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RESEARCH MEMORANDUM

IDEAL TEMPERATURE RISE DUE TO CONSTANT-PRESSURE COMBUSTION OF A JP-4 FUEL

By S. C. Huntley

Lewis Flight Propulsion Laboratory
Cleveland, Ohio

NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

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SUMMARY

The ideal temperature rise due to the constant-pressure combustion of a methylene (CH_2) fuel was calculated. CH_2 fuel closely approximates MIL-F-5624 grade JP-4 fuel presently used in most turbojet and ram-jet engines. Charts are presented from which the ideal temperature rise or the ideal quantity of fuel required to obtain a specified combustion temperature may be obtained for any flight condition likely to be encountered with turbojet or ram-jet engines using this fuel.

The charts are applicable only to a fuel having a hydrogen-carbon mass ratio of 0.168. They include a range of fuel-air ratios from 0 to 1.2 fraction of stoichiometric fuel-air ratio with dissociation taken into account, inlet-air temperatures from 400° to 1600° R, and combustion pressures from 1/16 to 64 atmospheres. The use of the charts is illustrated by several examples.

INTRODUCTION

A knowledge of the combustion temperature or of the quantity of fuel required to obtain a specified combustion temperature is necessary in the performance analyses of aircraft turbojet and ram-jet engines. Ideal combustion temperature is generally calculated assuming complete oxidation of the fuel where final fuel-air ratios are leaner than stoichiometric and where dissociation is unimportant. In the stoichiometric range of fuel-air ratios, ideal combustion temperatures are generally calculated assuming that chemical equilibrium exists among the combustion products and dissociation is thereby taken into account. With dissociation, the ideal combustion temperature is dependent on combustion-pressure level.

Accurate calculation of the ideal combustion-temperature rise of hydrocarbon fuels has been simplified by the presentation of charts for cases where the final fuel-air ratios are leaner than stoichiometric and at combustion temperatures where dissociation is unimportant.

Examples of these charts are found in references 1 and 2. Similar charts are presented in reference 3, which also includes the stoichiometric range of fuel-air ratios. In the latter case, with dissociation taken into account, the charts are applicable to combustion processes occurring at pressure levels from 1 to 5 atmospheres.

The operational range of turbojet and ram-jet engines has been extended in recent years to high altitudes and high flight speeds. This increase in operational range has extended the range of combustion-pressure levels which must be covered in the performance analyses of these engines. A laborious solution is required to calculate ideal combustion-temperature rise in the stoichiometric range of fuel-air ratios where combustion-pressure level has an effect. In addition, a different solution is required for each combination of combustion pressure, inlet-air temperature, and fraction of stoichiometric fuel-air ratio. Therefore, it is evident that a need exists for an accurate and simple method of determining the ideal combustion-temperature rise in the stoichiometric range of fuel-air ratios and for an extensive range of combustion pressures. The purpose of this report is to provide charts from which the ideal temperature rise or the ideal quantity of fuel required to obtain a specified combustion temperature may be obtained for a comprehensive range of turbojet- and ram-jet-engine operating conditions.

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A general method and thermodynamic tables for the solution of thermodynamic properties of a combustion gas in chemical equilibrium are provided in reference 4. This method has been used at the NACA Lewis laboratory to establish thermodynamic properties of a combustion gas for a CH_2 fuel and air reaction. These unpublished data were used to compute the ideal combustion-temperature rise. The temperature-rise results are presented herein.

Charts are presented from which the ideal combustion-temperature rise or the ideal quantity of fuel required to obtain a specified combustion temperature may be easily and accurately obtained. The charts are applicable only to a fuel having a hydrogen-carbon mass ratio of 0.168, which closely approximates MIL-F-5624 grade JP-4 fuel presently used in most turbojet and ram-jet engines. The charts are based on a constant-pressure adiabatic combustion process covering a range of fuel-air ratios from 0 to 1.2 fraction of stoichiometric, a range of combustion pressures from 1/16 to 64 atmospheres, and a range of inlet-air temperatures from 400° to 1600° R. Use of the charts for a nonadiabatic combustion process or for variations in heat content of the fuel is considered, and their use is illustrated by numerical examples.

SYMBOLS

The following symbols are used in this report:

a,b,c,d	constants used in interpolation process
c_p^o	specific heat at constant pressure and standard conditions, Btu/lb-^{o}R
f'	stoichiometric fuel-air mass ratio (0.067626)
h_c	lower heating value of fuel at constant pressure
h_T^o	sum of sensible enthalpy and chemical energy at temperature T and standard conditions, Btu/lb
Δh_T^o	difference in enthalpy at T and at 400^o R (table II), Btu/lb
i	air mass-flow ratio at station i
M	molecular weight, lb/lb-mole
m	mass-flow rate, lb/sec
P	absolute combustion pressure, atm or lb/sq ft
S	fraction of stoichiometric fuel-air ratio
T	absolute temperature, ^{o}R
ΔT	temperature rise, ^{o}R
$\delta\Delta T$	difference in temperature rise or correction factor, ^{o}R

Subscripts:

a	air
f	fuel
g	combustion gas
i	station
r	reference or assigned value

x adjusted values

1,2,3 stations

THEORETICAL BASIS OF CHARTS

The charts presented herein apply to an ideal constant-pressure adiabatic combustion process with an assigned value of fuel enthalpy. A method is discussed in the section USE OF CHARTS which accounts for a nonadiabatic combustion process or for a change in the assigned value of fuel enthalpy. Chemical equilibrium was assumed to exist among the products of combustion in the stoichiometric range of fuel-air ratio. At leaner-than-stoichiometric fuel-air ratios and at low combustion temperatures completely oxidized products of combustion were assumed.

For convenience, the enthalpy used is defined as the sum of sensible enthalpy and chemical energy. When the chemical energy is included in the enthalpy of each substance, enthalpy of the combustion gas for an adiabatic combustion must equal the enthalpy of the fuel and air entering the combustion process, or

$$(h_T^o)_a + Sf'(h_T^o)_f = (1 + Sf')(h_T^o)_g \tag{1}$$

where the state temperature for each term in equation (1) is taken as the appropriate entering or leaving temperature. Combustion-gas enthalpy was calculated from equation (1) for an assigned value of fuel enthalpy, for selected values of inlet-air temperature, and for several fractions of stoichiometric fuel-air ratio.

The composition of air was assumed to consist of the following mole fractions: N_2, 0.780881; O_2, 0.209495; A, 0.009324; CO_2, 0.000300. The air enthalpy at selected values of inlet-air temperature was calculated using this composition and the molar enthalpy of each constituent from the thermodynamic tables of reference 4.

The assigned value of fuel enthalpy was determined at a fuel temperature of 540° R. At this temperature, the liquid CH_2 fuel was assumed to have a lower heating value at constant pressure $(h_c)_{CH_2}$ of -18,700 Btu per pound. The lower heating value at constant pressure is defined as the amount of heat removed during the constant-pressure combustion of a fuel and gaseous oxygen mixture when the initial and final temperatures are equal and the completely oxidized combustion products are all in the gaseous state. The reaction equation for the determination of the lower heating value of CH_2 fuel is then

$$CH_2 + \frac{3}{2} O_2 \rightarrow CO_2 + H_2O \tag{2}$$

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and the enthalpy equation is

$$(Mh_T^O)_{CH_2} + \frac{3}{2} (Mh_T^O)_{O_2} = (Mh_T^O)_{CO_2} + (Mh_T^O)_{H_2O} - (Mh_c)_{CH_2} \qquad (3)$$

from which

$$(Mh_T^O)_{CH_2} = (Mh_T^O)_{CO_2} + (Mh_T^O)_{H_2O} - \frac{3}{2} (Mh_T^O)_{O_2} - (Mh_c)_{CH_2} \qquad (4)$$

The assigned value of fuel enthalpy at a temperature of 540° R was determined from equation (4) using the assigned lower heating value at constant pressure and the molar enthalpy of each constituent from the thermodynamic tables of reference 4. Stoichiometric fuel-air ratio f' is evaluated by consideration of equation (2) and the mole fraction of O_2 in the air available for combustion as

$$\left.\begin{aligned} f' \frac{M_a}{M_{CH_2}} &= \frac{2(0.209495)}{3} \\ \text{or} \qquad & \\ f' &= 0.067626 \end{aligned}\right\} \qquad (5)$$

The combustion temperature associated with a specific value of combustion-gas enthalpy was determined by interpolation from established relations between temperature, enthalpy, and specific heat at constant pressure. These thermodynamic properties were obtained at a sequence of temperatures in either 200° or 100° K increments. In the stoichiometric range of fuel-air ratios, chemical equilibrium was assumed to exist among products of combustion consisting of CO, CO_2, H, H_2, H_2O, O, O_2, OH, N, N_2, NO, and A. Applying the general method of reference 4 to these assumed products of combustion leads to eight dissociative equilibrium equations for gaseous molecules in terms of atomic species, namely, for CO, CO_2, H_2, H_2O, O_2, OH, N_2, and NO. However, as no free carbon was assumed among the combustion products, the equilibrium equation for CO_2 was expressed in terms of CO and O. Conservation of mass leads to five additional equations, one for each atomic type, namely, for C, H, O, N, and A. The total pressure being the sum of the partial pressure of each constituent provides an additional equation. The simultaneous solution of these equations subsequently leads to the composition of the combustion gas for a constant-pressure combustion process at a specified temperature, pressure, and fraction of stoichiometric fuel-air ratio. The composition of the combustion gas and selected thermodynamic properties were established for a sequence of temperatures in 200° K increments, at several pressures, and at several fractions of stoichiometric fuel-air ratio.

At leaner-than-stoichiometric fuel-air ratios and at low combustion temperatures, the combustion gas was assumed to be completely oxidized. The products of combustion, in this case, were assumed to consist of CO_2, H_2O, and the original air entering the combustion less the oxygen that went into the formation of CO_2 and H_2O, which leads to

$$(1 + Sf')(h_T^o)_g = (h_T^o)_a + \frac{2}{3}\left(\frac{0.209495}{M_a}\right)S\left[(Mh_T^o)_{CO_2} + (Mh_T^o)_{H_2O} - \frac{3}{2}(Mh_T^o)_{O_2}\right] \tag{6}$$

and

$$(1 + Sf')(c_p^o)_g = (c_p^o)_a + \frac{2}{3}\left(\frac{0.209495}{M_a}\right)S\left[(Mc_p^o)_{CO_2} + (Mc_p^o)_{H_2O} - \frac{3}{2}(Mc_p^o)_{O_2}\right] \tag{7}$$

where the state temperature for each term in equations (6) and (7) is the combustion temperature. Equations (6) and (7) were used in conjunction with the thermodynamic tables of reference 4 to calculate the enthalpy and specific heat at constant pressure of the completely oxidized combustion gas at a sequence of temperatures in 100^o K increments and at several fractions of stoichiometric fuel-air ratio.

A relation between temperature, enthalpy, and specific heat at constant pressure was established by assuming that

$$T_g = a(h_T^o)_g^3 + b(h_T^o)_g^2 + c(h_T^o)_g + d \tag{8}$$

and

$$\left[\frac{d(T_g)}{d(h_T^o)_g}\right]_p = \frac{1}{(c_p^o)_g} = 3a(h_T^o)_g^2 + 2b(h_T^o)_g + c \tag{9}$$

where a, b, c, and d were evaluated for each temperature increment from the thermodynamic properties of each temperature sequence. This relation was then assumed to be true for any temperature between the values at which a, b, c, and d were determined. This method gives an interpolation process based on a 2-point - 2-slope technique. From this established relation the combustion temperature associated with a specific value of combustion-gas enthalpy was determined for selected values of inlet-air temperature and for several fractions of stoichiometric fuel-air ratio.

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PRESENTATION OF CHARTS

The ideal combustion-temperature rise associated with a constant-pressure adiabatic combustion process is shown in figure 1 for a combustion pressure of 1 atmosphere and for inlet-air temperatures of 400° and 1600° R as a function of the fraction of stoichiometric fuel-air ratio. The effect of dissociation on temperature rise is illustrated by the separation between the curves with dissociation and without dissociation. The effect of dissociation is to decrease the ideal temperature rise attainable with a completely oxidized combustion gas, especially at high values of combustion temperature. The typical trend of temperature rise as the inlet-air temperature is increased is to reduce the temperature rise. The temperature rise is reduced more at near-stoichiometric mixtures, and the peak temperature rise occurs at richer mixtures with higher inlet temperatures. These trends in temperature rise for a pressure level of 1 atmosphere are also typical of other combustion-pressure levels.

The values of temperature rise in the stoichiometric range of fuel-air ratios were computed with the assumption of dissociation; whereas, at the leaner fuel-air ratios no dissociation was assumed. The resulting two sets of values were faired together as shown by the dashed curves in figure 1. The resulting continuous curves were used in subsequent charts for the relation of ideal combustion-temperature rise as a function of the fraction of stoichiometric fuel-air ratio.

Ideal combustion-temperature rise at a combustion pressure of 1 atmosphere is presented in table I as a function of the fraction of stoichiometric fuel-air ratio for a range of inlet-air temperatures from 400° to 1600° R. Temperature rise or the ideal quantity of fuel required to obtain a specified temperature rise may be easily obtained at any 0.001 incremental fraction of stoichiometric fuel-air ratio or at any 100° R increment in inlet-air temperature. These increments in fuel-air ratio and inlet-air temperature are sufficiently small to give accurate values by a simple straight-line interpolation at any interval between increments.

Ideal combustion-temperature rise for any combustion pressure other than 1 atmosphere is obtained by additive correction factors applied to the value of temperature rise obtained from table I at the appropriate fraction of stoichiometric fuel-air ratio and inlet-air temperature. Exact differences in temperature rise for equal increments of the logarithm of combustion pressure are presented in figure 2. The number of temperature-rise differences to be added depends on the difference of the pressure level from 1 atmosphere, as will be shown later in examples illustrating the use of the charts. Temperature rise is very nearly linear with the logarithm of combustion pressure. Consequently, a straight-line interpolation using the logarithm of the particular pressure gives a close approximation to the difference in temperature rise for a pressure within each increment. This relation was used to establish lines of intermediate pressure levels on each chart of figure 2, from which the appropriate temperature-rise correction factor may be easily obtained. More exact interpolations may be achieved, of course, by direct plots of the temperature-rise difference as a function of the logarithm of combustion pressure.

Correction-factor charts have also been prepared to assist in obtaining the ideal quantity of fuel required for a specified temperature rise at any combustion pressure. These charts are presented in figure 3. Additive correction factors are obtained from figure 3 as a function of the specified temperature rise, the inlet-air temperature, and the combustion pressure. These additive correction factors are derived in a manner similar to that for the correction factors of figure 2. The quantity of fuel required for a specified temperature rise at any combustion pressure is obtained from table I after applying the correction factors of figure 3 to the specified temperature rise. The number of correction factors to be applied to the specified temperature rise is again dependent on the difference between the pressure level and 1 atmosphere.

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USE OF CHARTS

The combustion charts presented herein may be used directly for an adiabatic combustion process and for the assigned value of fuel enthalpy. The charts may also be used for a nonadiabatic combustion process, such as a loss of air or power extraction, and for variations in the heat content of the fuel. A general system is presented in figure 4, which shows enthalpies for a nonadiabatic combustion process with a loss of air in the system and with a variation in heat content of the fuel from the assigned fuel enthalpy. The heat balance is

$$(mh_T^O)_{a,1} - (mh_T^O)_{a,i} + (mh_T^O)_{f,2} = (mh_T^O)_{g,3} \tag{10}$$

and the mass balance of the system is

$$m_{a,1} - m_{a,i} + m_{f,2} = m_{g,3} \tag{11}$$

Since, by definition,

$$\left.\begin{aligned} Sf' &= \frac{m_{f,2}}{m_{a,1} - m_{a,i}} \\ \text{and} \\ i &= \frac{m_{a,i}}{m_{a,1} - m_{a,i}} \end{aligned}\right\} \tag{12}$$

then, combining equations (10), (11), and (12) and using the assigned fuel enthalpy yield

$$(h_T^O)_{a,1} - i\left[(h_T^O)_{a,i} - (h_T^O)_{a,1}\right] + Sf'(h_T^O)_{f,r} +$$

$$Sf'\left[(h_T^O)_{f,2} - (h_T^O)_{f,r}\right] = (1 + Sf')(h_T^O)_{g,3} \tag{13}$$

Now, by using an adjusted inlet-air temperature T_x to accomodate the change in energy from an adiabatic process with assigned conditions, the adjusted inlet-air enthalpy is

$$(h_T^O)_{a,x} = (h_T^O)_{a,1} - i\left[(h_T^O)_{a,i} - (h_T^O)_{a,1}\right] + Sf'\left[(h_T^O)_{f,2} - (h_T^O)_{f,r}\right] \tag{14}$$

Substituting equation (14) into equation (13) yields the generalized (or adiabatic) heat-balance equation

$$(h_T^O)_{a,x} + Sf'(h_T^O)_{f,r} = (1 + Sf')(h_T^O)_{g,3} \tag{15}$$

The generalized heat-balance equation which is similar to equation (1) is directly applicable to the combustion charts.

An adjustment of inlet-air temperature is necessary to satisfy the difference between the generalized inlet-air enthalpy $(h_T^O)_{a,x}$ and the actual inlet-air enthalpy $(h_T^O)_{a,1}$. This difference in air enthalpy involves only a change in sensible enthalpy; consequently, any available sensible-enthalpy table for air may be used to obtain the corresponding adjustment of inlet-air temperature. For convenience, a chart of sensible air enthalpy as a function of temperature is presented in table II, which was calculated using the same air composition and molar enthalpy of each constituent as was used for the combustion charts. The change in enthalpy resulting from the loss of air in a general system (such as fig. 4) may be used directly in equation (14). An appropriate term may also be included to account for any other change in energy which may result in a nonadiabatic process, such as energy extracted from the system for auxiliary equipment.

A variation in fuel enthalpy from the assigned value may be the result of a change in either the lower heating value of the fuel at constant pressure or in the fuel-inlet temperature. The change in enthalpy resulting from a change in the lower heating value of the fuel at constant pressure is simply $Sf'(-18{,}700 - h_c)$. A change in enthalpy re-resulting from a variation in fuel-inlet temperature from the assigned value of 540° R may be obtained from a consideration of the specific heat at constant pressure of the liquid fuel. A typical variation of specific heat with fuel temperature was obtained from reference 5 for a JP-4 hydrocarbon fuel. The change in fuel enthalpy from the assigned value at 540° R was calculated by using

$$(c_p^o)_{f,liquid} = 0.502 + 0.000525(T_f - 540)$$

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For convenience, a chart of the change in fuel enthalpy of a stoichiometric mixture on a unit-mass-of-air basis is presented in table III as a function of the fuel-inlet temperature. The product of a chart value and the fraction of stoichiometric fuel-air ratio yields the appropriate change in air enthalpy for a variation in fuel-inlet temperature (eq. (14)).

The use of the combustion charts is illustrated by calculations for a turbojet engine with an afterburner for which the following conditions are employed: engine-inlet temperature, 520° R; 4-percent loss in air flow by compressor interstage air bleed occurring at a temperature of 624° R; combustor-inlet temperature, 1000° R, engine fuel-air ratio, 25 percent of stoichiometric; fuel-inlet temperature, 540° R; lower heating value of fuel at constant pressure of -19,135 Btu per pound at 540° R; turbine-outlet temperature, 1675° R; afterburner fuel-air ratio, 55 percent of stoichiometric; afterburner combustion pressure, 400 pounds per square foot; and afterburner combustion temperature, 3500° R.

Example 1 - Determination of Ideal Turbine-Outlet Temperature

Generalizing the heat balance from the engine inlet to the turbine outlet indicates that an adjustment in the inlet-air temperature is necessary before using table I. From equation (14) the adjusted inlet-air enthalpy is

$$(\Delta h_T^o)_{a,x} = (\Delta h_T^o)_{a,1} - i\left[(\Delta h_T^o)_{a,i} - (\Delta h_T^o)_{a,1}\right] + Sf'\left[-h_c - 18{,}700\right]$$

From table II

$$(\Delta h_T^o)_{a,i} - (\Delta h_T^o)_{a,1} = 53.7 - 28.8 = 24.9 \text{ Btu/lb}$$

and

$$(\Delta h_T^O)_{a,x} = 28.8 - 0.04(24.9) + 0.25 \times 0.067626(19{,}135 - 18{,}700)$$

$$= 35.2 \text{ Btu/lb}$$

or, from $(\Delta h_T^O)_{a,x}$ and table II,

$$T_x = 547^\circ \text{ R}$$

Then, from T_x, S, and table I,

$$\Delta T = 1195^\circ \text{ R}$$

The ideal turbine-outlet temperature is 1195° + 547° = 1742° R. No correction is necessary for combustion pressure at this low combustion temperature (lean fuel-air ratio).

Example 2 - Determination of Ideal Engine Fuel-Air Ratio

This example is the inverse of example 1, and an iteration process is necessary because of the change in fuel enthalpy from the assigned value.

An approximate adjusted inlet-air temperature may be obtained by using an estimated ideal engine fuel-air ratio. The estimated fuel-air ratio is obtained from a temperature rise based on the adjusted inlet temperature and the ideal ΔT of example 1. The approximate ΔT is 1675° - 547° = 1128° R; the ideal ΔT is 1195° R. An ideal fuel-air ratio estimated from a ratio of these temperature rises and the actual fuel-air ratio is $0.25 \times \frac{1128}{1195} = 0.236$ fraction of stoichiometric fuel-air ratio. An approximate adjusted inlet-air enthalpy is

$$(\Delta h_T^O)_{a,x} = 28.8 - 0.04(24.9) + 0.236 \times 0.067626(19.135 - 18{,}700)$$

$$= 34.7 \text{ Btu/lb}$$

or, from $(\Delta h_T^O)_{a,x}$ and table II,

$$T_x = 545^\circ \text{ R}$$

A new approximation of specified ΔT is 1675° - 545° = 1130° R. By using $T_x = 545^\circ$ R, $\Delta T = 1130^\circ$ R, and table I, the ideal fuel-air ratio is found to be 0.2348 fraction of stoichiometric fuel-air ratio. A reiteration process using this fuel-air ratio gives the same adjusted inlet-air temperature; therefore, no further iterations are necessary.

Example 3 - Determination of Engine Combustion Temperature

If it is assumed that the combustion of ideal engine fuel occurs only in the engine combustor, then the ideal fuel-air ratio may be specified by either the combustor temperature rise or the engine temperature rise. Consequently, the combustor temperature rise may be calculated from the ideal fuel flow determined in example 2 and the combustor-inlet temperature by applying a heat balance to the engine combustor. Generalizing the heat balance from the combustor inlet to exit indicates an adjustment of combustor-inlet temperature is necessary before using table I. This heat balance indicates an adiabatic process with an adjustment for variation of fuel enthalpy of the ideal fuel-air ratio. Furthermore, the combustor air flow is equal to the air flow used to specify the ideal fuel-air ratio of example 2; so no adjustment of fuel-air ratio is necessary. From the combustor-inlet temperature, table II, and the ideal fuel-air ratio,

$$(\Delta h_T^o)_{a,x} = 145.5 + 0.2348 \times 0.067626(19{,}135 - 18{,}700) = 152.4 \text{ Btu/lb}$$

or

$$T_x = 1027^\circ \text{ R}$$

Then, from T_x, ideal S, and table I,

$$\Delta T = 1058^\circ \text{ R}$$

The engine combustion temperature is $1058^\circ + 1027^\circ = 2085^\circ$ R.

Example 4 - Determination of Ideal Afterburner Combustion Temperature

Generalizing the heat balance from the engine inlet to the afterburner outlet indicates that an adjustment in the engine-inlet temperature is to be made which differs from example 1 because of the additional fuel supplied to the afterburner; therefore,

$$(\Delta h_T^o)_{a,x} = 35.2 + 0.55 \times 0.067626(19{,}135 - 18{,}700) = 51.4 \text{ Btu/lb}$$

or

$$T_x = 614^\circ \text{ R}$$

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The total fuel-air ratio supplied to the system is 0.25 + 0.55 = 0.80 fraction of the stoichiometric fuel-air ratio. Then, from T_x, total S, and table I,

$$\Delta T = 3119^\circ \text{ R}$$

As afterburner combustion occurs at a pressure of 400 pounds per square foot, correction factors must be applied to the temperature rise ob-
3774 tained from table I. From figure 2(a), total S, T_x, and P,

$$\delta\Delta T = -7^\circ \text{ R}$$

From figure 2(b), total S, T_x, and P = 1/4 atmosphere,

$$\delta\Delta T = -24^\circ \text{ R}$$

The ideal afterburner combustion temperature is $3119^\circ - 7^\circ - 24^\circ + 614^\circ = 3702^\circ$ R.

Example 5 - Determination of Ideal Afterburner Fuel-Air Ratio

This example is the inverse of example 4; and, as in example 2, an iteration process is necessary. The specified afterburner temperature rise is $3500^\circ - 1675^\circ = 1825^\circ$ R. From example 4, the ideal afterburner temperature rise is $3702^\circ - 1675^\circ = 2027^\circ$ R. An ideal afterburner fuel-air ratio estimated from a ratio of these temperature rises and the actual afterburner fuel-air ratio is $0.55 \times \frac{1825}{2027} = 0.495$ fraction of stoichiometric fuel-air ratio. An approximate adjusted inlet-air enthalpy from an estimate of the total ideal fuel-air ratio is

$$\begin{aligned}(\Delta h_T^\circ)_{a,x} &= 28.8 - 0.04(24.9) + (0.2348 + 0.495)0.067626(19{,}135 - 18{,}700) \\ &= 49.3 \text{ Btu/lb}\end{aligned}$$

or, from $(\Delta h_T^\circ)_{a,x}$ and table II,

$$T_x = 605^\circ \text{ R}$$

An approximation of total-temperature rise is $3500^\circ - 605^\circ = 2895^\circ$ R. By using $T_x = 605^\circ$ R, $\Delta T = 2895^\circ$ R, P = 400 pounds per square foot, and figure 3, the following correction factors are obtained:

$$\delta\Delta T = 3^\circ \text{ R (from fig. 3(a))}$$

$$\delta\Delta T = 9^\circ \text{ R (from fig. 3(b))}$$

The adjusted temperature rise becomes 2895° + 3° + 9° = 2907° R. From table I, T_x = 605° R, and ΔT = 2907° R, the ideal fuel-air ratio is found to be 0.7247 fraction of stoichiometric fuel-air ratio. A re-iteration process using this fuel-air ratio gives the same adjusted inlet-air temperature; therefore, no further iterations are necessary. The ideal afterburner fuel-air ratio is then 0.7247 - 0.2348 = 0.4899 fraction of stoichiometric fuel-air ratio.

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TABLE I. - IDEAL COMBUSTION-TEMPERATURE RISE, AT COMBUSTION PRESSURE OF 1 ATMOSPHERE

Fraction of stoichio-metric fuel-air ratio, S	Ideal combustion-temperature rise, ΔT, °R												
	Inlet-air temperature, °R												
	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
0	0	0	0	0	0	0	0	0	0	0	0	0	0
.001	5	5	5	5	5	5	5	5	5	5	5	5	4
.002	11	11	11	10	10	10	10	10	10	10	9	9	9
.003	16	16	16	16	15	15	15	15	14	14	14	14	13
.004	21	21	21	21	21	20	20	20	19	19	19	18	18
.005	27	27	26	26	26	25	25	24	24	24	23	23	22
.006	32	32	32	31	31	30	30	29	29	28	28	28	27
.007	37	37	37	36	36	35	35	34	34	33	33	32	31
.008	43	42	42	42	41	40	40	39	39	38	37	37	36
.009	48	48	47	47	46	45	45	44	43	43	42	41	40
.010	53	53	53	52	51	50	50	49	48	47	47	46	44
.011	59	58	58	57	56	55	55	54	53	52	51	51	49
.012	64	64	63	62	61	60	60	59	58	57	56	55	53
.013	69	69	68	67	66	65	64	63	62	62	61	60	58
.014	75	74	73	73	72	71	69	68	67	66	65	64	62
.015	80	79	79	78	77	76	74	73	72	71	70	69	67
.016	85	85	84	83	82	81	79	78	77	76	74	73	71
.017	91	90	89	88	87	86	84	83	82	80	79	78	75
.018	96	95	94	93	92	90	89	88	86	85	84	82	80
.019	101	100	100	98	97	95	94	93	91	90	88	87	84
.020	106	106	105	103	102	100	99	97	96	94	93	92	89
.021	112	111	110	109	107	105	104	102	101	99	98	96	93
.022	117	116	115	114	112	110	109	107	105	104	102	101	98
.023	122	121	120	119	117	115	114	112	110	108	107	105	102
.024	128	127	125	124	122	120	119	117	115	113	111	110	106
.025	133	132	131	129	127	125	123	121	120	118	116	114	111
.026	138	137	136	134	132	130	128	126	124	122	121	119	115
.027	143	142	141	139	137	135	133	131	129	127	125	123	120
.028	149	148	146	144	142	140	138	136	134	132	130	128	124
.029	154	153	151	149	147	145	143	141	138	136	134	132	128
.030	159	158	156	154	152	150	148	145	143	141	139	137	133
.031	164	163	162	160	157	155	153	150	148	146	144	141	137
.032	170	168	167	165	162	160	158	155	153	150	148	146	142
.033	175	173	172	170	167	165	162	160	157	155	153	150	146
.034	180	179	177	175	172	170	167	165	162	160	157	155	151
.035	185	184	182	180	177	175	172	169	167	164	162	159	155
.036	190	189	187	185	182	180	177	174	171	169	166	164	159
.037	196	194	192	190	187	185	182	179	176	173	171	168	164
.038	201	199	197	195	192	189	187	184	181	178	175	173	168
.039	206	205	203	200	197	194	191	188	186	183	180	177	173
.040	211	210	208	205	202	199	196	193	190	187	185	182	177
.041	216	215	213	210	207	204	201	198	195	192	189	186	181
.042	222	220	218	215	212	209	206	203	200	197	194	191	186
.043	227	225	223	220	217	214	211	207	204	201	198	195	190
.044	232	230	228	225	222	219	216	212	209	206	203	200	195
.045	237	235	233	230	227	224	220	217	214	210	207	204	199
.046	242	241	238	235	232	229	225	222	218	215	212	209	203
.047	248	246	243	240	237	233	230	226	223	220	216	213	208
.048	253	251	248	245	242	238	235	231	228	224	221	218	212
.049	258	256	253	250	247	243	240	236	232	229	225	222	217
.050	263	261	259	255	252	248	244	241	237	233	230	227	221

TABLE I. - Continued. IDEAL COMBUSTION-TEMPERATURE RISE, AT COMBUSTION PRESSURE OF 1 ATMOSPHERE

Fraction of stoichiometric fuel-air ratio, S	Ideal combustion-temperature rise, ΔT, °R												
	Inlet-air temperature, °R												
	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
0.051	268	266	264	260	257	253	249	245	242	238	234	231	225
.052	273	271	269	265	262	258	254	250	246	242	239	235	230
.053	279	276	274	270	267	263	259	255	251	247	243	240	234
.054	284	282	279	275	272	267	263	259	255	252	248	244	238
.055	289	287	284	280	276	272	268	264	260	256	252	249	243
.056	294	292	289	285	281	277	273	269	265	261	257	253	247
.057	299	297	294	290	286	282	278	273	269	265	261	258	252
.058	304	302	299	295	291	287	283	278	274	270	266	262	256
.059	309	307	304	300	296	292	287	283	279	274	270	267	260
.060	315	312	309	305	301	296	292	288	283	279	275	271	265
.061	320	317	314	310	306	301	297	292	288	283	279	275	269
.062	325	322	319	315	311	306	302	297	292	288	284	280	274
.063	330	327	324	320	316	311	306	302	297	293	288	284	278
.064	335	332	329	325	320	316	311	306	302	297	293	289	282
.065	340	337	334	330	325	321	316	311	306	302	297	293	287
.066	345	342	339	335	330	325	320	316	311	306	302	297	291
.067	350	348	344	340	335	330	325	320	315	311	306	302	295
.068	355	353	349	345	340	335	330	325	320	315	311	306	300
.069	361	358	354	349	345	340	335	329	325	320	315	311	304
.070	366	363	359	354	350	344	339	334	329	324	320	315	309
.071	371	368	364	359	354	349	344	339	334	329	324	319	313
.072	376	373	369	364	359	354	349	343	338	333	328	324	317
.073	381	378	374	369	364	359	353	348	343	338	333	328	322
.074	386	383	379	374	369	364	358	353	347	342	337	333	326
.075	391	388	384	379	374	368	363	357	352	347	342	337	330
.076	396	393	389	384	379	373	368	362	356	351	346	341	335
.077	401	398	394	389	383	378	372	367	361	356	351	346	339
.078	406	403	399	394	388	383	377	371	366	360	355	350	344
.079	411	408	404	398	393	387	382	376	370	365	359	354	348
.080	416	413	409	403	398	392	386	380	375	369	364	359	352
.081	421	418	413	408	403	397	391	385	379	374	368	363	357
.082	426	423	418	413	407	401	396	390	384	378	373	367	361
.083	431	428	423	418	412	406	400	394	388	383	377	372	365
.084	436	433	428	423	417	411	405	399	393	387	381	376	370
.085	442	438	433	428	422	416	410	403	397	391	386	381	374
.086	447	443	438	432	427	420	414	408	402	396	390	385	378
.087	452	448	443	437	431	425	419	412	406	400	395	389	383
.088	457	453	448	442	436	430	423	417	411	405	399	394	387
.089	462	458	453	447	441	434	428	422	415	409	403	398	392
.090	467	463	458	452	446	439	433	426	420	414	408	402	396
.091	472	467	463	457	450	444	437	431	424	418	412	407	400
.092	477	472	467	461	455	449	442	435	429	423	417	411	405
.093	482	477	472	466	460	453	447	440	433	427	421	415	409
.094	487	482	477	471	465	458	451	444	438	431	425	419	413
.095	492	487	482	476	469	463	456	449	442	436	430	424	418
.096	497	492	487	481	474	467	460	453	447	440	434	428	422
.097	502	497	492	486	479	472	465	458	451	445	438	432	426
.098	507	502	497	490	484	477	470	463	456	449	443	437	431
.099	512	507	502	495	488	481	474	467	460	454	447	441	435
.100	517	512	506	500	493	486	479	472	465	458	451	445	439

S = 0 to 0.100

TABLE I. - Continued. IDEAL COMBUSTION-TEMPERATURE RISE, AT COMBUSTION PRESSURE OF 1 ATMOSPHERE

Fraction of stoichio-metric fuel-air ratio, S	Ideal combustion-temperature rise, ΔT, °R												
	Inlet-air temperature, °R												
	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
0.101	521	517	511	505	498	491	483	476	469	462	456	450	444
.102	526	522	516	509	502	495	488	481	473	467	460	454	448
.103	531	527	521	514	507	500	492	485	478	471	464	458	452
.104	536	531	526	519	512	504	497	490	482	475	469	462	456
.105	541	536	530	524	516	509	501	494	487	480	473	467	460
.106	546	541	535	528	521	514	506	498	491	484	477	471	465
.107	551	546	540	533	526	518	511	503	496	488	482	475	469
.108	556	551	545	538	530	523	515	507	500	493	486	479	473
.109	561	556	550	542	535	527	520	512	504	497	490	484	477
.110	566	561	554	547	540	532	524	516	509	501	494	488	481
.111	571	566	559	552	544	536	529	521	513	506	499	492	486
.112	576	570	564	557	549	541	533	525	518	510	503	496	490
.113	581	575	569	561	554	546	538	530	522	514	507	500	494
.114	586	580	574	566	558	550	542	534	526	519	512	505	498
.115	591	585	578	571	563	555	547	539	531	523	516	509	502
.116	596	590	583	575	568	559	551	543	535	527	520	513	506
.117	601	595	588	580	572	564	556	547	539	532	524	517	511
.118	605	599	593	585	577	568	560	552	544	536	529	522	515
.119	610	604	597	590	581	573	565	556	548	540	533	526	519
.120	615	609	602	594	586	578	569	561	553	545	537	530	523
.121	620	614	607	599	591	582	574	565	557	549	541	534	527
.122	625	619	612	604	595	587	578	570	561	553	546	538	531
.123	630	624	616	608	600	591	583	574	566	558	550	543	536
.124	635	628	621	613	604	596	587	578	570	562	554	547	540
.125	640	633	626	618	609	600	591	583	574	566	558	551	544
.126	645	638	631	622	614	605	596	587	579	571	563	555	548
.127	649	643	635	627	618	609	600	592	583	575	567	559	552
.128	654	648	640	632	623	614	605	596	587	579	571	564	556
.129	659	652	645	636	627	618	609	600	592	583	575	568	560
.130	664	657	649	641	632	623	614	605	596	588	580	572	565
.131	669	662	654	645	637	627	618	609	600	592	584	576	569
.132	674	667	659	650	641	632	623	614	605	596	588	580	573
.133	679	671	664	655	646	636	627	618	609	601	592	585	577
.134	683	676	668	659	650	641	632	622	613	605	597	589	581
.135	688	681	673	664	655	645	636	627	618	609	601	593	585
.136	693	686	678	669	659	650	640	631	622	613	605	597	589
.137	698	690	682	673	664	654	645	635	626	618	609	601	594
.138	703	695	687	678	668	659	649	640	631	622	613	605	598
.139	708	700	692	682	673	663	654	644	635	626	618	610	602
.140	712	705	696	687	678	668	658	649	639	630	622	614	606
.141	717	709	701	692	682	672	663	653	644	635	626	618	610
.142	722	714	706	696	687	677	667	657	648	639	630	622	614
.143	727	719	710	701	691	681	671	662	652	643	634	626	618
.144	732	724	715	705	696	686	676	666	657	647	639	630	622
.145	736	728	720	710	700	690	680	670	661	652	643	634	626
.146	741	733	724	715	705	695	685	675	665	656	647	639	631
.147	746	738	729	719	709	699	689	679	669	660	651	643	635
.148	751	743	734	724	714	704	693	683	674	664	655	647	639
.149	756	747	738	728	718	708	698	688	678	669	660	651	643
.150	760	752	743	733	723	712	702	692	682	673	664	655	647

TABLE I. - Continued. IDEAL COMBUSTION-TEMPERATURE RISE, AT COMBUSTION PRESSURE OF 1 ATMOSPHERE

Fraction of stoichiometric fuel-air ratio, S	Ideal combustion-temperature rise, ΔT, °R												
	Inlet-air temperature, °R												
	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
0.151	765	757	748	738	727	717	707	696	687	677	668	659	651
.152	770	761	752	742	732	721	711	701	691	681	672	663	655
.153	775	766	757	747	736	726	715	705	695	686	676	668	659
.154	779	771	761	751	741	730	720	709	699	690	681	672	663
.155	784	775	766	756	745	735	724	714	704	694	685	676	667
.156	789	780	771	760	750	739	728	718	708	698	689	680	671
.157	794	785	775	765	754	743	733	722	712	702	693	684	676
.158	798	789	780	769	759	748	737	727	716	707	697	688	680
.159	803	794	785	774	763	752	742	731	721	711	701	692	684
.160	808	799	789	778	768	757	746	735	725	715	706	696	688
.161	813	803	794	783	772	761	750	740	729	719	710	701	692
.162	817	808	798	788	777	766	755	744	733	723	714	705	696
.163	822	813	803	792	781	770	759	748	738	728	718	709	700
.164	827	817	807	797	786	774	763	752	742	732	722	713	704
.165	832	822	812	801	790	779	768	757	746	736	726	717	708
.166	836	827	817	806	795	783	772	761	750	740	730	721	712
.167	841	831	821	810	799	788	776	765	755	744	735	725	716
.168	846	836	826	815	803	792	781	770	759	749	739	729	720
.169	850	841	830	819	808	796	785	774	763	753	743	733	724
.170	855	845	835	824	812	801	789	778	767	757	747	737	728
.171	860	850	839	828	817	805	794	782	772	761	751	742	732
.172	864	855	844	833	821	809	798	787	776	765	755	746	736
.173	869	859	849	837	826	814	802	791	780	769	759	750	740
.174	874	864	853	842	830	818	807	795	784	774	763	754	745
.175	878	868	858	846	834	823	811	799	788	778	768	758	749
.176	883	873	862	851	839	827	815	804	793	782	772	762	753
.177	888	878	867	855	843	831	820	808	797	786	776	766	757
.178	892	882	871	860	848	836	824	812	801	790	780	770	761
.179	897	887	876	864	852	840	828	816	805	794	784	774	765
.180	902	891	880	868	857	844	832	821	809	799	788	778	769
.181	906	896	885	873	861	849	837	825	814	803	792	782	773
.182	911	901	889	877	865	853	841	829	818	807	796	786	777
.183	916	905	894	882	870	857	845	833	822	811	800	790	781
.184	920	910	898	886	874	862	850	838	826	815	805	794	785
.185	925	914	903	891	879	866	854	842	830	819	809	798	789
.186	930	919	907	895	883	870	858	846	835	823	813	803	793
.187	934	923	912	900	887	875	862	850	839	828	817	807	797
.188	939	928	916	904	892	879	867	855	843	832	821	811	801
.189	944	932	921	909	896	883	871	859	847	836	825	815	805
.190	948	937	925	913	900	888	875	863	851	840	829	819	809
.191	953	942	930	917	905	892	880	867	855	844	833	823	813
.192	957	946	934	922	909	896	884	871	860	848	837	827	817
.193	962	951	939	926	914	901	888	876	864	852	841	831	821
.194	967	955	943	931	918	905	892	880	868	856	845	835	825
.195	971	960	948	935	922	909	897	884	872	860	849	839	829
.196	976	964	952	939	927	914	901	888	876	865	853	843	833
.197	980	969	957	944	931	918	905	892	880	869	858	847	837
.198	985	973	961	948	935	922	909	897	884	873	862	851	841
.199	989	978	966	953	940	926	914	901	889	877	866	855	845
.200	994	982	970	957	944	931	918	905	893	881	870	859	849

S = 0.101 to 0.200

TABLE I. - Continued. IDEAL COMBUSTION-TEMPERATURE RISE, AT COMBUSTION PRESSURE OF 1 ATMOSPHERE

Fraction of stoichiometric fuel-air ratio, S	Ideal combustion-temperature rise, ΔT, °R												
	Inlet-air temperature, °R												
	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
0.201	999	987	974	961	948	935	922	909	897	885	874	863	853
.202	1003	991	979	966	953	939	926	913	901	889	878	867	857
.203	1008	996	983	970	957	943	930	917	905	893	882	871	861
.204	1012	1000	988	974	961	948	935	922	909	897	886	875	865
.205	1017	1005	992	979	965	952	939	926	913	901	890	879	869
.206	1021	1009	996	983	970	956	943	930	917	905	894	883	873
.207	1026	1014	1001	987	974	960	947	934	922	910	898	887	877
.208	1030	1018	1005	992	978	965	951	938	926	914	902	891	881
.209	1035	1022	1010	996	983	969	955	942	930	918	906	895	885
.210	1039	1027	1014	1000	987	973	960	946	934	922	910	899	889
.211	1044	1031	1018	1005	991	977	964	951	938	926	914	903	893
.212	1048	1036	1023	1009	995	981	968	955	942	930	918	907	897
.213	1053	1040	1027	1013	1000	986	972	959	946	934	922	911	901
.214	1057	1045	1031	1018	1004	990	976	963	950	938	926	915	905
.215	1062	1049	1036	1022	1008	994	980	967	954	942	930	919	909
.216	1066	1053	1040	1026	1012	998	985	971	958	946	934	923	913
.217	1071	1058	1045	1031	1017	1003	989	975	962	950	938	927	917
.218	1075	1062	1049	1035	1021	1007	993	979	967	954	942	931	921
.219	1080	1067	1053	1039	1025	1011	997	984	971	958	947	935	925
.220	1084	1071	1058	1043	1029	1015	1001	988	975	962	951	939	929
.221	1088	1075	1062	1048	1034	1019	1005	992	979	966	955	943	933
.222	1093	1080	1066	1052	1038	1023	1010	996	983	970	959	947	937
.223	1097	1084	1071	1056	1042	1028	1014	1000	987	974	963	951	940
.224	1102	1089	1075	1061	1046	1032	1018	1004	991	978	967	955	944
.225	1106	1093	1079	1065	1051	1036	1022	1008	995	982	971	959	948
.226	1111	1097	1084	1069	1055	1040	1026	1012	999	987	975	963	952
.227	1115	1102	1088	1073	1059	1044	1030	1016	1003	991	979	967	956
.228	1120	1106	1092	1078	1063	1049	1034	1020	1007	995	983	971	960
.229	1124	1111	1097	1082	1067	1053	1038	1025	1011	999	987	975	964
.230	1128	1115	1101	1086	1072	1057	1043	1029	1015	1003	990	979	968
.231	1133	1119	1105	1091	1076	1061	1047	1033	1019	1007	994	983	972
.232	1137	1124	1110	1095	1080	1065	1051	1037	1023	1011.	998	987	976
.233	1142	1128	1114	1099	1084	1069	1055	1041	1027	1015	1002	991	980
.234	1146	1132	1118	1103	1088	1074	1059	1045	1031	1019	1006	995	984
.235	1151	1137	1123	1108	1093	1078	1063	1049	1035	1023	1010	999	988
.236	1155	1141	1127	1112	1097	1082	1067	1053	1040	1027	1014	1003	992
.237	1159	1145	1131	1116	1101	1086	1071	1057	1044	1031	1018	1007	995
.238	1164	1150	1135	1120	1105	1090	1076	1061	1048	1035	1022	1010	999
.239	1168	1154	1140	1125	1109	1094	1080	1065	1052	1039	1026	1014	1003
.240	1173	1159	1144	1129	1114	1098	1084	1069	1056	1043	1030	1018	1007
.241	1177	1163	1148	1133	1118	1103	1088	1073	1060	1047	1034	1022	1011
.242	1181	1167	1153	1137	1122	1107	1092	1077	1064	1051	1038	1026	1015
.243	1186	1172	1157	1142	1126	1111	1096	1082	1068	1055	1042	1030	1019
.244	1190	1176	1161	1146	1130	1115	1100	1086	1072	1058	1046	1034	1023
.245	1195	1180	1165	1150	1135	1119	1104	1090	1076	1062	1050	1038	1027
.246	1199	1185	1170	1154	1139	1123	1108	1094	1080	1066	1054	1042	1030
.247	1203	1189	1174	1158	1143	1127	1112	1098	1084	1070	1058	1046	1034
.248	1208	1193	1178	1163	1147	1132	1116	1102	1088	1074	1062	1050	1038
.249	1212	1197	1182	1167	1151	1136	1121	1106	1092	1078	1066	1054	1042
.250	1216	1202	1187	1171	1155	1140	1125	1110	1096	1082	1070	1057	1046

TABLE I. - Continued. IDEAL COMBUSTION-TEMPERATURE RISE, AT COMBUSTION PRESSURE OF 1 ATMOSPHERE

Fraction of stoichio-metric fuel-air ratio, S	Ideal combustion-temperature rise, ΔT, °R												
	Inlet-air temperature, °R												
	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
0.251	1221	1206	1191	1175	1160	1144	1129	1114	1100	1086	1073	1061	1050
.252	1225	1210	1195	1179	1164	1148	1133	1118	1104	1090	1077	1065	1054
.253	1230	1215	1200	1184	1168	1152	1137	1122	1108	1094	1081	1069	1057
.254	1234	1219	1204	1188	1172	1156	1141	1126	1112	1098	1085	1073	1061
.255	1238	1223	1208	1192	1176	1160	1145	1130	1116	1102	1089	1077	1065
.256	1243	1228	1212	1196	1180	1164	1149	1134	1120	1106	1093	1081	1069
.257	1247	1232	1216	1200	1185	1169	1153	1138	1124	1110	1097	1085	1073
.258	1251	1236	1221	1205	1189	1173	1157	1142	1128	1114	1101	1088	1077
.259	1256	1240	1225	1209	1193	1177	1161	1146	1132	1118	1105	1092	1081
.260	1260	1245	1229	1213	1197	1181	1165	1150	1136	1122	1109	1096	1084
.261	1264	1249	1233	1217	1201	1185	1169	1154	1139	1126	1113	1100	1088
.262	1269	1253	1238	1221	1205	1189	1173	1158	1143	1130	1116	1104	1092
.263	1273	1258	1242	1226	1209	1193	1177	1162	1147	1133	1120	1108	1096
.264	1277	1262	1246	1230	1213	1197	1181	1166	1151	1137	1124	1112	1100
.265	1282	1266	1250	1234	1218	1201	1185	1170	1155	1141	1128	1115	1103
.266	1286	1270	1255	1238	1222	1205	1189	1174	1159	1145	1132	1119	1107
.267	1290	1275	1259	1242	1226	1209	1194	1178	1163	1149	1136	1123	1111
.268	1295	1279	1263	1246	1230	1214	1198	1182	1167	1153	1140	1127	1115
.269	1299	1283	1267	1251	1234	1218	1202	1186	1171	1157	1144	1131	1119
.270	1303	1287	1271	1255	1238	1222	1206	1190	1175	1161	1147	1135	1122
.271	1307	1292	1276	1259	1242	1226	1210	1194	1179	1165	1151	1138	1126
.272	1312	1296	1280	1263	1246	1230	1214	1198	1183	1169	1155	1142	1130
.273	1316	1300	1284	1267	1250	1234	1218	1202	1187	1173	1159	1146	1134
.274	1320	1304	1288	1271	1255	1238	1222	1206	1191	1176	1163	1150	1138
.275	1325	1309	1292	1275	1259	1242	1226	1210	1195	1180	1167	1154	1141
.276	1329	1313	1297	1280	1263	1246	1230	1214	1199	1184	1171	1157	1145
.277	1333	1317	1301	1284	1267	1250	1234	1218	1203	1188	1174	1161	1149
.278	1338	1321	1305	1288	1271	1254	1238	1222	1207	1192	1178	1165	1153
.279	1342	1326	1309	1292	1275	1258	1242	1226	1210	1196	1182	1169	1156
.280	1346	1330	1313	1296	1279	1262	1246	1230	1214	1200	1186	1173	1160
.281	1350	1334	1317	1300	1283	1266	1250	1234	1218	1204	1190	1176	1164
.282	1355	1338	1322	1304	1287	1270	1254	1238	1222	1208	1194	1180	1168
.283	1359	1342	1326	1308	1291	1274	1258	1242	1226	1211	1197	1184	1171
.284	1363	1347	1330	1313	1295	1278	1262	1246	1230	1215	1201	1188	1175
.285	1367	1351	1334	1317	1300	1282	1266	1249	1234	1219	1205	1192	1179
.286	1372	1355	1338	1321	1304	1286	1270	1253	1238	1223	1209	1195	1183
.287	1376	1359	1342	1325	1308	1290	1274	1257	1242	1227	1213	1199	1186
.288	1380	1363	1347	1329	1312	1294	1278	1261	1246	1231	1216	1203	1190
.289	1384	1368	1351	1333	1316	1298	1282	1265	1250	1235	1220	1207	1194
.290	1389	1372	1355	1337	1320	1302	1286	1269	1253	1238	1224	1210	1198
.291	1393	1376	1359	1341	1324	1306	1290	1273	1257	1242	1228	1214	1201
.292	1397	1380	1363	1345	1328	1311	1294	1277	1261	1246	1232	1218	1205
.293	1401	1384	1367	1350	1332	1315	1298	1281	1265	1250	1235	1222	1209
.294	1406	1389	1371	1354	1336	1319	1302	1285	1269	1254	1239	1225	1212
.295	1410	1393	1376	1358	1340	1323	1305	1289	1273	1258	1243	1229	1216
.296	1414	1397	1380	1362	1344	1327	1309	1293	1277	1261	1247	1233	1220
.297	1418	1401	1384	1366	1348	1331	1313	1297	1281	1265	1251	1237	1223
.298	1422	1405	1388	1370	1352	1335	1317	1301	1284	1269	1254	1240	1227
.299	1427	1409	1392	1374	1356	1339	1321	1304	1288	1273	1258	1244	1231
.300	1431	1414	1396	1378	1360	1343	1325	1308	1292	1277	1262	1248	1235

S = 0.201 to 0.300

TABLE I. - Continued. IDEAL COMBUSTION-TEMPERATURE RISE, AT COMBUSTION PRESSURE OF 1 ATMOSPHERE

Fraction of stoichio-metric fuel-air ratio, S	Ideal combustion-temperature rise, ΔT, °R												
	Inlet-air temperature, °R												
	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
0.301	1435	1418	1400	1382	1364	1346	1329	1312	1296	1281	1266	1252	1238
.302	1439	1422	1404	1386	1368	1350	1333	1316	1300	1284	1269	1255	1242
.303	1443	1426	1408	1390	1372	1354	1337	1320	1304	1288	1273	1259	1245
.304	1448	1430	1412	1394	1376	1358	1341	1324	1308	1292	1277	1263	1249
.305	1452	1434	1417	1398	1380	1362	1345	1328	1312	1296	1281	1266	1253
.306	1456	1438	1421	1402	1384	1366	1349	1332	1315	1300	1284	1270	1256
.307	1460	1442	1425	1406	1388	1370	1353	1336	1319	1303	1288	1274	1260
.308	1464	1447	1429	1410	1392	1374	1357	1340	1323	1307	1292	1277	1264
.309	1468	1451	1433	1414	1396	1378	1361	1344	1327	1311	1296	1281	1267
.310	1472	1455	1437	1418	1400	1382	1365	1347	1331	1315	1299	1285	1271
.311	1477	1459	1441	1422	1404	1386	1369	1351	1335	1319	1303	1288	1274
.312	1481	1463	1445	1427	1408	1390	1373	1355	1339	1322	1307	1292	1278
.313	1485	1467	1449	1431	1412	1394	1376	1359	1342	1326	1311	1296	1282
.314	1489	1471	1453	1435	1416	1398	1380	1363	1346	1330	1314	1299	1285
.315	1493	1475	1457	1439	1420	1402	1384	1367	1350	1334	1318	1303	1289
.316	1497	1479	1461	1443	1424	1406	1388	1371	1354	1337	1322	1307	1293
.317	1501	1483	1465	1447	1428	1410	1392	1375	1358	1341	1326	1310	1296
.318	1506	1488	1469	1451	1432	1414	1396	1379	1362	1345	1329	1314	1300
.319	1510	1492	1473	1455	1436	1418	1400	1382	1365	1349	1333	1318	1303
.320	1514	1496	1477	1459	1440	1422	1404	1386	1369	1353	1337	1321	1307
.321	1518	1500	1481	1463	1444	1426	1408	1390	1373	1356	1340	1325	1310
.322	1522	1504	1485	1467	1448	1430	1412	1394	1377	1360	1344	1329	1314
.323	1526	1508	1489	1471	1452	1434	1416	1398	1381	1364	1348	1332	1318
.324	1530	1512	1493	1475	1456	1437	1419	1402	1384	1368	1351	1336	1321
.325	1534	1516	1498	1479	1460	1441	1423	1406	1388	1371	1355	1340	1325
.326	1539	1520	1502	1483	1464	1445	1427	1409	1392	1375	1359	1343	1328
.327	1543	1524	1506	1487	1468	1449	1431	1413	1396	1379	1363	1347	1332
.328	1547	1528	1510	1491	1472	1453	1435	1417	1400	1383	1366	1351	1336
.329	1551	1532	1514	1495	1476	1457	1439	1421	1404	1386	1370	1354	1339
.330	1555	1536	1518	1498	1480	1461	1443	1425	1407	1390	1374	1358	1343
.331	1559	1540	1522	1502	1484	1465	1447	1429	1411	1394	1377	1361	1346
.332	1563	1544	1526	1506	1487	1469	1451	1433	1415	1398	1381	1365	1350
.333	1567	1549	1530	1510	1491	1473	1454	1436	1419	1401	1385	1369	1353
.334	1571	1553	1534	1514	1495	1477	1458	1440	1422	1405	1388	1372	1357
.335	1575	1557	1538	1518	1499	1481	1462	1444	1426	1409	1392	1376	1360
.336	1579	1561	1542	1522	1503	1484	1466	1448	1430	1412	1396	1379	1364
.337	1584	1565	1546	1526	1507	1488	1470	1452	1434	1416	1399	1383	1368
.338	1588	1569	1550	1530	1511	1492	1474	1455	1438	1420	1403	1387	1371
.339	1592	1573	1554	1534	1515	1496	1478	1459	1441	1424	1407	1390	1375
.340	1596	1577	1558	1538	1519	1500	1481	1463	1445	1427	1410	1394	1378
.341	1600	1581	1562	1542	1523	1504	1485	1467	1449	1431	1414	1397	1382
.342	1604	1585	1566	1546	1527	1508	1489	1471	1453	1435	1418	1401	1385
.343	1608	1589	1570	1550	1531	1512	1493	1475	1456	1438	1421	1405	1389
.344	1612	1593	1574	1554	1535	1516	1497	1478	1460	1442	1425	1408	1392
.345	1616	1597	1578	1558	1538	1519	1501	1482	1464	1446	1428	1412	1396
.346	1620	1601	1582	1562	1542	1523	1504	1486	1468	1450	1432	1415	1399
.347	1624	1605	1586	1566	1546	1527	1508	1490	1471	1453	1436	1419	1403
.348	1628	1609	1590	1570	1550	1531	1512	1493	1475	1457	1439	1423	1406
.349	1632	1613	1593	1574	1554	1535	1516	1497	1479	1461	1443	1426	1410
.350	1636	1617	1597	1578	1558	1539	1520	1501	1483	1464	1447	1430	1413

TABLE I. - Continued. IDEAL COMBUSTION-TEMPERATURE RISE, AT COMBUSTION PRESSURE OF 1 ATMOSPHERE

Fraction of stoichio-metric fuel-air ratio, S	Ideal combustion-temperature rise, ΔT, °R												
	Inlet-air temperature, °R												
	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
0.351	1640	1621	1601	1582	1562	1543	1524	1505	1486	1468	1450	1433	1417
.352	1644	1625	1605	1585	1566	1546	1527	1509	1490	1472	1454	1437	1421
.353	1648	1629	1609	1589	1570	1550	1531	1512	1494	1475	1458	1440	1424
.354	1653	1633	1613	1593	1574	1554	1535	1516	1498	1479	1461	1444	1428
.355	1657	1637	1617	1597	1577	1558	1539	1520	1501	1483	1465	1448	1431
.356	1661	1641	1621	1601	1581	1562	1543	1524	1505	1486	1468	1451	1435
.357	1665	1645	1625	1605	1585	1566	1547	1527	1509	1490	1472	1455	1438
.358	1669	1649	1629	1609	1589	1570	1550	1531	1512	1494	1476	1458	1442
.359	1673	1653	1633	1613	1593	1573	1554	1535	1516	1497	1479	1462	1445
.360	1677	1657	1637	1617	1597	1577	1558	1539	1520	1501	1483	1465	1448
.361	1681	1661	1641	1621	1601	1581	1562	1543	1524	1505	1486	1469	1452
.362	1685	1665	1645	1625	1605	1585	1566	1546	1527	1508	1490	1472	1455
.363	1689	1669	1649	1628	1608	1589	1569	1550	1531	1512	1494	1476	1459
.364	1693	1673	1653	1632	1612	1593	1573	1554	1535	1516	1497	1479	1462
.365	1697	1677	1657	1636	1616	1596	1577	1558	1538	1519	1501	1483	1466
.366	1701	1681	1661	1640	1620	1600	1581	1561	1542	1523	1504	1486	1469
.367	1705	1685	1665	1644	1624	1604	1584	1565	1546	1526	1508	1490	1473
.368	1709	1689	1668	1648	1628	1608	1588	1569	1549	1530	1511	1494	1476
.369	1713	1693	1672	1652	1632	1612	1592	1572	1553	1534	1515	1497	1480
.370	1717	1697	1676	1656	1635	1616	1596	1576	1557	1537	1519	1501	1483
.371	1721	1701	1680	1660	1639	1619	1600	1580	1560	1541	1522	1504	1487
.372	1725	1705	1684	1664	1643	1623	1603	1584	1564	1545	1526	1508	1490
.373	1729	1708	1688	1667	1647	1627	1607	1587	1568	1548	1529	1511	1494
.374	1733	1712	1692	1671	1651	1631	1611	1591	1572	1552	1533	1515	1497
.375	1737	1716	1696	1675	1655	1635	1615	1595	1575	1555	1536	1518	1501
.376	1741	1720	1700	1679	1658	1638	1618	1599	1579	1559	1540	1522	1504
.377	1745	1724	1704	1683	1662	1642	1622	1602	1583	1563	1544	1525	1507
.378	1749	1728	1708	1687	1666	1646	1626	1606	1586	1566	1547	1529	1511
.379	1753	1732	1712	1691	1670	1650	1630	1610	1590	1570	1551	1532	1514
.380	1757	1736	1715	1694	1674	1654	1633	1613	1593	1573	1554	1536	1518
.381	1761	1740	1719	1698	1678	1657	1637	1617	1597	1577	1558	1539	1521
.382	1765	1744	1723	1702	1681	1661	1641	1621	1601	1581	1561	1543	1525
.383	1769	1748	1727	1706	1685	1665	1645	1624	1604	1584	1565	1546	1528
.384	1773	1752	1731	1710	1689	1669	1648	1628	1608	1588	1568	1550	1531
.385	1776	1756	1735	1714	1693	1672	1652	1632	1612	1591	1572	1553	1535
.386	1780	1760	1739	1718	1697	1676	1656	1636	1615	1595	1575	1557	1538
.387	1784	1764	1743	1721	1701	1680	1660	1639	1619	1599	1579	1560	1542
.388	1788	1767	1747	1725	1704	1684	1663	1643	1623	1602	1582	1563	1545
.389	1792	1771	1750	1729	1708	1688	1667	1647	1626	1606	1586	1567	1549
.390	1796	1775	1754	1733	1712	1691	1671	1650	1630	1609	1590	1570	1552
.391	1800	1779	1758	1737	1716	1695	1674	1654	1633	1613	1593	1574	1555
.392	1804	1783	1762	1741	1720	1699	1678	1658	1637	1616	1597	1577	1559
.393	1808	1787	1766	1744	1723	1703	1682	1661	1641	1620	1600	1581	1562
.394	1812	1791	1770	1748	1727	1706	1686	1665	1644	1624	1604	1584	1566
.395	1816	1795	1774	1752	1731	1710	1689	1669	1648	1627	1607	1588	1569
.396	1820	1799	1777	1756	1735	1714	1693	1672	1652	1631	1611	1591	1572
.397	1824	1803	1781	1760	1738	1718	1697	1676	1655	1634	1614	1595	1576
.398	1828	1807	1785	1764	1742	1721	1700	1680	1659	1638	1618	1598	1579
.399	1832	1810	1789	1767	1746	1725	1704	1683	1662	1641	1621	1601	1583
.400	1836	1814	1793	1771	1750	1729	1708	1687	1666	1645	1625	1605	1586

S = 0.301 to 0.400

TABLE I. - Continued. IDEAL COMBUSTION-TEMPERATURE RISE, AT COMBUSTION PRESSURE OF 1 ATMOSPHERE

Fraction of stoichio-metric fuel-air ratio, S	Ideal combustion-temperature rise, ΔT, °R												
	Inlet-air temperature, °R												
	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
0.401	1840	1818	1797	1775	1754	1733	1711	1690	1670	1648	1628	1608	1589
.402	1843	1822	1801	1779	1757	1736	1715	1694	1673	1652	1632	1612	1593
.403	1847	1826	1805	1783	1761	1740	1719	1698	1677	1656	1635	1615	1596
.404	1851	1830	1808	1787	1765	1744	1723	1701	1680	1659	1638	1619	1600
.405	1855	1834	1812	1790	1769	1748	1726	1705	1684	1663	1642	1622	1603
.406	1859	1838	1816	1794	1773	1751	1730	1709	1687	1666	1645	1626	1606
.407	1863	1842	1820	1798	1776	1755	1734	1712	1691	1670	1649	1629	1610
.408	1867	1845	1824	1802	1780	1759	1737	1716	1695	1673	1652	1632	1613
.409	1871	1849	1828	1806	1784	1763	1741	1720	1698	1677	1656	1636	1616
.410	1875	1853	1832	1810	1788	1766	1745	1723	1702	1680	1659	1639	1620
.411	1879	1857	1835	1813	1792	1770	1748	1727	1705	1684	1663	1643	1623
.412	1883	1861	1839	1817	1795	1774	1752	1730	1709	1687	1666	1646	1627
.413	1887	1865	1843	1821	1799	1777	1756	1734	1712	1691	1670	1649	1630
.414	1890	1869	1847	1825	1803	1781	1759	1738	1716	1694	1673	1653	1633
.415	1894	1873	1851	1829	1807	1785	1763	1741	1719	1698	1677	1656	1637
.416	1898	1876	1855	1832	1810	1789	1767	1745	1723	1701	1680	1660	1640
.417	1902	1880	1858	1836	1814	1792	1770	1748	1727	1705	1683	1663	1643
.418	1906	1884	1862	1840	1818	1796	1774	1752	1730	1708	1687	1666	1647
.419	1910	1888	1866	1844	1822	1800	1778	1756	1734	1712	1690	1670	1650
.420	1914	1892	1870	1848	1825	1803	1781	1759	1737	1715	1694	1673	1653
.421	1918	1896	1874	1851	1829	1807	1785	1763	1741	1719	1697	1677	1657
.422	1922	1900	1878	1855	1833	1811	1789	1766	1744	1722	1701	1680	1660
.423	1925	1903	1881	1859	1837	1814	1792	1770	1748	1725	1704	1683	1663
.424	1929	1907	1885	1863	1840	1818	1796	1773	1751	1729	1707	1687	1667
.425	1933	1911	1889	1867	1844	1822	1800	1777	1755	1732	1711	1690	1670
.426	1937	1915	1893	1870	1848	1826	1803	1781	1758	1736	1714	1693	1673
.427	1941	1919	1897	1874	1852	1829	1807	1784	1762	1739	1718	1697	1677
.428	1945	1923	1900	1878	1855	1833	1810	1788	1765	1743	1721	1700	1680
.429	1949	1926	1904	1882	1859	1837	1814	1791	1769	1746	1724	1703	1683
.430	1952	1930	1908	1885	1863	1840	1818	1795	1772	1750	1728	1707	1687
.431	1956	1934	1912	1889	1866	1844	1821	1798	1776	1753	1731	1710	1690
.432	1960	1938	1916	1893	1870	1848	1825	1802	1779	1757	1735	1714	1693
.433	1964	1942	1919	1897	1874	1851	1829	1806	1783	1760	1738	1717	1696
.434	1968	1946	1923	1900	1878	1855	1832	1809	1786	1764	1742	1720	1700
.435	1972	1949	1927	1904	1881	1859	1836	1813	1790	1767	1745	1724	1703
.436	1975	1953	1931	1908	1885	1862	1839	1816	1793	1770	1748	1727	1706
.437	1979	1957	1934	1912	1889	1866	1843	1820	1797	1774	1752	1730	1710
.438	1983	1961	1938	1915	1892	1870	1847	1823	1800	1777	1755	1734	1713
.439	1987	1965	1942	1919	1896	1873	1850	1827	1804	1781	1758	1737	1716
.440	1991	1968	1946	1923	1900	1877	1854	1830	1807	1784	1762	1740	1720
.441	1995	1972	1949	1926	1903	1880	1857	1834	1811	1788	1765	1744	1723
.442	1998	1976	1953	1930	1907	1884	1861	1837	1814	1791	1769	1747	1726
.443	2002	1980	1957	1934	1911	1888	1865	1841	1818	1794	1772	1750	1729
.444	2006	1984	1961	1938	1915	1891	1868	1844	1821	1798	1775	1754	1733
.445	2010	1987	1964	1941	1918	1895	1872	1848	1825	1801	1779	1757	1736
.446	2014	1991	1968	1945	1922	1899	1875	1852	1828	1805	1782	1760	1739
.447	2017	1995	1972	1949	1926	1902	1879	1855	1832	1808	1785	1764	1742
.448	2021	1999	1976	1953	1929	1906	1882	1859	1835	1812	1789	1767	1746
.449	2025	2002	1979	1956	1933	1909	1886	1862	1838	1815	1792	1770	1749
.450	2029	2006	1983	1960	1937	1913	1890	1866	1842	1818	1796	1774	1752

TABLE I. - Continued. IDEAL COMBUSTION-TEMPERATURE RISE, AT COMBUSTION PRESSURE OF 1 ATMOSPHERE

Fraction of stoichiometric fuel-air ratio, S	Ideal combustion-temperature rise, ΔT, °R												
	Inlet-air temperature, °R												
	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
0.451	2033	2010	1987	1964	1940	1917	1893	1869	1845	1822	1799	1777	1756
.452	2036	2014	1991	1967	1944	1920	1897	1873	1849	1825	1802	1780	1759
.453	2040	2017	1994	1971	1947	1924	1900	1876	1852	1829	1806	1783	1762
.454	2044	2021	1998	1975	1951	1928	1904	1880	1856	1832	1809	1787	1765
.455	2048	2025	2002	1978	1955	1931	1907	1883	1859	1835	1812	1790	1769
.456	2052	2029	2006	1982	1958	1935	1911	1887	1863	1839	1816	1793	1772
.457	2055	2032	2009	1986	1962	1938	1914	1890	1866	1842	1819	1797	1775
.458	2059	2036	2013	1989	1966	1942	1918	1894	1870	1846	1822	1800	1778
.459	2063	2040	2017	1993	1969	1945	1921	1897	1873	1849	1826	1803	1781
.460	2067	2044	2020	1997	1973	1949	1925	1901	1876	1852	1829	1806	1785
.461	2070	2047	2024	2000	1977	1953	1929	1904	1880	1856	1832	1810	1788
.462	2074	2051	2028	2004	1980	1956	1932	1907	1883	1859	1836	1813	1791
.463	2078	2055	2031	2008	1984	1960	1936	1911	1887	1862	1839	1816	1794
.464	2082	2059	2035	2011	1987	1963	1939	1914	1890	1866	1842	1820	1798
.465	2086	2062	2039	2015	1991	1967	1943	1918	1893	1869	1846	1823	1801
.466	2089	2066	2043	2019	1995	1971	1946	1921	1897	1873	1849	1826	1804
.467	2093	2070	2046	2022	1998	1974	1950	1925	1900	1876	1852	1829	1807
.468	2097	2073	2050	2026	2002	1978	1953	1928	1904	1879	1856	1833	1810
.469	2101	2077	2054	2030	2006	1981	1957	1932	1907	1883	1859	1836	1814
.470	2104	2081	2057	2033	2009	1985	1960	1935	1911	1886	1862	1839	1817
.471	2108	2085	2061	2037	2013	1988	1964	1939	1914	1889	1865	1842	1820
.472	2112	2088	2065	2041	2016	1992	1967	1942	1917	1893	1869	1846	1823
.473	2115	2092	2068	2044	2020	1995	1971	1946	1921	1896	1872	1849	1826
.474	2119	2096	2072	2048	2023	1999	1974	1949	1924	1899	1875	1852	1830
.475	2123	2099	2076	2051	2027	2002	1978	1952	1928	1903	1879	1855	1833
.476	2127	2103	2079	2055	2031	2006	1981	1956	1931	1906	1882	1859	1836
.477	2130	2107	2083	2059	2034	2010	1985	1959	1934	1909	1885	1862	1839
.478	2134	2110	2087	2062	2038	2013	1988	1963	1938	1913	1889	1865	1842
.479	2138	2114	2090	2066	2041	2017	1992	1966	1941	1916	1892	1868	1846
.480	2142	2118	2094	2070	2045	2020	1995	1970	1944	1919	1895	1872	1849
.481	2145	2122	2098	2073	2049	2024	1999	1973	1948	1923	1898	1875	1852
.482	2149	2125	2101	2077	2052	2027	2002	1976	1951	1926	1902	1878	1855
.483	2153	2129	2105	2080	2056	2031	2005	1980	1955	1929	1905	1881	1858
.484	2156	2133	2108	2084	2059	2034	2009	1983	1958	1933	1908	1884	1861
.485	2160	2136	2112	2088	2063	2038	2012	1987	1961	1936	1912	1888	1865
.486	2164	2140	2116	2091	2066	2041	2016	1990	1965	1939	1915	1891	1868
.487	2167	2144	2119	2095	2070	2045	2019	1994	1968	1943	1918	1894	1871
.488	2171	2147	2123	2098	2073	2048	2023	1997	1971	1946	1921	1897	1874
.489	2175	2151	2127	2102	2077	2052	2026	2000	1975	1949	1925	1901	1877
.490	2178	2155	2130	2106	2081	2055	2030	2004	1978	1953	1928	1904	1880
.491	2182	2158	2134	2109	2084	2059	2033	2007	1982	1956	1931	1907	1883
.492	2186	2162	2137	2113	2088	2062	2037	2011	1985	1959	1934	1910	1887
.493	2190	2165	2141	2116	2091	2066	2040	2014	1988	1963	1938	1913	1890
.494	2193	2169	2145	2120	2095	2069	2043	2017	1992	1966	1941	1917	1893
.495	2197	2173	2148	2123	2098	2073	2047	2021	1995	1969	1944	1920	1896
.496	2201	2176	2152	2127	2102	2076	2050	2024	1998	1972	1947	1923	1899
.497	2204	2180	2155	2131	2105	2080	2054	2028	2002	1976	1951	1926	1902
.498	2208	2184	2159	2134	2109	2083	2057	2031	2005	1979	1954	1929	1905
.499	2212	2187	2163	2138	2112	2086	2061	2034	2008	1982	1957	1932	1909
.500	2215	2191	2166	2141	2116	2090	2064	2038	2012	1986	1960	1936	1912

S = 0.401 to 0.500

TABLE I. - Continued. IDEAL COMBUSTION-TEMPERATURE RISE, AT COMBUSTION PRESSURE OF 1 ATMOSPHERE

Fraction of stoichio-metric fuel-air ratio, S	Ideal combustion-temperature rise, ΔT, °R												
	Inlet-air temperature, °R												
	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
0.501	2219	2194	2170	2145	2119	2093	2067	2041	2015	1989	1964	1939	1915
.502	2222	2198	2173	2148	2123	2097	2071	2044	2018	1992	1967	1942	1918
.503	2226	2202	2177	2152	2126	2100	2074	2048	2022	1996	1970	1945	1921
.504	2230	2205	2180	2155	2130	2104	2078	2051	2025	1999	1973	1949	1924
.505	2233	2209	2184	2159	2133	2107	2081	2054	2028	2002	1977	1952	1928
.506	2237	2212	2188	2162	2137	2110	2084	2058	2032	2006	1980	1955	1931
.507	2240	2216	2191	2166	2140	2114	2088	2061	2035	2009	1983	1958	1934
.508	2244	2220	2195	2169	2144	2117	2091	2065	2038	2012	1987	1962	1937
.509	2248	2223	2198	2173	2147	2121	2094	2068	2042	2015	1990	1965	1940
.510	2251	2227	2202	2176	2150	2124	2098	2071	2045	2019	1993	1968	1943
.511	2255	2230	2205	2180	2154	2128	2101	2075	2048	2022	1996	1971	1947
.512	2258	2234	2209	2183	2157	2131	2104	2078	2052	2025	2000	1974	1950
.513	2262	2237	2212	2187	2161	2134	2108	2081	2055	2029	2003	1978	1953
.514	2266	2241	2216	2190	2164	2138	2111	2085	2058	2032	2006	1981	1956
.515	2269	2244	2219	2194	2168	2141	2115	2088	2062	2035	2009	1984	1959
.516	2273	2248	2223	2197	2171	2145	2118	2091	2065	2038	2013	1987	1962
.517	2276	2252	2226	2201	2175	2148	2121	2095	2068	2042	2016	1990	1965
.518	2280	2255	2230	2204	2178	2151	2125	2098	2071	2045	2019	1994	1969
.519	2284	2259	2233	2208	2181	2155	2128	2101	2075	2048	2022	1997	1972
.520	2287	2262	2237	2211	2185	2158	2131	2105	2078	2052	2026	2000	1975
.521	2291	2266	2240	2215	2188	2161	2135	2108	2081	2055	2029	2003	1978
.522	2294	2269	2244	2218	2192	2165	2138	2111	2085	2058	2032	2006	1981
.523	2298	2273	2247	2222	2195	2168	2141	2115	2088	2061	2035	2009	1984
.524	2301	2276	2251	2225	2199	2172	2145	2118	2091	2065	2038	2013	1987
.525	2305	2280	2254	2228	2202	2175	2148	2121	2094	2068	2042	2016	1990
.526	2309	2283	2258	2232	2205	2178	2151	2124	2098	2071	2045	2019	1993
.527	2312	2287	2261	2235	2209	2182	2155	2128	2101	2074	2048	2022	1996
.528	2316	2291	2265	2239	2212	2185	2158	2131	2104	2078	2051	2025	1999
.529	2319	2294	2268	2242	2216	2188	2161	2134	2108	2081	2054	2028	2003
.530	2323	2298	2272	2246	2219	2192	2165	2138	2111	2084	2058	2031	2006
.531	2326	2301	2275	2249	2222	2195	2168	2141	2114	2087	2061	2035	2009
.532	2330	2305	2279	2253	2226	2198	2171	2144	2117	2090	2064	2038	2012
.533	2333	2308	2282	2256	2229	2202	2175	2148	2121	2094	2067	2041	2015
.534	2337	2312	2286	2259	2233	2205	2178	2151	2124	2097	2070	2044	2018
.535	2341	2315	2289	2263	2236	2209	2181	2154	2127	2100	2073	2047	2021
.536	2344	2319	2293	2266	2239	2212	2184	2157	2130	2103	2077	2050	2024
.537	2348	2322	2296	2270	2243	2215	2188	2161	2134	2107	2080	2053	2027
.538	2351	2326	2300	2273	2246	2219	2191	2164	2137	2110	2083	2056	2030
.539	2355	2329	2303	2277	2250	2222	2194	2167	2140	2113	2086	2059	2033
.540	2358	2333	2307	2280	2253	2225	2198	2170	2143	2116	2089	2063	2036
.541	2362	2336	2310	2284	2256	2229	2201	2174	2147	2119	2092	2066	2039
.542	2365	2340	2314	2287	2260	2232	2204	2177	2150	2123	2096	2069	2042
.543	2369	2343	2317	2290	2263	2235	2208	2180	2153	2126	2099	2072	2045
.544	2372	2347	2321	2294	2267	2239	2211	2184	2156	2129	2102	2075	2048
.545	2376	2350	2324	2297	2270	2242	2214	2187	2159	2132	2105	2078	2051
.546	2379	2354	2327	2301	2273	2245	2217	2190	2163	2135	2108	2081	2054
.547	2383	2357	2331	2304	2277	2249	2221	2193	2166	2138	2111	2084	2057
.548	2386	2361	2334	2307	2280	2252	2224	2197	2169	2142	2114	2087	2060
.549	2390	2364	2338	2311	2283	2255	2227	2200	2172	2145	2117	2090	2063
.550	2394	2368	2341	2314	2287	2258	2230	2203	2176	2148	2121	2093	2066

TABLE I. - Continued. IDEAL COMBUSTION-TEMPERATURE RISE, AT COMBUSTION PRESSURE OF 1 ATMOSPHERE

Fraction of stoichiometric fuel-air ratio, S	Ideal combustion-temperature rise, ΔT, °R												
	Inlet-air temperature, °R												
	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
0.551	2397	2371	2345	2318	2290	2262	2234	2206	2179	2151	2124	2096	2069
.552	2401	2375	2348	2321	2293	2265	2237	2209	2182	2154	2127	2099	2072
.553	2404	2378	2352	2324	2297	2268	2240	2213	2185	2157	2130	2102	2075
.554	2408	2382	2355	2328	2300	2272	2244	2216	2188	2161	2133	2105	2078
.555	2411	2385	2358	2331	2304	2275	2247	2219	2191	2164	2136	2108	2081
.556	2415	2388	2362	2335	2307	2278	2250	2222	2195	2167	2139	2111	2084
.557	2418	2392	2365	2338	2310	2282	2253	2226	2198	2170	2142	2115	2087
.558	2422	2395	2369	2341	2314	2285	2257	2229	2201	2173	2145	2118	2090
.559	2425	2399	2372	2345	2317	2288	2260	2232	2204	2176	2148	2121	2093
.560	2429	2402	2376	2348	2320	2291	2263	2235	2207	2179	2151	2124	2096
.561	2432	2406	2379	2352	2324	2295	2266	2238	2211	2183	2155	2127	2099
.562	2436	2409	2382	2355	2327	2298	2270	2242	2214	2186	2158	2130	2102
.563	2439	2413	2386	2358	2330	2301	2273	2245	2217	2189	2161	2133	2104
.564	2443	2416	2389	2362	2334	2305	2276	2248	2220	2192	2164	2136	2107
.565	2446	2420	2393	2365	2337	2308	2279	2251	2223	2195	2167	2139	2110
.566	2449	2423	2396	2368	2340	2311	2283	2254	2226	2198	2170	2142	2113
.567	2453	2427	2399	2372	2344	2314	2286	2258	2230	2201	2173	2145	2116
.568	2456	2430	2403	2375	2347	2318	2289	2261	2233	2204	2176	2148	2119
.569	2460	2433	2406	2378	2350	2321	2292	2264	2236	2207	2179	2150	2122
.570	2463	2437	2410	2382	2354	2324	2295	2267	2239	2211	2182	2153	2125
.571	2467	2440	2413	2385	2357	2328	2299	2270	2242	2214	2185	2156	2128
.572	2470	2444	2416	2389	2360	2331	2302	2274	2245	2217	2188	2159	2131
.573	2474	2447	2420	2392	2363	2334	2305	2277	2248	2220	2191	2162	2134
.574	2477	2451	2423	2395	2367	2337	2308	2280	2251	2223	2194	2165	2136
.575	2481	2454	2427	2399	2370	2341	2312	2283	2255	2226	2197	2168	2139
.576	2484	2457	2430	2402	2373	2344	2315	2286	2258	2229	2200	2171	2142
.577	2488	2461	2433	2405	2377	2347	2318	2289	2261	2232	2203	2174	2145
.578	2491	2464	2437	2409	2380	2350	2321	2293	2264	2235	2206	2177	2148
.579	2495	2468	2440	2412	2383	2354	2324	2296	2267	2238	2209	2180	2151
.580	2498	2471	2444	2415	2387	2357	2328	2299	2270	2241	2212	2183	2154
.581	2501	2475	2447	2419	2390	2360	2331	2302	2273	2244	2215	2186	2156
.582	2505	2478	2450	2422	2393	2363	2334	2305	2276	2247	2218	2189	2159
.583	2508	2481	2454	2425	2396	2367	2337	2308	2280	2250	2221	2192	2162
.584	2512	2485	2457	2429	2400	2370	2340	2312	2283	2253	2224	2195	2165
.585	2515	2488	2460	2432	2403	2373	2344	2315	2286	2257	2227	2198	2168
.586	2519	2492	2464	2435	2406	2376	2347	2318	2289	2260	2230	2200	2171
.587	2522	2495	2467	2439	2410	2379	2350	2321	2292	2263	2233	2203	2173
.588	2526	2498	2470	2442	2413	2383	2353	2324	2295	2266	2236	2206	2176
.589	2529	2502	2474	2445	2416	2386	2356	2327	2298	2269	2239	2209	2179
.590	2532	2505	2477	2449	2419	2389	2359	2330	2301	2272	2242	2212	2182
.591	2536	2509	2481	2452	2423	2392	2363	2334	2304	2275	2245	2215	2185
.592	2539	2512	2484	2455	2426	2396	2366	2337	2307	2278	2248	2218	2187
.593	2543	2515	2487	2458	2429	2399	2369	2340	2310	2281	2251	2221	2190
.594	2546	2519	2491	2462	2432	2402	2372	2343	2313	2284	2254	2224	2193
.595	2550	2522	2494	2465	2436	2405	2375	2346	2317	2287	2257	2226	2196
.596	2553	2525	2497	2468	2439	2408	2378	2349	2320	2290	2260	2229	2199
.597	2556	2529	2501	2472	2442	2412	2382	2352	2323	2293	2263	2232	2201
.598	2560	2532	2504	2475	2445	2415	2385	2355	2326	2296	2266	2235	2204
.599	2563	2536	2507	2478	2449	2418	2388	2359	2329	2299	2268	2238	2207
.600	2567	2539	2511	2481	2452	2421	2391	2362	2332	2302	2271	2241	2210

S = 0.501 to 0.600

TABLE I. - Continued. IDEAL COMBUSTION-TEMPERATURE RISE, AT COMBUSTION PRESSURE OF 1 ATMOSPHERE

Fraction of stoichiometric fuel-air ratio, S	Ideal combustion-temperature rise, ΔT, °R												
	Inlet-air temperature, °R												
	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
0.601	2570	2542	2514	2485	2455	2425	2394	2365	2335	2305	2274	2244	2213
.602	2574	2546	2517	2488	2458	2428	2398	2368	2338	2308	2277	2247	2215
.603	2577	2549	2521	2491	2462	2431	2401	2371	2341	2311	2280	2249	2218
.604	2580	2553	2524	2495	2465	2434	2404	2374	2344	2314	2283	2252	2221
.605	2584	2556	2527	2498	2468	2438	2407	2378	2347	2317	2286	2255	2224
.606	2587	2559	2531	2501	2472	2441	2410	2381	2351	2320	2289	2258	2227
.607	2591	2563	2534	2505	2475	2444	2414	2384	2354	2323	2292	2261	2229
.608	2594	2566	2537	2508	2478	2447	2417	2387	2357	2326	2295	2264	2232
.609	2598	2569	2541	2511	2481	2451	2420	2390	2360	2329	2298	2267	2235
.610	2601	2573	2544	2515	2485	2454	2423	2393	2363	2332	2301	2270	2238
.611	2604	2576	2547	2518	2488	2457	2427	2396	2366	2335	2304	2272	2240
.612	2608	2580	2551	2521	2491	2460	2430	2400	2369	2338	2307	2275	2243
.613	2611	2583	2554	2524	2494	2464	2433	2403	2372	2341	2310	2278	2246
.614	2615	2586	2557	2528	2498	2467	2436	2406	2375	2344	2313	2281	2249
.615	2618	2590	2561	2531	2501	2470	2439	2409	2378	2347	2316	2284	2251
.616	2621	2593	2564	2534	2504	2473	2442	2412	2381	2350	2319	2287	2254
.617	2625	2596	2567	2538	2507	2476	2446	2415	2384	2353	2322	2289	2257
.618	2628	2600	2571	2541	2511	2480	2449	2418	2388	2356	2324	2292	2260
.619	2632	2603	2574	2544	2514	2483	2452	2422	2391	2359	2327	2295	2262
.620	2635	2606	2577	2547	2517	2486	2455	2425	2394	2362	2330	2298	2265
.621	2638	2610	2580	2551	2520	2489	2458	2428	2397	2365	2333	2301	2268
.622	2642	2613	2584	2554	2523	2492	2461	2431	2400	2368	2336	2304	2270
.623	2645	2616	2587	2557	2527	2496	2465	2434	2403	2371	2339	2306	2273
.624	2648	2620	2590	2560	2530	2499	2468	2437	2406	2374	2342	2309	2276
.625	2652	2623	2594	2564	2533	2502	2471	2440	2409	2377	2345	2312	2279
.626	2655	2626	2597	2567	2536	2505	2474	2443	2412	2380	2348	2315	2281
.627	2659	2630	2600	2570	2540	2508	2477	2446	2415	2383	2350	2317	2284
.628	2662	2633	2604	2573	2543	2511	2480	2449	2418	2386	2353	2320	2287
.629	2665	2636	2607	2577	2546	2515	2483	2452	2421	2389	2356	2323	2289
.630	2669	2640	2610	2580	2549	2518	2486	2455	2424	2392	2359	2326	2292
.631	2672	2643	2613	2583	2552	2521	2490	2458	2427	2395	2362	2328	2295
.632	2675	2646	2617	2586	2556	2524	2493	2462	2430	2397	2365	2331	2297
.633	2679	2650	2620	2589	2559	2527	2496	2465	2433	2400	2367	2334	2300
.634	2682	2653	2623	2593	2562	2530	2499	2468	2436	2403	2370	2337	2302
.635	2685	2656	2626	2596	2565	2534	2502	2471	2439	2406	2373	2339	2305
.636	2689	2659	2630	2599	2568	2537	2505	2474	2442	2409	2376	2342	2308
.637	2692	2663	2633	2602	2571	2540	2508	2477	2445	2412	2379	2345	2310
.638	2695	2666	2636	2606	2575	2543	2511	2480	2448	2415	2382	2348	2313
.639	2699	2669	2639	2609	2578	2546	2514	2483	2451	2418	2384	2350	2316
.640	2702	2673	2643	2612	2581	2549	2517	2486	2454	2421	2387	2353	2318
.641	2705	2676	2646	2615	2584	2552	2521	2489	2456	2423	2390	2356	2321
.642	2709	2679	2649	2618	2587	2555	2524	2492	2459	2426	2393	2358	2323
.643	2712	2683	2652	2622	2590	2559	2527	2495	2462	2429	2395	2361	2326
.644	2715	2686	2656	2625	2593	2562	2530	2498	2465	2432	2398	2364	2329
.645	2719	2689	2659	2628	2597	2565	2533	2501	2468	2435	2401	2366	2331
.646	2722	2692	2662	2631	2600	2568	2536	2504	2471	2438	2404	2369	2334
.647	2725	2696	2665	2634	2603	2571	2539	2507	2474	2441	2406	2372	2336
.648	2729	2699	2669	2637	2606	2574	2542	2510	2477	2443	2409	2374	2339
.649	2732	2702	2672	2641	2609	2577	2545	2513	2480	2446	2412	2377	2341
.650	2735	2705	2675	2644	2612	2580	2548	2516	2483	2449	2415	2380	2344

TABLE I. - Continued. IDEAL COMBUSTION-TEMPERATURE RISE, AT COMBUSTION PRESSURE OF 1 ATMOSPHERE

Fraction of stoichio-metric fuel-air ratio, S	Ideal combustion-temperature rise, ΔT, °R												
	Inlet-air temperature, °R												
	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
0.651	2739	2709	2678	2647	2615	2583	2551	2519	2486	2452	2417	2382	2346
.652	2742	2712	2681	2650	2619	2586	2554	2522	2489	2455	2420	2385	2349
.653	2745	2715	2685	2653	2622	2590	2557	2525	2491	2457	2423	2388	2352
.654	2749	2718	2688	2656	2625	2593	2560	2528	2494	2460	2426	2390	2354
.655	2752	2722	2691	2660	2628	2596	2563	2531	2497	2463	2428	2393	2357
.656	2755	2725	2694	2663	2631	2599	2566	2533	2500	2466	2431	2395	2359
.657	2758	2728	2697	2666	2634	2602	2569	2536	2503	2469	2434	2398	2362
.658	2762	2731	2701	2669	2637	2605	2572	2539	2506	2471	2436	2401	2364
.659	2765	2735	2704	2672	2640	2608	2575	2542	2509	2474	2439	2403	2367
.660	2768	2738	2707	2675	2643	2611	2578	2545	2511	2477	2442	2406	2369
.661	2772	2741	2710	2678	2646	2614	2581	2548	2514	2480	2444	2408	2372
.662	2775	2744	2713	2682	2650	2617	2584	2551	2517	2483	2447	2411	2374
.663	2778	2748	2717	2685	2653	2620	2587	2554	2520	2485	2450	2414	2377
.664	2781	2751	2720	2688	2656	2623	2590	2557	2523	2488	2452	2416	2379
.665	2785	2754	2723	2691	2659	2626	2593	2560	2526	2491	2455	2419	2382
.666	2788	2757	2726	2694	2662	2629	2596	2563	2528	2494	2458	2421	2384
.667	2791	2761	2729	2697	2665	2632	2599	2566	2531	2496	2460	2424	2386
.668	2794	2764	2732	2700	2668	2635	2602	2568	2534	2499	2463	2426	2389
.669	2798	2767	2736	2703	2671	2638	2605	2571	2537	2502	2466	2429	2391
.670	2801	2770	2739	2707	2674	2641	2608	2574	2540	2504	2468	2431	2394
.671	2804	2773	2742	2710	2677	2644	2611	2577	2543	2507	2471	2434	2396
.672	2807	2777	2745	2713	2680	2647	2614	2580	2545	2510	2474	2437	2399
.673	2811	2780	2748	2716	2683	2650	2617	2583	2548	2513	2476	2439	2401
.674	2814	2783	2751	2719	2686	2653	2620	2586	2551	2515	2479	2442	2404
.675	2817	2786	2754	2722	2689	2656	2623	2589	2554	2518	2481	2444	2406
.676	2820	2789	2758	2725	2692	2659	2625	2591	2556	2521	2484	2447	2408
.677	2824	2793	2761	2728	2695	2662	2628	2594	2559	2523	2487	2449	2411
.678	2827	2796	2764	2731	2698	2665	2631	2597	2562	2526	2489	2452	2413
.679	2830	2799	2767	2734	2701	2668	2634	2600	2565	2529	2492	2454	2416
.680	2833	2802	2770	2738	2704	2671	2637	2603	2567	2531	2494	2457	2418
.681	2837	2805	2773	2741	2707	2674	2640	2606	2570	2534	2497	2459	2420
.682	2840	2808	2776	2744	2710	2677	2643	2608	2573	2537	2500	2462	2423
.683	2843	2812	2780	2747	2713	2680	2646	2611	2576	2539	2502	2464	2425
.684	2846	2815	2783	2750	2717	2683	2649	2614	2578	2542	2505	2466	2427
.685	2850	2818	2786	2753	2720	2686	2652	2617	2581	2545	2507	2469	2430
.686	2853	2821	2789	2756	2723	2689	2654	2620	2584	2547	2510	2471	2432
.687	2856	2824	2792	2759	2726	2692	2657	2622	2587	2550	2512	2474	2434
.688	2859	2827	2795	2762	2729	2695	2660	2625	2589	2553	2515	2476	2437
.689	2862	2831	2798	2765	2732	2698	2663	2628	2592	2555	2517	2479	2439
.690	2866	2834	2801	2768	2734	2701	2666	2631	2595	2558	2520	2481	2441
.691	2869	2837	2804	2771	2737	2703	2669	2634	2597	2560	2522	2484	2444
.692	2872	2840	2808	2774	2740	2706	2672	2636	2600	2563	2525	2486	2446
.693	2875	2843	2811	2777	2743	2709	2675	2639	2603	2566	2528	2488	2448
.694	2878	2846	2814	2780	2746	2712	2677	2642	2606	2568	2530	2491	2451
.695	2882	2850	2817	2783	2749	2715	2680	2645	2608	2571	2533	2493	2453
.696	2885	2853	2820	2786	2752	2718	2683	2647	2611	2573	2535	2496	2455
.697	2888	2856	2823	2789	2755	2721	2686	2650	2614	2576	2538	2498	2458
.698	2891	2859	2826	2792	2758	2724	2689	2653	2616	2579	2540	2500	2460
.699	2894	2862	2829	2795	2761	2727	2692	2656	2619	2581	2542	2503	2462
.700	2898	2865	2832	2798	2764	2730	2694	2658	2622	2584	2545	2505	2464

S = 0.601 to 0.700

TABLE I. - Continued. IDEAL COMBUSTION-TEMPERATURE RISE, AT COMBUSTION PRESSURE OF 1 ATMOSPHERE

Fraction of stoichiometric fuel-air ratio, S	Ideal combustion-temperature rise, ΔT, °R												
	Inlet-air temperature, °R												
	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
0.701	2901	2868	2835	2802	2767	2733	2697	2661	2624	2586	2547	2508	2467
.702	2904	2872	2839	2805	2770	2736	2700	2664	2627	2589	2550	2510	2469
.703	2907	2875	2842	2808	2773	2739	2703	2667	2630	2592	2552	2512	2471
.704	2911	2878	2845	2811	2776	2742	2706	2670	2632	2594	2555	2515	2473
.705	2914	2881	2848	2814	2780	2745	2709	2673	2635	2597	2557	2517	2475
.706	2917	2885	2851	2817	2783	2748	2712	2675	2638	2599	2560	2520	2478
.707	2920	2888	2854	2820	2786	2751	2715	2678	2641	2602	2562	2522	2480
.708	2924	2891	2858	2823	2789	2753	2718	2681	2643	2605	2565	2524	2482
.709	2927	2894	2861	2826	2792	2756	2720	2684	2646	2607	2567	2527	2484
.710	2930	2897	2864	2830	2795	2759	2723	2686	2649	2610	2570	2529	2486
.711	2933	2901	2867	2833	2798	2762	2726	2689	2651	2612	2572	2531	2488
.712	2936	2904	2870	2836	2801	2765	2729	2692	2654	2615	2575	2534	2490
.713	2940	2907	2873	2839	2804	2768	2732	2695	2657	2617	2577	2536	2493
.714	2943	2910	2876	2842	2807	2771	2735	2697	2659	2620	2580	2538	2495
.715	2946	2913	2879	2845	2810	2774	2737	2700	2662	2622	2582	2541	2497
.716	2949	2916	2883	2848	2813	2777	2740	2703	2665	2625	2585	2543	2499
.717	2953	2920	2886	2851	2816	2780	2743	2706	2667	2628	2587	2545	2501
.718	2956	2923	2889	2854	2819	2783	2746	2708	2670	2630	2589	2548	2503
.719	2959	2926	2892	2857	2822	2786	2749	2711	2672	2633	2592	2550	2505
.720	2962	2929	2895	2860	2825	2788	2752	2714	2675	2635	2594	2552	2507
.721	2965	2932	2898	2863	2827	2791	2754	2716	2678	2638	2597	2554	2510
.722	2968	2935	2901	2866	2830	2794	2757	2719	2680	2640	2599	2557	2512
.723	2972	2938	2904	2869	2833	2797	2760	2722	2683	2643	2601	2559	2514
.724	2975	2941	2907	2872	2836	2800	2763	2725	2685	2645	2604	2561	2516
.725	2978	2945	2910	2875	2839	2803	2765	2727	2688	2648	2606	2564	2518
.726	2981	2948	2913	2878	2842	2806	2768	2730	2691	2650	2608	2566	2520
.727	2984	2951	2916	2881	2845	2808	2771	2733	2693	2652	2611	2568	2522
.728	2987	2954	2919	2884	2848	2811	2774	2735	2696	2655	2613	2570	2524
.729	2991	2957	2923	2887	2851	2814	2776	2738	2698	2657	2615	2572	2526
.730	2994	2960	2926	2890	2854	2817	2779	2740	2701	2660	2618	2575	2528
.731	2997	2963	2929	2893	2857	2820	2782	2743	2703	2662	2620	2577	2530
.732	3000	2966	2932	2896	2860	2823	2785	2746	2706	2665	2622	2579	2533
.733	3003	2969	2935	2899	2862	2825	2787	2748	2708	2667	2625	2581	2535
.734	3006	2972	2938	2902	2865	2828	2790	2751	2711	2670	2627	2584	2537
.735	3009	2975	2941	2905	2868	2831	2793	2754	2713	2672	2629	2586	2539
.736	3012	2979	2944	2908	2871	2834	2795	2756	2716	2674	2632	2588	2541
.737	3016	2982	2947	2911	2874	2837	2798	2759	2718	2677	2634	2590	2543
.738	3019	2985	2950	2914	2877	2839	2801	2761	2721	2679	2636	2592	2545
.739	3022	2988	2953	2917	2880	2842	2804	2764	2723	2682	2639	2595	2547
.740	3025	2991	2956	2919	2883	2845	2806	2767	2726	2684	2641	2597	2549
.741	3028	2994	2959	2922	2885	2848	2809	2769	2728	2686	2643	2599	2551
.742	3031	2997	2962	2925	2888	2850	2812	2772	2731	2689	2645	2601	2553
.743	3034	3000	2965	2928	2891	2853	2814	2774	2733	2691	2648	2603	2555
.744	3037	3003	2968	2931	2894	2856	2817	2777	2736	2693	2650	2605	2557
.745	3040	3006	2970	2934	2897	2859	2819	2779	2738	2696	2652	2607	2559
.746	3043	3009	2973	2937	2899	2861	2822	2782	2741	2698	2654	2610	2561
.747	3046	3012	2976	2940	2902	2864	2825	2784	2743	2700	2657	2612	2563
.748	3050	3015	2979	2943	2905	2867	2827	2787	2745	2703	2659	2614	2565
.749	3053	3018	2982	2946	2908	2869	2830	2790	2748	2705	2661	2616	2567
.750	3056	3021	2985	2948	2911	2872	2833	2792	2750	2707	2663	2618	2569

TABLE I. - Continued. IDEAL COMBUSTION-TEMPERATURE RISE, AT COMBUSTION PRESSURE OF 1 ATMOSPHERE

Fraction of stoichio-metric fuel-air ratio, S	Ideal combustion-temperature rise, ΔT, °R												
	Inlet-air temperature, °R												
	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
0.751	3059	3024	2988	2951	2913	2875	2835	2795	2753	2710	2666	2620	2571
.752	3062	3027	2991	2954	2916	2878	2838	2797	2755	2712	2668	2622	2573
.753	3065	3030	2994	2957	2919	2880	2840	2800	2758	2714	2670	2624	2575
.754	3068	3033	2997	2960	2922	2883	2843	2802	2760	2717	2672	2626	2577
.755	3071	3036	3000	2963	2925	2886	2846	2805	2762	2719	2674	2629	2579
.756	3074	3039	3003	2965	2927	2888	2848	2807	2765	2721	2676	2631	2581
.757	3077	3042	3006	2968	2930	2891	2851	2809	2767	2723	2679	2633	2583
.758	3080	3045	3008	2971	2933	2894	2853	2812	2769	2726	2681	2635	2585
.759	3083	3048	3011	2974	2935	2896	2856	2814	2772	2728	2683	2637	2587
.760	3086	3051	3014	2977	2938	2899	2858	2817	2774	2730	2685	2639	2589
.761	3089	3054	3017	2980	2941	2901	2861	2819	2777	2733	2687	2641	2591
.762	3092	3057	3020	2982	2944	2904	2863	2822	2779	2735	2689	2643	2593
.763	3095	3059	3023	2985	2946	2907	2866	2824	2781	2737	2692	2645	2595
.764	3098	3062	3026	2988	2949	2909	2869	2827	2784	2739	2694	2647	2597
.765	3101	3065	3029	2991	2952	2912	2871	2829	2786	2741	2696	2649	2599
.766	3104	3068	3031	2993	2954	2915	2874	2831	2788	2744	2698	2651	2601
.767	3107	3071	3034	2996	2957	2917	2876	2834	2790	2746	2700	2653	2603
.768	3110	3074	3037	2999	2960	2920	2879	2836	2793	2748	2702	2655	2604
.769	3113	3077	3040	3002	2962	2922	2881	2839	2795	2750	2704	2657	2606
.770	3116	3080	3043	3004	2965	2925	2884	2841	2797	2752	2706	2659	2608
.771	3119	3083	3046	3007	2968	2927	2886	2843	2800	2755	2708	2661	2610
.772	3122	3086	3048	3010	2970	2930	2888	2846	2802	2757	2711	2663	2612
.773	3125	3089	3051	3013	2973	2933	2891	2848	2804	2759	2713	2665	2614
.774	3128	3091	3054	3015	2976	2935	2893	2851	2806	2761	2715	2667	2616
.775	3131	3094	3057	3018	2978	2938	2896	2853	2809	2763	2717	2669	2618
.776	3133	3097	3060	3021	2981	2940	2898	2855	2811	2765	2719	2671	2620
.777	3136	3100	3062	3024	2984	2943	2901	2858	2813	2768	2721	2673	2622
.778	3139	3103	3065	3026	2986	2945	2903	2860	2815	2770	2723	2675	2624
.779	3142	3106	3068	3029	2989	2948	2906	2862	2818	2772	2725	2677	2625
.780	3145	3109	3071	3032	2992	2950	2908	2865	2820	2774	2727	2679	2627
.781	3148	3111	3074	3034	2994	2953	2910	2867	2822	2776	2729	2680	2629
.782	3151	3114	3076	3037	2997	2955	2913	2869	2824	2778	2731	2682	2631
.783	3154	3117	3079	3040	2999	2958	2915	2872	2827	2780	2733	2684	2633
.784	3157	3120	3082	3042	3002	2960	2918	2874	2829	2783	2735	2686	2635
.785	3160	3123	3085	3045	3005	2963	2920	2876	2831	2785	2737	2688	2637
.786	3163	3126	3087	3048	3007	2965	2923	2878	2833	2787	2739	2690	2639
.787	3166	3128	3090	3050	3010	2968	2925	2881	2835	2789	2741	2692	2640
.788	3168	3131	3093	3053	3012	2970	2927	2883	2838	2791	2743	2694	2642
.789	3171	3134	3096	3056	3015	2973	2930	2885	2840	2793	2745	2696	2644
.790	3174	3137	3098	3058	3017	2975	2932	2888	2842	2795	2747	2698	2646
.791	3177	3140	3101	3061	3020	2978	2934	2890	2844	2797	2749	2699	2648
.792	3180	3142	3104	3064	3022	2980	2937	2892	2846	2799	2751	2701	2650
.793	3183	3145	3106	3066	3025	2983	2939	2894	2848	2801	2753	2703	2652
.794	3186	3148	3109	3069	3028	2985	2941	2897	2851	2803	2755	2705	2653
.795	3189	3151	3112	3071	3030	2987	2944	2899	2853	2805	2757	2707	2655
.796	3191	3154	3114	3074	3033	2990	2946	2901	2855	2807	2759	2709	2657
.797	3194	3156	3117	3077	3035	2992	2948	2903	2857	2809	2760	2710	2659
.798	3197	3159	3120	3079	3038	2995	2951	2905	2859	2811	2762	2712	2661
.799	3200	3162	3123	3082	3040	2997	2953	2908	2861	2813	2764	2714	2662
.800	3203	3165	3125	3084	3043	3000	2955	2910	2863	2815	2766	2716	2664

S = 0.701 to 0.800

TABLE I. - Continued. IDEAL COMBUSTION-TEMPERATURE RISE, AT COMBUSTION PRESSURE OF 1 ATMOSPHERE

Fraction of stoichiometric fuel-air ratio, S	Ideal combustion-temperature rise, ΔT, °R												
	Inlet-air temperature, °R												
	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
0.801	3206	3168	3128	3087	3045	3002	2958	2912	2865	2817	2768	2718	2666
.802	3209	3171	3131	3090	3048	3005	2960	2914	2867	2819	2770	2719	2668
.803	3212	3173	3134	3093	3050	3007	2962	2917	2870	2821	2772	2721	2669
.804	3215	3176	3137	3095	3053	3010	2965	2919	2872	2823	2774	2723	2671
.805	3218	3179	3139	3098	3056	3012	2967	2921	2874	2825	2776	2725	2673
.806	3221	3182	3142	3101	3058	3014	2969	2923	2876	2827	2778	2727	2674
.807	3224	3185	3145	3103	3061	3017	2972	2926	2878	2829	2779	2728	2676
.808	3227	3188	3148	3106	3063	3019	2974	2928	2880	2831	2781	2730	2678
.809	3230	3191	3151	3109	3066	3022	2976	2930	2882	2833	2783	2732	2679
.810	3233	3194	3153	3112	3068	3024	2979	2932	2884	2835	2785	2734	2681
.811	3236	3197	3156	3114	3071	3027	2981	2934	2886	2837	2787	2735	2683
.812	3239	3200	3159	3117	3074	3029	2983	2936	2888	2839	2789	2737	2684
.813	3242	3202	3162	3119	3076	3031	2986	2939	2890	2841	2791	2739	2686
.814	3245	3205	3164	3122	3079	3034	2988	2941	2893	2843	2792	2740	2687
.815	3248	3208	3167	3125	3081	3036	2990	2943	2895	2845	2794	2742	2689
.816	3251	3211	3170	3127	3084	3039	2992	2945	2897	2847	2796	2744	2691
.817	3254	3214	3173	3130	3086	3041	2995	2947	2899	2849	2798	2746	2692
.818	3257	3217	3175	3133	3089	3043	2997	2949	2901	2851	2800	2747	2694
.819	3259	3219	3178	3135	3091	3046	2999	2952	2903	2853	2801	2749	2695
.820	3262	3222	3181	3138	3093	3048	3001	2954	2905	2854	2803	2751	2697
.821	3265	3225	3183	3140	3096	3050	3004	2956	2907	2856	2805	2752	2699
.822	3268	3228	3186	3143	3098	3053	3006	2958	2909	2858	2807	2754	2700
.823	3271	3231	3189	3145	3101	3055	3008	2960	2911	2860	2808	2756	2702
.824	3274	3233	3191	3148	3103	3057	3010	2962	2913	2862	2810	2757	2703
.825	3277	3236	3194	3150	3106	3060	3012	2964	2915	2864	2812	2759	2705
.826	3279	3239	3197	3153	3108	3062	3015	2966	2916	2866	2814	2761	2706
.827	3282	3242	3199	3156	3110	3064	3017	2968	2918	2868	2816	2762	2708
.828	3285	3244	3202	3158	3113	3067	3019	2970	2920	2869	2817	2764	2710
.829	3288	3247	3204	3161	3115	3069	3021	2972	2922	2871	2819	2766	2711
.830	3291	3250	3207	3163	3118	3071	3023	2974	2924	2873	2821	2767	2713
.831	3294	3252	3210	3165	3120	3073	3025	2976	2926	2875	2822	2769	2714
.832	3296	3255	3212	3168	3122	3076	3028	2978	2928	2877	2824	2770	2716
.833	3299	3258	3215	3170	3125	3078	3030	2980	2930	2878	2826	2772	2717
.834	3302	3260	3217	3173	3127	3080	3032	2982	2932	2880	2828	2774	2719
.835	3305	3263	3220	3175	3129	3082	3034	2984	2934	2882	2829	2775	2720
.836	3307	3266	3222	3178	3132	3084	3036	2986	2936	2884	2831	2777	2722
.837	3310	3268	3225	3180	3134	3087	3038	2988	2938	2886	2833	2778	2723
.838	3313	3271	3228	3183	3136	3089	3040	2990	2939	2887	2834	2780	2725
.839	3316	3274	3230	3185	3139	3091	3042	2992	2941	2889	2836	2782	2726
.840	3318	3276	3233	3187	3141	3093	3044	2994	2943	2891	2838	2783	2728
.841	3321	3279	3235	3190	3143	3095	3046	2996	2945	2893	2839	2785	2729
.842	3324	3281	3238	3192	3146	3098	3049	2998	2947	2894	2841	2786	2731
.843	3326	3284	3240	3195	3148	3100	3051	3000	2949	2896	2843	2788	2732
.844	3329	3286	3242	3197	3150	3102	3053	3002	2951	2898	2844	2789	2733
.845	3332	3289	3245	3199	3152	3104	3055	3004	2952	2900	2846	2791	2735
.846	3334	3292	3247	3202	3155	3106	3057	3006	2954	2901	2847	2792	2736
.847	3337	3294	3250	3204	3157	3108	3059	3008	2956	2903	2849	2794	2738
.848	3340	3297	3252	3206	3159	3110	3061	3010	2958	2905	2851	2795	2739
.849	3342	3299	3255	3209	3161	3112	3063	3012	2960	2906	2852	2797	2741
.850	3345	3302	3257	3211	3163	3115	3065	3014	2961	2908	2854	2798	2742

TABLE I. - Continued. IDEAL COMBUSTION-TEMPERATURE RISE, AT COMBUSTION PRESSURE OF 1 ATMOSPHERE

Fraction of stoichio-metric fuel-air ratio, S	Ideal combustion-temperature rise, ΔT, ^{o}R												
	Inlet-air temperature, ^{o}R												
	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
0.851	3347	3304	3260	3213	3166	3117	3067	3015	2963	2910	2855	2800	2743
.852	3350	3307	3262	3215	3168	3119	3069	3017	2965	2911	2857	2801	2745
.853	3353	3309	3264	3218	3170	3121	3071	3019	2967	2913	2859	2803	2746
.854	3355	3312	3267	3220	3172	3123	3073	3021	2968	2915	2860	2804	2748
.855	3358	3314	3269	3222	3174	3125	3075	3023	2970	2916	2862	2806	2749
.856	3360	3317	3271	3225	3176	3127	3076	3025	2972	2918	2863	2807	2750
.857	3363	3319	3274	3227	3179	3129	3078	3027	2974	2920	2865	2809	2752
.858	3365	3321	3276	3229	3181	3131	3080	3028	2975	2921	2866	2810	2753
.859	3368	3324	3278	3231	3183	3133	3082	3030	2977	2923	2868	2812	2755
.860	3370	3326	3281	3233	3185	3135	3084	3032	2979	2925	2869	2813	2756
.861	3373	3329	3283	3236	3187	3137	3086	3034	2981	2926	2871	2815	2757
.862	3375	3331	3285	3238	3189	3139	3088	3036	2982	2928	2873	2816	2759
.863	3378	3334	3288	3240	3191	3141	3090	3037	2984	2929	2874	2818	2760
.864	3380	3336	3290	3242	3193	3143	3092	3039	2986	2931	2876	2819	2761
.865	3383	3338	3292	3244	3195	3145	3094	3041	2987	2933	2877	2820	2763
.866	3385	3341	3294	3247	3197	3147	3095	3043	2989	2934	2879	2822	2764
.867	3388	3343	3297	3249	3200	3149	3097	3044	2991	2936	2880	2823	2765
.868	3390	3345	3299	3251	3202	3151	3099	3046	2992	2937	2881	2825	2767
.869	3393	3348	3301	3253	3204	3153	3101	3048	2994	2939	2883	2826	2768
.870	3395	3350	3303	3255	3206	3155	3103	3050	2996	2941	2884	2827	2769
.871	3397	3352	3306	3257	3208	3157	3105	3051	2997	2942	2886	2829	2771
.872	3400	3355	3308	3259	3210	3159	3106	3053	2999	2944	2887	2830	2772
.873	3402	3357	3310	3262	3212	3161	3108	3055	3000	2945	2889	2832	2773
.874	3405	3359	3312	3264	3214	3162	3110	3057	3002	2947	2890	2833	2775
.875	3407	3362	3314	3266	3216	3164	3112	3058	3004	2948	2892	2834	2776
.876	3409	3364	3317	3268	3218	3166	3114	3060	3005	2950	2893	2836	2777
.877	3412	3366	3319	3270	3220	3168	3115	3062	3007	2951	2895	2837	2778
.878	3414	3368	3321	3272	3222	3170	3117	3063	3009	2953	2896	2838	2780
.879	3416	3371	3323	3274	3224	3172	3119	3065	3010	2954	2897	2840	2781
.880	3419	3373	3325	3276	3225	3174	3121	3067	3012	2956	2899	2841	2782
.881	3421	3375	3327	3278	3227	3175	3122	3068	3013	2957	2900	2842	2783
.882	3423	3377	3330	3280	3229	3177	3124	3070	3015	2959	2902	2844	2785
.883	3426	3379	3332	3282	3231	3179	3126	3072	3016	2960	2903	2845	2786
.884	3428	3382	3334	3284	3233	3181	3128	3073	3018	2962	2904	2846	2787
.885	3430	3384	3336	3286	3235	3183	3129	3075	3019	2963	2906	2848	2788
.886	3433	3386	3338	3288	3237	3185	3131	3076	3021	2965	2907	2849	2790
.887	3435	3388	3340	3290	3239	3186	3133	3078	3022	2966	2908	2850	2791
.888	3437	3390	3342	3292	3241	3188	3134	3080	3024	2967	2910	2851	2792
.889	3439	3393	3344	3294	3243	3190	3136	3081	3025	2969	2911	2853	2793
.890	3442	3395	3346	3296	3244	3192	3138	3083	3027	2970	2913	2854	2794
.891	3444	3397	3348	3298	3246	3193	3139	3084	3028	2972	2914	2855	2796
.892	3446	3399	3350	3300	3248	3195	3141	3086	3030	2973	2915	2856	2797
.893	3448	3401	3352	3302	3250	3197	3143	3088	3031	2974	2917	2858	2798
.894	3451	3403	3354	3304	3252	3199	3144	3089	3033	2976	2918	2859	2799
.895	3453	3405	3356	3306	3254	3200	3146	3091	3034	2977	2919	2860	2800
.896	3455	3407	3358	3307	3255	3202	3148	3092	3036	2979	2920	2861	2801
.897	3457	3409	3360	3309	3257	3204	3149	3094	3037	2980	2922	2863	2803
.898	3459	3411	3362	3311	3259	3205	3151	3095	3039	2981	2923	2864	2804
.899	3461	3414	3364	3313	3261	3207	3153	3097	3040	2983	2924	2865	2805
.900	3464	3416	3366	3315	3263	3209	3154	3098	3042	2984	2926	2866	2806

S = 0.801 to 0.900

TABLE I. - Continued. IDEAL COMBUSTION-TEMPERATURE RISE, AT COMBUSTION PRESSURE OF 1 ATMOSPHERE

Fraction of stoichiometric fuel-air ratio, S	Ideal combustion-temperature rise, ΔT, °R												
	Inlet-air temperature, °R												
	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
0.901	3466	3418	3368	3317	3264	3211	3156	3100	3043	2985	2927	2867	2807
.902	3468	3420	3370	3319	3266	3212	3157	3101	3044	2987	2928	2869	2808
.903	3470	3422	3372	3321	3268	3214	3159	3103	3046	2988	2929	2870	2809
.904	3473	3424	3374	3323	3270	3216	3161	3104	3047	2989	2931	2871	2811
.905	3475	3426	3376	3325	3272	3217	3162	3106	3049	2991	2932	2872	2812
.906	3477	3429	3378	3326	3273	3219	3164	3107	3050	2992	2933	2873	2813
.907	3480	3431	3380	3328	3275	3221	3165	3109	3051	2993	2934	2875	2814
.908	3482	3433	3382	3330	3277	3222	3167	3110	3053	2995	2936	2876	2815
.909	3484	3435	3384	3332	3279	3224	3168	3112	3054	2996	2937	2877	2816
.910	3486	3437	3386	3334	3280	3226	3170	3113	3056	2997	2938	2878	2817
.911	3488	3439	3388	3336	3282	3227	3171	3115	3057	2999	2939	2879	2818
.912	3491	3441	3390	3338	3284	3229	3173	3116	3058	3000	2940	2880	2819
.913	3493	3443	3392	3339	3286	3231	3175	3118	3060	3001	2942	2881	2820
.914	3495	3445	3394	3341	3287	3232	3176	3119	3061	3002	2943	2883	2821
.915	3497	3447	3396	3343	3289	3234	3178	3120	3062	3004	2944	2884	2823
.916	3499	3449	3398	3345	3291	3235	3179	3122	3064	3005	2945	2885	2824
.917	3501	3451	3400	3347	3292	3237	3181	3123	3065	3006	2946	2886	2825
.918	3504	3453	3402	3348	3294	3238	3182	3125	3066	3007	2948	2887	2826
.919	3506	3455	3404	3350	3296	3240	3183	3126	3068	3009	2949	2888	2827
.920	3508	3457	3405	3352	3297	3242	3185	3127	3069	3010	2950	2889	2828
.921	3510	3459	3407	3354	3299	3243	3186	3129	3070	3011	2951	2890	2829
.922	3512	3461	3409	3355	3301	3245	3188	3130	3071	3012	2952	2891	2830
.923	3514	3463	3411	3357	3302	3246	3189	3131	3073	3013	2953	2892	2831
.924	3516	3465	3413	3359	3304	3248	3191	3133	3074	3015	2954	2893	2832
.925	3518	3467	3414	3360	3305	3249	3192	3134	3075	3016	2955	2894	2833
.926	3520	3469	3416	3362	3307	3251	3193	3135	3076	3017	2957	2896	2834
.927	3522	3471	3418	3364	3309	3252	3195	3137	3078	3018	2958	2897	2835
.928	3524	3473	3420	3365	3310	3254	3196	3138	3079	3019	2959	2898	2836
.929	3526	3474	3421	3367	3312	3255	3198	3139	3080	3020	2960	2899	2837
.930	3528	3476	3423	3369	3313	3257	3199	3141	3081	3022	2961	2900	2838
.931	3530	3478	3425	3370	3315	3258	3200	3142	3083	3023	2962	2901	2839
.932	3532	3480	3427	3372	3316	3259	3202	3143	3084	3024	2963	2902	2840
.933	3534	3482	3428	3374	3318	3261	3203	3144	3085	3025	2964	2903	2841
.934	3535	3483	3430	3375	3319	3262	3204	3146	3086	3026	2965	2904	2842
.935	3537	3485	3432	3377	3321	3264	3206	3147	3087	3027	2966	2905	2843
.936	3539	3487	3433	3378	3322	3265	3207	3148	3089	3028	2967	2906	2843
.937	3541	3489	3435	3380	3324	3266	3208	3149	3090	3029	2968	2907	2844
.938	3543	3490	3437	3381	3325	3268	3210	3151	3091	3031	2969	2908	2845
.939	3545	3492	3438	3383	3327	3269	3211	3152	3092	3032	2971	2909	2846
.940	3547	3494	3440	3385	3328	3271	3212	3153	3093	3033	2972	2910	2847
.941	3548	3496	3442	3386	3329	3272	3214	3154	3094	3034	2973	2911	2848
.942	3550	3497	3443	3388	3331	3273	3215	3155	3095	3035	2974	2912	2849
.943	3552	3499	3445	3389	3332	3275	3216	3157	3097	3036	2975	2913	2850
.944	3554	3501	3446	3390	3334	3276	3217	3158	3098	3037	2976	2914	2851
.945	3555	3502	3448	3392	3335	3277	3219	3159	3099	3038	2977	2914	2852
.946	3557	3504	3449	3393	3336	3278	3220	3160	3100	3039	2978	2915	2853
.947	3559	3506	3451	3395	3338	3280	3221	3161	3101	3040	2979	2916	2854
.948	3561	3507	3452	3396	3339	3281	3222	3162	3102	3041	2980	2917	2854
.949	3562	3509	3454	3398	3341	3282	3223	3164	3103	3042	2980	2918	2855
.950	3564	3510	3455	3399	3342	3284	3225	3165	3104	3043	2981	2919	2856

TABLE I. - Continued. IDEAL COMBUSTION-TEMPERATURE RISE, AT COMBUSTION PRESSURE OF 1 ATMOSPHERE

Fraction of stoichiometric fuel-air ratio, S	Ideal combustion-temperature rise, ΔT, °R												
	Inlet-air temperature, °R												
	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
0.951	3566	3512	3457	3401	3343	3285	3226	3166	3105	3044	2982	2920	2857
.952	3568	3514	3459	3402	3345	3286	3227	3167	3106	3045	2983	2921	2858
.953	3569	3515	3460	3403	3346	3287	3228	3168	3107	3046	2984	2922	2859
.954	3571	3517	3462	3405	3347	3289	3229	3169	3109	3047	2985	2923	2860
.955	3573	3519	3463	3406	3349	3290	3231	3170	3110	3048	2986	2924	2860
.956	3575	3520	3465	3408	3350	3291	3232	3171	3111	3049	2987	2924	2861
.957	3576	3522	3466	3409	3351	3292	3233	3172	3112	3050	2988	2925	2862
.958	3578	3523	3468	3410	3352	3294	3234	3174	3113	3051	2989	2926	2863
.959	3580	3525	3469	3412	3354	3295	3235	3175	3114	3052	2990	2927	2864
.960	3581	3526	3470	3413	3355	3296	3236	3176	3115	3053	2991	2928	2865
.961	3583	3528	3472	3414	3356	3297	3237	3177	3116	3054	2992	2929	2865
.962	3584	3529	3473	3416	3357	3298	3238	3178	3117	3055	2993	2930	2866
.963	3586	3531	3475	3417	3359	3299	3240	3179	3118	3056	2993	2930	2867
.964	3588	3532	3476	3418	3360	3301	3241	3180	3119	3057	2994	2931	2868
.965	3589	3534	3477	3420	3361	3302	3242	3181	3120	3058	2995	2932	2869
.966	3591	3535	3479	3421	3362	3303	3243	3182	3120	3059	2996	2933	2869
.967	3592	3537	3480	3422	3363	3304	3244	3183	3121	3059	2997	2934	2870
.968	3594	3538	3481	3423	3365	3305	3245	3184	3122	3060	2998	2935	2871
.969	3595	3539	3483	3425	3366	3306	3246	3185	3123	3061	2999	2935	2872
.970	3597	3541	3484	3426	3367	3307	3247	3186	3124	3062	2999	2936	2872
.971	3598	3542	3485	3427	3368	3308	3248	3187	3125	3063	3000	2937	2873
.972	3599	3543	3486	3428	3369	3309	3249	3188	3126	3064	3001	2938	2874
.973	3601	3545	3488	3429	3370	3310	3250	3189	3127	3065	3002	2939	2875
.974	3602	3546	3489	3430	3371	3311	3251	3190	3128	3066	3003	2939	2875
.975	3604	3547	3490	3432	3372	3312	3252	3191	3129	3066	3004	2940	2876
.976	3605	3549	3491	3433	3374	3314	3253	3191	3130	3067	3004	2941	2877
.977	3606	3550	3492	3434	3375	3315	3254	3192	3131	3068	3005	2942	2878
.978	3607	3551	3494	3435	3376	3316	3255	3193	3131	3069	3006	2942	2878
.979	3609	3552	3495	3436	3377	3317	3256	3194	3132	3070	3007	2943	2879
.980	3610	3553	3496	3437	3378	3317	3257	3195	3133	3071	3007	2944	2880
.981	3611	3555	3497	3438	3379	3318	3258	3196	3134	3071	3008	2945	2881
.982	3612	3556	3498	3439	3380	3319	3258	3197	3135	3072	3009	2945	2881
.983	3614	3557	3499	3440	3381	3320	3259	3198	3136	3073	3010	2946	2882
.984	3615	3558	3500	3441	3382	3321	3260	3199	3136	3074	3011	2947	2883
.985	3616	3559	3501	3442	3383	3322	3261	3199	3137	3074	3011	2948	2883
.986	3617	3560	3502	3443	3384	3323	3262	3200	3138	3075	3012	2948	2884
.987	3618	3561	3503	3444	3385	3324	3263	3201	3139	3076	3013	2949	2885
.988	3619	3562	3504	3445	3385	3325	3264	3202	3140	3077	3013	2950	2885
.989	3620	3563	3505	3446	3386	3326	3265	3203	3140	3078	3014	2950	2886
.990	3622	3564	3506	3447	3387	3327	3265	3204	3141	3078	3015	2951	2887
.991	3623	3565	3507	3448	3388	3328	3266	3204	3142	3079	3016	2952	2887
.992	3624	3566	3508	3449	3389	3328	3267	3205	3143	3080	3016	2952	2888
.993	3625	3567	3509	3450	3390	3329	3268	3206	3143	3080	3017	2953	2889
.994	3626	3568	3510	3451	3391	3330	3269	3207	3144	3081	3018	2954	2889
.995	3627	3569	3511	3452	3392	3331	3269	3207	3145	3082	3018	2954	2890
.996	3628	3570	3512	3453	3393	3332	3270	3208	3146	3083	3019	2955	2891
.997	3628	3571	3513	3453	3393	3332	3271	3209	3146	3083	3020	2956	2891
.998	3629	3572	3514	3454	3394	3333	3272	3210	3147	3084	3020	2956	2892
.999	3630	3573	3515	3455	3395	3334	3273	3210	3148	3085	3021	2957	2892
1.000	3631	3574	3515	3456	3396	3335	3273	3211	3148	3085	3022	2958	2893

S = 0.901 to 1.000

TABLE I. - Continued. IDEAL COMBUSTION-TEMPERATURE RISE, AT COMBUSTION PRESSURE OF 1 ATMOSPHERE

Fraction of stoichiometric fuel-air ratio, S	Ideal combustion-temperature rise, ΔT, °R												
	Inlet-air temperature, °R												
	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
1.001	3632	3575	3516	3457	3397	3336	3274	3212	3149	3086	3022	2958	2894
.002	3633	3575	3517	3458	3397	3336	3275	3213	3150	3087	3023	2959	2894
.003	3634	3576	3518	3458	3398	3337	3275	3213	3151	3087	3024	2959	2895
.004	3634	3577	3519	3459	3399	3338	3276	3214	3151	3088	3024	2960	2895
.005	3635	3578	3520	3460	3400	3339	3277	3215	3152	3089	3025	2961	2896
.006	3636	3579	3520	3461	3400	3339	3278	3215	3153	3089	3025	2961	2897
.007	3637	3579	3521	3461	3401	3340	3278	3216	3153	3090	3026	2962	2897
.008	3637	3580	3522	3462	3402	3341	3279	3217	3154	3090	3027	2962	2898
.009	3638	3581	3523	3463	3403	3341	3280	3217	3154	3091	3027	2963	2898
.010	3639	3582	3523	3464	3403	3342	3280	3218	3155	3092	3028	2964	2899
.011	3639	3582	3524	3464	3404	3343	3281	3219	3156	3092	3028	2964	2899
.012	3640	3583	3525	3465	3405	3343	3282	3219	3156	3093	3029	2965	2900
.013	3641	3584	3525	3466	3405	3344	3282	3220	3157	3093	3030	2965	2900
.014	3641	3584	3526	3466	3406	3345	3283	3220	3157	3094	3030	2966	2901
.015	3642	3585	3527	3467	3406	3345	3283	3221	3158	3095	3031	2966	2901
.016	3642	3585	3527	3468	3407	3346	3284	3222	3159	3095	3031	2967	2902
.017	3643	3586	3528	3468	3408	3346	3285	3222	3159	3096	3032	2967	2903
.018	3643	3587	3528	3469	3408	3347	3285	3223	3160	3096	3032	2968	2903
.019	3644	3587	3529	3469	3409	3348	3286	3223	3160	3097	3033	2968	2904
.020	3644	3588	3530	3470	3409	3348	3286	3224	3161	3097	3033	2969	2904
.021	3645	3588	3530	3470	3410	3349	3287	3224	3161	3098	3034	2969	2905
.022	3645	3589	3531	3471	3411	3349	3287	3225	3162	3098	3034	2970	2905
.023	3646	3589	3531	3471	3411	3350	3288	3225	3162	3099	3035	2970	2906
.024	3646	3590	3532	3472	3412	3350	3288	3226	3163	3099	3035	2971	2906
.025	3647	3590	3532	3472	3412	3351	3289	3226	3163	3100	3036	2971	2906
.026	3647	3590	3533	3473	3413	3351	3289	3227	3164	3100	3036	2972	2907
.027	3647	3591	3533	3473	3413	3352	3290	3227	3164	3101	3037	2972	2907
.028	3648	3591	3533	3474	3413	3352	3290	3228	3165	3101	3037	2973	2908
.029	3648	3592	3534	3474	3414	3353	3291	3228	3165	3102	3038	2973	2908
.030	3648	3592	3534	3475	3414	3353	3291	3229	3166	3102	3038	2974	2909
.031	3649	3592	3535	3475	3415	3354	3292	3229	3166	3103	3039	2974	2909
.032	3649	3593	3535	3475	3415	3354	3292	3230	3167	3103	3039	2975	2910
.033	3649	3593	3535	3476	3416	3354	3293	3230	3167	3104	3040	2975	2910
.034	3649	3593	3536	3476	3416	3355	3293	3231	3168	3104	3040	2976	2911
.035	3650	3594	3536	3477	3416	3355	3293	3231	3168	3104	3040	2976	2911
.036	3650	3594	3536	3477	3417	3356	3294	3231	3168	3105	3041	2976	2911
.037	3650	3594	3537	3477	3417	3356	3294	3232	3169	3105	3041	2977	2912
.038	3650	3594	3537	3477	3417	3356	3295	3232	3169	3106	3042	2977	2912
.039	3650	3594	3537	3478	3418	3357	3295	3233	3170	3106	3042	2978	2913
.040	3650	3595	3537	3478	3418	3357	3295	3233	3170	3107	3043	2978	2913
.041	3651	3595	3537	3478	3418	3357	3296	3233	3170	3107	3043	2978	2913
.042	3651	3595	3538	3479	3419	3358	3296	3234	3171	3107	3043	2979	2914
.043	3651	3595	3538	3479	3419	3358	3296	3234	3171	3108	3044	2979	2914
.044	3651	3595	3538	3479	3419	3358	3297	3234	3171	3108	3044	2980	2914
.045	3651	3595	3538	3479	3419	3358	3297	3235	3172	3108	3044	2980	2915
.046	3651	3595	3538	3479	3420	3359	3297	3235	3172	3109	3045	2980	2915
.047	3651	3595	3538	3480	3420	3359	3298	3235	3172	3109	3045	2981	2916
.048	3651	3595	3539	3480	3420	3359	3298	3236	3173	3109	3045	2981	2916
.049	3651	3595	3539	3480	3420	3359	3298	3236	3173	3110	3046	2981	2916
.050	3651	3595	3539	3480	3420	3360	3298	3236	3173	3110	3046	2982	2917

TABLE I. - Continued. IDEAL COMBUSTION-TEMPERATURE RISE, AT COMBUSTION PRESSURE OF 1 ATMOSPHERE

Fraction of stoichiometric fuel-air ratio, S	Ideal combustion-temperature rise, ΔT, °R												
	Inlet-air temperature, °R												
	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
1.051	3651	3595	3539	3480	3421	3360	3299	3236	3174	3110	3046	2982	2917
.052	3650	3595	3539	3480	3421	3360	3299	3236	3174	3111	3047	2982	2917
.053	3650	3595	3539	3480	3421	3360	3299	3236	3174	3111	3047	2983	2918
.054	3650	3595	3539	3480	3421	3360	3299	3236	3174	3111	3047	2983	2918
.055	3650	3595	3539	3480	3421	3361	3299	3237	3175	3111	3048	2983	2918
.056	3650	3595	3539	3480	3421	3361	3300	3238	3175	3112	3048	2984	2919
.057	3650	3595	3539	3481	3421	3361	3300	3238	3175	3112	3048	2984	2919
.058	3649	3595	3539	3481	3421	3361	3300	3238	3175	3112	3049	2984	2919
.059	3649	3595	3539	3481	3421	3361	3300	3238	3176	3113	3049	2984	2919
.060	3649	3595	3539	3481	3421	3361	3300	3238	3176	3113	3049	2985	2920
.061	3649	3594	3539	3481	3421	3361	3300	3239	3176	3113	3049	2985	2920
.062	3648	3594	3538	3480	3422	3361	3301	3239	3176	3113	3050	2985	2920
.063	3648	3594	3538	3480	3422	3361	3301	3239	3176	3113	3050	2986	2921
.064	3648	3594	3538	3480	3422	3362	3301	3239	3177	3114	3050	2986	2921
.065	3647	3594	3538	3480	3422	3362	3301	3239	3177	3114	3050	2986	2921
.066	3647	3593	3538	3480	3422	3362	3301	3239	3177	3114	3050	2986	2921
.067	3647	3593	3538	3480	3421	3362	3301	3239	3177	3114	3051	2986	2922
.068	3646	3593	3537	3480	3421	3362	3301	3240	3177	3114	3051	2987	2922
.069	3646	3592	3537	3480	3421	3362	3301	3240	3177	3115	3051	2987	2922
.070	3645	3592	3537	3480	3421	3362	3301	3240	3178	3115	3051	2987	2922
.071	3645	3592	3537	3479	3421	3362	3301	3240	3178	3115	3052	2987	2923
.072	3644	3591	3536	3479	3421	3362	3301	3240	3178	3115	3052	2988	2923
.073	3644	3591	3536	3479	3421	3362	3301	3240	3178	3115	3052	2988	2923
.074	3643	3590	3536	3479	3421	3362	3301	3240	3178	3115	3052	2988	2923
.075	3643	3590	3535	3479	3421	3361	3301	3240	3178	3116	3052	2988	2923
.076	3642	3590	3535	3478	3421	3361	3301	3240	3178	3116	3052	2988	2924
.077	3642	3589	3535	3478	3420	3361	3301	3240	3178	3116	3053	2989	2924
.078	3641	3589	3534	3478	3420	3361	3301	3240	3178	3116	3053	2989	2924
.079	3641	3588	3534	3478	3420	3361	3301	3240	3178	3116	3053	2989	2924
.080	3640	3588	3534	3477	3420	3361	3301	3240	3179	3116	3053	2989	2924
.081	3639	3587	3533	3477	3420	3361	3301	3240	3179	3116	3053	2989	2925
.082	3639	3587	3533	3477	3419	3361	3301	3240	3179	3116	3053	2989	2925
.083	3638	3586	3532	3476	3419	3361	3301	3240	3179	3116	3053	2989	2925
.084	3637	3585	3532	3476	3419	3360	3301	3240	3179	3116	3053	2990	2925
.085	3637	3585	3531	3476	3419	3360	3301	3240	3179	3117	3054	2990	2925
.086	3636	3584	3531	3475	3418	3360	3301	3240	3179	3117	3054	2990	2925
.087	3635	3584	3530	3475	3418	3360	3300	3240	3179	3117	3054	2990	2926
.088	3634	3583	3530	3474	3418	3360	3300	3240	3179	3117	3054	2990	2926
.089	3634	3582	3529	3474	3417	3359	3300	3240	3179	3117	3054	2990	2926
.090	3633	3582	3529	3474	3417	3359	3300	3240	3179	3117	3054	2990	2926
.091	3632	3581	3528	3473	3417	3359	3300	3240	3179	3117	3054	2990	2926
.092	3631	3580	3528	3473	3416	3359	3300	3240	3179	3117	3054	2991	2926
.093	3630	3579	3527	3472	3416	3358	3299	3239	3179	3117	3054	2991	2926
.094	3629	3579	3526	3472	3416	3358	3299	3239	3178	3117	3054	2991	2926
.095	3628	3578	3526	3471	3415	3358	3299	3239	3178	3117	3054	2991	2926
.096	3627	3577	3525	3471	3415	3357	3299	3239	3178	3117	3054	2991	2927
.097	3627	3576	3524	3470	3414	3357	3299	3239	3178	3117	3054	2991	2927
.098	3626	3576	3524	3470	3414	3357	3298	3239	3178	3117	3054	2991	2927
.099	3625	3575	3523	3469	3414	3356	3298	3239	3178	3117	3054	2991	2927
.100	3624	3574	3522	3468	3413	3356	3298	3238	3178	3117	3054	2991	2927

S = 1.001 to 1.100

TABLE I. - Continued. IDEAL COMBUSTION-TEMPERATURE RISE, AT COMBUSTION PRESSURE OF 1 ATMOSPHERE

Fraction of stoichiometric fuel-air ratio, S	Ideal combustion-temperature rise, ΔT, °R												
	Inlet-air temperature, °R												
	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
0.101	3623	3573	3522	3468	3413	3356	3298	3238	3178	3117	3054	2991	2927
.102	3622	3573	3521	3468	3412	3356	3297	3238	3178	3116	3054	2991	2927
.103	3622	3572	3521	3467	3412	3355	3297	3238	3178	3116	3054	2991	2927
.104	3621	3571	3520	3467	3412	3355	3297	3238	3177	3116	3054	2991	2927
.105	3620	3571	3520	3466	3411	3355	3297	3237	3177	3116	3054	2991	2927
.106	3619	3570	3519	3466	3411	3354	3296	3237	3177	3116	3054	2991	2927
.107	3619	3569	3518	3465	3410	3354	3296	3237	3177	3116	3054	2991	2927
.108	3618	3569	3518	3465	3410	3354	3296	3237	3177	3116	3054	2991	2927
.109	3617	3568	3517	3464	3410	3353	3296	3237	3177	3116	3054	2991	2927
.110	3616	3567	3517	3464	3409	3353	3295	3236	3176	3116	3054	2991	2927
.111	3616	3567	3516	3463	3409	3352	3295	3236	3176	3116	3054	2991	2927
.112	3615	3566	3515	3462	3408	3352	3295	3236	3176	3115	3054	2991	2927
.113	3614	3565	3515	3462	3408	3352	3294	3236	3176	3115	3054	2991	2927
.114	3613	3565	3514	3461	3407	3351	3294	3235	3176	3115	3053	2991	2927
.115	3612	3564	3513	3461	3407	3351	3294	3235	3175	3115	3053	2991	2927
.116	3612	3563	3513	3460	3406	3350	3293	3235	3175	3115	3053	2991	2927
.117	3611	3562	3512	3460	3406	3350	3293	3234	3175	3115	3053	2991	2927
.118	3610	3561	3511	3459	3405	3349	3292	3234	3175	3114	3053	2991	2927
.119	3609	3561	3511	3458	3404	3349	3292	3234	3175	3114	3053	2990	2927
.120	3608	3560	3510	3458	3404	3348	3292	3233	3174	3114	3053	2990	2927
.121	3607	3559	3509	3457	3403	3348	3291	3233	3174	3114	3053	2990	2927
.122	3606	3558	3508	3456	3403	3347	3291	3233	3174	3114	3052	2990	2927
.123	3605	3557	3508	3456	3402	3347	3290	3232	3173	3113	3052	2990	2927
.124	3604	3557	3507	3455	3402	3346	3290	3232	3173	3113	3052	2990	2927
.125	3603	3556	3506	3454	3401	3346	3290	3232	3173	3113	3052	2990	2927
.126	3602	3555	3505	3454	3400	3345	3289	3231	3173	3113	3052	2990	2926
.127	3602	3554	3504	3453	3400	3345	3289	3231	3172	3112	3052	2989	2926
.128	3601	3553	3504	3452	3399	3344	3288	3231	3172	3112	3051	2989	2926
.129	3600	3552	3503	3451	3398	3344	3288	3230	3172	3112	3051	2989	2926
.130	3599	3551	3502	3451	3398	3343	3287	3230	3171	3112	3051	2989	2926
.131	3598	3550	3501	3450	3397	3342	3287	3229	3171	3111	3051	2989	2926
.132	3596	3549	3500	3449	3396	3342	3286	3229	3171	3111	3050	2989	2926
.133	3595	3548	3499	3448	3396	3341	3286	3228	3170	3111	3050	2989	2926
.134	3594	3547	3498	3447	3395	3341	3285	3228	3170	3110	3050	2988	2926
.135	3593	3546	3498	3447	3394	3340	3285	3228	3169	3110	3050	2988	2925
.136	3592	3545	3497	3446	3394	3339	3284	3227	3169	3110	3049	2988	2925
.137	3591	3544	3496	3445	3393	3339	3283	3227	3169	3110	3049	2988	2925
.138	3590	3543	3495	3444	3392	3338	3283	3226	3168	3109	3049	2988	2925
.139	3589	3542	3494	3443	3391	3337	3282	3226	3168	3109	3049	2987	2925
.140	3588	3541	3493	3442	3390	3337	3282	3225	3167	3108	3048	2987	2925
.141	3587	3540	3492	3442	3390	3336	3281	3225	3167	3108	3048	2987	2925
.142	3586	3539	3491	3441	3389	3335	3280	3224	3167	3108	3048	2987	2924
.143	3584	3538	3490	3440	3388	3335	3280	3224	3166	3107	3048	2986	2924
.144	3583	3537	3489	3439	3387	3334	3279	3223	3166	3107	3047	2986	2924
.145	3582	3536	3488	3438	3386	3333	3279	3222	3165	3107	3047	2986	2924
.146	3581	3535	3487	3437	3386	3332	3278	3222	3165	3106	3047	2986	2924
.147	3580	3534	3486	3436	3385	3332	3277	3221	3164	3106	3046	2985	2923
.148	3578	3532	3485	3435	3384	3331	3277	3221	3164	3105	3046	2985	2923
.149	3577	3531	3484	3434	3383	3330	3276	3220	3163	3105	3046	2985	2923
.150	3576	3530	3483	3433	3382	3329	3275	3220	3163	3105	3045	2985	2923

TABLE I. - Concluded. IDEAL COMBUSTION-TEMPERATURE RISE, AT COMBUSTION PRESSURE OF 1 ATMOSPHERE

Fraction of stoichio-metric fuel-air ratio, S	Ideal combustion-temperature rise, ΔT, °R												
	Inlet-air temperature, °R												
	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
1.151	3575	3529	3482	3432	3381	3329	3275	3219	3162	3104	3045	2984	2923
.152	3573	3528	3480	3431	3380	3328	3274	3218	3162	3104	3045	2984	2922
.153	3572	3527	3479	3430	3379	3327	3273	3218	3161	3103	3044	2984	2922
.154	3571	3525	3478	3429	3379	3326	3272	3217	3161	3103	3044	2983	2922
.155	3570	3524	3477	3428	3378	3325	3272	3217	3160	3102	3043	2983	2922
.156	3568	3523	3476	3427	3377	3325	3271	3216	3160	3102	3043	2983	2921
.157	3567	3522	3475	3426	3376	3324	3270	3215	3159	3102	3043	2983	2921
.158	3566	3521	3474	3425	3375	3323	3270	3215	3158	3101	3042	2982	2921
.159	3564	3519	3472	3424	3374	3322	3269	3214	3158	3101	3042	2982	2921
.160	3563	3518	3471	3423	3373	3321	3268	3213	3157	3100	3041	2982	2920
.161	3562	3517	3470	3422	3372	3320	3267	3213	3157	3100	3041	2981	2920
.162	3560	3515	3469	3421	3371	3319	3266	3212	3156	3099	3041	2981	2920
.163	3559	3514	3468	3420	3370	3318	3266	3211	3156	3099	3040	2980	2919
.164	3557	3513	3466	3418	3369	3317	3265	3211	3155	3098	3040	2980	2919
.165	3556	3511	3465	3417	3368	3317	3264	3210	3154	3097	3039	2980	2919
.166	3555	3510	3464	3416	3367	3316	3263	3209	3154	3097	3039	2979	2918
.167	3553	3509	3463	3415	3366	3315	3262	3208	3153	3096	3038	2979	2918
.168	3552	3507	3461	3414	3365	3314	3261	3208	3152	3096	3038	2979	2918
.169	3550	3506	3460	3413	3364	3313	3261	3207	3152	3095	3037	2978	2918
.170	3549	3505	3459	3411	3362	3312	3260	3206	3151	3095	3037	2978	2917
.171	3547	3503	3458	3410	3361	3311	3259	3205	3150	3094	3036	2977	2917
.172	3546	3502	3456	3409	3360	3310	3258	3205	3150	3094	3036	2977	2916
.173	3544	3500	3455	3408	3359	3309	3257	3204	3149	3093	3035	2977	2916
.174	3543	3499	3454	3407	3358	3308	3256	3203	3148	3092	3035	2976	2916
.175	3541	3497	3452	3405	3357	3307	3255	3202	3148	3092	3034	2976	2915
.176	3540	3496	3451	3404	3356	3306	3254	3201	3147	3091	3034	2975	2915
.177	3538	3495	3449	3403	3354	3305	3253	3201	3146	3091	3033	2975	2915
.178	3536	3493	3448	3401	3353	3304	3252	3200	3146	3090	3033	2974	2914
.179	3535	3492	3447	3400	3352	3303	3251	3199	3145	3089	3032	2974	2914
.180	3533	3490	3445	3399	3351	3301	3251	3198	3144	3089	3032	2973	2914
.181	3532	3488	3444	3398	3350	3300	3250	3197	3143	3088	3031	2973	2913
.182	3530	3487	3442	3396	3349	3299	3249	3196	3143	3087	3031	2972	2913
.183	3528	3485	3441	3395	3347	3298	3248	3195	3142	3087	3030	2972	2912
.184	3527	3484	3439	3393	3346	3297	3247	3195	3141	3086	3030	2971	2912
.185	3525	3482	3438	3392	3345	3296	3246	3194	3140	3085	3029	2971	2912
.186	3524	3481	3436	3391	3344	3295	3245	3193	3140	3085	3028	2970	2911
.187	3522	3479	3435	3389	3342	3294	3244	3192	3139	3084	3028	2970	2911
.188	3520	3478	3433	3388	3341	3293	3243	3191	3138	3083	3027	2969	2910
.189	3518	3476	3432	3387	3340	3291	3241	3190	3137	3083	3027	2969	2910
.190	3517	3474	3430	3385	3338	3290	3240	3189	3136	3082	3026	2968	2909
.191	3515	3473	3429	3384	3337	3289	3239	3188	3135	3081	3025	2968	2909
.192	3513	3471	3427	3382	3336	3288	3238	3187	3135	3080	3025	2967	2908
.193	3512	3469	3426	3381	3334	3287	3237	3186	3134	3080	3024	2967	2908
.194	3510	3468	3424	3379	3333	3285	3236	3185	3133	3079	3023	2966	2908
.195	3508	3466	3423	3378	3332	3284	3235	3184	3132	3078	3023	2966	2907
.196	3506	3464	3421	3376	3330	3283	3234	3183	3131	3077	3022	2965	2907
.197	3504	3463	3419	3375	3329	3282	3233	3182	3130	3077	3021	2965	2906
.198	3503	3461	3418	3373	3328	3280	3232	3181	3129	3076	3021	2964	2906
.199	3501	3459	3416	3372	3326	3279	3230	3180	3129	3075	3020	2963	2905
.200	3499	3457	3414	3370	3325	3278	3229	3179	3128	3074	3019	2963	2905

S = 1.101 to 1.200

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TABLE II. - ENTHALPY OF AIR

T, °R	Enthalpy difference, $(\Delta h_T^o)_a$, Btu/lb									
	0	1	2	3	4	5	6	7	8	9
400	0.0	0.2	0.5	0.7	1.0	1.2	1.4	1.7	1.9	2.2
10	2.4	2.6	2.9	3.1	3.4	3.6	3.8	4.1	4.3	4.6
20	4.8	5.0	5.3	5.5	5.8	6.0	6.2	6.5	6.7	6.9
30	7.2	7.4	7.7	7.9	8.1	8.4	8.6	8.9	9.1	9.3
40	9.6	9.8	0.1	0.3	0.5	0.8	1.0	1.3	1.5	1.7
50	12.0	2.2	2.5	2.7	2.9	3.2	3.4	3.7	3.9	4.1
60	4.4	4.6	4.9	5.1	5.3	5.6	5.8	6.1	6.3	6.5
70	6.8	7.0	7.3	7.5	7.7	8.0	8.2	8.5	8.7	8.9
80	9.2	9.4	9.7	9.9	0.1	0.4	0.6	0.9	1.1	1.3
90	21.6	1.8	2.1	2.3	2.5	2.8	3.0	3.3	3.5	3.7
500	4.0	4.2	4.4	4.7	4.9	5.2	5.4	5.6	5.9	6.1
10	6.4	6.6	6.8	7.1	7.3	7.6	7.8	8.0	8.3	8.5
20	8.8	9.0	9.2	9.5	9.7	0.0	0.2	0.4	0.7	0.9
30	31.2	1.4	1.6	1.9	2.1	2.4	2.6	2.8	3.1	3.3
40	3.6	3.8	4.0	4.3	4.5	4.8	5.0	5.2	5.5	5.7
50	6.0	6.2	6.4	6.7	6.9	7.2	7.4	7.6	7.9	8.1
60	8.4	8.6	8.8	9.1	9.3	9.6	9.8	0.0	0.3	0.5
70	40.8	1.0	1.2	1.5	1.7	2.0	2.2	2.4	2.7	2.9
80	3.2	3.4	3.6	3.9	4.1	4.4	4.6	4.8	5.1	5.3
90	5.6	5.8	6.0	6.3	6.5	6.8	7.0	7.2	7.5	7.7
600	8.0	8.2	8.5	8.7	8.9	9.2	9.4	9.7	9.9	0.1
10	50.4	0.6	0.9	1.1	1.3	1.6	1.8	2.1	2.3	2.5
20	2.8	3.0	3.3	3.5	3.7	4.0	4.2	4.5	4.7	5.0
30	5.2	5.4	5.7	5.9	6.2	6.4	6.6	6.9	7.1	7.4
40	7.6	7.8	8.1	8.3	8.6	8.8	9.1	9.3	9.5	9.8
50	60.0	0.3	0.5	0.7	1.0	1.2	1.5	1.7	1.9	2.2
60	2.4	2.7	2.9	3.2	3.4	3.6	3.9	4.1	4.4	4.6
70	4.8	5.1	5.3	5.6	5.8	6.1	6.3	6.5	6.8	7.0
80	7.3	7.5	7.7	8.0	8.2	8.5	8.7	9.0	9.2	9.4
90	9.7	9.9	0.2	0.4	0.6	0.9	1.1	1.4	1.6	1.9
700	72.1	2.3	2.6	2.8	3.1	3.3	3.5	3.8	4.0	4.3
10	4.5	4.8	5.0	5.2	5.5	5.7	6.0	6.2	6.4	6.7
20	6.9	7.1	7.4	7.6	7.9	8.1	8.4	8.6	8.8	9.1
30	9.3	9.6	9.8	0.1	0.3	0.5	0.8	1.0	1.3	1.5
40	81.8	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	3.9
50	4.2	4.4	4.7	4.9	5.1	5.4	5.6	5.9	6.1	6.4
60	6.6	6.8	7.1	7.3	7.6	7.8	8.1	8.3	8.6	8.8
70	9.0	9.3	9.5	9.8	0.0	0.3	0.5	0.5	1.0	1.2
80	91.5	1.7	2.0	2.2	2.4	2.7	2.9	3.2	3.4	3.7
90	3.9	4.1	4.4	4.6	4.9	5.1	5.4	5.6	5.9	6.1
800	6.3	6.6	6.8	7.1	7.3	7.6	7.8	8.0	8.3	8.5
10	8.8	9.0	9.3	9.5	9.8	0.0	0.2	0.5	0.7	1.0
20	101.2	1.5	1.7	2.0	2.2	2.4	2.7	2.9	3.2	3.4
30	3.7	3.9	4.2	4.4	4.6	4.9	5.1	5.4	5.6	5.9
40	6.1	6.4	6.6	6.8	7.1	7.3	7.6	7.8	8.1	8.3
50	8.6	8.8	9.0	9.3	9.5	9.8	0.0	0.3	0.5	0.8
60	111.0	1.2	1.5	1.7	2.0	2.2	2.5	2.7	3.0	3.2
70	3.5	3.7	3.9	4.2	4.4	4.7	4.9	5.2	5.4	5.7
80	5.9	6.2	6.4	6.6	6.9	7.1	7.4	7.6	7.9	8.1
90	8.4	8.6	8.9	9.1	9.3	9.6	9.8	0.1	0.3	0.6
900	120.8	1.0	1.3	1.5	1.8	2.0	2.3	2.5	2.8	3.0
10	3.3	3.5	3.7	4.0	4.2	4.5	4.7	5.0	5.2	5.5
20	5.7	6.0	6.2	6.5	6.7	7.0	7.2	7.4	7.7	7.9
30	8.2	8.4	8.7	8.9	9.2	9.4	9.7	9.9	0.2	0.4
40	130.7	0.9	1.1	1.4	1.6	1.9	2.1	2.4	2.6	2.9
50	3.1	3.4	3.6	3.9	4.1	4.4	4.6	4.9	5.1	5.4
60	5.6	5.8	6.1	6.3	6.6	6.8	7.1	7.3	7.6	7.8
70	8.1	8.3	8.6	8.8	9.1	9.3	9.6	9.8	0.1	0.3
80	140.6	0.8	1.1	1.3	1.6	1.8	2.0	2.3	2.5	2.8
90	3.0	3.3	3.5	3.8	4.0	4.3	4.5	4.8	5.0	5.3

T, °R	Emthalpy difference, $(\Delta h_T^o)_a$, Btu/lb									
	0	1	2	3	4	5	6	7	8	9
1000	145.5	5.8	6.0	6.3	6.5	6.8	7.0	7.3	7.5	7.8
10	8.0	8.3	8.5	8.8	9.0	9.3	9.5	9.8	0.0	0.3
20	150.5	0.8	1.0	1.3	1.5	1.8	2.0	2.3	2.5	2.8
30	3.0	3.3	3.5	3.8	4.0	4.3	4.5	4.8	5.0	5.3
40	5.5	5.8	6.0	6.3	6.5	6.8	7.0	7.3	7.5	7.8
50	8.0	8.3	8.5	8.8	9.0	9.3	9.5	9.8	0.0	0.3
60	160.5	0.8	1.0	1.3	1.5	1.8	2.0	2.3	2.5	2.8
70	3.0	3.3	3.5	3.8	4.0	4.3	4.5	4.8	5.0	5.3
80	5.5	5.8	6.0	6.3	6.5	6.8	7.0	7.3	7.5	7.8
90	8.0	8.3	8.5	8.8	9.0	9.3	9.5	9.8	0.0	0.3
1100	170.5	0.8	1.0	1.3	1.5	1.8	2.0	2.3	2.5	2.8
10	3.1	3.3	3.6	3.8	4.1	4.3	4.6	4.8	5.1	5.3
20	5.6	5.8	6.1	6.3	6.6	6.8	7.1	7.3	7.6	7.8
30	8.1	8.3	8.6	8.9	9.1	9.4	9.6	9.9	0.1	0.4
40	180.6	0.9	1.1	1.4	1.6	1.9	2.1	2.4	2.6	2.9
50	3.2	3.4	3.7	3.9	4.2	4.4	4.7	4.9	5.2	5.4
60	5.7	5.9	6.2	6.5	6.7	7.0	7.2	7.5	7.7	8.0
70	8.2	8.5	8.7	9.0	9.2	9.5	9.8	0.0	0.3	0.5
80	190.8	1.0	1.3	1.5	1.8	2.0	2.3	2.5	2.8	3.1
90	3.3	3.6	3.8	4.1	4.3	4.6	4.8	5.1	5.3	5.6
1200	5.9	6.1	6.4	6.6	6.9	7.1	7.4	7.6	7.9	8.2
10	8.4	8.7	8.9	9.2	9.4	9.7	9.9	0.2	0.5	0.7
20	201.0	1.2	1.5	1.7	2.0	2.2	2.5	2.8	3.0	3.3
30	3.5	3.8	4.0	4.3	4.5	4.8	5.1	5.3	5.6	5.8
40	6.1	6.3	6.6	6.8	7.1	7.4	7.6	7.9	8.1	8.4
50	8.6	8.9	9.2	9.4	9.7	9.9	0.2	0.4	0.7	0.9
60	211.2	1.5	1.7	2.0	2.2	2.5	2.7	3.0	3.3	3.5
70	3.8	4.0	4.3	4.5	4.8	5.1	5.3	5.6	5.8	6.1
80	6.3	6.6	6.9	7.1	7.4	7.6	7.9	8.1	8.4	8.7
90	8.9	9.2	9.4	9.7	0.0	0.2	0.5	0.7	1.0	1.2
1300	221.5	1.8	2.0	2.3	2.5	2.8	3.0	3.3	3.6	3.8
10	4.1	4.3	4.6	4.9	5.1	5.4	5.6	5.9	6.1	6.4
20	6.7	6.9	7.2	7.4	7.7	8.0	8.2	8.5	8.7	9.0
30	9.3	9.5	9.8	0.0	0.3	0.5	0.8	1.1	1.3	1.6
40	231.8	2.1	2.4	2.6	2.9	3.1	3.4	3.7	3.9	4.2
50	4.4	4.7	5.0	5.2	5.5	5.7	6.0	6.3	6.5	6.8
60	7.0	7.3	7.6	7.8	8.1	8.3	8.6	8.9	9.1	9.4
70	9.6	9.9	0.2	0.4	0.7	0.9	1.2	1.5	1.7	2.0
80	242.2	2.5	2.8	3.0	3.3	3.5	3.8	4.1	4.3	4.6
90	4.8	5.1	5.4	5.6	5.9	6.1	6.4	6.7	6.9	7.2
1400	7.5	7.7	8.0	8.2	8.5	8.8	9.0	9.3	9.5	9.8
10	250.1	0.3	0.6	0.9	1.1	1.4	1.6	1.9	2.2	2.4
20	2.7	2.9	3.2	3.5	3.7	4.0	4.3	4.5	4.8	5.0
30	5.3	5.6	5.8	6.1	6.4	6.6	6.9	7.1	7.4	7.7
40	7.9	8.2	8.5	8.7	9.0	9.2	9.5	9.8	0.0	0.3
50	260.6	0.8	1.1	1.3	1.6	1.9	2.1	2.4	2.7	2.9
60	3.2	3.5	3.7	4.0	4.2	4.5	4.8	5.0	5.3	5.6
70	5.8	6.1	6.3	6.6	6.9	7.1	7.4	7.7	7.9	8.2
80	8.5	8.7	9.0	9.2	9.5	9.8	0.0	0.3	0.6	0.8
90	271.1	1.4	1.6	1.9	2.1	2.4	2.7	2.9	3.2	3.5
1500	3.7	4.0	4.3	4.5	4.8	5.1	5.3	5.6	5.8	6.1
10	6.4	6.6	6.9	7.2	7.4	7.7	8.0	8.2	8.5	8.8
20	9.0	9.3	9.6	9.8	0.1	0.3	0.6	0.9	1.1	1.4
30	281.7	1.9	2.2	2.5	2.7	3.0	3.3	3.5	3.8	4.1
40	4.3	4.6	4.9	5.1	5.4	5.6	5.9	6.2	6.4	6.7
50	7.0	7.2	7.5	7.8	8.0	8.3	8.6	8.8	9.1	9.4
60	9.6	9.9	0.2	0.4	0.7	1.0	1.2	1.5	1.8	2.0
70	292.3	2.6	2.8	3.1	3.4	3.6	3.9	4.2	4.4	4.7
80	5.0	5.2	5.5	5.8	6.0	6.3	6.6	6.8	7.1	7.4
90	7.6	7.9	8.2	8.4	8.7	9.0	9.2	9.5	9.8	0.0

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TABLE III. - ENTHALPY OF LIQUID FUEL

FOR A STOICHIOMETRIC MIXTURE

Fuel temperature, T_f, $^{\circ}R$	Enthalpy difference, $f'(\Delta h_T^{\circ})_f$, Btu/lb-air
400	-4.4
410	-4.1
420	-3.8
430	-3.5
440	-3.2
450	-2.9
460	-2.6
470	-2.3
480	-2.0
490	-1.7
500	-1.3
510	-1.0
520	-.7
530	-.3
540	0
550	.3
560	.7
570	1.0
580	1.4
590	1.7
600	2.1

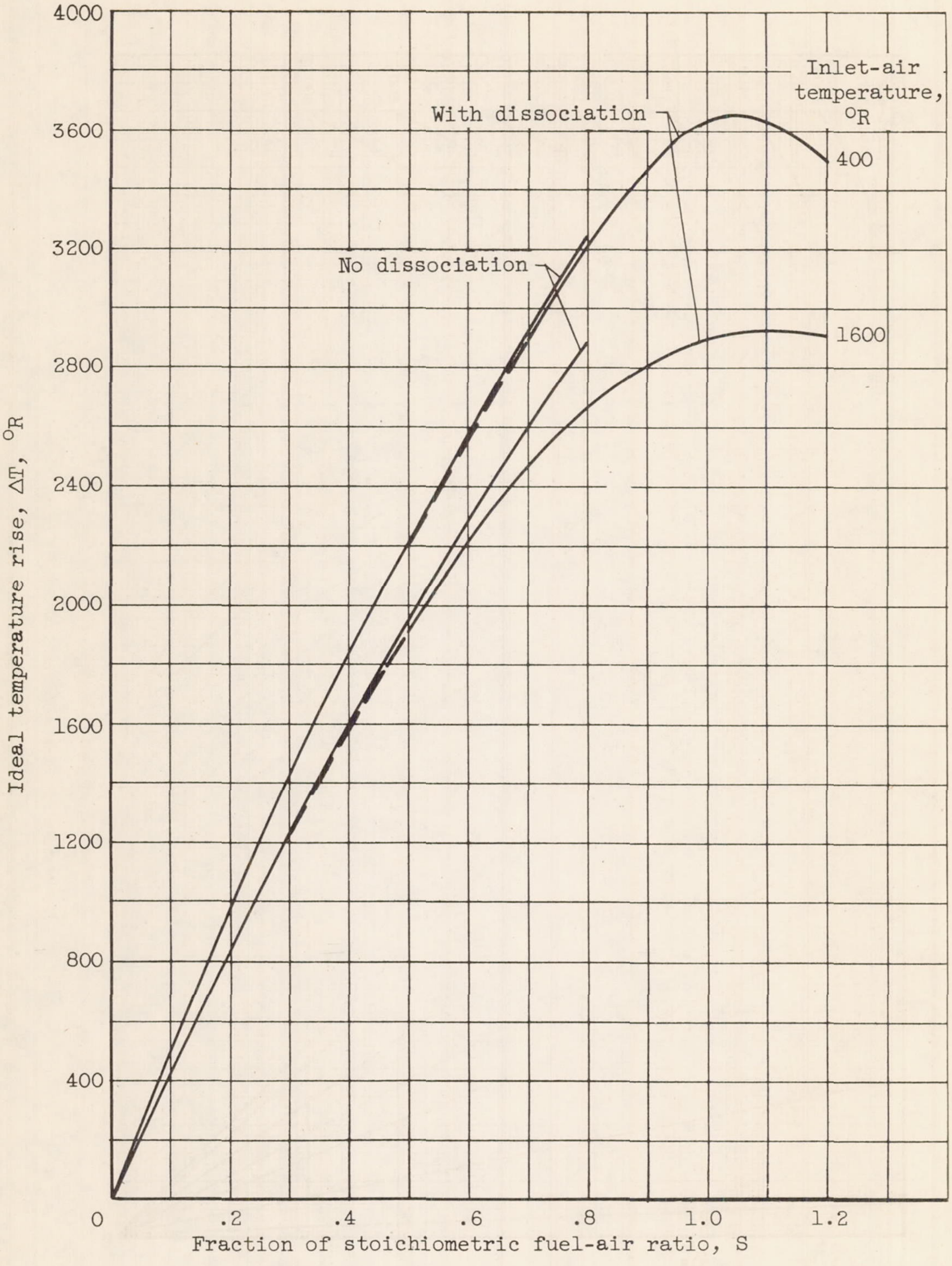
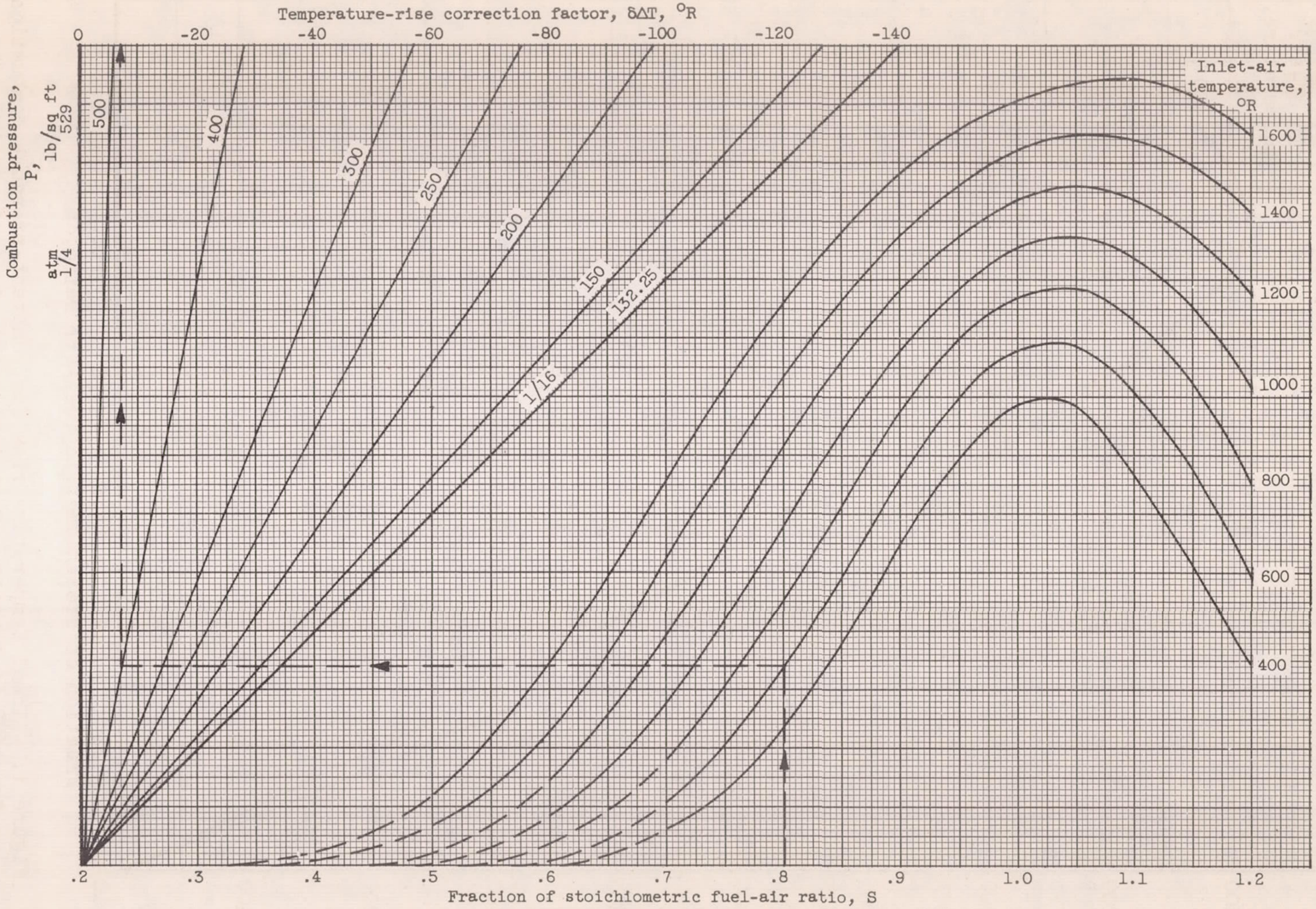
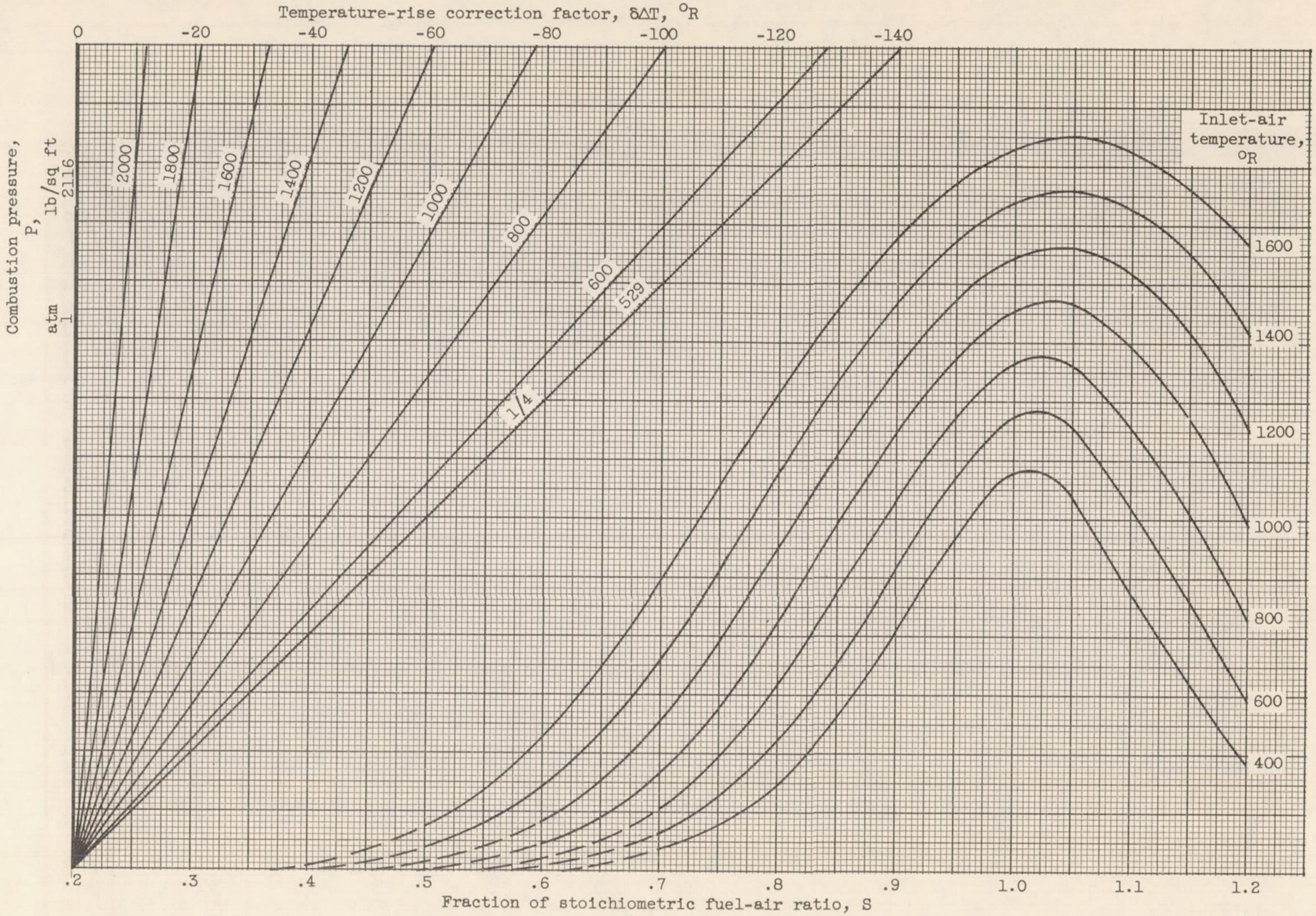


Figure 1. - Ideal temperature rise for constant-pressure combustion as function of fraction of stoichiometric fuel-air ratio. Combustion pressure, 1 atmosphere.



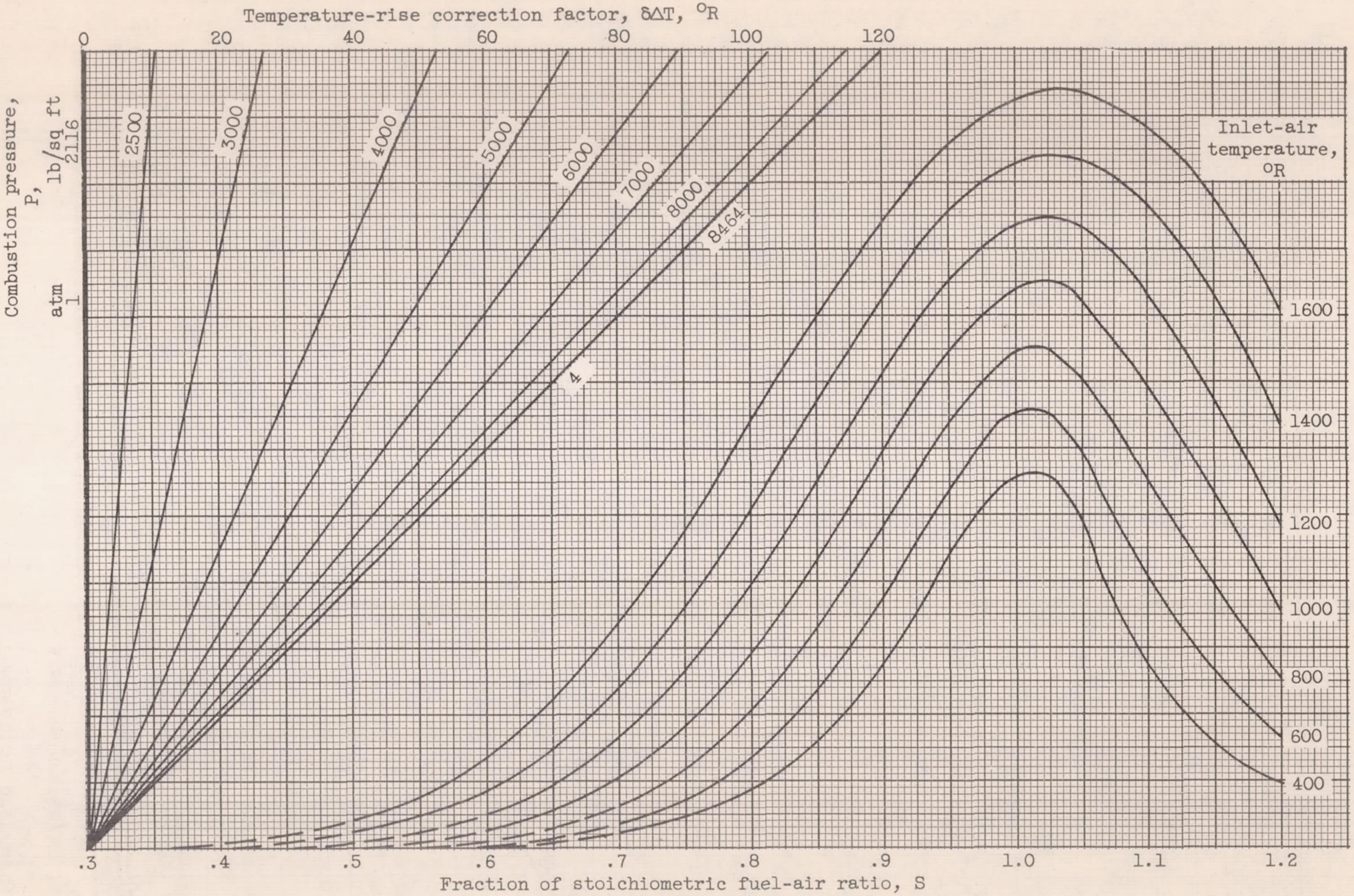
(a) Combustion pressures from 1/4 to 1/16 atmosphere.

Figure 2. - Temperature-rise correction factors as function of fuel-air ratio.



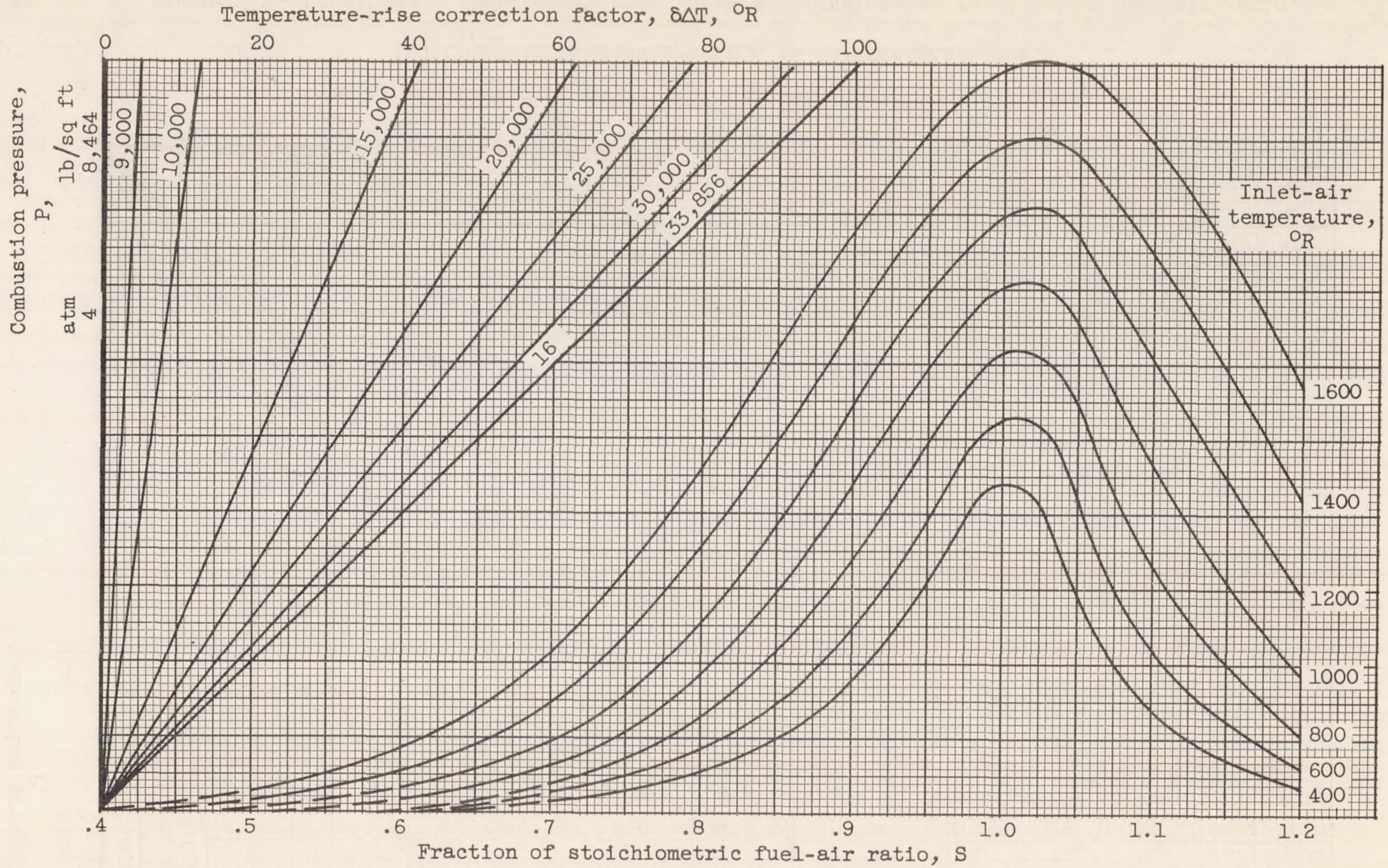
(b) Combustion pressures from 1 to 1/4 atmosphere.

Figure 2. - Continued. Temperature-rise correction factors as function of fuel-air ratio.



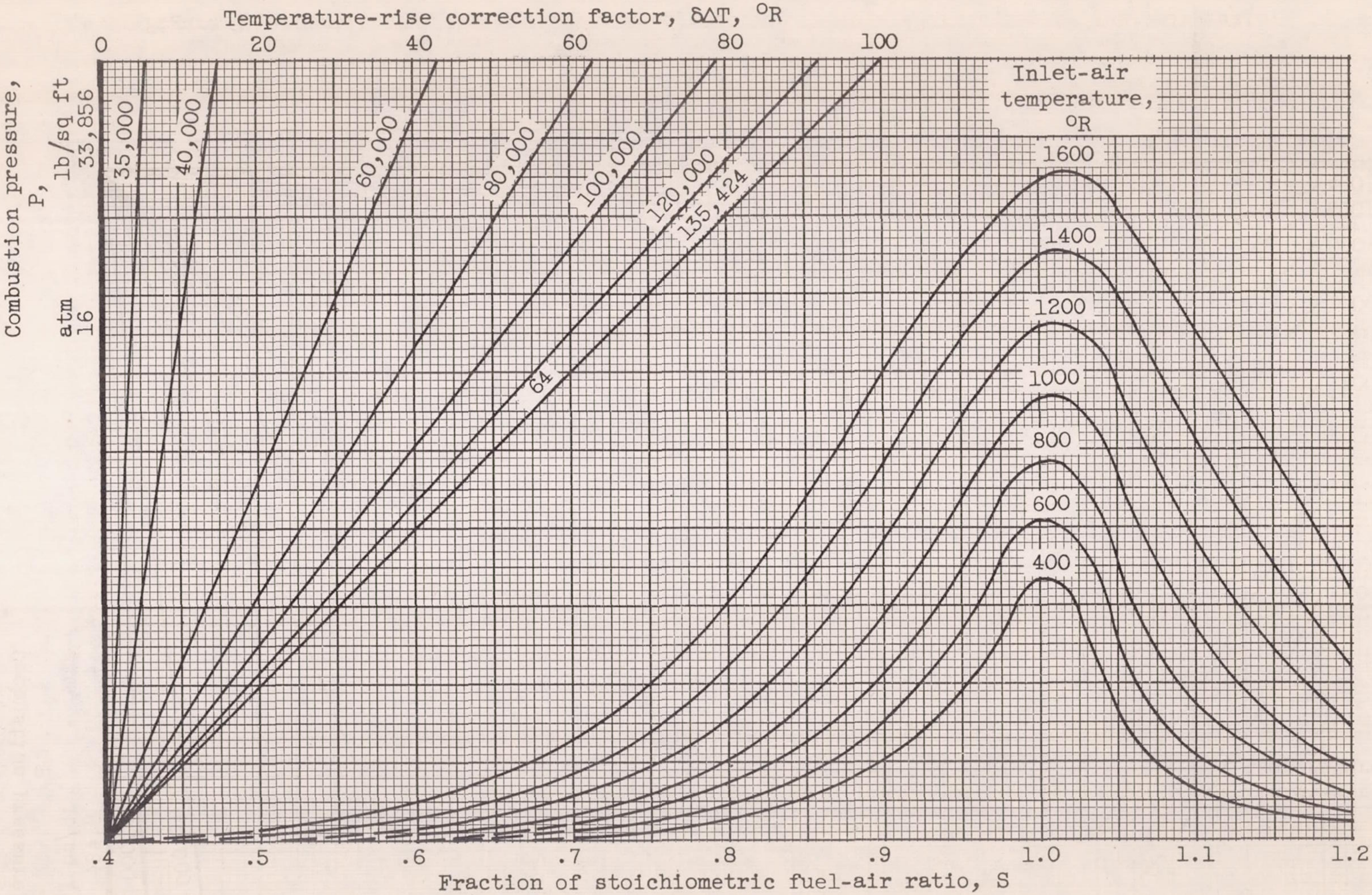
(c) Combustion pressures from 1 to 4 atmospheres.

Figure 2. - Continued. Temperature-rise correction factors as function of fuel-air ratio.



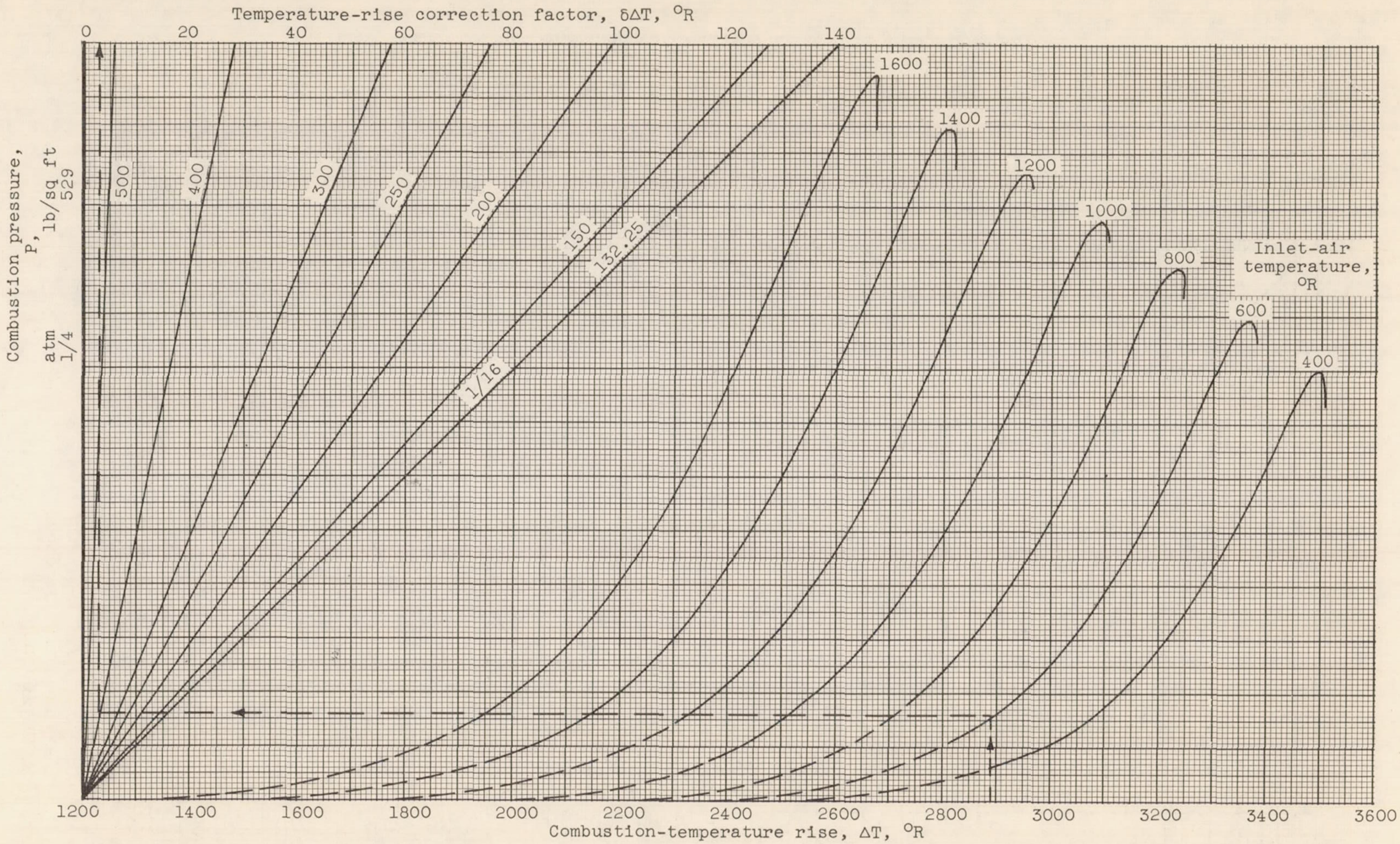
(d) Combustion pressures from 4 to 16 atmospheres.

Figure 2. - Continued. Temperature-rise correction factors as function of fuel-air ratio.



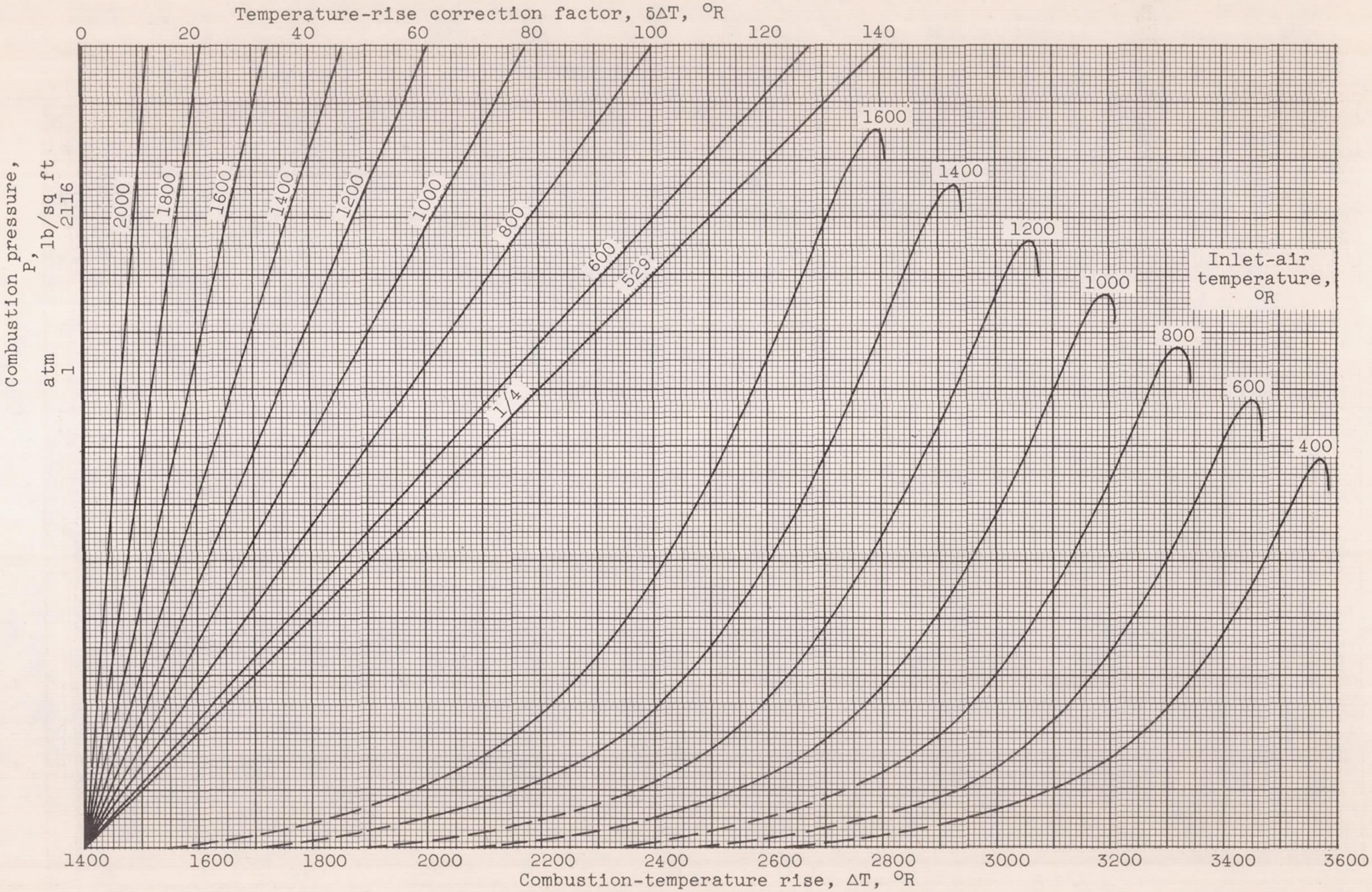
(e) Combustion pressures from 16 to 64 atmospheres.

Figure 2. - Concluded. Temperature-rise correction factors as function of fuel-air ratio.



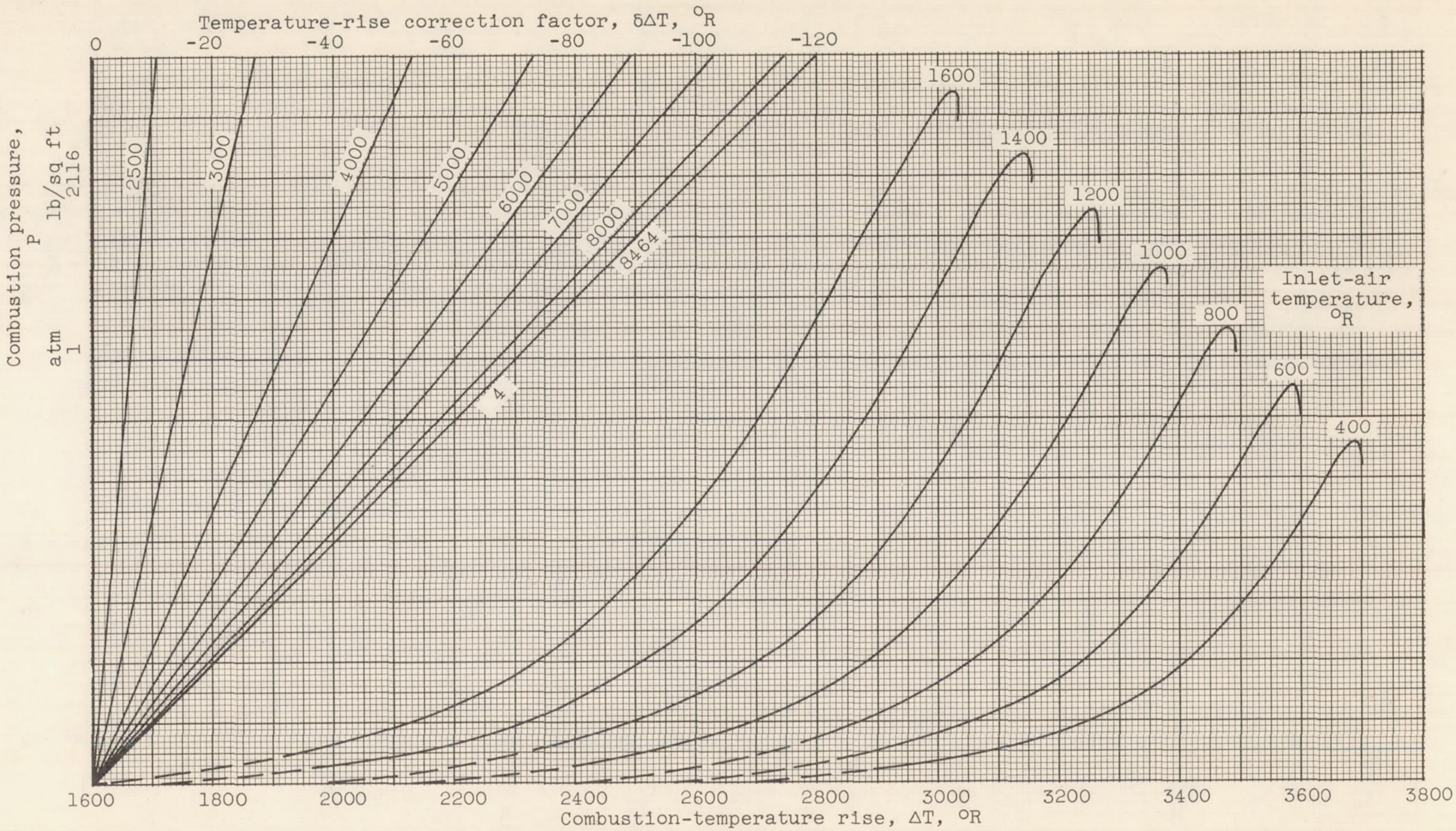
(a) Combustion pressures from 1/4 to 1/16 atmosphere.

Figure 3. - Temperature-rise correction factors as function of combustion-temperature rise.



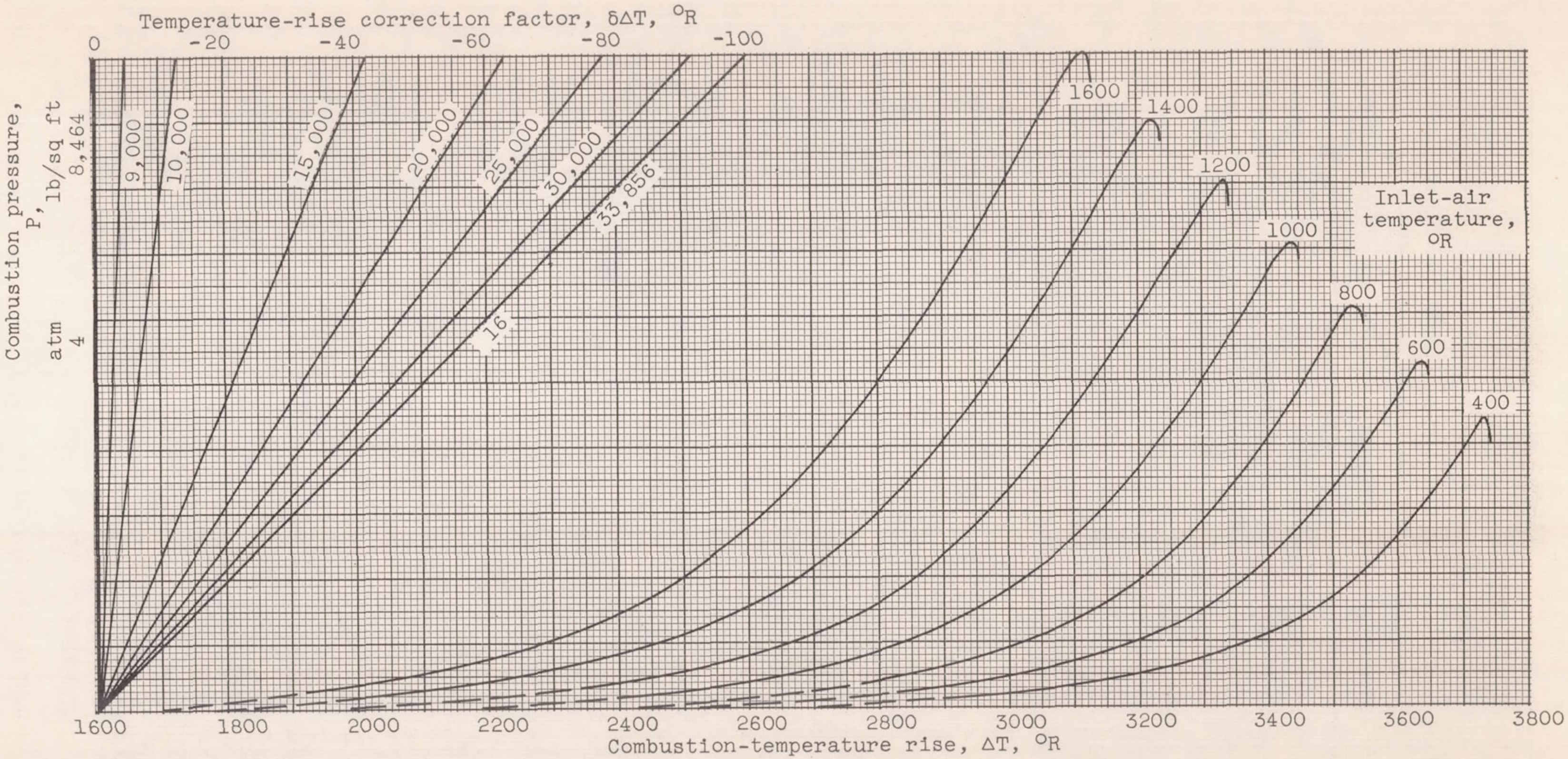
(b) Combustion pressures from 1 to 1/4 atmosphere.

Figure 3. - Continued. Temperature-rise correction factors as function of combustion-temperature rise.



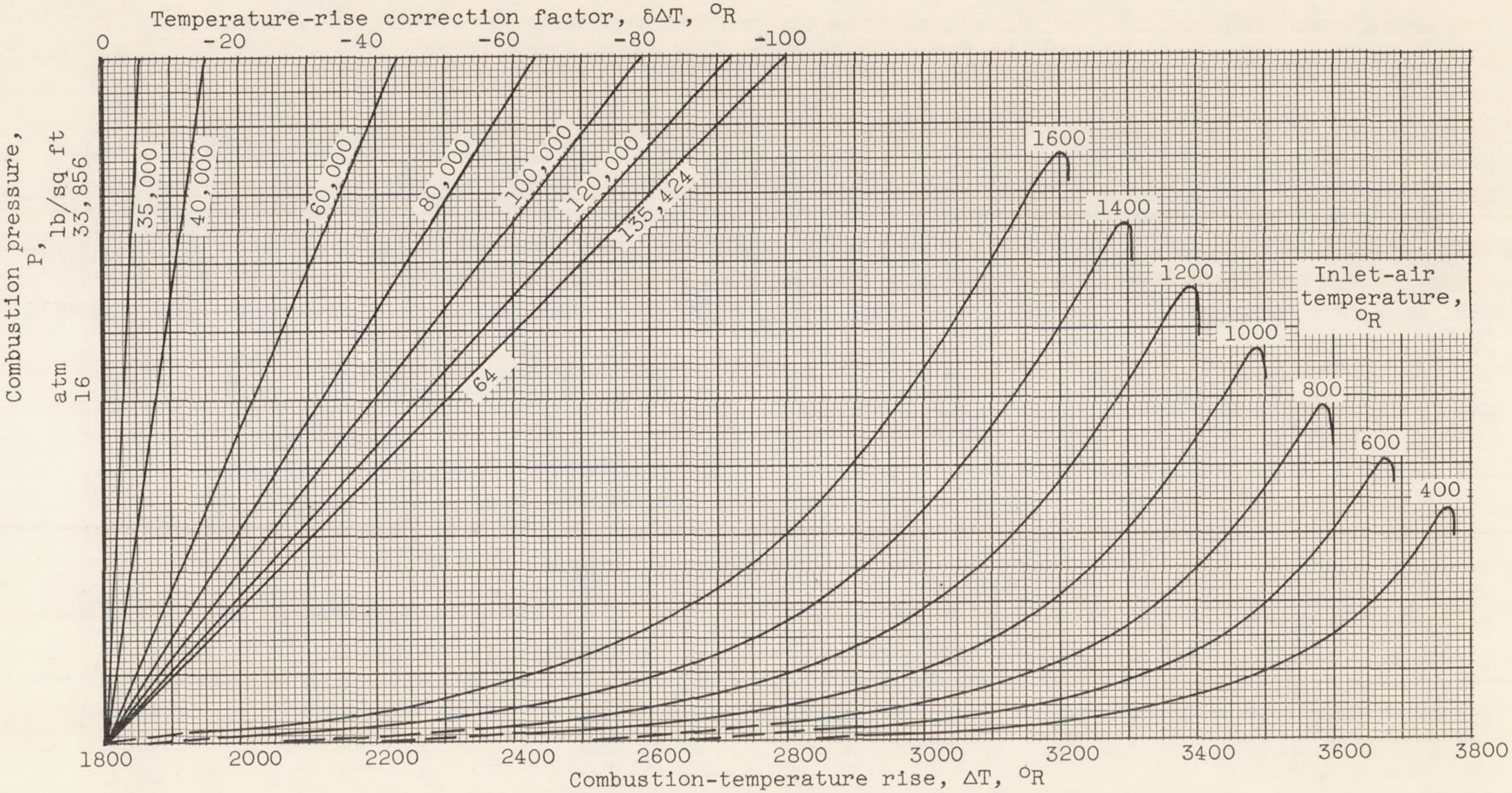
(c) Combustion pressures from 1 to 4 atmospheres.

Figure 3. - Continued. Temperature-rise correction factors as function of combustion-temperature rise.



(d) Combustion pressures from 4 to 16 atmospheres.

Figure 3. - Continued. Temperature-rise correction factors as function of combustion-temperature rise.



(e) Combustion pressures from 16 to 64 atmospheres.

Figure 3. - Concluded. Temperature-rise correction factors as function of combustion-temperature rise.

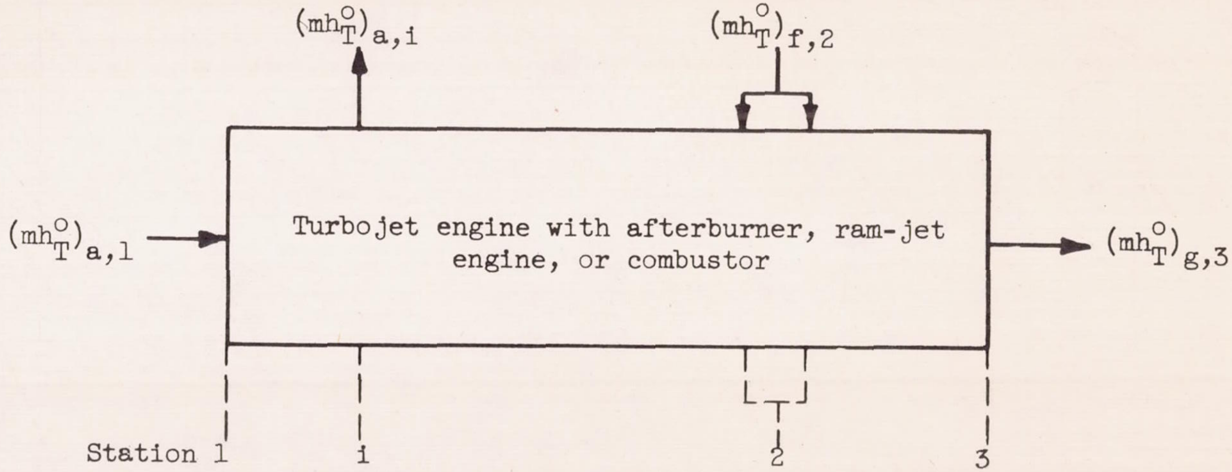


Figure 4. - General system showing entering and leaving enthalpies.