH(CH_3)_2 + CH_3\bullet \rightarrow (CH_3)_3CCH(\bullet)CH(CH_3)_2 + CH_4$ PENTANE, 2,2,4-TRIMETHYL-, + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-750	2.0(+11)	0	4830±250	0.7	1.3

$(CH_3)_3CCH_2CH(CH_3)_2 + CH_3\bullet \rightarrow (CH_3)_3CCH_2C(\bullet)(CH_3)_2 + CH_4$ PENTANE, 2,2,4-TRIMETHYL-, + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-750	9.5(+10)	0	3975±250	0.7	1.3

$(CH_3)_3CCH_2CH(CH_3)_2 + CH_3\bullet \rightarrow (CH_3)_3CCH_2CH(CH_3)CH_2\bullet$ $+ CH_2C(CH_3)_2CH_2CH(CH_3)_2 + CH_4$ PENTANE, 2,2,4-TRIMETHYL-, + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-750	1.2(+12)	0	5800±250	0.7	1.3

$(CH_3)_2CHCH(CH_3)CH(CH_3)_2 + O \rightarrow$ products PENTANE, 2,3,4-TRIMETHYL-, + OXYGEN ATOM 73 BER/BUI REACTION ORDER: 2.	307	3.0(+10)	-	-	0.6	1.5

$(CH_3)_2CHCH(CH_3)CH(CH_3)_2 + CH_3\bullet \rightarrow$ $\bullet CH_2CH(CH_3)CH(CH_3)CH(CH_3)_2 + CH_4$ PENTANE, 2,3,4-TRIMETHYL-, + METHYL FREE RADICAL 76 KER/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-750	1.2(+12)	0	5800±250	0.7	1.3

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	k factors F
$(CH_3)_2CHCH(CH_3)CH(CH_3)_2 + CH_3\bullet \rightarrow (CH_3)_2CHC(\bullet)(CH_3)CH(CH_3)_2 + (CH_3)_2C(\bullet)CH(CH_3)_2 + CH_4$ PENTANE, 2,3,4-TRIMETHYL-, + METHYL FREE RADICAL 76 KEE/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-750	2.9(+11)	0	3975±250	0.7	1.3
$(CH_3)_2CHCH(CH_3)CH(CH_3)_2 + CH_3\bullet \rightarrow [C_8H_{17}\bullet] + CH_4$ PENTANE, 2,3,4-TRIMETHYL-, + METHYL FREE RADICAL 72 KON REACTION ORDER: 2.	414-605	4.7(+11)	0	4575		
$(CH_3)_3CC(CH_3)_3 \rightarrow (CH_3)_3C\bullet + (CH_3)_3C\bullet$ BUTANE, 2,2,3,3-TETRAMETHYL- 70 BEN/O'N REACTION ORDER: 1.	985-1119	5.0(+16)	0	33800		
$(CH_3)_3CC(CH_3)_3 + O \rightarrow$ products BUTANE, 2,2,3,3-TETRAMETHYL- 73 BER/HUI REACTION ORDER: 2.	307	8.0(+9)	-	-	0.6	1.5
$(CH_3)_3CC(CH_3)_3 + CH_3\bullet \rightarrow \bullet CH_2C(CH_3)_2CC(CH_3)_2 + CH_4$ BUTANE, 2,2,3,3-TETRAMETHYL-, + METHYL FREE RADICAL 76 KEE/PAR REACTION ORDER: 2. NOTE: TENTATIVE k VALUE.	350-800	1.4(+12)	0	5800±250	0.7	1.3
$(CH_3COO)_2CHCH=CHCH_3 \rightarrow (CH_3CO)_2O + cis\text{-}CH_3CH=CHCHO$ 2-BUTENE-1,1-DIOL, DIACETATE 70 BEN/O'N REACTION ORDER: 1. NOTE: PROBABLY RELIABLE k.	492-533	1.3(+11)	0	16600		
$(CH_3COO)_2CHCH_2CH_2CH_3 \rightarrow (CH_3CO)_2O + CH_3CH_2CH_2CHO$ 1,1-BUTANEDIOL, DIACETATE 70 BEN/O'N REACTION ORDER: 1. NOTE: PROBABLY RELIABLE k.	484-538	3.0(+10)	0	16560		
$(CH_3CH_2COO)_2CHCH_3 \rightarrow (CH_3CH_2CO)_2O + CH_3CHO$ 1,1-ETHANEDIOL, DIPROPANOATE 70 BEN/O'N REACTION ORDER: 1.	484-538	2.5(+10)	0	16560		
$CH_3CH_2CH_2C(O)OOC(O)CH_2CH_2CH_3 \rightarrow CH_3CH_2CH_2C(O)O\bullet + CH_3CH_2CH_2C(O)O\bullet$ PEROXIDE, BIS(1-OXOBUTYL) 70 BEN/O'N REACTION ORDER: 1.	370-452	2.0(+14)	0	14900		
$CH_3COOC(CH_2CH_3)_2CH_3 \rightarrow$ cis-, and trans-$CH_3CH=C(CH_3)CH_2CH_3 + CH_2=C(CH_2CH_3)_2 + CH_3COOH$ ACETIC ACID 1-ETHYL-1-METHYLPROPYL ESTER 70 BEN/O'N REACTION ORDER: 1. NOTE: 65% 1-BUTENE, 2-ETHYL-.	560-610	1.4(+13)	0	19400		
$CH_3COOCH_2CH(CH_2CH_3)_2 \rightarrow (CH_3CH_2)_2C=CH_2 + CH_3COOH$ ACETIC ACID 2-ETHYLBUTYL ESTER 70 BEN/O'N REACTION ORDER: 1.	725-810	7.9(+11)	0	23050		
$CH_3COOCH(CH_3)CH(CH_3)CH_2CH_3 \rightarrow CH_2=CHCH(CH_3)CH_2CH_3$						

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f	F
• cis-, and trans-$CH_3CH{=}C(CH_3)CH_2CH_3$ • CH_3COOH						
ACETIC ACID 1,2-DIMETHYLBUTYL ESTER						
70 BEN/G'N REACTION ORDER: 1.	650-710	4.0(+12)	0	21740		
NOTE: 76% 1-PENTENE, 3-METHYL-.						

$CH_3COOC(CH_3)_2CH_2CH_2CH_3 \rightarrow CH_2{=}C(CH_3)CH_2CH_2CH_3$						
• $(CH_3)_2C{=}CHCH_2CH_3$ • CH_3COOH						
ACETIC ACID 1,1-DIMETHYLBUTYL ESTER						
70 BEN/G'N REACTION ORDER: 1.	560-610	1.5(+13)	0	19525		
NOTE: 72% 1-PENTENE, 2-METHYL-.						

$CH_3COOC(CH_3)_2CH(CH_3)_2 \rightarrow (CH_3)_2C{=}C(CH_3)_2$						
• $CH_2{=}C(CH_3)CH(CH_3)_2$ • CH_3COOH						
ACETIC ACID 1,1,2-TRIMETHYLPROPYL ESTER						
70 BEN/G'N REACTION ORDER: 1.	560-610	1.3(+13)	0	19075		
NOTE: 90% 1-BUTENE, 2,3-DIMETHYL-.						

$(CH_3)_3COOC(CH_3)_3 \rightarrow (CH_3)_3CHO\bullet + (CH_3)_3CO\bullet$						
PEROXIDE, BIS(1,1-DIMETHYLETHYL)						
70 BEN/G'N REACTION ORDER: 1.	403-443	4.0(+15)	0	18800		

$(CH_3)_3COOC(CH_3)_3 + CH_3\bullet \rightarrow \bullet CH_2C(CH_3)_2OOC(CH_3)_3 + CH_4$						
PEROXIDE, BIS(1,1-DIMETHYLETHYL)-, • METHYL FREE RADICAL						
76 KER/PAR REACTION ORDER: 2.	350-500	1.8(+12)	0	5900±150	0.3	3

$CH_3CH_2CH_2CH_2N{=}NCH_2CH_2CH_2CH_3 \rightarrow CH_3CH_2CH_2CH_2N{=}N\bullet$						
• $CH_3CH_2CH_2CH_2\bullet$						
DIAZENE, DIBUTYL-						
70 BEN/G'N REACTION ORDER: 1.	473-673	3.2(+16)	0	25165		

$CH_3CH_2CH(CH_3)N{=}NCH(CH_3)CH_2CH_3 \rightarrow CH_3CH_2CH(CH_3)N{=}N\bullet$						
• $CH_3CH_2CH(\bullet)CH_3$						
DIAZENE, BIS(1-METHYLPROPYL)-						
70 BEN/G'N REACTION ORDER: 1.	535-618	4.0(+16)	0	23500		

$(CH_3)_2CHCH_2N{=}NCH_2CH(CH_3)_2 \rightarrow (CH_3)_2CHCH_2N{=}N\bullet$						
• $(CH_3)_2CHCH_2\bullet$						
DIAZENE, BIS(2-METHYLPROPYL)-						
70 BEN/G'N REACTION ORDER: 1.	473-673	1.7(+16)	0	24660		

$(CH_3)_3CN{=}NC(CH_3)_3 \rightarrow (CH_3)_3CN{=}N\bullet + (CH_3)_3C\bullet$						
DIAZENE, BIS(1,1-DIMETHYLETHYL)-						
70 BEN/G'N REACTION ORDER: 1.	473-673	1.4(+17)	0	21900		

$(CH_3CH_2)_2NN{=}NN(CH_2CH_3)_2 \rightarrow (CH_3CH_2)_2NN{=}N\bullet + (CH_3CH_2)_2N\bullet$						
2-TETRAZENE, 1,1,4,4-TETRAETHYL-						
70 BEN/G'N REACTION ORDER: 1.	471-508	2.5(+14)	0	17365		

$(CH_3)_2CHCH_2N(O)N(O)CH_2CH(CH_3)_2 \rightarrow (CH_3)_2CHCH_2NO$						
• $(CH_3)_2CHCH_2NO$						
PROPANE, 1-NITROSO-2-METHYL-, DIMERIC						
70 BEN/G'N REACTION ORDER: 1.	374-402	2.5(+14)	0	12900		

CHEMICAL REACTIONS	T/K	A	B	E/R (in °K)	k factors f F
$CH_3CH{=}C(CH_2CH_3)C(CH_3)_2COOH \rightarrow (CH_3CH_2)_2C{=}C(CH_3)_2 + CO_2$ PENTANOIC ACID, 2,2-DIMETHYL-3-ETHYLIDENE- 70 BEN/C'N REACTION ORDER: 1. NOTE: RELIABLE k.	468-502	4.8(+11)	0	18100	
$(CH_3CH_2CH_2COO)_2CH_2 \rightarrow (CH_3CH_2CH_2CO)_2O + HCHO$ METHANEDIOL, DIBUTANOATE 70 BEN/C'N REACTION ORDER: 1.	493-578	5.0(+10)	0	18300	
$CH_3COOCH(CH_3)(CH_2)_4CH_3 \rightarrow CH_3(CH_2)_4CH{=}CH_2$ + cis-, and trans-$CH_3CH{=}CH(CH_2)_3CH_3$ ACETIC ACID 1-METHYLHEXYL ESTER 70 BEN/C'N REACTION ORDER: 1. NOTE: 58% 1-HEPTENE.	650-710	5.4(+12)	0	21995	
$CH_3COOCH(CH_2CH_3)CH_2CH_2CH_2CH_3 \rightarrow CH_3CH{=}CH(CH_2)_3CH_3$ + cis-, and trans-$CH_3CH_2CH{=}CHCH_2CH_2CH_3 + CH_3COOH$ ACETIC ACID 1-ETHYLPENTYL ESTER 70 BEN/C'N REACTION ORDER: 1.	650-710	5.6(+12)	0	21740	
$CH_3COOCH(CH_2CH_2CH_3)_2 \rightarrow$ + cis-, and trans-$CH_3CH_2CH{=}CHCH_2CH_2CH_3 + CH_3COOH$ ACETIC ACID 1-PROPYLBUTYL ESTER 70 BEN/C'N REACTION ORDER: 1.	650-710	4.0(+12)	0	21500	
$CH_3COOCH[CH(CH_3)_2]_2 \rightarrow (CH_3)_2CHCH{=}C(CH_3)_2 + CH_3COOH$ ACETIC ACID 1-(1'-METHYLETHYL)-2-METHYLPROPYL ESTER 70 BEN/C'N REACTION ORDER: 1.	650-710	6.9(+12)	0	22500	
$(CH_3)_2C{=}CHCH_2CH_2CH(CH_3)CH{=}CH_2 \rightarrow$ cy-$[CH_2{=}C(CH_3)]CHCH(CH_3)CH(CH_3)CH_2CH_2$ 1,6-OCTADIENE, 3,7-DIMETHYL- 70 BEN/C'N REACTION ORDER: 1.	656-682	1.2(+9)	0	17700	
$(CH_3CH_2CH_2COO)_2CHCH_3 \rightarrow (CH_3CH_2CH_2CO)_2O + CH_3CHO$ 1,1-ETHANEDIOL, DIBUTANOATE 70 BEN/C'N REACTION ORDER: 1. NOTE: PROBABLY RELIABLE k.	473-573	1.8(+10)	0	16600	
$(CH_3COO)_2CH(CH_2)_5CH_3 \rightarrow CH_3(CH_2)_5CHO + (CH_3CO)_2O$ 1,1-HEPTANEDIOL, DIACETATE 70 BEN/C'N REACTION ORDER: 1. NOTE: PROBABLY RELIABLE k.	473-573	3.0(+10)	0	16600	

APPENDIX: CONVERSION TABLES

EQUIVALENT SECOND ORDER RATE CONSTANTS

A \ B	$cm^3 mol^{-1} s^{-1}$	$dm^3 mol^{-1} s^{-1}$	$m^3 mol^{-1} s^{-1}$	$cm^3 molecule^{-1} s^{-1}$	$(mm\ Hg)^{-1} s^{-1}$	$atm^{-1} s^{-1}$	$ppm^{-1} min^{-1}$	$m^2 kN^{-1} s^{-1}$
1 $cm^3 mol^{-1} s^{-1}$ =	1	10^{-3}	10^{-6}	1.66×10^{-24}	$1.604 \times 10^{-5} T^{-1}$	$1.219 \times 10^{-2} T^{-1}$	2.453×10^{-9}	$1.203 \times 10^{-4} T^{-1}$
1 $dm^3 mol^{-1} s^{-1}$ =	10^3	1	10^{-3}	1.66×10^{-21}	$1.604 \times 10^{-2} T^{-1}$	$12.19\ T^{-1}$	2.453×10^{-6}	$1.203 \times 10^{-1} T^{-1}$
1 $m^3 mol^{-1} s^{-1}$ =	10^6	10^3	1	1.66×10^{-18}	$16.04\ T^{-1}$	$1.219 \times 10^4 T^{-1}$	2.453×10^{-3}	$120.3\ T^{-1}$
1 $cm^3 molecule^{-1} s^{-1}$ =	6.023×10^{23}	6.023×10^{20}	6.023×10^{17}	1	$9.658 \times 10^{18} T^{-1}$	$7.34 \times 10^{21} T^{-1}$	1.478×10^{15}	$7.244 \times 10^{19} T^{-1}$
1 $(mm\ Hg)^{-1} s^{-1}$ =	$6.236 \times 10^4 T$	$62.36\ T$	$6.236 \times 10^{-2} T$	$1.035 \times 10^{-19} T$	1	760	4.56×10^{-2}	7.500
1 $atm^{-1} s^{-1}$ =	$82.06\ T$	$8.206 \times 10^{-2} T$	$8.206 \times 10^{-5} T$	$1.362 \times 10^{-22} T$	1.316×10^{-3}	1	6×10^{-5}	9.869×10^{-3}
1 $ppm^{-1} min^{-1}$ = at 298K, 1 atm. total pressure	4.077×10^8	4.077×10^5	407.7	6.76×10^{-16}	21.93	1.667×10^4	1	164.5
1 $m^2 kN^{-1} s^{-1}$ =	$8314\ T$	$8.314\ T$	$8.314 \times 10^{-3} T$	$1.38 \times 10^{-20} T$	0.1333	101.325	6.079×10^{-3}	1

To convert a rate constant from one set of units A to a new set B find the conversion factor for the row A under Column B and multiply the old value by it, e.g. to convert $cm^3 molecule^{-1} s^{-1}$ to $m^3 mol^{-1} s^{-1}$ multiply by 6.023×10^{17}.

Table adapted from Evaluated Kinetic Data for High Temperature Reactions, Volume 1: Homogeneous Gas Phase Reactions of the H_2-O_2 System, Butterworths, London, 1972.

EQUIVALENT THIRD ORDER RATE CONSTANTS

A \ B	$cm^6 mol^{-2} s^{-1}$	$dm^6 mol^{-2} s^{-1}$	$m^6 mol^{-2} s^{-1}$	$cm^6 molecule^{-2} s^{-1}$	$(mm\ Hg)^{-2} s^{-1}$	$atm^{-2} s^{-1}$	$ppm^{-2} min^{-1}$	$m^4 kN^{-2} s^{-1}$
1 $cm^6 mol^{-2} s^{-1}$ =	1	10^{-6}	10^{-12}	2.76×10^{-48}	$2.57 \times 10^{-10} T^{-2}$	$1.48 \times 10^{-4} T^{-2}$	1.003×10^{-19}	$1.447 \times 10^{-8} T^{-2}$
1 $dm^6 mol^{-2} s^{-1}$ =	10^6	1	10^{-6}	2.76×10^{-42}	$2.57 \times 10^{-4} T^{-2}$	$148\ T^{-2}$	1.003×10^{-13}	$1.447 \times 10^{-2} T^{-2}$
1 $m^6 mol^{-2} s^{-1}$ =	10^{12}	10^6	1	2.76×10^{-36}	$257\ T^{-2}$	$1.48 \times 10^{8} T^{-2}$	1.003×10^{-7}	$1.447 \times 10^{4} T^{-2}$
1 $cm^6 molecule^{-2} s^{-1}$ =	3.628×10^{47}	3.628×10^{41}	3.628×10^{35}	1	$9.328 \times 10^{37} T^{-2}$	$5.388 \times 10^{43} T^{-2}$	3.64×10^{28}	$5.248 \times 10^{39} T^{-2}$
1 $(mm\ Hg)^{-2} s^{-1}$ =	$3.89 \times 10^{9} T^2$	$3.89 \times 10^{3} T^2$	$3.89 \times 10^{-3} T^2$	$1.07 \times 10^{-38} T^2$	1	5.776×10^{5}	3.46×10^{-5}	56.25
1 $atm^{-2} s^{-1}$ =	$6.733 \times 10^{3} T^2$	$6.733 \times 10^{-3} T^2$	$6.733 \times 10^{-9} T^2$	$1.86 \times 10^{-44} T^2$	1.73×10^{-6}	1	6×10^{-11}	9.74×10^{-5}
1 $ppm^{-2} min^{-1}$ = at 298K, 1 atm. total pressure	9.97×10^{18}	9.97×10^{12}	9.97×10^{6}	2.75×10^{-29}	2.89×10^{4}	1.667×10^{10}	1	1.623×10^{6}
1 $m^4 kN^{-2} s^{-1}$ =	$6.91 \times 10^{7} T^2$	$69.1\ T^2$	$6.91 \times 10^{-5} T^2$	$1.904 \times 10^{-40} T^2$	0.0178	1.027×10^{4}	6.16×10^{-7}	1

See note to Table for Second Order Rate Constants

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15. SUPPLEMENTARY NOTES

☐ Document describes a computer program; SF-185, FIPS Software Summary, is attached.

16. 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 table of recommended rate constants for gas phase chemical reactions occurring in combustion is presented. Specifically, it gives in tabular form the values of the parameters for the modified Arrhenius equation $k = AT^{B}\exp(-E/RT)$. The table covers reactions occurring in the combustion, oxidation and decomposition of aliphatic saturated or unsaturated C_1 to C_{10} hydrocarbons, alcohols, aldehydes, ketones, thiols, ethers, peroxides, amines, amides and their free radicals, as well as the reactions of O, O_2, H, H_2, OH, H_2O, H_2O_2, N, N_2, NO, N_2O, NO_2, N_2O_4, N_2O_5, S, S_2, SH, SO, SO_2, SOH, NS_2 with each other. The table includes approximately 170 first order reactions 760 second order reactions and 50 third order reactions. There are 1805 entries covering about 1100 distinct chemical reactions. These recommendations have been taken from eleven evaluations and critical reviews published between 1970 and 1976. The papers examined by the evaluators extend from the nineteen fifties up to - and including - 1975.

17. KEY WORDS *(six to twelve entries; alphabetical order; capitalize only the first letter of the first key word unless a proper name; separated by semicolons)*

Arrhenius parameters; combustion; decomposition; free radicals; hydrocarbons; hydrogen; nitrogen; oxidation; oxygen; oxygenated; organic compounds; rate constant; sulfur

18. AVAILABILITY ☒ Unlimited

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