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U. S. NAVY DIVING-GAS MANUAL

October 1, 1969

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U. S. NAVY SUPERVISOR OF DIVING

NAVAL SHIP SYSTEMS COMMAND

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NAVAL SHIPS SYSTEMS COMMAND

APPROVED

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INTRODUCTION

The concept of saturation diving has, for the first time, provided promise that practical undersea work can be carried out at depths approaching 1000 feet. The elimination of daily decompression requirements makes it possible for man to spend a significant part of each day at productive work at depth, and makes it economically feasible to undertake undersea tasks not previously practical. However, continued progress in development of saturation-diving techniques requires precise knowledge of physical and engineering properties of the helium-oxygen mixtures used for breathing gas, and no such information has yet been reported in published literature.

The principal objective of this manual is to provide the best available information on gas properties in a form convenient for use in diving research, engineering, and operations. All of the data in this manual are based upon calculation from theoretical relationships, substantiated where experimental information can be found in the literature (as for pure gases), and unsubstantiated where such information does not exist (as for helium-oxygen mixtures). It is felt that the data presented are the best that can be generated today, and that they will be generally satisfactory in the pressure range up to about 500 psi. For the higher pressures used in storing of diving gases, errors are indeterminate and may be significant. Future experimental research is needed to improve the state of knowledge of mixture properties at very high pressures, and to explore the properties of helium-oxygen-nitrogen mixtures.

A second objective of this manual is to summarize the present practice regarding choice of breathing-gas mixtures and some of the calculation procedures used in design and operation of diving equipment. An attempt has been made to present these procedures in such a manner that they can be used by both designers and operating personnel.

ACKNOWLEDGEMENTS

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Herbert R. Hazard directed the work and served as editor and principal author.

Joseph W. Walling developed the methodology and prepared the tables of gas properties found in Part 2.

John Broehl carried out the computer programming and calculations for tables of gas properties in Part 2.

Frederick A. Creswick prepared the humidity charts and examples. These were based upon an approach proposed by Dr. Richard A. Gaggioli, now with Marquette University.

Peter S. Riegel developed the chart of Figure 4 for semi-closed-system breathing gas composition and flow rates, and provided valuable technical review of the manual.

Arthur J. Coyle contributed the section on The Ocean Environment and provided valuable technical review of the work.

Mr. O. R. Hansen, U. S. Navy Office of Salvage, served as project monitor and provided valuable information, guidance, and technical review of the work.

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PART 1. DIVING CONSIDERATIONS WITH HELIUM-OXYGEN MIXTURES

THE OCEAN ENVIRONMENT

The ocean environment can be described in terms of the density, temperature, and salinity of water; atmospheric conditions (barometric pressure, air temperature and humidity, winds and contaminants); tides and currents; and bottom topography, water clarity, and marine organisms. All of these factors interact to make an ever-changing and formidable environment for men and material. For the working diver these conditions become more rigorous with each additional fathom.

These conditions impose high hydrostatic pressure, dynamic forces from waves and currents, limited visibility, and low temperatures, which reduce the working diver's sense of touch and severely limit his effectiveness and time on the bottom. The forces which he can exert are reduced by his buoyancy which, when coupled with low visibility, can lead to disorientation, especially in deep dives and with the onset of narcosis.

The diver's ability to ventilate his lungs with increasing depth is greatly reduced because of increased breathing-gas density and breathing-apparatus resistance. For example, a diver breathing air at 200 feet has only 49 percent of his surface capability for ventilation,(1)* and this reduces his maximum work level to half that at the surface. This limitation occurs with the best diving apparatus available, and thus the importance of low breathing resistance in diving equipment is stressed.

This discussion will be limited to ocean parameters and processes that will be concerned with gas properties, diving equipment, and supporting systems, such as compressed gas systems, for the working diver.

Density of Seawater

The density of seawater varies with latitude, location, seasons, temperature, dissolved salt content (salinity), and depth (compressibility). Fortunately, the dominating factors, temperature and salinity, tend to counterbalance and, for most practical purposes, a density of 64 lb/ft^3 or 0.4444 psi for each foot of depth, can be assumed. The error resulting from such an assumption should be less than 0.5 percent, or 5 feet in 1000 feet of water. The effects of compressibility on density is negligible (0.01 percent at 1500 feet). Appendix A discusses in detail the variations of salinity, temperature, and density in the oceans.

Water Temperature

Low-temperature water, in addition to its effects on divers, causes moisture to condense in breathing systems, where it can cause malfunction of regulators, increased

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*References are listed on page 54.

flow resistance, and partial blockage of carbon dioxide scrubbers. Low temperature also reduces drastically the useful life of Baralyme carbon dioxide absorbent: in the operational Mark VIII and Mark IX apparatus, the useful life of Baralyme charges is reduced from 4 hours at 70 F to only 1/2 hour at 40 F. The increase in gas density with low temperature also increases the work of breathing, as volumetric flow rates must be maintained for control of carbon dioxide in the body.

Another serious consequence of cold water is the high rate of heat transfer from personnel transfer chambers, especially when helium-oxygen mixtures are used as the breathing gas. The design of such chambers, including the power and communication umbilical cables, should provide for the increased power required for heating and/or insulation of the chambers to maintain comfortable conditions.

Atmospheric Conditions

The interaction of air, water, and land to form winds, storms, and wave systems is well known. The resultant violent motions of surface support ships can impose severe dynamic loads on machinery and men. However, for the purpose of this manual, air temperature, humidity, barometric pressure, and contaminants are of greater interest. These conditions influence satisfactory design and operation of compressed gas systems. For instance, high inlet air temperatures and humidity can cause an appreciable reduction of compressor capacity, thus limiting the capability of supporting a team of divers in the water. Further, the capacity to pressurize and ventilate decompression chambers must be included in the system design. Contaminants in the environment, particularly CO_2 and CO, are critical to adequate design and safe operation of these systems. Since sufficient air must be provided to ventilate metabolic production of CO_2 by the diving team, any CO_2 contamination at the compressor inlet can greatly increase the required capacity of compressors and related systems.

Ambient air temperatures and heat-transfer processes external to decompression chambers contribute to the heating and cooling loads imposed on environmental control systems. Such systems have become increasingly important with deep and saturated diving, which require long periods for decompression. The fact that divers must spend long periods in confined spaces makes environmental control systems a critical necessity rather than just a desirable luxury.

The introduction of compressor lubricants into compressed-gas systems can present serious explosion and physiological hazards to the diver. Where water-lubricated and nonlubricated compressors are not available, the design, selection, and operation of lubricated systems must include consideration of the reduction of the carry-over of lubricants from compressors or alternative supply systems; cylinder temperatures; controlled lubrication; adequate inter-and-after coolers; and filtering systems.

Dynamic Aspects of the Ocean

The interaction of tides, winds, barometric pressure, the rotation of the earth, variable density, bottom topography, river outflow, and other factors lead to water movement, stratification, and mixing. For example, offshore winds reduce tide levels and push warm surface waters seaward to be replaced by cold and dense waters upwelling from the bottom. These waters can be rich in nutrients and clouded with silt. The nutrients result in growth of marine organisms which, along with suspended matter in the water, reduce underwater visibility. Onshore winds can reverse this process. Further, the transport of warm surface water into a region with cold air can result in dense fogs and other hazards.

Of the many complex processes in the ocean, those having the greatest impact on diving conditions include changes in heat transfer caused by water flow around the divers, the hoses, and the personnel transfer chambers (PTC); loss of gases through solution at open PTC hatches; buildup of humidity; contamination of gases in such chambers by products of marine decomposition; and finally, fluctuation of hydrostatic pressure caused by waves, tide changes, and PTC motion.

PHYSIOLOGICAL REQUIREMENTS OF BREATHING-GAS MIXTURES

The composition of breathing-gas mixtures and the quantity required are determined by physiological characteristics of the human body when exposed to elevated pressures. The breathing mechanisms that serve to regulate partial pressures of oxygen and carbon dioxide in the blood at sea level serve equally well under the sea if the partial pressures of oxygen, nitrogen, and carbon dioxide, as well as the respiratory volume, are similar to those at sea level. Medical research has provided sufficient information on physical tolerance to partial-pressure levels to permit safe selection of both composition and volumes of breathing gas for diving, and this information forms the basis for the discussion that follows.

Breathing-Gas Composition

Oxygen Concentration

The breathing-gas mixtures used in diving must be such as to be nontoxic over the range of working depth, and must include sufficient oxygen for normal activities at depth. Air can be used only for relatively shallow dives because both nitrogen and oxygen become toxic at elevated partial pressures. For deeper dives over longer periods, helium is preferred as the inert gas in the mixture because it is nontoxic, and because its low density reduces breathing effort. The percentage of oxygen in the breathing mixture must be reduced with increasing depth to maintain the oxygen partial pressure within a range of about 0.21 to 1.2 atm (atmospheres absolute pressure)(3 psia to 17.7 psia). For saturated diving over long periods, the preferred mixture would contain oxygen at a partial pressure between 0.21 and 0.30 atm, near that in normal air at sea level. The limits of oxygen concentration in the breathing gas are determined by the levels of solution of oxygen in the blood, which are related directly to oxygen partial pressure. In order to maintain blood oxygen levels within acceptable limits, oxygen partial pressure is held about constant regardless of total pressure, and the remaining pressure is provided by increasing the proportion and partial pressure of diluent gas.

Figure 1 relates the percentage of oxygen in the breathing mixture to depth, and to oxygen partial pressure in both psia and atm. The curves show a large area within which mixtures are physiologically acceptable, bounded on the lower side by curves defining different levels of anoxia (oxygen deficiency) and on the upper side by levels of oxygen toxicity. It will be noted in Figure 1 that the first symptoms of anoxia occur when oxygen partial pressure falls to 0.16 atm, and that the diver becomes helpless at a partial pressure of 0.12 atm.(2) In the region of high oxygen concentrations, it may be seen that oxygen toxicity limits the maximum partial pressure for long-term exposure to about 1.2 atm, but that higher concentrations can be tolerated for short periods.(2) These toxicity limits are imposed by effects on the central nervous system that result in unconsciousness and convulsions. A different limit is encountered in saturation diving over extended periods, which is imposed by lung irritation and eventual lung damage. This occurs with 10 percent incidence in a 14 day period with an oxygen partial pressure of 0.6 atm.(3) In order to avoid pulmonary irritation, present practice in saturation diving for extended periods is to limit oxygen partial pressure to 0.3 atm (5 psi).(3)

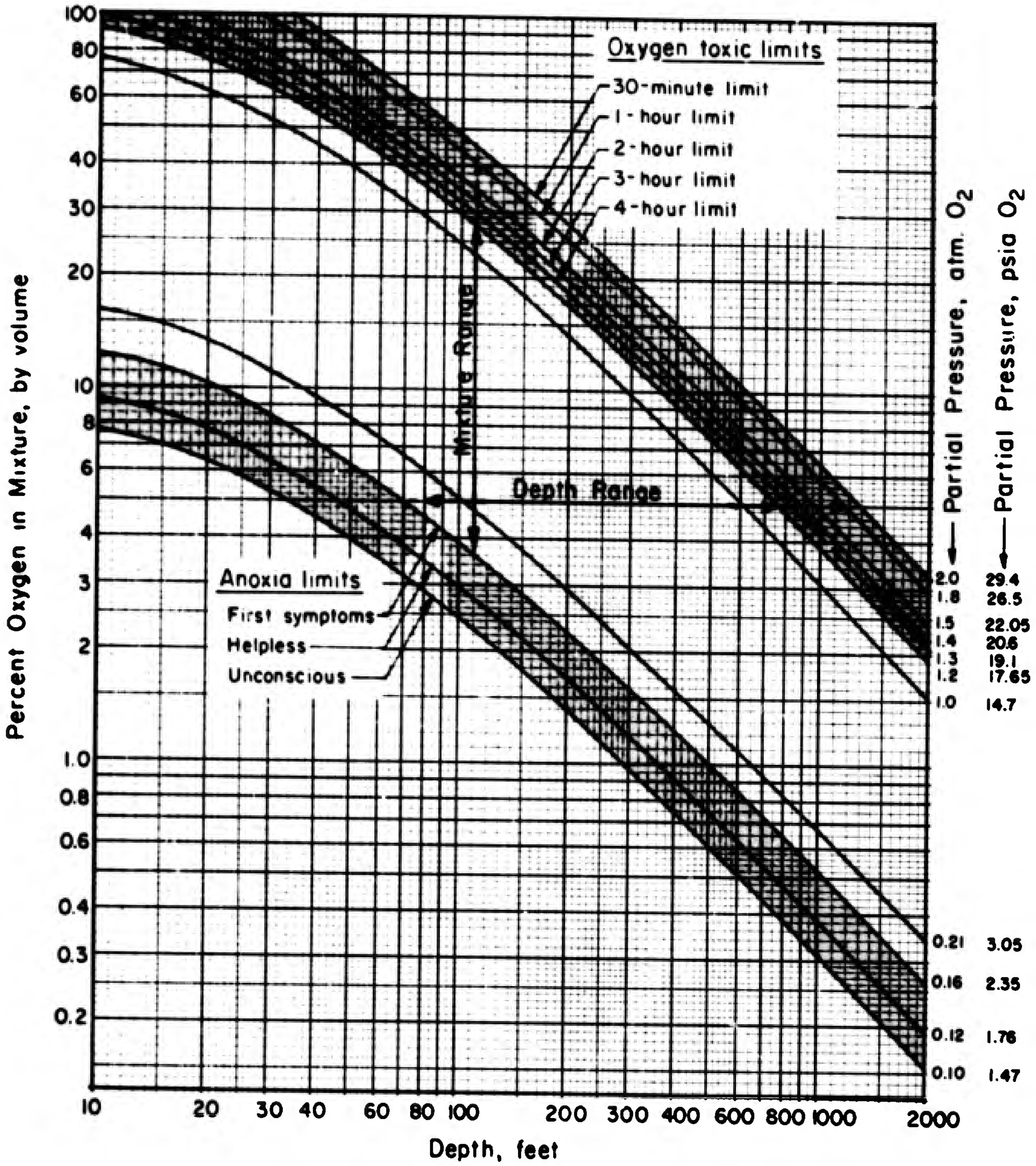

FIGURE 1. PERCENTAGE OF OXYGEN IN BREATHING MIXTURE AS A FUNCTION OF DEPTH AND OXYGEN PARTIAL PRESSURE

$$\text{Percent } O_2 = \frac{\text{Partial pressure } O_2\text{, atm} \times 100}{\text{Seawater pressure, atm}}$$

From inspection of Figure 1 it is evident that, at any fixed depth, it is feasible to breathe a wide range of mixtures without ill effects. For example, at a depth of 200 feet, the mixture could be as lean as 3 percent oxygen (0.21 atm) or as rich as 17 percent oxygen without encountering any short-term physiological limits. Likewise, with a fixed oxygen concentration in the breathing mixture, the diver can make long excursions in depth. A mixture containing 10 percent oxygen, for example, would permit operations between 36 and 360 feet, with the possibility of short excursions as deep as 600 feet. However, it is important to note that dangerous anoxia can occur if lean mixtures intended for deep operations are breathed during ascent and decompression. It is necessary to provide higher oxygen concentrations at shallower depths to stay within the working range indicated in Figure 1.

Diluent Gases

The oxygen percentages shown in Figure 1 would be applicable with any diluent gas or mixture of diluent gases that might be applicable to diving. Oxygen-nitrogen mixtures, including air, can be used freely if nitrogen partial pressure is limited to 3 atm, the pressure at which the first symptoms of nitrogen narcosis appear, although nitrogen partial pressures to 5.5 atm can be used with care by experienced divers for short periods.(2) (This is equivalent to diving at 200 feet with air.) For greater depths, helium is the diluent gas now generally used because it is nontoxic at any practical diving depth and because its low density reduces breathing effort. The principal disadvantages of helium are its limited availability and high cost, its high sonic velocity which results in high-pitched speech that is hard to understand, and the high leakage rates experienced when minute imperfections are present in joints and seals. Nitrogen at partial pressures up to 3 atm can be mixed with helium as a means of conserving helium, improving speech intelligibility, and reducing cost, but precise information on physical and engineering properties of helium-nitrogen-oxygen mixtures is not available at the present time.

Hydrogen has been proposed as a diluent gas for depths beyond 1000 feet because of its low cost and because its density is half that of helium. However, the effects of hydrogen on body tissues at high pressures have not yet been explored. Furthermore, hydrogen-oxygen mixtures are readily ignited by static-electricity discharges unless oxygen concentrations are below the combustible limit, which is at 6 percent oxygen at 1 atm pressure.(4) Explosive limits of oxygen-hydrogen mixtures have not yet been investigated at high pressures and are not known, but would be well below 6 percent oxygen.

Decompression Considerations

Decompression considerations also influence the selection of breathing-gas composition. The length of the decompression period is a function of the partial pressure of diluent gas (helium or nitrogen) in the breathing mixture. The decompression period can be shortened by using oxygen concentrations close to the toxic limit during a scheduled diving period and during the decompression period.(2, 3) This approach is most effective for dives at shallow to moderate depths, where the proportion of oxygen can be large enough to significantly reduce the partial pressure of diluent gas. Under marginal conditions, use of a high-oxygen mixture may eliminate the decompression period entirely. Oxygen is not normally a limiting factor in decompression because it appears to be metabolized at a rate sufficient to avoid adverse effects.

Carbon Dioxide Concentration and Its Control

In normal breathing, the concentration of oxygen in the breathing gas is reduced and the oxygen is replaced by a nearly equal volume of carbon dioxide. If carbon dioxide is included in the inhaled gas, the partial pressure of carbon dioxide in the blood increases, and the respiratory center in the brain increases breathing rate to restore normal carbon dioxide tension. Excessive amounts of carbon dioxide in the breathing gas result in toxic effects, as summarized in Table 1.(5)

TABLE 1. RELATION OF PARTIAL PRESSURE OF CARBON DIOXIDE TO TOXIC EFFECTS

CO_2, vol % (Sea Level)	Partial Pressure		Physiological Effects
	Atm	Psi	
0-1	0.00-0.01	0.00-0.15	None
1-2	0.01-0.02	0.15-0.30	Increase in breathing rate, slight hearing loss
2-6.5	0.02-0.065	0.30-0.96	Mental depression, headache, dizziness, nausea, visual-accuity loss
6.5+	0.065+	0.96+	Dizziness, stupor, unconsciousness

As with oxygen, the physiological effects of carbon dioxide depend upon its partial pressure in the blood and, therefore, in the breathing gas. The percentage of carbon dioxide in the breathing gas that can be tolerated at diving depths decreases with depth, and the respiratory volume required to ventilate the lungs at depth remains approximately equal to that at sea level.

If a diver's breathing circuit includes dead space from which he rebreathes exhaled air, this dead space must be ventilated to dilute the carbon dioxide partial pressure to a nontoxic level. If all of the diver's carbon dioxide production flows into the dead space and is mixed with all of the ventilating air, the reduction of partial pressure depends only upon the ratio of carbon dioxide flow to dilution-air flow, and this ratio must be about 1:100 to limit carbon dioxide to 0.01 atm partial pressure. This is the usual condition in helmet ventilation.

The quantity of ventilation gas can be reduced if the concentration of carbon dioxide can be reduced by other means, such as absorption by a carbon dioxide absorbent. Thus, the standard deep-diving helmet has an attached canister of absorbent through which the breathing gas in the helmet is recirculated to reduce carbon dioxide level and, thus, reduce the quantity of breathing gas required.

In closed-circuit and semiclosed-circuit breathing apparatus, all exhaled gas can be rebreathed. This is made possible by passing all exhaled gas through a canister of carbon dioxide absorber before it can again be inhaled. Excess exhaled gas is vented between the mouthpiece and the absorbent canister in semiclosed-circuit apparatus, and incoming gas can be introduced in an ejector to assist in circulation through the canister.

Unventilated dead space has a significant effect on the respiratory volume required for control of carbon dioxide tension. Examples of unventilated dead space are the natural volume of the mouth and throat, the volume of a mouthpiece between non-return valves, or the volume of a full face mask. The effect of dead space is to increase the tidal volume, or volume for each inhalation, by the amount of volume of the dead space. Thus, if normal tidal volume is 1 liter and dead space in a full face mask of 1/2 liter is added, the tidal volume needed for equivalent carbon dioxide tension in the blood increases to 1.5 liters. The extra tidal volume needed would reduce maximum work level, increase the quantity of breathing gas needed by 50 percent, and increase the effort of breathing. If tidal volume of 1.0 liter is maintained, only 0.5 liter of fresh gas would be obtained with each inhalation, and this would double the respiratory frequency and gas consumption. It is always desirable to minimize dead space in any diving equipment to the extent possible while meeting other requirements.

When divers are supplied with air from compressors at the surface there is always danger that some carbon dioxide may find its way into the compressor inlet. Exhaust gas from shipboard engines, for example, or from motor traffic in harbor areas can result in significant air contamination. If the compressed air contains 0.2 percent carbon dioxide, for example, it contains half the toxic limit of 0.4 percent at 5 atm pressure (130 feet depth). Thus, only half of the air supplied is useful as diluent for the carbon dioxide generated by the diver's respiration, and the quantity of air supplied must be doubled to avoid toxic reactions. Thus, it is extremely important to assure that clean, fresh air is piped to the compressor inlet, and that it is not downwind from any nearby sources of carbon dioxide.

Breathing-Gas Consumption

Breathing gas contains oxygen that is consumed in respiration and a diluent gas such as nitrogen or helium that is not consumed or altered. The oxygen consumed in the body reacts with carbon and hydrogen to produce CO_2 and water, and the CO_2 thus formed is exhaled in the breathing gas. In addition, the exhaled gas is saturated with water vapor. The volume fraction of CO_2 released varies from 0.7 to 0.9 relative to the volume of oxygen consumed, depending upon the carbon-hydrogen ratio of food being metabolized.(2)

Figure 2 relates oxygen consumption and respiratory volume to rate of exertion. The data for Figure 2 are based on experimental measurements,(2, 3) and provide a basis for selection of breathing-gas quantities for diving equipment.(6)

The mass rate of oxygen consumption and corresponding carbon dioxide production varies with the rate of exertion, and is independent of depth. As indicated in Figure 2, values of oxygen consumption vary from about 0.5 standard liters per minute (slm) when at rest to about 4.0 slm with heavy exertion. These values are equivalent to 0.0895 and 0.716 pound of oxygen per hour, or 1.14 to 9.13 standard cubic feet (scf) per hour*. The actual volume of oxygen consumed at depth would decrease in inverse proportion to absolute pressure in accordance with gas laws.

The values for respiratory minute volume (RMV) shown in Figure 2 are determined by carbon dioxide ventilation requirements within the body, and these volumes are

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*The standard liter is defined at 0 C (32 F) and the standard cubic foot is defined at 60 F. Thus, although 1 ft^3 = 28.3 liters, one standard ft^3 = 26.3 standard liters.

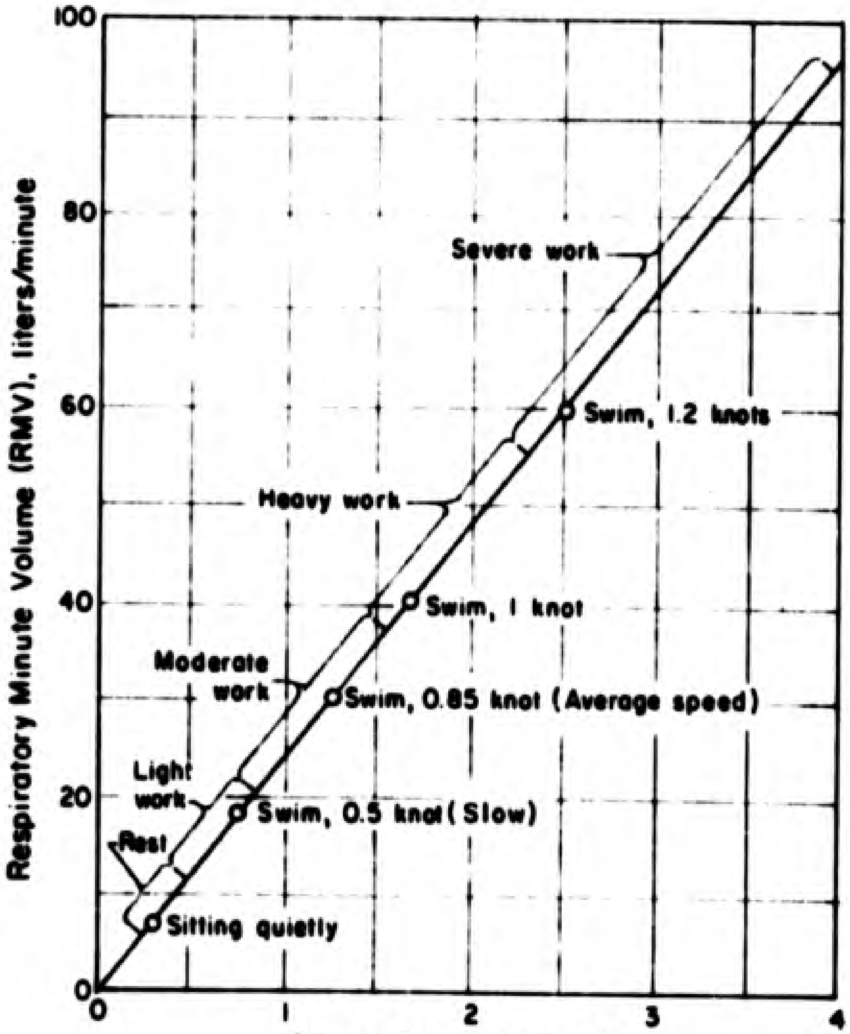

FIGURE 2. RELATION OF RESPIRATORY VOLUME AND OXYGEN CONSUMPTION TO TYPE AND LEVEL OF EXERTION(3)

the same at diving depths. Thus, the mass flow of gas to meet respiratory requirements increases in direct proportion with depth and with oxygen consumption. The ratio of respiratory volume to the volume of oxygen consumed is such that only 20 percent of the oxygen inhaled is consumed, and the other 80 percent is exhaled. In sea-level respiration the oxygen content of inhaled air is reduced from 20.8 percent to 16.6 percent, equivalent to a reduction from 0.208 to 0.166 atm partial pressure.

In any demand type breathing apparatus, the rate of supply of breathing gas must satisfy the RMV requirement. Thus, with oxygen partial pressure of 0.208 atm in the breathing gas, only 20 percent of the oxygen supplied will be consumed. The actual gas consumption will be 10 to 100 liters per minute (lpm) at depth, depending upon level of exertion.

In closed-circuit rebreathing apparatus supplied with pure oxygen, the rate of oxygen consumption would be equal to the rate of supply, as all carbon dioxide is absorbed in recirculation and no gas is vented. The oxygen consumption rate would depend only upon rate of exertion and would be independent of depth. Oxygen consumption can be 0.5 to 3 slm, and about 2 slm is average.(2)

In semiclosed-circuit breathing apparatus, the problems of oxygen supply and usage are more complex. Oxygen is supplied to the inhalation bag at 1.2 atm partial pressure, and with a preset mixture flow rate sufficient to provide oxygen for continuous exertion at 3 slm oxygen demand. The oxygen concentration in the inhalation bag will vary from about 1.0 atm at rest, to 0.21 atm during severe exertion. Excess gas is vented between the exhalation bag and the carbon dioxide absorber, at oxygen partial pressures varying from 0.8 atm at rest to 0.16 atm during heavy exertion. The total flow rate of breathing gas depends upon the depth, and can vary greatly because of the wide range of depths and mixtures for which the semiclosed-system is suitable.

The volume of breathing gas needed for surface-supplied diving apparatus having ventilated dead space, such as helmet or face mask, is determined by the flow rate needed to dilute carbon dioxide in the dead space to nontoxic levels of 0.01 to 0.02 atm partial pressure. The flow rate needed is similar to the RMV at maximum exertion. It is usual to supply 4.5 cfm (127 lpm) of gas, measured at depth. This would be sufficient to permit exertion levels corresponding to oxygen consumption of 1.27 slm if carbon dioxide in the dead space is held to a level of 0.01 atm, or 2.55 slm for 0.02 atm of carbon dioxide. More air would be required should levels of exertion exceed those corresponding to 2.5 slm of oxygen consumption.

The helium-oxygen deep-sea diving outfit operates much like the semiclosed-circuit apparatus in that breathing gas in the helmet is recirculated through a carbon dioxide absorber to minimize the flow of breathing gas needed. However, flow rate is determined by ventilation requirements. Breathing gas is supplied from the surface through a hose at a rate of 0.5 cfm, measured at depth, and enters the helmet through an ejector which drives the recirculation flow. With a recirculation ratio of about 10, the ventilation effect is equivalent to 5 cfm or 140 lpm, which is adequate for heavy work. The oxygen content of the mixture is maintained at a high level and can be varied during the dive to suit depth and decompression requirements. If this rig is used at shallow depths with air, anoxia could result unless flow rate is increased to provide needed oxygen. The required flow rate will reach 2.1 scfm at the surface for oxygen consumption of 3 slm.

OPERATING CHARACTERISTICS AND BREATHING-GAS CONSUMPTION OF DIVING APPARATUS

All breathing apparatus used in diving must, in some way, satisfy both respiratory-volume requirements and oxygen-supply requirements at all depths. Various types of apparatus having different characteristics have been developed, each having applications of greatest suitability. The general characteristics of each type of system, and means of calculating or estimating the composition and flow rates of breathing gas required for a diving mission are discussed below.

Table 2 compares the relative air-flow rates needed by four basic types of underwater breathing equipment under identical conditions: the demand-regulator SCUBA, a semiclosed-circuit system, a surface-supplied deep-sea diving outfit, and a surface-supplied deep-sea diving outfit with carbon dioxide absorption provisions. For these comparisons, the breathing gas is air containing 21 percent oxygen. Data are shown for three levels of oxygen consumption: 3.0 slm, corresponding to heavy exertion, 2.0 slm, corresponding to moderate exertion, and 1 slm, corresponding to light exertion or rest. From the table it may be seen that for heavy exertion, the air flow required for the semiclosed-circuit system decreases markedly with increasing depth, and that air flow required for the other systems increases markedly with depth. Thus, the semiclosed-circuit system appears especially attractive for deep-diving missions, the SCUBA for shallow dives, and the deep-sea rigs for all heavy-duty applications where surface supply of air is advantageous. It should be noted that, at shallow depths, 0.5 cfm of air does not supply enough oxygen for exertion in the deep-sea diving outfit with carbon dioxide absorption. Flow rate then becomes equal to that for the semi-closed circuit apparatus.

TABLE 2. COMPARISON OF AIR-FLOW RATES FOR DIFFERENT BREATHING SYSTEMS

Depth, ft	Pressure, atm	O_2 Demand, slm	Air Supplied to Breathing Apparatus, slm: Semiclosed	SCUBA	Deep Sea Rig[a]	Deep Sea (CO_2 abs)[b]
150	5.54	3.0	16.3	388	707	78.6
50	2.51	3.0	19.7	176	320	35.6
30	1.91	3.0	22.7	134	244	27.2
20	1.60	3.0	25.6	112	204	25.6[c]
10	1.30	3.0	32.9	91	166	32.9[c]
0	1.00	3.0	60.0	70	127	60.0[c]
30	1.91	2.0	15.2	89	244	27.2
10	1.3	2.0	22.0	61	166	22.0[c]
0	1.0	2.0	40.0	47	127	40.0[c]
10	1.3	1.0	11.0	30	166	18.5
0	1.0	1.0	20.0	23	127	20.0[c]

(a) 4.5 cfm air as measured at working depth.

(b) 0.5 cfm air as measured at working depth.

(c) Flow rate needed to provide needed oxygen.

For all of the conditions listed in Table 2, the air required to supply the semiclosed-circuit system is less than for the demand regulator system. However, this is not necessarily true of all missions. For example, the demand regulator system operates on actual demand for breathing gas, which may be low if little exertion is required, while the semiclosed circuit system requires continuous flow sufficient for the highest exertion level.

SCUBA Demand-Regulator Apparatus

Open-circuit SCUBA equipment is based upon use of a demand regulator, with which gas is supplied with each inhalation in the exact quantity needed, thus conserving stored compressed gas. However, all exhaled gas is vented and lost, so that the volume rate of usage is equal to the respiratory volume. The actual rate of usage of stored gas, and the duration of the stored supply will, thus, depend upon the rate of effort and the depth of usage. Volume-flow rates required for breathing will vary between 7 and 70 slm, or 15 and 150 ft^3/hr at the density corresponding to depth(2), depending upon level of effort.

Figure 3 shows the variation of endurance with depth and level of effort for a demand-regulator SCUBA system with tank capacity of 1450 $in.^3$ (twin 90 ft^3 tanks) charged to 3000 psi. It may be seen that mission duration can range from 4 hours in shallow water with little exertion, to only 15 minutes at 130 feet with heavy exertion. These curves provide for reserve air at 500 psi in one tank only, and do not include air for decompression if needed.(5) The endurance of other SCUBA systems would depend upon their tank capacity and pressure, and similar curves could be drawn.

Closed-Circuit Rebreathing Apparatus

In principle, it is possible to breath pure oxygen in a closed system if exhaled oxygen and carbon dioxide are passed through an absorbent that removes the carbon dioxide, and fresh oxygen is added at the rate of consumption. Such apparatus has been developed and used within the depth limitations imposed by oxygen toxicity. Although suitable only for shallow depths, such apparatus leaves no trail of bubbles, making it advantageous for clandestine military operations. It is also extremely efficient in use of oxygen, as all of the oxygen stored is actually used. Finally, because of the efficient oxygen usage and the elimination of diluent gas, sufficient oxygen can be carried for rather long diving periods, and the diving time is independent of depth. Diving periods are limited by both the quantity of oxygen carried and the amount of CO_2 absorbent provided, and these should be approximately balanced in design of equipment.

Several experimental closed-circuit rigs now under development use diluent gas in breathing bags to permit extension of closed-circuit advantages to greater depths. The only diluent gas needed is that required to fill the breathing bags and to adjust their volume with changes in depth; pure oxygen is added to the breathing mixture at the rate of consumption, so that all oxygen is utilized, and the duration of oxygen supply is independent of depth. These systems rely upon an automatic control system to sense and maintain oxygen partial pressure within tolerances of 0.2 to 1.2 atm. If it proves possible to meet reliability requirements, such systems should be extremely advantageous for deep operations as they consume virtually no diluent gas and only minimum quantities of oxygen.

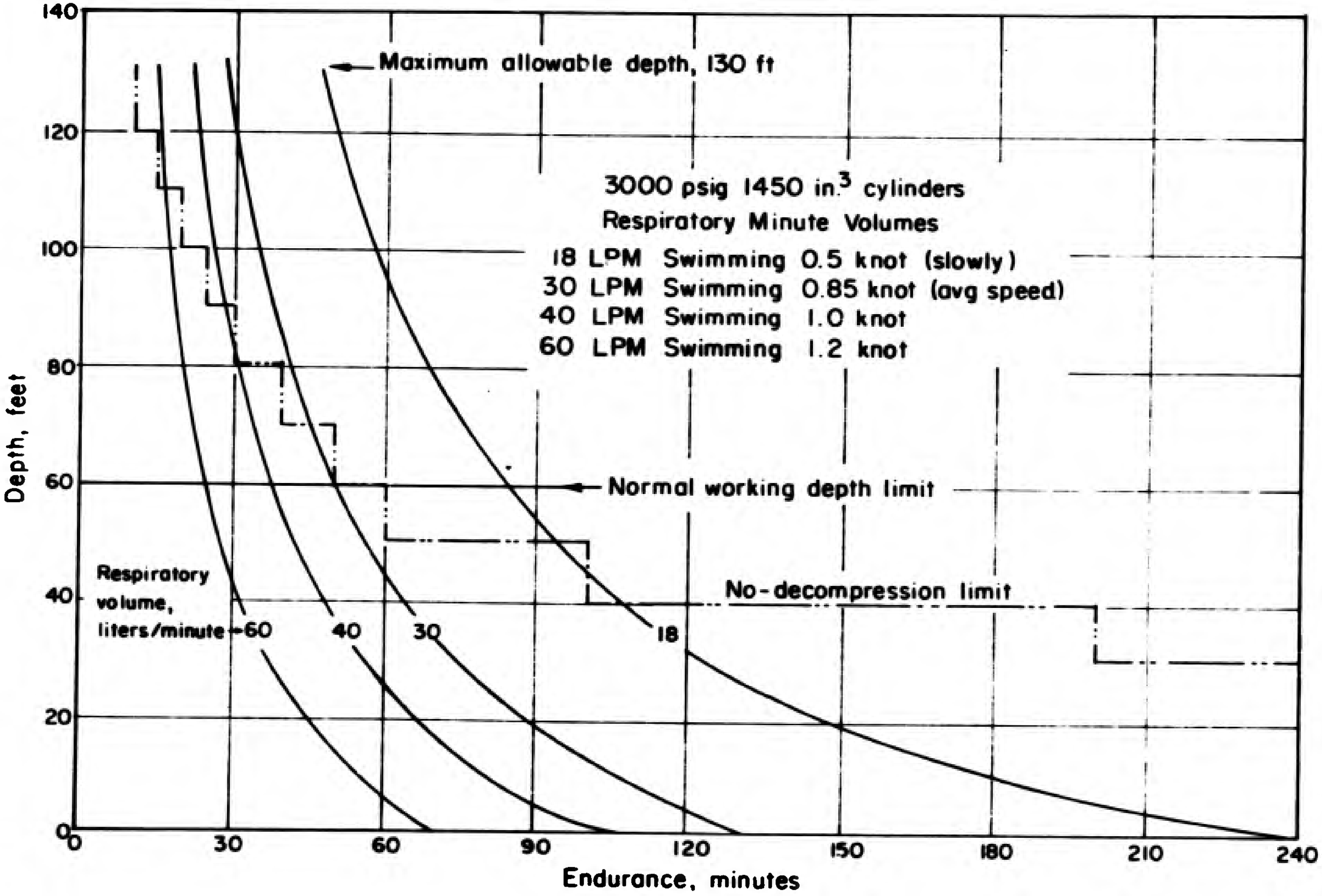

FIGURE 3. RELATION OF ENDURANCE OF SCUBA TO DEPTH AND LEVEL OF EXERTION

Twin 90 ft^3 tanks at 3000 psi. Reserve of 500 psi in one tank.(5)

In any pure-oxygen rebreathing apparatus, the rate of consumption is the oxygen usage rate. For normal underwater activities, this often averages 2 slm, and increases to 3 slm with heavy exertion. Thus, oxygen storage of about 120 to 180 sl, or 4.57 to 6.85 scf, per hour of endurance is required.

Semiclosed-Circuit Breathing Apparatus

Semiclosed-circuit breathing apparatus is of special interest because it is adaptable to use at very great depths and is very efficient in use of breathing gas. In theory, oxygen can be supplied to the apparatus at a partial pressure of 1.2 atm, just under the toxic limit, and rebreathed through a CO_2 absorber until oxygen partial pressure is reduced to 0.16 atm on exhalation. In this way, as much as 86 percent of the oxygen supplied could be utilized, compared with only 20 percent for an open-circuit system. In addition, the high partial pressure of oxygen in the gas mixture minimizes the amount of mixed gas used for the required oxygen consumption.

In a typical helium-oxygen semiclosed-circuit apparatus suitable for saturated diving, breathing gas is supplied continuously at a mass flow rate (referred to as the "liter-flow" rate) sufficient to provide for oxygen usage of about 3 slm. The partial pressure of oxygen in the mixture supplied to the apparatus is at 1.2 atm, just under the toxic limit when breathing incoming gas. The incoming gas enters an inhalation bag where it mixes with and is diluted by partially depleted gas. After inhalation it is exhaled into an exhalation bag and then circulated through a CO_2 absorber back to the inhalation bag. Surplus exhaled gas is vented from the exhalation bag at a rate that is somewhat less in volume than the incoming stream because of CO_2 absorbed. The level of oxygen partial pressure in the inhalation bag will vary with the rate of oxygen usage, from about 1.0 atm when at rest to 0.21 atm at maximum exertion, and the partial pressure of oxygen in vented gas will vary from 0.96 to 0.16 atm. With constant mass flow of breathing gas, most efficient use of the supply occurs only at maximum exertion; at other conditions, surplus oxygen is vented.

The quantity of oxygen that must be supplied is independent of depth if the range of oxygen partial pressures from 1.2 to 0.21 atm is maintained in the inhalation bag at all depths. This is done by selection of oxygen concentration and liter flow rate. However, to avoid toxicity, the oxygen percentage must decrease as depth increases, so that the quantity of helium supplied with the oxygen will increase with depth. Thus, the total consumption of breathing gas will increase in proportion to total pressure and depth.

By its nature the semiclosed-circuit apparatus is most economical of breathing gas if used within a moderate depth range. In setting up the equipment for a mission, the oxygen percentage is limited by the maximum depth planned, and the liter-flow rate is established to provide sufficient oxygen for exertion at the minimum depth. As the maximum and minimum depths become farther apart, the difference in oxygen partial pressure between breathing gas and vented gas is reduced, which reduces the efficiency of oxygen utilization and increases the required liter-flow rates.

Figure 4 is a chart for selecting oxygen percentage and liter flow rate for semiclosed-circuit breathing apparatus. It shows the relation of oxygen content of the breathing gas, partial pressure of oxygen in the inhalation bag, and liter flow, to the

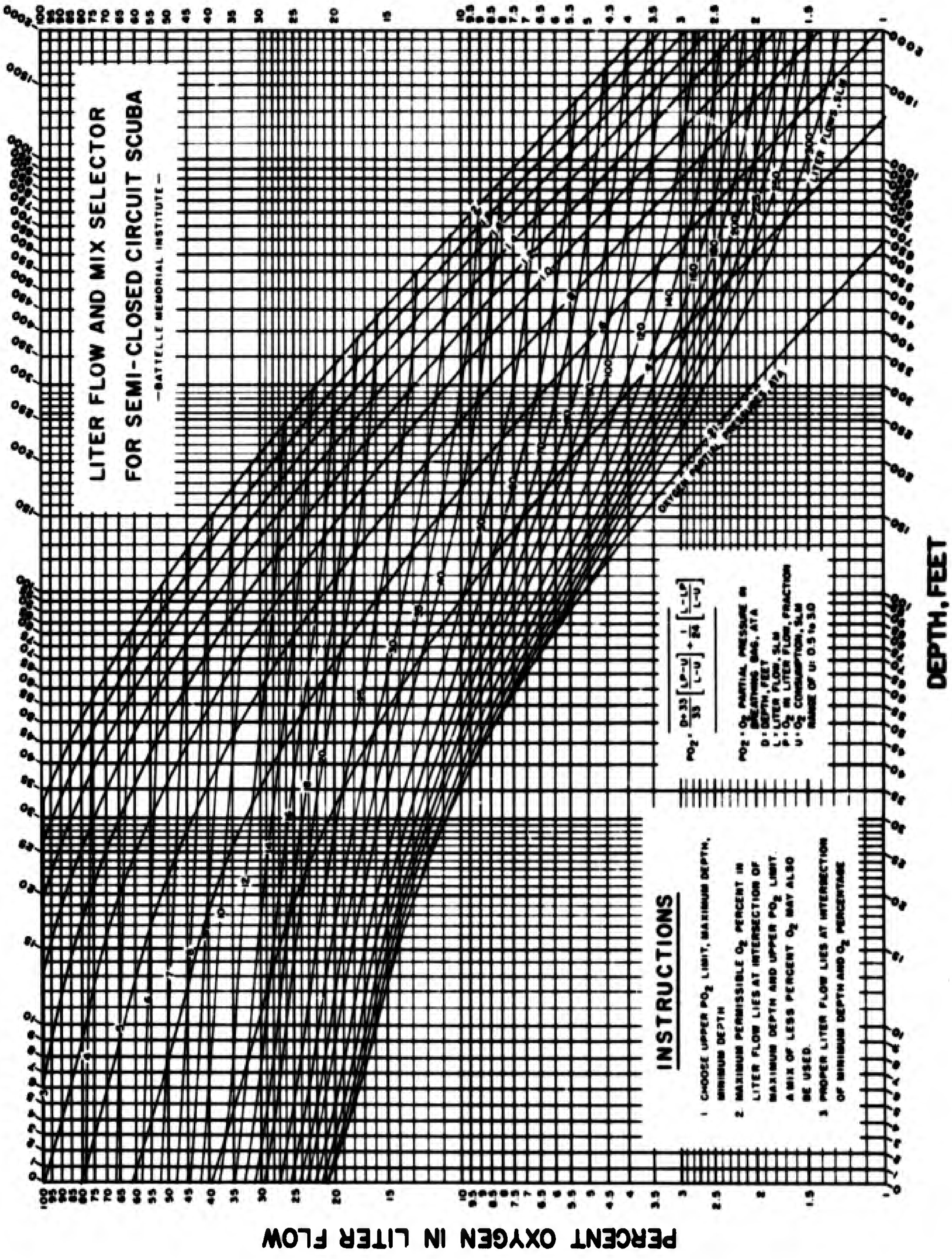

FIGURE 4. CHART FOR SELECTING LITER FLOW AND OXYGEN PERCENTAGE FOR SEMICLOSED-CIRCUIT BREATHING APPARATUS

Partial pressure lines refer to oxygen partial pressure in inhalation bag with 0.5 slm oxygen usage.

diving depth. In using the chart the oxygen percentage in the liter flow is found at the intersection of the vertical line of maximum depth and the sloping curve of 1.2 atm oxygen partial pressure; the liter flow rate is found to the left at the same oxygen percentage, on the vertical line representing the minimum diving depth. When used in this way the conditions selected will provide 1.2 atm oxygen partial pressure in the inhalation bag when resting and consuming 0.5 slm oxygen at the greatest depth, and sufficient flow for severe exertion with consumption of 3 slm oxygen at the least depth. It should be noted that the oxygen partial pressure lines indicate higher oxygen percentages than in Figure 1 because they represent remaining oxygen partial pressure after some oxygen has been used. For short dives it is possible to utilize higher oxygen partial pressures if the time limits indicated in Figure 1 are observed.

The semiclosed-circuit breathing apparatus is currently the most versatile breathing apparatus available. It is suitable for use at any depth to 1000 feet, as demonstrated in experimental test-chamber dives, Sealab programs, and other saturation-diving missions. Accordingly, the rates of consumption of oxygen and of helium can vary widely with depth, and with range of depth required for specified missions. The procedures for determining oxygen concentration and gas flow rates are shown by example below.

Calculation Procedure

The procedure for calculating oxygen concentration in breathing gas and the liter-flow rate for semiclosed-circuit apparatus is as follows:

(1) Select the maximum diving depth, the minimum depth, and the maximum oxygen demand rate.

(2) Determine percentage of oxygen in the breathing gas that corresponds to 1.2 atm at the maximum diving depth.

(3) Determine percentage of oxygen in exhalation bags and vented that corresponds to 0.166 atm at the minimum diving depth or at the surface.

(4) Calculate liter-flow rate for breathing gas using above oxygen percentages.

(5) If desired, check efficiency of oxygen utilization and oxygen supply rate.

(6) If pertinent, check oxygen available for surfacing if this is not provided for in Step (3).

The diving depths will be defined by mission objectives. The maximum oxygen demand could be estimated on the basis of rate of effort planned, using Figure 2 as a guide. However, it is recommended that, as a standard procedure, an oxygen demand of 3.0 slm be provided in order to permit extreme exertion should an emergency arise.

The percentage of oxygen in the breathing gas corresponding to 1.2 atm oxygen partial pressure at the maximum diving depth can be read directly from Figure 1 or Figure 4. The value of 1.2 atm is low enough for saturation diving, but higher partial pressures can be used for shorter periods within time limits shown in Figure 1 should this be necessary.

The partial pressure of oxygen in exhalation bags should be taken as 0.166 atm at the minimum diving depth; for dives from the surface, it would be usual to provide enough oxygen for surface swimming.

The liter flow can be calculated using the following equation:

$$L = \frac{U}{O_1 - O_2\left(\frac{1 - O_1}{1 - O_3}\right)}$$

where

L = liter flow, slm

U = oxygen used (normally 3.0 slm)

O_1 = percentage (decimal) of oxygen in liter flow (1.2 atm at greatest depth)

O_2 = percentage (decimal) of oxygen vented from exhalation bag. (0.166 atm at least depth).

O_3 = percentage (decimal) of oxygen inhaled from inhalation bag. (0.208 atm at least depth).

The efficiency of oxygen utilization, E, can be determined as:

$$E = \frac{O_1 - O_2\left(\frac{1 - O_1}{1 - O_3}\right)}{O_1}$$

The oxygen flow in the breathing gas, O slm, is

$$O \text{ slm} = L \times O_1 .$$

The slm of oxygen available in the breathing gas at the surface, or any other depth, can be calculated from the equation:

$$U = L\left[(O_1 - O_2)\ \left(\frac{1 - O_1}{1 - O_3}\right)\right]$$

where

U = oxygen slm that the diver can use

L = liter-flow rate, slm

O_1 = percentage (decimal) of oxygen in breathing gas

O_2 = percentage (decimal) of oxygen at 0.166 atm at depth of interest

O_3 = percentage (decimal) oxygen at 0.208 atm at depth of interest.

Example 1. A semiclosed-circuit breathing apparatus is to be used for work at a depth of 300 feet under saturated diving conditions. No changes in depth are anticipated and no decompression is required, as the diver will utilize a PTC (Personal Transfer Chamber) and a surface compression chamber between dives. Determine the optimum oxygen percentage in the breathing mixture and the liter flow required for heavy exertion. Also check the efficiency of oxygen utilization, the rate of oxygen flow as part of the breathing gas, and the rate of helium flow.

(1) Find pressure at 300 ft – Take from Column 2, Table T-2, or calculate as follows:

$$\text{Patm} = \frac{\text{Depth}}{33.1} + 1 \qquad \frac{300}{33.1} + 1 = 10.07 \text{ atm}$$

(2) Find oxygen percentages for oxygen partial pressures of 1.2, 0.166, and 0.208 atm at depth of 300 ft:

Take from curves of Figure 1, or calculate as follows:

$$O_1 = \frac{ppO_1}{\text{Patm}} = \frac{1.2}{10.07} = 0.1182 \text{ (11.82 percent)}$$

$$O_2 = \frac{ppO_2}{\text{Patm}} = \frac{0.166}{10.07} = 0.0165 \text{ (1.65 percent)}$$

$$O_3 = \frac{ppO_3}{\text{Patm}} = \frac{0.208}{10.07} = 0.0206 \text{ (2.06 percent)}$$

(3) Calculate liter-flow rate

$$L = \frac{U}{O_1 - O_2\left(\frac{1 - O_1}{1 - O_3}\right)} = \frac{3}{0.1182 - 0.0165\left(\frac{1 - 0.1182}{1 - 0.0206}\right)}$$

$$= \frac{3}{0.1186 - 0.0165\left(\frac{.882}{.989}\right)} = \frac{3}{.1182 - 0.0147}$$

$$= \frac{3}{.1035} = 29.0 \text{ slm}$$

(4) Find oxygen flow in breathing gas, slm

$$O_{slm} = L \times O_1 = 29.0\text{x } (0.1182) = 3.43 \text{ slm}$$

(5) Find helium flow in breathing gas

$$He = L. - O_{slm}$$

$$= 29.0 - 3.43 = 25.57 \text{ slm}$$

Example 2 - Using Available Gas Mixture. Under the conditions of Example 1, a supply of gas containing 10 percent oxygen is already mixed and available. Determine the liter-flow rate for this mixture.

(1) O_1 will be taken as 0.10 (10 percent) to match available gas.

O_2 will be 0.0165 (1.65 percent), from Example 1

O_3 will be 0.0206 (2.06 percent) from Example 1

$$L = \frac{U}{O_1 - O_2 \left(\frac{1 - O_1}{1 - O_3}\right)} = \frac{3}{0.10 - 0.016 \left(\frac{1 - 0.10}{1 - 0.0206}\right)} = \frac{3}{0.10 - 0.016 \left(\frac{0.90}{0.989}\right)}$$

$$= \frac{3}{0.10 - 0.0146} = \frac{3}{0.0854} = 35.1 \text{ slm}$$

Thus, with a 10-percent-oxygen mixture, liter flow is 35.1 slm.

Example 3 - Deep Dive From Surface. A diver must descend from the surface to carry out a mission that requires heavy exertion at depths ranging from 50 to 150 feet. What breathing-gas mixture and liter-flow rate are required?

(1) Find oxygen percentage at greatest depth (150 ft), 1.2 atm, (from Figure 1):

$O_1 = 0.213$ (21.3 percent) .

(2) Find oxygen percentages at least depth (at surface)

Although the mission involves work at 50 ft, the diver should be provided with sufficient oxygen for surface swimming, where oxygen vented will be 16.6 percent and oxygen inhaled will be 20.8 percent.

$O_2 = 0.0166$ (16.0 percent)

$O_3 = 0.208$ (20.8 percent)

(3) Liter-flow rate:

$$L = \frac{U}{O_1 - O_2 \left(\frac{1 - O_1}{1 - O_3}\right)} = \frac{3}{0.213 - 0.166 \left(\frac{1 - .213}{1 - .208}\right)} = \frac{3}{0.213 - 0.166(0.993)} = 62.6 \text{ slm}$$

This liter-flow rate is relatively high and may limit duration of the dive to an inconveniently short period. It is required because of the small difference between oxygen percentage of gas supplied and gas vented, and it can be reduced somewhat by increasing this difference. If the time scheduled for work at the 150-foot level is less than 3 hours, the 3-hour toxicity limit of 1.3 atm oxygen partial pressure can be used to advantage. This will raise permissible oxygen concentration in the breathing mixture to 23 percent (0.23)(from Figure 1). Then,

$$L = \frac{U}{O_1 - O_2(.993)} = \frac{3}{0.23 - 0.165} = \frac{3.0}{0.065} = 46.2 \text{ slm} \ .$$

A second large reduction in liter flow can be obtained by simply reducing the a amount of oxygen supplied for surface swimming. However, in any case, sufficient oxygen for severe exertion at 50 feet must be provided. This can be calculated as follows:

$$U_{50} = 3.0 \text{ slm}$$

$$O_2 = 0.0662 \text{ (6.62 percent)}$$

$$O_3 = 0.0829 \text{ (8.29 percent)}$$

$$L_{50ft} = \frac{U}{O_1 - O_2 \left(\frac{1 - O_1}{1 - O_2}\right)} = \frac{0.3}{0.23 - .0662 \left(\frac{1 - .23}{1 - .0829}\right)}$$

$$= \frac{0.3}{0.23 - .0662 \left(\frac{.770}{.917}\right)} = \frac{.3}{.1744} = 17.2 \text{ slm} \quad .$$

If 20 slm is provided, then the oxygen actually available for surface swimming would be:

At surface,

$$O_1 = 0.23 \text{ (23 percent)}$$

$$O_2 = 0.16 \text{ (16.6 percent)}$$

$$O_3 = 0.208 \text{ (20.8 percent)}$$

$$L = 20 \text{ slm}$$

$$U = L \left[O_1 - O_2 \left(\frac{1 - O_1}{1 - O_3}\right)\right] = 20 \left[0.23 - 0.166 \left(\frac{1 - .23}{1 - .208}\right)\right]$$

$$U = 20 \left[0.23 - 0.166 \left(\frac{.770}{.792}\right)\right]$$

$$= 20 \; [0.23 - 0.161]$$

$$= 20 \; [0.069] = 1.38 \text{ slm.}$$

Referring to Figure 2, 1.38 slm is sufficient oxygen for moderate exertion, and might be an acceptible condition if diving conditions are such that severe exertion should not be required. However, if oxygen for surface swimming is a limiting factor, the diver should be made fully aware of this limitation.

Example 4 - Saturation Diving Mission. In a saturation-diving mission a habitat is located at a depth of 600 feet and work is planned at levels as deep as 900 feet. Select gas consumption and flow rate appropriate for heavy exertion from 600 to 900 feet.

(1) Oxygen percentage at 900 ft, 1.2 atm, from Figure 1:

$$O_1 = 4.26 \text{ percent (0.0426)} \quad .$$

(2) Oxygen percentage at 600 ft, 0.166 atm and 0.208 atm:

$$O_2 = 0.866 \text{ percent } (0.00866)$$

$$O_3 = 1.08 \text{ percent } (0.0108) \quad .$$

(3) Liter-flow rate:

$$L = \frac{U}{O_1 - O_2\left(\frac{1 - O_1}{1 - O_3}\right)} = \frac{3.0}{0.0426 - 0.00866\left(\frac{1 - 0.0426}{1 - 0.0108}\right)} = \frac{3.0}{0.0426 - 0.0083} = 87.4 \quad .$$

The relatively high liter-flow rate results from the low oxygen content of the breathing-gas mixture. The efficiency of oxygen utilization is 80 percent, which is high, because the depth range of 300 feet is not large in terms of pressure change.

Surface-Supplied Open-Circuit Diving Rigs

Simple open-circuit surface-supplied diving rigs are widely used for light activity and moderate depths using air as the breathing gas. The breathing air is supplied to a helmet or mask within which the diver breathes normally. The helmet acts as a ventilated dead space within which breathing air is mixed with carbon dioxide exhaled by the diver. The flow of air must be great enough to dilute the exhaled carbon dioxide to non-toxic levels for rebreathing, in the range of 0.01 to 0.02 atm partial pressure. The rate of ventilation required is defined by the following equation:

Equation 1: $$V = \frac{P_{atm} \times O_{slm} \times R \times F}{26.2\,(C_2 - C_1 \times P_{atm})}$$

where

V = Volume of air required, in scfm

O_{slm} = Oxygen requirement, in slm

R = Respiratory quotient, or ratio: Vol CO_2 produced/Vol O_2 consumed

26.2 = Conversion factor, slm to scfm

C_2 = Desired partial pressure CO_2 in inhaled air (atm)

C_1 = Partial pressure CO_2 in breathing air from compressor (atm)

P_{atm} = Pressure at depth, expressed in atm, $= \frac{D + 33.1}{33.1}$

F = Mixing Effectiveness Factor.

The following values can be used in almost all operations:

O_{slm} = 2.6 slm (enough for heavy to severe exertion)

R = 0.9 (the highest value likely to occur)

C_2 = 0.02 atm, toxic limit of carbon dioxide.

$C_2 = 0.02$ atm, toxic limit of carbon dioxide.

$F = 1.0$ assumed because no actual values are now known.

If these values are substituted in Equation 1, Equation 2, below results:

$$\text{Equation 2:}\quad V = \frac{0.0893\ P_{atm}}{0.02 - C_1 P_{atm}}\ .$$

If the breathing air contains no carbon dioxide this equation reduces to:

$$\text{Equation 3:}\quad V = 4.5\ P_{atm}$$

F, the Mixing Effectiveness Factor, is a factor to account for the mixing of exhaled carbon dioxide with breathing gas within the helmet. It is the ratio (% CO_2 in vented air)/(% CO_2 in inhaled air). The value of F would vary under the following conditions:

$F = 1$ When mixing is perfect, and the vented mixture contains the same percentage of carbon dioxide as the inhaled mixture.

$F < 1$ (F less than 1.) When mixing is intentionally imperfect and flow patterns are directed so that the inhaled mixture contains less CO_2 than the vented mixture.

$F > 1$ (F more than 1.) When mixing is imperfect and, through poor flow patterns, the inhaled mixture contains more CO_2 than the vented mixture.

The only way of evaluating F for a specific helmet design is to measure the carbon dioxide concentration in the exhaust and that at the point of inhalation while a diver wears the helmet and performs hard work. In the absence of such experimental data, it appears reasonable to assume that $F = 1$.

The Diving Manual(2) recommends that flow rate be set at 4.5 P_{atm}. This rate will supply only enough ventilation for 2.6 slm oxygen consumption. Thus, there may be occasions when flow rate should be higher than 4.5 P_{atm}.

Example 1: How much air should be supplied to a diver working at a depth of 70 feet? Assume that air contains no carbon dioxide.

Procedure	Example
1. Find P_{atm} (From Table T-2, Col 3)	3.12 atm
2. Use Equation 2:	
$V = 4.5\ P_{atm}$	$V = 4.5\ (3.12) = 14.05$ scfm

Example 2: A diver is to work at a depth of 150 ft. Calculate the amount of air he will need under three different conditions of air purity, as follows:

(a) Pure air containing no carbon dioxide

(b) Air cleaned to just meet Bu. Med. air purity standards of 0.05 percent (0.0005 atm) carbon dioxide

(c) Unpurified air from a compressor in a machinery space, containing 0.2 percent (0.002 atm) carbon dioxide

Procedure	Example
1. Find P_{atm} (From Table T-2, Col 3)	5.53 for all conditions
2. Use Equation 2 to find ventilation rate: $V = \frac{0.0893 P_{atm}}{0.02 - C_1 P_{atm}}$	
Condition (a)	$V = \frac{0.0893(5.53)}{0.02} = 24.7$ scfm
Condition (b)	$V = \frac{0.0893(5.53)}{0.02 - 0.0005(5.3)} = 28.8$ scfm
Condition (c)	$V = \frac{0.0893(5.53)}{0.02 - 0.002(5.53)} = 53.3$ scfm

Example 2 shows the relative effects of carbon dioxide in breathing air. When carbon dioxide level is at the maximum partial pressure permitted by Bu. Med, Air Purity Standards, Condition (b) air flow must be increased 25 percent above that for air containing no carbon dioxide. At the much higher level of 0.2 percent carbon dioxide, the required air flow is more than doubled.

The U. S. Navy Bureau of Medicine and Surgery has established purity standards for diver's breathing air which should be met by all apparatus used to supply breathing air. Requirements are as follows:

Oxygen	20 to 22 percent by volume
Carbon dioxide	300 to 500 ppm (0.03 to 0.05 percent) by vol.
Carbon monoxide	20 ppm maximum
Oil, mist, and vapor	5 mg/m^3 maximum
Water, maximum content	Saturated at maximum pressure of use
Solid and liquid particles	Not detectable except as noted above under oil, mist, and vapor.
Odor	Not objectionable

In order to meet the above specifications it is necessary to use special non-lubricated compressors, or to pass air from standard compressors through a highly efficient cleanup system. The compressed air provided for general shipboard services is not adequate for use as breathing air, as it usually contains excessive amounts of oil and may contain carbon dioxide if taken from machinery spaces.

Helium-Oxygen Deep-Sea Diving Outfit

The helium-oxygen deep-sea diving outfit is a surface-supplied diving outfit that operates as a semiclosed system with recirculation of breathing gas and carbon dioxide absorption. In principle, the helmet is a ventilated dead space, requiring the usual high volume flow rate for dilution of carbon dioxide. However, this high flow rate is obtained by introducing breathing gas at high velocity in an injector that recirculates helmet gas through a Baralyme canister attached to the helmet. The volume of gas recirculated is about ten times the volume of breathing gas admitted, which reduces the flow of breathing gas needed for helmet ventilation by a factor of ten below that for a system without recirculation.

The oxygen content of the breathing gas is adjusted and controlled at the surface and can be varied to suit depth and decompression requirements. The gas pressure at the inlet to the diver's ejector is also set at the surface and determines the flow rate of breathing gas, which enters the ejector through a 0.025-inch diameter nozzle.

In setting oxygen percentages and flow rates for breathing gas it is necessary to assure that three conditions are met:

(1) The oxygen percentage should be below the toxic limit for the scheduled diving period (1.2 to 1.8 atm under usual conditions), and high enough to avoid anoxia at high levels of exertion (above 0.37 atm for 3 slm oxygen consumption)

(2) The flow rate should be high enough for adequate ventilation of carbon carbon dioxide within the helmet; with ejector recirculation ratio of 10:1 a flow rate of $(0.5 \times P_{atm})$scfm, or $(14.2 \times P_{atm})$slm is required.

(3) Pressure drop across the helmet ejector should be high enough to assure critical flow. This requires that gas pressure at the helmet be at least twice the bottom pressure. (For depths greater than 190 ft, supply pressure will be more than that recommended in the Diving Manual of 100 psi above bottom pressure.)

The supply pressure should include an allowance for hose pressure drop, which may be significant. However, if the correct flow rate is metered into the hose the pressures should automatically adjust to the required level.

The duration of a dive when using this outfit is the effective life of the Baralyme carbon dioxide absorbent. The design life of a full canister of 6 pounds is 3 hours(2), but in cold water this can be drastically reduced and may be as little as 1/2 hour at 40 F(8).

Calculation of Breathing-Gas Oxygen Content and Flow Rate

With the breathing-gas flow rate of 0.5 cfm at depth established, the oxygen content of the breathing gas and the required flow rate, in scfm or in lb/hr, can be calculated as follows:

Procedure	Example
(1) Conditions	
Working depth	300 ft
Water temperature	60 F
Length of dive – time at depth	30 min
(2) Select oxygen percentage in mixture	
Use oxygen partial pressure safe for time limit	1 hr
From Figure 1, select oxygen percentage at partial pressure of 1.5 atm	15 percent
(3) Select gas-flow rate:	
$V = 0.5 \times P_{atm}$,	$V = 0.5 \times 10.07 = 50$ scfm
where	
V = volume flow rate, scfm	
P_{atm} = pressure at depth, atm (from any table at 300 ft);	
or, for gas flow in lb/hr:	
$W = 0.5 \times 60 \times \rho$,	$W = 0.5 \times 60 \times 0.1279$ $= 3.84$ lb/hr
where	
W = lb/hr breathing gas	
60 = minutes per hour	
ρ = gas density, from Table 56 at 300 ft, 60 F	
(4) Select supply pressure to diver	
The minimum supply pressure will be:	
$p_s = 2(P) - 15 + p_h$	$p_s = 2\,(148) - 15 + 3 = 284$ psi
where	
p_s = supply pressure, psi	
P = bottom pressure, psia (from Table T-2, Col. 2 at 300 ft)	
p_h = hose pressure drop, psi (estimated)	
(5) Similarly, mixtures and flow rates for reduced depths should be determined and used during the decompression period to assure that adequate oxygen percentages are used at the shallow depths during decompression.	

MIXING OF BREATHING GASES

Mixtures of oxygen and helium, or oxygen and nitrogen, in various proportions are used for different diving missions. These mixtures may be prepared by one of several methods.

In shore-based facilities, it is feasible to mix gases at ambient pressure by adding suitable volumes of each gas to a constant-pressure gas holder, measuring the volume added for each gas. The mixture can then be analyzed and the composition adjusted as needed, following which the gas can be compressed into high-pressure cylinders for storage or shipment. With this approach, precise proportioning of gases in the mixture is readily obtained.

Where small, portable cylinders are to be filled, it is sometimes feasible to mix gases by weight. It is necessary to calculate the weight of gas mixture needed to fill the cylinder to the desired pressure, the percentage by weight of each constituent gas, and the weight of each gas to be added. The cylinder is then placed on a precise scale and the required weights of gas added. Where applicable, this method is free of temperature effects and can provide good mixture accuracy. In filling the cylinder, gas is taken from larger, high-pressure cylinders. If necessary, in order to obtain the desired high cylinder pressure, the final increment of gas may be pumped into the cylinder with a high-pressure compressor. Manual compressors are available for this purpose. This method requires a scale of high accuracy because gas weights are quite small. It is probably not suitable for shipboard use because of ship motion.

Still another approach to gas mixing is use of calibrated flow meters in both oxygen and diluent-gas lines entering a mixing device. Continuous flow and mixing in proper proportions can be provided by selection and adjustment of the metering equipment. The mixed gas may be supplied directly to the diver if pressure is adequate, or it may be compressed for storage in high-pressure cylinders or for supply to a diver.

The fourth approach to mixing of diving gases consists of adding each of the constituent gases to a storage cylinder in turn, the proportion by volume of each gas being in direct proportion to the partial pressure of that gas in the mixture. For example, a mixture containing 10 percent oxygen and 90 percent helium at a total pressure of 1000 psi could be prepared by filling the cylinder by adding oxygen until pressure was 100 psi, then adding helium until the pressure reached 1000 psi. Because of the practice of carrying helium and oxygen in high-pressure gas cylinders aboard ships, this method is used frequently.

The procedures for carrying out each of these mixing methods are discussed in detail in the U. S. Navy Diving Manual.(2) The calculation procedures required to implement the methous are outlined below. Calculation procedures for helium-oxygen mixtures are based on use of the tables presented in this manual; alternative calculation methods based upon perfect-gas laws (PVT relations) are presented for comparison. Calculations based on densities and specific volumes of oxygen, helium, and mixtures taken from the tables include real-gas compressibility effects, and would be expected to provide results more accurate than those obtained by calculations based on perfect gas laws. However, they are considerably more complex than perfect-gas calculations.

Mixing by Weight - Two or More Gases (Real-Gas Method)

In mixing by weight it is necessary to know the receiver volume and weight, the final pressure, the temperature at which the receiver is to be filled, and the gaseous constituents of the mixture and their proportions. From these it is possible to calculate the weight of each gas to be added to the receiver. The procedure is outlined in detail below:

Condition

	Example 1	Example 2
Volume of Receiver, ft^3	0.5	0.5
Weight of Receiver (Empty), lb	30.0	30.0
Final Gas Pressure, psi	2200	2200
Final Gas Temperature, F	70	70
Gas Composition, volume percent		
Oxygen, Mol Wt 32	10	10
Helium, Mol Wt 4	90	88.5
	0	1.5
	100	100

Example 1. Oxygen-Helium Mixture

Oxygen (from Table T-1), wt %	47
Helium (by Difference), wt %	53
Gas Density After Filling, lb/ft^3 (from Table T-63, 2200 psi, 70 F)	2.45
Total Gas Weight, lb (Gas Density) x (Receiver Vol)	2.45 x 0.5 = 1.225
Weight of Oxygen to be Added, (Weight % Oxygen) x (Total Gas Weight)	47/100 x 1.225 = 0.524 lb or 8.4 oz
Weight of Helium to be Added (Weight % Helium) x (Total Gas Weight)	53/100 x 1.225 = 0.649 lb or 10.4 oz
Initial Tank Weight, lb	30.0
Weight After Adding Oxygen, lb	30.524, or 30 lb 8.4 oz
Weight After Adding Helium, lb	31.225, or 31 lb 3.6 oz

Example 2. Oxygen-Helium-Nitrogen Mixture (Real-Gas Method)

For this mixture of three gases it is necessary to calculate the percentages by weight of the gases and the density of the mixture from perfect-gas laws. With these known, the weights to be added are calculated as in Example 1.

Mean molecular weight of mixture:

$$100 \times \text{mol wt mix} = (\text{mol wt } O_2 \times V\%\ O_2) + (\text{mol wt He} \times V\%\ \text{He}) + (\text{mol wt } N_2 \times V\%\ N_2)$$

$$= (32 \times 10) + (4 \times 88.5) + (28 \times 1.5)$$

$$\text{Mol wt} = \frac{320 + 354 + 42}{100} = 7.16\ .$$

Calculate specific volume and density:

Specific volume is calculated from the perfect-gas relation $PV = RT$, where

P = absolute pressure, lb/ft^2 - (gage pressure, psi + 14.7) x 144

T = absolute temperature, R = (degrees F + 460)

R = 1545/(mean molecular weight of gas)

V = specific volume, ft^3/lb.

Then, if $PV = RT$, $V = RT/P$, where

R = 1545/mol wt = 1545/7.16 - 237

$V = RT/P = (237)(70 + 460)/(2200 + 15) \times 144 = 0.386\ ft^3/lb$,

Density is $1/V = 1/(0.386) = 2.59\ lb/ft^3$.

Total weight of gas added to receiver:

(receiver volume) x (gas density) = $(0.5\ ft^3) \times (2.59\ lb/ft^3) = 1.295$ lb .

From this point the calculation is the same as that for Example 1; the weight percentage of each gas is found and is multiplied by the total weight to obtain the weight of each gas.

Although the total weight in the tank is calculated by perfect-gas laws, the final mixture proportions are not affected by compressibility effects; only the final pressure may be somewhat low. Accordingly, the mixture can be assumed to be correct under real-gas conditions.

The weight of gases to be used for refilling partially filled tanks can also be calculated by the weight method. This is done by calculating the weight of the gas to fill the tank at full pressure, and subtracting the weight of gas in the tank at the existing pressure. Both these calculations are done as described above, and the difference is the weight to be added. The added weight is proportioned in the same way as when filling an empty tank.

If it is desired to change the mixture ratio in a filled tank, or in a partially filled tank, the above method can be used to calculate the weight of each gas in the tank and the weight of each gas desired in the tank. The desired difference in weight of one gas is then added to the tank. If the tank is full, it will be necessary to bleed off some mixture in order to adjust composition. These methods (filling a partially filled tank, or adjusting mixture) depend upon knowing very accurately the weight of the tank when empty. Without this knowledge, the partial pressure method described below can be used to perform the calculations.

It is evident that the scale used for proportioning gases by the weight method must be suitable for measuring small weight changes with high accuracy. The error in gas composition involved in a 1/2-oz. error in oxygen weight in Example 1, for example, would be about 6 percent. That is, if the oxygen weight added was 8.9 oz instead of 8.4 oz, the volume percentage of oxygen in the mixture would be 10.6 instead of the target value of 10.0. This method is probably unsuitable for shipboard use because ship motion complicates an already-difficult weighing problem.

Mixing by Partial Pressures

When two or more ideal gases are mixed at constant temperature, the partial pressure of each gas in the mixture is proportional to the percentage by volume of that gas in the mixture, and the sums of the partial pressures of all gases must add to the total pressure. Thus, it is possible to prepare a gas mixture in a high-pressure storage cylinder by adding, in series, several gases. As each gas is added, the cylinder pressure will rise and the pressure, as a percentage of the final pressure, will be proportional to the percentage by volume of the gas.

When real gases such as oxygen and helium are mixed, the mixture compresses slightly more or less than predicted by perfect-gas laws. The differences in partial pressures resulting from real-gas effects are quite small at the pressures usual for diving and can be neglected for most purposes. However, they can be significant at the high pressures used in mixing and storing of breathing gases, and can cause significant error in the percentage of oxygen in a mixture. Accordingly, the calculation methods recommended in this manual are based on real-gas properties as taken from the tables in Part 2. However, perfect-gas calculations are also shown for use when applicable, and for comparison of results.

All mixing calculations assume isothermal conditions throughout the mixing period, with initial and final temperatures equal. In actual practice, if mixing is done quickly the adiabatic compression in the receiving vessel will cause a temperature rise that can result in mixing error. This effect can be minimized by adding the gas to the receiver at low flow rates so that the gas temperature can come to equilibrium with vessel metal temperatures, or by waiting for temperature to return to ambient and then topping off the receiver to proper pressure.

A highly accurate pressure gage having many scale divisions, and of suitable scale range, is required for gas mixing. For example, if a gas mixture containing 10 percent oxygen is to be mixed within an accuracy of ±0.1 percent oxygen (9.9 to 10.1), and the partial pressure of the oxygen is 200 psi, then the gage accuracy must be ±2 psi. If, in this case, a 3000-psi gage having 20 psi increments were used, and the actual oxygen pressure was in error by +10 psi, the oxygen content of the mixture would be higher than calculated, at 10.5 percent.

Although the receiving vessel will contain the proper amounts of oxygen and helium when filled by the partial-pressure method, these gases may not be well mixed.

At the high pressures used for gas storage molecular diffusion is very slow, and gas drawn from the tank immediately after mixing could be quite different in composition than the average for the entire receiver. Accordingly, it is desirable to provide for a storage period of many hours before use, if possible, or provide for mechanical agitation to improve the rate of mixing.(2)

When mixing low-oxygen, helium-oxygen mixtures, best accuracy can be obtained by adding oxygen to the receiver first, using a low-pressure gage to measure its partial pressure, and then adding helium to the final mixture pressure. Where oxygen percentage is high, or where helium is already in the receiver, oxygen can be added after the helium, and it is necessary to know the partial pressure of helium and the final mixture pressure for the desired mixture.

When adding oxygen first, the density of oxygen at its partial pressure in the mixture must be known. This can be found by solving the following equation:

$$\rho O_2 = \frac{32\ a\ \rho m}{28\ a + 4} ,$$

where

ρO_2 = density of oxygen, lb/ft^3, at its partial pressure in the mixture

ρm = density of the mixture at final pressure (from tables)

a = decimal percentage oxygen in mixture

32 = molecular weight of oxygen
4 = molecular weight of helium
28 = difference in molecular weight of oxygen and helium.

The partial pressure of oxygen corresponding to this density is found in oxygen density tables T-7 and T-8, of Part 2 by locating the computed density in the proper temperature column and finding the corresponding tabulated pressure in Column 2. In preparing the mixture, oxygen is added to the receiver until this pressure is reached, and then helium is added until the final mixture pressure used in the calculation above is reached. This must all be done at constant gas temperature, and the procedures recommended in the Navy Diving Manual should be followed in detail. Essentially, the receiver is filled slowly, allowed to cool until pressure is stabilized, then topped off to the desired partial pressure.

If helium is to be added to the mixture first, the helium density at its partial pressure in the mixture can be found using the equation:

$$\rho He = \frac{4b\ \rho m}{32 - 28b}$$

where

ρHe = density of helium

b = decimal percentage of helium in mixture and other terms are the same as in the oxygen equation.

Helium partial pressure would be taken from the helium density Table T-14 or T-15.

This real-gas mixture method cannot be used where a third gas such as nitrogen is present, as the nitrogen would affect the compressibility of the mixture and cause error.

It is sometimes advisable to check the pressure drop that occurs in gas-storage cylinders used to fill the receiver, to assure that the desired partial pressure level can be obtained with the gas on hand. The pressure drop in the supply vessel can be calculated using the following equation:

$$\text{Supply } \Delta P = \frac{(\text{receiver volume}) \times (\text{receiver } \Delta P)}{(\text{supply-vessel volume})} ,$$

where

Supply ΔP = pressure drop in supply vessel, psi

Receiver ΔP = pressure rise in receiver, psi

Volumes = ft^3

If gas is taken from the supply vessel at a high rate of pressure change, the adiabatic cooling with expansion of gas in the vessel will lower temperature, and reduce pressure. Accordingly, a margin of excess pressure should be available in the supply vessel. On standing, the gas temperature and pressure will rise, so that some additional pressure should be available for topping off the receiver after it has cooled.

Example 1. Mixing by Filling an Empty Receiver

A mixture containing 10 percent oxygen and 90 percent helium is to be prepared by filling a receiver containing the same mixture at atm pressure. Assume that ambient temperature is 70 F. Find the partial pressure of oxygen to be used in preparing a mixture having a pressure of 3000 psi.

Example 1

Terms	Example
P_1 = Initial mixture pressure, psia	14.7
P_2 = Final mixture pressure, psia	3000 (2985 psi)
t = Temperature, F	70
a = Decimal fraction (percent) of oxygen in mixture	0.10
ρ_m = Density of mixture	
ρO_2 = Density of oxygen in mixture at final pressure	
ΔppO = Change in oxygen partial pressure	
ppO_2 = Partial pressure of oxygen at final pressure	

Procedure - Real-Gas Method

Example

(1) Find ρ_m - in Table T-63 for 3000 psi, 70 F — 3.258 lb/ft^3

(2) Find ρ_{O2}:

$$\rho_{O2} = \frac{32a(\rho_m)}{28a + 4} \qquad = \frac{32\ (0.10)\ (3.258)}{28\ (0.10) + 4} = 1.534$$

(3) Find ppO$_2$ in Table T-8 at $\rho_O = 1.534$, t - 70 F (psia, in Column 2)

Interpolation: (use straight-line interpolation between points in tables)

$$\begin{array}{rrl} \text{ppO falls between} & 272.5 \text{ psia at } \rho = & 1.5534 \text{ lb/ft}^3 \\ \text{and} & \underline{268.0} \text{ psia at } \rho = & \underline{1.5279} \\ & 4.5 \text{ psi} \quad = & .0256 \end{array}$$

$$\begin{array}{rl} \rho_O = & 1.534 \\ \rho \text{ at } 268 \text{ psia} = & \underline{1.528} \\ & .006 \end{array}$$

$$4.5 \text{ psi} \times \frac{.006}{0256} = 1.75 \text{ psia}$$

$$\begin{array}{rl} & \underline{+268.00} \\ ppO_2 = & 269.75 \text{ psia} \end{array}$$

(4) $ppO_1 = P_1\ a_1$ — $(14.7)(0.10) = 1.47$ psi

(5) $ppO_2 - ppO_1 = \Delta ppO$ — $(269.75)-(1.47) = 266.3$ psi

(6) $PO_2 = P_1 + \Delta ppO$ — $(14.7) + (266.3) = 281.0$ psi

Thus, the gage pressure after adding oxygen should be 281 psi

If the receiver had contained a previous mixture of different oxygen content, or air, the value of a_1 in Step (4) would be that for the old mixture. Step 4 is a perfect-gas method, but introduces no error at low pressures.

Procedure - Perfect-Gas Method

$\Delta ppO = (P_2 - P_1)(a)$ — $(3000-15)(0.10) = 298.5$ psia

$P_O = P_1 + \Delta ppO$ — $(14.7) + (298.5) = 313.2$ psi

With final oxygen pressure of 313 psi, the mixture would have contained 11.2 percent oxygen instead of the specified value of 10.0 percent. This illustrates the desirability of using real-gas properties.

Example 2. Refilling A Partially Filled Tank With the Same Mixture or a Different Mixture

A tank contains a mixture of 10 percent oxygen and 90 percent helium at a pressure of 1200 psi. It is to be refilled with the same mixture at 3000 psi, using pure oxygen and pure helium. Assume a temperature of 70 F. What should the tank pressure be after addition of new oxygen?

Example 2

Terms	Example
t = Mixing temp	70 F
P_1 = Initial mixture pressure, psia	1200
P_2 = Final mixture pressure, psia	3000
ρ_{m1} = Initial mixture density	
ρ_{m2} = Final mixture density	
pp_{O_1} = Oxygen partial press, initial mixture	
pp_{O_2} = Oxygen partial press, final mixture	
ρ_{O_1} = Oxygen density, initial mixture	
ρ_{O_2} = Oxygen density, final mixture	
a_1 = Decimal fraction of oxygen in initial mixture	0.10
a_2 = Decimal fraction of oxygen in final mixture	0.10

Procedure - Real-Gas Method

(1) Find ρ_{m_1} in Table T-63 at 1200 psi, 70 F	1.379
(2) Find ρ_{m_2} in Table T-63 at 3000 psi, 70 F	3.258
(3) Find ρ_{O_1} $\rho_{O_1} = \frac{32a\,\rho_{m1}}{28\,a + 4} =$	$\frac{32\,(0.10)(1.379)}{28\,(0.10) + 4} = \frac{5.725}{6.8} = 0.832$
(4) Find pp_{O_1} - in Table T-8 at $\rho_{O_1} = 0.832$, $t = 70$ F	147.9 psia
(5) Find ρ_{O_2} $\rho_{O_2} = \frac{32a\,\rho_{m2}}{28a + 4}$	$\frac{32\,(0.10)(3.258)}{28\,(0.10) + 4} = \frac{10.44}{6.8} = 1.536$
(6) Find pp_{O_2} in Table T-8 at $\rho_{O_2} = 1.536$, $T = 70$ F	272.5 psia
(7) Find change in oxygen partial pressure $\Delta P_O = pp_{O_2} - pp_{O_1}$	272.5-147.9 = 124.6 psia

(8) Find pressure after adding new oxygen

$P_{m_1} + \Delta P_O$

Change to gage pressure.

$$\begin{array}{r}1200 + 124.6 = 1324.6 \text{ psia}\\ -14.7\\ \hline 1310 \text{ psi}\end{array}$$

(9) Find pressure after adding new helium

Change to gage pressure.

$$\begin{array}{r}3000 \text{ psia}\\ -15\\ \hline 2985 \text{ psi}\end{array}$$

Procedure - Perfect-Gas Method	Example
(1) $\Delta pp_O = (P \ \ - P \ \ )a =$ (Δpp_O = change in oxygen partial pressure)	$(3000 - 1200)(-10) = 180$ psi
(2) $P_1 + \Delta pp_O =$ Change to gage pressure	$1200 + 180 = 1380$ psia = pressure after adding new oxygen -15 1365 psi

In this example the calculated partial pressure of oxygen to be added was 124 psi using the real-gas method, and 180 psi using the perfect-gas method. The actual oxygen percentage of the gas mixture added would be 10.0 for the real-gas method, and 14.4 for the perfect-gas method.

If the oxygen content of the initial mixture had been different from that of the final mixture the problem would follow the same steps but a_1 and a_2 would have different values, and ρO_1 and ρO_2 would have been found in different tables.

Example 3. Changing Oxygen Content of Mixture by Adding Pure Oxygen

It is possible to use the partial-pressure method to change the oxygen content of a mixture by adding oxygen. The increase in pressure from adding oxygen can be calculated using the same real-gas method used in Examples 1 and 2, but it is also necessary to know weight percentages to calculate the oxygen pressure rise. Accordingly, the calculation method is carried out by converting to a percentage-by-weight basis first, then proceeding with calculations on a weight basis.

Condition and Terminology	Example
a_1 - Decimal volume percentage of oxygen in Mixture 1	0.10 (10%)
a_2 - Decimal volume percentage of oxygen in Mixture 2	0.32 (32%)
b_1, b_2 - Decimal volume percentage helium in Mixtures 1 and 2	
P_1 - Pressure of Mixture 1	900 psia
P_2 - Pressure of Mixture 2	
t - Temperature	70 F

w_{O_1} - Decimal weight fraction of oxygen in Mixture 1

w_{O_2} - Decimal weight fraction of oxygen in Mixture 2

w_{He_1} and w_{He_2} - Decimal weight fraction of helium

ρ_{m_1}, ρ_{m_2} - Mixture densities

ρ_{O_1}, ρ_{O_2}, ρ_{He} - Densities of oxygen and helium in mixtures

pp_{O_1}, pp_{O_2}, pp_{He} - Partial pressures of oxygen, helium

Procedure - Real-Gas Method — **Example**

(1) Convert volume mixture percentage to weight percentages (Use Table T-1 for mixtures tabulated there)

		By Vol	By Weight
Initial mix:	O_2 =	10%	47.1
	He =	90%	52.9
Final mix:	O_2 =	32%	79.0
	He =	68%	21.0

(2) Find ρ_{m_1} in Table T-63 at 900 psi, 70 F — 1.045

(3) Find ρ_{O_1}, ρ_{He_1}

$\rho_{O_1} = \rho_{m_1} \times w_{O_1} =$ — $(1.045)\ (47.1) = 0.492$

$\rho_{He} = \rho_{m_1} \times w_{He_1} =$ — $(1045)\ (52.9) = \underline{0.553}$

1.045

(4) Find ρ_{O_2}, ρ_{m_2}

$\rho_{He_2} = \rho_{He_1}$, - because no helium is added

$$\rho_{O_2} = \frac{w_{O_2} \times \rho_{He_2}}{w_{He_2}} = \frac{(79)}{(21)}\ (0.553) =$$ — 2.085

(5) Find ρ_{m_2} — 2.640

$\rho_{m_2} = \rho_{He_2} + \rho_{O_2} = (0.553) + (2.085) =$

(6) Find P_{m_2}

From Table T-45 for 32 percent oxygen, at $\rho_{m_2} = 2.640$, t = 70 F — 1201.4 psia

(7) Change to gage pressure. — $\underline{-14.7}$

Thus, final pressure after adding oxygen = — 1186.7 psi

Procedure – Perfect-Gas Method	Example
(1) $pp_{O_1} = P_1 \times a_1$	900 x 0.10 = 90 psi
(2) $pp_{He} = P_1 \times b_1$	900 x 0.90 = 810 psi
(3) $pp_{He_2} = pp_{He_1}$	810 psi
(4) $P_2 = \frac{pp_{He_1}}{b_2} =$	$\frac{810}{0.68} = 1190$ psia
(5) Change from psia to psi	$\frac{-15}{1175}$ psi
(6) **Check**	
$pp_{O_2} =$	1190 x 0.32 = 381 psi
$\Delta pp_O =$	381 - 90 = 291 psi
$P_2 = P_1 \times \Delta pp_O =$	900 + 291 = 1191 psi

The difference in final pressure calculated by the two methods is 10 psi, and this would result in a final gas mixture containing 31.2 percent oxygen when using the perfect-gas method. The difference is fairly small because of the moderate pressure of 1200 psi.

Example 4. Mixing of Two Mixtures to Make a Third Mixture

It is possible to mix an oxygen-rich mixture with an oxygen-lean mixture to obtain any desired oxygen content between the concentrations in the two starting mixtures, using the partial-pressure method. Although the mixing procedure is exactly the same as for mixing two pure gases directly, the calculations for determining the proportions of each mixture that will result in the correct final oxygen concentration are more complicated than for mixing two pure gases. Two simultaneous linear equations are used to determine the volume proportions of each gas mixture to use. With these proportions known, the partial pressure for each gas mixture is carried out by converting to weight percentages, then carrying out the usual mixing calculation.

Example 4

Conditions and Terminology	Example
a_1 = decimal fraction of oxygen in Gas 1	0.10 (10 percent)
a_2 = decimal fraction of oxygen in Gas 2	0.40
a_3 = decimal fraction of oxygen in Gas 3	0.15
P_3 = pressure of Gas 3, psia	2200
X = decimal fraction of Gas 1 in Gas 3	
Y = decimal fraction of Gas 2 in Gas 3	
Z = Gas 3 = 1.0 decimal fraction	

Mol Wt = Molecular Weight

ρ = density

pp = partial pressure

w_1, w_2 = weight fractions of Gas 1 and Gas 2 in Gas 3

Procedure **Example**

(1) Solve for percentages of Gas 1 and Gas 2 in Gas 3

Equation (1): $X + Y = 1$, and $Y = 1 - X$

Equation (2): $a_1X + a_2Y = a_3$ (1) .

Substitute Equation (1) in Equation (2) and solve for X:

$$a_1X + a_2(1 - X) = a_3 \quad .$$

This reduces to:

$$X = \frac{a_3 - a_2}{a_1 - a_2} \quad .$$

Substituting values:

$$X = \frac{0.15 - 0.40}{0.10 - 0.40} = \frac{-0.25}{-0.30} = \qquad 0.833 \text{ (83.3 percent)}$$

Equation 1: $Y = 1 - X = 1.00 - 0.833 =$ 0.167 (16.7 percent)

Therefore, Gas 3 will contain 83.3 percent of Gas 1 and 16.7 percent of Gas 2.

Procedure - Real-Gas Method **Example**

(2) Convert volume fraction to weight fraction. Find mol wt. in Table T-1

(Vol Fract), x (Mol Wt)	Weight Fraction, w
(Gas 1) 0.833 x 6.80 = 5.67 ÷ 8.21 =	0.6906
(Gas 2) 0.167 x 15.20 = 2.54 ÷ 8.21 =	0.3094
8.21	1.0000

(3) Find ρ_3 (density of Gas 3 at 2200 psia, 70 F) in Table T-57

$\rho_3 =$ 2.951 lb/ft^3

(4) Find ρ_1 and ρ_2

$\rho_1 = \rho_3 w_1 = (2.951) \times (0.6906) =$ 2.038 lb/ft^3

$\rho_2 = \rho_3 w_2 = (2.951) \times (0.3094) =$ .913 lb/ft^3

2.951 lb/ft^3

(5) Find partial pressures pp_1 and pp_2 from Tables

pp_1 - (Table T-63 - at ρ = 2.038): 1808 psia (0 to 1808)

or

pp_2 - (Table T-39 - at ρ = 0.913): 344 psia (0 to 344)

(2152 psia)

The tank should be pressurized to 344 psi with Gas 2, then brought to 2200 psi with Gas 1, so that a low-pressure gage can be used for good accuracy with Gas 2. Alternatively, the tank can first be pressurized to 1808 psi with Gas 1, and Gas 2 can then be added to bring tank to 2200 psi. It will be noted that the sum of 1808 and 344 is not 2200. This is because of gaseous interactions (compressibility effect) and does not indicate an error in the computation.

This calculation neglected any existing gas in the tank before filling. If at 1 atm pressure, the effect would be negligible, and all absolute pressures simply become differential pressure for gas additions without changing absolute pressures to gage pressures.

Procedure - Perfect-Gas Method	Example
$pp_1 + pp_2 = P_3 = 2200$ psia	
$pp_1 (X) + pp_2 (Y) = 2200$	
$pp_1 = P_3 \times X$	2200 x 0.833 = 1832.6 psi
$pp_2 = P_3 \times Y$	2200 x 0.167 = 367.4 psi
$pp_1 + pp_2 = P_3$	2200.0 psi

Comparison with the real-gas method shows pp_2 at 367 and 344 psi, a difference sufficient to change the percentage of Gas 2 in the mixture from the desired value of 16.7 percent to about 17.8 percent, and the oxygen content of the mixture from 15 percent to about 15.3 percent.

Continuous-Flow Mixing Systems

The third basic method of preparing diving-gas mixtures is by metering and controlling separate streams of oxygen, helium, and air or nitrogen, then mixing them at high turbulence downstream from the metering system. The mixture can be supplied directly to a diver, or recompressed and stored for future use. In theory, any method of flow measurement could be used in such a system if properly applied and used. In practice, however, it is highly desirable to provide a mixing system that is simple to operate and that does not require extensive calculation and skill to obtain correct mixtures. Finally, since the mixture may flow to the diver continuously as prepared, a continuous-flow mixture analyzer appears essential to detect any malfunction in the system.

Figure 4A is a schematic diagram showing principles of the system used in an Airco Mixmaker, a continuous-flow diving-gas mixing system in service at EDU*. Several features of this system are of interest, and indicate typical means of simplifying and automating the measurement function. Stored pure gases, at the left of the diagram, are supplied to pressure regulators (1), at a pressure of 1100 psi or more. Gas at constant regulated pressure is then heated to a specified and controlled temperature in the heaters (2), so that the flow meters (3) always measure gas at the same pressure and temperature. This eliminates the need for computing temperature and pressure corrections. After passing through the flowmeters the three gas streams are mixed in a turbulent mixing chamber (4), then passed through a regulator (5) that controls the flowmeter-outlet pressure at 750 psi. A sample of the mixed gas is withdrawn through line (6) and passed through a recording gas analyzer. The main gas stream passes through regulator (7), where its pressure is regulated at the value needed to supply the diver. An accumulator could be added at (9) for mixed-gas storage. With the above pressure levels, the rate of flow of the mixture is 6 cfm at depth for depths of 0-850 ft. This system is the subject of U. S. Patents No. 3062017 and 3369558.

Under the closely-controlled metering conditions maintained in the above system, with pressure drop in the transonic range but not quite great enough for critical flow, two methods of flow metering appear especially appropriate. One is the use of a variable-area orifice, with the flow rate proportional to effective orifice area. For this purpose one or more multi-turn micrometer valves, using 10 or more turns for flow modulation, would provide reproducible flow-area settings; the actual flow for any reading of the micrometer-valve handles could be calibrated and used in curves or tables of settings for desired flow rates and mixtures. A second method would be use of several parallel small orifices which could be valved in and out of the flow circuit with solenoid valves in various combinations, to provide various flow rates. Both of these methods are well suited to precise flow measurement over wide flow ranges.

The flexibility of such a system depends a great deal upon the flexibility of flow measurement capability provided by the combination of metering sensors and the selection system. It would be possible to provide a range of flow rates at any desired pressure and mixture ratio with a sophisticated selection procedure that would provide for variations in metering pressure and area. Alternatively, operation could be limited to a few pre-scheduled mixtures and flow rates with a simpler selection procedure. The entire system could be cycled on and off by a pressure switch on an accumulator (9), actuating solenoid values on inlet gas lines.

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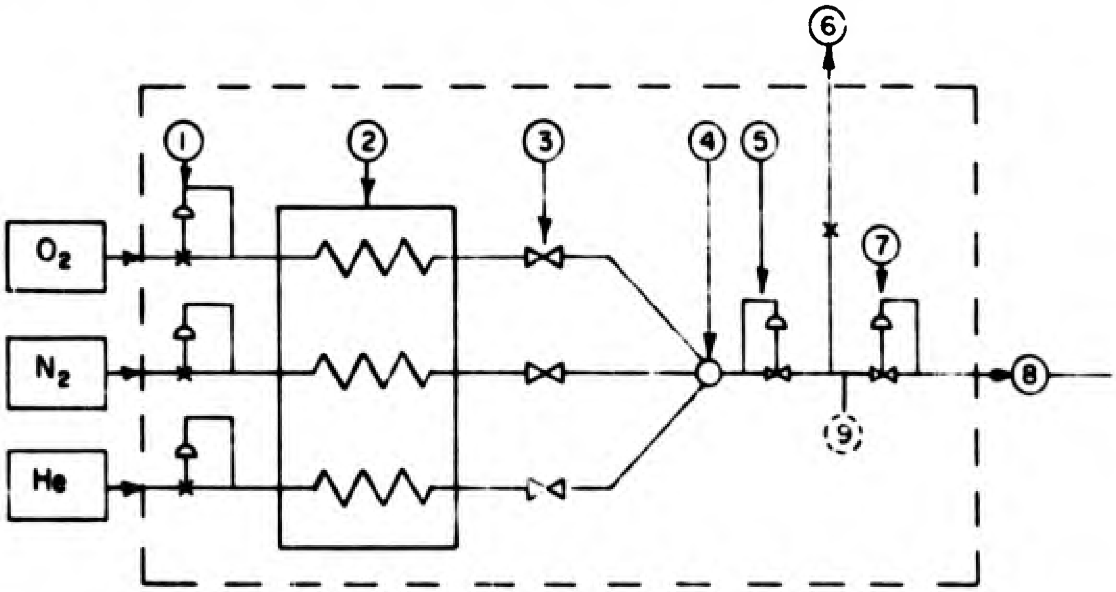
*U. S. Navy Experimental Diving Unit.

The accuracy of mixing claimed for the Airco Mixmaker is as follows:

Percentage oxygen in mixture	Precision of oxygen content
0 - 10	±0.15 percent oxygen
10 - 25	±0.25 percent oxygen
25 - 100	±0.50 percent oxygen

For example, the oxygen content of a mixture prepared with the 5-percent-oxygen setting could vary between 4.85 and 5.15 percent.

Continuous-flow breathing-gas mixture systems can be used to supply divers continuously from the mixing system, or the mixture can be fed to a high-pressure compressor for filling of SCUBA tanks or compressed-gas storage tanks. The oxygen content of the mixture to be prepared must be determined on the basis of the type of breathing apparatus to be used and the range of diving depths.



1. **Pressure Regulation**
2. **Temperature Equilibration**
3. **Metering Valves**
4. **Mixing Chamber**
5. **Back Pressure Regulator**
6. **Mixed Gas Sample to Analysis Console**
7. **Pressure Regulation for Direct Diver Supply or Storage Compressor**
8. **Gas Mixing Console Interface**
9. **(Possible accumulator, if used)**

FIGURE 4A. SCHEMATIC ARRANGEMENT OF AIRCO MIXMAKER© MIXING SYSTEM

Courtesy Airco Central Research Laboratories

USEFUL CAPACITY OF STORAGE TANKS (REAL-GAS METHOD)

The useful capacity of a tank used for storage of high-pressure breathing gas is the quantity of gas that can be supplied from it for a specific mission. It depends upon the tank volume, the initial gas pressure, and the final gas pressure below which gas cannot be removed. The capacity will be different for different missions because the final pressure may differ with diving depth and type of equipment used.

The initial weight of gas in the tank is the product of initial gas density and tank volume. The residual weight is the product of final gas density and tank volume. The weight removed, thus, can be calculated as the product of the tank volume and the change in gas density between initial pressure and final pressure, or as the difference between initial and final weights of gas.

As an example, the capacity of a tank is determined as follows:

Conditions	Example
Tank Volume	30 ft^3
Tank Temperature	50 F
Initial Pressure	3,000 psia (2985 psi)
Residual Pressure	400 psia (385 psi)
Gas Mixture in Tank	10% oxygen, 90% helium
(1) Initial Density in Tank (from Table T-63 for 3000 psia, 50 F)	3.374 lb/ft^3
(2) Residual Density in Tank (from Table T-63 for 400 psia, 50 F)(see Column 2 at 870 ft)	0.492 lb/ft^3
(3) Density Change (Initial – Residual)	2.882 lb/ft^3
(4) Weight of Gas Used (Tank Vol) x (Density Change)	30 ft^3 x 2.882 lb/ft^3 = 86.2 lb
(5) Volume of Gas Available to Diver	
Water Temperature	50 F
Working Depth of Diver	300 ft
Specific Volume of Gas at 300 Ft, 50 F (from Table T-62)	5.46 ft^3/lb
Total Volume = (Weight) x (Sp. Vol)	86.2 lb x 5.46 = 466 ft^3

VENTILATION OF HYPERBARIC PERSONNEL CHAMBERS

In modern diving operations it is usual to utilize a variety of pressurized working spaces – decompression chambers, personnel transfer chambers, underwater habitats, experimental diving chambers, and surface pressure chambers are typical examples. All of these share the common problem of ventilation to limit the partial pressure of carbon dioxide to non-toxic partial pressures. The general requirement for ventilation is exactly the same as that for helmet ventilation: the rate of venting of carbon dioxide must be equal to the rate of production. During steady-state operation the helmet-ventilation equation on Page 21 applies:

$$V = \frac{P_{atm} \times O_{slm} \times R \times F}{26.2\ (C_2 - C_1 \times P_{atm})}$$

Terms are defined on Page 21.

In using this equation it is necessary to apply appropriate values for the rate of oxygen consumption and the mixing factor. The rate of oxygen consumption can be estimated from the number of people in the chamber and the rate of effort expected of them. A man at rest undergoing treatment might require 0.5 slm oxygen, while an attendent working over him might require 1.0 slm. Light work may be expected in some situations, and digestion of food will generate carbon dioxide at a rate equivalent to light work over a period of an hour or more.

The applicable mixing factor is highly problematical, and every effort should be made in the chamber design and development to optimize it at near 1.0. This can be done by providing for good internal gas recirculation with a fan or ejector, and by selection of best locations for gas admission and venting. Mixing factor can be evaluated by introducing a gaseous tracer at various points in the chamber and measuring concentrations of the tracer at points within the chamber and in the vented gas. Such procedures would be well justified in chamber development as a means of minimizing required ventilation rates and avoiding excessive local carbon dioxide concentrations.

The level of carbon dioxide partial pressure that produces symptoms of toxicity depends upon the period of exposure. Partial pressure of 0.02 atm produces only mild symptoms in 30 minutes of exposure, and partial pressure of 0.01 atm produces no observable toxic symptoms in exposures of several hours.(5) However, for exposures of 12 to 38 hours, as required for longer treatment schedules in recompression chambers, levels below 0.005 atm appear necessary to avoid toxic effects, and levels of about 0.003 atm are recommended for very long exposures during saturation diving operations.(3) The Diving Manual presents ventilation schedules for recompression chambers designed to maintain carbon dioxide partial pressures at 0.015 atm or less regardless of exposure time. These schedules provide 2 cfm of air at chamber pressure ($2 \times P_{atm}$) for each occupant at rest and 4 cfm at pressure for each active attendant.

In the more elaborate hyperbaric facilities ventilation is provided by circulation of chamber gas through a conditioning system that absorbs carbon dioxide, removes water vapor, and controls gas temperature. The ventilating flow rate is controlled by a circulating fan that circulates the same volume of gas at any pressure, thus satisfying the ventilation requirement under all conditions. Simple recompression chambers usually rely upon venting of gas from the chamber and replacement with fresh gas. The partial pressure in the chamber is determined by the rate of venting, not the rate of supply, of gas. Because of the slow rate of change of carbon dioxide partial pressure in a large chamber of 250 or 500 cubic feet of volume, it is permissible to ventilate such a chamber at intervals, exchanging a large quantity of gas in a short time instead of providing continuous flow at a low rate. This is often done to avoid the continuous noise of unsilenced gas inlets and outlets.

The oxygen content of breathing gas provided for hyperbaric chambers should be matched to circumstances; in saturation-diving habitats oxygen partial pressure should be below 0.37 atm to avoid lung irritation, but in recompression chambers, where air is used at pressures to six atm, oxygen partial pressure will be in the range of 1.2 atm. When pure oxygen is used for respiration within recompression chambers the Diving Manual recommends chamber ventilation rates of 4 cfm at pressure for each occupant breathing oxygen, which is designed to keep oxygen percentage in the chamber below 30 percent.

Helium-oxygen mixtures are recommended in the Diving Manual for treatment of serious decompression sickness. The mixture would contain about 20 percent oxygen, and the ventilation rate would be the same as for air.

CARBON DIOXIDE ABSORPTION IN DIVING OPERATIONS

Rebreathing of expired air or breathing gas is common in diving operations, including decompression chambers, underwater habitats, personnel transfer chambers, closed-circuit and semiclosed-circuit breathing apparatus, and heavy deep-sea diving rigs. In each application it is necessary to remove virtually all of the exhaled carbon dioxide before rebreathing the gas in order to avoid toxic effects. This is done in a scrubber consisting of a canister filled with a chemical absorbent through which the exhaled gas is passed. The design of the scrubber must be such that all of the carbon dioxide that enters is removed and the gas leaving it is completely free of carbon dioxide. The life of the chemical absorbent is effectively ended when carbon dioxide begins to pass through, even though it may have considerable absorptive capacity remaining. In practice, it has been found that about half of the theoretical absorptive capacity of common chemical absorbents can be utilized in diving applications.

The quantity of carbon dioxide generated by the diver, the number of divers served by the scrubber, and the period over which the scrubber must operate before replenishment determine the weight of absorbent required. The design of the canister must be such that all of the absorbent is well exposed to the gas passing through, in order to obtain efficient use of the material.

An extremely important factor in life of absorbent is the temperature at which it operates. Experiments have shown that a canister sized to perform adequately for a 4-hour period when at 70 F will reach its effective life after only 30 minutes when at 40 F. Thus, for efficient use of absorbent, it is necessary to heat the canister to maintain it at a temperature near 70 F.(8)

The quantity of carbon dioxide generated by each diver depends upon his rate of effort. The volume of carbon dioxide generated is slightly less than the volume of oxygen consumed and metabolized, the ratio being between 0.7 and 0.9 depending upon carbon-hydrogen ratio of food being metabolized. For design purposes, a value of 0.9 is recommended. The rate of effort at which a diver can work can be such as to use as much as 4 slm of oxygen on shore, but it is difficult to utilize more than 3 slm under water at shallow depths, and 2 slm at very great depths, because of the increase in breathing resistance with depth. Thus, if oxygen consumption of 3 slm is assumed, with a conversion factor of 0.9, the rate of production of carbon dioxide would be 2.7 slm. This value converts to 5.72 ft^3/hr or 0.71 lb/hr.

Table 3 summarizes information on three carbon dioxide absorbents. Data are based on requirements of one diver at 3 slm oxygen usage.

TABLE 3. CHARACTERISTICS OF CARBON DIOXIDE ABSORBENTS

Absorbent	Absorbent Density, lb/ft^3	Theoretical Absorption, lb CO_2/lb	Useful Absorption, lb CO_2/lb	Pounds of Absorbent per Diver Hour, (0.71 Lb CO_2)	Canister Volume per Diver Hour, ft^3	Cost, $/hr
Lithium(10) hydroxide	28	0.92	0.46	1.55	0.0552	$6.20
Sodasorb(8, 9)	55.4	0.49	0.245	2.90	0.0533	$0.75
Baralyme(8, 9)	65.4	0.39	0.195	3.65	0.0558	$1.75

Canisters of carbon-dioxide absorbent for self-contained breathing apparatus should be sized for the planned mission duration and should provide absorptive capacity that matches breathing-gas storage capacity. Apparatus for use in very cold water should provide for heating and insulation of the canister in order to realize the potential life of the absorbent, which is greatly reduced at low temperatures(8).

Life-support systems for hyperbaric personnel chambers should incorporate carbon dioxide absorbers that can be conveniently replaced without interference with normal activities within the chamber. It is common to use dual absorbers so that one can be replaced while the other continues to operate, but it is also possible, in a large chamber, to interrupt operation of the life-support system for a short time for absorbent replacement.

The usual absorbent canister permits utilization of about 50 percent of the theoretical absorbing capacity of the absorbent before "breakthrough", when carbon dioxide begins to pass through the absorbent. The breakthrough region is usually a small local area which is exposed to a higher-than-average flow rate because of non-uniform flow distribution through the absorbent. It appears possible to improve the utilization of absorbent by careful design of canisters for ideal flow distribution.

PSYCHROMETRIC CALCULATIONS FOR DIVING APPLICATIONS

Description of Psychrometric Charts

Standard psychrometric charts are commonly used in calculating the effects of heating and cooling moist air at atmospheric pressure. Such charts relate enthalpy changes to wet- and dry-bulb temperatures, relative humidity, dew point, and specific humidity, and permit graphical solutions of usual problems. These standard charts are set up for a single gas mixture (air) and for a single pressure (14.7 psia), and are not suitable for use with a range of gas compositions and pressures. Accordingly, a special humidity chart suitable for use with diving-gas mixtures to depths of 1300 feet has been developed for use in this manual.

In order to construct a chart suitable for gases of differing molecular weight and density, the mole has been used as the unit of gas quantity. A mole, as used in this discussion, is a quantity having a weight, in pounds, equal to the molecular weight of the dry gas mixture. A useful property of this unit is that the volume of a mole of gas is the same for any gas of any molecular weight, at any specified temperature and pressure. Accordingly, the molar volume and the partial pressure of water vapor provide a means of determining the quantity of water per mole of gas, on which all other psychrometric relations are based.

Figures 5, 6, and 7 are psychrometric charts developed for use at elevated pressures with breathing-gas mixtures. Chart 1 is for use with gas mixtures at pressures from 14.7 psia to 200 psia. Chart 2 covers the pressure range from 100 psia to 600 psia. Chart 3 provides temperature corrections for moisture enthalpy, to be applied to enthalpy data from Charts 1 and 2. Charts 1 and 2 are similar except for the vertical scale.

The slopes of constant-wet-bulb lines for different gas mixtures are shown in the upper left area of Charts 1 and 2. The molar specific heats of air, nitrogen, and oxygen are approximately equal at 6.95 Btu/lb-mole, as represented by the highest line, and the molar specific heat of helium is lower, at 4.96 Btu/lb-mole, represented by the lowest line. Lines for gas mixtures containing different percentages of helium are plotted between these limits. To determine a constant-wet-bulb-temperature line, a line is drawn parallel to the appropriate line in the upper left area of the chart, using a parallel rule or drafting triangles. This line starts at the intersection of the wet-bulb temperature and the proper pressure curve and extends to the right until it reaches the desired value of dry-bulb temperature. The mole fraction of water vapor in the mixture at the dry-bulb temperature can be read from the right scale. The relative humidity can then be calculated as the ratio of this value to the value corresponding to the intersection of the dry-bulb temperature with the proper pressure curve. Alternatively, if dry-bulb temperature and relative humidity are known, wet-bulb temperature can be found by the following procedure: (1) read moisture mole fraction for saturated gas at dry-bulb temperature and proper pressure curve; (2) multiply this value by relative humidity, and plot the result on the dry bulb temperature line; (3) draw a constant-wet bulb-temperature line from this point to the left, to intersect with the proper pressure line. The wet-bulb temperature can be read below this intersection on the temperature scale.

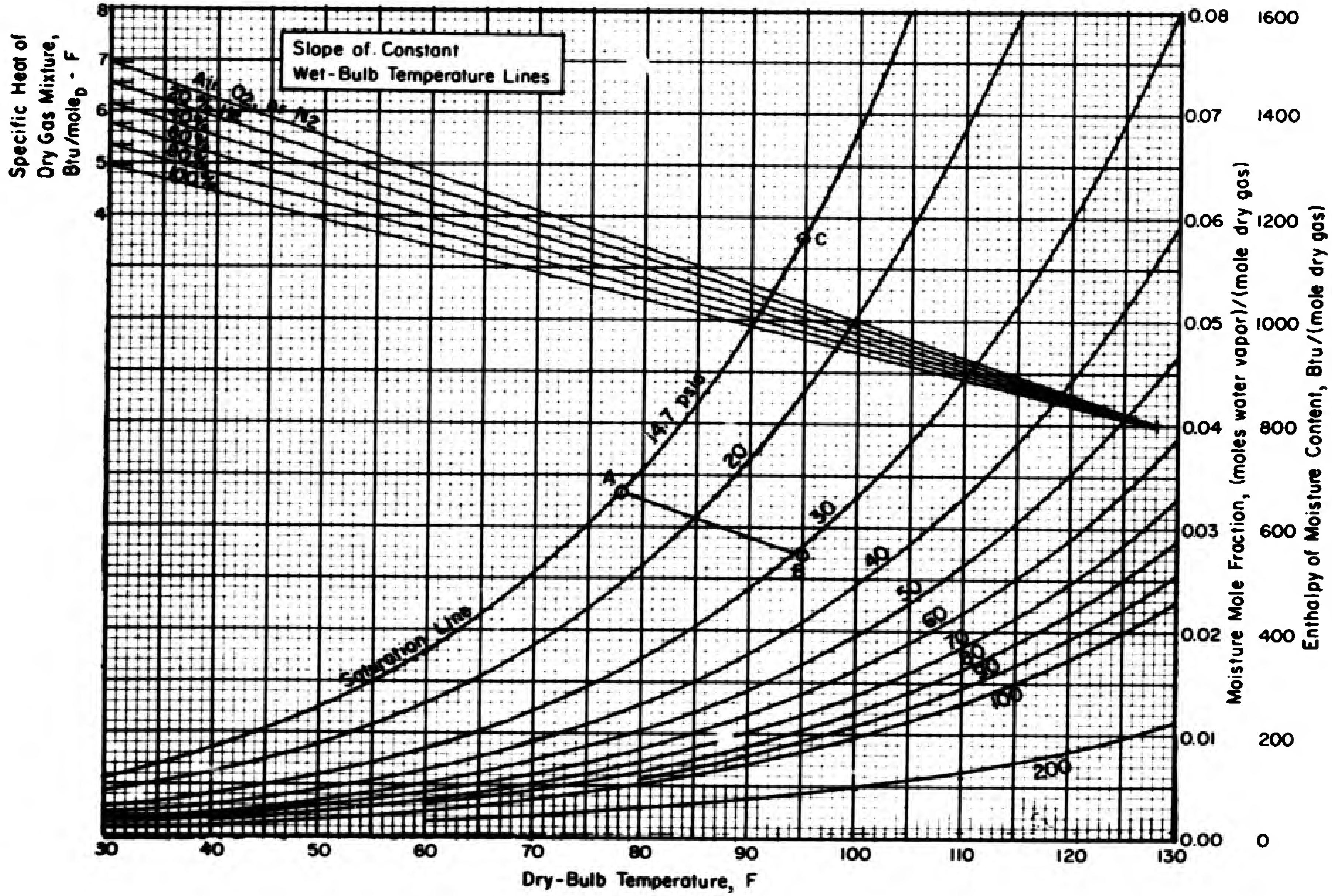


FIGURE 5. PSYCHROMETRIC CHART 1 - DATA FOR GAS MIXTURES AT PRESSURES FROM 14.7 PSIA TO 200 PSIA

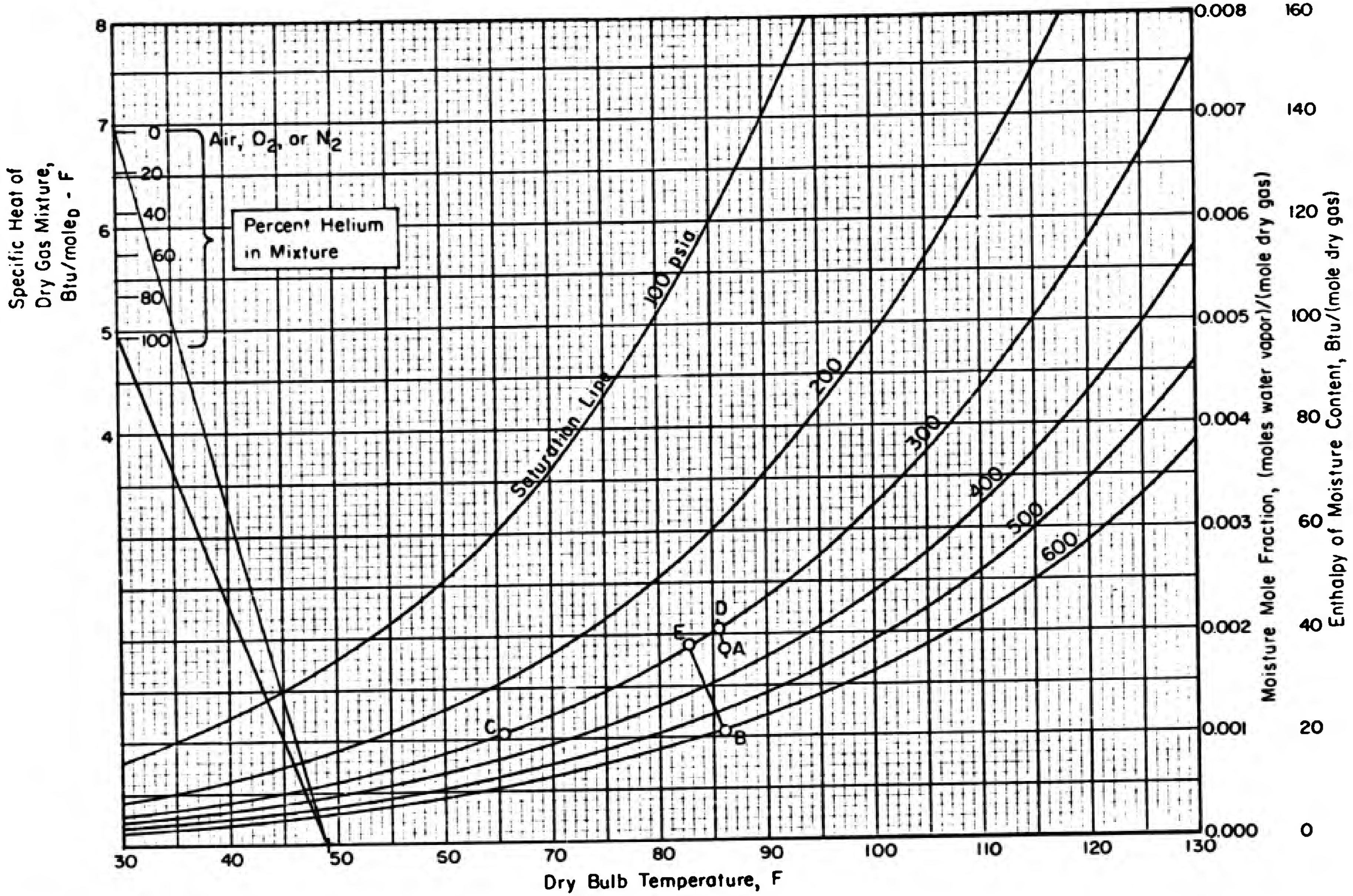


FIGURE 6. PSYCHROMETRIC CHART 2 – DATA FOR GAS MIXTURES AT PRESSURES FROM 100 PSIA TO 600 PSIA

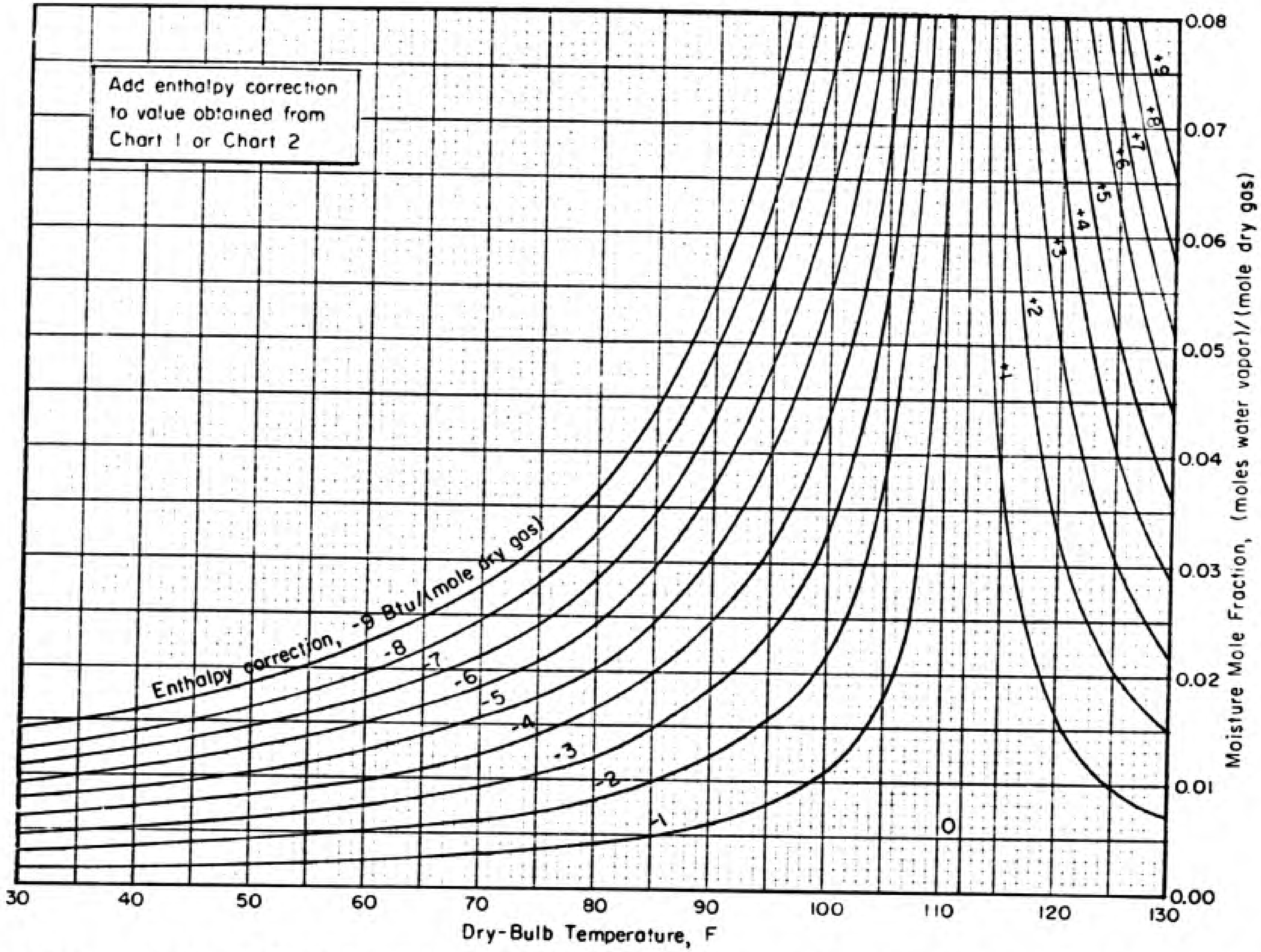


FIGURE 7. PSYCHROMETRIC CHART 3 - CORRECTION FOR ENTHALPY OF MOISTURE CONTENT

Enthalpy is given for the moisture content alone, rather than for the moist gas mixture, and is expressed in Btu/mole of dry gas. Most of the enthalpy of the water vapor is in the latent heat of vaporization. Consequently, the water-vapor enthalpy is almost directly proportional to the amount of water vapor present. For this reason, both enthalpy and moisture concentration appear on the vertical scale of Charts 1 and 2. However, there is a small effect of mixture temperatures which is presented in Chart 3 as a temperature correction.

Detailed methods for various calculations are best shown by examples, which are included below.

Data sources and computational methods involved in preparing the charts and accuracy are discussed in Appendix B.

Definitions of Psychrometric Terms

The nomenclature and definitions relating to the psychrometric charts presented in this manual are generally consistent with those presented in Chapter 6 of the ASHRAE Handbook of Fundamentals (published by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc., New York, 1967). The following definitions are paraphrased from this publication:

W - Humidity ratio is the ratio of the mass of water vapor contained in a given sample of moist gas to the mass of dry gas with which the water vapor is associated, pounds of water vapor per pound of dry gas.

ϕ - Relative humidity is the ratio of the mole fraction of water vapor in moist gas to the mole fraction of water vapor in saturated moist gas at the same temperature and pressure. It is normally expressed as a percentage.

x - Mole fraction pertaining to any given constituent in a mixture of gaseous substances is used herein as the number of moles of that constituent present in the mixture divided by the total number of moles of dry gas contained in the mixture. It is numerically equal to the volume fraction. x_w represents the mole fraction for water vapor, and x_{ws} represents that for water vapor at saturation.

t_{db} - Dry-bulb temperature is the Fahrenheit temperature of moist gas at rest with respect to the temperature-measuring element.

t_{wb} - Thermodynamic wet-bulb temperature is the temperature at which water (liquid or solid), by evaporating into moist gas at given dry-bulb temperature, t_{db}, and humidity ratio, W, can bring the gas to saturation adiabatically at the same temperature t_{wb} while the pressure p is maintained constant.

Additional nomenclature employed in following examples of the use of the diving-gas psychrometric charts are:

c_{pm} - Specific heat at constant pressure, expressed as Btu/mole of dry gas

h - Specific enthalpy, Btu/lb

h_m - Molar enthalpy, Btu/mole

M - Pound molecular weight, lb/mole

Q - Volumetric flow rate, ft^3/min

q - Heat flow rate, Btu/min

w - Mass flow rate, lb/min

ρ - Density, lb/ft^3.

General subscripts used are the following:

d - refers to dry gas mixture

w - refers to water vapor

m - refers to mole as unit of weight.

Example Calculations

Three example calculations which illustrate the use of the diving-gas psychrometric charts are given below.

Example 1

Find the relative humidity of moist air at 1 atm pressure (14.7 psia), 95 F dry-bulb temperature, and 78 F wet-bulb temperature.

Procedure: Using Chart 1 locate Point A at the intersection of the 78 F dry-bulb-temperature line and the 14.7-psia saturation line. (At saturation, wet-bulb and dry-bulb temperatures are the same.) Draw Line AB from Point A parallel to the constant-wet-bulb line for air, using a parallel rule or drafting triangle. Point B is the intersection of the 78 F wet-bulb line (just drawn) and the 95 F dry-bulb line.

Locate Point C by going up the 95 F dry-bulb line to the 14.7 psia saturation line.

Reading the vertical scale on the right to determine the moisture content (expressed as mole fraction) for Points B and C gives the following:

$.0272 \text{ mole}_w/\text{mole}_d$ for Point B

$.0581 \text{ mole}_w/\text{mole}_d$ for Point C.

The relative humidity is the ratio of the moisture content for Point B to the moisture content of saturated gas at the dry-bulb temperature (Point C). Therefore,

$$\text{Relative humidity} = \phi = .0272/.0581$$
$$= 0.468, \text{ or}$$
$$46.8 \text{ percent} \quad .$$

Example 2

Find the humidity ratio and the enthalpy of the gas mixture used in Example 1 (air at one atm pressure, 95 F dry-bulb temperature, and 78 F wet-bulb).

Using the vertical scale on the right for Point B, the enthalpy of the moisture content is read as 544 Btu/mole_d.

Using Chart 3, the enthalpy correction for $x_w = .0272$ and $T_{db} = 95$ F is about 3 Btu/mole_d.

The molar enthalpy of the moisture content is:

$$h_{wm} = 544 - 3 = 541 \text{ Btu/mole}_d \quad .$$

The enthalpy of the moist air mixture is given by

$$h = [(c_{pm})_d \ t_{db} + h_{wm}]/M_d \quad .$$

For air,

$$(c_{pm})_d = 6.95 \text{ Btu/mole}_d$$

$$M_d = 28.96 \text{ lb/mole} \quad .$$

Then

$$h = [(6.95)(95) + 541]/28.96$$

$$h = 41.5 \text{ Btu/lb}_d \quad .$$

The humidity ratio, W, is given by

$$W = x_w(M_w/M_d)$$

$$W = .0272\ (18.01/28.96)$$

$$W = .0169 \text{ lb water vapor per lb dry air}$$

From standard psychrometric charts for air at 1 atm, the following values are obtained directly:

$$h = 41.58 \text{ Btu/lb}_d$$

$$W = .0168 \text{ lb}_w/\text{lb}_d \text{ (approximately)}$$

$$\phi = 47 \text{ percent (approximately)} \quad .$$

The values obtained by the use of Charts 1 and 3 in this example are essentially in agreement with those obtained using standard psychrometric charts for air.

Example 3

Find the energy requirement, moisture removal rate, and coil temperature to dehumidify 100 cfm of a 1 percent O_2 – 99 percent He gas mixture at 300 psia from 86 F dry-bulb temperature and 90 percent relative humidity to 50 percent relative humidity. Also find the wet-bulb temperatures for this gas mixture at 86 F dry-bulb temperature and at 90 and 50 percent relative humidities.

Procedure:

Moisture Removal Rate. Using Chart 2, the saturation line for 300 psia shows that the moisture mole fraction at 86 F and 100 percent relative humidity is .00209 $\text{mole}_w/\text{mole}_d$. Since relative humidity, ϕ, is:

$$\phi = x_w/x_{ws} \quad ,$$

the moisture mole fraction at ϕ = 90 percent is

$$x_w = 0.90\ (.00209)$$

$$x_w = .01881 \text{ mole}_w/\text{mole}_d$$

and at ϕ = 50 percent is

$$x_w = 0.50\ (.00209)$$

$$x_w = .001045 \text{ mole}_w/\text{mole}_d \quad .$$

The 90 and 50 percent relative humidity points are shown on Chart 2 as Points A and B. From the density tables for the 1 percent O_2 – 99 percent He mixture, the density figures given for 640 ft depth (299.14 psia) are

$$\rho_d = 0.21908 \text{ lb/ft}^3 \text{ at 80 F}$$

$$\rho_d = 0.21514 \text{ lb/ft}^3 \text{ at 90 F} \quad ,$$

and the molecular weight of the dry gas mixture is given as 4.283. Interpolation to find the density at 86 F gives

$$\rho_{86\text{ F}} = 0.2167 \text{ lb/ft}^3 \quad .$$

(For engineering purposes, there is no need to correct for the difference between 299.14 and 300 psia).

The humidity ratio is given by

$$W = x_w \, (M_w/M_d) \quad ;$$

therefore, at 90 percent relative humidity

$$W = .01881 \, (18.01/4.283)$$

$$W = .07910 \ \mathrm{lb_w/lb_d} \quad .$$

and at 50 percent relative humidity

$$W = .01045 \, (18.01/4.283)$$

$$W = .04394 \ \mathrm{lb_w/lb_d} \quad .$$

The dry-gas mass flow rate at 100 cfm is

$$w_d = \rho_d Q_d$$

$$w_d = 0.2167 \, (100)$$

$$w_d = 21.67 \ \mathrm{lb_d/min} \quad .$$

The moisture removal rate is

$$w_w = w_d \, (W_{90} - W_{50})$$

$$w_w = 21.67 \, (0.07910 - 0.04394)$$

$$w_w = 0.7619 \ \mathrm{lb_w/min} \quad .$$

Coil Temperature. The coil temperature is found at Point C on Chart 2, a point on the 300-psia saturation line at which the moisture mole fraction is the same as that of 86 F dry-bulb gas at 50 percent relative humidity (Point B). This indicates that it will be necessary to cool the gas mixture to 65.5 F to remove the desired amount of moisture.

Energy Requirement. The moisture enthalpy values corresponding to Points A and C are:

$$h_{wm} = h_{wm} \text{ (from Chart 2)} - \Delta h_{wm} \text{ (from Chart 3)}$$

$$h_{wm} = 37.6 - 0.3$$

$$= 37.3 \ \mathrm{Btu/mole_d} \text{ at } t_{db} = 86 \text{ F}, \ \phi = 90 \text{ percent} \quad .$$

$$h_{wm} = 20.9 - 0.3$$

$$= 20.6 \ \mathrm{Btu/mole_d} \text{ at } t_{db} = 65.5 \text{ F}, \ \phi = 100 \text{ percent} \quad .$$

The corresponding moist-gas-mixture enthalpies are computed by the following expression:

$$h = [(c_{pm})_d t_{db} + h_{wm}]/M_d \quad .$$

The value of the specific heat of the dry gas is computed as follows:

$$\begin{aligned}(c_p)_d &= 6.95\, x_{O_2} + 4.965 x_{He} \\ &= 6.95(0.01) + 4.965(0.99) \\ &= 4.985 \text{ Btu/mole}_d\text{-F} \quad .\end{aligned}$$

Using this value in the expression for enthalpy, the following values are obtained:

$$h_A = [(4.985)(86) + 37.3]/4.283$$

$$h_A = 108.80 \qquad \text{Btu/lb}_d \quad .$$

$$h_C = [(4.985)(65.5) + 20.6]/4.283$$

$$h_C = 81.05 \qquad \text{Btu/lb}_d \quad .$$

$$q = w_d (h_A - h_c)$$

$$q = 21.67 (108.80 - 81.05)$$

$$q = 601.3 \qquad \text{Btu/min} \quad .$$

This is equivalent to 601.3/200 = 3 tons of refrigeration, approximately. (One ton of refrigeration is defined or 200 Btu/min.)

In controlling the climate of a diving habitat, it may be necessary to reheat the gas leaving the cooling coil. If, for example, it is desirable to have the gas from the environmental control system returning at 75 F, the reheat energy required can be computed as follows:

$$\begin{aligned}\Delta h_{65.5-75} &= (c_p)_d\, \Delta t_{db}/M_d \\ &= 4.985\,(75 - 65.5)/4.283 \\ &= 11.06 \text{ Btu/lb}_d \quad .\end{aligned}$$

$$\begin{aligned}q &= w_d \Delta h \\ &= 21.67\,(11.06) \\ &= 239.6 \text{ Btu/min} \quad .\end{aligned}$$

Wet-Bulb Temperatures. On Chart 2, the slope of the constant wet-bulb temperature line should be that corresponding to a specific heat of 4.985 Btu/mole$_d$. Drawing lines of this slope from Points A and B to the 300-psia saturation line gives Points D and E. At saturation, wet-bulb and dry-bulb temperatures are the same: therefore, the following results are obtained:

t_{wb} = 85.4 F when t_{db} = 86 F and ¢ = 90 percent

t_{wb} = 82.8 F when t_{db} = 86 F and ¢ = 50 percent

MISCELLANEOUS CALCULATIONS

Seawater Pressure at Depth

The seawater pressure at depth can be calculated by several methods. Three of these follow.

Method 1

$$\text{Seawater pressure, atm} = \frac{\text{depth, ft}}{33} + 1 \quad .$$

This calculation is correct for seawater density of 64.12 lb/ft^3, and is used in the U. S. Navy Diving Manual.

Method 2

Select atm pressure for depth of interest from Column 2 in tables of properties.

The tables are based on seawater density of 64.0 lb/ft^3, so the resulting pressure will be 0.2 percent less than for Method 1. The equation used in calculating this table is:

$$\text{atm} = \frac{\text{depth, ft} \times 64.0\ \text{lb/ft}^3}{14.696 \times 144} + 1 \quad .$$

This reduces to:

$$\text{atm} = \frac{\text{depth, ft}}{33.1} + 1$$

Method 3

Measure the temperature gradient and salinity gradient at the diving site and calculate a seawater density gradient and the true pressure at the depth of interest. After mean density has been calculated, atm pressure is:

$$\text{atm} = \frac{(\text{depth, ft}) \times (\text{mean density, lb/ft}^3)}{14.696 \times 144}$$

$$+ \frac{(\text{barometric pressure, in Hg})}{2.041} \quad .$$

The barometric pressure is approximately 14.7 psi, and can vary by about ±0.5 psi with the weather. It will influence bottom pressure accordingly.

For normal diving calculations, the same results can be obtained within satisfactory tolerances by any of these methods.

Oxygen Percentage at Specified Partial Pressure and Depth

The percentage of oxygen in a mixture corresponding to a selected oxygen partial pressure and depth can be calculated as follows:

$$\text{Percent oxygen} = \frac{(\text{partial pressure oxygen, atm})\ (100)}{(\text{seawater pressure at depth, atm})} .$$

Carbon Dioxide Percentage at Specified Partial Pressure

The percentage of carbon dioxide in a mixture corresponding to a selected carbon dioxide partial pressure and depth can be calculated as follows:

$$\text{Percent carbon dioxide} = \frac{(\text{partial pressure carbon dioxide, atm})\ (100)}{(\text{seawater pressure at depth, atm})} .$$

Conversion of Liters to Cubic Feet

Several conversions that are frequently used can be easily confused. These involve the following conversion factors:

(1) 1 ft^3 = 28.317 liters

(2) 1 std ft^3 is mass in 1 ft^3 at 60 F, 14.696 psia

(3) 1 std liter is mass in 1 liter at 32 F, 14.696 psia

(4) 1 std ft^3 = 26.3 std liters (accounting for temperature correction).

(5) 1 std ft^3 air for compressor rating is at 14.7 psia, 36% RH, 70 F, $\rho = 0.075\ lb/ft^3$

Conversion Factors for Viscosity

In the tables of Part 2, viscosity is expressed as lb/ft sec. The following conversion factors can be used in converting to other units:

To get:	Multiply table entry by:
Poise	14.88
Kg/hr meter	5.357×10^4
Lbs/ft hr	3600
Slugs/ft hr	111.89

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(7) P. S. Riegel, The 3-color chart of Figure 4 was provided by P. S. Riegel and is to be described in detail in a future publication.

(8) B. R. Lower, J. S. Glasgow, and D. W. Frink, "Mark VII and IX Carbon Dioxide Canister Heat Exchangers", report to U. S. Navy Experimental Diving Unit, Contract No. N00014-C-0199, April 25, 1969.

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U. S. NAVY DIVING-GAS MANUAL

PART 2.

PROPERTIES OF HELIUM-OXYGEN MIXTURES AND OF PURE GASES

October 1, 1969

PART 2. PROPERTIES OF OXYGEN-HELIUM MIXTURES AND OF PURE GASES

CONTENT AND FORMAT OF TABLES

The tables of gas properties included in this manual were prepared for convenient use in design and operation of diving systems. The pressure range covered is 0 to 1500 feet of seawater, and 500 to 5000 psi, for use in high-pressure-gas-storage calculations. All pressures are also expressed in atm as a convenience for calculations. The temperature range covered is 30 F to 130 F, which covers the usual range of air and water temperatures for diving operations.

In order to present data as a function of depth, it was necessary to select a suitable value for the density of seawater. As discussed in Appendix A, density of seawater varies slightly with temperature and salinity, so that no single value can be correct for all conditions. A value of 64.0 lb/ft^3 was selected for use in preparing these tables. If another value is known to be applicable, the known value can be used to calculate the true pressure at depth, and tabulated values for this pressure can then be used.

Properties of five pure gases and of thirteen mixtures of helium and oxygen are tabulated. These gases and mixtures appear most useful in diving studies. The mixtures included in the tables are

Air
Oxygen
Helium
Nitrogen
Carbon dioxide
Oxygen-helium mixtures:

O_2, percent	He, percent
60	40
40	60
32	68
20	80
15	85
10	90
6	94
3	97
1.5	98.5
1.0	99.0
0.7	99.3
0.5	99.5
0.3	99.7

For each of the 18 gases and mixtures listed above, the following properties are tabulated:

Property	Units
Specific volume	ft^3/lb
Density	lb/ft^3
Enthalpy	Btu/lb
Entropy	Btu/lb F
C_p	Btu/lb F
C_v	Btu/lb F
Thermal conductivity	Btu/sec ft F
Prandtl number	None
C_p/C_v (k) or (γ)	None
Viscosity	lb/ft sec
Sonic velocity	ft/sec

The increments of pressure used for specific volume and density are small, to minimize the need for interpolation in use of tables. Most of the other properties vary only a little through the pressure and temperature range covered, so that large increments of pressure and temperature are used in the tables.

The content of the tables is discussed in some detail in Appendix C. At this point it is appropriate to note that very few published experimental data were found for oxygen-helium mixtures, so that comparisons of the table contents with experimental information were not generally possible. Moreover, some of the correlation schemes used to provide information for the pure gases could not be used for mixtures and required abbreviation of some tables. Accordingly, the possibility of some indeterminate error in helium-oxygen tables should be recognized, with the possible magnitude of error increasing with increasing pressure.

APPENDIX A

DENSITY OF SEAWATER

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DENSITY OF SEAWATER

For practical purposes, in diving practice it can be assumed that the density of seawater is 64.0 lb/ft^3, equivalent to 0.4444 psi for each foot of depth. The true value of seawater density varies from point to point in the oceans, but the error resulting from the assumption of a constant value should normally be less than 0.5 percent, equivalent to 5 feet in 1000 feet.

The true density of seawater depends upon its salinity, or salt content, its temperature, and its depth. Increasing salinity results in increasing density; increasing temperature results in decreasing density except for the range of temperature below 39 F, and water is slightly compressible so that increasing depth results in increasing density. The effects of these three variables are interrelated in a complex way so that it is difficult to calculate an exact value of density. Accordingly, calculation methods based on use of nomograms, or upon tabulated values, are commonly used by oceanographers needing high accuracy. All of these tables and nomograms are based on use of metric or international units. Illustrative density data that follow are shown in both metric and engineering units to provide a basis of comparison.

The surface temperature of seawater varies widely both with latitude and with the seasons, and can range from about 32 F to about 85 F. However, at a depth of 600 feet the worldwide variation of seawater temperature is smaller, 34 F to 68 F, and at 1500 feet the range is further reduced to 39 F to 54 F. The lower temperatures are found in northern areas and the higher temperatures are found near the equator. The difference in density at constant salinity of 35 parts per thousand for a temperature range of 39 F to 85 F would be 0.59 percent.

The salinity of seawater is defined as the total quantity of dissolved solids expressed as parts per thousand by weight. Salinity can vary widely from place to place, and is typically low in regions of high rainfall, or inflow from coastal rivers, and high in regions of high evaporation and low rainfall, as in the Sargasso Sea. The usual range of salinities is from 33 to 37 parts per thousand; the equivalent range of seawater density at a constant water temperature is 0.3 percent.

The third variable that affects seawater density is the compressibility of water under pressure. However, this factor is very small for present diving depths, and density is increased by only 0.01 percent at 1500 feet.

The naturally occurring gradients of temperature and salinity in the oceans are such that high temperatures and high salinities are found near the surface, and lower temperatures and lower salinities are found with increasing depth. The net result is a very small gradient of density, which increases with depth within a water mass of a common origin. Discontinuities of temperature-salinity gradients occur as the result of formation of layers of water from different sources and can be clearly distinguished when plotted on a temperature-salinity diagram.

Figure A-1 is a temperature-salinity diagram upon which are plotted some typical values of August surface salinities and temperatures for various coastal locations.(A-1)

The diagonal curves represent constant-density lines. The dashed lines are seawater **density, in lb/ft^3, and the solid lines are density anomaly,** or the last two places in **the specific gravity value; for example, the value** "25" means that 1.025 is the specific **gravity. Figure 1 can be used to interpret density in engineering units,** simply by **plotting salinity and temperature data in either** English or metric units.

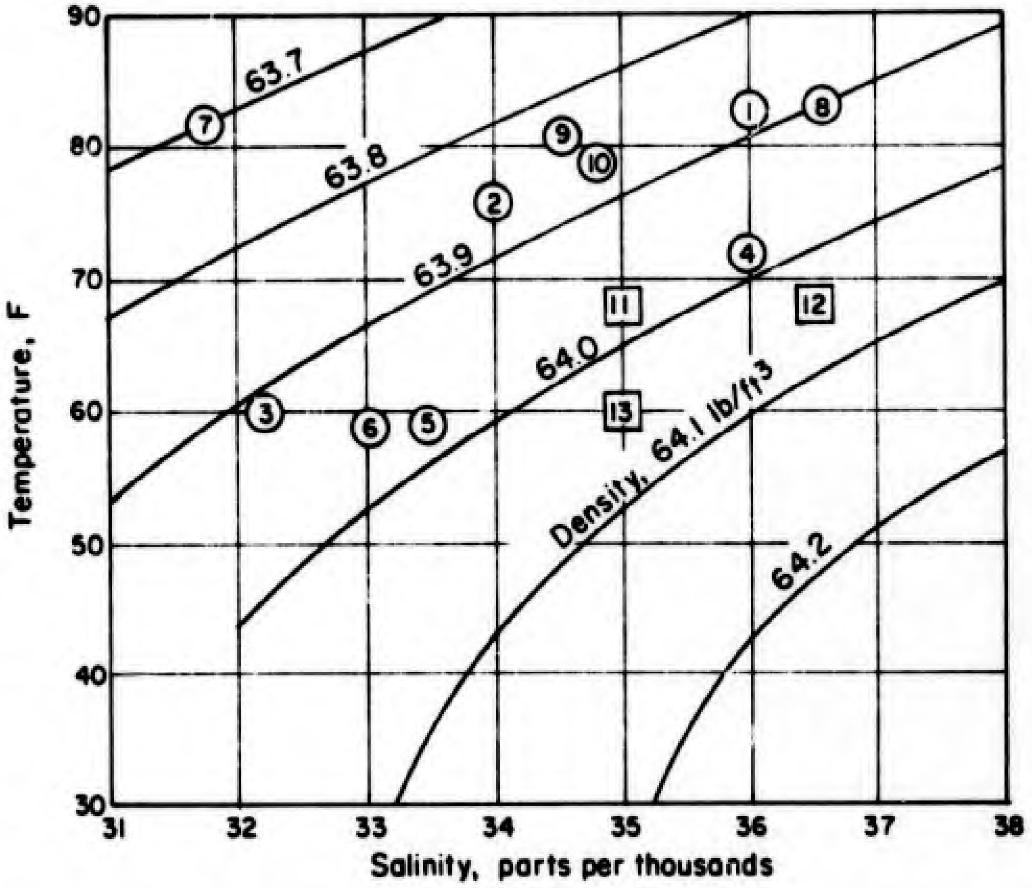

FIGURE A-1. TEMPERATURE-SALINITY-DENSITY PLOT SHOWING SEAWATER SURFACE CONDITIONS AT SELECTED LOCATIONS, AUGUST

No.	Density	Location
(1)	63.88	Florida East Coast
(2)	63.85	Atlantic Coast off Chesapeak Bay
(3)	63.91	Atlantic Coast off Maine
(4)	63.99	Atlantic Coast off Gibralter
(5)	63.97	Pacific Coast off San Diego
(6)	63.95	Pacific Coast off Seattle
(7)	63.7	Panama - Pacific Coast
(8)	63.9	Panama - Atlantic Coast (Gulf)
(9)	63.82	Pacific - off South Japan
(10)	63.86	Pacific - at Hawaii
(11)	63.97	South Central Atlantic
(12)	64.03	North Central Atlantic
(13)	64.04	Central Indian Ocean

In Figure A-1 it will be noted that the density of surface water under summer conditions is generally somewhat less than 64.0 lb/ft^3. However, the density increases as the water cools in other months, and is greater with increasing depth, so that the value of 64.0 appears suitable as an all-around number for engineering use.

References

(A-1) Von Arx, W. S., An Introduction to Physical Oceanography, Addison-Wesley Publishing Co., Inc., Reading, Mass. U.S. and London, England; 1962 Library of Congress Card No. 61-5026.

(A-2) Williams, Jerome, Oceanography, Little, Brown and Company, Boston and Toronto, 1962; Library of Congress Card No. 62-18105.

(A-3) Sverdrup, H. U., Johnson, Martin W., and Fleming, Richard H., The Oceans, Their Physics, Chemistry, and General Biology, Prentice-Hall, Inc., Englewood Cliffs, N. J., 1942.

APPENDIX B

DATA SOURCES AND CALCULATIONS FOR PSYCHROMETRIC CHARTS

APPENDIX B

DATA SOURCES AND CALCULATIONS FOR PSYCHROMETRIC CHARTS

In constructing the psychrometric charts for diving-gas mixtures, the following assumptions are made:

(1) The molar specific heats of the dry-gas and constituents are constant over the temperature and pressure ranges covered by the charts. Specifically, the following values are assumed:

c_{pm} = 6.951 Btu/mole for air, oxygen, and nitrogen

c_{pm} = 4.965 Btu/mole for helium.

(2) The molar specific heat of the dry-gas mixture is calculable by the ideal additive rule,

$$(c_{pm})_d = 6.951\ (x_{O_2} + x_{H_2}) + 4.965\ x_{He} \qquad (\text{Btu/mole}_d)$$

(3) The enthalpy of the moist-gas mixture is equal to the sum of the individual enthalpies of the dry-gas constituents and the water vapor, that is,

$$h_{mixture} = h_d + h_w$$

$$= (c_{pm})_d\ t_{db} + h_w.$$

Further, the value of enthalpy of the water vapor is taken as the value for saturated water vapor in the absence of other gases. No correction for effect of total pressure is used.

(4) For total mixture pressures up to 100 psia, no correction for the effect of total pressure on the water-vapor saturation pressure is used. Above 100 psia, Povnting's equation,

$$\frac{\Delta P_{ws}}{P_{ws}} = \frac{v_\ell}{RT}\ \Delta P_{total},$$

where v_ℓ is the specific volume of saturated liquid, is used as an estimated correction for total pressure. A derivation of Poynting's equation is presented in Reference B-1, p 236.

By limiting the psychrometric charts to 600-psia pressure, and with the assumption that oxygen and nitrogen concentration will be low at the higher pressures, it is believed that the accuracy of the charts will be adequate for normal engineering calculations, and that the effort required to obtain an estimate of the error is not justified at this time.

Charts 1 and 2 are primarily graphs of the relationship

$$x_w(t_{db}, p) = \frac{p_s}{p_{total} - p_s} ,$$

where the values of p_s have been taken from Reference (B-2), Chapter 21, Table 2. Values used in Reference B-2 are taken from an earlier paper by Goff and Gratch.

At pressures above 100 psia, values for p_s have been modified using Poynting's correction.

The enthalpy scale on Charts 1 and 2 (Figures 5 and 6) was set up using an approximate water-vapor enthalpy value of 20, 000 Btu/mole$_w$. (This value is correct for saturated vapor at 112 F.) The approximate water-vapor enthalpy scale, expressed in Btu/mole of dry gas, is obtained by simply multiplying the moisture mole fraction, x_w, by 20, 000 or

$$h_{m,w} = 20,000 \left(\frac{\text{Btu}}{\text{mole}_w}\right) x_w \left(\frac{\text{moles}_w}{\text{mole}_d}\right) .$$

Chart 3 (Figure 7) for the enthalpy correction is derived as follows: If Δh_w is defined as the difference between the true water-vapor enthalpy at t_{db} and the reference enthalpy value at 112 F, then the error is given by

$$\Delta h_{m,w} \left(\frac{\text{Btu}}{\text{mole}_d}\right) = x_w \Delta h_{m,w} \left(\frac{\text{Btu}}{\text{mole}_w}\right) .$$

To set up constant-$\Delta h_{m,w}$ lines, the above expression was simply rearranged to obtain

$$x_w = \Delta h_{m,w} \left(\frac{\text{Btu}}{\text{mole}_d}\right) / \Delta h_{m,w} \left(\frac{\text{Btu}}{\text{mole}_w}\right) ,$$

where Δh_w is a function of dry-bulb temperature.

Enthalpy values for saturated water vapor were also taken from Reference (B-2), Chapter 21, Table 2. As previously explained, no correction was made for the effect of total mixture pressure on the water-vapor enthalpy.

Because the constant-wet-bulb-temperature lines are lines of constant mixture enthalpy, their slope is determined as follows: The expression for mixture enthalpy was taken previously to be

$$h_{m,\text{mixture}} = (c_{pm})_d t_{db} + h_{m,w} .$$

Differentiating with respect to dry-bulb-temperature results in

$$\left.\frac{dh_{m,\text{mixture}}}{dt_{db}}\right]_{t_{wb}} = (c_{pm})_d + \frac{dh_{m,w}}{dt_{db}} = 0 ,$$

Therefore,

$$\frac{dh_{m,w}}{dt_{db}} = -(c_{pm})_d$$

along a constant wet-bulb temperature line.

References

(B-1) Glasstone, Samuel, Thermodynamics for Chemists, 8th Printing, D. Van Nostrand, New York (1947).

(B-2) ASHRAE Handbook of Fundamentals, American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc., New York (1967).

APPENDIX C

DATA SOURCES AND INTERPOLATION TECHNIQUES FOR CALCULATING TABLES OF PHYSICAL PROPERTIES OF GASES

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APPENDIX C

DATA SOURCES AND INTERPOLATION TECHNIQUES FOR CALCULATING TABLES OF PHYSICAL PROPERTIES OF GASES

For the purpose of this discussion, the physical properties will be classed in two groups: (1) volumetric properties and (2) thermodynamic and transport properties.

Volumetric Properties

Density and specific volume values for the tables were calculated on a computer by manipulation of the virial equation of state:

$$\frac{PV}{RT} = 1 + \frac{B}{V} + \frac{C}{V^2} + \frac{D}{V^3} + \frac{E}{V^4} ----$$

As a matter of convenience, all substances were treated in this general fashion.

At first glance this might be considered a poor technique for obtaining such information. For example, it can be noted that, because of the sizable pressure range, as many virial coefficients as possible need to be included and present knowledge of the higher ones is poor. This is indeed true, but the difficulty is lessened by two facts:

(1) The higher coefficients can be estimated for pure substances and comparisons made of calculated and experimental compressibility results.

(2) The virial expansion in $\frac{1}{V}$ converges more rapidly than the pressure expansion which would have been obviously more convenient in this situation. Therefore the $\frac{1}{V}$ expansion was used to minimize the effect of errors in the higher coefficients.

The balance was swung in favor of this technique by the $He-O_2$ mixtures. No PVT data were found for this system in the temperature range of interest. The temperature range is low enough that the quantum effects of helium cannot be dismissed summarily as insignificant. Under these conditions it seemed best to estimate the second and third virial coefficients where some precedent is available for making estimates from knowledge of pure-component behavior. This feeling was reinforced when it became clear that the other major alternative would fall short of the goal of producing desired information. This alternative would have been to determine pseudocritical constants of the mixtures by some scheme and from these calculate compressibilities (or for that matter other thermodynamic properties) by employing some corresponding-states treatment. For the very helium-rich mixtures, it developed that, even overlooking problems in making choices of pseudocritical constants, tabulations of Pitzer et al. and Hougen et al. were not capable of producing data over the temperature range of interest.(1)

Having selected the virial formalism, then the problem was to evaluate the virial coefficients. Consider the pure gases only for a moment. It was elected to evaluate B and C for pure substances using a Kihara potential function with a spherical core. Tables of values of functions are available for these. The basic information is contained in three references.(C-2 – C-4) The same sort of information for the fourth and fifth virial coefficients is to be found in one paper.(C-5) The information for the fourth and fifth coefficients is presented for the Lennard-Jones and Devonshire potential function only. However, this is the same as a Kihara potential with a spherical core of radius zero.

In order to use the information in References C-2 through C-5 it is necessary to have parameters which characterize the particular substance. These parameters were obtained by a variety of techniques from numerous sources, which are summarized in the listing at the end of this section.

For helium-oxygen mixtures it was necessary to calculate virial coefficients for the mixture. In the case of the second virial coefficient, this involves taking a sum of terms which include the composition of the given mixture, virial coefficients for both pure substances, and one virial coefficient characteristic of the two substances in the mixture. This is a common procedure described in most texts. In the listing which follows, the mixing rules used to calculate the term characteristic of the two substances in the mixture are given. Quantum corrections are included.

The procedure for estimating the third virial coefficient of the mixture is similar, although the rules stated for calculation of the mixed coefficients are empirical. No estimate for other virial coefficients was possible. Thus, results for all mixtures became more suspect with increasing pressure.

For pure substances it was possible to compare compressibility values calculated by this scheme with some experimental values. Experimental results were chosen with an eye toward getting a single piece of work which spanned a significant portion of the pressure-temperature range of interest. As it turned out, the very precise and generally well regarded work of Michels and co-workers was often suitable.

In the listing below, then, may be found statements regarding the source material for parameters of the virial coefficients and compressibility data and something about the difference between calculated and experimental compressibilities. Following that is a listing of the parameters used for each gas and listings of Fortran IV statements for two computer routines – one for pure substances, the other for mixtures. The Fortran statements supply the detailed information on the calculational procedure.

Air

Parameters from Hirschfelder, Curtiss and Bird, "The Molecular Theory of Gases and Liquids", Wiley, New York (1954), p 1111 (parameters from Ref. L).

Data from Michels, A., Wassenaar, T., and Van Seventer, W., "Isotherms of Air Between 0 and 75 C and Pressures up to 2200 Atm", Appl. Sci. Rev., A4, 52 (1953).

Difference between calculated and experimental compressibilities is 0.6 percent or less for the points examined.

Nitrogen

Parameters from Holleran, E. M., "A Dimensionless Constant Characteristic of Gases, Equations of State and Intermolecular Potentials", J. Phys. Chem., 73, 167 (1969).

Data from Michels, A., Lunbeck, R. J., and Wolkers, G. J., "Thermodynamical Properties of Nitrogen as Functions of Density and Temperature Between -125 and +150 C and Densities up to 760 Amagat", Physica, 17, 801 (1951).

Difference between calculated and experimental compressibilities is 0.6 percent or less for the points examined.

Oxygen

Parameters from Holleran, E. M., "A Dimensionless Constant Characteristic of Gases, Equations of State and Potentials", J. Phys. Chem., 73, 167 (1969) and "Linear Relation of Temperature and Density at Unit Compressibility Factor", J. Chem. Phys., 47, 5318 (1967) (with slight scaling).

Data from Michels, A., Schamp, H. W., and De Graaf, W., "Compressibility Isotherms of Oxygen", Physica 20, 1209 (1954).

Difference between calculated and experimental compressibilities is 0.6 percent or less for points examined.

Helium

Parameters from Hirschfelder, Curtiss and Bird, "The Molecular Theory of Gases and Liquids", Wiley, New York (1964), (quantum mechanical with slight sealing), p 1110.

Data from Canfield, F. B., Leland, T. W., and Kobayashi, R., "Compressibility Factors for Helium-Nitrogen Mixtures", J. Chem. Engr. Data, 10, 92 (1965) and Miller, J. G., Brandt, L. N., and Stroud, L., "Compressibility Factors for Helium and Helium-Nitrogen Mixtures", Bureau of Mines Rept. of Invest., No. 5845 (1961).

Difference between calculated and experimental compressibilities is 0.5 percent or less for points examined.

Carbon Dioxide

Parameters from Sherwood, A. E., and Prausnitz, J. M., "Intermolecular Potential Functions and the Second and Third Virial Coefficients", J. Chem. Phys., 41, 429 (1964) and Holleran, E. M., J. Phys. Chem., 73, 167 (1969) (for 4th and 5th virials).

Data from Van Huff, V. E., Houghton, G., and Coull, J., "Equation of State and Compressibilities for Gaseous CO_2 in the Range 0-600 C and 0 to 150 Atm", J. Chem. and Engr. Data, 8, 336 (1963); and Hilsenrath, et al., National Bureau of Standards Circular 564, U. S. Govt. Printing Office, Washington, D. C. (1955).

Difference between calculated and experimental compressibilities is 0.5 percent or less for points examined.

Helium-Oxygen Mixtures

Parameters –

Mixing rules to estimate second virial coefficient characteristic of the two substances:

	In Fortran Statements
$2\sigma_{12} = \sigma_{11} + \sigma_{22}$	BGAS = $1.262 \times 10^{24}\,\sigma^3$
$\epsilon_{12}^2 = \epsilon_{11}\,\epsilon_{22}$	EGAS = ϵ
$2\rho_{12} = \rho_{11} + \rho_{22}$	
$\rho = 2^{1/6}(\sigma - 2a)$	ASTAR = $\dfrac{2a}{\sigma - 2a}$
$\Lambda^* = \dfrac{6.6 \times 10^{-27}}{\sigma\sqrt{2\epsilon\left(\frac{1}{m_i} + \frac{1}{m_j}\right)^{-1}}}$	LAMBDA = $(\Lambda^*)^2$

m_i is the mass of molecule i.

Thermodynamic and Transport Properties

Values for thermodynamic and transport properties came from a variety of sources. In a program of this size there was no possibility of evaluation, correlation, and refinement of original data. Thus, reliance had to be placed in published efforts which did this. It might be thought then that NBS Circular 564 was uniformly adequate for the pure gases. However, the information in that publication falls quite short of the maximum pressure of interest.

In the list which follows this section, comments are made about the sources of data for the pure gases. Generally, thermodynamic data in these sources were merely converted into desired units. Usually, however, sonic velocities and Prandtl numbers had to be calculated. The Prandtl number calculation is merely the straightforward combination of other quantities in the tables. Sonic velocities were calculated using an approximate but convenient equation for nonideal gases.(6) Exceptions are noted in the list.

Also, usually, low-pressure viscosity and thermal-conductivity.data for pure gases came from two sources.(7, 8) Pressure coefficients were generally estimated using the scheme presented in two sources.(9, 10) The major exceptions to this were helium and air. For air there were other sources. For helium the schemes are invalid.

No data on the thermodynamic properties of helium-oxygen mixtures were found. Sonic velocity was calculated in the same manner as that used for pure substances. Data were found for low-pressure thermal conductivity(11) and the low-pressure viscosity was estimated using the reliable Wilke technique.(12) Pressure coefficients for viscosity and thermal conductivity were not estimated because of a lack of confidence in available techniques in handling helium-containing mixtures. Estimates for the other thermodynamic properties of the mixtures were made assuming that ideal solutions were formed at every pressure and temperature. More refined procedures are not justified by present levels of knowledge.

Air

Enthalpy, entropy, C_p, and C_v, from Din, F., "Air", Thermodynamic Functions of Gases, F. Din, Editor, Butterworths, London (1962), Vol 2, p 1.

Sonic velocity calculated using Reference (6).

Thermal conductivity from Carroll, D. L., Hing, Y. L., and Stiel, L. I., "Thermal Conductivity of Air at Moderate and High Pressures", J. Chem. and Engr. Data, 13, 53 (1968).

Viscosity from Hing, Y. L., Carroll, D. L., and Stiel, L. I., "Viscosity of Gaseous Air at Moderate and High Pressures", J. Chem. and Engr. Data, 11, 540 (1966).

Nitrogen

Enthalpy, entropy; C_p, and C_v from Din, F., "Nitrogen", Thermodynamic Functions of Gases, F. Din, Editor, Butterworths, London (1961), Vol 3, p 72.

Sonic velocity calculated using Reference (6).

Thermal conductivity from References (8) and (10).

Viscosity from References (7) and (9) and Hilsenrath, et al., National Bureau of Standards Circular 564, U. S. Government Printing Office, Washington, D. C. (1955).

Oxygen

Enthalpy, entropy, sonic velocity, C_p/C_v, and C_v up to 100 atmospheres from Hilsenrath, et al., National Bureau of Standards Circular 564, U. S. Government Printing Office, Washington, D. C. (1955).

Enthalpy and entropy above 100 atm from Curl, R. F., Jr., and Pitzer, K. S., "Volumetric and Thermodynamic Properties of Fluids - Enthalpy, Free Energy and Entropy", Ind. Eng. Chem., 50, 265 (1958).

C_p and C_v above 100 atm from Edmister, W. C., "Application of Thermodynamics to Hydrocarbon Processing, Part XIII-Heat Capacities", Petrol. Refiner, 27, 609 (1948).

Viscosity from NBS Circular 564 and Reference (9).

Thermal Conductivity from References (8) and (10).

Helium

Enthalpy, entropy, C_p, C_v, and sonic velocity from Wilson, M. P., Jr., "Thermodynamic and Transport Properties of Helium", USAEC Report GA-1355 (1960).

Viscosity from USAEC Report GA-1355 (1960), Reference (8), and Ross, J. F., and Brown, G. M., "Viscosities of Gases at High Pressures", Ind. Eng. Chem., 49, 2027 (1957).

Thermal conductivity from Reference (8) and USAEC Report GA-1355 (1960).

Carbon Dioxide

Enthalpy, entropy, C_p, C_v, and sonic velocity from Hilsenrath, et al., National Bureau of Standards Circular 514, U. S. Government Printing Office, Washington, D. C. (1955).

Viscosity from NBS Circular 564 and References (7) and (9).

Thermal conductivity from References (8) and (10).

Helium-Oxygen Mixtures

X = mole fraction of helium
Enthalpy (Btu/mole) = X(Enthalpy He) + (1-X)(Enthalpy, O_2).
Entropy (Btu/mole R) = X(Entropy He) + (1-X)(Entropy O_2) - R [X ln X + (1-X) ln (1-X)]
C_p (Btu)/mole, F) = X(C_{pHe}) + (1-X)(C_pO_2)
C_v (Btu)/mole F) = X (C_{vHe}) + (1-X)(C_vO_2)

Sonic velocity from Reference (6).

Viscosity from Reference (1), p 421.

Thermal conductivity from Reference (11).

Note: Equations written here are on a mole basis for simplicity. Tables contain entries on a per pound basis.

References

(1) Reid, R. C., and Sherwood, T. K., Properties of Gases and Liquids, 2nd Ed., McGraw-Hill, New York (1966), Chapter 7, Appendixes A and B.

(2) Sherwood, A. E., and Prausnitz, J. M., "Intermolecular Potential Functions and the Second and Third Virial Coefficients", J. Chem. Phys., 41, 429 (1964).

(3) "Extension of Kihara's Table of F_1, F_2, and F_3", American Documentation Institute, Washington, D. C., Document No. 6307.

(4) Sherwood, A. E., and Prausnitz, J. M., "Third Virial Coefficients for the Kihara, Exp-6, and Square Well Potentials", J. Chem. Phys., 41, 413 (1964).

(5) Barker, J. A., Leonard, P. J., and Pompe, A., "Fifth Virial Coefficients", J. Chem. Phys., 44, 4206 (1966).

(6) Goring, G. E., "A Compact Sonic Velocity Equation for Non-Ideal Gases", Ind. Eng. Chem. (Fundamentals), 7(4), 669 (1968).

(7) DiPippo, R., and Kestin, J., "The Viscosity of Seven Gases Up to 500 C and Its Statistical Interpretation", Proceedings of the Fourth Symposium on Thermophysical Properties, I. R. Moszynski, Editor, A. S. M. E., New York (1968), p 304.

(8) Liley, P. E., The Thermal Conductivity of 46 Gases at Atmospheric Pressure, Reference (7), p 323.

(9) Jossi, J. A., Stiel, L. I., and Thodos, G., "The Viscosity of Substances in the Dense Gaseous and Liquid Phases", A. I. Ch. E. Jour., 8, 59 (1962).

(10) Steil, L. I., and Thodos, G., "The Thermal Conductivity of Nonpolar Substances in the Dense Gaseous and Liquid Regions", A. I. Ch. E. Jour., 10, 26 (1964).

(11) Srivastava, B. N., and Barua, A. K., "Thermal Conductivity of Mixtures of Diatomic and Monatomic Gases", J. Chem. Phys., 32, 427 (1960).

```
                 PROGRAM PROG1(INPUT,OUTPUT,TAPE60=INPUT)
000003           DIMENSION ID(8),TD(25),DSTAR(25),TRELVN(12),P(300)     ,TO(25),D(25
                1),E(25),TF(25),F1(25),F2(25),F3(25),TC(25),C(25),DELC(25),TEMP(25)
000003           DIMENSION V(302,11),ZZERO(11),PP(300)
000003           DIMENSION ITITL1(8),ITITL2(8)
000003           COMMON NV,CV,DV,EV,ISO,COEF
000003           REAL LAMBDA,LENOPT
000003           EXTERNAL FUNCT
000003           DIMENSION FMAT1(3),FMAT2(3)
000003           INTEGER FMAT1,FMAT2
000003           DATA(P(I),I=1,8)/1.0,2.0,4.0,6.0,8.0,9.0,12.0,25.0,100.0/
000003           DATA(DSTAR(I),I=1,8)/0.0145,0.00203,0.03247,0.01020,0.0105/,
                1 0.00/26,0.003825,0.000120/
000003           PRINT 9999
000007      9999 FORMAT(*PM REVERSE PAPER*)
000007         5 READ 1000,(ID(I),I=1,8)
000021      1000 FORMAT (8A10)
000021           IF (EOF,60) 10,15
000024        10 CALL EXIT
000025        15 CONTINUE
000025           PRINT 2000,(ID(I),I=1,8)
000037      2000 FORMAT (1H1,10X,8A10)
000037           READ 1000,(ITITL1(I),I=1,8)
000051           READ 1000,(ITITL2(I),I=1,8)
000063           READ 1001,ASTAR,ALPHA,LAMBDA,EGAS,BGAS,GGAS,HGAS,CONSTC
000107      1001 FORMAT (8E10.0)
000107           READ 1002,NUMT,NCMP,LENOPT,NENOPT
000123      1002 FORMAT (2I10,6E10.0)
000123           PRINT 2001,ASTAR,ALPHA,LAMBDA,EGAS,BGAS,HGAS,GGAS
000145      2001 FORMAT (//10X,5HASTAR,5X,E15.5  /,
                1               10X,5HALPHA,5X,E15.5  /,
                2               10X,6HLAMBDA,4X,E15.5 /,
                3               10X,4HEGAS  ,6X,E15.5 /,
                4               10X,4HBGAS  ,6X,E15.5 /,
                5               10X,4HHGAS  ,6X,E15.5 /
                6               10X,4HGGAS  ,6X,E15.5  //)
000145           READ 1003,NTD
000153      1003 FORMAT (I10)
000153           READ 1001,(TD(I),D(I),E(I),I=1,NTD)
000172           DO 30 I=1,NTD
000176           PRINT 2002, TD(I),D(I),E(I)
000205      2002 FORMAT (//10X,1HT, E15.6,5X,1HD,E15.6,5X,1HE,E15.6)
000205        30 CONTINUE
000210           READ 1003,NTF
000215           READ 1001,(TF(I),F1(I),F2(I),F3(I),I=1,NTF)
000236           DO 40 I=1,NTF
000246           PRINT 2003,TF(I),F1(I),F2(I),F3(I)
000253      2003 FORMAT (//10X,1HT,E15.6,4X,2HF1,E15.6,4X,2HF2,E15.6,4X,2HF3,E15.6)
000253        40 CONTINUE
000256           READ 1003,NTC
000263           READ 1001,(TC(I),C(I),DELC(I),I=1,NTC)
000302           DO 50 I=1,NTC
000304           PRINT 2004,TC(I),C(I),DELC(I)
000315      2004 FORMAT (//10X,1HT,E15.6,5X,1HC,E15.6,4X,2HDC,E15.6)

000315        50 CONTINUE
000320           FMAT1(1)=10H(F9.0,F9.2
000321           FMAT1(2)=10H ,F8.2,2X,
000323           FMAT1(3)=10H1F8.3)
000324           FMAT2(1)=10H(5X,F9.0,
000326           FMAT2(2)=10H,F8.2,2X,
000327           FMAT2(3)=10H1F8.3)
000331           DELTAT=5.556
000332           TRELVN(1)=272.04
000334           DO 11 I=2,11
000335        11 TRELVN(I)=TRELVN(I-1)+DELTAT
000342           DO 12 I=1,100
000343        12 P(I)=(I-1)*10.0
000351           DO 13 I=1,11
000353        13 P(I+100)=1000.0+(I-1)*50.0
000363           DO 16 I=1,111
000364        16 PP(I)=(P(I)*0.444444*14.696)/14.696
000373           P(112)=500.0
000374           PP(112)=30.023
000376           DO 17 I=1,65
000377           P(I+112)=P(I+111)+100.0
000402        17 PP(I+112)= P(I+112)/14.696
000407           GGAS3=GGAS**3
000410           GGAS4=GGAS3*GGAS
000412           HGAS2=HGAS*HGAS
000414           ASTAR2=ASTAR*ASTAR
000415           ASTAR3=ASTAR2*ASTAR
000417           DENOM=(1.0+ASTAR)**3
000422           INTDEG=2
000423           DO  200 I=1,NUMT
000424           TSTAR=TRELVN(I)/EGAS
000427           TEMP1=0.0
000430           CALL AITKN(TF,F3,NTF,INTDEG,TSTAR,F3T,TEMP,IER)
000437           IF (ASTAR) 110,120,110
000440       110 CALL AITKN(TF,F2,NTF,INTDEG,TSTAR,F2T,TEMP,IER)
000450           CALL AITKN(TF,F1,NTF,INTDEG,TSTAR,F1T,TEMP,IER)
000460           TEMP1=3.729763*ASTAR*F2T+3.307366*ASTAR2*F1T+ASTAR3
000467       120 CONTINUE
000467           CALL AITKN(TD,DSTAR,8,INTDEG,TSTAR,BT,TEMP,IER)
000477           BV=BGAS*(1.616216*F3T+TEMP1)/DENOM +HGAS*LAMBDA*BT
000506           CALL AITKN(TC,C,NTC,INTDEG,TSTAR,CT,TEMP,IER)
000516           CALL AITKN(TC,DELC,NTC,INTDEG,TSTAR,DELCT,TEMP,IER)
000520           CV=HGAS2*(CT+ALPHA*DELCT)
000532           ISO=10
000533           IF (GGAS) 130,140,130
000534       130 TAV=TRELVN(I)/GGAS
000537           CALL AITKN(TD,D,NTD,INTDEG,TAV,DT,TEMP,IER)
000546           CALL AITKN(TD,E,NTD,INTDEG,TAV,ET,TEMP,IER)
000556           DV=GGAS3*DT
000560           EV=GGAS4*ET
000562           ISO=20
000563       140 CONTINUE
000563           ALL=LENOPT*82.0*TRELVN(I)
000566           ANNN=NENOPT*82.0*TRELVN(I)
000571           DO 150 J=1,NCMP
```

```
000573        COEF=PP(J)/(82.057*TALLVM(I))
000577        IF (COEF) 144,150,144
000600    144 CONTINUE
000600        AL=ALL/PP(J)
000603        AR=ARR/PP(J)
000605        FFL=FUNCT(AL)
000610        FFR=FUNCT(AR)
000612   3000 FORMAT (1X,10E12.4)
000612        CALL RSECT (FUNCT,AL,AR,30,0.0,0.0,0.0,0.00010,V(J,I),IERR)
000627        IF (IERR)  145,150,145
000630    145 PRINT 2010,I,J,IERR
000642   2010 FORMAT (///10X,19HTROUBLE AT POINT I=,I3,2X,2HJ=,I3,/H  IERR=,I2 /
             1/)
000642        V(J,I)=1.0
000644    150 CONTINUE
000651    200 CONTINUE
000653        DO 210 I=1,NUMP
000655        DO 210 J=1,NUMT
000656    210 V(I,J)=CONSTC/V(I,J)
000670        ISW=1
000671    300 CONTINUE
000671        NP=0
000672        ICOUNT=0
000673         PRINT 2222
000676   2222 FORMAT (1H1)
000676        PRINT 2021,(ITITL1(J),J=1,8)
000710   2021 FORMAT(1H1 /// 27X,8A10)
000710        PRINT 2022
000714   2022 FORMAT(        / 4X,5HDEPTH,7X,8HPRESSURE,46X,16HTEMPERATURES,F /
             1        7X,2HFT,5X,4HPSIA,5X,3HATM,7X,2H30,7X,2H40,7X,2H50,7X,2H60,
             2        7X,2H70,7X,2H80,7X,2H90,7X,3H100,6X,3H110,6X,3H120,6X,3H130
             3        /)
000714        DO 301 I=1,NUMP
000716        VMIN=10000.0
000720        DO 320 J=1,11
000721        IF(V(I,J)-VMIN) 315,320,320
000726    315 VMIN=V(I,J)
000732    320 CONTINUE
000734        IF(VMIN-10) 330,340,340
000737    340 FMAT1(3)=10H11F9.3 )
000741        FMAT2(3)=FMAT1(3)
000742        GO TO 380
000743    330 IF(VMIN-1) 350,360,360
000746    360 FMAT1(3)=10H11F9.4 )
000750        FMAT2(3)=FMAT1(3)
000751        GO TO 380
000752    350 FMAT1(3)=10H11F9.5 )
000754        FMAT2(3)=FMAT1(3)
000755    380 CONTINUE
000755        IF (I-I12) 302,303,304
000760    302 PPP=14.696*PP(I)
000763        PRINT FMAT1,P(I),PPP,PP(I),(V(I,J),J=1,NUMT)
001000        GO TO 305
001007    303 PRINT 2111
001013   2111 FORMAT (///   )

001013        NP=NP+2
001015        ICOUNT=0
001016    304 PRINT FMAT2, P(I),PP(I),(V(I,J),J=1,NUMT)
001037    305 CONTINUE
001037         NP=NP+1
001041        IF(NP-60) 306,307,306
001043    307 PRINT 2021,(ITITL1(J),J=1,8)
001055        PRINT 2022
001061        NP=0
001062        ICOUNT=0
001063        GO TO 301
001063    306 CONTINUE
001063        ICOUNT=ICOUNT+1
001065        IF(ICOUNT-5) 311,310,311
001067    310 PRINT 2014
001073   2014 FORMAT (1X)
001073        ICOUNT=0
001076    311 CONTINUE
001076    301 CONTINUE
001077        GO TO (400,500), ISW
001105    400 DO 410 I=1,NUMP
001107        DO 410 J=1,NUMT
001110    410 V(I,J)=1.0/V(I,J)
001122        DO 420 I=1,8
001124    420 ITITL1(I)=ITITL2(I)
001130        ISW=2
001131        GO TO 300
001132    500 CONTINUE
001132        GO TO 5
001133        END
```

```
      SUBROUTINE AITKN (X,Y,N,K,XB,YB,TEMP,IEX)                         7043A001
CAITKEN INTERPOLATION SUBROUTINE                                        7043A002
C     THIS SUBROUTINE ALLOWS THE INDEPENDENT VARIABLE TO BE IN EITHER   7043A003
C     INCREASING OR DECREASING SEQUENCE. IF INCREASING SEQUENCE ONLY IS 7043A004
C     NEEDED THEN CARDS 16 AND 32 THRU 42 INC CAN BE REMOVED            7043A005
C     CALLING SEQUENCE...                                               7043A006
C     CALL AITKN (X,Y,N,K,XB,YB,TEMP,IEX)                               7043A007
C        X IS A ONE DIMENSIONAL ARRAY OF INDEPENDENT                    7043A008
C          VARIABLE(INCREASING OR DECREASING)                           7043A009
C        Y IS A ONE DIMENSIONAL ARRAY OF DEPENDENT                      7043A010
C          VARIABLE                                                     7043A011
C        N IS NO. OF X,Y PAIRS                                          7043A012
C        K IS DEGREE OF INTERPOLATING POLYNOMIAL                        7043A013
C        XB IS INDEP. VARIABLE ARGUMENT                                 7043A014
C            IF XB IS NOT WITHIN THE RANGE OF X,        EXTRAPOLATION   7043A015
C          WILL BE PERFORMED                                            7043A016
C        YB IS INTERPOLATED RESULT                                      7043A017
C        TEMP ONE DIMENSIONAL ARRAY OF AT LEAST 2*N WORDS PROVIDING     7043A018
C            SCRATCH STORAGE                                            7043A019
C        IEX INDICATES WHETHER OR NOT        EXTRAPOLATION WAS PERFORMED7043A020
C            IEX=1, INDICATES IT WAS PERFORMED                          7043A021
C            IEX=0, INDICATES IT WAS NOT PERFORMED                      7043A022
```

```
000013        DIMENSION X(1),Y(1),TEMP(1)                                      7043A023
000013        IEX=0                                                            7043A024
000013        K1=K+1                                                           7043A025
000015        IF (X(N)-X(1)) 100,10,10                                         7043A026
000021     10 IF (XB-X(1)) 15,15,30                                            7043A027
000024     15 IEX=1                                                            7043A028
000026     20 LL=0                                                             7043A029
000027        GO TO 200                                                        7043A030
000030     30 IF (X(N)-XB) 35,35,50                                            7043A031
000033     35 IEX=1                                                            7043A032
000035     40 LL=N-K1                                                          7043A033
000037        GO TO 200                                                        7043A034
000037     50 LL=1                                                             7043A035
000040        LU=N                                                             7043A036
000041     60 IF (LU-LL-1) 180,180,70                                          7043A037
000044     70 LI=(LL+LU)/2                                                     7043A038
000046        IF (X(LI)-XB) 80,80,90                                           7043A039
000052     80 LL=LI                                                            7043A040
000054        GO TO 60                                                         7043A041
000054     90 LU=LI                                                            7043A042
000056        GO TO 60                                                         7043A043
000056    100 IF (XB-X(1)) 120,15,15                                           7043A044
000061    120 IF (X(N)-XB) 130,35,35                                           7043A045
000064    130 LL=1                                                             7043A046
000065        LU=N                                                             7043A047
000066    140 IF (LU-LL-1) 180,180,150                                         7043A048
000071    150 LI=(LL+LU)/2                                                     7043A049
000073        IF (X(LI)-XB) 160,170,170                                        7043A050
000077    160 LU=LI                                                            7043A051
000101        GO TO 140                                                        7043A052
000101    170 LL=LI                                                            7043A053
000103        GO TO 140                                                        7043A054
000103    180 LL=LL-(K1+1)/2                                                   7043A055
000106        IF (LL) 20,200,190                                               7043A056
000110    190 IF (LL+K1-N) 200,200,40                                          7043A057
000113    200 DO 210 I=1,K1                                                    7043A058
000115        I1=LL+I                                                          7043A059
000117        TEMP(I)=X(I1)-XB                                                 7043A060
000124    210 TEMP(N+I+1)=Y(I1)                                                7043A061
000132        DO 220 I=1,K                                                     7043A062
000133        DO 220 J=I,K                                                     7043A063
000134    220 TEMP(N+J+2)=(1.0/(TEMP(J+1)-TEMP(I)))*(TEMP(N+I+1)*TEMP(J+1)-TEMP(7043A064
             1N+J+2)*TEMP(I))                                                  7043A065
000157        YR=TEMP(N+K1+1)                                                  7043A066
000162        RETURN                                                           7043A067
000162        END                                                              7043A068
```

```
              FUNCTION FUNCT(A)
000003        COMMON BV,CV,DV,EV,ISW,COEF
000003        F=A*(A*(COEF*A-1.0)-BV)-CV
000011        IF (ISW-16) 10,5,10
000013      5 FUNCT=F
000015        RETURN
000015     10 FUNCT=A*(A*F-DV)-EV
000022        RETURN
000022        END
```

```
              SUBROUTINE BSECT(F,A,B,N,EF,EA,ER,XR,IERR)                       BSECT001
        C                                                                      BSECT002
        C        INITIALIZATIONS                                               BSECT003
        C                                                                      BSECT004
000014        IT=0                                                             BSECT005
000014        IERR=0                                                           BSECT006
000015        XA=A                                                             BSECT007
000017        XB=B                                                             BSECT008
        C                                                                      BSECT009
        C        CHECK THAT F(A) AND F(B) DIFFER IN SIGN                       BSECT010
        C                                                                      BSECT011
000020        FA=F(A)                                                          BSECT012
000031        IF(FA*F(XB))3,1,1                                                BSECT013
000044      1 IERR=1                                                           BSECT014
000046      2 RETURN                                                           BSECT015
        C                                                                      BSECT016
        C        BISECT AND PERFORM CONVERGENCE  TESTS                         BSECT017
        C                                                                      BSECT018
000047      3 XR=(XA+XB)/2.0                                                   BSECT019
000052        IT=IT+1                                                          BSECT020
000054        FXR=F(XR)                                                        BSECT021
000065      4 IF(ABS(FXR)-EF)2,2,5                                             BSECT022
000070      5 IF(ABS(XA-XB)-AMAX1(EA,ER*ABS(XR)))2,2,6                         BSECT023
        C                                                                      BSECT024
        C        TEST FOR LIMIT ON NUMBER OF BISECTIONS                        BSECT025
        C                                                                      BSECT026
000102      6 IF(IT-N)8,7,7                                                    BSECT027
000104      7 IERR=2                                                           BSECT028
000106        RETURN                                                           BSECT029
        C                                                                      BSECT030
        C        SELECT NEW INTERVAL AND LOOP BACK FOR NEXT BISECTION          BSECT031
        C                                                                      BSECT032
000106      8 IF(FA*FXR)9,2,10                                                 BSECT033
000111      9 XB=XR                                                            BSECT034
000113        GO TO 3                                                          BSECT035
000113     10 XA=XR                                                            BSECT036
000115        GO TO 3                                                          BSECT037
000115        END                                                              BSECT038
```

```
        OXYGEN TEST CASE

ASTAR           .50000E-01
ALPHA          0.
LAMBDA         0.
EGAS            .12710E+03
HGAS            .55840E+02
MGAS            .11000E+03
GGAS            .54200E+02

T    .190000E+01    D    .131300E+00    E   -.217000E-01

T    .200000E+01    D    .122000E+00    E   -.100000E-01

T    .210000E+01    D    .117500E+00    E    .150000E-02

T    .220000E+01    D    .114500E+00    E    .120000E-01

T    .230000E+01    D    .113100E+00    E    .214000E-01

T    .240000E+01    D    .112000E+00    E    .245000E-01

T    .250000E+01    D    .113100E+00    E    .345000E-01

T    .300000E+01    D    .119800E+00    E    .578000E-01

T    .400000E+01    D    .131100E+00    E    .648000E-01

T    .500000E+01    D    .134100E+00    E    .629000E-01

T    .153846E+01    F1   .545573E+00    F2  -.120120E-01    F3   -.800090E+00

T    .166667E+01    F1   .572910E+00    F2   .535000E-01    F3   -.601900E+00

T    .200000E+01    F1   .626000E+00    F2   .177192E+00    F3   -.443707E+00

T    .222222E+01    F1   .647727E+00    F2   .235343E+00    F3   -.330477E+00

T    .250000E+01    F1   .670155E+00    F2   .290939E+00    F3   -.221050E+00

T    .277778E+01    F1   .687101E+00    F2   .333401E+00    F3   -.136410E+00

T    .303030E+01    F1   .699177E+00    F2   .366100E+00    F3   -.767060E-01

T    .333333E+01    F1   .710456E+00    F2   .393764E+00    F3   -.146110E-01

T    .400000E+01    F1   .720262E+00    F2   .440205E+00    F3    .816100E-01

T    .190000E+01    C    .432550E+00    DC   .392200E+01

T    .200000E+01    C    .417370E+00    DC   .361000E+01

T    .220000E+01    C    .393250E+00    DC   .311300E+01

T    .240000E+01    C    .375540E+00    DC   .273600E+01

T    .260000E+01    C    .362420E+00    DC   .244100E+01

T    .280000E+01    C    .352500E+00    DC   .220500E+01

T    .300000E+01    C    .345040E+00    DC   .201100E+01
```

```
        WITHOWEN TEST CASE

ASTAR          .75000E-01
ALPHA         0.
LAMBDA        0.
EGAS           .10880E+03
HGAS           .61340E+02
MGAS           .95400E+02
GGAS           .59000E+02

T    .190000E+01    D    .131300E+00    E   -.217000E-01

T    .200000E+01    D    .122000E+00    E   -.100000E-01

T    .210000E+01    D    .117500E+00    E    .150000E-02

T    .220000E+01    D    .114500E+00    E    .120000E-01

T    .230000E+01    D    .113100E+00    E    .214000E-01

T    .240000E+01    D    .112000E+00    E    .295000E-01

T    .250000E+01    D    .113100E+00    E    .365000E-01

T    .300000E+01    D    .119000E+00    E    .570000E-01

T    .400000E+01    D    .131100E+00    E    .688000E-01

T    .500000E+01    D    .134100E+00    E    .629000E-01

T    .100000E+01    F1   .319017E+00    F2  -.542410E+00    F3  -.179460E+01

T    .111111E+01    F1   .340730E+00    F2  -.377390E+00    F3  -.149904E+01

T    .125000E+01    F1   .456382E+00    F2  -.223450E+00    F3  -.120475E+01

T    .130890E+01    F1   .505300E+00    F2  -.107800E+00    F3  -.901960E+00

T    .153040E+01    F1   .545573E+00    F2  -.123120E-01    F3  -.800090E+00

T    .166667E+01    F1   .572910E+00    F2   .515000E-01    F3  -.681900E+00

T    .181818E+01    F1   .599058E+00    F2   .116565E+00    F3  -.560960E+00

T    .200000E+01    F1   .624010E+00    F2   .177190E+00    F3  -.443000E+00

T    .222222E+01    F1   .647727E+00    F2   .235343E+00    F3  -.330477E+00

T    .250000E+01    F1   .670155E+00    F2   .290934E+00    F3  -.221050E+00

T    .277778E+01    F1   .687101E+00    F2   .333481E+00    F3  -.136410E+00

T    .303030E+01    F1   .699177E+00    F2   .366180E+00    F3  -.747040E-01

T    .333333E+01    F1   .710656E+00    F2   .393764E+00    F3  -.140110E-01

T    .400000E+01    F1   .720262E+00    F2   .440285E+00    F3   .610100E-01

T    .220000E+01    C    .385650E+00    DC   .290800E+01

T    .240000E+01    C    .369340E+00    DC   .262700E+01

T    .260000E+01    C    .357440E+00    DC   .234500E+01

T    .280000E+01    C    .348640E+00    DC   .211800E+01

T    .300000E+01    C    .342040E+00    DC   .193200E+01

T    .320000E+01    C    .337030E+00    DC   .177700E+01
```

```
                         AIR TEST CASE

ASTAR         0.
ALPHA         0.
LAMBDA        0.
EGAS           .10208E+03
HGAS           .60348E+02
MGAS           .10208E+03
UGAS           .60340E+02

T   .190000E+01   D    .131300E+00   E   -.217000E-01

T   .200000E+01   D    .122800E+00   E   -.100000E-01

T   .210000E+01   D    .117500E+00   E    .150000E-02

T   .220000E+01   D    .114500E+00   E    .120000E-01

T   .230000E+01   D    .113100E+00   E    .214000E-01

T   .240000E+01   D    .112800E+00   E    .245000E-01

T   .250000E+01   D    .113100E+00   E    .385000E-01

T   .300000E+01   D    .119800E+00   E    .578000E-01

T   .400000E+01   D    .132100E+00   E    .688000E-01

T   .500000E+01   D    .134100E+00   E    .679000E-01

T   .153846E+01   F1   .545573E+00   F2  -.120120E-01   F3  -.806690E+00

T   .166667E+01   F1   .572910E+00   F2   .535000E-01   F3  -.601900E+00

T   .200000E+01   F1   .624000E+00   F2   .177192E+00   F3  -.443797E+00

T   .222222E+01   F1   .647727E+00   F2   .235343E+00   F3  -.330477E+00

T   .250000E+01   F1   .670155E+00   F2   .290939E+00   F3  -.221050E+00

T   .277778E+01   F1   .687101E+00   F2   .333481E+00   F3  -.136410E+00

T   .303030E+01   F1   .699177E+00   F2   .364180E+00   F3  -.747060E-01

T   .333333E+01   F1   .710656E+00   F2   .393764E+00   F3  -.146110E-01

T   .400000E+01   F1   .728262E+00   F2   .440285E+00   F3   .816100E-01

T   .200000E+01   C    .437130E+00   DC   .393500E+01

T   .220000E+01   C    .409990E+00   DC   .374600E+01

T   .240000E+01   C    .389450E+00   DC   .247800E+01

T   .260000E+01   C    .373800E+00   DC   .265500E+01

T   .280000E+01   C    .361760E+00   DC   .239600E+01

T   .300000E+01   C    .352370E+00   DC   .218500E+01

T   .320000E+01   C    .344940E+00   DC   .208800E+01

T   .340000E+01   C    .338900E+00   DC   .145900E+01
```

```
          CARBON DIOXIDE  TEST CASE

ASTAR          .65000E+00
ALPHA          .25000E-01
LAMMDA        0.
EGAS           .44170E+03
HGAS           .64480E+02
M              .21110E+03
GGA            .58500E+02

T    .750000E+00    D   -.188400E+02    E   -.185900E+03

T    .800000E+00    D   -.938800E+01    E   -.779100E+02

T    .875000E+00    D   -.324300E+01    E   -.274600E+02

T    .950000E+00    D   -.944000E+00    E   -.660800E+01

T    .100000E+01    D   -.276400E+00    E   -.286000E+01

T    .105000E+01    D    .691000E-01    E   -.116500E+01

T    .110000E+01    D    .237400E+00    E   -.416200E+00

T    .120000E+01    D    .335400E+00    E    .150000E-01

T    .130000E+01    D    .315700E+00    E    .361000E-01

T    .140000E+01    D    .269500E+00    E   -.220000E-02

T    .150000E+01    D    .225000E+00    E   -.303000E-01

T    .160000E+01    D    .189400E+00    E   -.413000E-01

T    .588240E+00    F1  -.360139E+00    F2  -.208537E+01    F3  -.454377E+01

T    .606060E+00    F1  -.298657E+00    F2  -.194790E+01    F3  -.430352E+01

T    .625000E+00    F1  -.234493E+00    F2  -.181531E+01    F3  -.407136E+01

T    .645160E+00    F1  -.182553E+00    F2  -.168741E+01    F3  -.384069E+0

T    .689660E+00    F1  -.749900E-01    F2  -.144495E+01    F3  -.341868E+01

T    .714286E+00    F1  -.242010E-01    F2  -.133004E+01    F3  -.321478E+01

T    .735290E+00    F1  -.150660E-01    F2  -.124099E+01    F3  -.305628E+01

T    .550000E+00     C  -.580110E+00    DC   .437930E+02

T    .600000E+00     C   .175280E+00    DC   .303820E+02

T    .650000E+00     C   .468940E+00    DC   .223560E+02

T    .700000E+00     C   .569030E+00    DC   .177120E+02

T    .750000E+00     C   .568940E+00    DC   .147300E+02

T    .800000E+00     C   .569420E+00    DC   .112680E+02
```

```
      HELIUM TEST CASE

ASTAR         0.
ALPHA         0.
LAMBDA          .71300E+01
EGAS            .10220E+02
HGAS            .21680E+02
HGAS            .10220E+02
GGAS            .21680E+02


T    .100000E+02     D    .115600E+00     E     .340000E-01

T    .150000E+02     D    .964000E-01     E     .275000E-01

T    .200000E+02     D    .832000E-01     E     .204000E-01

T    .200000E+02    F1    .752800E+00    F2     .551000E+00    F3    .371500E+00

T    .250000E+02    F1    .746900E+00    F2     .545800E+00    F3    .373700E+00

T    .333333E+02    F1    .737900E+00    F2     .536100E+00    F3    .371000E+00

T    .500000E+02    F1    .722900E+00    F2     .518100E+00    F3    .359500E+00

T    .600000E+01     C    .307700E+00    UC     .965000E+00

T    .100000E+02     C    .286100E+00    UC     .576000E+00

T    .100000E+03     C    .142500E+00    UC     .790000E-01
```

```
                   PROGRAM PROG2(INPUT,OUTPUT,TAPE60=INPUT)
000003             DIMENSION IMAT(3)
000003             DIMENSION ID(8),TH(25),HSTAR(25),ASTAR(3),LAMBDA(3),EGAS(3),BGAS(3
                  1),NTC(2),TC(25,2),C(25,2),TF(25),F1(25),F2(25),F3(25),      TEMP(50
                  2),TRELVN(11),CC(2),B(3),P(300),PPP(300),V(300,11)
000003             DIMENSION FMAT1(3),FMAT2(3),X(13)
000003             COMMON  BM,CV,COEF
000003             REAL LAMBDA,LENDPT
000003             EXTERNAL FUNCT
000003             DATA(TH(I),I=1,8)/1.0,2.0,4.0,6.0,9.0,12.0,25.0,100.0/
000003             DATA(HSTAR(I),I=1,8)/0.6145,0.08203,0.03247,0.01826,0.01057,
                  10.007324,0.003025,0.0006126/
000003             PRINT 9999
000007        9999 FORMAT(*PM REVERSE PAPER*)
000007             FMAT1(1)=10H(F9.0,F9.2
000011             FMAT1(2)=10H ,F8.2,2X,
000012             FMAT1(3)=10H1(F8.3)
000014             FMAT2(1)=10H(9X,F9.0,
000015             FMAT2(2)=10H,F8.2,2X,
000017             FMAT2(3)=10H1(F8.3)
000020           5 READ 1000,(ID(I),I=1,8)
000032        1000 FORMAT (8A10)
000032             IF (EOF,60) 10,15
000035          10 CALL EXIT
000036          15 CONTINUE
000036             PRINT 2000,(ID(I),I=1,8)
000050        2000 FORMAT (1X,8A10)
000050             READ 1001,NUMT,NUMP,NUMX,LENDPT,RENDPT
000066        1001 FORMAT(3I10,2E10.0)
000066             DO 20 I=1,3
000070             READ 1002,ASTAR(I),LAMBDA(I),EGAS(I),BGAS(I)
000103        1002 FORMAT(8E10.0)
000103             PRINT 2001,ASTAR(I),LAMBDA(I),EGAS(I),BGAS(I)
000117        2001 FORMAT(//5X,5HASTAR,3X,E15.5,5X,6HLAMBDA,2X,E15.5,5X,4HEGAS,4X,
                  1         F15.5,5X,4HBGAS,4X,E15.5 /)
000117          20 CONTINUE
000121             DO 30 J=1,2
000123             READ 1003,NTC(J)
000130        1003 FORMAT (I10)
000130             INDEX=NTC(J)
000132             READ 1002,(TC(I,J),C(I,J),I=1,INDEX)
000153             PRINT 2002,(TC(I,J),C(I,J),I=1,INDEX)
000174        2002 FORMAT (10X,1HT,E15.6,10X,1HC,E15.6)
000174          30 CONTINUE
000176             READ 1003,NTF
000204             READ 1002,(TF(I),F1(I),F2(I),F3(I),I=1,NTF)
000225             X(1)=0.997
000227             X(2)=0.995
000230             X(3)=0.993
000232             X(4)=0.99
000233             X(5)=0.985
000235             X(6)=0.97
000236             X(7)=0.94
000240             X(8)=0.9
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```
000241        X(9)=0.05
000243        X(10)=0.0
000244        X(11)=0.00
000246        X(12)=0.6
000247        X(13)=0.4
000251        NX=13
000252        INTDEG=2
000253        DO 26 I=1,11
000254        TKELVN(I)=272.06+(I-1)*5.556
000262     26 CONTINUE
000264        NF=112
000265        DO 27 I=1,100
000266     27 P(I)=(I-1)*10.0
000274        DO 28 I=1,11
000276     28 P(I+100)=1000.0+(I-1)*50.0
000306        DO 29 I=1,111
000307     29 PPP(I)=(P(I)*0.44444+14.696)/14.696
000316        P(112)=500.0
000317        PPP(112)=34.021
000321        DO 25 I=1,45
000322        P(I+112)=P(I+111)+100.0
000325     25 PPP(I+112)=P(I+112)/14.696
000332        DO 60 I=1,NTF
000333        PRINT 2003,TF(I),F1(I),F2(I),F3(I)
000346   2003 FORMAT (//10X,1HT,E15.6,4X,2HF1,E15.6,4X,2HF2,E15.6,4X,2HF3,E15.6)
000346     60 CONTINUE
000351        PRINT 2222
000354   2222 FORMAT(1H1)
000354        DO 290 IX=1,NX
000356        DO 200 I=1,NUMT
000357        DO 190 II=1,3
000360        TSTAR=TKELVN(I)/EGAS(II)
000363        CALL AITKN(TH,HSTAR,W,INTDEG,TSTAR,HT,TEMP,IER)
000373        CALL AITKN(TF,F3,NTF,INTDEG,TSTAR,F3T,TEMP,IER)
000403    110 CALL AITKN(TF,F2,NTF,INTDEG,TSTAR,F2T,TEMP,IER)
000413        CALL AITKN(TF,F1,NTF,INTDEG,TSTAR,F1T,TEMP,IER)
000423        TRM1=1.414214*F3T
000425        TRM2=3.779763*ASTAR(II)*F2T
000430        TRM3=3.367386*ASTAR(II)**2*F1T+ASTAR(II)**3
000435        DENOM=(1.0+ASTAR(II))**3
000440    120 H(II)=BGAS(II)*(TRM1+TRM2+TRM3)/DENOM+BGAS(II)*LAMBDA(II)*HT
000450        IF (II-3)  130,190,190
000453    130 CALL AITKN(TC(1,II),C(1,II),NTC(II),INTDEG,TSTAR,CT,TEMP,IER)
000467        CC(II)=BGAS(II)**2*CT
000472    190 CONTINUE
000474        HM=X(IX)**2*H(1)+2.0*X(IX)*(1.0-X(IX))*H(3)+(1.0-X(IX))**2*H(2)
000507        CM=X(IX)**3*CC(1)+3.0*X(IX)**2*(1.0-X(IX))* (CC(1)**2*CC(2))**0.33
             13  +3.0*X(IX)*(1.0-X(IX))**2*(CC(1)*CC(2)**2)**0.333 +(1.0-X(IX))*
             2   *3*CC(2)
000544        ALL=LFNDPT*82.0*TKELVN(I)
000547        ARR=HFNDPT*82.0*TKELVN(I)
000552        DO 180 J=1,NUMP
000553        COEF=PPP(J)/(82.057*TKELVN(I))
000557        AL=ALL/PPP(J)
000562        AR=ARR/PPP(J)
000566        CALL RSECT (FUNCT,AL,AR,30.0,0.0,0.0,0.00005,V(J,I),IERR)
000601        IF (IERR) 170,180,170
000602    170 PRINT 2010,II,I,J,IERR
000616   2010 FORMAT(//10X,20HTROUBLE AT POINT II=,I2,2X,2HI=,I2,2X,2HJ=,I2,2X,
             1        5HIERR=,I2 /)
000616    180 CONTINUE
000621    200 CONTINUE
000623        CONVC=62.428*(4.003*X(IX)+32.00*(1.0-X(IX)))
000631        DO 210 J=1,NUMP
000633        DO 210 I=1,NUMT
000636        V(J,I)=CONVC/V(J,I)
000642    210 CONTINUE
000647        ISW=1
000650        IMAT(1)=10H     DENSI
000652        IMAT(2)=10HTY,LBS/CUB
000653        IMAT(3)=10HIC FT
000655    300 CONTINUE
000655        NP=0
000656        ICOUNT=0
000657        XM1=1.0-X(IX)
000661        AMW=4.003*X(IX)+32.0*XM1
000665        PRINT 2300,IMAT
000673   2300 FORMAT(1H1,50X,3A10)
000673        PRINT 2100 ,XM1,X(IX),AMW
000705   2100 FORMAT (      /36X,F5.3,7H OXYGEN,3X,F5.3,7H HELIUM,3X,24HAVERAGE M
             1OLECULAR WEIGHT ,F8.3  )
000705        PRINT 2011
000711   2011 FORMAT (/ 4X,5HDEPTH,7X,8HPRESSURE,46X,14HTEMPERATURE,F /
             1          7X,2HFT,5X,4HPSIA,5X,3HATM,7X,2H30,7X,2H40,7X,2H50,7X,2H60
             2        ,7X,2H70,7X,2H80,7X,2H90,7X,3H100,6X,3H110,6X,3H120,6X,3H13
             30 /)
000711        DO 301 I=1,NUMP
000713        VMIN=100000.0
000715        DO 320 J=1,11
000716        IF(V(I,J)-VMIN) 315,320,320
000723    315 VMIN=V(I,J)
000727    320 CONTINUE
000731        IF(VMIN-10) 330,340,340
000734    340 FMAT1(3)=10H11F9.3 )
000736        FMAT2(3)=FMAT1(3)
000737        GO TO 380
000740    330 IF(VMIN-1) 350,360,360
000743    360 FMAT1(3)=10H11F9.4 )
000745        FMAT2(3)=FMAT1(3)
000746        GO TO 380
000747    350 FMAT1(3)=10H11F9.5 )
000751        FMAT2(3)=FMAT1(3)
000752    380 CONTINUE
000752        IF (I-NF) 302,303,304
000755    302 PP=14.696*PPP(I)
000760        PRINT FMAT1,P(I),PP,PPP(I),(V(I,J),J=1,NUMT)
001003        GO TO 305
001004    303 PRINT 2111
001010   2111 FORMAT (///  )
001010        NP=NP+2
```

```
001012         ICOUNT=0
001013     304 PRINT FMAT2,P(I),PPP(I),(V(I,J),J=1,NUMT)
001034     305 CONTINUE
001034         NP=NP+1
001034         IF (NP-ND) 304,307,306
001040     307 PRINT 2300,IMAT
001046         PRINT 2100 ,XM1,X(IX),AMW
001060         PRINT 2011
001064         NP=0
001065         ICOUNT=0
001066         GO TO 301
001066     306 CONTINUE
001066         ICOUNT=ICOUNT+1
001070         IF(ICOUNT-5) 311,310,311
001072     310 PRINT 2014
001076    2014 FORMAT (1X)
001076         ICOUNT=0
001077     311 CONTINUE
001077     301 CONTINUE
001102         GO TO (400,290) ISW
001110     400 DO 410 I=1,NUMP
001112         DO 410 J=1,NUMT
001113     410 V(I,J)=1.0/V(I,J)
001125         ISW=2
001126         IMAT(1)=10H SPECIFIC
001130         IMAT(2)=10HVOLUME,CUB
001131         IMAT(3)=10HIC FT/LB
001133         GO TO 300
001133     290 CONTINUE
001136         GO TO 5
001136         END
               FUNCTION FUNCT(X)
000003         COMMON AM,CM,COEF
000003         FUNCT=X*(X*(COEF*X+1.0)-AM)-CM
000011         RETURN
000012         END
```

```
      MIXTURE TEST CASE

   ASTAR       0.               LAMBDA      .71300E+01      EGAS        .10220E+02      DGAS        .21600E+02
   ASTAR        .50000E-01      LAMBDA     0.               EGAS        .12710E+03      DGAS        .55060E+02
   ASTAR        .25000E-01      LAMBDA      .81100E+00      EGAS        .36040E+02      DGAS        .36110E+02
        T    .400000E+01          C     .307700E+00
        T    .100000E+02          C     .286120E+00
        T    .100000E+03          C     .142540E+00
        T    .190000E+01          C     .432550E+00
        T    .200000E+01          C     .417370E+00
        T    .220000E+01          C     .393250E+00
        T    .240000E+01          C     .375540E+00
        T    .260000E+01          C     .362420E+00
        T    .280000E+01          C     .352580E+00
        T    .300000E+01          C     .345090E+00
        T    .200000E+01    F1    .624010E+00    F2    .177190E+00    F3   -.443800E+00

        T    .222222E+01    F1    .647730E+00    F2    .239340E+00    F3   -.330400E+00

        T    .250000E+01    F1    .670150E+00    F2    .290940E+00    F3   -.221050E+00

        T    .277778E+01    F1    .687100E+00    F2    .333480E+00    F3   -.136410E+00

        T    .303030E+01    F1    .699180E+00    F2    .364100E+00    F3   -.747000E-01

        T    .333333E+01    F1    .710660E+00    F2    .393760E+00    F3   -.146100E-01

        T    .400000E+01    F1    .728260E+00    F2    .440280E+00    F3   -.816100E-01

        T    .454545E+01    F1    .737730E+00    F2    .466250E+00    F3    .130670E+00

        T    .500000E+01    F1    .743470E+00    F2    .482590E+00    F3    .172070E+00

        T    .625000E+01    F1    .753250E+00    F2    .512340E+00    F3    .239100E+00

        T    .714290E+01    F1    .757010E+00    F2    .525260E+00    F3    .270270E+00

        T    .833330E+01    F1    .759740E+00    F2    .536730E+00    F3    .299410E+00

        T    .909090E+01    F1    .760610E+00    F2    .541630E+00    F3    .313030E+00

        T    .100000E+02    F1    .761080E+00    F2    .545890E+00    F3    .325090E+00

        T    .125000E+02    F1    .760410E+00    F2    .551950E+00    F3    .340710E+00

        T    .200000E+02    F1    .752750E+00    F2    .550990E+00    F3    .371500E+00

        T    .250000E+02    F1    .746910E+00    F2    .545860E+00    F3    .373720E+00

        T    .333333E+02    F1    .737860E+00    F2    .536970E+00    F3    .370450E+00

        T    .500000E+02    F1    .722940E+00    F2    .514070E+00    F3    .359470E+00
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SUMMARY OF DATA TABULATIONS

Gas or Mixture		Page Numbers				
		Density	Volume	Others	Molecular Weight	Oxygen, wt %
Air		2-3	4-5	6-7	28.97	
Oxygen		8-9	10-11	12-13	32.00	
Helium		14-15	16-17	18-19	4.00	
Nitrogen		20-21	22-23	24-25	28.00	
Carbon dioxide		26	27	30-31	44.01	
60% O_2,	40% He	32-33	34-35	36-37	20.80	92.308
40	60	38-39	40-41	42-43	15.20	84.211
32	68	44-45	46-47	48-49	12.96	79.012
20	80	50-51	52-53	54-55	9.60	66.667
15	85	56-57	58-59	60-61	8.26	58.537
10	90	62-63	64-65	66-67	6.80	47.059
6	94	68-69	70-71	72-73	5.68	33.803
3	97	74-75	76-77	78-79	4.8	19.835
1.5	98.5	80-81	82-83	--	4.42	10.860
1.0	99.0	84-85	86-87	88-89	4.28	7.477
0.7	99.3	90-91	92-93	--	4.20	5.338
0.5	99.5	94-95	96-97	98-99	4.14	3.865
0.3	99.7	100-101	102-103	--	4.09	2.350

DENSITY

AIR

AIR,DENSITY,LBS/CUBIC FT

DEPTH	PRESSURE		TEMPERATURES,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	.08106	.07963	.07787	.07636	.07492	.07353	.07218	.07084	.06960	.06844	.06720
10	19.14	1.30	.10559	.10367	.10163	.09967	.09759	.09577	.09402	.09234	.09071	.08916	.08763
20	23.58	1.60	.13014	.12752	.12500	.12258	.12026	.11802	.11586	.11379	.11178	.10984	.10798
30	28.03	1.91	.15469	.15157	.14858	.14570	.14294	.14027	.13771	.13524	.13285	.13055	.12833
40	32.47	2.21	.17925	.17564	.17216	.16883	.16562	.16253	.15956	.15669	.15393	.15126	.14868
50	36.92	2.51	.20382	.19971	.19576	.19196	.18831	.18474	.18141	.17815	.17500	.17197	.16903
60	41.36	2.81	.22840	.22379	.21936	.21510	.21101	.20706	.20327	.19961	.19608	.19268	.18939
70	45.81	3.12	.25299	.24787	.24296	.23824	.23370	.22933	.22513	.22107	.21716	.21340	.20975
80	50.25	3.42	.27759	.27197	.26657	.26139	.25640	.25161	.24699	.24254	.23824	.23410	.23010
90	54.70	3.72	.30220	.29607	.29019	.28454	.27911	.27389	.26885	.26401	.25933	.25482	.25046
100	59.14	4.02	.32682	.32018	.31382	.30770	.30183	.29617	.29072	.28549	.28062	.27556	.27082
110	63.58	4.33	.35144	.34430	.33745	.33087	.32456	.31848	.31260	.30697	.30151	.29625	.29118
120	68.03	4.63	.37606	.36843	.36109	.35404	.34727	.34075	.33447	.32843	.32260	.31698	.31155
130	72.47	4.93	.40073	.39257	.38476	.37722	.37000	.36304	.35635	.34991	.34369	.33770	.33191
140	76.92	5.23	.42538	.41671	.40839	.40040	.39273	.38534	.37824	.37139	.36479	.35842	.35228
150	81.36	5.54	.45004	.44086	.43205	.42359	.41547	.40765	.40013	.39288	.38588	.37915	.37264
160	85.81	5.84	.47471	.46502	.45572	.44674	.43821	.42995	.42201	.41436	.40699	.39987	.39301
170	90.25	6.14	.49939	.48918	.47939	.46999	.46096	.45227	.44391	.43585	.42810	.42060	.41338
180	94.70	6.44	.52408	.51336	.50306	.49320	.48371	.47458	.46580	.45735	.44914	.44133	.43375
190	99.14	6.75	.54876	.53754	.52676	.51641	.50646	.49690	.48770	.47884	.47030	.46207	.45412
200	103.58	7.05	.57345	.56173	.55045	.53963	.52923	.51921	.50960	.50034	.49141	.48280	.47449
210	108.03	7.35	.59821	.58593	.57414	.56285	.55199	.54155	.53151	.52184	.51252	.50353	.49486
220	112.47	7.65	.62293	.61013	.59784	.58608	.57476	.56388	.55342	.54334	.53363	.52427	.51523
230	116.92	7.96	.64766	.63434	.62154	.60931	.59756	.58622	.57533	.56485	.55475	.54501	.53561
240	121.36	8.26	.67241	.65856	.64529	.63255	.62032	.60856	.59725	.58638	.57586	.56575	.55598
250	125.81	8.56	.69716	.68279	.66902	.65580	.64310	.63090	.61917	.60787	.59699	.58649	.57636
260	130.25	8.86	.72192	.70702	.69275	.67905	.66589	.65325	.64109	.62939	.61810	.60723	.59676
270	134.69	9.17	.74669	.73127	.71649	.70230	.68868	.67560	.66301	.65090	.63922	.62797	.61711
280	139.14	9.47	.77146	.75551	.74023	.72556	.71148	.69795	.68494	.67242	.66035	.64871	.63749
290	143.58	9.77	.79625	.77977	.76399	.74883	.73428	.72031	.70687	.69393	.68147	.66946	.65787
300	148.03	10.07	.82104	.80404	.78774	.77211	.75708	.74267	.72880	.71546	.70260	.69021	.67825
310	152.47	10.38	.84585	.82830	.81151	.79538	.77990	.76503	.75074	.73699	.72373	.71095	.69863
320	156.92	10.68	.87068	.85259	.83528	.81866	.80272	.78743	.77268	.75851	.74486	.73170	.71902
330	161.36	10.98	.89548	.87687	.85905	.84195	.82556	.80977	.79462	.78004	.76599	.75245	.73940
340	165.81	11.29	.92031	.90117	.88283	.86526	.84836	.83215	.81657	.80157	.78712	.77321	.75978
350	170.25	11.58	.94515	.92546	.90662	.88856	.87119	.85453	.83851	.82311	.80826	.79396	.78017
360	174.69	11.89	.96999	.94977	.93042	.91185	.89403	.87691	.86046	.84466	.82940	.81471	.80055
370	179.14	12.19	.99484	.97400	.95422	.93515	.91686	.89930	.88242	.86618	.85054	.83546	.82096
380	183.58	12.49	1.01970	.99861	.97803	.95846	.93970	.92168	.90437	.88772	.87168	.85622	.84132
390	188.03	12.79	1.04457	1.02274	1.00146	.98178	.96255	.94408	.92633	.90926	.89282	.87698	.86171
400	192.47	13.10	1.06946	1.04707	1.02566	1.00511	.98540	.96647	.94830	.93081	.91396	.89776	.88209
410	196.92	13.40	1.09434	1.07142	1.04949	1.02846	1.00825	.98887	.97026	.95236	.93511	.91850	.90248
420	201.36	13.70	1.11924	1.09577	1.07331	1.05177	1.03111	1.01126	.99223	.97390	.95626	.93926	.92287
430	205.81	14.00	1.14414	1.12012	1.09715	1.07511	1.05397	1.03366	1.01420	.99545	.97740	.96001	.94326
440	210.25	14.31	1.16905	1.14449	1.12099	1.09845	1.07684	1.05604	1.03617	1.01700	.99855	.98078	.96365
450	214.69	14.61	1.19397	1.16888	1.14484	1.12180	1.09971	1.07851	1.05816	1.03856	1.01971	1.00156	.98404
460	219.14	14.91	1.2189	1.1932	1.1687	1.1452	1.1226	1.1009	1.0801	1.0601	1.0409	1.0223	1.0044
470	223.58	15.21	1.2438	1.2176	1.1924	1.1685	1.1455	1.1233	1.1021	1.0817	1.0620	1.0431	1.0248
480	228.03	15.52	1.2688	1.2420	1.2164	1.1919	1.1683	1.1458	1.1241	1.1032	1.0832	1.0639	1.0452
490	232.47	15.82	1.2937	1.2664	1.2403	1.2152	1.1912	1.1682	1.1461	1.1248	1.1043	1.0846	1.0656
500	236.92	16.12	1.3187	1.2908	1.2642	1.2386	1.2141	1.1906	1.1681	1.1464	1.1255	1.1054	1.0860
510	241.36	16.42	1.3437	1.3152	1.2880	1.2620	1.2370	1.2131	1.1900	1.1679	1.1466	1.1261	1.1064
520	245.81	16.73	1.3686	1.3396	1.3119	1.2854	1.2599	1.2355	1.2120	1.1895	1.1678	1.1469	1.1268
530	250.25	17.03	1.3936	1.3641	1.3358	1.3088	1.2828	1.2579	1.2340	1.2111	1.1890	1.1677	1.1472
540	254.69	17.33	1.4186	1.3885	1.3597	1.3322	1.3057	1.2804	1.2560	1.2326	1.2101	1.1885	1.1676
550	259.14	17.63	1.4436	1.4129	1.3836	1.3555	1.3286	1.3029	1.2780	1.2542	1.2313	1.2092	1.1880
560	263.58	17.94	1.4686	1.4374	1.4075	1.3789	1.3515	1.3252	1.3000	1.2758	1.2525	1.2300	1.2084
570	268.03	18.24	1.4936	1.4618	1.4315	1.4023	1.3745	1.3477	1.3220	1.2974	1.2736	1.2508	1.2288
580	272.47	18.54	1.5186	1.4863	1.4554	1.4258	1.3974	1.3702	1.3440	1.3189	1.2948	1.2715	1.2492
590	276.92	18.84	1.5437	1.5108	1.4793	1.4492	1.4203	1.3926	1.3660	1.3405	1.3160	1.2923	1.2696
600	281.36	19.15	1.5687	1.5352	1.5032	1.4726	1.4432	1.4151	1.3881	1.3621	1.3371	1.3131	1.2899
610	285.81	19.45	1.5938	1.5597	1.5272	1.4960	1.4661	1.4375	1.4101	1.3837	1.3583	1.3339	1.3103
620	290.25	19.75	1.6188	1.5842	1.5511	1.5194	1.4891	1.4600	1.4321	1.4053	1.3795	1.3548	1.3307
630	294.69	20.05	1.6439	1.6087	1.5751	1.5429	1.5120	1.4825	1.4541	1.4269	1.4008	1.3756	1.3511
640	299.14	20.36	1.6689	1.6332	1.5990	1.5663	1.5350	1.5049	1.4761	1.4485	1.4219	1.3964	1.3716
650	303.58	20.66	1.6940	1.6577	1.6230	1.5897	1.5579	1.5274	1.4981	1.4700	1.4430	1.4170	1.3920
660	308.03	20.96	1.7191	1.6822	1.6469	1.6132	1.5809	1.5499	1.5202	1.4916	1.4642	1.4377	1.4123
670	312.47	21.26	1.7442	1.7067	1.6709	1.6366	1.6038	1.5724	1.5422	1.5132	1.4853	1.4585	1.4327
680	316.92	21.56	1.7693	1.7312	1.6948	1.6601	1.6268	1.5949	1.5642	1.5348	1.5065	1.4793	1.4531
690	321.36	21.87	1.7944	1.7557	1.7188	1.6835	1.6497	1.6174	1.5862	1.5564	1.5277	1.5001	1.4735
700	325.81	22.17	1.8195	1.7803	1.7428	1.7070	1.6727	1.6398	1.6083	1.5780	1.5489	1.5209	1.4940
710	330.25	22.47	1.8446	1.8048	1.7668	1.7305	1.6956	1.6623	1.6303	1.5996	1.5700	1.5416	1.5144
720	334.69	22.77	1.8697	1.8293	1.7908	1.7539	1.7186	1.6848	1.6523	1.6212	1.5912	1.5624	1.5347
730	339.14	23.07	1.8948	1.8539	1.8148	1.7774	1.7416	1.7073	1.6744	1.6428	1.6124	1.5832	1.5551
740	343.58	23.38	1.9200	1.8785	1.8388	1.8009	1.7646	1.7299	1.6964	1.6644	1.6336	1.6040	1.5755
750	348.03	23.68	1.9451	1.9030	1.8628	1.8244	1.7876	1.7523	1.7185	1.6860	1.6548	1.6248	1.5959
760	352.47	23.98	1.9703	1.9276	1.8868	1.8478	1.8105	1.7748	1.7405	1.7076	1.6760	1.6455	1.6163
770	356.91	24.28	1.9954	1.9522	1.9108	1.8713	1.8335	1.7973	1.7625	1.7292	1.6972	1.6663	1.6367
780	361.36	24.59	2.0206	1.9767	1.9349	1.8948	1.8565	1.8198	1.7846	1.7508	1.7183	1.6871	1.6571
790	365.80	24.89	2.0457	2.0013	1.9589	1.9183	1.8795	1.8423	1.8066	1.7724	1.7395	1.7079	1.6774

T-3

DENSITY

AIR

AIR,DENSITY,LBS/CUBIC FT

DEPTH	PRESSURE		TEMPERATURES,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
800	370.25	25.19	2.0710	2.0259	1.9838	1.9418	1.9025	1.8644	1.8267	1.7940	1.7607	1.7247	1.6979
810	374.69	25.50	2.0962	2.0505	2.0070	1.9653	1.9255	1.8873	1.8507	1.8150	1.7819	1.7495	1.7192
820	379.14	25.80	2.1214	2.0751	2.0310	1.9888	1.9484	1.9099	1.8728	1.8372	1.8031	1.7702	1.7386
830	383.58	26.10	2.1466	2.0997	2.0551	2.0123	1.9715	1.9323	1.8948	1.8589	1.8243	1.7910	1.7590
840	388.03	26.40	2.1719	2.1243	2.0791	2.0358	1.9945	1.9549	1.9169	1.8805	1.8455	1.8118	1.7794
850	392.47	26.71	2.1970	2.1488	2.1032	2.0594	2.0175	1.9774	1.9389	1.9021	1.8666	1.8326	1.7998
860	396.91	27.01	2.2222	2.1734	2.1273	2.0829	2.0405	1.9999	1.9610	1.9237	1.8878	1.8534	1.8202
870	401.36	27.31	2.2474	2.1982	2.1513	2.1064	2.0635	2.0224	1.9831	1.9453	1.9090	1.8741	1.8406
880	405.80	27.61	2.2727	2.2228	2.1754	2.1299	2.0865	2.0449	2.0051	1.9669	1.9302	1.8949	1.8610
890	410.25	27.92	2.2979	2.2475	2.1995	2.1535	2.1095	2.0675	2.0272	1.9885	1.9514	1.9157	1.8814
900	414.69	28.22	2.3231	2.2721	2.2235	2.1770	2.1325	2.0900	2.0493	2.0102	1.9726	1.9365	1.9018
910	419.14	28.52	2.3484	2.2968	2.2476	2.2005	2.1554	2.1125	2.0713	2.0318	1.9938	1.9573	1.9222
920	423.58	28.82	2.3737	2.3214	2.2717	2.2241	2.1784	2.1351	2.0934	2.0534	2.0150	1.9781	1.9426
930	428.03	29.13	2.3989	2.3461	2.2958	2.2476	2.2014	2.1576	2.1155	2.0750	2.0362	1.9988	1.9630
940	432.47	29.43	2.4242	2.3708	2.3199	2.2712	2.2244	2.1801	2.1375	2.0966	2.0574	2.0196	1.9833
950	436.91	29.73	2.4495	2.3954	2.3440	2.2947	2.2477	2.2027	2.1596	2.1183	2.0786	2.0404	2.0037
960	441.36	30.03	2.4748	2.4201	2.3681	2.3183	2.2707	2.2252	2.1817	2.1399	2.0998	2.0612	2.0241
970	445.80	30.33	2.5001	2.4448	2.3922	2.3418	2.2936	2.2478	2.2037	2.1615	2.1209	2.0820	2.0445
980	450.25	30.64	2.5254	2.4695	2.4163	2.3654	2.3166	2.2703	2.2258	2.1831	2.1421	2.1028	2.0649
990	454.69	30.94	2.5506	2.4942	2.4404	2.3890	2.3396	2.2928	2.2479	2.2048	2.1633	2.1235	2.0853
1000	459.14	31.24	2.5760	2.5189	2.4645	2.4125	2.3625	2.3154	2.2700	2.2264	2.1845	2.1443	2.1057
1050	481.36	32.75	2.7026	2.6424	2.5852	2.5304	2.4781	2.4282	2.3804	2.3345	2.2905	2.2482	2.2076
1100	503.58	34.27	2.8294	2.7661	2.7059	2.6484	2.5935	2.5410	2.4908	2.4427	2.3965	2.3521	2.3095
1150	525.80	35.78	2.9563	2.8899	2.8268	2.7664	2.7088	2.6539	2.6012	2.5508	2.5024	2.4560	2.4113
1200	548.02	37.29	3.0834	3.0138	2.9477	2.8845	2.8242	2.7667	2.7117	2.6590	2.6084	2.5598	2.5132
1250	570.25	38.80	3.2105	3.1378	3.0687	3.0028	2.9397	2.8796	2.8221	2.7671	2.7143	2.6637	2.6150
1300	592.47	40.31	3.3378	3.2619	3.1897	3.1208	3.0552	2.9925	2.9326	2.8753	2.8203	2.7675	2.7168
1350	614.69	41.83	3.4653	3.3861	3.3109	3.2391	3.1707	3.1054	3.0431	2.9834	2.9262	2.8713	2.8186
1400	636.91	43.34	3.5928	3.5103	3.4321	3.3574	3.2862	3.2184	3.1536	3.0916	3.0321	2.9750	2.9203
1450	659.13	44.85	3.7204	3.6347	3.5534	3.4757	3.4018	3.3313	3.2640	3.1997	3.1379	3.0788	3.0220
1500	681.36	46.36	3.8482	3.7591	3.6747	3.5941	3.5174	3.4443	3.3745	3.3078	3.2438	3.1825	3.1236
	500	34.02	2.8090	2.7462	2.6865	2.6296	2.5744	2.5228	2.4730	2.4253	2.3794	2.3354	2.2931
	600	40.83	3.3810	3.3039	3.2308	3.1609	3.0943	3.0307	2.9701	2.9119	2.8562	2.8027	2.7513
	700	47.63	3.9554	3.8635	3.7765	3.6935	3.6144	3.5391	3.4672	3.3985	3.3326	3.2694	3.2089
	800	54.44	4.5310	4.4244	4.3231	4.2265	4.1347	4.0473	3.9641	3.8845	3.8083	3.7354	3.6655
	900	61.24	5.1089	4.9861	4.8702	4.7597	4.6548	4.5552	4.4603	4.3698	4.2831	4.2003	4.1209
	1000	68.05	5.6889	5.5480	5.4172	5.2925	5.1744	5.0622	4.9556	4.8540	4.7567	4.6638	4.5749
	1100	74.85	6.2688	6.1096	5.9635	5.8265	5.6929	5.5681	5.4496	5.3367	5.2288	5.1257	5.0272
	1200	81.65	6.8620	6.6702	6.5087	6.3552	6.2100	6.0726	5.9419	5.8177	5.6990	5.5857	5.4775
	1300	88.46	7.4174	7.2293	7.0523	6.8841	6.7252	6.5747	6.4322	6.2966	6.1471	6.0436	5.9257
	1400	95.26	7.9918	7.7863	7.5938	7.4180	7.2381	7.0745	6.9231	6.7731	6.6320	6.4998	6.3714
	1500	102.07	8.5630	8.3407	8.1325	7.9368	7.7483	7.5721	7.4053	7.2470	7.0958	6.9518	6.8145
	1600	108.87	9.1310	8.8918	8.6680	8.4558	8.2554	8.0663	7.8875	7.7178	7.5558	7.4017	7.2547
	1700	115.68	9.6950	9.4391	9.2008	8.9724	8.7590	8.5571	8.3663	8.1854	8.0127	7.8446	7.6918
	1800	122.48	10.2565	9.9821	9.7276	9.4861	9.2587	9.0462	8.8415	8.6494	8.4661	8.2917	8.1257
	1900	129.29	10.8094	10.5203	10.2508	9.9950	9.7562	9.5272	9.3128	9.1096	8.9159	8.7315	8.5561
	2000	136.09	11.3579	11.0533	10.7649	10.4991	10.2451	10.0058	9.7798	9.5659	9.3617	9.1675	8.9828
	2100	142.90	11.9008	11.5805	11.2817	10.9961	10.7313	10.4798	10.2425	10.0178	9.8034	9.5997	9.4057
	2200	149.70	12.4371	12.1017	11.7884	11.4918	11.2123	10.9494	10.7005	10.4653	10.2409	10.0276	9.8248
	2300	156.51	12.967	12.617	12.290	11.980	11.688	11.413	11.154	10.908	10.674	10.451	10.240
	2400	163.31	13.489	13.125	12.785	12.462	12.158	11.872	11.602	11.346	11.102	10.871	10.650
	2500	170.11	14.004	13.626	13.273	12.938	12.622	12.325	12.045	11.779	11.526	11.285	11.057
	2600	176.92	14.511	14.120	13.754	13.407	13.080	12.773	12.482	12.207	11.945	11.696	11.459
	2700	183.72	15.010	14.608	14.229	13.870	13.532	13.214	12.914	12.630	12.359	12.101	11.856
	2800	190.53	15.501	15.085	14.694	14.327	13.978	13.650	13.341	13.047	12.768	12.502	12.249
	2900	197.33	15.984	15.556	15.157	14.778	14.418	14.080	13.761	13.459	13.171	12.897	12.637
	3000	204.14	16.459	16.020	15.610	15.219	14.851	14.504	14.177	13.866	13.570	13.288	13.020
	3100	210.94	16.925	16.476	16.056	15.655	15.276	14.922	14.586	14.269	13.963	13.674	13.399
	3200	217.75	17.384	16.924	16.495	16.085	15.698	15.334	14.989	14.663	14.351	14.055	13.773
	3300	224.55	17.836	17.365	16.926	16.507	16.112	15.739	15.387	15.053	14.734	14.431	14.142
	3400	231.36	18.275	17.797	17.353	16.923	16.520	16.139	15.779	15.438	15.112	14.802	14.506
	3500	238.16	18.709	18.222	17.767	17.331	16.920	16.532	16.165	15.817	15.484	15.167	14.866
	3600	244.96	19.135	18.640	18.177	17.733	17.315	16.920	16.546	16.191	15.852	15.528	15.221
	3700	251.77	19.552	19.050	18.579	18.129	17.703	17.301	16.920	16.559	16.214	15.884	15.571
	3800	258.57	19.962	19.453	18.975	18.518	18.085	17.676	17.289	16.922	16.570	16.235	15.916
	3900	265.38	20.365	19.848	19.364	18.900	18.461	18.046	17.653	17.280	16.922	16.581	16.256
	4000	272.18	20.759	20.237	19.748	19.278	18.831	18.409	18.011	17.632	17.269	16.922	16.592
	4100	278.99	21.147	20.618	20.121	19.645	19.194	18.767	18.363	17.979	17.613	17.264	16.924
	4200	285.79	21.527	20.993	20.490	20.008	19.552	19.120	18.710	18.320	17.947	17.590	17.251
	4300	292.60	21.900	21.360	20.854	20.365	19.904	19.466	19.051	18.657	18.279	17.917	17.573
	4400	299.40	22.267	21.722	21.209	20.717	20.250	19.807	19.388	18.989	18.605	18.243	17.891
	4500	306.21	22.627	22.077	21.559	21.062	20.590	20.143	19.719	19.315	18.927	18.557	18.204
	4600	313.01	22.980	22.425	21.903	21.401	20.924	20.474	20.045	19.637	19.245	18.870	18.513
	4700	319.81	23.326	22.768	22.242	21.735	21.255	20.799	20.368	19.954	19.559	19.179	18.818
	4800	326.62	23.667	23.104	22.574	22.063	21.579	21.119	20.682	20.265	19.868	19.483	19.118
	4900	333.42	24.002	23.435	22.901	22.386	21.899	21.434	20.993	20.574	20.170	19.784	19.416
	5000	340.23	24.331	23.760	23.222	22.704	22.212	21.744	21.300	20.877	20.469	20.079	19.707

AIR

AIR.SPECIFIC VOLUME.CUBIC FT/LB

DEPTH	PRESSURE		TEMPERATURES,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	12.337	12.590	12.842	13.095	13.348	13.601	13.853	14.106	14.359	14.611	14.864
10	19.14	1.30	9.4703	9.6647	9.8589	10.0532	10.2476	10.4416	10.6358	10.8299	11.0241	11.2182	11.4123
20	23.58	1.60	7.6842	7.8421	7.9999	8.1577	8.3156	8.4732	8.6308	8.7885	8.9462	9.1038	9.2614
30	28.03	1.91	6.4646	6.5975	6.7304	6.8633	6.9961	7.1289	7.2617	7.3946	7.5272	7.6599	7.7926
40	32.47	2.21	5.5788	5.6936	5.8084	5.9232	6.0379	6.1526	6.2673	6.3820	6.4966	6.6113	6.7259
50	36.92	2.51	4.9862	5.0873	5.1884	5.2894	5.3904	5.4914	5.5924	5.6933	5.7942	5.8951	5.9960
60	41.36	2.81	4.3782	4.4685	4.5588	4.6491	4.7393	4.8295	4.9197	5.0098	5.1000	5.1901	5.2801
70	45.81	3.12	3.9527	4.0343	4.1159	4.1974	4.2790	4.3605	4.4420	4.5234	4.6049	4.6863	4.7677
80	50.25	3.42	3.6024	3.6769	3.7513	3.8257	3.9001	3.9745	4.0488	4.1231	4.1974	4.2716	4.3459
90	54.70	3.72	3.3091	3.3775	3.4460	3.5144	3.5828	3.6512	3.7195	3.7879	3.8561	3.9244	3.9926
100	59.14	4.02	3.0598	3.1232	3.1865	3.2499	3.3132	3.3764	3.4397	3.5029	3.5661	3.6293	3.6924
110	63.58	4.33	2.8456	2.9045	2.9634	3.0223	3.0813	3.1401	3.1990	3.2578	3.3167	3.3756	3.4343
120	68.03	4.63	2.6590	2.7142	2.7694	2.8245	2.8796	2.9347	2.9898	3.0449	3.0998	3.1548	3.2098
130	72.47	4.93	2.4955	2.5473	2.5992	2.6510	2.7027	2.7545	2.8062	2.8579	2.9096	2.9612	3.0129
140	76.92	5.23	2.3508	2.3997	2.4486	2.4975	2.5463	2.5951	2.6439	2.6926	2.7413	2.7900	2.8387
150	81.36	5.54	2.2221	2.2683	2.3145	2.3607	2.4069	2.4531	2.4992	2.5453	2.5914	2.6375	2.6835
160	85.81	5.84	2.1065	2.1504	2.1943	2.2382	2.2820	2.3258	2.3696	2.4133	2.4571	2.5008	2.5445
170	90.25	6.14	2.0024	2.0442	2.0860	2.1277	2.1694	2.2111	2.2527	2.2943	2.3360	2.3775	2.4191
180	94.70	6.44	1.9081	1.9480	1.9878	2.0276	2.0674	2.1071	2.1468	2.1865	2.2262	2.2659	2.3055
190	99.14	6.75	1.8222	1.8603	1.8984	1.9365	1.9745	2.0125	2.0504	2.0884	2.1263	2.1642	2.2021
200	103.58	7.05	1.7437	1.7802	1.8167	1.8531	1.8896	1.9259	1.9623	1.9986	2.0350	2.0713	2.1075
210	108.03	7.35	1.6717	1.7067	1.7417	1.7767	1.8116	1.8465	1.8814	1.9163	1.9511	1.9860	2.0208
220	112.47	7.65	1.6053	1.6390	1.6726	1.7063	1.7399	1.7734	1.8069	1.8405	1.8739	1.9074	1.9409
230	116.92	7.96	1.5440	1.5764	1.6088	1.6412	1.6735	1.7059	1.7381	1.7704	1.8026	1.8348	1.8670
240	121.36	8.26	1.4872	1.5185	1.5497	1.5809	1.6121	1.6432	1.6744	1.7054	1.7365	1.7676	1.7986
250	125.81	8.56	1.4344	1.4646	1.4947	1.5249	1.5550	1.5850	1.6151	1.6451	1.6751	1.7051	1.7350
260	130.25	8.86	1.3852	1.4144	1.4435	1.4727	1.5017	1.5308	1.5598	1.5888	1.6179	1.6468	1.6758
270	134.69	9.17	1.3393	1.3675	1.3957	1.4239	1.4520	1.4802	1.5083	1.5363	1.5644	1.5924	1.6204
280	139.14	9.47	1.2962	1.3236	1.3509	1.3782	1.4055	1.4328	1.4600	1.4872	1.5144	1.5415	1.5686
290	143.58	9.77	1.2559	1.2824	1.3089	1.3354	1.3619	1.3883	1.4147	1.4411	1.4674	1.4937	1.5201
300	148.03	10.07	1.2180	1.2437	1.2695	1.2952	1.3208	1.3465	1.3721	1.3977	1.4233	1.4488	1.4744
310	152.47	10.38	1.1822	1.2073	1.2323	1.2573	1.2822	1.3071	1.3320	1.3569	1.3817	1.4066	1.4314
320	156.92	10.68	1.1486	1.1729	1.1972	1.2215	1.2458	1.2700	1.2942	1.3184	1.3425	1.3667	1.3908
330	161.36	10.98	1.1167	1.1404	1.1641	1.1877	1.2113	1.2349	1.2585	1.2820	1.3055	1.3290	1.3525
340	165.81	11.28	1.0866	1.1097	1.1327	1.1557	1.1787	1.2017	1.2246	1.2476	1.2704	1.2933	1.3162
350	170.25	11.58	1.0580	1.0805	1.1030	1.1254	1.1479	1.1702	1.1926	1.2149	1.2372	1.2595	1.2818
360	174.69	11.89	1.0309	1.0529	1.0748	1.0967	1.1185	1.1404	1.1622	1.1839	1.2057	1.2274	1.2491
370	179.14	12.19	1.0052	1.0266	1.0480	1.0693	1.0907	1.1120	1.1332	1.1545	1.1757	1.1969	1.2181
380	183.58	12.49	.98068	1.00160	1.02247	1.04334	1.06417	1.08497	1.10574	1.12648	1.14722	1.16792	1.18861
390	188.03	12.79	.95733	.97777	.99816	1.01856	1.03891	1.05924	1.07952	1.09979	1.12005	1.14028	1.16048
400	192.47	13.10	.93505	.95504	.97498	.99491	1.01482	1.03469	1.05452	1.07434	1.09414	1.11391	1.13366
410	196.92	13.40	.91375	.93334	.95285	.97235	.99182	1.01125	1.03066	1.05003	1.06939	1.08873	1.10806
420	201.36	13.70	.89347	.91260	.93170	.95078	.96983	.98885	1.00784	1.02680	1.04574	1.06467	1.08357
430	205.81	14.00	.87402	.89276	.91145	.93014	.94879	.96742	.98600	1.00457	1.02312	1.04165	1.06015
440	210.25	14.31	.85539	.87376	.89207	.91037	.92865	.94689	.96510	.98328	1.00145	1.01960	1.03772
450	214.69	14.61	.83754	.85554	.87349	.89142	.90933	.92721	.94505	.96287	.98067	.99846	1.01622
460	219.14	14.91	.82042	.83806	.85566	.87324	.89081	.90833	.92583	.94329	.96075	.97818	.99559
470	223.58	15.21	.80397	.82127	.83856	.85579	.87301	.89020	.90736	.92449	.94161	.95871	.97578
480	228.03	15.52	.78816	.80515	.82208	.83901	.85592	.87278	.88962	.90642	.92322	.93999	.95674
490	232.47	15.82	.77296	.78964	.80626	.82288	.83947	.85603	.87255	.88905	.90553	.92199	.93844
500	236.92	16.12	.75833	.77471	.79104	.80735	.82364	.83990	.85612	.87233	.88851	.90467	.92081
510	241.36	16.42	.74424	.76033	.77637	.79240	.80840	.82437	.84030	.85621	.87211	.88799	.90384
520	245.80	16.73	.73066	.74647	.76223	.77799	.79371	.80940	.82506	.84069	.85631	.87191	.88748
530	250.25	17.03	.71756	.73310	.74860	.76409	.77956	.79496	.81035	.82572	.84107	.85640	.87171
540	254.69	17.33	.70492	.72021	.73544	.75067	.76587	.78103	.79616	.81127	.82636	.84143	.85648
550	259.14	17.63	.69271	.70775	.72273	.73771	.75266	.76758	.78246	.79731	.81216	.82698	.84177
560	263.58	17.94	.68092	.69571	.71046	.72519	.73990	.75458	.76921	.78383	.79843	.81301	.82757
570	268.03	18.24	.66951	.68407	.69859	.71309	.72756	.74201	.75641	.77079	.78516	.79951	.81383
580	272.47	18.54	.65848	.67282	.68711	.70139	.71563	.72985	.74403	.75818	.77233	.78645	.80055
590	276.92	18.84	.64781	.66192	.67599	.69005	.70408	.71808	.73204	.74598	.75991	.77381	.78769
600	281.36	19.15	.63747	.65137	.66523	.67908	.69290	.70668	.72043	.73416	.74787	.76157	.77523
610	285.80	19.45	.62745	.64115	.65480	.66844	.68206	.69564	.70919	.72271	.73622	.74970	.76317
620	290.25	19.75	.61774	.63124	.64470	.65814	.67156	.68494	.69829	.71161	.72492	.73820	.75147
630	294.69	20.05	.60832	.62163	.63490	.64814	.66137	.67455	.68771	.70084	.71396	.72705	.74012
640	299.14	20.36	.59919	.61231	.62538	.63845	.65148	.66449	.67765	.69049	.70337	.71626	.72912
650	303.58	20.66	.59032	.60326	.61615	.62904	.64189	.65471	.66750	.68026	.69301	.70573	.71843
660	308.03	20.96	.58171	.59447	.60719	.61989	.63257	.64521	.65782	.67041	.68299	.69554	.70806
670	312.47	21.26	.57334	.58593	.59848	.61101	.62352	.63599	.64843	.66084	.67324	.68563	.69798
680	316.92	21.56	.56521	.57763	.59001	.60238	.61472	.62702	.63930	.65155	.66378	.67599	.68818
690	321.36	21.87	.55730	.56957	.58178	.59399	.60617	.61831	.63042	.64251	.65458	.66663	.67866
700	325.80	22.17	.54961	.56171	.57377	.58583	.59786	.60983	.62178	.63371	.64561	.65752	.66938
710	330.25	22.47	.54212	.55408	.56598	.57788	.58975	.60158	.61338	.62516	.63692	.64866	.66038
720	334.69	22.77	.53484	.54664	.55840	.57015	.58188	.59355	.60520	.61683	.62844	.64003	.65160
730	339.14	23.08	.52775	.53940	.55101	.56262	.57419	.58573	.59724	.60872	.62019	.63164	.64305
740	343.58	23.38	.52084	.53235	.54382	.55528	.56672	.57811	.58948	.60082	.61215	.62345	.63473
750	348.03	23.68	.51410	.52548	.53681	.54814	.55943	.57069	.58192	.59312	.60431	.61547	.62662
760	352.47	23.98	.50756	.51878	.52994	.54117	.55233	.56345	.57455	.58561	.59667	.60770	.61871
770	356.91	24.29	.50114	.51225	.52332	.53436	.54541	.55640	.56736	.57830	.58922	.60012	.61100
780	361.36	24.59	.49508	.50598	.51692	.52775	.53866	.54952	.56035	.57115	.58194	.59273	.60348
790	365.80	24.88	.48881	.49967	.51048	.52129	.53207	.54281	.55352	.56420	.57487	.58552	.59614

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AIR,SPECIFIC VOLUME,CUBIC FT/LB

DEPTH FT	PRESSURE PSIA	ATM	TEMPERATURES,F 30	40	50	60	70	80	90	100	110	120	130
800	370.25	25.19	.48286	.49360	.50430	.51498	.52561	.53625	.54684	.55740	.56795	.57848	.58898
810	374.69	25.50	.47706	.48768	.49826	.50882	.51936	.52986	.54033	.55077	.56120	.57161	.58199
820	379.14	25.80	.47140	.48190	.49236	.50281	.51323	.52361	.53396	.54429	.55461	.56490	.57516
830	383.58	26.10	.46580	.47625	.48660	.49696	.50724	.51751	.52775	.53796	.54816	.55834	.56850
840	388.03	26.40	.46045	.47074	.48097	.49120	.50139	.51155	.52168	.53178	.54187	.55194	.56198
850	392.47	26.71	.45517	.46536	.47547	.48559	.49567	.50573	.51576	.52576	.53572	.54568	.55561
860	396.91	27.01	.45001	.46007	.47009	.48010	.49008	.50003	.50996	.51983	.52970	.53956	.54939
870	401.36	27.31	.44495	.45492	.46483	.47474	.48462	.49446	.50427	.51405	.52383	.53358	.54330
880	405.80	27.61	.44001	.44987	.45969	.46950	.47927	.48901	.49872	.50840	.51808	.52772	.53735
890	410.25	27.92	.43518	.44494	.45466	.46437	.47404	.48369	.49329	.50288	.51245	.52200	.53152
900	414.69	28.22	.43045	.44017	.44976	.45935	.46893	.47847	.48798	.49747	.50694	.51640	.52582
910	419.14	28.52	.42582	.43539	.44492	.45443	.46392	.47337	.48279	.49218	.50156	.51091	.52025
920	423.58	28.82	.42129	.43077	.44020	.44962	.45901	.46837	.47770	.48699	.49628	.50555	.51479
930	428.03	29.13	.41685	.42624	.43558	.44491	.45421	.46348	.47271	.48192	.49112	.50029	.50944
940	432.47	29.43	.41251	.42181	.43106	.44030	.44951	.45869	.46783	.47695	.48606	.49514	.50420
950	436.91	29.73	.40825	.41746	.42662	.43578	.44490	.45399	.46305	.47208	.48110	.49010	.49907
960	441.36	30.03	.40408	.41321	.42228	.43135	.44039	.44939	.45837	.46731	.47624	.48516	.49404
970	445.80	30.33	.39999	.40903	.41803	.42701	.43597	.44489	.45378	.46264	.47149	.48031	.48912
980	450.25	30.64	.39598	.40494	.41388	.42276	.43163	.44047	.44928	.45805	.46682	.47557	.48429
990	454.69	30.94	.39206	.40094	.40977	.41859	.42738	.43614	.44486	.45356	.46225	.47091	.47955
1000	459.14	31.24	.38820	.39700	.40576	.41450	.42321	.43189	.44054	.44916	.45776	.46635	.47491
1050	481.36	32.75	.37001	.37844	.38682	.39519	.40353	.41183	.42011	.42835	.43659	.44480	.45298
1100	503.58	34.27	.35343	.36152	.36956	.37759	.38559	.39355	.40148	.40939	.41728	.42515	.43300
1150	525.80	35.78	.33820	.34604	.35376	.36148	.36916	.37682	.38444	.39203	.39961	.40717	.41471
1200	548.02	37.29	.32432	.33181	.33925	.34668	.35408	.36144	.36878	.37609	.38338	.39065	.39790
1250	570.25	38.80	.31148	.31870	.32587	.33304	.34017	.34724	.35436	.36139	.36842	.37542	.38241
1300	592.47	40.31	.29960	.30657	.31350	.32043	.32732	.33417	.34099	.34779	.35458	.36134	.36808
1350	614.69	41.83	.28858	.29533	.30203	.30873	.31539	.32202	.32861	.33518	.34174	.34828	.35479
1400	636.91	43.34	.27834	.28487	.29137	.29785	.30430	.31072	.31710	.32346	.32981	.33613	.34243
1450	659.13	44.85	.26874	.27513	.28142	.28771	.29396	.30018	.30637	.31253	.31868	.32481	.33091
1500	681.36	46.36	.25986	.26602	.27213	.27823	.28430	.29034	.29634	.30232	.30828	.31422	.32014
	500	34.02	.35600	.36414	.37223	.38032	.38837	.39638	.40437	.41233	.42027	.42820	.43610
	600	40.83	.29577	.30267	.30952	.31636	.32317	.32995	.33669	.34341	.35012	.35680	.36346
	700	47.63	.25282	.25883	.26479	.27075	.27667	.28256	.28842	.29425	.30007	.30586	.31164
	800	54.44	.22067	.22602	.23131	.23660	.24186	.24708	.25227	.25743	.26258	.26771	.27281
	900	61.24	.19574	.20056	.20533	.21010	.21483	.21953	.22420	.22884	.23347	.23808	.24267
	1000	68.05	.17584	.18024	.18460	.18895	.19326	.19754	.20179	.20602	.21023	.21442	.21858
	1100	74.85	.15962	.16368	.16769	.17169	.17566	.17959	.18350	.18738	.19125	.19510	.19892
	1200	81.65	.14616	.14992	.15364	.15735	.16103	.16468	.16830	.17189	.17547	.17903	.18257
	1300	88.46	.13481	.13833	.14180	.14526	.14869	.15210	.15547	.15882	.16215	.16547	.16876
	1400	95.26	.12513	.12843	.13169	.13494	.13816	.14135	.14451	.14764	.15077	.15387	.15695
	1500	102.07	.11678	.11989	.12296	.12603	.12906	.13206	.13504	.13799	.14093	.14385	.14675
	1600	108.87	.10952	.11246	.11537	.11826	.12113	.12397	.12678	.12957	.13235	.13510	.13784
	1700	115.68	.10315	.10594	.10870	.11145	.11417	.11686	.11953	.12217	.12480	.12741	.13001
	1800	122.48	.09752	.10018	.10280	.10542	.10801	.11057	.11310	.11562	.11812	.12060	.12307
	1900	129.29	.09252	.09505	.09755	.10005	.10252	.10496	.10738	.10977	.11216	.11453	.11688
	2000	136.09	.08804	.09047	.09286	.09525	.09761	.09994	.10225	.10454	.10682	.10908	.11132
	2100	142.90	.08403	.08635	.08864	.09092	.09319	.09542	.09763	.09982	.10201	.10417	.10632
	2200	149.70	.08040	.08263	.08481	.08702	.08919	.09133	.09345	.09555	.09765	.09972	.10178
	2300	156.51	.07712	.07926	.08137	.08347	.08556	.08762	.08966	.09167	.09369	.09568	.09766
	2400	163.31	.07413	.07619	.07822	.08025	.08225	.08423	.08619	.08814	.09007	.09199	.09389
	2500	170.11	.07141	.07339	.07534	.07729	.07923	.08114	.08302	.08489	.08676	.08861	.09044
	2600	176.92	.06891	.07082	.07270	.07459	.07645	.07829	.08011	.08192	.08372	.08550	.08727
	2700	183.72	.06662	.06847	.07028	.07210	.07390	.07568	.07743	.07918	.08091	.08264	.08435
	2800	190.53	.06451	.06629	.06804	.06980	.07154	.07326	.07496	.07664	.07832	.07999	.08164
	2900	197.33	.06256	.06428	.06598	.06768	.06936	.07102	.07267	.07430	.07592	.07754	.07913
	3000	204.14	.06076	.06242	.06406	.06571	.06733	.06895	.07054	.07212	.07369	.07525	.07680
	3100	210.94	.05908	.06069	.06228	.06388	.06545	.06701	.06856	.07009	.07162	.07313	.07463
	3200	217.75	.05753	.05909	.06063	.06217	.06370	.06522	.06671	.06820	.06968	.07115	.07261
	3300	224.55	.05607	.05759	.05908	.06058	.06207	.06353	.06499	.06643	.06787	.06930	.07071
	3400	231.36	.05472	.05619	.05766	.05909	.06053	.06196	.06337	.06477	.06617	.06756	.06894
	3500	238.16	.05345	.05488	.05629	.05770	.05910	.06049	.06185	.06322	.06458	.06593	.06727
	3600	244.96	.05226	.05365	.05502	.05639	.05775	.05910	.06044	.06176	.06309	.06440	.06570
	3700	251.77	.05114	.05249	.05382	.05516	.05649	.05780	.05910	.06039	.06168	.06295	.06422
	3800	258.57	.05009	.05141	.05270	.05400	.05529	.05657	.05784	.05909	.06035	.06159	.06283
	3900	265.38	.04910	.05038	.05164	.05291	.05417	.05541	.05665	.05787	.05909	.06031	.06151
	4000	272.18	.04817	.04942	.05066	.05188	.05310	.05432	.05552	.05672	.05791	.05909	.06027
	4100	278.99	.04729	.04850	.04970	.05090	.05210	.05328	.05446	.05562	.05679	.05794	.05909
	4200	285.79	.04645	.04763	.04880	.04998	.05115	.05230	.05345	.05458	.05572	.05685	.05797
	4300	292.60	.04568	.04682	.04796	.04910	.05024	.05137	.05249	.05360	.05471	.05581	.05691
	4400	299.40	.04491	.04604	.04715	.04827	.04938	.05049	.05158	.05268	.05375	.05483	.05590
	4500	306.21	.04420	.04530	.04638	.04748	.04857	.04964	.05071	.05177	.05283	.05389	.05493
	4600	313.01	.04352	.04459	.04566	.04673	.04779	.04884	.04989	.05092	.05196	.05299	.05402
	4700	319.81	.04287	.04392	.04496	.04601	.04705	.04808	.04910	.05012	.05114	.05216	.05316
	4800	326.62	.04225	.04328	.04430	.04532	.04634	.04735	.04835	.04934	.05034	.05133	.05231
	4900	333.42	.04166	.04267	.04367	.04467	.04567	.04665	.04763	.04861	.04958	.05055	.05151
	5000	340.23	.04110	.04209	.04306	.04404	.04502	.04599	.04695	.04790	.04885	.04980	.05074

AIR
ENTHALPY,BTU/LB

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	171.86	176.66	181.46	186.27	191.08	195.89
30.00	171.75	176.56	181.37	186.18	191.00	195.82
50.00	171.60	176.42	181.24	186.07	190.90	195.73
100.00	171.23	176.08	180.93	185.78	190.64	195.49
200.00	170.49	175.41	180.31	185.22	190.12	195.01
300.00	169.74	174.73	179.69	184.65	189.60	194.54
400.00	168.99	174.04	179.07	184.08	189.07	194.06
500.00	168.23	173.36	178.45	183.51	188.55	193.58
1000.00	164.53	169.99	175.39	180.72	186.02	191.26
2000.00	157.83	163.92	169.89	175.73	181.49	187.14
3000.00	153.08	159.59	165.95	172.15	178.26	184.24
4000.00	150.26	156.96	163.50	169.91	176.24	182.44
5000.00	148.85	155.61	162.25	168.78	175.25	181.61

AIR
CV,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.172	.172	.172	.172	.172	.172
30.00	.172	.172	.172	.172	.172	.172
50.00	.172	.172	.172	.172	.172	.172
100.00	.172	.172	.172	.172	.172	.172
200.00	.173	.172	.172	.172	.172	.172
300.00	.174	.173	.173	.173	.173	.173
400.00	.174	.174	.174	.174	.174	.173
500.00	.175	.175	.175	.174	.174	.174
1000.00	.179	.178	.177	.177	.176	.176
2000.00	.183	.182	.180	.179	.179	.178
3000.00	.186	.184	.182	.181	.181	.181
4000.00	.188	.187	.185	.184	.183	.182
5000.00	.190	.188	.186	.185	.184	.183

AIR
ENTROPY,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.9053	.9149	.9242	.9330	.9416	.9499
30.00	.8764	.8860	.8953	.9042	.9128	.9210
50.00	.8386	.8483	.8576	.8664	.8750	.8833
100.00	.7768	.7865	.7958	.8047	.8134	.8217
200.00	.7306	.7398	.7493	.7583	.7671	.7755
300.00	.7002	.7101	.7197	.7288	.7377	.7462
400.00	.6755	.6855	.6952	.7044	.7134	.7220
500.00	.6611	.6716	.6812	.6905	.6996	.7082
1000.00	.6070	.6179	.6283	.6381	.6476	.6566
2000.00	.5437	.5558	.5673	.5780	.5883	.5980
3000.00	.5053	.5193	.5315	.5429	.5538	.5641
4000.00	.4801	.4935	.5061	.5179	.5292	.5399
5000.00	.4602	.4737	.4865	.4985	.5101	.5209

AIR
THERMAL CONDUCTIVITY,BTU/SEC FT F
(MULTIPLY TABLE ENTRY BY .00000101)

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	3.93	4.06	4.19	4.32	4.45	4.58
30.00	3.93	4.07	4.20	4.33	4.46	4.59
50.00	3.95	4.08	4.21	4.34	4.47	4.59
100.00	3.98	4.11	4.24	4.37	4.49	4.62
200.00	4.03	4.16	4.29	4.42	4.54	4.66
300.00	4.09	4.22	4.34	4.47	4.59	4.71
400.00	4.15	4.27	4.40	4.52	4.64	4.76
500.00	4.21	4.33	4.45	4.57	4.68	4.80
1000.00	4.54	4.64	4.76	4.85	4.95	5.05
2000.00	5.30	5.35	5.41	5.47	5.53	5.61
3000.00	6.21	6.17	6.16	6.17	6.19	6.22
4000.00	7.20	7.08	7.01	6.95	6.91	6.90
5000.00	8.17	7.99	7.87	7.76	7.67	7.61

AIR
CP,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.2401	.2401	.2402	.2403	.2404	.2406
30.00	.2406	.2406	.2406	.2407	.2408	.2409
50.00	.2413	.2412	.2412	.2412	.2413	.2413
100.00	.2430	.2424	.2426	.2425	.2424	.2424
200.00	.2465	.2459	.2454	.2450	.2448	.2446
300.00	.2499	.2490	.2482	.2476	.2471	.2467
400.00	.2533	.2521	.2510	.2501	.2495	.2489
500.00	.2568	.2552	.2538	.2527	.2518	.2510
1000.00	.2750	.2716	.2683	.2657	.2634	.2615
2000.00	.3077	.3008	.2947	.2895	.2848	.2809
3000.00	.3293	.3215	.3143	.3080	.3021	.2972
4000.00	.3371	.3302	.3238	.3180	.3125	.3075
5000.00	.3410	.3352	.3299	.3251	.3204	.3150

AIR
PRANDTL NUMBER

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.70	.70	.70	.69	.69	.69
30.00	.70	.70	.70	.69	.69	.69
50.00	.70	.70	.70	.69	.69	.69
100.00	.70	.70	.70	.69	.69	.69
200.00	.71	.71	.70	.70	.70	.70
300.00	.72	.71	.71	.70	.70	.70
400.00	.72	.72	.71	.70	.70	.70
500.00	.73	.72	.72	.71	.70	.70
1000.00	.76	.75	.74	.73	.72	.72
2000.00	.82	.80	.79	.77	.76	.74
3000.00	.86	.83	.81	.80	.79	.78
4000.00	.85	.84	.83	.82	.81	.80
5000.00	.84	.84	.83	.82	.81	.80

AIR
CP/CV

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.40	1.40	1.40	1.40	1.40	1.40
30.00	1.40	1.40	1.40	1.40	1.40	1.40
50.00	1.41	1.40	1.40	1.40	1.40	1.40
100.00	1.41	1.41	1.41	1.41	1.41	1.41
200.00	1.43	1.42	1.42	1.42	1.41	1.41
300.00	1.44	1.43	1.43	1.43	1.42	1.42
400.00	1.45	1.44	1.44	1.44	1.43	1.43
500.00	1.46	1.45	1.45	1.45	1.44	1.44
1000.00	1.53	1.52	1.52	1.51	1.49	1.49
2000.00	1.69	1.66	1.64	1.61	1.59	1.57
3000.00	1.77	1.75	1.72	1.70	1.66	1.64
4000.00	1.80	1.77	1.76	1.74	1.71	1.68
5000.00	1.80	1.78	1.77	1.76	1.73	1.71

AIR
VISCOSITY,LB/FT SEC
(MULTIPLY TABLE ENTRY BY .0000100)

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.148	1.184	1.212	1.244	1.275	1.310
30.00	1.149	1.186	1.213	1.245	1.276	1.311
50.00	1.151	1.187	1.215	1.246	1.278	1.313
100.00	1.156	1.192	1.220	1.251	1.282	1.317
200.00	1.165	1.200	1.228	1.259	1.290	1.324
300.00	1.174	1.208	1.237	1.267	1.298	1.332
400.00	1.183	1.217	1.246	1.276	1.306	1.339
500.00	1.192	1.225	1.254	1.284	1.314	1.347
1000.00	1.248	1.277	1.305	1.332	1.359	1.390
2000.00	1.400	1.416	1.435	1.456	1.476	1.499
3000.00	1.581	1.583	1.588	1.597	1.606	1.623
4000.00	1.798	1.784	1.774	1.771	1.772	1.779
5000.00	2.016	1.986	1.965	1.948	1.934	1.932

AIR
SONIC VELOCITY FT/SEC

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1084	1106	1128	1149	1170	1190
30.00	1084	1107	1129	1150	1170	1191
50.00	1085	1107	1129	1150	1171	1191
100.00	1085	1108	1131	1152	1172	1193
200.00	1086	1110	1133	1155	1176	1197
300.00	1088	1112	1136	1158	1179	1200
400.00	1089	1113	1138	1161	1182	1204
500.00	1090	1115	1141	1164	1195	1207
1000.00	1106	1134	1162	1185	1207	1231
2000.00	1165	1196	1224	1248	1270	1293
3000.00	1232	1265	1295	1319	1340	1361
4000.00	1313	1344	1375	1400	1421	1441
5000.00	1401	1432	1461	1491	1523	1544

DENSITY

OXYGEN

OXYGEN,DENSITY,LBS/CUBIC FT

DEPTH	PRESSURE		TEMPERATURES,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	.08958	.08778	.08605	.08439	.08279	.08125	.07977	.07834	.07696	.07563	.07434
10	19.14	1.30	.11671	.11436	.11211	.10994	.10785	.10584	.10391	.10205	.10025	.09851	.09684
20	23.58	1.60	.14386	.14096	.13817	.13550	.13292	.13045	.12806	.12576	.12354	.12140	.11934
30	28.03	1.91	.17102	.16757	.16425	.16107	.15801	.15506	.15222	.14948	.14685	.14430	.14184
40	32.47	2.21	.19820	.19419	.19035	.18665	.18310	.17968	.17639	.17321	.17015	.16720	.16435
50	36.92	2.51	.22539	.22083	.21646	.21225	.20820	.20431	.20056	.19695	.19347	.19011	.18686
60	41.36	2.81	.25260	.24749	.24258	.23786	.23332	.22895	.22475	.22070	.21679	.21302	.20938
70	45.81	3.12	.27983	.27416	.26871	.26348	.25844	.25360	.24894	.24445	.24012	.23594	.23191
80	50.25	3.42	.30708	.30084	.29486	.28911	.28358	.27826	.27314	.26821	.26345	.25887	.25443
90	54.70	3.72	.33434	.32754	.32102	.31475	.30872	.30293	.29735	.29198	.28680	.28180	.27697
100	59.14	4.02	.36162	.35425	.34719	.34040	.33388	.32761	.32157	.31575	.31014	.30473	.29951
110	63.58	4.33	.38891	.38098	.37338	.36607	.35905	.35230	.34580	.33953	.33350	.32767	.32205
120	68.03	4.63	.41622	.40773	.39958	.39175	.38423	.37699	.37003	.36332	.35686	.35062	.34460
130	72.47	4.93	.44355	.43449	.42579	.41744	.40942	.40170	.39427	.38712	.38023	.37358	.36716
140	76.92	5.23	.47090	.46126	.45202	.44314	.43461	.42641	.41852	.41092	.40360	.39653	.38971
150	81.36	5.54	.49826	.48805	.47826	.46886	.45982	.45114	.44278	.43473	.42698	.41950	.41228
160	85.81	5.84	.52564	.51485	.50451	.49458	.48504	.47587	.46705	.45855	.45037	.44247	.43485
170	90.25	6.14	.55303	.54167	.53078	.52032	.51027	.50062	.49132	.48238	.47376	.46545	.45742
180	94.70	6.44	.58044	.56851	.55706	.54607	.53552	.52537	.51561	.50621	.49716	.48843	.48000
190	99.14	6.75	.60787	.59535	.58335	.57183	.56077	.55013	.53990	.53005	.52057	.51141	.50258
200	103.58	7.05	.63532	.62222	.60966	.59761	.58603	.57490	.56420	.55390	.54398	.53441	.52517
210	108.03	7.35	.66278	.64910	.63599	.62339	.61130	.59968	.58851	.57775	.56740	.55740	.54777
220	112.47	7.65	.69025	.67599	.66232	.64919	.63658	.62447	.61283	.60161	.59082	.58041	.57036
230	116.92	7.96	.71775	.70289	.68867	.67500	.66188	.64927	.63715	.62549	.61425	.60342	.59297
240	121.36	8.26	.74526	.72982	.71502	.70081	.68718	.67408	.66148	.64936	.63769	.62643	.61557
250	125.81	8.56	.77279	.75675	.74139	.72665	.71249	.69889	.68582	.67324	.66113	.64945	.63819
260	130.25	8.86	.80033	.78370	.76778	.75249	.73782	.72372	.71017	.69713	.68458	.67248	.66080
270	134.69	9.17	.82790	.81067	.79418	.77835	.76315	.74856	.73452	.72103	.70804	.69551	.68342
280	139.14	9.47	.85547	.83765	.82059	.80421	.78849	.77340	.75889	.74493	.73150	.71854	.70605
290	143.58	9.77	.88306	.86465	.84702	.83009	.81385	.79825	.78326	.76884	.75497	.74159	.72868
300	148.03	10.07	.91067	.89166	.87345	.85598	.83922	.82312	.80764	.79276	.77845	.76463	.75131
310	152.47	10.38	.93830	.91868	.89990	.88188	.86459	.84799	.83203	.81669	.80192	.78769	.77395
320	156.92	10.68	.96595	.94572	.92637	.90780	.88997	.87286	.85643	.84062	.82541	.81074	.79660
330	161.36	10.98	.99360	.97278	.95285	.93372	.91537	.89776	.88083	.86456	.84890	.83381	.81925
340	165.81	11.28	1.02128	.99984	.97934	.95966	.94078	.92266	.90525	.88851	.87240	.85687	.84190
350	170.25	11.58	1.04897	1.02693	1.00584	.98560	.96619	.94756	.92967	.91246	.89591	.87995	.86456
360	174.69	11.89	1.07668	1.05403	1.03236	1.01156	.99162	.97248	.95409	.93642	.91942	.90302	.88722
370	179.14	12.19	1.10441	1.08114	1.05889	1.03753	1.01706	.99740	.97853	.96039	.94294	.92611	.90989
380	183.58	12.49	1.13215	1.10827	1.08543	1.06351	1.04250	1.02234	1.00297	.98436	.96646	.94920	.93256
390	188.03	12.79	1.15990	1.13541	1.11198	1.08951	1.06795	1.04728	1.02743	1.00834	.98999	.97230	.95524
400	192.47	13.10	1.18768	1.16257	1.13855	1.11551	1.09342	1.07223	1.05189	1.03233	1.01352	.99539	.97792
410	196.92	13.40	1.2155	1.1897	1.1651	1.1415	1.1189	1.0972	1.0764	1.0563	1.0371	1.0185	1.0006
420	201.36	13.70	1.2433	1.2169	1.1917	1.1676	1.1444	1.1222	1.1008	1.0803	1.0606	1.0416	1.0233
430	205.81	14.00	1.2711	1.2441	1.2183	1.1936	1.1699	1.1471	1.1253	1.1043	1.0842	1.0647	1.0460
440	210.25	14.31	1.2989	1.2713	1.2450	1.2196	1.1954	1.1721	1.1498	1.1283	1.1077	1.0878	1.0687
450	214.69	14.61	1.3268	1.2986	1.2716	1.2457	1.2209	1.1971	1.1743	1.1524	1.1313	1.1110	1.0914
460	219.14	14.91	1.3547	1.3258	1.2982	1.2718	1.2464	1.2221	1.1988	1.1764	1.1549	1.1341	1.1141
470	223.58	15.21	1.3826	1.3531	1.3249	1.2979	1.2720	1.2471	1.2233	1.2004	1.1784	1.1572	1.1368
480	228.03	15.52	1.4105	1.3803	1.3516	1.3240	1.2975	1.2722	1.2478	1.2245	1.2020	1.1804	1.1595
490	232.47	15.82	1.4384	1.4076	1.3782	1.3501	1.3231	1.2972	1.2724	1.2485	1.2256	1.2035	1.1822
500	236.92	16.12	1.4663	1.4349	1.4049	1.3762	1.3486	1.3222	1.2969	1.2726	1.2492	1.2267	1.2050
510	241.36	16.42	1.4943	1.4622	1.4316	1.4023	1.3742	1.3473	1.3214	1.2966	1.2728	1.2498	1.2277
520	245.80	16.73	1.5222	1.4896	1.4584	1.4284	1.3998	1.3723	1.3460	1.3207	1.2964	1.2730	1.2504
530	250.25	17.03	1.5502	1.5169	1.4851	1.4546	1.4254	1.3974	1.3706	1.3448	1.3200	1.2962	1.2732
540	254.69	17.33	1.5782	1.5443	1.5119	1.4808	1.4510	1.4225	1.3951	1.3689	1.3436	1.3193	1.2959
550	259.14	17.63	1.6062	1.5716	1.5386	1.5069	1.4766	1.4476	1.4197	1.3929	1.3673	1.3425	1.3187
560	263.58	17.94	1.6343	1.5990	1.5654	1.5331	1.5022	1.4726	1.4443	1.4170	1.3909	1.3657	1.3414
570	268.03	18.24	1.6623	1.6264	1.5922	1.5593	1.5279	1.4977	1.4689	1.4411	1.4145	1.3889	1.3642
580	272.47	18.54	1.6904	1.6538	1.6190	1.5855	1.5535	1.5229	1.4935	1.4652	1.4381	1.4121	1.3869
590	276.92	18.84	1.7185	1.6813	1.6458	1.6117	1.5792	1.5480	1.5181	1.4894	1.4618	1.4353	1.4097
600	281.36	19.15	1.7466	1.7087	1.6726	1.6380	1.6048	1.5731	1.5427	1.5135	1.4854	1.4585	1.4324
610	285.80	19.45	1.7747	1.7362	1.6994	1.6642	1.6305	1.5982	1.5673	1.5376	1.5091	1.4817	1.4552
620	290.25	19.75	1.8028	1.7636	1.7263	1.6904	1.6562	1.6234	1.5919	1.5617	1.5328	1.5049	1.4780
630	294.69	20.05	1.8310	1.7911	1.7531	1.7167	1.6819	1.6485	1.6166	1.5859	1.5564	1.5281	1.5008
640	299.14	20.36	1.8591	1.8186	1.7800	1.7430	1.7076	1.6737	1.6412	1.6100	1.5801	1.5513	1.5236
650	303.58	20.66	1.8873	1.8461	1.8069	1.7693	1.7333	1.6988	1.6658	1.6342	1.6038	1.5745	1.5463
660	308.03	20.96	1.9155	1.8737	1.8338	1.7956	1.7590	1.7240	1.6905	1.6583	1.6275	1.5977	1.5691
670	312.47	21.26	1.9437	1.9012	1.8607	1.8219	1.7847	1.7492	1.7152	1.6825	1.6512	1.6210	1.5919
680	316.92	21.56	1.9719	1.9288	1.8876	1.8482	1.8105	1.7744	1.7398	1.7067	1.6748	1.6442	1.6147
690	321.36	21.87	2.0002	1.9563	1.9145	1.8745	1.8362	1.7996	1.7645	1.7308	1.6985	1.6675	1.6375
700	325.80	22.17	2.0284	1.9839	1.9415	1.9009	1.8620	1.8248	1.7892	1.7550	1.7223	1.6907	1.6603
710	330.25	22.47	2.0567	2.0115	1.9684	1.9272	1.8877	1.8500	1.8139	1.7792	1.7460	1.7140	1.6831
720	334.69	22.77	2.0850	2.0391	1.9954	1.9535	1.9135	1.8752	1.8386	1.8034	1.7697	1.7372	1.7060
730	339.14	23.08	2.1133	2.0667	2.0224	1.9799	1.9393	1.9005	1.8633	1.8276	1.7934	1.7605	1.7288
740	343.58	23.38	2.1416	2.0944	2.0494	2.0063	1.9651	1.9257	1.8880	1.8518	1.8171	1.7837	1.7516
750	348.03	23.68	2.1700	2.1220	2.0764	2.0327	1.9909	1.9510	1.9127	1.8760	1.8409	1.8070	1.7744
760	352.47	23.98	2.1983	2.1497	2.1034	2.0591	2.0167	1.9762	1.9374	1.9003	1.8646	1.8303	1.7972
770	356.91	24.29	2.2267	2.1774	2.1305	2.0855	2.0426	2.0015	1.9622	1.9245	1.8883	1.8536	1.8201
780	361.36	24.59	2.2551	2.2051	2.1575	2.1119	2.0684	2.0268	1.9869	1.9487	1.9121	1.8768	1.8429
790	365.80	24.89	2.2835	2.2328	2.1846	2.1384	2.0942	2.0520	2.0116	1.9729	1.9358	1.9001	1.8658

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OXYGEN,DENSITY,LBS/CUBIC FT

DEPTH FT	PRESSURE PSIA	PRESSURE ATM	TEMPERATURES,F 30	40	50	60	70	80	90	100	110	120	130
800	370.25	25.19	2.3119	2.2605	2.2116	2.1648	2.1201	2.0773	2.0364	1.9972	1.9596	1.9234	1.8886
810	374.69	25.50	2.3403	2.2883	2.2387	2.1913	2.1459	2.1026	2.0612	2.0214	1.9834	1.9467	1.9114
820	379.14	25.80	2.3688	2.3160	2.2658	2.2177	2.1718	2.1279	2.0859	2.0457	2.0071	1.9700	1.9343
830	383.58	26.10	2.3972	2.3438	2.2929	2.2442	2.1977	2.1532	2.1107	2.0700	2.0309	1.9933	1.9572
840	388.03	26.40	2.4257	2.3715	2.3200	2.2707	2.2236	2.1786	2.1355	2.0942	2.0547	2.0166	1.9800
850	392.47	26.71	2.4542	2.3993	2.3471	2.2972	2.2495	2.2039	2.1603	2.1185	2.0785	2.0399	2.0029
860	396.91	27.01	2.4827	2.4271	2.3743	2.3237	2.2754	2.2292	2.1851	2.1428	2.1023	2.0632	2.0257
870	401.36	27.31	2.5112	2.4550	2.4014	2.3502	2.3013	2.2546	2.2099	2.1671	2.1260	2.0866	2.0486
880	405.80	27.61	2.5398	2.4828	2.4286	2.3767	2.3272	2.2799	2.2347	2.1914	2.1498	2.1099	2.0715
890	410.25	27.92	2.5683	2.5106	2.4558	2.4033	2.3531	2.3053	2.2595	2.2157	2.1736	2.1332	2.0944
900	414.69	28.22	2.5969	2.5385	2.4830	2.4298	2.3791	2.3306	2.2843	2.2400	2.1974	2.1566	2.1172
910	419.14	28.52	2.6255	2.5664	2.5102	2.4564	2.4051	2.3560	2.3091	2.2643	2.2213	2.1799	2.1401
920	423.58	28.82	2.6541	2.5942	2.5374	2.4829	2.4310	2.3814	2.3340	2.2886	2.2451	2.2032	2.1630
930	428.03	29.13	2.6827	2.6221	2.5646	2.5095	2.4570	2.4068	2.3588	2.3129	2.2689	2.2266	2.1859
940	432.47	29.43	2.7113	2.6501	2.5918	2.5361	2.4830	2.4322	2.3837	2.3372	2.2927	2.2499	2.2088
950	436.91	29.73	2.7400	2.6780	2.6191	2.5627	2.5089	2.4576	2.4085	2.3616	2.3166	2.2733	2.2317
960	441.36	30.03	2.7686	2.7059	2.6463	2.5893	2.5349	2.4830	2.4334	2.3859	2.3404	2.2966	2.2546
970	445.80	30.33	2.7973	2.7339	2.6736	2.6159	2.5609	2.5084	2.4582	2.4102	2.3642	2.3200	2.2775
980	450.25	30.64	2.8260	2.7618	2.7009	2.6426	2.5870	2.5339	2.4831	2.4346	2.3881	2.3434	2.3004
990	454.69	30.94	2.8547	2.7898	2.7282	2.6692	2.6130	2.5593	2.5080	2.4589	2.4119	2.3668	2.3233
1000	459.14	31.24	2.8834	2.8178	2.7555	2.6958	2.6390	2.5847	2.5329	2.4833	2.4358	2.3901	2.3462
1050	481.36	32.75	3.0273	2.9580	2.8922	2.8293	2.7693	2.7121	2.6574	2.6052	2.5552	2.5071	2.4608
1100	503.58	34.27	3.1715	3.0984	3.0292	2.9629	2.8998	2.8396	2.7821	2.7272	2.6746	2.6241	2.5755
1150	525.80	35.78	3.3161	3.2392	3.1664	3.0968	3.0305	2.9673	2.9069	2.8493	2.7942	2.7412	2.6903
1200	548.02	37.29	3.4610	3.3804	3.3039	3.2309	3.1614	3.0951	3.0319	2.9716	2.9139	2.8584	2.8052
1250	570.25	38.80	3.6064	3.5218	3.4417	3.3652	3.2925	3.2232	3.1571	3.0940	3.0337	2.9757	2.9201
1300	592.47	40.31	3.7520	3.6636	3.5798	3.4998	3.4238	3.3514	3.2823	3.2165	3.1535	3.0931	3.0351
1350	614.69	41.83	3.8981	3.8056	3.7182	3.6347	3.5553	3.4797	3.4078	3.3391	3.2735	3.2105	3.1501
1400	636.91	43.34	4.0445	3.9480	3.8568	3.7697	3.6870	3.6083	3.5333	3.4619	3.3936	3.3281	3.2652
1450	659.13	44.85	4.1912	4.0906	3.9956	3.9049	3.8189	3.7370	3.6590	3.5847	3.5138	3.4457	3.3804
1500	681.36	46.36	4.3383	4.2336	4.1347	4.0404	3.9509	3.8658	3.7848	3.7077	3.6341	3.5634	3.4956
	500	34.02	3.1482	3.0758	3.0071	2.9413	2.8787	2.8190	2.7620	2.7075	2.6554	2.6052	2.5571
	600	40.83	3.8015	3.7117	3.6267	3.5455	3.4683	3.3949	3.3249	3.2580	3.1942	3.1329	3.0741
	700	47.63	4.4619	4.3537	4.2517	4.1542	4.0618	3.9740	3.8905	3.8109	3.7350	3.6622	3.5923
	800	54.44	5.1290	5.0015	4.8815	4.7672	4.6589	4.5562	4.4586	4.3659	4.2775	4.1928	4.1117
	900	61.24	5.8023	5.6546	5.5159	5.3838	5.2591	5.1409	5.0289	4.9225	4.8214	4.7245	4.6317
	1000	68.05	6.4812	6.3124	6.1562	6.0038	5.8619	5.7278	5.6009	5.4805	5.3663	5.2569	5.1523
	1100	74.85	7.1651	6.9743	6.7959	6.6265	6.4670	6.3165	6.1742	6.0396	5.9119	5.7897	5.6730
	1200	81.65	7.8532	7.6396	7.4404	7.2514	7.0737	6.9064	6.7485	6.5992	6.4578	6.3226	6.1937
	1300	88.46	8.5447	8.3076	8.0870	7.8780	7.6817	7.4972	7.3232	7.1590	7.0037	6.8553	6.7138
	1400	95.26	9.2388	8.9777	8.7352	8.5056	8.2904	8.0882	7.8980	7.7187	7.5493	7.3875	7.2333
	1500	102.07	9.9346	9.6489	9.3841	9.1336	8.8991	8.6791	8.4723	8.2777	8.0940	7.9187	7.7518
	1600	108.87	10.6312	10.3206	10.0331	9.7613	9.5073	9.2693	9.0459	8.8357	8.6376	8.4487	8.2688
	1700	115.68	11.3275	10.9917	10.6814	10.3882	10.1145	9.8583	9.6180	9.3923	9.1798	8.9770	8.7843
	1800	122.48	12.0226	11.6615	11.3283	11.0135	10.7200	10.4455	10.1886	9.9470	9.7200	9.5035	9.2978
	1900	129.29	12.7155	12.3291	11.9738	11.6367	11.3233	11.0306	10.7565	10.4996	10.2580	10.0278	9.8090
	2000	136.09	13.405	12.994	12.615	12.257	11.924	11.613	11.322	11.049	10.793	10.549	10.318
	2100	142.90	14.091	13.654	13.253	12.874	12.521	12.192	11.884	11.596	11.326	11.068	10.824
	2200	149.70	14.771	14.310	13.887	13.486	13.114	12.767	12.443	12.140	11.855	11.584	11.326
	2300	156.51	15.446	14.961	14.515	14.095	13.703	13.339	12.998	12.679	12.381	12.096	11.826
	2400	163.31	16.114	15.606	15.139	14.697	14.287	13.905	13.548	13.215	12.902	12.604	12.322
	2500	170.11	16.775	16.243	15.756	15.295	14.866	14.467	14.094	13.746	13.420	13.109	12.814
	2600	176.92	17.427	16.874	16.366	15.886	15.439	15.021	14.635	14.272	13.933	13.609	13.302
	2700	183.72	18.071	17.497	16.969	16.470	16.006	15.574	15.171	14.794	14.441	14.104	13.785
	2800	190.53	18.705	18.111	17.565	17.047	16.567	16.119	15.701	15.310	14.944	14.595	14.265
	2900	197.33	19.330	18.717	18.152	17.618	17.120	16.657	16.225	15.821	15.442	15.082	14.739
	3000	204.14	19.945	19.313	18.732	18.180	17.667	17.189	16.743	16.326	15.935	15.563	15.209
	3100	210.94	20.550	19.900	19.303	18.735	18.207	17.715	17.255	16.825	16.423	16.039	15.674
	3200	217.75	21.145	20.478	19.865	19.282	18.739	18.233	17.760	17.318	16.905	16.509	16.134
	3300	224.55	21.728	21.047	20.418	19.821	19.264	18.745	18.259	17.806	17.381	16.975	16.589
	3400	231.36	22.302	21.605	20.963	20.351	19.781	19.249	18.752	18.287	17.851	17.435	17.039
	3500	238.16	22.864	22.154	21.498	20.873	20.290	19.746	19.237	18.761	18.315	17.889	17.484
	3600	244.96	23.416	22.693	22.024	21.387	20.792	20.236	19.716	19.230	18.774	18.338	17.923
	3700	251.77	23.958	23.222	22.542	21.892	21.286	20.719	20.188	19.692	19.226	18.780	18.357
	3800	258.57	24.489	23.741	23.050	22.389	21.772	21.195	20.653	20.147	19.672	19.218	18.785
	3900	265.38	25.010	24.251	23.549	22.878	22.250	21.663	21.112	20.597	20.113	19.649	19.208
	4000	272.18	25.520	24.752	24.040	23.358	22.721	22.124	21.564	21.039	20.547	20.075	19.626
	4100	278.99	26.021	25.243	24.522	23.831	23.184	22.577	22.008	21.476	20.975	20.495	20.038
	4200	285.79	26.512	25.725	24.995	24.295	23.639	23.024	22.447	21.906	21.397	20.910	20.445
	4300	292.60	26.993	26.197	25.459	24.751	24.087	23.463	22.878	22.329	21.814	21.318	20.847
	4400	299.40	27.465	26.661	25.916	25.199	24.527	23.896	23.303	22.747	22.224	21.722	21.243
	4500	306.21	27.927	27.117	26.366	25.640	24.960	24.322	23.721	23.158	22.628	22.119	21.634
	4600	313.01	28.381	27.564	26.806	26.073	25.386	24.741	24.133	23.563	23.027	22.511	22.019
	4700	319.81	28.826	28.003	27.236	26.498	25.805	25.153	24.539	23.962	23.420	22.898	22.400
	4800	326.62	29.263	28.433	27.661	26.917	26.217	25.558	24.938	24.356	23.807	23.279	22.775
	4900	333.42	29.691	28.856	28.078	27.328	26.622	25.957	25.331	24.743	24.189	23.655	23.145
	5000	340.23	30.112	29.271	28.488	27.732	27.020	26.350	25.718	25.125	24.565	24.025	23.510

OXYGEN

OXYGEN,SPECIFIC VOLUME,CUBIC FT/LB

DEPTH	PRESSURE		TEMPERATURES,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	11.163	11.392	11.621	11.850	12.079	12.307	12.536	12.765	12.994	13.223	13.451
10	19.14	1.30	8.5682	8.7441	8.9201	9.0960	9.2719	9.4478	9.6236	9.7994	9.9752	10.1510	10.3267
20	23.58	1.60	6.9514	7.0944	7.2373	7.3802	7.5231	7.6660	7.8087	7.9515	8.0943	8.2371	8.3798
30	28.03	1.91	5.8474	5.9678	6.0881	6.2085	6.3288	6.4491	6.5694	6.6897	6.8099	6.9300	7.0503
40	32.47	2.21	5.0455	5.1496	5.2536	5.3575	5.4615	5.5654	5.6693	5.7732	5.8770	5.9808	6.0846
50	36.92	2.51	4.4367	4.5283	4.6199	4.7115	4.8030	4.8945	4.9859	5.0774	5.1687	5.2601	5.3515
60	41.36	2.81	3.9588	4.0406	4.1224	4.2042	4.2860	4.3677	4.4494	4.5311	4.6127	4.6944	4.7760
70	45.81	3.12	3.5736	3.6476	3.7215	3.7954	3.8693	3.9432	4.0170	4.0908	4.1646	4.2384	4.3121
80	50.25	3.42	3.2565	3.3240	3.3915	3.4589	3.5264	3.5937	3.6611	3.7284	3.7957	3.8630	3.9303
90	54.70	3.72	2.9910	3.0531	3.1151	3.1771	3.2391	3.3011	3.3630	3.4249	3.4868	3.5487	3.6105
100	59.14	4.02	2.7654	2.8228	2.8803	2.9377	2.9951	3.0524	3.1098	3.1670	3.2243	3.2816	3.3388
110	63.58	4.33	2.5713	2.6248	2.6782	2.7317	2.7851	2.8385	2.8919	2.9452	2.9985	3.0518	3.1051
120	68.03	4.63	2.4026	2.4526	2.5026	2.5526	2.6026	2.6526	2.7025	2.7524	2.8022	2.8521	2.9019
130	72.47	4.93	2.2545	2.3016	2.3486	2.3956	2.4425	2.4894	2.5363	2.5832	2.6300	2.6768	2.7236
140	76.92	5.23	2.1236	2.1680	2.2123	2.2566	2.3009	2.3451	2.3894	2.4335	2.4777	2.5219	2.5660
150	81.36	5.54	2.0070	2.0490	2.0909	2.1328	2.1747	2.2166	2.2584	2.3003	2.3420	2.3838	2.4255
160	85.81	5.84	1.9025	1.9423	1.9821	2.0219	2.0617	2.1014	2.1411	2.1808	2.2204	2.2600	2.2997
170	90.25	6.14	1.8082	1.8461	1.8840	1.9219	1.9597	1.9975	2.0353	2.0731	2.1108	2.1485	2.1862
180	94.70	6.44	1.7228	1.7590	1.7951	1.8313	1.8674	1.9036	1.9395	1.9755	2.0116	2.0474	2.0833
190	99.14	6.75	1.6451	1.6797	1.7142	1.7488	1.7833	1.8178	1.8522	1.8866	1.9210	1.9554	1.9897
200	103.58	7.05	1.5740	1.6072	1.6402	1.6733	1.7064	1.7394	1.7724	1.8054	1.8383	1.8712	1.9041
210	108.03	7.35	1.5088	1.5406	1.5724	1.6041	1.6359	1.6675	1.6992	1.7308	1.7624	1.7940	1.8256
220	112.47	7.65	1.4487	1.4793	1.5099	1.5404	1.5709	1.6014	1.6318	1.6622	1.6926	1.7229	1.7533
230	116.92	7.96	1.3932	1.4227	1.4521	1.4815	1.5109	1.5402	1.5695	1.5988	1.6280	1.6572	1.6864
240	121.36	8.26	1.3418	1.3702	1.3986	1.4269	1.4552	1.4835	1.5118	1.5400	1.5682	1.5963	1.6245
250	125.81	8.56	1.2940	1.3214	1.3488	1.3762	1.4035	1.4308	1.4581	1.4853	1.5126	1.5398	1.5669
260	130.25	8.86	1.2495	1.2760	1.3025	1.3289	1.3554	1.3817	1.4081	1.4344	1.4607	1.4870	1.5133
270	134.69	9.17	1.2079	1.2335	1.2592	1.2848	1.3104	1.3359	1.3614	1.3869	1.4123	1.4378	1.4632
280	139.14	9.47	1.1689	1.1938	1.2186	1.2435	1.2682	1.2930	1.3177	1.3424	1.3671	1.3917	1.4163
290	143.58	9.77	1.1324	1.1565	1.1806	1.2047	1.2287	1.2527	1.2767	1.3007	1.3246	1.3485	1.3723
300	148.03	10.07	1.0981	1.1215	1.1449	1.1682	1.1916	1.2149	1.2382	1.2614	1.2846	1.3078	1.3310
310	152.47	10.38	1.0658	1.0885	1.1112	1.1339	1.1566	1.1793	1.2019	1.2245	1.2470	1.2695	1.2921
320	156.92	10.68	1.0353	1.0574	1.0795	1.1016	1.1236	1.1457	1.1676	1.1896	1.2115	1.2334	1.2553
330	161.36	10.98	1.0064	1.0280	1.0495	1.0710	1.0925	1.1139	1.1353	1.1567	1.1780	1.1993	1.2206
340	165.81	11.28	.97916	1.00016	1.02110	1.04204	1.06295	1.08383	1.10467	1.12548	1.14626	1.16703	1.18778
350	170.25	11.58	.95331	.97378	.99419	1.01461	1.03499	1.05534	1.07565	1.09594	1.11619	1.13643	1.15666
360	174.69	11.89	.92878	.94874	.96866	.98857	1.00845	1.02830	1.04812	1.06790	1.08765	1.10739	1.12711
370	179.14	12.19	.90546	.92495	.94439	.96383	.98323	1.00260	1.02194	1.04124	1.06051	1.07978	1.09903
380	183.58	12.49	.88328	.90231	.92129	.94028	.95923	.97815	.99704	1.01589	1.03470	1.05351	1.07231
390	188.03	12.79	.86214	.88074	.89929	.91785	.93637	.95485	.97330	.99173	1.01011	1.02849	1.04685
400	192.47	13.10	.84198	.86017	.87831	.89645	.91456	.93264	.95067	.96869	.98666	1.00463	1.02258
410	196.92	13.40	.82273	.84052	.85827	.87602	.89374	.91142	.92906	.94668	.96426	.98184	.99940
420	201.36	13.70	.80433	.82175	.83912	.85649	.87383	.89114	.90841	.92565	.94286	.96005	.97723
430	205.81	14.00	.78672	.80378	.82079	.83781	.85479	.87173	.88865	.90552	.92237	.93921	.95603
440	210.25	14.31	.76986	.78657	.80324	.81991	.83655	.85315	.86972	.88625	.90276	.91925	.93573
450	214.69	14.61	.75369	.77008	.78642	.80276	.81906	.83534	.85158	.86778	.88395	.90012	.91626
460	219.14	14.91	.73819	.75426	.77028	.78631	.80229	.81825	.83417	.85006	.86591	.88176	.89759
470	223.58	15.21	.72330	.73906	.75478	.77050	.78618	.80183	.81745	.83303	.84858	.86413	.87965
480	228.03	15.52	.70899	.72446	.73989	.75531	.77071	.78607	.80139	.81668	.83193	.84719	.86242
490	232.47	15.82	.69522	.71042	.72556	.74071	.75582	.77089	.78596	.80095	.81592	.83089	.84585
500	236.92	16.12	.68198	.69690	.71177	.72665	.74149	.75630	.77107	.78581	.80052	.81521	.82990
510	241.36	16.42	.66922	.68388	.69850	.71311	.72769	.74224	.75675	.77123	.78567	.80011	.81453
520	245.80	16.73	.65693	.67133	.68570	.70006	.71439	.72869	.74294	.75717	.77136	.78555	.79972
530	250.25	17.03	.64507	.65924	.67335	.68747	.70156	.71561	.72963	.74362	.75757	.77152	.78544
540	254.69	17.33	.63367	.64756	.66144	.67533	.68918	.70300	.71679	.73053	.74425	.75796	.77166
550	259.14	17.63	.62257	.63628	.64996	.66360	.67723	.69082	.70438	.71790	.73139	.74488	.75835
560	263.58	17.94	.61189	.62538	.63882	.65227	.66568	.67905	.69239	.70570	.71897	.73224	.74548
570	268.03	18.24	.60156	.61484	.62809	.64131	.65451	.66767	.68080	.69389	.70696	.72001	.73305
580	272.47	18.54	.59158	.60465	.61768	.63071	.64370	.65666	.66959	.68248	.69534	.70819	.72102
590	276.92	18.84	.58191	.59479	.60762	.62045	.63324	.64601	.65873	.67143	.68409	.69674	.70938
600	281.36	19.15	.57255	.58523	.59788	.61052	.62312	.63569	.64822	.66073	.67320	.68566	.69810
610	285.80	19.45	.56348	.57598	.58843	.60089	.61331	.62570	.63804	.65036	.66265	.67492	.68718
620	290.25	19.75	.55468	.56701	.57928	.59156	.60380	.61600	.62817	.64031	.65242	.66451	.67660
630	294.69	20.05	.54618	.55831	.57041	.58251	.59457	.60661	.61860	.63057	.64250	.65442	.66633
640	299.14	20.36	.53788	.54987	.56180	.57373	.58563	.59749	.60932	.62111	.63287	.64462	.65636
650	303.58	20.66	.52985	.54167	.55344	.56521	.57694	.58864	.60030	.61193	.62352	.63512	.64669
660	308.03	20.96	.52206	.53371	.54532	.55693	.56850	.58004	.59155	.60302	.61445	.62588	.63730
670	312.47	21.26	.51448	.52598	.53743	.54888	.56031	.57169	.58304	.59436	.60564	.61691	.62817
680	316.92	21.56	.50711	.51847	.52977	.54107	.55234	.56357	.57477	.58594	.59707	.60819	.61930
690	321.36	21.87	.49995	.51116	.52232	.53347	.54459	.55568	.56674	.57775	.58874	.59972	.61068
700	325.80	22.17	.49299	.50405	.51507	.52608	.53706	.54801	.55892	.56979	.58063	.59147	.60229
710	330.25	22.47	.48621	.49714	.50801	.51889	.52973	.54054	.55131	.56204	.57275	.58345	.59413
720	334.69	22.77	.47962	.49041	.50115	.51189	.52259	.53327	.54390	.55450	.56507	.57563	.58618
730	339.14	23.08	.47319	.48385	.49446	.50507	.51564	.52619	.53669	.54716	.55760	.56803	.57845
740	343.58	23.38	.46693	.47747	.48796	.49843	.50888	.51929	.52967	.54001	.55032	.56062	.57091
750	348.03	23.68	.46084	.47124	.48160	.49196	.50228	.51257	.52282	.53304	.54322	.55340	.56356
760	352.47	23.98	.45489	.46518	.47541	.48565	.49585	.50602	.51615	.52625	.53631	.54637	.55641
770	356.91	24.29	.44910	.45927	.46938	.47950	.48958	.49963	.50964	.51962	.52957	.53951	.54943
780	361.36	24.59	.44344	.45350	.46350	.47350	.48347	.49340	.50330	.51316	.52299	.53281	.54262
790	365.80	24.89	.43793	.44787	.45776	.46765	.47750	.48732	.49711	.50686	.51657	.52628	.53598

T-11 SP. VOL.

OXYGEN

OXYGEN,SPECIFIC VOLUME,CUBIC FT/LB

DEPTH FT	PRESSURE PSIA	PRESSURE ATM	TEMPERATURES,F 30	40	50	60	70	80	90	100	110	120	130
800	370.25	25.19	.43255	.44238	.45216	.46194	.47168	.48139	.49106	.50070	.51031	.51991	.52949
810	374.69	25.50	.42729	.43701	.44669	.45636	.46600	.47560	.48516	.49470	.50420	.51369	.52316
820	379.14	25.80	.42216	.43178	.44135	.45091	.46044	.46994	.47940	.48883	.49822	.50761	.51698
830	383.58	26.10	.41715	.42666	.43613	.44559	.45502	.46442	.47378	.48310	.49239	.50168	.51095
840	388.03	26.40	.41225	.42167	.43103	.44040	.44973	.45902	.46828	.47750	.48669	.49588	.50505
850	392.47	26.71	.40746	.41678	.42605	.43532	.44455	.45374	.46290	.47203	.48112	.49021	.49928
860	396.91	27.01	.40279	.41201	.42118	.43035	.43949	.44859	.45765	.46668	.47568	.48467	.49365
870	401.36	27.31	.39821	.40734	.41642	.42549	.43454	.44355	.45252	.46145	.47036	.47926	.48813
880	405.80	27.61	.39374	.40277	.41176	.42075	.42970	.43861	.44749	.45634	.46515	.47396	.48275
890	410.25	27.92	.38936	.39831	.40720	.41610	.42496	.43379	.44258	.45133	.46006	.46877	.47747
900	414.69	28.22	.38507	.39393	.40274	.41156	.42033	.42907	.43777	.44644	.45507	.46370	.47231
910	419.14	28.52	.38088	.38966	.39838	.40710	.41579	.42445	.43306	.44165	.45019	.45874	.46726
920	423.58	28.82	.37678	.38547	.39411	.40275	.41135	.41992	.42845	.43695	.44542	.45388	.46232
930	428.03	29.13	.37276	.38137	.38993	.39848	.40700	.41549	.42394	.43236	.44074	.44912	.45748
940	432.47	29.43	.36882	.37735	.38583	.39430	.40275	.41115	.41952	.42786	.43616	.44446	.45273
950	436.91	29.73	.36497	.37342	.38181	.39021	.39857	.40690	.41519	.42345	.43167	.43989	.44809
960	441.36	30.03	.36119	.36956	.37788	.38620	.39449	.40274	.41095	.41913	.42728	.43542	.44354
970	445.80	30.33	.35749	.36578	.37403	.38227	.39048	.39866	.40679	.41490	.42297	.43103	.43908
980	450.25	30.64	.35385	.36208	.37025	.37842	.38655	.39465	.40272	.41075	.41875	.42673	.43471
990	454.69	30.94	.35030	.35845	.36654	.37464	.38271	.39073	.39872	.40668	.41460	.42252	.43042
1000	459.14	31.24	.34681	.35489	.36291	.37094	.37893	.38689	.39481	.40269	.41054	.41839	.42622
1050	481.36	32.75	.33033	.33807	.34576	.35345	.36110	.36872	.37631	.38385	.39137	.39887	.40637
1100	503.58	34.27	.31531	.32274	.33013	.33751	.34485	.35216	.35944	.36668	.37389	.38109	.38827
1150	525.80	35.78	.30156	.30871	.31582	.32292	.32998	.33701	.34400	.35096	.35789	.36480	.37170
1200	548.02	37.29	.28893	.29583	.30267	.30951	.31632	.32309	.32982	.33652	.34319	.34985	.35649
1250	570.25	38.80	.27729	.28395	.29055	.29716	.30372	.31025	.31675	.32321	.32963	.33605	.34246
1300	592.47	40.31	.26652	.27296	.27934	.28573	.29207	.29838	.30466	.31090	.31710	.32330	.32948
1350	614.69	41.83	.25654	.26277	.26895	.27513	.28127	.28738	.29345	.29948	.30548	.31147	.31745
1400	636.91	43.34	.24725	.25330	.25929	.26527	.27123	.27714	.28302	.28886	.29467	.30047	.30626
1450	659.13	44.85	.23860	.24446	.25027	.25609	.26186	.26760	.27330	.27896	.28459	.29022	.29582
1500	681.36	46.36	.23051	.23621	.24185	.24750	.25311	.25868	.26421	.26971	.27517	.28063	.28607

500	34.02	.31764	.32512	.33255	.33998	.34737	.35473	.36206	.36934	.37660	.38384	.39107
600	40.83	.26305	.26942	.27573	.28205	.28832	.29456	.30077	.30693	.31307	.31919	.32530
700	47.63	.22412	.22969	.23520	.24072	.24619	.25163	.25704	.26240	.26774	.27306	.27837
800	54.44	.19497	.19994	.20485	.20977	.21464	.21948	.22428	.22905	.23378	.23850	.24321
900	61.24	.17235	.17685	.18130	.18574	.19015	.19452	.19885	.20315	.20741	.21166	.21590
1000	68.05	.15429	.15842	.16249	.16656	.17059	.17459	.17854	.18246	.18635	.19023	.19409
1100	74.85	.13957	.14338	.14715	.15091	.15463	.15832	.16196	.16558	.16915	.17272	.17627
1200	81.65	.12734	.13090	.13440	.13790	.14137	.14479	.14818	.15153	.15485	.15816	.16146
1300	88.46	.11703	.12037	.12365	.12694	.13018	.13338	.13655	.13968	.14278	.14587	.14895
1400	95.26	.10824	.11139	.11448	.11757	.12062	.12364	.12661	.12956	.13246	.13536	.13825
1500	102.07	.10066	.10364	.10656	.10949	.11237	.11522	.11803	.12081	.12355	.12628	.12900
1600	108.87	.09406	.09689	.09967	.10244	.10518	.10788	.11055	.11318	.11577	.11836	.12094
1700	115.68	.08828	.09098	.09362	.09626	.09887	.10144	.10397	.10647	.10893	.11140	.11384
1800	122.48	.08318	.08575	.08827	.09080	.09328	.09573	.09815	.10053	.10288	.10522	.10755
1900	129.29	.07864	.08111	.08352	.08594	.08831	.09066	.09297	.09524	.09748	.09972	.10195
2000	136.09	.07460	.07696	.07927	.08159	.08387	.08611	.08832	.09050	.09265	.09479	.09692
2100	142.90	.07097	.07324	.07546	.07768	.07987	.08202	.08415	.08624	.08829	.09035	.09239
2200	149.70	.06770	.06988	.07201	.07415	.07625	.07833	.08037	.08237	.08435	.08633	.08829
2300	156.51	.06474	.06684	.06889	.07095	.07298	.07497	.07694	.07887	.08077	.08267	.08456
2400	163.31	.06206	.06408	.06606	.06804	.06999	.07192	.07381	.07567	.07751	.07934	.08116
2500	170.11	.05961	.06156	.06347	.06538	.06727	.06912	.07095	.07275	.07452	.07629	.07804
2600	176.92	.05738	.05926	.06110	.06295	.06477	.06656	.06833	.07007	.07177	.07348	.07518
2700	183.72	.05534	.05715	.05893	.06072	.06248	.06421	.06592	.06760	.06925	.07090	.07254
2800	190.53	.05346	.05522	.05693	.05866	.06036	.06204	.06369	.06532	.06692	.06851	.07010
2900	197.33	.05173	.05343	.05509	.05676	.05841	.06003	.06163	.06321	.06476	.06631	.06785
3000	204.14	.05014	.05178	.05339	.05500	.05660	.05818	.05973	.06125	.06275	.06426	.06575
3100	210.94	.04866	.05025	.05181	.05338	.05492	.05645	.05796	.05943	.06089	.06235	.06380
3200	217.75	.04729	.04883	.05034	.05186	.05336	.05485	.05631	.05774	.05916	.06057	.06198
3300	224.55	.04602	.04751	.04898	.05045	.05191	.05335	.05477	.05616	.05753	.05891	.06028
3400	231.36	.04484	.04629	.04770	.04914	.05055	.05195	.05333	.05468	.05602	.05736	.05869
3500	238.16	.04374	.04514	.04652	.04791	.04928	.05064	.05198	.05330	.05460	.05590	.05720
3600	244.96	.04271	.04407	.04540	.04676	.04810	.04942	.05072	.05200	.05327	.05453	.05579
3700	251.77	.04174	.04306	.04436	.04568	.04699	.04826	.04953	.05078	.05201	.05325	.05448
3800	258.57	.04083	.04212	.04338	.04466	.04593	.04718	.04842	.04963	.05083	.05204	.05323
3900	265.38	.03998	.04124	.04246	.04371	.04494	.04615	.04737	.04855	.04972	.05089	.05206
4000	272.18	.03918	.04040	.04160	.04281	.04401	.04520	.04637	.04753	.04867	.04981	.05095
4100	278.99	.03843	.03962	.04078	.04196	.04313	.04429	.04544	.04656	.04768	.04879	.04990
4200	285.79	.03772	.03887	.04001	.04116	.04230	.04343	.04455	.04565	.04673	.04782	.04891
4300	292.60	.03705	.03817	.03928	.04040	.04152	.04262	.04371	.04478	.04584	.04691	.04797
4400	299.40	.03641	.03751	.03859	.03968	.04077	.04185	.04291	.04396	.04500	.04604	.04708
4500	306.21	.03581	.03688	.03793	.03900	.04006	.04112	.04216	.04318	.04419	.04521	.04622
4600	313.01	.03523	.03628	.03731	.03835	.03939	.04042	.04144	.04244	.04343	.04442	.04542
4700	319.81	.03469	.03571	.03672	.03774	.03875	.03976	.04075	.04173	.04270	.04367	.04464
4800	326.62	.03417	.03517	.03615	.03715	.03814	.03913	.04010	.04106	.04200	.04296	.04391
4900	333.42	.03368	.03465	.03562	.03659	.03756	.03852	.03948	.04042	.04134	.04227	.04321
5000	340.23	.03321	.03416	.03510	.03606	.03701	.03795	.03888	.03980	.04071	.04162	.04254

OXYGEN
ENTHALPY,BTU/LB

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	106.24	110.62	115.01	119.41	123.81	128.22
30.00	106.11	110.50	114.89	119.30	123.70	128.12
50.00	105.93	110.33	114.74	119.16	123.57	128.00
100.00	105.49	109.93	114.36	118.80	123.24	127.69
200.00	104.6	109.1	113.6	118.1	122.6	127.1
300.00	103.7	108.3	112.8	117.4	121.9	126.5
400.00	102.8	107.4	112.1	116.7	121.3	125.9
500.00	102.0	106.6	111.3	116.0	120.6	125.3
1000.00	97.5	102.6	107.6	112.5	117.4	122.2
2000.00	89.7	95.5	101.2	106.7	111.8	116.8
3000.00	82.4	88.9	95.5	101.5	106.9	111.9
4000.00	78.4	85.2	91.8	98.1	103.9	109.6
5000.00	75.2	81.6	88.0	95.3	101.1	107.3

OXYGEN
CV,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.1565	.1568	.1572	.1576	.1581	.1585
30.00	.1566	.1569	.1573	.1577	.1581	.1586
50.00	.1567	.1569	.1573	.1577	.1582	.1586
100.00	.1568	.1571	.1575	.1579	.1583	.1588
200.00	.1572	.1574	.1577	.1582	.1586	.1590
300.00	.1575	.1578	.1580	.1584	.1588	.1592
400.00	.1579	.1581	.1583	.1587	.1590	.1594
500.00	.1583	.1584	.1588	.1589	.1592	.1595
1000.00	.1600	.1600	.1600	.1602	.1603	.1606
2000.00	.17	.17	.17	.16	.16	.16
3000.00	.18	.18	.18	.17	.17	.17
4000.00						
5000.00						

OXYGEN
ENTROPY,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.5105	1.5192	1.5276	1.5356	1.5437	1.5512
30.00	1.4804	1.4891	1.4976	1.5057	1.5136	1.5212
50.00	1.4411	1.4499	1.4583	1.4664	1.4744	1.4820
100.00	1.3966	1.4055	1.4141	1.4222	1.4302	1.4378
200.00	1.3546	1.3636	1.3723	1.3805	1.3886	1.3963
300.00	1.3337	1.3428	1.3516	1.3599	1.3681	1.3759
400.00	1.3120	1.3220	1.3309	1.3394	1.3476	1.3555
500.00	1.2910	1.3012	1.3102	1.3188	1.3271	1.3350
1000.00	1.2352	1.2453	1.2549	1.2640	1.2727	1.2810
2000.00	1.182	1.194	1.205	1.215	1.224	1.233
3000.00	1.142	1.155	1.167	1.178	1.188	1.198
4000.00	1.119	1.132	1.145	1.155	1.164	1.174
5000.00	1.098	1.111	1.124	1.136	1.147	1.157

OXYGEN
THERMAL CONDUCTIVITY,BTU/SEC FT F
(MULTIPLY TABLE ENTRY BY .0000010)

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	3.918	4.069	4.214	4.353	4.483	4.611
30.00	3.93	4.09	4.22	4.36	4.49	4.62
50.00	3.94	4.09	4.23	4.37	4.50	4.63
100.00	3.97	4.12	4.26	4.40	4.53	4.65
200.00	4.03	4.17	4.32	4.45	4.58	4.70
300.00	4.09	4.23	4.37	4.50	4.63	4.75
400.00	4.15	4.29	4.43	4.56	4.68	4.80
500.00	4.21	4.35	4.48	4.61	4.73	4.85
1000.00	4.54	4.66	4.79	4.89	4.99	5.10
2000.00	5.39	5.42	5.48	5.53	5.60	5.67
3000.00	6.35	6.29	6.26	6.25	6.26	6.27
4000.00	7.37	7.23	7.14	7.08	7.03	6.98
5000.00	8.37	8.13	8.00	7.87	7.74	7.70

OXYGEN
CP,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.2189	.2192	.2195	.2199	.2204	.2208
30.00	.2194	.2197	.2199	.2203	.2207	.2212
50.00	.2201	.2203	.2205	.2208	.2212	.2216
100.00	.2217	.2218	.2218	.2220	.2223	.2226
200.00	.2251	.2248	.2246	.2246	.2246	.2247
300.00	.2287	.2280	.2274	.2271	.2269	.2269
400.00	.2322	.2311	.2303	.2297	.2293	.2290
500.00	.2357	.2342	.2331	.2323	.2316	.2312
1000.00	.2543	.2506	.2476	.2454	.2434	.2419
2000.00	.29	.28	.28	.27	.27	.26
3000.00	.33	.31	.30	.29	.29	.28
4000.00	.33	.31	.31	.30	.29	.29
5000.00						

OXYGEN
PRANDTL NUMBER

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.716	.712	.710	.708	.707	.707
30.00	.72	.71	.71	.71	.71	.71
50.00	.72	.71	.71	.71	.71	.71
100.00	.72	.72	.71	.71	.71	.71
200.00	.73	.72	.72	.72	.72	.71
300.00	.74	.73	.72	.72	.72	.72
400.00	.74	.74	.73	.73	.72	.72
500.00	.75	.74	.74	.73	.73	.73
1000.00	.78	.77	.76	.75	.75	.75
2000.00	.88	.85	.83	.81	.80	.79
3000.00	.97	.92	.89	.85	.86	.86
4000.00	.98	.93	.91	.88	.86	.85
5000.00						

OXYGEN
CP/CV

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.399	1.398	1.397	1.395	1.394	1.393
30.00	1.402	1.400	1.399	1.397	1.396	1.395
50.00	1.405	1.403	1.402	1.400	1.398	1.397
100.00	1.414	1.411	1.409	1.407	1.404	1.402
200.00	1.432	1.428	1.424	1.420	1.417	1.414
300.00	1.451	1.445	1.439	1.434	1.429	1.425
400.00	1.470	1.462	1.454	1.448	1.442	1.436
500.00	1.489	1.478	1.470	1.462	1.454	1.448
1000.00	1.584	1.566	1.548	1.531	1.518	1.506
2000.00	1.7	1.7	1.6	1.6	1.6	1.6
3000.00	1.8	1.7	1.7	1.7	1.7	1.7
4000.00						
5000.00						

OXYGEN
VISCOSITY,LB/FT SEC
(MULTIPLY TABLE ENTRY BY .0000100)

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.281	1.322	1.364	1.404	1.440	1.482
30.00	1.28	1.32	1.37	1.41	1.44	1.48
50.00	1.28	1.33	1.37	1.41	1.44	1.48
100.00	1.29	1.33	1.37	1.41	1.45	1.49
200.00	1.30	1.34	1.38	1.42	1.46	1.50
300.00	1.31	1.35	1.39	1.43	1.46	1.51
400.00	1.32	1.36	1.40	1.44	1.47	1.51
500.00	1.34	1.37	1.41	1.45	1.48	1.52
1000.00	1.40	1.43	1.46	1.50	1.54	1.57
2000.00	1.63	1.63	1.65	1.66	1.68	1.72
3000.00	1.88	1.86	1.85	1.85	1.86	1.88
4000.00	2.17	2.12	2.09	2.07	2.06	2.07
5000.00	2.47	2.39	2.33	2.30	2.27	2.26

OXYGEN
SONIC VELOCITY FT/SEC

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1031	1051	1071	1092	1111	1130
30.00	1031	1051	1071	1092	1111	1130
50.00	1031	1051	1072	1092	1112	1131
100.00	1031	1051	1072	1093	1113	1132
200.00	1031	1052	1073	1094	1114	1134
300.00	1031	1053	1075	1096	1116	1136
400.00	1031	1053	1075	1097	1118	1138
500.00	1031	1054	1077	1099	1120	1140
1000.00	1040	1065	1088	1111	1133	1155
2000.00	1062	1084	1118	1151	1192	1205
3000.00						
4000.00						
5000.00						

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HELIUM

HELIUM,DENSITY,LBS/CUBIC FT

DEPTH	PRESSURE		TEMPERATURES,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	.01119	.01097	.01075	.01054	.01034	.01015	.00997	.00979	.00962	.00945	.00929
10	19.14	1.30	.01457	.01428	.01400	.01373	.01347	.01322	.01298	.01275	.01253	.01231	.01210
20	23.58	1.60	.01795	.01759	.01725	.01692	.01660	.01629	.01599	.01571	.01543	.01517	.01491
30	28.03	1.91	.02133	.02090	.02050	.02010	.01972	.01936	.01901	.01867	.01834	.01802	.01772
40	32.47	2.21	.02471	.02421	.02374	.02328	.02284	.02242	.02201	.02162	.02124	.02088	.02052
50	36.92	2.51	.02809	.02752	.02699	.02647	.02597	.02549	.02502	.02458	.02415	.02373	.02333
60	41.36	2.81	.03146	.03083	.03023	.02965	.02909	.02855	.02803	.02753	.02705	.02658	.02613
70	45.81	3.12	.03484	.03414	.03347	.03283	.03221	.03161	.03104	.03049	.02995	.02944	.02894
80	50.25	3.42	.03821	.03745	.03671	.03601	.03533	.03468	.03405	.03344	.03285	.03229	.03174
90	54.70	3.72	.04158	.04075	.03995	.03919	.03845	.03774	.03705	.03639	.03575	.03514	.03454
100	59.14	4.02	.04495	.04406	.04319	.04237	.04157	.04080	.04006	.03934	.03865	.03799	.03735
110	63.58	4.33	.04833	.04736	.04643	.04554	.04468	.04386	.04306	.04229	.04155	.04084	.04015
120	68.03	4.63	.05170	.05066	.04967	.04872	.04780	.04692	.04607	.04524	.04445	.04369	.04295
130	72.47	4.93	.05506	.05396	.05291	.05189	.05092	.04997	.04907	.04819	.04735	.04653	.04575
140	76.92	5.23	.05843	.05726	.05614	.05507	.05403	.05303	.05207	.05114	.05025	.04938	.04855
150	81.36	5.54	.06180	.06056	.05938	.05824	.05714	.05609	.05507	.05409	.05314	.05223	.05134
160	85.81	5.84	.06516	.06386	.06261	.06141	.06026	.05914	.05807	.05704	.05604	.05507	.05414
170	90.25	6.14	.06853	.06716	.06585	.06458	.06337	.06220	.06107	.05998	.05893	.05792	.05694
180	94.70	6.44	.07189	.07046	.06908	.06775	.06648	.06525	.06407	.06293	.06183	.06076	.05974
190	99.14	6.75	.07525	.07375	.07231	.07092	.06959	.06830	.06707	.06587	.06472	.06361	.06253
200	103.58	7.05	.07861	.07705	.07554	.07409	.07270	.07136	.07006	.06881	.06761	.06645	.06533
210	108.03	7.35	.08197	.08034	.07877	.07726	.07581	.07441	.07306	.07176	.07050	.06929	.06812
220	112.47	7.65	.08533	.08363	.08200	.08043	.07891	.07746	.07605	.07470	.07339	.07213	.07091
230	116.92	7.96	.08869	.08692	.08522	.08359	.08202	.08051	.07905	.07764	.07628	.07497	.07371
240	121.36	8.26	.09205	.09021	.08845	.08676	.08512	.08355	.08204	.08058	.07917	.07781	.07650
250	125.81	8.56	.09540	.09350	.09167	.08992	.08823	.08660	.08503	.08352	.08206	.08065	.07929
260	130.25	8.86	.09876	.09679	.09490	.09308	.09133	.08965	.08802	.08646	.08495	.08349	.08208
270	134.69	9.17	.10211	.10008	.09812	.09624	.09444	.09269	.09102	.08940	.08783	.08633	.08487
280	139.14	9.47	.10546	.10336	.10134	.09940	.09754	.09574	.09401	.09233	.09072	.08916	.08766
290	143.58	9.77	.10881	.10665	.10457	.10256	.10064	.09878	.09699	.09527	.09361	.09200	.09045
300	148.03	10.07	.11216	.10993	.10779	.10572	.10374	.10183	.09998	.09821	.09649	.09483	.09323
310	152.47	10.38	.11551	.11321	.11101	.10888	.10684	.10487	.10297	.10114	.09937	.09767	.09602
320	156.92	10.68	.11886	.11650	.11422	.11204	.10993	.10791	.10596	.10407	.10226	.10050	.09881
330	161.36	10.98	.12221	.11978	.11744	.11519	.11303	.11095	.10894	.10701	.10514	.10333	.10159
340	165.81	11.28	.12555	.12306	.12066	.11835	.11613	.11399	.11193	.10994	.10802	.10617	.10438
350	170.25	11.59	.12890	.12633	.12387	.12150	.11922	.11703	.11491	.11287	.11090	.10900	.10716
360	174.69	11.89	.13224	.12961	.12709	.12466	.12232	.12007	.11789	.11580	.11378	.11183	.10994
370	179.14	12.19	.13558	.13289	.13030	.12781	.12541	.12310	.12088	.11873	.11666	.11466	.11273
380	183.58	12.49	.13893	.13617	.13351	.13096	.12850	.12614	.12386	.12166	.11954	.11749	.11551
390	188.03	12.79	.14227	.13944	.13672	.13411	.13160	.12917	.12684	.12459	.12242	.12032	.11829
400	192.47	13.10	.14561	.14271	.13993	.13726	.13469	.13221	.12982	.12752	.12529	.12314	.12107
410	196.92	13.40	.14894	.14599	.14314	.14041	.13778	.13524	.13280	.13044	.12817	.12597	.12385
420	201.36	13.70	.15228	.14926	.14635	.14356	.14087	.13828	.13578	.13337	.13104	.12880	.12663
430	205.81	14.00	.15562	.15253	.14956	.14670	.14395	.14131	.13875	.13629	.13392	.13162	.12941
440	210.25	14.31	.15895	.15580	.15277	.14985	.14704	.14434	.14173	.13922	.13679	.13445	.13218
450	214.69	14.61	.16229	.15907	.15597	.15299	.15013	.14737	.14471	.14214	.13966	.13727	.13496
460	219.14	14.91	.16562	.16234	.15918	.15614	.15321	.15040	.14768	.14506	.14254	.14010	.13774
470	223.58	15.21	.16895	.16560	.16238	.15928	.15630	.15343	.15066	.14799	.14541	.14292	.14051
480	228.03	15.52	.17229	.16887	.16558	.16242	.15938	.15645	.15363	.15091	.14828	.14574	.14329
490	232.47	15.82	.17562	.17213	.16878	.16556	.16247	.15948	.15660	.15383	.15115	.14856	.14606
500	236.92	16.12	.17894	.17540	.17199	.16870	.16555	.16251	.15957	.15675	.15402	.15138	.14883
510	241.36	16.42	.18227	.17866	.17519	.17184	.16863	.16553	.16254	.15966	.15688	.15420	.15161
520	245.81	16.73	.18560	.18192	.17838	.17498	.17171	.16855	.16551	.16258	.15975	.15702	.15438
530	250.25	17.03	.18893	.18518	.18158	.17812	.17479	.17158	.16848	.16550	.16262	.15984	.15715
540	254.69	17.33	.19225	.18844	.18478	.18126	.17787	.17460	.17145	.16842	.16548	.16265	.15992
550	259.14	17.63	.19557	.19170	.18797	.18439	.18094	.17762	.17442	.17133	.16835	.16547	.16269
560	263.58	17.94	.19890	.19496	.19117	.18753	.18402	.18064	.17739	.17425	.17121	.16829	.16546
570	268.03	18.24	.20222	.19821	.19436	.19066	.18710	.18366	.18035	.17716	.17408	.17110	.16823
580	272.47	18.54	.20554	.20147	.19756	.19379	.19017	.18668	.18332	.18007	.17694	.17392	.17099
590	276.92	18.84	.20886	.20472	.20075	.19692	.19325	.18970	.18628	.18299	.17980	.17673	.17376
600	281.36	19.15	.21218	.20798	.20394	.20006	.19632	.19272	.18925	.18590	.18266	.17954	.17653
610	285.81	19.45	.21550	.21123	.20713	.20319	.19939	.19573	.19221	.18881	.18553	.18236	.17929
620	290.25	19.75	.21881	.21448	.21032	.20632	.20246	.19875	.19517	.19172	.18839	.18517	.18206
630	294.69	20.05	.22213	.21773	.21351	.20944	.20553	.20176	.19813	.19463	.19124	.18798	.18482
640	299.14	20.36	.22544	.22098	.21669	.21257	.20860	.20478	.20109	.19753	.19410	.19079	.18758
650	303.58	20.66	.22875	.22423	.21988	.21570	.21167	.20779	.20405	.20044	.19696	.19360	.19035
660	308.03	20.96	.23207	.22748	.22307	.21882	.21474	.21080	.20701	.20335	.19982	.19641	.19311
670	312.47	21.26	.23538	.23072	.22625	.22195	.21780	.21381	.20997	.20626	.20267	.19921	.19587
680	316.92	21.57	.23869	.23397	.22943	.22507	.22087	.21682	.21292	.20916	.20553	.20202	.19863
690	321.36	21.87	.24200	.23721	.23262	.22819	.22394	.21983	.21588	.21206	.20838	.20483	.20139
700	325.81	22.17	.24531	.24046	.23580	.23131	.22700	.22284	.21883	.21497	.21124	.20763	.20415
710	330.25	22.47	.24861	.24370	.23898	.23443	.23007	.22585	.22179	.21787	.21409	.21044	.20691
720	334.69	22.77	.25192	.24694	.24216	.23755	.23313	.22886	.22474	.22077	.21694	.21324	.20966
730	339.14	23.08	.25522	.25018	.24534	.24067	.23619	.23186	.22769	.22367	.21979	.21604	.21242
740	343.58	23.38	.25853	.25342	.24851	.24379	.23925	.23487	.23065	.22657	.22264	.21885	.21518
750	348.03	23.68	.26183	.25666	.25169	.24691	.24231	.23787	.23360	.22947	.22549	.22165	.21793
760	352.47	23.98	.26513	.25990	.25487	.25003	.24537	.24088	.23655	.23237	.22834	.22445	.22069
770	356.92	24.29	.26843	.26313	.25804	.25314	.24842	.24388	.23950	.23527	.23119	.22725	.22344
780	361.36	24.59	.27173	.26637	.26121	.25626	.25148	.24688	.24245	.23817	.23404	.23005	.22620
790	365.81	24.89	.27503	.26961	.26439	.25937	.25454	.24988	.24539	.24107	.23689	.23285	.22895

HELIUM

HELIUM.DENSITY.LBS/CUBIC FT

DEPTH	PRESSURE		TEMPERATURES.F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
800	370.25	25.19	.27833	.27284	.26756	.26248	.25759	.25288	.24834	.24399	.23973	.23565	.23170
810	374.69	25.50	.28163	.27607	.27073	.26559	.26065	.25588	.25129	.24689	.24258	.23845	.23445
820	379.14	25.80	.28492	.27931	.27391	.26870	.26370	.25888	.25423	.24975	.24542	.24124	.23720
830	383.58	26.10	.28822	.28253	.27707	.27181	.26675	.26188	.25718	.25264	.24827	.24404	.23995
840	388.03	26.40	.29151	.28576	.28024	.27492	.26980	.26487	.26012	.25554	.25111	.24683	.24270
850	392.47	26.71	.29480	.28899	.28340	.27803	.27285	.26787	.26307	.25843	.25395	.24963	.24545
860	396.91	27.01	.29810	.29222	.28657	.28114	.27591	.27085	.26601	.26132	.25679	.25242	.24820
870	401.36	27.31	.30139	.29545	.28974	.28424	.27895	.27385	.26895	.26421	.25963	.25522	.25094
880	405.80	27.61	.30467	.29867	.29290	.28735	.28200	.27685	.27189	.26710	.26247	.25801	.25369
890	410.25	27.92	.30796	.30190	.29606	.29045	.28505	.27985	.27483	.26999	.26531	.26080	.25644
900	414.69	28.22	.31125	.30512	.29923	.29355	.28810	.28284	.27777	.27287	.26815	.26359	.25918
910	419.14	28.52	.31454	.30835	.30239	.29666	.29114	.28583	.28070	.27576	.27099	.26638	.26193
920	423.58	28.82	.31782	.31157	.30555	.29976	.29418	.28882	.28364	.27865	.27383	.26917	.26467
930	428.03	29.13	.32111	.31479	.30871	.30286	.29721	.29181	.28658	.28153	.27666	.27196	.26741
940	432.47	29.43	.32439	.31802	.31187	.30596	.30027	.29480	.28951	.28442	.27950	.27475	.27015
950	436.91	29.73	.32767	.32122	.31502	.30906	.30332	.29779	.29245	.28730	.28233	.27754	.27290
960	441.36	30.03	.33095	.32444	.31818	.31216	.30635	.30077	.29538	.29017	.28517	.28032	.27564
970	445.80	30.33	.33423	.32766	.32134	.31525	.30940	.30376	.29832	.29307	.28800	.28311	.27838
980	450.25	30.64	.33751	.33087	.32449	.31835	.31244	.30674	.30125	.29595	.29083	.28589	.28112
990	454.69	30.94	.34079	.33409	.32765	.32145	.31548	.30973	.30418	.29882	.29367	.28868	.28386
1000	459.14	31.24	.34407	.33730	.33080	.32454	.31851	.31271	.30711	.30171	.29650	.29146	.28659
1050	481.36	32.75	.36044	.35336	.34655	.34001	.33369	.32761	.32175	.31610	.31064	.30537	.30027
1100	503.58	34.27	.37678	.36939	.36228	.35545	.34885	.34250	.33638	.33047	.32477	.31926	.31394
1150	525.80	35.78	.39309	.38539	.37798	.37087	.36399	.35736	.35099	.34482	.33888	.33313	.32759
1200	548.02	37.29	.40939	.40138	.39367	.38628	.37912	.37222	.36556	.35915	.35298	.34699	.34121
1250	570.25	38.80	.42567	.41733	.40932	.40161	.39416	.38702	.38012	.37346	.36703	.36082	.35482
1300	592.47	40.31	.44191	.43327	.42495	.41695	.40925	.40182	.39466	.38770	.38105	.37464	.36841
1350	614.69	41.83	.45813	.44918	.44046	.43228	.42430	.41660	.40919	.40203	.39512	.38844	.38199
1400	636.91	43.34	.47433	.46534	.45615	.44759	.43932	.43139	.42364	.41624	.40914	.40223	.39555
1450	659.13	44.85	.49052	.48092	.47172	.46288	.45431	.44610	.43817	.43052	.42313	.41590	.40909
1500	681.36	46.36	.50664	.49670	.48724	.47812	.46931	.46082	.45266	.44476	.43711	.42976	.42261

500	34.02	.37416	.36681	.35976	.35295	.34641	.34010	.33402	.32810	.32249	.31702	.31176
600	40.83	.44744	.43866	.43024	.42215	.41435	.40684	.39959	.39260	.38584	.37932	.37302
700	47.63	.52017	.51003	.50024	.49086	.48180	.47315	.46470	.45662	.44882	.44126	.43395
800	54.44	.59242	.58092	.56984	.55921	.54895	.53906	.52953	.52032	.51144	.50285	.49456
900	61.24	.66418	.65133	.63897	.62700	.61562	.60457	.59391	.58362	.57364	.56408	.55479
1000	68.05	.73545	.72128	.70764	.69451	.68180	.66967	.65780	.64654	.63557	.62497	.61471
1100	74.85	.80626	.79076	.77587	.76152	.74770	.73437	.72151	.70910	.69716	.68551	.67430
1200	81.65	.87656	.85974	.84365	.82811	.81313	.79869	.78475	.77129	.75829	.74572	.73356
1300	88.46	.94641	.92837	.91100	.89428	.87816	.86261	.84761	.83312	.81912	.80559	.79249
1400	95.26	1.01579	.99650	.97783	.96003	.94270	.92615	.91010	.89460	.87961	.86512	.85111
1500	102.07	1.08472	1.06420	1.04463	1.02530	1.00703	.98933	.97223	.95572	.93976	.92433	.90941
1600	108.87	1.15324	1.13165	1.11051	1.09033	1.07089	1.05211	1.03400	1.01649	.99958	.98322	.96739
1700	115.68	1.2212	1.1983	1.1762	1.1549	1.1344	1.1145	1.0956	1.0769	1.0591	1.0418	1.0251
1800	122.48	1.2888	1.2647	1.2416	1.2190	1.1976	1.1766	1.1565	1.1374	1.1182	1.1000	1.0826
1900	129.29	1.3564	1.3307	1.3063	1.2828	1.2602	1.2383	1.2172	1.1966	1.1770	1.1576	1.1395
2000	136.09	1.4227	1.3963	1.3704	1.3462	1.3225	1.2996	1.2775	1.2562	1.2356	1.2156	1.1963
2100	142.90	1.4890	1.4616	1.4348	1.4092	1.3845	1.3606	1.3376	1.3153	1.2937	1.2729	1.2527
2200	149.70	1.5554	1.5262	1.4985	1.4719	1.4461	1.4213	1.3973	1.3741	1.3516	1.3299	1.3089
2300	156.51	1.6208	1.5906	1.5618	1.5341	1.5076	1.4816	1.4566	1.4325	1.4092	1.3866	1.3648
2400	163.31	1.6855	1.6545	1.6247	1.5960	1.5683	1.5415	1.5156	1.4908	1.4664	1.4430	1.4203
2500	170.11	1.7501	1.7181	1.6873	1.6570	1.6288	1.6011	1.5743	1.5484	1.5234	1.4991	1.4756
2600	176.92	1.8146	1.7813	1.7494	1.7187	1.6890	1.6604	1.6327	1.6059	1.5800	1.5549	1.5307
2700	183.72	1.8783	1.8441	1.8113	1.7794	1.7484	1.7193	1.6908	1.6631	1.6364	1.6105	1.5854
2800	190.53	1.9417	1.9066	1.8727	1.8400	1.8085	1.7780	1.7485	1.7200	1.6926	1.6657	1.6399
2900	197.33	2.0048	1.9687	1.9338	1.9001	1.8677	1.8363	1.8059	1.7766	1.7482	1.7207	1.6941
3000	204.14	2.0676	2.0304	1.9945	1.9594	1.9265	1.8943	1.8631	1.8329	1.8037	1.7754	1.7480
3100	210.94	2.1299	2.0917	2.0545	2.0190	1.9851	1.9519	1.9199	1.8884	1.8586	1.8296	1.8016
3200	217.75	2.1918	2.1527	2.1146	2.0785	2.0433	2.0093	1.9766	1.9443	1.9137	1.8839	1.8550
3300	224.55	2.2535	2.2133	2.1740	2.1373	2.1012	2.0663	2.0326	2.0002	1.9684	1.9377	1.9082
3400	231.36	2.3147	2.2734	2.2334	2.1957	2.1588	2.1228	2.0885	2.0550	2.0227	1.9913	1.9618
3500	238.16	2.3750	2.3330	2.2930	2.2540	2.2160	2.1795	2.1441	2.1097	2.0766	2.0447	2.0145
3600	244.96	2.4351	2.3931	2.3517	2.3111	2.2730	2.2350	2.1994	2.1644	2.1305	2.0977	2.0665
3700	251.77	2.4945	2.4526	2.4100	2.3684	2.3294	2.2916	2.2545	2.2187	2.1841	2.1505	2.1189
3800	258.57	2.5541	2.5113	2.4681	2.4253	2.3860	2.3470	2.3092	2.2727	2.2374	2.2030	2.1704
3900	265.38	2.6135	2.5694	2.5256	2.4825	2.4420	2.4022	2.3637	2.3264	2.2903	2.2543	2.2214
4000	272.18	2.6727	2.6267	2.5832	2.5390	2.4974	2.4572	2.4179	2.3799	2.3431	2.3063	2.2724
4100	278.99	2.7308	2.6841	2.6402	2.5961	2.5532	2.5119	2.4719	2.4331	2.3955	2.3581	2.3234
4200	285.79	2.7891	2.7417	2.6969	2.6520	2.6080	2.5662	2.5255	2.4860	2.4477	2.4101	2.3744
4300	292.60	2.8471	2.7988	2.7533	2.7076	2.6624	2.6203	2.5788	2.5385	2.4996	2.4616	2.4253
4400	299.40	2.9049	2.8555	2.8094	2.7629	2.7174	2.6742	2.6317	2.5909	2.5513	2.5136	2.4756
4500	306.21	2.9624	2.9119	2.8652	2.8179	2.7722	2.7277	2.6846	2.6431	2.6027	2.5647	2.5257
4600	313.01	3.0196	2.9681	2.9211	2.8726	2.8262	2.7814	2.7372	2.6949	2.6540	2.6152	2.5756
4700	319.82	3.0765	3.0240	2.9761	2.9273	2.8798	2.8341	2.7895	2.7464	2.7046	2.6655	2.6253
4800	326.62	3.1331	3.0796	3.0313	2.9817	2.9336	2.8869	2.8417	2.7977	2.7554	2.7158	2.6747
4900	333.42	3.1895	3.1342	3.0859	3.0355	2.9844	2.9394	2.8935	2.8487	2.8061	2.7658	2.7244
5000	340.23	3.2462	3.1894	3.1402	3.0891	3.0364	2.9915	2.9454	2.9000	2.8563	2.8148	2.7726

HELIUM

HELIUM,SPECIFIC VOLUME,CUBIC FT/LB

DEPTH	PRESSURE		TEMPERATURES,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	89.374	91.198	93.023	94.847	96.671	98.495	100.320	102.144	103.968	105.793	107.617
10	19.14	1.30	68.633	70.033	71.434	72.835	74.235	75.636	77.036	78.437	79.838	81.239	82.639
20	23.58	1.60	55.708	56.845	57.982	59.118	60.255	61.392	62.528	63.665	64.802	65.938	67.075
30	28.03	1.91	46.883	47.839	48.795	49.752	50.708	51.665	52.621	53.578	54.534	55.490	56.447
40	32.47	2.21	40.472	41.298	42.123	42.949	43.775	44.600	45.426	46.251	47.077	47.902	48.728
50	36.92	2.51	35.606	36.332	37.058	37.784	38.511	39.237	39.963	40.689	41.415	42.141	42.867
60	41.36	2.81	31.785	32.433	33.081	33.729	34.378	35.026	35.674	36.322	36.970	37.618	38.266
70	45.81	3.12	28.706	29.291	29.876	30.461	31.047	31.632	32.217	32.802	33.387	33.973	34.558
80	50.25	3.42	26.171	26.705	27.238	27.772	28.305	28.838	29.372	29.905	30.439	30.972	31.505
90	54.70	3.72	24.050	24.539	25.028	25.518	26.007	26.496	26.986	27.475	27.964	28.453	28.943
100	59.14	4.02	22.245	22.698	23.151	23.604	24.058	24.511	24.964	25.417	25.871	26.324	26.777
110	63.58	4.33	20.694	21.115	21.536	21.958	22.379	22.801	23.222	23.644	24.066	24.487	24.909
120	68.03	4.63	19.344	19.738	20.132	20.526	20.920	21.314	21.708	22.102	22.496	22.890	23.284
130	72.47	4.93	18.161	18.531	18.901	19.271	19.640	20.010	20.380	20.750	21.120	21.489	21.859
140	76.92	5.23	17.114	17.463	17.811	18.160	18.508	18.857	19.205	19.554	19.902	20.251	20.599
150	81.36	5.54	16.182	16.511	16.841	17.170	17.500	17.829	18.159	18.488	18.817	19.147	19.476
160	85.81	5.84	15.346	15.659	15.971	16.283	16.596	16.908	17.220	17.533	17.845	18.158	18.470
170	90.25	6.14	14.593	14.890	15.187	15.484	15.781	16.078	16.375	16.672	16.969	17.266	17.563
180	94.70	6.44	13.910	14.193	14.476	14.759	15.042	15.325	15.608	15.891	16.174	16.457	16.740
190	99.14	6.75	13.289	13.559	13.829	14.100	14.370	14.640	14.911	15.181	15.451	15.722	15.992
200	103.58	7.05	12.721	12.979	13.238	13.497	13.756	14.015	14.273	14.532	14.791	15.049	15.308
210	108.03	7.35	12.199	12.447	12.696	12.944	13.192	13.441	13.689	13.938	14.186	14.434	14.683
220	112.47	7.65	11.719	11.957	12.195	12.434	12.672	12.910	13.149	13.387	13.625	13.864	14.102
230	116.92	7.96	11.275	11.505	11.734	11.963	12.192	12.421	12.651	12.880	13.109	13.338	13.567
240	121.36	8.26	10.864	11.085	11.306	11.527	11.747	11.968	12.189	12.410	12.631	12.852	13.072
250	125.81	8.56	10.482	10.695	10.908	11.121	11.334	11.547	11.760	11.973	12.186	12.399	12.612
260	130.25	8.86	10.126	10.332	10.538	10.743	10.949	11.155	11.360	11.566	11.772	11.978	12.183
270	134.69	9.17	9.7835	9.9826	10.1816	10.3803	10.5793	10.7782	10.9771	11.1761	11.3750	11.5739	11.7728
280	139.14	9.47	9.4822	9.6748	9.8673	10.0599	10.2525	10.4451	10.6377	10.8302	11.0229	11.2154	11.4080
290	143.58	9.77	9.1901	9.3767	9.5634	9.7500	9.9366	10.1232	10.3099	10.4965	10.6831	10.8697	11.0563
300	148.03	10.07	8.9156	9.0967	9.2777	9.4587	9.6397	9.8207	10.0017	10.1827	10.3637	10.5447	10.7257
310	152.47	10.38	8.6571	8.8328	9.0086	9.1844	9.3601	9.5358	9.7116	9.8873	10.0630	10.2387	10.4145
320	156.92	10.68	8.4133	8.5840	8.7548	8.9255	9.0963	9.2670	9.4378	9.6085	9.7793	9.9500	10.1208
330	161.36	10.98	8.1828	8.3489	8.5150	8.6810	8.8470	9.0131	9.1791	9.3452	9.5112	9.6773	9.8433
340	165.81	11.28	7.9648	8.1264	8.2880	8.4495	8.6112	8.7727	8.9343	9.0959	9.2575	9.4191	9.5807
350	170.25	11.58	7.7581	7.9155	8.0728	8.2302	8.3876	8.5450	8.7023	8.8597	9.0171	9.1744	9.3318
360	174.69	11.89	7.5619	7.7153	7.8686	8.0220	8.1754	8.3288	8.4821	8.6355	8.7888	8.9422	9.0955
370	179.14	12.19	7.3755	7.5250	7.6746	7.8242	7.9737	8.1233	8.2729	8.4224	8.5720	8.7215	8.8710
380	183.58	12.49	7.1980	7.3439	7.4899	7.6358	7.7818	7.9277	8.0737	8.2196	8.3655	8.5115	8.6574
390	188.03	12.79	7.0290	7.1715	7.3140	7.4565	7.5990	7.7415	7.8839	8.0264	8.1689	8.3114	8.4539
400	192.47	13.10	6.8678	7.0070	7.1462	7.2854	7.4246	7.5638	7.7030	7.8422	7.9814	8.1205	8.2597
410	196.92	13.40	6.7139	6.8499	6.9859	7.1220	7.2581	7.3941	7.5302	7.6662	7.8023	7.9383	8.0743
420	201.36	13.70	6.5667	6.6998	6.8328	6.9659	7.0989	7.2320	7.3650	7.4980	7.6311	7.7641	7.8971
430	205.81	14.00	6.4260	6.5561	6.6863	6.8165	6.9466	7.0768	7.2070	7.3371	7.4673	7.5975	7.7276
440	210.25	14.31	6.2911	6.4185	6.5460	6.6734	6.8008	6.9282	7.0556	7.1830	7.3104	7.4378	7.5652
450	214.69	14.61	6.1619	6.2866	6.4114	6.5362	6.6610	6.7857	6.9105	7.0353	7.1601	7.2848	7.4096
460	219.14	14.91	6.0378	6.1601	6.2823	6.4046	6.5268	6.6491	6.7713	6.8935	7.0158	7.1380	7.2602
470	223.58	15.21	5.9187	6.0386	6.1584	6.2782	6.3980	6.5179	6.6376	6.7574	6.8772	6.9970	7.1168
480	228.03	15.52	5.8043	5.9218	6.0393	6.1567	6.2742	6.3917	6.5092	6.6266	6.7441	6.8616	6.9790
490	232.47	15.82	5.6943	5.8095	5.9247	6.0400	6.1552	6.2704	6.3856	6.5008	6.6161	6.7313	6.8465
500	236.92	16.12	5.5883	5.7014	5.8145	5.9275	6.0406	6.1536	6.2667	6.3797	6.4928	6.6058	6.7189
510	241.36	16.42	5.4863	5.5973	5.7083	5.8192	5.9302	6.0412	6.1522	6.2631	6.3741	6.4850	6.5960
520	245.80	16.73	5.3879	5.4969	5.6059	5.7149	5.8238	5.9328	6.0418	6.1507	6.2597	6.3687	6.4776
530	250.25	17.03	5.2931	5.4001	5.5072	5.6142	5.7212	5.8283	5.9353	6.0423	6.1494	6.2564	6.3634
540	254.69	17.33	5.2016	5.3067	5.4119	5.5171	5.6222	5.7274	5.8326	5.9377	6.0429	6.1480	6.2531
550	259.14	17.63	5.1131	5.2165	5.3199	5.4232	5.5266	5.6299	5.7333	5.8367	5.9400	6.0434	6.1467
560	263.58	17.94	5.0277	5.1294	5.2310	5.3326	5.4342	5.5358	5.6374	5.7390	5.8406	5.9422	6.0438
570	268.03	18.24	4.9451	5.0451	5.1450	5.2449	5.3449	5.4448	5.5447	5.6446	5.7445	5.8445	5.9444
580	272.47	18.54	4.8653	4.9636	5.0619	5.1602	5.2585	5.3568	5.4550	5.5533	5.6516	5.7499	5.8482
590	276.92	18.84	4.7879	4.8846	4.9814	5.0781	5.1748	5.2715	5.3682	5.4649	5.5616	5.6583	5.7550
600	281.36	19.15	4.7130	4.8082	4.9034	4.9986	5.0938	5.1890	5.2842	5.3793	5.4745	5.5697	5.6649
610	285.80	19.45	4.6405	4.7342	4.8279	4.9216	5.0153	5.1090	5.2027	5.2964	5.3901	5.4838	5.5775
620	290.25	19.75	4.5701	4.6624	4.7547	4.8470	4.9392	5.0315	5.1238	5.2160	5.3083	5.4006	5.4929
630	294.69	20.05	4.5019	4.5928	4.6837	4.7745	4.8654	4.9563	5.0471	5.1380	5.2289	5.3197	5.4106
640	299.14	20.36	4.4357	4.5253	4.6148	4.7043	4.7938	4.8833	4.9728	5.0624	5.1519	5.2414	5.3309
650	303.58	20.66	4.3715	4.4597	4.5479	4.6361	4.7243	4.8125	4.9007	4.9889	5.0772	5.1654	5.2536
660	308.03	20.96	4.3091	4.3960	4.4830	4.5699	4.6568	4.7438	4.8307	4.9176	5.0046	5.0915	5.1784
670	312.47	21.26	4.2485	4.3342	4.4199	4.5056	4.5913	4.6770	4.7627	4.8484	4.9341	5.0198	5.1055
680	316.92	21.56	4.1895	4.2740	4.3585	4.4430	4.5275	4.6120	4.6965	4.7810	4.8655	4.9500	5.0345
690	321.36	21.87	4.1323	4.2156	4.2989	4.3823	4.4656	4.5489	4.6322	4.7156	4.7989	4.8822	4.9655
700	325.80	22.17	4.0766	4.1587	4.2409	4.3231	4.4053	4.4875	4.5697	4.6518	4.7340	4.8162	4.8984
710	330.25	22.47	4.0223	4.1034	4.1845	4.2655	4.3466	4.4277	4.5087	4.5898	4.6709	4.7520	4.8330
720	334.69	22.77	3.9696	4.0496	4.1296	4.2096	4.2896	4.3696	4.4495	4.5296	4.6096	4.6896	4.7697
730	339.14	23.08	3.9181	3.9971	4.0761	4.1550	4.2340	4.3129	4.3919	4.4708	4.5498	4.6288	4.7077
740	343.58	23.38	3.8681	3.9460	4.0239	4.1019	4.1798	4.2577	4.3356	4.4136	4.4915	4.5694	4.6473
750	348.03	23.68	3.8193	3.8962	3.9731	4.0501	4.1270	4.2039	4.2809	4.3578	4.4347	4.5116	4.5886
760	352.47	23.98	3.7717	3.8477	3.9237	3.9996	4.0756	4.1515	4.2275	4.3034	4.3794	4.4554	4.5313
770	356.91	24.29	3.7254	3.8004	3.8755	3.9505	4.0255	4.1006	4.1756	4.2506	4.3256	4.4007	4.4757
780	361.36	24.59	3.6801	3.7542	3.8283	3.9024	3.9765	4.0506	4.1246	4.1987	4.2728	4.3469	4.4210
790	365.80	24.89	3.6359	3.7091	3.7823	3.8555	3.9287	4.0019	4.0751	4.1483	4.2215	4.2947	4.3679

HELIUM,SPECIFIC VOLUME,CUBIC FT/LB

DEPTH FT	PRESSURE PSIA	ATM	TEMPERATURES,F 30	40	50	60	70	80	90	100	110	120	130
800	370.25	25.19	3.5929	3.6652	3.7375	3.8098	3.8821	3.9544	4.0267	4.0990	4.1713	4.2436	4.3159
810	374.69	25.50	3.5508	3.6223	3.6937	3.7652	3.8366	3.9081	3.9795	4.0510	4.1224	4.1938	4.2653
820	379.14	25.80	3.5097	3.5803	3.6510	3.7216	3.7922	3.8628	3.9334	4.0040	4.0746	4.1452	4.2158
830	383.58	26.10	3.4696	3.5394	3.6092	3.6790	3.7488	3.8186	3.8884	3.9582	4.0279	4.0977	4.1675
840	388.03	26.40	3.4304	3.4994	3.5684	3.6374	3.7064	3.7754	3.8444	3.9134	3.9823	4.0513	4.1203
850	392.47	26.71	3.3921	3.4603	3.5285	3.5967	3.6650	3.7332	3.8014	3.8696	3.9378	4.0060	4.0741
860	396.91	27.01	3.3546	3.4221	3.4895	3.5570	3.6244	3.6919	3.7593	3.8267	3.8942	3.9616	4.0290
870	401.36	27.31	3.3180	3.3847	3.4514	3.5181	3.5848	3.6515	3.7182	3.7849	3.8516	3.9183	3.9849
880	405.80	27.61	3.2822	3.3482	3.4141	3.4801	3.5461	3.6120	3.6780	3.7439	3.8099	3.8758	3.9418
890	410.25	27.92	3.2471	3.3124	3.3777	3.4429	3.5082	3.5736	3.6387	3.7039	3.7691	3.8344	3.8996
900	414.69	28.22	3.2128	3.2774	3.3420	3.4065	3.4711	3.5356	3.6001	3.6647	3.7292	3.7938	3.8583
910	419.14	28.52	3.1793	3.2431	3.3070	3.3709	3.4348	3.4986	3.5625	3.6263	3.6902	3.7540	3.8179
920	423.58	28.82	3.1464	3.2096	3.2728	3.3360	3.3992	3.4624	3.5256	3.5888	3.6519	3.7151	3.7783
930	428.03	29.13	3.1142	3.1768	3.2393	3.3018	3.3644	3.4269	3.4894	3.5520	3.6145	3.6770	3.7395
940	432.47	29.43	3.0827	3.1446	3.2065	3.2684	3.3303	3.3922	3.4541	3.5159	3.5778	3.6397	3.7016
950	436.91	29.73	3.0518	3.1131	3.1744	3.2356	3.2969	3.3581	3.4194	3.4807	3.5419	3.6031	3.6644
960	441.36	30.03	3.0216	3.0822	3.1429	3.2035	3.2642	3.3248	3.3854	3.4461	3.5067	3.5673	3.6280
970	445.80	30.33	2.9919	3.0520	3.1120	3.1720	3.2321	3.2921	3.3521	3.4122	3.4722	3.5322	3.5922
980	450.25	30.64	2.9628	3.0223	3.0817	3.1412	3.2006	3.2601	3.3195	3.3790	3.4384	3.4978	3.5572
990	454.69	30.94	2.9343	2.9932	3.0521	3.1110	3.1698	3.2287	3.2875	3.3464	3.4052	3.4641	3.5229
1000	459.14	31.24	2.9064	2.9647	3.0230	3.0813	3.1396	3.1979	3.2561	3.3144	3.3727	3.4310	3.4893
1050	481.36	32.75	2.7744	2.8300	2.8856	2.9412	2.9968	3.0524	3.1080	3.1636	3.2191	3.2747	3.3303
1100	503.58	34.27	2.6540	2.7072	2.7603	2.8135	2.8666	2.9197	2.9729	3.0260	3.0791	3.1323	3.1856
1150	525.80	35.78	2.5438	2.5947	2.6456	2.6965	2.7474	2.7983	2.8492	2.9001	2.9509	3.0018	3.0527
1200	548.02	37.29	2.4426	2.4914	2.5402	2.5891	2.6379	2.6867	2.7355	2.7843	2.8331	2.8820	2.9308
1250	570.25	38.80	2.3492	2.3962	2.4431	2.4900	2.5369	2.5838	2.6307	2.6776	2.7245	2.7714	2.8183
1300	592.47	40.31	2.2629	2.3080	2.3532	2.3984	2.4435	2.4887	2.5338	2.5789	2.6241	2.6692	2.7144
1350	614.69	41.83	2.1828	2.2263	2.2698	2.3133	2.3568	2.4004	2.4439	2.4874	2.5309	2.5744	2.6179
1400	636.91	43.34	2.1082	2.1502	2.1922	2.2342	2.2762	2.3182	2.3602	2.4022	2.4442	2.4862	2.5281
1450	659.13	44.85	2.0387	2.0793	2.1199	2.1605	2.2011	2.2416	2.2822	2.3228	2.3633	2.4039	2.4444
1500	681.36	46.36	1.9738	2.0130	2.0523	2.0915	2.1308	2.1700	2.2093	2.2485	2.2878	2.3270	2.3662
	500	34.02	2.6727	2.7262	2.7797	2.8333	2.8868	2.9403	2.9938	3.0473	3.1008	3.1543	3.2078
	600	40.83	2.2351	2.2797	2.3242	2.3688	2.4134	2.4580	2.5026	2.5471	2.5917	2.6363	2.6808
	700	47.63	1.9225	1.9607	1.9989	2.0371	2.0753	2.1135	2.1517	2.1899	2.2281	2.2662	2.3044
	800	54.44	1.6880	1.7214	1.7548	1.7883	1.8217	1.8551	1.8885	1.9219	1.9553	1.9887	2.0221
	900	61.24	1.5056	1.5353	1.5650	1.5947	1.6244	1.6541	1.6838	1.7134	1.7431	1.7728	1.8025
	1000	68.05	1.3597	1.3864	1.4131	1.4399	1.4666	1.4933	1.5200	1.5467	1.5734	1.6001	1.6268
	1100	74.85	1.2403	1.2646	1.2889	1.3132	1.3374	1.3617	1.3860	1.4102	1.4345	1.4588	1.4830
	1200	81.65	1.1408	1.1631	1.1853	1.2076	1.2298	1.2521	1.2743	1.2965	1.3188	1.3410	1.3632
	1300	88.46	1.0566	1.0772	1.0977	1.1182	1.1387	1.1593	1.1798	1.2003	1.2208	1.2413	1.2618
	1400	95.26	.98445	1.00351	1.02257	1.04163	1.06068	1.07973	1.09878	1.11782	1.13686	1.15591	1.17496
	1500	102.07	.92190	.93968	.95746	.97525	.99302	1.01079	1.02856	1.04633	1.06410	1.08186	1.09962
	1600	108.87	.86715	.88382	.90049	.91715	.93381	.95047	.96712	.98377	1.00042	1.01707	1.03371
	1700	115.68	.81884	.83452	.85021	.86588	.88156	.89723	.91290	.92856	.94423	.95989	.97555
	1800	122.48	.77590	.79071	.80551	.82031	.83511	.84991	.86470	.87950	.89428	.90907	.92385
	1900	129.29	.73747	.75149	.76552	.77953	.79355	.80756	.82157	.83558	.84959	.86358	.87750
	2000	136.09	.70288	.71620	.72951	.74283	.75614	.76944	.78275	.79606	.80935	.82266	.83594
	2100	142.90	.67158	.68426	.69694	.70962	.72229	.73496	.74763	.76029	.77296	.78561	.79827
	2200	149.70	.64312	.65523	.66732	.67942	.69151	.70360	.71569	.72777	.73985	.75194	.76401
	2300	156.51	.61713	.62871	.64027	.65185	.66341	.67497	.68653	.69809	.70964	.72119	.73273
	2400	163.31	.59331	.60440	.61548	.62656	.63764	.64872	.65979	.67086	.68193	.69299	.70406
	2500	170.11	.57139	.58203	.59267	.60330	.61393	.62456	.63519	.64581	.65643	.66705	.67767
	2600	176.92	.55115	.56138	.57161	.58183	.59205	.60227	.61248	.62269	.63290	.64311	.65331
	2700	183.72	.53241	.54226	.55210	.56194	.57178	.58162	.59145	.60128	.61111	.62093	.63075
	2800	190.53	.51500	.52450	.53399	.54347	.55296	.56244	.57192	.58140	.59087	.60034	.60981
	2900	197.33	.49879	.50796	.51712	.52627	.53543	.54458	.55373	.56288	.57202	.58116	.59030
	3000	204.14	.48366	.49252	.50137	.51022	.51907	.52791	.53675	.54559	.55443	.56326	.57209
	3100	210.94	.46951	.47807	.48664	.49520	.50376	.51232	.52087	.52942	.53797	.54652	.55506
	3200	217.75	.45624	.46453	.47283	.48112	.48941	.49769	.50598	.51426	.52254	.53081	.53909
	3300	224.55	.44376	.45181	.45985	.46789	.47592	.48395	.49199	.50001	.50804	.51606	.52408
	3400	231.36	.43202	.43983	.44763	.45543	.46323	.47102	.47882	.48661	.49439	.50217	.50994
	3500	238.16	.42095	.42853	.43611	.44369	.45126	.45883	.46639	.47396	.48152	.48908	.49664
	3600	244.96	.41049	.41786	.42523	.43259	.43995	.44731	.45466	.46201	.46936	.47671	.48406
	3700	251.77	.40060	.40776	.41493	.42209	.42925	.43641	.44356	.45071	.45786	.46501	.47215
	3800	258.57	.39122	.39820	.40517	.41215	.41911	.42608	.43304	.44001	.44696	.45392	.46088
	3900	265.38	.38232	.38912	.39592	.40271	.40950	.41628	.42307	.42985	.43662	.44340	.45017
	4000	272.18	.37387	.38050	.38712	.39374	.40035	.40697	.41358	.42019	.42680	.43340	.44000
	4100	278.99	.36583	.37229	.37875	.38521	.39166	.39811	.40456	.41101	.41745	.42389	.43033
	4200	285.79	.35817	.36447	.37078	.37708	.38338	.38967	.39597	.40226	.40855	.41483	.42112
	4300	292.60	.35085	.35702	.36317	.36933	.37548	.38163	.38777	.39392	.40006	.40619	.41233
	4400	299.40	.34388	.34990	.35592	.36193	.36794	.37395	.37995	.38595	.39195	.39795	.40394
	4500	306.21	.33722	.34310	.34898	.35486	.36073	.36660	.37247	.37834	.38420	.39006	.39592
	4600	313.01	.33084	.33659	.34234	.34809	.35384	.35958	.36532	.37106	.37679	.38252	.38825
	4700	319.81	.32473	.33036	.33599	.34161	.34723	.35285	.35847	.36409	.36970	.37530	.38091
	4800	326.62	.31887	.32438	.32989	.33540	.34090	.34640	.35190	.35740	.36289	.36838	.37387
	4900	333.42	.31325	.31865	.32405	.32944	.33484	.34022	.34560	.35099	.35637	.36174	.36712
	5000	340.23	.30785	.31315	.31844	.32372	.32900	.33428	.33955	.34483	.35010	.35537	.36063

HELIUM T-18

HELIUM
ENTHALPY,BTU/LB

PRESSURE PSIA	TEMPERATURE					
	30	50	70	90	110	130
14.70	619.39	644.21	669.03	693.86	718.68	743.50
30.00	619.53	644.35	669.17	694.00	718.82	743.64
50.00	619.71	644.53	669.36	694.18	719.00	743.82
100.00	620.16	644.98	669.81	694.64	719.46	744.28
200.00	621.04	645.88	670.71	695.54	720.37	745.20
300.00	621.92	646.76	671.60	696.43	721.27	746.10
400.00	622.80	647.64	672.49	697.33	722.16	747.00
500.00	623.67	648.53	673.37	698.22	723.06	747.90
1000.00	628.02	652.89	677.77	702.63	727.50	752.36
2000.00	636.69	661.60	686.32	711.22	736.12	761.03
3000.00	644.80	669.77	694.72	719.66	744.59	769.53
4000.00	652.85	677.85	702.84	727.82	752.81	777.78
5000.00	660.70	685.73	710.75	735.77	760.79	785.80

HELIUM
CV,BTU/LB F

PRESSURE PSIA	TEMPERATURE					
	30	50	70	90	110	130
14.70	.746	.746	.746	.746	.746	.746
30.00	.746	.746	.746	.746	.746	.746
50.00	.746	.746	.746	.746	.746	.746
100.00	.746	.746	.746	.746	.745	.745
200.00	.746	.746	.746	.746	.746	.745
300.00	.746	.746	.746	.745	.746	.745
400.00	.746	.746	.746	.746	.745	.745
500.00	.746	.746	.746	.746	.746	.746
1000.00	.746	.746	.746	.746	.746	.745
2000.00	.746	.746	.746	.746	.746	.746
3000.00	.746	.746	.746	.746	.746	.746
4000.00	.746	.746	.746	.746	.746	.746
5000.00	.746	.746	.746	.746	.746	.746

HELIUM
ENTROPY,BTU/LB F

PRESSURE PSIA	TEMPERATURE					
	30	50	70	90	110	130
14.70	6.6802	6.7300	6.7777	6.8236	6.8681	6.9109
30.00	6.5500	6.5997	6.6475	6.6935	6.7379	6.7807
50.00	6.3798	6.4295	6.4773	6.5233	6.5677	6.6105
100.00	5.9543	6.0040	6.0518	6.0978	6.1422	6.1850
200.00	5.4616	5.5113	5.5592	5.6052	5.6496	5.6925
300.00	5.3276	5.3771	5.4250	5.4710	5.5154	5.5583
400.00	5.1932	5.2429	5.2908	5.3368	5.3812	5.4241
500.00	5.0590	5.1087	5.1566	5.2026	5.2470	5.2899
1000.00	4.6166	4.6664	4.7143	4.7604	4.8049	4.8478
2000.00	4.2701	4.3200	4.3679	4.4141	4.4586	4.5016
3000.00	4.0396	4.0893	4.1374	4.1836	4.2282	4.2712
4000.00	3.8950	3.9450	3.9932	4.0395	4.0841	4.1272
5000.00	3.7826	3.8327	3.8809	3.9272	3.9719	4.0151

HELIUM
THERMAL CONDUCTIVITY,BTU/SEC FT F
(MULTIPLY TABLE ENTRY BY .00001000)

PRESSURE PSIA	TEMPERATURE					
	30	50	70	90	110	130
14.70	2.26	2.32	2.38	2.43	2.49	2.54
30.00	2.27	2.32	2.38	2.43	2.49	2.54
50.00	2.27	2.32	2.38	2.44	2.49	2.54
100.00	2.28	2.33	2.39	2.44	2.50	2.55
200.00	2.29	2.34	2.40	2.45	2.51	2.56
300.00	2.30	2.36	2.41	2.47	2.52	2.57
400.00	2.31	2.37	2.43	2.48	2.53	2.59
500.00	2.33	2.38	2.44	2.49	2.55	2.60
1000.00	2.39	2.45	2.50	2.55	2.61	2.66
2000.00	2.43	2.49	2.55	2.60	2.66	2.71
3000.00						
4000.00						
5000.00						

HELIUM
CP,BTU/LB F

PRESSURE PSIA	TEMPERATURE					
	30	50	70	90	110	130
14.70	1.2420	1.2420	1.2420	1.2420	1.2420	1.2420
30.00	1.2421	1.2421	1.2421	1.2421	1.2421	1.2421
50.00	1.2421	1.2421	1.2421	1.2421	1.2421	1.2421
100.00	1.2423	1.2423	1.2422	1.2422	1.2422	1.2422
200.00	1.2426	1.2425	1.2425	1.2425	1.2424	1.2424
300.00	1.2428	1.2428	1.2427	1.2427	1.2426	1.2426
400.00	1.2431	1.2430	1.2430	1.2429	1.2429	1.2428
500.00	1.2434	1.2433	1.2432	1.2431	1.2431	1.2430
1000.00	1.2448	1.2446	1.2444	1.2443	1.2441	1.2440
2000.00	1.2469	1.2466	1.2464	1.2461	1.2458	1.2456
3000.00	1.2491	1.2487	1.2485	1.2482	1.2480	1.2477
4000.00	1.2509	1.2506	1.2503	1.2500	1.2497	1.2494
5000.00	1.2527	1.2524	1.2521	1.2518	1.2515	1.2512

HELIUM
PRANDTL NUMBER

PRESSURE PSIA	TEMPERATURE					
	30	50	70	90	110	130
14.70	.63	.64	[illegible]	[illegible]	[illegible]	[illegible]
30.00	.69	.69	.59	[illegible]	[illegible]	[illegible]
50.00	.59	.69	[illegible]	[illegible]	[illegible]	[illegible]
100.00	.69	.59	[illegible]	[illegible]	[illegible]	[illegible]
200.00	.68	.68	[illegible]	[illegible]	[illegible]	[illegible]
300.00	.68	.68	.68	[illegible]	[illegible]	[illegible]
400.00	.67	.67	.66	[illegible]	[illegible]	[illegible]
500.00	.67	.67	.67	[illegible]	[illegible]	[illegible]
1000.00	.65	.65	.55	.66	[illegible]	[illegible]
2000.00	.54	.64	[illegible]	[illegible]	[illegible]	[illegible]
3000.00						
4000.00						
5000.00						

HELIUM
CP/CV

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.665	1.665	1.665	1.665	1.665	1.665
30.00	1.665	1.665	1.665	1.665	1.665	1.665
50.00	1.665	1.665	1.665	1.665	1.665	1.665
100.00	1.665	1.665	1.665	1.665	1.665	1.665
200.00	1.666	1.666	1.666	1.666	1.666	1.666
300.00	1.666	1.666	1.666	1.666	1.666	1.666
400.00	1.667	1.667	1.666	1.666	1.666	1.666
500.00	1.667	1.667	1.667	1.667	1.666	1.666
1000.00	1.669	1.669	1.669	1.668	1.668	1.668
2000.00	1.671	1.671	1.671	1.670	1.670	1.670
3000.00	1.674	1.674	1.674	1.673	1.673	1.672
4000.00	1.676	1.676	1.676	1.675	1.675	1.674
5000.00	1.678	1.678	1.678	1.677	1.677	1.676

HELIUM
VISCOSITY•LB/FT SEC
(MULTIPLY TABLE ENTRY BY .0000100)

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.257	1.290	1.323	1.357	1.389	1.422
30.00	1.257	1.290	1.323	1.357	1.389	1.422
50.00	1.257	1.290	1.323	1.357	1.389	1.422
100.00	1.257	1.290	1.323	1.357	1.389	1.422
200.00	1.257	1.290	1.323	1.357	1.389	1.422
300.00	1.257	1.290	1.323	1.357	1.389	1.422
400.00	1.257	1.290	1.323	1.357	1.389	1.422
500.00	1.257	1.290	1.323	1.357	1.389	1.422
1000.00	1.257	1.290	1.323	1.357	1.389	1.422
2000.00	1.257	1.290	1.323	1.357	1.389	1.422
3000.00	1.257	1.290	1.323	1.357	1.389	1.422
4000.00	1.257	1.290	1.323	1.357	1.389	1.422
5000.00	1.257	1.290	1.323	1.357	1.389	1.422

HELIUM
SONIC VELOCITY FT/SEC

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	3162	3202	3282	3362	3431	3491
30.00	3164	3204	3284	3363	3433	3493
50.00	3156	3207	3286	3365	3435	3495
100.00	3173	3214	3293	3371	3440	3500
200.00	3186	3230	3306	3382	3450	3510
300.00	3199	3245	3319	3393	3460	3520
400.00	3212	3260	3332	3404	3470	3530
500.00	3225	3275	3345	3415	3480	3540
1000.00	3290	3350	3410	3470	3530	3590
2000.00	3390	3450	3510	3570	3630	3690
3000.00	3525	3575	3635	3695	3755	3815
4000.00	3660	3700	3760	3820	3880	3940
5000.00	3760	3800	3860	3920	3977	4032

DENSITY

T-20

NITROGEN

NITROGEN,DENSITY,LBS/CUBIC FT

DEPTH	PRESSURE		TEMPERATURES,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	.07839	.07681	.07530	.07385	.07245	.07110	.06981	.06856	.06735	.06619	.06506
10	19.14	1.30	.10211	.10006	.09808	.09619	.09437	.09261	.09092	.08929	.08772	.08620	.08474
20	23.58	1.60	.12584	.12330	.12087	.11854	.11629	.11412	.11204	.11003	.10809	.10622	.10441
30	28.03	1.91	.14957	.14656	.14367	.14089	.13821	.13564	.13316	.13077	.12846	.12624	.12409
40	32.47	2.21	.17331	.16982	.16646	.16324	.16014	.15715	.15428	.15151	.14883	.14625	.14376
50	36.92	2.51	.19706	.19308	.18926	.18559	.18207	.17867	.17540	.17225	.16921	.16627	.16344
60	41.36	2.81	.22081	.21635	.21207	.20795	.20400	.20019	.19652	.19299	.18958	.18629	.18311
70	45.81	3.12	.24458	.23963	.23488	.23032	.22593	.22171	.21765	.21373	.20995	.20631	.20279
80	50.25	3.42	.26834	.26291	.25770	.25269	.24787	.24324	.23878	.23447	.23033	.22633	.22246
90	54.70	3.72	.29212	.28620	.28052	.27506	.26981	.26477	.25990	.25522	.25070	.24634	.24214
100	59.14	4.02	.31590	.30949	.30336	.29743	.29175	.28629	.28103	.27596	.27108	.26636	.26181
110	63.58	4.33	.33968	.33279	.32617	.31981	.31370	.30782	.30217	.29671	.29145	.28638	.28148
120	68.03	4.63	.36346	.35609	.34900	.34219	.33565	.32936	.32330	.31746	.31183	.30640	.30115
130	72.47	4.93	.38728	.37940	.37184	.36458	.35760	.35089	.34443	.33821	.33221	.32641	.32083
140	76.92	5.23	.41108	.40271	.39468	.38697	.37956	.37243	.36557	.35896	.35258	.34643	.34050
150	81.36	5.54	.43490	.42603	.41753	.40936	.40151	.39397	.38670	.37970	.37296	.36645	.36017
160	85.81	5.84	.45872	.44935	.44037	.43176	.42347	.41551	.40784	.40046	.39334	.38647	.37984
170	90.25	6.14	.48254	.47268	.46323	.45415	.44544	.43705	.42898	.42121	.41371	.40649	.39951
180	94.70	6.44	.50637	.49602	.48609	.47656	.46740	.45860	.45013	.44196	.43409	.42650	.41918
190	99.14	6.75	.53021	.51936	.50895	.49896	.48937	.48014	.47126	.46271	.45447	.44652	.43885
200	103.58	7.05	.55405	.54270	.53182	.52137	.51134	.50169	.49241	.48347	.47485	.46654	.45852
210	108.03	7.35	.57790	.56605	.55469	.54378	.53331	.52324	.51356	.50422	.49523	.48656	.47819
220	112.47	7.65	.60176	.58941	.57756	.56620	.55529	.54480	.53470	.52498	.51561	.50657	.49786
230	116.92	7.96	.62562	.61276	.60044	.58862	.57727	.56635	.55585	.54574	.53599	.52659	.51752
240	121.36	8.26	.64949	.63613	.62332	.61104	.59926	.58791	.57700	.56649	.55637	.54661	.53719
250	125.81	8.56	.67336	.65950	.64621	.63347	.62123	.60946	.59814	.58725	.57675	.56662	.55686
260	130.25	8.86	.69724	.68288	.66911	.65589	.64321	.63102	.61930	.60800	.59713	.58664	.57652
270	134.69	9.17	.72113	.70625	.69200	.67832	.66520	.65259	.64045	.62876	.61751	.60666	.59619
280	139.14	9.47	.74502	.72964	.71490	.70076	.68719	.67415	.66160	.64952	.63788	.62667	.61585
290	143.58	9.77	.76892	.75303	.73780	.72320	.70918	.69571	.68276	.67028	.65827	.64668	.63551
300	148.03	10.07	.79282	.77642	.76071	.74564	.73117	.71728	.70392	.69104	.67865	.66670	.65518
310	152.47	10.38	.81673	.79982	.78362	.76808	.75317	.73885	.72507	.71180	.69903	.68671	.67484
320	156.92	10.68	.84065	.82323	.80653	.79053	.77517	.76042	.74623	.73256	.71941	.70673	.69450
330	161.36	10.98	.86457	.84664	.82945	.81298	.79717	.78199	.76739	.75332	.73979	.72674	.71416
340	165.81	11.28	.88850	.87004	.85238	.83543	.81917	.80356	.78855	.77409	.76016	.74676	.73382
350	170.25	11.58	.91243	.89346	.87530	.85788	.84118	.82513	.80971	.79485	.78055	.76677	.75348
360	174.69	11.89	.93637	.91689	.89823	.88034	.86318	.84671	.83087	.81562	.80093	.78678	.77313
370	179.14	12.19	.96031	.94031	.92116	.90281	.88519	.86829	.85203	.83637	.82131	.80679	.79279
380	183.58	12.49	.98426	.96374	.94410	.92526	.90720	.88987	.87319	.85714	.84168	.82680	.81245
390	188.03	12.79	1.00822	.98718	.96703	.94773	.92922	.91145	.89435	.87791	.86207	.84681	.83210
400	192.47	13.10	1.03217	1.01062	.98998	.97021	.95123	.93302	.91552	.89867	.88245	.86682	.85176
410	196.92	13.40	1.05614	1.03406	1.01292	.99267	.97325	.95461	.93669	.91943	.90282	.88683	.87141
420	201.36	13.70	1.08011	1.05751	1.03588	1.01514	.99527	.97619	.95785	.94019	.92321	.90684	.89106
430	205.81	14.00	1.10409	1.08097	1.05883	1.03763	1.01730	.99778	.97901	.96096	.94358	.92685	.91071
440	210.25	14.31	1.12807	1.10442	1.08179	1.06010	1.03931	1.01936	1.00018	.98173	.96396	.94685	.93036
450	214.69	14.61	1.15206	1.12788	1.10475	1.08259	1.06134	1.04095	1.02135	1.00250	.98436	.96686	.95001
460	219.14	14.91	1.17605	1.15135	1.12771	1.10507	1.08336	1.06254	1.04252	1.02326	1.00471	.98687	.96966
470	223.58	15.21	1.20005	1.17482	1.15068	1.12756	1.10539	1.08413	1.06369	1.04402	1.02509	1.00687	.98931
480	228.03	15.52	1.2240	1.1983	1.1736	1.1500	1.1274	1.1057	1.0849	1.0648	1.0455	1.0269	1.0090
490	232.47	15.82	1.2481	1.2218	1.1966	1.1725	1.1495	1.1273	1.1060	1.0856	1.0658	1.0469	1.0286
500	236.92	16.12	1.2721	1.2453	1.2196	1.1950	1.1715	1.1489	1.1272	1.1063	1.0862	1.0669	1.0482
510	241.36	16.42	1.2961	1.2687	1.2426	1.2175	1.1935	1.1705	1.1484	1.1271	1.1066	1.0869	1.0679
520	245.80	16.73	1.3201	1.2922	1.2656	1.2400	1.2156	1.1921	1.1695	1.1478	1.1270	1.1069	1.0875
530	250.25	17.03	1.3441	1.3157	1.2886	1.2625	1.2376	1.2137	1.1907	1.1686	1.1474	1.1269	1.1072
540	254.69	17.33	1.3682	1.3392	1.3115	1.2850	1.2596	1.2353	1.2119	1.1894	1.1677	1.1469	1.1268
550	259.14	17.63	1.3922	1.3627	1.3345	1.3075	1.2817	1.2569	1.2331	1.2101	1.1881	1.1669	1.1464
560	263.58	17.94	1.4163	1.3862	1.3575	1.3300	1.3037	1.2785	1.2542	1.2309	1.2085	1.1869	1.1661
570	268.03	18.24	1.4403	1.4098	1.3805	1.3526	1.3258	1.3001	1.2754	1.2517	1.2288	1.2069	1.1857
580	272.47	18.54	1.4644	1.4333	1.4035	1.3751	1.3478	1.3217	1.2966	1.2724	1.2492	1.2269	1.2054
590	276.92	18.84	1.4884	1.4568	1.4265	1.3976	1.3699	1.3433	1.3178	1.2932	1.2696	1.2469	1.2250
600	281.36	19.15	1.5125	1.4803	1.4495	1.4201	1.3919	1.3649	1.3389	1.3140	1.2900	1.2669	1.2446
610	285.80	19.45	1.5365	1.5038	1.4726	1.4426	1.4140	1.3865	1.3601	1.3347	1.3103	1.2869	1.2642
620	290.25	19.75	1.5606	1.5273	1.4956	1.4651	1.4360	1.4081	1.3813	1.3555	1.3307	1.3068	1.2839
630	294.69	20.05	1.5847	1.5509	1.5186	1.4877	1.4581	1.4297	1.4025	1.3763	1.3511	1.3268	1.3035
640	299.14	20.36	1.6088	1.5744	1.5416	1.5102	1.4801	1.4513	1.4236	1.3970	1.3714	1.3468	1.3231
650	303.58	20.66	1.6329	1.5980	1.5646	1.5327	1.5022	1.4729	1.4448	1.4178	1.3918	1.3666	1.3427
660	308.03	20.96	1.6570	1.6215	1.5876	1.5552	1.5242	1.4945	1.4660	1.4386	1.4122	1.3868	1.3624
670	312.47	21.26	1.6811	1.6451	1.6107	1.5778	1.5463	1.5161	1.4872	1.4593	1.4325	1.4068	1.3820
680	316.92	21.56	1.7052	1.6686	1.6337	1.6003	1.5684	1.5377	1.5083	1.4801	1.4529	1.4268	1.4016
690	321.36	21.87	1.7293	1.6922	1.6567	1.6228	1.5904	1.5593	1.5295	1.5008	1.4733	1.4468	1.4212
700	325.80	22.17	1.7534	1.7157	1.6798	1.6454	1.6125	1.5810	1.5507	1.5216	1.4936	1.4667	1.4409
710	330.25	22.47	1.7775	1.7393	1.7028	1.6679	1.6345	1.6026	1.5719	1.5424	1.5140	1.4867	1.4605
720	334.69	22.77	1.8016	1.7628	1.7258	1.6904	1.6566	1.6242	1.5930	1.5631	1.5344	1.5067	1.4801
730	339.14	23.08	1.8257	1.7864	1.7489	1.7130	1.6787	1.6458	1.6142	1.5839	1.5547	1.5267	1.4997
740	343.58	23.38	1.8498	1.8100	1.7719	1.7355	1.7007	1.6674	1.6354	1.6046	1.5751	1.5467	1.5193
750	348.03	23.68	1.8740	1.8335	1.7950	1.7581	1.7228	1.6890	1.6566	1.6254	1.5954	1.5666	1.5389
760	352.47	23.98	1.8981	1.8571	1.8180	1.7806	1.7449	1.7106	1.6777	1.6461	1.6158	1.5866	1.5585
770	356.91	24.29	1.9223	1.8807	1.8411	1.8032	1.7669	1.7322	1.6989	1.6669	1.6362	1.6066	1.5781
780	361.36	24.59	1.9464	1.9043	1.8641	1.8257	1.7890	1.7538	1.7201	1.6877	1.6565	1.6266	1.5977
790	365.80	24.89	1.9705	1.9279	1.8872	1.8483	1.8111	1.7755	1.7413	1.7084	1.6769	1.6465	1.6173

DENSITY

NITROGEN

NITROGEN,DENSITY,LBS/CUBIC FT

DEPTH FT	PRESSURE PSIA	ATM	TEMPERATURES,F 30	40	50	60	70	80	90	100	110	120	130
800	370.25	25.19	1.9947	1.9515	1.9102	1.8708	1.8331	1.7971	1.7624	1.7292	1.6972	1.6665	1.6369
810	374.69	25.50	2.0188	1.9751	1.9333	1.8934	1.8552	1.8187	1.7836	1.7499	1.7176	1.6865	1.6565
820	379.14	25.80	2.0430	1.9987	1.9563	1.9159	1.8773	1.8403	1.8048	1.7707	1.7379	1.7064	1.6761
830	383.58	26.10	2.0672	2.0223	1.9794	1.9385	1.8994	1.8619	1.8260	1.7914	1.7583	1.7264	1.6957
840	388.03	26.40	2.0913	2.0459	2.0025	1.9610	1.9214	1.8835	1.8472	1.8122	1.7786	1.7464	1.7153
850	392.47	26.71	2.1155	2.0695	2.0255	1.9836	1.9435	1.9051	1.8683	1.8329	1.7990	1.7663	1.7349
860	396.91	27.01	2.1397	2.0931	2.0486	2.0062	1.9656	1.9267	1.8895	1.8537	1.8193	1.7863	1.7545
870	401.36	27.31	2.1639	2.1167	2.0717	2.0287	1.9877	1.9484	1.9107	1.8745	1.8397	1.8062	1.7741
880	405.80	27.61	2.1880	2.1403	2.0948	2.0513	2.0097	1.9700	1.9318	1.8952	1.8600	1.8262	1.7937
890	410.25	27.92	2.2122	2.1639	2.1178	2.0738	2.0318	1.9916	1.9530	1.9160	1.8804	1.8462	1.8133
900	414.69	28.22	2.2364	2.1875	2.1409	2.0964	2.0539	2.0132	1.9742	1.9367	1.9007	1.8661	1.8328
910	419.14	28.52	2.2606	2.2111	2.1640	2.1190	2.0760	2.0348	1.9953	1.9574	1.9210	1.8861	1.8524
920	423.58	28.82	2.2848	2.2348	2.1871	2.1415	2.0980	2.0564	2.0165	1.9782	1.9414	1.9060	1.8720
930	428.03	29.13	2.3090	2.2584	2.2102	2.1641	2.1201	2.0780	2.0377	1.9989	1.9617	1.9260	1.8916
940	432.47	29.43	2.3332	2.2820	2.2332	2.1867	2.1422	2.0997	2.0589	2.0197	1.9820	1.9459	1.9112
950	436.91	29.73	2.3574	2.3057	2.2563	2.2093	2.1643	2.1213	2.0800	2.0404	2.0024	1.9659	1.9307
960	441.36	30.03	2.3816	2.3293	2.2794	2.2318	2.1864	2.1429	2.1012	2.0612	2.0227	1.9858	1.9503
970	445.80	30.33	2.4058	2.3529	2.3025	2.2544	2.2084	2.1645	2.1224	2.0819	2.0431	2.0057	1.9699
980	450.25	30.64	2.4300	2.3766	2.3256	2.2770	2.2305	2.1861	2.1435	2.1026	2.0634	2.0257	1.9894
990	454.69	30.94	2.4543	2.4002	2.3487	2.2995	2.2526	2.2077	2.1647	2.1234	2.0837	2.0456	2.0090
1000	459.14	31.24	2.4785	2.4238	2.3718	2.3221	2.2747	2.2293	2.1858	2.1441	2.1040	2.0656	2.0286
1050	481.36	32.75	2.5996	2.5421	2.4873	2.4350	2.3851	2.3374	2.2917	2.2478	2.2057	2.1652	2.1263
1100	503.58	34.27	2.7209	2.6604	2.6028	2.5479	2.4955	2.4454	2.3975	2.3514	2.3072	2.2648	2.2240
1150	525.80	35.78	2.8422	2.7787	2.7183	2.6608	2.6059	2.5535	2.5032	2.4550	2.4087	2.3643	2.3217
1200	548.02	37.29	2.9635	2.8971	2.8339	2.7737	2.7163	2.6615	2.6089	2.5585	2.5102	2.4638	2.4193
1250	570.25	38.80	3.0850	3.0155	2.9495	2.8866	2.8267	2.7696	2.7146	2.6621	2.6116	2.5633	2.5168
1300	592.47	40.31	3.2064	3.1340	3.0651	2.9995	2.9370	2.8774	2.8203	2.7655	2.7130	2.6627	2.6143
1350	614.69	41.83	3.3280	3.2525	3.1807	3.1124	3.0474	2.9853	2.9259	2.8689	2.8143	2.7620	2.7117
1400	636.91	43.34	3.4495	3.3709	3.2963	3.2253	3.1577	3.0932	3.0315	2.9723	2.9156	2.8612	2.8091
1450	659.13	44.85	3.5711	3.4895	3.4119	3.3382	3.2680	3.2010	3.1370	3.0756	3.0168	2.9604	2.9063
1500	681.36	46.36	3.6927	3.6080	3.5275	3.4511	3.3782	3.3089	3.2425	3.1789	3.1179	3.0595	3.0035

500	34.02	2.7014	2.6413	2.5842	2.5297	2.4777	2.4280	2.3804	2.3347	2.2909	2.2488	2.2083
600	40.83	3.2476	3.1741	3.1043	3.0378	2.9744	2.9140	2.8561	2.8006	2.7474	2.6963	2.6473
700	47.63	3.7948	3.7074	3.6245	3.5457	3.4707	3.3993	3.3309	3.2654	3.2027	3.1426	3.0850
800	54.44	4.3423	4.2407	4.1444	4.0531	3.9662	3.8836	3.8046	3.7290	3.6566	3.5874	3.5210
900	61.24	4.8857	4.7736	4.6636	4.5595	4.4606	4.3656	4.2768	4.1909	4.1088	4.0303	3.9552
1000	68.05	5.4364	5.3056	5.1816	5.0644	4.9534	4.8479	4.7472	4.6510	4.5591	4.4713	4.3872
1100	74.85	5.9818	5.8357	5.6979	5.5676	5.4443	5.3272	5.2156	5.1089	5.0072	4.9100	4.8170
1200	81.65	6.5254	6.3642	6.2122	6.0686	5.9329	5.8042	5.6816	5.5645	5.4528	5.3462	5.2443
1300	88.46	7.0666	6.8901	6.7239	6.5670	6.4188	6.2785	6.1449	6.0173	5.8957	5.7797	5.6690
1400	95.26	7.6049	7.4131	7.2326	7.0625	6.9019	6.7500	6.6052	6.4672	6.3357	6.2104	6.0908
1500	102.07	8.1398	7.9327	7.7380	7.5546	7.3816	7.2181	7.0624	6.9140	6.7726	6.6379	6.5095
1600	108.87	8.6707	8.4485	8.2396	8.0430	7.8577	7.6827	7.5161	7.3573	7.2061	7.0623	6.9250
1700	115.68	9.1972	8.9600	8.7370	8.5274	8.3299	8.1435	7.9661	7.7970	7.6362	7.4831	7.3372
1800	122.48	9.7189	9.4667	9.2300	9.0075	8.7979	8.6002	8.4121	8.2329	8.0625	7.9003	7.7458
1900	129.29	10.2352	9.9684	9.7181	9.4829	9.2614	9.0526	8.8540	8.6647	8.4849	8.3137	8.1508
2000	136.09	10.7459	10.4648	10.2011	9.9534	9.7203	9.5006	9.2916	9.0924	8.9033	8.7233	8.5520
2100	142.90	11.2506	10.9555	10.6787	10.4188	10.1743	9.9438	9.7246	9.5157	9.3174	9.1288	8.9493
2200	149.70	11.7490	11.4402	11.1507	10.8789	10.6231	10.3821	10.1530	9.9346	9.7273	9.5301	9.3425
2300	156.51	12.2407	11.9188	11.6167	11.3333	11.0667	10.8155	10.5766	10.3489	10.1328	9.9272	9.7317
2400	163.31	12.726	12.391	12.077	11.782	11.505	11.244	10.995	10.758	10.534	10.320	10.117
2500	170.11	13.204	12.857	12.531	12.225	11.937	11.667	11.409	11.163	10.930	10.708	10.497
2600	176.92	13.675	13.315	12.978	12.662	12.364	12.084	11.817	11.563	11.322	11.092	10.874
2700	183.72	14.138	13.767	13.419	13.093	12.786	12.496	12.221	11.958	11.709	11.472	11.246
2800	190.53	14.594	14.213	13.854	13.518	13.201	12.903	12.619	12.348	12.091	11.846	11.614
2900	197.33	15.043	14.651	14.282	13.936	13.611	13.304	13.011	12.733	12.468	12.216	11.977
3000	204.14	15.484	15.082	14.704	14.349	14.016	13.699	13.399	13.113	12.841	12.582	12.336
3100	210.94	15.918	15.506	15.119	14.755	14.412	14.089	13.781	13.487	13.208	12.943	12.690
3200	217.75	16.345	15.923	15.527	15.155	14.804	14.473	14.158	13.857	13.571	13.299	13.040
3300	224.55	16.764	16.334	15.929	15.548	15.190	14.852	14.529	14.221	13.929	13.651	13.386
3400	231.36	17.176	16.737	16.326	15.936	15.570	15.225	14.895	14.581	14.282	13.998	13.727
3500	238.16	17.580	17.134	16.713	16.317	15.944	15.592	15.256	14.936	14.630	14.340	14.063
3600	244.96	17.978	17.524	17.096	16.693	16.313	15.954	15.612	15.285	14.974	14.678	14.396
3700	251.77	18.368	17.907	17.472	17.062	16.676	16.311	15.963	15.630	15.313	15.011	14.724
3800	258.57	18.752	18.283	17.842	17.426	17.033	16.662	16.308	15.969	15.647	15.340	15.047
3900	265.38	19.128	18.654	18.205	17.783	17.385	17.008	16.648	16.304	15.976	15.664	15.366
4000	272.18	19.498	19.017	18.563	18.135	17.731	17.349	16.983	16.634	16.301	15.984	15.681
4100	278.99	19.862	19.375	18.915	18.481	18.072	17.684	17.314	16.959	16.621	16.299	15.992
4200	285.79	20.219	19.726	19.261	18.822	18.407	18.015	17.639	17.280	16.937	16.610	16.299
4300	292.60	20.569	20.072	19.601	19.157	18.737	18.340	17.960	17.596	17.248	16.917	16.602
4400	299.40	20.914	20.411	19.936	19.487	19.063	18.660	18.276	17.907	17.555	17.220	16.900
4500	306.21	21.253	20.745	20.265	19.812	19.382	18.976	18.587	18.214	17.858	17.518	17.195
4600	313.01	21.587	21.074	20.589	20.131	19.698	19.287	18.894	18.516	18.156	17.813	17.485
4700	319.81	21.916	21.398	20.907	20.445	20.008	19.593	19.196	18.814	18.451	18.103	17.772
4800	326.62	22.239	21.716	21.221	20.755	20.313	19.895	19.494	19.106	18.741	18.390	18.055
4900	333.42	22.550	22.026	21.529	21.059	20.614	20.192	19.787	19.398	19.027	18.672	18.334
5000	340.23	22.861	22.333	21.833	21.359	20.910	20.484	20.076	19.684	19.309	18.951	18.609

NITROGEN

NITROGEN,SPECIFIC VOLUME,CUBIC FT/LB

DEPTH	PRESSURE						TEMPERATURES,F						
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	12.757	13.018	13.280	13.541	13.803	14.064	14.325	14.586	14.848	15.109	15.370
10	19.14	1.30	9.7935	9.9944	10.1953	10.3961	10.5969	10.7976	10.9984	11.1991	11.3999	11.6005	11.8012
20	23.58	1.60	7.9469	8.1101	8.2732	8.4363	8.5994	8.7624	8.9254	9.0885	9.2515	9.4144	9.5773
30	28.03	1.91	6.6858	6.8232	6.9606	7.0980	7.2353	7.3726	7.5099	7.6472	7.7844	7.9216	8.0587
40	32.47	2.21	5.7699	5.8887	6.0074	6.1260	6.2447	6.3633	6.4818	6.6004	6.7189	6.8374	6.9559
50	36.92	2.51	5.0746	5.1792	5.2838	5.3881	5.4925	5.5969	5.7013	5.8056	5.9099	6.0142	6.1185
60	41.36	2.81	4.5287	4.6221	4.7154	4.8088	4.9020	4.9953	5.0885	5.1817	5.2748	5.3680	5.4611
70	45.81	3.12	4.0837	4.1731	4.2575	4.3418	4.4261	4.5103	4.5946	4.6788	4.7630	4.8471	4.9313
80	50.25	3.42	3.7266	3.8036	3.8806	3.9575	4.0344	4.1112	4.1880	4.2649	4.3417	4.4184	4.4951
90	54.70	3.72	3.4233	3.4941	3.5649	3.6356	3.7063	3.7769	3.8476	3.9182	3.9888	4.0594	4.1299
100	59.14	4.02	3.1650	3.2311	3.2966	3.3621	3.4275	3.4929	3.5583	3.6237	3.6890	3.7543	3.8196
110	63.58	4.33	2.9439	3.0049	3.0659	3.1268	3.1877	3.2486	3.3094	3.3703	3.4311	3.4919	3.5526
120	68.03	4.63	2.7512	2.8083	2.8653	2.9223	2.9793	3.0362	3.0931	3.1500	3.2069	3.2637	3.3206
130	72.47	4.93	2.5821	2.6358	2.6894	2.7429	2.7964	2.8499	2.9033	2.9568	3.0102	3.0636	3.1169
140	76.92	5.23	2.4326	2.4832	2.5337	2.5842	2.6347	2.6851	2.7355	2.7859	2.8362	2.8865	2.9368
150	81.36	5.54	2.2994	2.3472	2.3951	2.4428	2.4906	2.5383	2.5860	2.6336	2.6813	2.7289	2.7765
160	85.81	5.84	2.1800	2.2254	2.2708	2.3161	2.3614	2.4067	2.4519	2.4971	2.5424	2.5875	2.6327
170	90.25	6.14	2.0724	2.1156	2.1588	2.2019	2.2450	2.2881	2.3311	2.3741	2.4171	2.4601	2.5031
180	94.70	6.44	1.9749	2.0151	2.0572	2.0984	2.1395	2.1806	2.2216	2.2626	2.3037	2.3446	2.3856
190	99.14	6.75	1.8861	1.9255	1.9648	2.0042	2.0434	2.0827	2.1220	2.1612	2.2004	2.2395	2.2787
200	103.58	7.05	1.8049	1.8426	1.8803	1.9180	1.9556	1.9932	2.0308	2.0684	2.1059	2.1434	2.1809
210	108.03	7.35	1.7304	1.7666	1.8028	1.8390	1.8751	1.9112	1.9472	1.9833	2.0193	2.0553	2.0912
220	112.47	7.65	1.6618	1.6966	1.7314	1.7662	1.8009	1.8355	1.8702	1.9049	1.9395	1.9740	2.0086
230	116.92	7.96	1.5984	1.6320	1.6654	1.6989	1.7323	1.7657	1.7991	1.8324	1.8657	1.8990	1.9323
240	121.36	8.26	1.5397	1.5720	1.6043	1.6365	1.6688	1.7010	1.7331	1.7653	1.7974	1.8295	1.8615
250	125.81	8.56	1.4851	1.5163	1.5475	1.5786	1.6097	1.6408	1.6718	1.7029	1.7339	1.7648	1.7958
260	130.25	8.86	1.4342	1.4644	1.4945	1.5246	1.5547	1.5847	1.6147	1.6447	1.6747	1.7046	1.7345
270	134.69	9.17	1.3867	1.4159	1.4451	1.4742	1.5033	1.5324	1.5614	1.5904	1.6194	1.6484	1.6773
280	139.14	9.47	1.3422	1.3705	1.3988	1.4270	1.4552	1.4834	1.5115	1.5396	1.5677	1.5957	1.6238
290	143.58	9.77	1.3005	1.3280	1.3554	1.3827	1.4101	1.4374	1.4647	1.4919	1.5191	1.5463	1.5735
300	148.03	10.07	1.2613	1.2880	1.3146	1.3411	1.3677	1.3942	1.4206	1.4471	1.4735	1.4999	1.5263
310	152.47	10.38	1.2244	1.2503	1.2761	1.3019	1.3277	1.3535	1.3792	1.4049	1.4306	1.4562	1.4818
320	156.92	10.68	1.1896	1.2147	1.2349	1.2650	1.2900	1.3151	1.3401	1.3651	1.3900	1.4150	1.4399
330	161.36	10.98	1.1566	1.1811	1.2056	1.2300	1.2544	1.2788	1.3031	1.3274	1.3517	1.3760	1.4002
340	165.81	11.28	1.1255	1.1494	1.1732	1.1970	1.2207	1.2445	1.2682	1.2918	1.3155	1.3391	1.3627
350	170.25	11.58	1.0960	1.1192	1.1425	1.1657	1.1888	1.2119	1.2350	1.2581	1.2812	1.3042	1.3272
360	174.69	11.89	1.0680	1.0906	1.1133	1.1359	1.1585	1.1810	1.2036	1.2261	1.2485	1.2710	1.2934
370	179.14	12.19	1.0413	1.0635	1.0856	1.1077	1.1297	1.1517	1.1737	1.1956	1.2176	1.2395	1.2614
380	183.58	12.49	1.0160	1.0376	1.0592	1.0808	1.1023	1.1238	1.1452	1.1667	1.1881	1.2095	1.2308
390	188.03	12.79	.99185	1.01299	1.03409	1.05515	1.07617	1.09716	1.11812	1.13907	1.16000	1.18090	1.20177
400	192.47	13.10	.96883	.98949	1.01012	1.03071	1.05127	1.07178	1.09228	1.11276	1.13321	1.15365	1.17406
410	196.92	13.40	.94684	.96706	.98724	1.00738	1.02748	1.04755	1.06759	1.08763	1.10764	1.12761	1.14757
420	201.36	13.70	.92583	.94562	.96536	.98508	1.00475	1.02439	1.04400	1.06361	1.08318	1.10273	1.12226
430	205.81	14.00	.90572	.92510	.94444	.96374	.98300	1.00223	1.02144	1.04062	1.05979	1.07893	1.09804
440	210.25	14.31	.88647	.90545	.92440	.94331	.96217	.98101	.99982	1.01862	1.03739	1.05613	1.07485
450	214.69	14.61	.86801	.88662	.90519	.92371	.94220	.96066	.97909	.99751	1.01591	1.03428	1.05262
460	219.14	14.91	.85030	.86855	.88675	.90492	.92305	.94114	.95921	.97727	.99531	1.01331	1.03129
470	223.58	15.21	.83330	.85120	.86906	.88687	.90465	.92240	.94013	.95784	.97552	.99318	1.01081
480	228.03	15.52	.81696	.83452	.85205	.86953	.88697	.90438	.92178	.93916	.95650	.97383	.99113
490	232.47	15.82	.80125	.81848	.83569	.85285	.86998	.88706	.90414	.92119	.93822	.95522	.97219
500	236.92	16.12	.78612	.80305	.81994	.83680	.85362	.87040	.88715	.90390	.92062	.93732	.95397
510	241.36	16.42	.77155	.78818	.80478	.82134	.83785	.85434	.87080	.88724	.90367	.92006	.93643
520	245.80	16.73	.75751	.77386	.79016	.80644	.82267	.83886	.85503	.87119	.88733	.90344	.91952
530	250.25	17.03	.74397	.76004	.77607	.79206	.80802	.82393	.83983	.85571	.87157	.88740	.90320
540	254.69	17.33	.73090	.74670	.76247	.77819	.79387	.80952	.82516	.84077	.85636	.87193	.88746
550	259.14	17.63	.71828	.73382	.74933	.76480	.78022	.79562	.81099	.82635	.84168	.85698	.87226
560	263.58	17.94	.70608	.72138	.73664	.75185	.76703	.78217	.79730	.81241	.82749	.84254	.85757
570	268.03	18.24	.69430	.70935	.72436	.73934	.75428	.76918	.78406	.79893	.81377	.82859	.84337
580	272.47	18.54	.68289	.69771	.71249	.72724	.74194	.75661	.77126	.78589	.80050	.81508	.82963
590	276.92	18.84	.67186	.68645	.70100	.71552	.73000	.74444	.75887	.77328	.78766	.80201	.81634
600	281.36	19.15	.66116	.67554	.68988	.70418	.71844	.73266	.74687	.76105	.77521	.78935	.80346
610	285.80	19.45	.65081	.66497	.67909	.69318	.70723	.72125	.73524	.74921	.76317	.77709	.79099
620	290.25	19.75	.64077	.65473	.66865	.68253	.69637	.71018	.72397	.73773	.75148	.76520	.77890
630	294.69	20.05	.63103	.64480	.65851	.67219	.68584	.69945	.71304	.72661	.74015	.75367	.76716
640	299.14	20.36	.62159	.63515	.64868	.66217	.67562	.68904	.70243	.71581	.72916	.74249	.75579
650	303.58	20.66	.61242	.62579	.63914	.65243	.66570	.67892	.69213	.70533	.71849	.73163	.74474
660	308.03	20.96	.60351	.61671	.62987	.64299	.65606	.66911	.68213	.69514	.70813	.72108	.73401
670	312.47	21.26	.59486	.60788	.62086	.63381	.64671	.65957	.67242	.68526	.69806	.71086	.72359
680	316.92	21.56	.58646	.59930	.61211	.62486	.63761	.65031	.66298	.67564	.68827	.70088	.71346
690	321.36	21.87	.57826	.59096	.60360	.61621	.62877	.64129	.65380	.66629	.67876	.69120	.70361
700	325.80	22.17	.57033	.58285	.59532	.60777	.62016	.63253	.64487	.65721	.66951	.68178	.69404
710	330.25	22.47	.56259	.57495	.58727	.59955	.61179	.62400	.63619	.64835	.66050	.67262	.68471
720	334.69	22.77	.55500	.56726	.57943	.59156	.60365	.61570	.62773	.63975	.65174	.66370	.67564
730	339.14	23.08	.54773	.55978	.57180	.58376	.59571	.60761	.61950	.63136	.64320	.65502	.66680
740	343.58	23.38	.54058	.55249	.56436	.57619	.58798	.59974	.61147	.62319	.63488	.64655	.65820
750	348.03	23.68	.53363	.54539	.55711	.56880	.58045	.59206	.60366	.61524	.62678	.63831	.64981
760	352.47	23.98	.52684	.53846	.55005	.56160	.57311	.58458	.59604	.60749	.61889	.63027	.64163
770	356.91	24.29	.52022	.53171	.54316	.55458	.56595	.57729	.58861	.59991	.61119	.62244	.63367
780	361.36	24.59	.51377	.52513	.53645	.54773	.55897	.57018	.58136	.59253	.60368	.61480	.62589
790	365.80	24.89	.50748	.51870	.52990	.54105	.55215	.56323	.57429	.58534	.59635	.60734	.61830

NITROGEN

NITROGEN,SPECIFIC VOLUME,CUBIC FT/LB

DEPTH	PRESSURE		TEMPERATURES,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
800	370.25	25.19	.50133	.51243	.52350	.53453	.54551	.55646	.56739	.57831	.58920	.60006	.61090
810	374.69	25.50	.49533	.50631	.51725	.52816	.53902	.54985	.56066	.57145	.58222	.59296	.60367
820	379.14	25.80	.48948	.50034	.51116	.52194	.53269	.54339	.55408	.56475	.57540	.58602	.59661
830	383.58	26.10	.48376	.49449	.50520	.51587	.52649	.53708	.54765	.55821	.56874	.57924	.58972
840	388.03	26.40	.47816	.48879	.49938	.50993	.52044	.53092	.54137	.55184	.56223	.57262	.58298
850	392.47	26.71	.47270	.48322	.49370	.50414	.51453	.52490	.53524	.54557	.55587	.56615	.57640
860	396.91	27.01	.46736	.47777	.48814	.49846	.50876	.51901	.52924	.53946	.54965	.55982	.56995
870	401.36	27.31	.46214	.47244	.48270	.49292	.50310	.51325	.52338	.53349	.54358	.55364	.56367
880	405.80	27.61	.45703	.46723	.47738	.48750	.49758	.50762	.51764	.52765	.53763	.54759	.55751
890	410.25	27.92	.45204	.46213	.47218	.48220	.49217	.50211	.51203	.52193	.53182	.54167	.55149
900	414.69	28.22	.44715	.45714	.46709	.47701	.48688	.49672	.50654	.51633	.52613	.53588	.54560
910	419.14	28.52	.44236	.45225	.46211	.47193	.48170	.49144	.50117	.51087	.52055	.53021	.53983
920	423.58	28.82	.43768	.44747	.45723	.46695	.47664	.48628	.49590	.50551	.51510	.52465	.53419
930	428.03	29.13	.43309	.44279	.45246	.46208	.47167	.48122	.49075	.50027	.50976	.51922	.52866
940	432.47	29.43	.42860	.43821	.44778	.45731	.46681	.47627	.48571	.49513	.50453	.51390	.52324
950	436.91	29.73	.42420	.43372	.44320	.45264	.46205	.47141	.48076	.49010	.49941	.50869	.51794
960	441.36	30.03	.41988	.42932	.43871	.44807	.45738	.46666	.47592	.48517	.49438	.50358	.51274
970	445.80	30.33	.41566	.42500	.43431	.44358	.45281	.46200	.47118	.48033	.48946	.49857	.50765
980	450.25	30.64	.41152	.42078	.43000	.43918	.44832	.45743	.46652	.47560	.48464	.49366	.50266
990	454.69	30.94	.40746	.41663	.42577	.43487	.44393	.45296	.46196	.47095	.47991	.48885	.49776
1000	459.14	31.24	.40347	.41257	.42162	.43064	.43962	.44856	.45749	.46639	.47528	.48413	.49296
1050	481.36	32.75	.38467	.39338	.40205	.41068	.41927	.42783	.43636	.44489	.45338	.46185	.47029
1100	503.58	34.27	.36753	.37589	.38420	.39248	.40072	.40893	.41711	.42528	.43342	.44154	.44963
1150	525.80	35.78	.35184	.35988	.36787	.37583	.38375	.39163	.39949	.40733	.41516	.42295	.43071
1200	548.02	37.29	.33744	.34517	.35287	.36053	.36815	.37573	.38330	.39085	.39837	.40587	.41334
1250	570.25	38.80	.32415	.33162	.33906	.34643	.35377	.36108	.36838	.37565	.38290	.39012	.39732
1300	592.47	40.31	.31187	.31908	.32625	.33339	.34049	.34754	.35458	.36160	.36859	.37556	.38251
1350	614.69	41.83	.30049	.30746	.31440	.32129	.32815	.33497	.34178	.34856	.35532	.36206	.36877
1400	636.91	43.34	.28990	.29665	.30337	.31005	.31669	.32329	.32987	.33644	.34298	.34950	.35599
1450	659.13	44.85	.28003	.28658	.29309	.29956	.30600	.31240	.31878	.32514	.33168	.33779	.34408
1500	681.36	46.36	.27080	.27716	.28348	.28977	.29601	.30222	.30841	.31458	.32073	.32685	.33294

500	34.02	.37018	.37860	.38697	.39530	.40360	.41186	.42009	.42832	.43652	.44469	.45283
600	40.83	.30792	.31505	.32214	.32919	.33620	.34317	.35013	.35707	.36399	.37087	.37774
700	47.63	.26352	.26973	.27590	.28203	.28812	.29418	.30022	.30624	.31224	.31820	.32415
800	54.44	.23029	.23581	.24129	.24673	.25213	.25749	.26284	.26817	.27348	.27876	.28401
900	61.24	.20451	.20949	.21443	.21932	.22419	.22901	.23382	.23861	.24338	.24812	.25283
1000	68.05	.18395	.18849	.19299	.19746	.20188	.20628	.21065	.21501	.21934	.22365	.22794
1100	74.85	.16717	.17136	.17550	.17961	.18368	.18772	.19173	.19574	.19971	.20367	.20760
1200	81.65	.15325	.15713	.16097	.16478	.16855	.17229	.17601	.17971	.18339	.18705	.19068
1300	88.46	.14151	.14513	.14872	.15228	.15579	.15927	.16274	.16619	.16962	.17302	.17640
1400	95.26	.13149	.13490	.13826	.14159	.14489	.14815	.15139	.15463	.15783	.16102	.16418
1500	102.07	.12285	.12606	.12923	.13237	.13547	.13854	.14159	.14463	.14765	.15065	.15362
1600	108.87	.11533	.11836	.12137	.12433	.12726	.13016	.13305	.13592	.13877	.14160	.14440
1700	115.68	.10873	.11161	.11446	.11727	.12005	.12280	.12553	.12825	.13096	.13363	.13629
1800	122.48	.10289	.10563	.10836	.11102	.11366	.11628	.11888	.12146	.12403	.12658	.12910
1900	129.29	.09770	.10032	.10290	.10545	.10797	.11047	.11294	.11541	.11786	.12028	.12269
2000	136.09	.09306	.09556	.09803	.10047	.10288	.10526	.10762	.10998	.11232	.11464	.11693
2100	142.90	.08888	.09128	.09364	.09598	.09829	.10057	.10283	.10509	.10733	.10956	.11176
2200	149.70	.08511	.08741	.08968	.09192	.09413	.09632	.09849	.10066	.10280	.10493	.10704
2300	156.51	.08169	.08390	.08608	.08824	.09036	.09246	.09455	.09663	.09869	.10073	.10276
2400	163.31	.07856	.08070	.08280	.08487	.08692	.08894	.09095	.09295	.09493	.09690	.09885
2500	170.11	.07574	.07778	.07980	.08180	.08377	.08572	.08765	.08958	.09149	.09338	.09526
2600	176.92	.07313	.07510	.07705	.07898	.08088	.08275	.08462	.08648	.08833	.09015	.09196
2700	183.72	.07073	.07263	.07452	.07638	.07821	.08003	.08183	.08363	.08541	.08717	.08892
2800	190.53	.06852	.07036	.07218	.07398	.07575	.07750	.07925	.08099	.08271	.08441	.08611
2900	197.33	.06648	.06826	.07002	.07176	.07347	.07517	.07686	.07854	.08020	.08186	.08349
3000	204.14	.06458	.06630	.06801	.06969	.07136	.07300	.07463	.07626	.07788	.07948	.08106
3100	210.94	.06282	.06449	.06614	.06777	.06939	.07098	.07256	.07414	.07571	.07726	.07880
3200	217.75	.06118	.06280	.06440	.06599	.06755	.06909	.07063	.07217	.07369	.07519	.07669
3300	224.55	.05965	.06122	.06278	.06432	.06583	.06733	.06883	.07032	.07179	.07326	.07471
3400	231.36	.05822	.05975	.06126	.06275	.06423	.06568	.06713	.06858	.07002	.07144	.07285
3500	238.16	.05688	.05836	.05983	.06128	.06272	.06413	.06555	.06695	.06835	.06974	.07111
3600	244.96	.05562	.05707	.05849	.05991	.06130	.06268	.06405	.06542	.06679	.06813	.06947
3700	251.77	.05444	.05584	.05724	.05861	.05997	.06131	.06265	.06398	.06531	.06662	.06792
3800	258.57	.05333	.05469	.05605	.05737	.05871	.06002	.06132	.06262	.06391	.06519	.06646
3900	265.38	.05229	.05361	.05493	.05623	.05752	.05880	.06007	.06133	.06259	.06382	.06504
4000	272.18	.05129	.05258	.05387	.05514	.05640	.05764	.05888	.06012	.06135	.06256	.06377
4100	278.99	.05035	.05161	.05287	.05411	.05533	.05655	.05776	.05897	.06018	.06135	.06253
4200	285.79	.04946	.05069	.05192	.05313	.05433	.05551	.05669	.05787	.05906	.06020	.06135
4300	292.60	.04862	.04982	.05102	.05220	.05337	.05453	.05568	.05683	.05798	.05911	.06024
4400	299.40	.04781	.04899	.05016	.05132	.05246	.05359	.05472	.05584	.05696	.05807	.05917
4500	306.21	.04705	.04820	.04935	.05048	.05159	.05270	.05380	.05490	.05600	.05708	.05816
4600	313.01	.04633	.04745	.04857	.04967	.05077	.05185	.05293	.05401	.05508	.05614	.05719
4700	319.81	.04564	.04674	.04783	.04891	.04998	.05104	.05210	.05315	.05420	.05524	.05627
4800	326.62	.04499	.04605	.04712	.04818	.04923	.05026	.05130	.05233	.05336	.05438	.05539
4900	333.42	.04437	.04540	.04645	.04748	.04851	.04953	.05054	.05155	.05256	.05355	.05456
5000	340.23	.04374	.04478	.04580	.04682	.04782	.04882	.04981	.05080	.05179	.05277	.05376

NITROGEN

T-24

NITROGEN
ENTHALPY,BTU/LB

PRESSURE PSIA	TEMPERATURE					
	30	50	70	90	110	130
14.70	226.79	231.73	236.67	241.60	246.55	251.49
30.00	226.68	231.63	236.57	241.51	246.46	251.41
50.00	226.53	231.49	236.44	241.39	246.35	251.31
100.00	226.15	231.14	236.12	241.10	246.07	251.05
200.00	225.40	230.46	235.48	240.51	245.53	250.54
300.00	224.64	229.75	234.84	239.92	244.99	250.05
400.00	223.89	229.06	234.21	239.33	244.45	249.55
500.00	223.13	228.37	233.57	238.75	243.92	249.06
1000.00	219.47	225.06	230.55	236.00	241.42	246.77
2000.00	213.19	219.34	225.38	231.31	237.15	242.89
3000.00	209.15	215.61	221.93	228.11	234.21	240.19
4000.00	206.69	213.31	219.80	226.15	232.41	238.55
5000.00	205.46	212.14	218.71	225.14	231.50	237.73

NITROGEN
CV,BTU/LB F

PRESSURE PSIA	TEMPERATURE					
	30	50	70	90	110	130
14.70	.176	.176	.176	.176	.176	.176
30.00	.175	.175	.176	.175	.176	.176
50.00	.175	.175	.176	.175	.176	.176
100.00	.176	.176	.176	.176	.176	.175
200.00	.176	.176	.176	.176	.175	.176
300.00	.177	.176	.176	.176	.176	.177
400.00	.177	.177	.177	.177	.177	.177
500.00	.177	.177	.177	.177	.177	.177
1000.00	.179	.179	.179	.179	.179	.178
2000.00	.183	.182	.182	.182	.181	.181
3000.00	.186	.185	.184	.183	.183	.183
4000.00	.188	.187	.186	.185	.185	.185
5000.00	.191	.190	.188	.187	.187	.186

NITROGEN
ENTROPY,BTU/LB F

PRESSURE PSIA	TEMPERATURE					
	30	50	70	90	110	130
14.70	1.6075	1.6174	1.6268	1.6359	1.6447	1.6532
30.00	1.5775	1.5874	1.5969	1.6060	1.6149	1.6234
50.00	1.5384	1.5483	1.5578	1.5669	1.5758	1.5843
100.00	1.4744	1.4843	1.4939	1.5031	1.5120	1.5206
200.00	1.4261	1.4362	1.4459	1.4551	1.4641	1.4727
300.00	1.3953	1.4055	1.4153	1.4246	1.4337	1.4424
400.00	1.3691	1.3795	1.3894	1.3988	1.4080	1.4168
500.00	1.3527	1.3631	1.3731	1.3827	1.3919	1.4008
1000.00	1.2956	1.3068	1.3174	1.3274	1.3371	1.3463
2000.00	1.2341	1.2466	1.2581	1.2690	1.2794	1.2893
3000.00	1.1967	1.2096	1.2218	1.2332	1.2441	1.2543
4000.00	1.1701	1.1833	1.1958	1.2075	1.2187	1.2292
5000.00	1.1494	1.1628	1.1754	1.1872	1.1986	1.2093

NITROGEN
THERMAL CONDUCTIVITY,BTU/SEC FT F
(MULTIPLY TABLE ENTRY BY .0000010)

PRESSURE PSIA	TEMPERATURE					
	30	50	70	90	110	130
14.70	3.834	3.967	4.100	4.227	4.348	4.470
30.00	3.84	3.98	4.11	4.24	4.36	4.48
50.00	3.86	3.99	4.12	4.25	4.37	4.49
100.00	3.89	4.02	4.15	4.27	4.39	4.51
200.00	3.95	4.08	4.21	4.33	4.45	4.56
300.00	4.01	4.14	4.26	4.38	4.50	4.62
400.00	4.08	4.20	4.32	4.44	4.55	4.67
500.00	4.14	4.26	4.38	4.49	4.60	4.72
1000.00	4.48	4.58	4.68	4.78	4.88	4.98
2000.00	5.28	5.32	5.37	5.44	5.52	5.58
3000.00	6.17	6.14	6.14	6.17	6.23	6.23
4000.00	7.07	6.99	6.94	6.91	6.90	6.88
5000.00	7.93	7.81	7.72	7.66	7.58	7.54

NITROGEN
CP,BTU/LB F

PRESSURE PSIA	TEMPERATURE					
	30	50	70	90	110	130
14.70	.2469	.2469	.2470	.2471	.2472	.2473
30.00	.2473	.2473	.2474	.2475	.2475	.2476
50.00	.2479	.2479	.2479	.2479	.2479	.2480
100.00	.2493	.2492	.2491	.2491	.2490	.2490
200.00	.2524	.2521	.2517	.2514	.2512	.2510
300.00	.2557	.2550	.2544	.2539	.2534	.2530
400.00	.2590	.2580	.2571	.2563	.2556	.2550
500.00	.2624	.2610	.2598	.2587	.2577	.2569
1000.00	.2805	.2771	.2741	.2715	.2691	.2671
2000.00	.3114	.3051	.2995	.2945	.2896	.2854
3000.00	.3266	.3194	.3130	.3072	.3017	.2971
4000.00	.3350	.3279	.3214	.3155	.3100	.3052
5000.00	.3377	.3312	.3251	.3196	.3143	.3098

NITROGEN
PRANDTL NUMBER

PRESSURE PSIA	TEMPERATURE					
	30	50	70	90	110	130
14.70	.72	.72	.71	.71	.71	[illegible]
30.00	.72	.72	.71	.71	.71	.71
50.00	.72	.72	.71	.71	.71	.71
100.00	.72	.72	.71	.71	.71	.71
200.00	.73	.72	.72	.72	.72	.72
300.00	.73	.73	.72	.72	.72	.72
400.00	.73	.73	.72	.72	.72	.72
500.00	.74	.73	.73	.72	.72	.72
1000.00	.77	.76	.75	.75	.74	.74
2000.00	.83	.80	.79	.78	.76	.76
3000.00	.85	.83	.82	.80	.79	.78
4000.00	.86	.84	.83	.81	.80	.79
5000.00	.87	.85	.84	.82	.81	.80

NITROGEN
CP/CV

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.40	1.40	1.40	1.40	1.40	1.40
30.00	1.40	1.40	1.40	1.40	1.40	1.41
50.00	1.41	1.41	1.41	1.41	1.41	1.41
100.00	1.41	1.41	1.41	1.41	1.41	1.41
200.00	1.43	1.43	1.43	1.43	1.43	1.43
300.00	1.45	1.45	1.44	1.44	1.44	1.44
400.00	1.47	1.46	1.45	1.45	1.45	1.45
500.00	1.48	1.47	1.47	1.47	1.46	1.45
1000.00	1.56	1.55	1.53	1.52	1.51	1.50
2000.00	1.68	1.65	1.63	1.61	1.59	1.57
3000.00	1.75	1.73	1.70	1.68	1.65	1.63
4000.00	1.78	1.75	1.72	1.70	1.68	1.66
5000.00	1.77	1.75	1.73	1.71	1.69	1.67

NITROGEN
VISCOSITY,LB/FT SEC
(MULTIPLY TABLE ENTRY BY .00001000)

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.114	1.148	1.184	1.219	1.255	1.289
30.00	1.12	1.15	1.19	1.22	1.26	1.29
50.00	1.12	1.15	1.19	1.22	1.26	1.29
100.00	1.12	1.16	1.19	1.23	1.26	1.30
200.00	1.13	1.16	1.20	1.23	1.27	1.30
300.00	1.14	1.17	1.21	1.24	1.28	1.31
400.00	1.15	1.18	1.22	1.25	1.28	1.32
500.00	1.16	1.19	1.22	1.26	1.29	1.33
1000.00	1.22	1.25	1.28	1.31	1.34	1.37
2000.00	1.40	1.41	1.43	1.45	1.47	1.49
3000.00	1.60	1.60	1.60	1.61	1.62	1.63
4000.00	1.82	1.80	1.79	1.79	1.80	1.80
5000.00	2.04	2.00	1.98	1.97	1.96	1.95

NITROGEN
SONIC VELOCITY FT/SEC

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1103	1125	1147	1168	1189	1212
30.00	1104	1126	1148	1169	1190	1213
50.00	1105	1127	1149	1170	1191	1214
100.00	1106	1129	1151	1172	1194	1217
200.00	1110	1133	1155	1176	1199	1222
300.00	1114	1137	1159	1181	1204	1227
400.00	1117	1141	1163	1185	1209	1232
500.00	1121	1145	1168	1190	1214	1237
1000.00	1146	1171	1195	1218	1243	1266
2000.00	1212	1239	1265	1289	1311	1333
3000.00	1285	1312	1340	1363	1385	1405
4000.00	1376	1401	1425	1448	1470	1491
5000.00	1466	1490	1515	1536	1556	1576

CARBON DIOXIDE

CARBON DIOXIDE,DENSITY,LBS/CUBIC FT

DEPTH	PRESSURE		TEMPERATURES,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	.12393	.12140	.11897	.11663	.11439	.11224	.11016	.10818	.10624	.10438	.10259
10	19.14	1.30	.16175	.15842	.15523	.15217	.14923	.14648	.14364	.14109	.13854	.13611	.13377
20	23.58	1.60	.19974	.19560	.19163	.18783	.18418	.18087	.17730	.17408	.17093	.16792	.16502
30	28.03	1.91	.23788	.23292	.22817	.22362	.21925	.21535	.21152	.20714	.20340	.19980	.19634
40	32.47	2.21	.27619	.27039	.26445	.25953	.25443	.24953	.24483	.24031	.23595	.23177	.22773
50	36.92	2.51	.31467	.30802	.30144	.29557	.28973	.28412	.27874	.27357	.26859	.26381	.25920
60	41.36	2.81	.35332	.34580	.33841	.33174	.32515	.31893	.31270	.30642	.30132	.29593	.29074
70	45.81	3.12	.39214	.38376	.37571	.36804	.36068	.35383	.34687	.34037	.33412	.32813	.32235
80	50.25	3.42	.43114	.42183	.41245	.40446	.39634	.38955	.38148	.37391	.36702	.36040	.35404
90	54.70	3.72	.47031	.46009	.45074	.44183	.43212	.42354	.41540	.40754	.40002	.39276	.38583
100	59.14	4.02	.50965	.49850	.48747	.47772	.46802	.45873	.44942	.44127	.43307	.42520	.41764
110	63.58	4.33	.54914	.53706	.52556	.51455	.50404	.49390	.48348	.47511	.46622	.45772	.44955
120	68.03	4.63	.58889	.57583	.56339	.55153	.54019	.52935	.51847	.50912	.49947	.49032	.48154
130	72.47	4.93	.62879	.61474	.60137	.58863	.57680	.56463	.55370	.54313	.53280	.52300	.51360
140	76.92	5.23	.66887	.65382	.63951	.62547	.61288	.60044	.58854	.57713	.56622	.55577	.54574
150	81.36	5.54	.70914	.69318	.67788	.66328	.64947	.63615	.62349	.61130	.59974	.58842	.57796
160	85.81	5.84	.74961	.73250	.71625	.70079	.68605	.67198	.65854	.64567	.63334	.62155	.61025
170	90.25	6.14	.79027	.77210	.75484	.73846	.72266	.70794	.69370	.68007	.66703	.65456	.64263
180	94.70	6.44	.83112	.81188	.79362	.77626	.75977	.74401	.72897	.71459	.70091	.68767	.67508
190	99.14	6.75	.87218	.85183	.83255	.81424	.79682	.78021	.76435	.74919	.73469	.72085	.70761
200	103.58	7.05	.91344	.89190	.87164	.85236	.83401	.81652	.79985	.78391	.76866	.75412	.74021
210	108.03	7.35	.95490	.93229	.91091	.89062	.87133	.85296	.83545	.81872	.80273	.78748	.77291
220	112.47	7.65	.99657	.97280	.95033	.92903	.90878	.88952	.87117	.85363	.83689	.82092	.80567
230	116.92	7.96	1.03845	1.01350	.98992	.96759	.94634	.92621	.90699	.88865	.87113	.85444	.83852
240	121.36	8.26	1.08056	1.05439	1.02968	1.00631	.98412	.96303	.94294	.92378	.90548	.88867	.87145
250	125.81	8.56	1.12287	1.09567	1.06967	1.04518	1.02200	.99996	.97900	.95981	.93993	.92178	.90446
260	130.25	8.86	1.16540	1.13675	1.10974	1.08421	1.06002	1.03703	1.01518	.99435	.97447	.95558	.93756
270	134.69	9.17	1.20816	1.17823	1.15003	1.12340	1.09814	1.07423	1.05148	1.02979	1.00911	.98946	.97076
280	139.14	9.47	1.2511	1.2199	1.1905	1.1628	1.1364	1.1116	1.0879	1.0653	1.0438	1.0236	1.0048
290	143.58	9.77	1.2944	1.2610	1.2312	1.2023	1.1769	1.1490	1.1244	1.1018	1.0787	1.0575	1.0373
300	148.03	10.07	1.3378	1.3039	1.2720	1.2419	1.2135	1.1866	1.1611	1.1368	1.1136	1.0917	1.0708

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CARBON DIOXIDE

CARBON DIOXIDE,SPECIFIC VOLUME,CUBIC FT/LB

DEPTH	PRESSURE		TEMPERATURES,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	8.0889	8.2376	8.4057	8.5730	8.7419	8.9097	9.0775	9.2452	9.4128	9.5803	9.7475
10	19.14	1.30	6.1823	6.3126	6.4421	6.5710	6.7011	6.8305	6.9598	7.0890	7.2180	7.3469	7.4756
20	23.58	1.60	5.0048	5.1125	5.2193	5.3248	5.4295	5.5344	5.6401	5.7453	5.8506	5.9552	6.0599
30	28.03	1.91	4.2036	4.2933	4.3827	4.4720	4.5611	4.6501	4.7390	4.8277	4.9164	5.0049	5.0932
40	32.47	2.21	3.6177	3.6963	3.7748	3.8531	3.9304	4.0075	4.0845	4.1613	4.2381	4.3147	4.3910
50	36.92	2.51	3.1779	3.2465	3.3148	3.3833	3.4515	3.5199	3.5875	3.6556	3.7231	3.7906	3.8580
60	41.36	2.81	2.8303	2.8918	2.9532	3.0144	3.0755	3.1365	3.1974	3.2581	3.3188	3.3792	3.4395
70	45.81	3.12	2.5501	2.6059	2.6614	2.7171	2.7725	2.8276	2.8829	2.9380	2.9929	3.0476	3.1022
80	50.25	3.42	2.3184	2.3700	2.4216	2.4724	2.5231	2.5737	2.6241	2.6744	2.7246	2.7747	2.8245
90	54.70	3.72	2.1263	2.1735	2.2205	2.2674	2.3142	2.3608	2.4073	2.4537	2.5000	2.5461	2.5920
100	59.14	4.02	1.9621	2.0058	2.0497	2.0933	2.1367	2.1799	2.2231	2.2662	2.3091	2.3518	2.3944
110	63.58	4.33	1.8209	1.8619	1.9027	1.9434	1.9840	2.0246	2.0647	2.1048	2.1449	2.1847	2.2244
120	68.03	4.63	1.6981	1.7366	1.7750	1.8132	1.8512	1.8891	1.9266	1.9645	2.0021	2.0395	2.0767
130	72.47	4.93	1.5904	1.6267	1.6629	1.6989	1.7347	1.7704	1.8060	1.8415	1.8768	1.9120	1.9470
140	76.92	5.23	1.4951	1.5296	1.5637	1.5976	1.6317	1.6655	1.6991	1.7327	1.7661	1.7993	1.8324
150	81.36	5.54	1.4102	1.4428	1.4756	1.5077	1.5399	1.5720	1.6039	1.6357	1.6674	1.6990	1.7302
160	85.81	5.84	1.3340	1.3652	1.3962	1.4270	1.4576	1.4881	1.5185	1.5489	1.5789	1.6089	1.6387
170	90.25	6.14	1.2654	1.2952	1.3248	1.3542	1.3834	1.4125	1.4415	1.4704	1.4992	1.5277	1.5561
180	94.70	6.44	1.2032	1.2317	1.2600	1.2882	1.3162	1.3441	1.3718	1.3994	1.4269	1.4542	1.4813
190	99.14	6.75	1.1464	1.1739	1.2011	1.2281	1.2550	1.2817	1.3083	1.3349	1.3611	1.3873	1.4132
200	103.58	7.05	1.0946	1.1211	1.1473	1.1732	1.1990	1.2247	1.2502	1.2757	1.3010	1.3261	1.3510
210	108.03	7.35	1.0472	1.0726	1.0978	1.1229	1.1477	1.1726	1.1970	1.2216	1.2458	1.2699	1.2938
220	112.47	7.65	1.0034	1.0280	1.0523	1.0766	1.1006	1.1242	1.1479	1.1715	1.1949	1.2181	1.2412
230	116.92	7.96	.96297	.98665	1.01016	1.03350	1.05665	1.07967	1.10256	1.12530	1.14793	1.17034	1.19258
240	121.36	8.26	.92565	.94842	.97117	.99373	1.01613	1.03839	1.06051	1.08251	1.10438	1.12614	1.14751
250	125.81	8.56	.89057	.91285	.93496	.95677	.97867	1.00026	1.02165	1.04276	1.06391	1.08485	1.10563
260	130.25	8.86	.85817	.87974	.90131	.92233	.94336	.96426	.98505	1.00567	1.02628	1.04669	1.06688
270	134.70	9.17	.82778	.84973	.86996	.89015	.91060	.93090	.95106	.97107	.99097	1.01065	1.03016
280	139.14	9.47	.79927	.81973	.83964	.86003	.87990	.89963	.91921	.93867	.95799	.97718	.99602
290	143.58	9.77	.77256	.79253	.81226	.83176	.85118	.87038	.88934	.90827	.92705	.94562	.96401
300	148.03	10.07	.74749	.76695	.78617	.80519	.82404	.84272	.86127	.87969	.89797	.91603	.93391

CARBON DIOXIDE

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CARBON DIOXIDE
ENTHALPY,BTU/LB

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	81.67	85.65	89.67	93.76	97.87	102.05
30.00	81.14	85.16	89.22	93.34	97.49	101.70
50.00	80.44	84.52	88.63	92.80	96.99	101.23
100.00	78.69	82.92	87.17	91.44	95.74	100.07
200.00				88.33	92.95	97.53
300.00				84.94	89.99	94.85
400.00				81.55	87.02	92.10
500.00				78.15	84.06	89.51
1000.00						73.00
2000.00						
3000.00						
4000.00						
5000.00						

CARBON DIOXIDE
CV,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.1508	.1534	.1561	.1588	.1613	.1639
30.00	.1514	.1541	.1567	.1593	.1618	.1643
50.00	.1524	.1550	.1574	.1599	.1624	.1648
100.00	.1549	.1572	.1594	.1618	.1639	.1662
200.00				.167	.168	.169
300.00				.173	.173	.172
400.00				.180	.178	.175
500.00				.187	.183	.178
1000.00						.201
2000.00						
3000.00						
4000.00						
5000.00						

CARBON DIOXIDE
ENTROPY,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.1471	1.1487	1.1564	1.1639	1.1713	1.1785
30.00	1.1300	1.1327	1.1406	1.1482	1.1556	1.1628
50.00	1.1076	1.1119	1.1199	1.1275	1.1350	1.1423
100.00	1.0517	1.0599	1.0681	1.0760	1.0837	1.0911
200.00				1.0454	1.0538	1.0616
300.00				1.0267	1.0359	1.0442
400.00				1.0079	1.0180	1.0268
500.00				.9892	1.0001	1.0094
1000.00						.9527
2000.00						
3000.00						
4000.00						
5000.00						

CARBON DIOXIDE
THERMAL CONDUCTIVITY,BTU/SEC FT F
(MULTIPLY TABLE ENTRY BY .0000010)

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	2.324	2.459	2.595	2.732	2.870	3.008
30.00	2.34	2.48	2.61	2.75	2.88	3.02
50.00	2.37	2.50	2.63	2.76	2.90	3.04
100.00	2.42	2.55	2.68	2.81	2.95	3.08
200.00				2.91	3.04	3.17
300.00				3.00	3.12	3.25
400.00				3.10	3.22	3.34
500.00				3.23	3.33	3.45
1000.00						
2000.00						
3000.00						
4000.00						
5000.00						

CARBON DIOXIDE
CP,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.1973	.1997	.2023	.2048	.2073	.2098
30.00	.1997	.2019	.2042	.2065	.2088	.2111
50.00	.2020	.2047	.2067	.2087	.2107	.2128
100.00	.2107	.2117	.2128	.2142	.2156	.2171
200.00				.2324	.2304	.2288
300.00				.2564	.2493	.2424
400.00				.2804	.2682	.2570
500.00				.3044	.2871	.2718
1000.00						.4228
2000.00						
3000.00						
4000.00						
5000.00						

CARBON DIOXIDE
PRANDTL NUMBER

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.78	.77	.77	.77	.77	.77
30.00	.79	.78	.78	.77	.77	.77
50.00	.79	.79	.78	.78	.78	.78
100.00	.81	.80	.80	.79	.79	.79
200.00				.84	.83	.82
300.00				.92	.89	.86
400.00				.99	.94	.90
500.00				1.06	.99	.93
1000.00						
2000.00						
3000.00						
4000.00						
5000.00						

CARBON DIOXIDE
CP/CV

PRESSURE PSIA	30	50	70	90	110	130
14.70	1.310	1.302	1.296	1.291	1.286	1.281
30.00	1.319	1.310	1.303	1.297	1.291	1.285
50.00	1.331	1.321	1.313	1.305	1.296	1.291
100.00	1.361	1.347	1.335	1.325	1.315	1.307
200.00				1.39	1.37	1.35
300.00				1.46	1.43	1.41
400.00				1.54	1.50	1.46
500.00				1.62	1.56	1.52
1000.00						2.08
2000.00						
3000.00						
4000.00						
5000.00						

CARBON DIOXIDE
VISCOSITY,LB/FT SEC
(MULTIPLY TABLE ENTRY BY .0000100)

PRESSURE PSIA	30	50	70	90	110	130
14.70	.917	.956	.991	1.027	1.066	1.104
30.00	.920	.957	.993	1.029	1.068	1.106
50.00	.924	.960	.996	1.032	1.072	1.109
100.00	.934	.969	1.005	1.040	1.079	1.117
200.00				1.057	1.095	1.132
300.00				1.075	1.111	1.147
400.00				1.095	1.131	1.165
500.00				1.120	1.153	1.185
1000.00						
2000.00						
3000.00						
4000.00						
5000.00						

CARBON DIOXIDE
SONIC VELOCITY FT/SEC

PRESSURE PSIA	30	50	70	90	110	130
14.70	842	857	873	887	902	916
30.00	838	854	870	885	899	914
50.00	833	850	866	881	896	911
100.00	822	840	857	873	889	905
200.00				854	873	891
300.00				832	857	878
400.00				810	840	865
500.00				784	824	851
1000.00						766
2000.00						
3000.00						
4000.00						
5000.00						

DENSITY
60% O_2, 40% He

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DENSITY,LBS/CUBIC FT

.600 OXYGEN .400 HELIUM AVERAGE MOLECULAR WEIGHT 20.801

DEPTH	PRESSURE		TEMPERATURE,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	.05817	.05700	.05588	.05481	.05377	.05277	.05181	.05089	.04999	.04913	.04830
10	19.14	1.30	.07576	.07424	.07278	.07138	.07003	.06873	.06748	.06627	.06511	.06398	.06290
20	23.58	1.60	.09335	.09148	.08968	.08795	.08629	.08469	.08314	.08166	.08022	.07883	.07750
30	28.03	1.91	.11094	.10871	.10658	.10452	.10254	.10064	.09881	.09704	.09533	.09368	.09209
40	32.47	2.21	.12853	.12595	.12347	.12109	.11880	.11659	.11446	.11242	.11044	.10853	.10669
50	36.92	2.51	.14612	.14318	.14037	.13766	.13505	.13254	.13012	.12779	.12555	.12338	.12128
60	41.36	2.81	.16370	.16042	.15726	.15422	.15130	.14849	.14578	.14317	.14065	.13822	.13587
70	45.81	3.12	.18129	.17765	.17415	.17079	.16755	.16444	.16144	.15854	.15576	.15306	.15046
80	50.25	3.42	.19888	.19488	.19106	.18735	.18380	.18038	.17709	.17392	.17085	.16790	.16505
90	54.70	3.72	.21646	.21211	.20793	.20391	.20005	.19632	.19274	.18929	.18596	.18274	.17963
100	59.14	4.02	.23405	.22934	.22482	.22047	.21629	.21227	.20839	.20465	.20105	.19757	.19421
110	63.58	4.33	.25164	.24657	.24171	.23703	.23254	.22821	.22404	.22002	.21615	.21241	.20879
120	68.03	4.63	.26922	.26380	.25859	.25359	.24879	.24415	.23968	.23539	.23124	.22724	.22337
130	72.47	4.93	.28681	.28103	.27548	.27015	.26502	.26009	.25533	.25075	.24633	.24206	.23795
140	76.92	5.23	.30439	.29825	.29236	.28673	.28126	.27602	.27097	.26611	.26142	.25689	.25252
150	81.36	5.54	.32197	.31548	.30925	.30326	.29750	.29196	.28662	.28147	.27651	.27172	.26709
160	85.81	5.84	.33955	.33270	.32612	.31981	.31374	.30789	.30226	.29682	.29159	.28654	.28166
170	90.25	6.14	.35713	.34993	.34301	.33636	.32997	.32382	.31789	.31218	.30668	.30136	.29623
180	94.70	6.44	.37471	.36715	.35989	.35291	.34620	.33975	.33353	.32754	.32175	.31618	.31079
190	99.14	6.75	.39229	.38437	.37676	.36946	.36243	.35568	.34916	.34288	.33686	.33099	.32535
200	103.58	7.05	.40987	.40159	.39364	.38600	.37867	.37160	.36479	.35824	.35191	.34581	.33992
210	108.03	7.35	.42746	.41881	.41052	.40256	.39489	.38752	.38042	.37359	.36699	.36062	.35448
220	112.47	7.65	.44502	.43603	.42740	.41910	.41112	.40345	.39605	.38893	.38206	.37543	.36903
230	116.92	7.96	.46260	.45325	.44426	.43563	.42734	.41937	.41168	.40427	.39714	.39024	.38358
240	121.36	8.26	.48018	.47047	.46114	.45218	.44356	.43529	.42730	.41962	.41220	.40505	.39813
250	125.81	8.56	.49775	.48768	.47801	.46872	.45979	.45120	.44292	.43495	.42727	.41985	.41268
260	130.25	8.86	.51532	.50489	.49487	.48526	.47601	.46712	.45855	.45029	.44233	.43465	.42726
270	134.69	9.17	.53290	.52210	.51175	.50179	.49223	.48303	.47417	.46562	.45740	.44945	.44178
280	139.14	9.47	.55047	.53931	.52861	.51832	.50844	.49894	.48978	.48096	.47246	.46424	.45632
290	143.58	9.77	.56804	.55652	.54549	.53487	.52466	.51484	.50539	.49630	.48751	.47905	.47086
300	148.03	10.07	.58561	.57374	.56235	.55139	.54087	.53075	.52101	.51162	.50257	.49384	.48540
310	152.47	10.38	.60319	.59095	.57920	.56793	.55709	.54666	.53663	.52695	.51762	.50862	.49993
320	156.92	10.68	.62076	.60816	.59607	.58446	.57330	.56256	.55222	.54227	.53268	.52341	.51448
330	161.36	10.98	.63832	.62536	.61293	.60098	.58951	.57846	.56783	.55760	.54773	.53821	.52901
340	165.81	11.28	.65588	.64257	.62978	.61752	.60571	.59437	.58344	.57291	.56278	.55299	.54354
350	170.25	11.58	.67345	.65976	.64665	.63404	.62192	.61027	.59905	.58824	.57782	.56776	.55806
360	174.69	11.89	.69101	.67697	.66349	.65055	.63812	.62616	.61464	.60355	.59286	.58254	.57259
370	179.14	12.19	.70857	.69417	.68035	.66709	.65432	.64206	.63025	.61887	.60791	.59733	.58711
380	183.58	12.49	.72615	.71137	.69720	.68360	.67052	.65795	.64585	.63419	.62294	.61210	.60163
390	188.03	12.79	.74371	.72858	.71406	.70011	.68673	.67385	.66143	.64949	.63799	.62687	.61614
400	192.47	13.10	.76127	.74578	.73092	.71664	.70293	.68974	.67703	.66481	.65302	.64164	.63067
410	196.92	13.40	.77883	.76298	.74775	.73315	.71912	.70561	.69263	.68011	.66805	.65642	.64519
420	201.36	13.70	.79639	.78016	.76461	.74966	.73531	.72150	.70822	.69542	.68309	.67118	.65970
430	205.81	14.00	.81394	.79736	.78145	.76617	.75150	.73739	.72380	.71072	.69811	.68594	.67420
440	210.25	14.31	.83150	.81456	.79830	.78269	.76769	.75327	.73939	.72603	.71313	.70070	.68871
450	214.69	14.61	.84905	.83175	.81513	.79920	.78388	.76915	.75498	.74132	.72817	.71548	.70321
460	219.14	14.91	.86661	.84893	.83199	.81570	.80007	.78503	.77055	.75662	.74318	.73023	.71771
470	223.58	15.21	.88418	.86612	.84882	.83222	.81625	.80091	.78614	.77191	.75820	.74498	.73221
480	228.03	15.52	.90173	.88332	.86567	.84872	.83243	.81677	.80172	.78721	.77323	.75973	.74671
490	232.47	15.82	.91928	.90051	.88249	.86521	.84861	.83265	.81728	.80249	.78824	.77448	.76120
500	236.92	16.12	.93683	.91770	.89936	.88171	.86479	.84852	.83286	.81779	.80324	.78924	.77569
510	241.36	16.42	.95438	.93487	.91616	.89823	.88097	.86439	.84842	.83307	.81827	.80398	.79018
520	245.80	16.73	.97193	.95206	.93301	.91472	.89714	.88026	.86400	.84836	.83327	.81873	.80469
530	250.25	17.03	.98948	.96924	.94983	.93121	.91332	.89611	.87958	.86363	.84827	.83346	.81918
540	254.69	17.33	1.00703	.98641	.96667	.94770	.92949	.91198	.89513	.87892	.86329	.84820	.83366
550	259.14	17.63	1.02457	1.00359	.98349	.96418	.94566	.92784	.91070	.89419	.87829	.86293	.84814
560	263.58	17.94	1.04212	1.02078	1.00033	.98069	.96183	.94371	.92627	.90946	.89328	.87749	.86262
570	268.03	18.24	1.05966	1.03796	1.01714	.99718	.97799	.95957	.94181	.92476	.90830	.89242	.87710
580	272.47	18.54	1.07720	1.05517	1.03396	1.01366	.99416	.97540	.95738	.94000	.92328	.90714	.89157
590	276.92	18.84	1.09475	1.07230	1.05079	1.03014	1.01032	.99126	.97292	.95529	.93827	.92187	.90604
600	281.36	19.15	1.11229	1.08948	1.06760	1.04662	1.02648	1.00712	.98848	.97054	.95326	.93659	.92051
610	285.80	19.45	1.12983	1.10664	1.08444	1.06312	1.04264	1.02297	1.00405	.98582	.96826	.95131	.93498
620	290.25	19.75	1.14737	1.12381	1.10126	1.07960	1.05880	1.03880	1.01958	1.00107	.98326	.96605	.94945
630	294.69	20.05	1.16488	1.14099	1.11805	1.09607	1.07496	1.05465	1.03514	1.01632	.99822	.98077	.96391
640	299.14	20.36	1.18241	1.15814	1.13488	1.11255	1.09111	1.07050	1.05067	1.03160	1.01322	.99549	.97837
650	303.58	20.66	1.19995	1.17532	1.15164	1.12902	1.10726	1.08635	1.06622	1.04684	1.02820	1.01019	.99283
660	308.03	20.96	1.2175	1.1925	1.1685	1.1455	1.1234	1.1022	1.0817	1.0621	1.0432	1.0249	1.0073
670	312.47	21.26	1.2350	1.2096	1.1853	1.1620	1.1396	1.1180	1.0973	1.0774	1.0581	1.0396	1.0217
680	316.92	21.56	1.2526	1.2268	1.2021	1.1784	1.1557	1.1339	1.1128	1.0926	1.0731	1.0543	1.0362
690	321.36	21.87	1.2701	1.2439	1.2189	1.1949	1.1719	1.1497	1.1284	1.1079	1.0881	1.0690	1.0506
700	325.80	22.17	1.2876	1.2611	1.2357	1.2114	1.1880	1.1655	1.1439	1.1231	1.1031	1.0837	1.0651
710	330.25	22.47	1.3051	1.2783	1.2525	1.2278	1.2041	1.1813	1.1594	1.1383	1.1180	1.0984	1.0795
720	334.69	22.77	1.3227	1.2954	1.2693	1.2443	1.2203	1.1972	1.1750	1.1536	1.1330	1.1131	1.0940
730	339.14	23.08	1.3402	1.3126	1.2861	1.2608	1.2364	1.2130	1.1905	1.1688	1.1480	1.1278	1.1084
740	343.58	23.38	1.3577	1.3297	1.3029	1.2772	1.2525	1.2288	1.2060	1.1841	1.1629	1.1425	1.1228
750	348.03	23.68	1.3752	1.3469	1.3197	1.2937	1.2687	1.2446	1.2215	1.1993	1.1779	1.1572	1.1373
760	352.47	23.98	1.3927	1.3640	1.3365	1.3101	1.2848	1.2604	1.2371	1.2145	1.1928	1.1719	1.1517
770	356.91	24.29	1.4103	1.3812	1.3533	1.3266	1.3009	1.2763	1.2526	1.2298	1.2078	1.1866	1.1661
780	361.36	24.59	1.4278	1.3983	1.3701	1.3430	1.3170	1.2921	1.2681	1.2450	1.2227	1.2013	1.1805
790	365.80	24.89	1.4453	1.4155	1.3869	1.3595	1.3332	1.3079	1.2836	1.2602	1.2377	1.2159	1.1950

T-33

DENSITY

60 % O_2, 40 % He

DENSITY,LBS/CUBIC FT

.600 OXYGEN .400 HELIUM AVERAGE MOLECULAR WEIGHT 20.801

DEPTH	PRESSURE		TEMPERATURE,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
800	370.25	25.19	1.4628	1.4326	1.4037	1.3759	1.3493	1.3237	1.2991	1.2754	1.2526	1.2308	1.2094
810	374.69	25.50	1.4803	1.4497	1.4204	1.3924	1.3654	1.3395	1.3146	1.2906	1.2675	1.2453	1.2238
820	379.14	25.80	1.4978	1.4669	1.4373	1.4088	1.3815	1.3553	1.3301	1.3058	1.2825	1.2600	1.2382
830	383.58	26.10	1.5154	1.4840	1.4540	1.4253	1.3976	1.3711	1.3456	1.3211	1.2974	1.2746	1.2527
840	388.03	26.40	1.5328	1.5012	1.4708	1.4417	1.4137	1.3869	1.3611	1.3363	1.3124	1.2893	1.2671
850	392.47	26.71	1.5504	1.5183	1.4876	1.4581	1.4299	1.4027	1.3766	1.3515	1.3273	1.3040	1.2815
860	396.91	27.01	1.5679	1.5354	1.5044	1.4746	1.4460	1.4185	1.3921	1.3667	1.3422	1.3186	1.2959
870	401.36	27.31	1.5854	1.5526	1.5211	1.4910	1.4621	1.4343	1.4076	1.3819	1.3572	1.3333	1.3103
880	405.80	27.61	1.6029	1.5697	1.5379	1.5074	1.4782	1.4501	1.4231	1.3971	1.3721	1.3479	1.3247
890	410.25	27.92	1.6204	1.5868	1.5547	1.5239	1.4943	1.4659	1.4386	1.4123	1.3870	1.3626	1.3391
900	414.69	28.22	1.6379	1.6040	1.5714	1.5403	1.5104	1.4817	1.4541	1.4275	1.4019	1.3773	1.3535
910	419.14	28.52	1.6554	1.6211	1.5882	1.5567	1.5265	1.4975	1.4695	1.4427	1.4169	1.3919	1.3679
920	423.58	28.82	1.6729	1.6382	1.6050	1.5732	1.5426	1.5132	1.4850	1.4579	1.4318	1.4066	1.3823
930	428.03	29.13	1.6904	1.6553	1.6217	1.5896	1.5587	1.5290	1.5005	1.4731	1.4467	1.4212	1.3967
940	432.47	29.43	1.7079	1.6724	1.6385	1.6060	1.5748	1.5448	1.5160	1.4883	1.4616	1.4359	1.4111
950	436.91	29.73	1.7253	1.6896	1.6552	1.6224	1.5909	1.5606	1.5315	1.5035	1.4765	1.4505	1.4255
960	441.36	30.03	1.7428	1.7067	1.6720	1.6388	1.6069	1.5764	1.5469	1.5186	1.4914	1.4651	1.4398
970	445.80	30.33	1.7603	1.7238	1.6888	1.6552	1.6230	1.5921	1.5624	1.5338	1.5063	1.4798	1.4542
980	450.25	30.64	1.7778	1.7409	1.7055	1.6716	1.6391	1.6079	1.5779	1.5490	1.5212	1.4944	1.4686
990	454.69	30.94	1.7953	1.7580	1.7223	1.6880	1.6552	1.6236	1.5934	1.5642	1.5361	1.5090	1.4829
1000	459.14	31.24	1.8128	1.7751	1.7390	1.7044	1.6713	1.6394	1.6088	1.5794	1.5510	1.5237	1.4973
1050	481.36	32.75	1.9002	1.8606	1.8228	1.7865	1.7516	1.7182	1.6861	1.6552	1.6255	1.5968	1.5691
1100	503.58	34.27	1.9876	1.9461	1.9066	1.8686	1.8319	1.7970	1.7633	1.7310	1.6998	1.6699	1.6409
1150	525.80	35.78	2.0749	2.0315	1.9900	1.9503	1.9122	1.8756	1.8405	1.8067	1.7742	1.7428	1.7126
1200	548.02	37.29	2.1621	2.1169	2.0736	2.0321	1.9924	1.9542	1.9176	1.8823	1.8484	1.8157	1.7842
1250	570.25	38.80	2.2493	2.2022	2.1571	2.1139	2.0725	2.0328	1.9946	1.9579	1.9226	1.8886	1.8558
1300	592.47	40.31	2.3365	2.2875	2.2406	2.1957	2.1526	2.1113	2.0716	2.0334	1.9968	1.9614	1.9273
1350	614.69	41.83	2.4237	2.3727	2.3240	2.2773	2.2326	2.1897	2.1485	2.1089	2.0709	2.0341	1.9987
1400	636.91	43.34	2.5107	2.4579	2.4073	2.3590	2.3126	2.2681	2.2254	2.1843	2.1448	2.1068	2.0701
1450	659.13	44.85	2.5978	2.5430	2.4906	2.4405	2.3924	2.3464	2.3022	2.2597	2.2188	2.1794	2.1414
1500	681.36	46.36	2.6847	2.6281	2.5738	2.5220	2.4723	2.4246	2.3789	2.3349	2.2926	2.2519	2.2126
	500	34.02	1.9735	1.9323	1.8930	1.8552	1.8190	1.7843	1.7509	1.7188	1.6879	1.6581	1.6294
	600	40.83	2.3661	2.3164	2.2689	2.2234	2.1797	2.1379	2.0977	2.0590	2.0219	1.9861	1.9515
	700	47.63	2.7577	2.6994	2.6437	2.5903	2.5393	2.4903	2.4432	2.3980	2.3546	2.3127	2.2724
	800	54.44	3.1482	3.0812	3.0172	2.9560	2.8974	2.8413	2.7874	2.7356	2.6859	2.6380	2.5918
	900	61.24	3.5375	3.4618	3.3895	3.3204	3.2543	3.1909	3.1302	3.0718	3.0158	2.9618	2.9098
	1000	68.05	3.9256	3.8410	3.7604	3.6833	3.6097	3.5391	3.4716	3.4066	3.3442	3.2841	3.2263
	1100	74.85	4.3122	4.2189	4.1299	4.0449	3.9636	3.8858	3.8113	3.7397	3.6711	3.6050	3.5414
	1200	81.65	4.6973	4.5952	4.4978	4.4049	4.3160	4.2310	4.1495	4.0714	3.9965	3.9244	3.8549
	1300	88.46	5.0808	4.9699	4.8640	4.7631	4.6664	4.5745	4.4861	4.4014	4.3203	4.2420	4.1669
	1400	95.26	5.4626	5.3428	5.2284	5.1197	5.0157	4.9163	4.8210	4.7299	4.6424	4.5582	4.4772
	1500	102.07	5.8427	5.7139	5.5914	5.4745	5.3631	5.2564	5.1543	5.0566	4.9629	4.8727	4.7859
	1600	108.87	6.2208	6.0833	5.9526	5.8275	5.7085	5.5948	5.4859	5.3815	5.2817	5.1855	5.0931
	1700	115.68	6.5972	6.4507	6.3115	6.1788	6.0522	5.9313	5.8155	5.7048	5.5988	5.4966	5.3985
	1800	122.48	6.9714	6.8162	6.6686	6.5281	6.3940	6.2660	6.1436	6.0263	5.9140	5.8061	5.7022
	1900	129.29	7.3435	7.1798	7.0238	6.8753	6.7338	6.5988	6.4696	6.3459	6.2276	6.1137	6.0042
	2000	136.09	7.7136	7.5411	7.3769	7.2206	7.0717	6.9296	6.7937	6.6638	6.5394	6.4196	6.3045
	2100	142.90	8.0815	7.9082	7.7279	7.5640	7.4077	7.2587	7.1160	6.9797	6.8492	6.7238	6.6031
	2200	149.70	8.4471	8.2573	8.0769	7.9052	7.7416	7.5855	7.4365	7.2939	7.1574	7.0262	6.8999
	2300	156.51	8.8105	8.6121	8.4235	8.2443	8.0736	7.9106	7.7548	7.6059	7.4636	7.3265	7.1951
	2400	163.31	9.1714	8.9645	8.7680	8.5813	8.4032	8.2335	8.0713	7.9163	7.7680	7.6253	7.4881
	2500	170.11	9.5299	9.3147	9.1104	8.9160	8.7308	8.5544	8.3857	8.2248	8.0704	7.9221	7.7796
	2600	176.92	9.8862	9.6627	9.4503	9.2485	9.0564	8.8735	8.6982	8.5308	8.3711	8.2173	8.0695
	2700	183.72	10.2398	10.0082	9.7893	9.5790	9.3799	9.1900	9.0085	8.8352	8.6698	8.5106	8.3571
	2800	190.53	10.5911	10.3515	10.1234	9.9071	9.7012	9.5049	9.3172	9.1380	8.9665	8.8010	8.6432
	2900	197.33	10.9396	10.6918	10.4570	10.2329	10.0203	9.8176	9.6237	9.4382	9.2616	9.0911	8.9277
	3000	204.14	11.2858	11.0303	10.7876	10.5569	10.3371	10.1281	9.9276	9.7368	9.5546	9.3787	9.2102
	3100	210.94	11.6296	11.3663	11.1143	10.8781	10.6517	10.4363	10.2304	10.0333	9.8456	9.6643	9.4907
	3200	217.75	11.9708	11.6999	11.4420	11.1975	10.9645	10.7426	10.5304	10.3281	10.1344	9.9484	9.7696
	3300	224.55	12.309	12.030	11.766	11.514	11.275	11.047	10.829	10.621	10.422	10.230	10.047
	3400	231.36	12.646	12.359	12.087	11.829	11.583	11.349	11.125	10.911	10.707	10.511	10.322
	3500	238.16	12.979	12.685	12.406	12.141	11.889	11.648	11.419	11.200	10.991	10.789	10.595
	3600	244.96	13.309	13.009	12.723	12.451	12.193	11.946	11.711	11.487	11.272	11.065	10.867
	3700	251.77	13.638	13.330	13.037	12.759	12.494	12.242	12.001	11.771	11.551	11.340	11.137
	3800	258.57	13.963	13.648	13.348	13.064	12.794	12.535	12.289	12.054	11.829	11.613	11.405
	3900	265.38	14.286	13.964	13.658	13.367	13.090	12.827	12.575	12.334	12.105	11.883	11.671
	4000	272.18	14.607	14.278	13.965	13.668	13.386	13.116	12.859	12.613	12.378	12.152	11.935
	4100	278.99	14.925	14.589	14.270	13.967	13.678	13.404	13.141	12.890	12.651	12.420	12.198
	4200	285.79	15.240	14.897	14.572	14.263	13.969	13.689	13.420	13.165	12.920	12.685	12.459
	4300	292.60	15.553	15.204	14.872	14.557	14.257	13.972	13.698	13.438	13.189	12.949	12.718
	4400	299.40	15.863	15.508	15.170	14.848	14.544	14.253	13.974	13.709	13.455	13.211	12.976
	4500	306.21	16.171	15.809	15.466	15.139	14.828	14.532	14.248	13.978	13.720	13.470	13.231
	4600	313.01	16.476	16.108	15.759	15.426	15.110	14.808	14.520	14.245	13.982	13.728	13.485
	4700	319.81	16.779	16.405	16.050	15.712	15.390	15.083	14.790	14.510	14.243	13.985	13.737
	4800	326.62	17.079	16.699	16.338	15.995	15.668	15.356	15.058	14.774	14.502	14.240	13.988
	4900	333.42	17.377	16.991	16.624	16.276	15.944	15.627	15.324	15.035	14.759	14.493	14.237
	5000	340.23	17.672	17.281	16.908	16.554	16.218	15.896	15.590	15.295	15.015	14.744	14.484

SP. VOL.
60 % O_2, 40 % He

T-34

SPECIFIC VOLUME,CUBIC FT/LB

.600 OXYGEN .400 HELIUM AVERAGE MOLECULAR WEIGHT 20.801

DEPTH	PRESSURE		TEMPERATURE,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	17.191	17.542	17.894	18.246	18.597	18.949	19.300	19.652	20.003	20.355	20.706
10	19.14	1.30	13.200	13.469	13.739	14.009	14.279	14.549	14.819	15.089	15.359	15.629	15.899
20	23.58	1.60	10.712	10.932	11.151	11.370	11.589	11.808	12.027	12.247	12.466	12.685	12.904
30	28.03	1.91	9.0139	9.1984	9.3830	9.5674	9.7520	9.9364	10.1208	10.3055	10.4899	10.6743	10.8585
40	32.47	2.21	7.7802	7.9397	8.0991	8.2584	8.4178	8.5769	8.7363	8.8955	9.0547	9.2139	9.3731
50	36.92	2.51	6.8438	6.9841	7.1242	7.2644	7.4046	7.5448	7.6850	7.8250	7.9651	8.1053	8.2454
60	41.36	2.81	6.1086	6.2338	6.3589	6.4842	6.6093	6.7345	6.8596	6.9846	7.1098	7.2348	7.3600
70	45.81	3.12	5.5159	5.6291	5.7421	5.8552	5.9684	6.0814	6.1944	6.3074	6.4203	6.5333	6.6462
80	50.25	3.42	5.0282	5.1313	5.2345	5.3376	5.4406	5.5438	5.6468	5.7499	5.8529	5.9560	6.0589
90	54.70	3.72	4.6197	4.7144	4.8093	4.9040	4.9988	5.0936	5.1883	5.2829	5.3776	5.4723	5.5670
100	59.14	4.02	4.2725	4.3603	4.4480	4.5357	4.6234	4.7111	4.7986	4.8863	4.9739	5.0615	5.1490
110	63.58	4.33	3.9740	4.0556	4.1372	4.2188	4.3003	4.3820	4.4634	4.5450	4.6265	4.7079	4.7894
120	68.03	4.63	3.7145	3.7907	3.8671	3.9434	4.0196	4.0958	4.1722	4.2483	4.3245	4.4007	4.4768
130	72.47	4.93	3.4867	3.5584	3.6301	3.7017	3.7733	3.8448	3.9165	3.9881	4.0596	4.1311	4.2026
140	76.92	5.23	3.2853	3.3528	3.4204	3.4880	3.5555	3.6229	3.6904	3.7578	3.8253	3.8926	3.9601
150	81.36	5.54	3.1059	3.1698	3.2336	3.2975	3.3613	3.4252	3.4890	3.5528	3.6165	3.6803	3.7440
160	85.81	5.84	2.9451	3.0057	3.0663	3.1269	3.1874	3.2479	3.3085	3.3690	3.4295	3.4849	3.5503
170	90.25	6.14	2.8001	2.8577	2.9154	2.9730	3.0306	3.0881	3.1457	3.2033	3.2608	3.3183	3.3758
180	94.70	6.44	2.6687	2.7237	2.7786	2.8336	2.8885	2.9434	2.9982	3.0531	3.1080	3.1628	3.2176
190	99.14	6.75	2.5491	2.6016	2.6542	2.7066	2.7592	2.8116	2.8640	2.9164	2.9688	3.0212	3.0736
200	103.58	7.05	2.4398	2.4901	2.5404	2.5906	2.6408	2.6911	2.7413	2.7915	2.8416	2.8917	2.9419
210	108.03	7.35	2.3395	2.3877	2.4359	2.4841	2.5323	2.5805	2.6286	2.6768	2.7249	2.7730	2.8211
220	112.47	7.65	2.2471	2.2934	2.3397	2.3861	2.4324	2.4786	2.5249	2.5712	2.6174	2.6636	2.7098
230	116.92	7.96	2.1617	2.2063	2.2509	2.2955	2.3401	2.3845	2.4291	2.4736	2.5180	2.5625	2.6070
240	121.36	8.26	2.0826	2.1255	2.1685	2.2115	2.2545	2.2973	2.3403	2.3831	2.4260	2.4689	2.5117
250	125.81	8.56	2.0091	2.0505	2.0920	2.1335	2.1749	2.2163	2.2577	2.2991	2.3404	2.3818	2.4232
260	130.25	8.86	1.9405	1.9806	2.0207	2.0607	2.1008	2.1408	2.1808	2.2208	2.2607	2.3007	2.3406
270	134.69	9.17	1.8765	1.9153	1.9541	1.9929	2.0316	2.0703	2.1090	2.1477	2.1863	2.2249	2.2636
280	139.14	9.47	1.8166	1.8542	1.8918	1.9293	1.9668	2.0042	2.0417	2.0792	2.1166	2.1540	2.1914
290	143.58	9.77	1.7604	1.7969	1.8333	1.8696	1.9060	1.9423	1.9787	2.0149	2.0512	2.0875	2.1238
300	148.03	10.07	1.7076	1.7430	1.7783	1.8136	1.8489	1.8841	1.9193	1.9546	1.9898	2.0250	2.0602
310	152.47	10.38	1.6579	1.6922	1.7265	1.7608	1.7950	1.8293	1.8635	1.8977	1.9319	1.9661	2.0003
320	156.92	10.68	1.6109	1.6443	1.6777	1.7110	1.7443	1.7776	1.8109	1.8441	1.8773	1.9105	1.9437
330	161.36	10.98	1.5666	1.5991	1.6315	1.6639	1.6963	1.7287	1.7611	1.7934	1.8257	1.8580	1.8903
340	165.81	11.28	1.5247	1.5562	1.5879	1.6194	1.6509	1.6825	1.7140	1.7455	1.7769	1.8084	1.8398
350	170.25	11.58	1.4849	1.5157	1.5464	1.5772	1.6079	1.6386	1.6693	1.7000	1.7306	1.7613	1.7919
360	174.69	11.89	1.4472	1.4772	1.5072	1.5372	1.5671	1.5970	1.6270	1.6569	1.6867	1.7166	1.7465
370	179.14	12.19	1.4113	1.4406	1.4698	1.4991	1.5283	1.5575	1.5867	1.6158	1.6450	1.6741	1.7033
380	183.58	12.49	1.3771	1.4057	1.4343	1.4628	1.4914	1.5199	1.5483	1.5768	1.6053	1.6337	1.6622
390	188.03	12.79	1.3446	1.3725	1.4004	1.4283	1.4562	1.4840	1.5119	1.5397	1.5674	1.5952	1.6230
400	192.47	13.10	1.3136	1.3409	1.3681	1.3954	1.4226	1.4498	1.4770	1.5042	1.5313	1.5585	1.5856
410	196.92	13.40	1.2840	1.3107	1.3373	1.3640	1.3906	1.4172	1.4438	1.4704	1.4969	1.5234	1.5499
420	201.36	13.70	1.2557	1.2818	1.3079	1.3339	1.3600	1.3860	1.4120	1.4380	1.4639	1.4899	1.5159
430	205.81	14.00	1.2286	1.2541	1.2797	1.3052	1.3307	1.3561	1.3816	1.4070	1.4324	1.4578	1.4832
440	210.25	14.31	1.2026	1.2277	1.2527	1.2776	1.3026	1.3275	1.3525	1.3774	1.4023	1.4271	1.4520
450	214.69	14.61	1.1778	1.2023	1.2268	1.2513	1.2757	1.3001	1.3245	1.3490	1.3733	1.3977	1.4220
460	219.14	14.91	1.1539	1.1780	1.2019	1.2259	1.2499	1.2738	1.2978	1.3217	1.3456	1.3694	1.3933
470	223.58	15.21	1.1310	1.1546	1.1781	1.2016	1.2251	1.2486	1.2720	1.2955	1.3189	1.3423	1.3657
480	228.03	15.52	1.1090	1.1321	1.1552	1.1782	1.2013	1.2243	1.2473	1.2703	1.2933	1.3163	1.3392
490	232.47	15.82	1.0878	1.1105	1.1332	1.1558	1.1784	1.2010	1.2236	1.2461	1.2687	1.2912	1.3137
500	236.92	16.12	1.0674	1.0897	1.1119	1.1342	1.1564	1.1785	1.2007	1.2228	1.2450	1.2670	1.2892
510	241.36	16.42	1.0478	1.0697	1.0915	1.1133	1.1351	1.1569	1.1787	1.2004	1.2221	1.2438	1.2655
520	245.80	16.73	1.0289	1.0504	1.0718	1.0932	1.1147	1.1360	1.1574	1.1787	1.2001	1.2214	1.2427
530	250.25	17.03	1.0106	1.0317	1.0528	1.0739	1.0949	1.1159	1.1369	1.1579	1.1789	1.1998	1.2207
540	254.69	17.33	.99302	1.01378	1.03448	1.05519	1.07586	1.09652	1.11716	1.13775	1.15836	1.17897	1.19953
550	259.14	17.63	.97602	.99642	1.01679	1.03715	1.05747	1.07777	1.09806	1.11833	1.13858	1.15884	1.17905
560	263.58	17.94	.95958	.97964	.99967	1.01969	1.03969	1.05965	1.07960	1.09956	1.11947	1.13936	1.15926
570	268.03	18.24	.94370	.96342	.98314	1.00283	1.02250	1.04214	1.06178	1.08138	1.10096	1.12055	1.14012
580	272.47	18.54	.92833	.94776	.96716	.98652	1.00588	1.02522	1.04452	1.06383	1.08309	1.10236	1.12162
590	276.92	18.84	.91345	.93257	.95166	.97074	.98978	1.00882	1.02783	1.04681	1.06579	1.08475	1.10370
600	281.36	19.15	.89905	.91787	.93668	.95546	.97420	.99293	1.01165	1.03035	1.04904	1.06770	1.08635
610	285.80	19.45	.88509	.90364	.92214	.94062	.95910	.97754	.99597	1.01438	1.03278	1.05118	1.06954
620	290.25	19.75	.87156	.88983	.90806	.92627	.94447	.96265	.98080	.99893	1.01704	1.03514	1.05325
630	294.69	20.05	.85846	.87643	.89442	.91235	.93027	.94818	.96605	.98394	1.00178	1.01961	1.03744
640	299.14	20.36	.84573	.86345	.88115	.89884	.91650	.93414	.95178	.96937	.98695	1.00454	1.02211
650	303.58	20.66	.83337	.85083	.86830	.88573	.90313	.92051	.93789	.95525	.97258	.98941	1.00722
660	308.03	20.96	.82137	.83858	.85579	.87299	.89014	.90730	.92443	.94152	.95862	.97570	.99277
670	312.47	21.26	.80970	.82670	.84366	.86062	.87753	.89445	.91133	.92820	.94506	.96190	.97873
680	316.92	21.56	.79837	.81512	.83187	.84857	.86529	.88195	.89862	.91526	.93185	.94849	.96508
690	321.36	21.87	.78735	.80389	.82039	.83688	.85337	.86980	.88624	.90265	.91904	.93544	.95180
700	325.80	22.17	.77663	.79295	.80924	.82551	.84177	.85800	.87420	.89040	.90657	.92275	.93889
710	330.25	22.47	.76620	.78230	.79839	.81444	.83048	.84650	.86250	.87847	.89444	.91048	.92633
720	334.69	22.77	.75604	.77195	.78781	.80367	.81950	.83530	.85109	.86687	.88263	.89836	.91416
730	339.14	23.08	.74617	.76185	.77753	.79318	.80880	.82442	.84000	.85557	.87111	.88666	.90219
740	343.58	23.38	.73654	.75204	.76751	.78296	.79838	.81380	.82918	.84455	.85991	.87527	.89059
750	348.03	23.68	.72715	.74245	.75773	.77300	.78823	.80344	.81855	.83383	.84900	.86415	.87929
760	352.47	23.98	.71800	.73313	.74821	.76329	.77833	.79338	.80837	.82338	.83836	.85332	.86827
770	356.91	24.29	.70908	.72402	.73893	.75383	.76870	.78354	.79837	.81317	.82798	.84276	.85755
780	361.36	24.59	.70038	.71513	.72947	.74460	.75928	.77394	.78859	.80323	.81786	.83246	.84706
790	365.80	24.89	.69191	.70648	.72104	.73557	.75010	.76460	.77907	.79354	.80797	.82241	.83684

T-35

SP. VOL.
60 % O_2, 40 % He

SPECIFIC VOLUME,CUBIC FT/LB

.600 OXYGEN .400 HELIUM AVERAGE MOLECULAR WEIGHT 20.801

TEMPERATURE,F

DEPTH FT	PRESSURF PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
800	370.25	25.19	.68362	.69802	.71242	.72678	.74113	.75546	.76976	.78405	.79833	.81260	.82686
810	374.69	25.50	.67553	.68978	.70401	.71819	.73238	.74654	.76069	.77481	.78892	.80303	.81711
820	379.14	25.80	.66763	.68171	.69577	.70981	.72383	.73784	.75181	.76579	.77974	.79367	.80760
830	383.58	26.10	.65991	.67384	.68774	.70162	.71550	.72933	.74316	.75696	.77074	.78454	.79830
840	388.03	26.40	.65238	.66614	.67990	.69362	.70734	.72102	.73470	.74834	.76197	.77561	.78922
850	392.47	26.71	.64501	.65863	.67224	.68581	.69937	.71291	.72642	.73993	.75340	.76689	.78035
860	396.91	27.01	.63781	.65128	.66473	.67816	.69157	.70496	.71834	.73170	.74503	.75836	.77167
870	401.36	27.31	.63076	.64410	.65740	.67069	.68395	.69721	.71043	.72364	.73683	.75002	.76318
880	405.80	27.61	.62389	.63706	.65024	.66338	.67651	.68961	.70270	.71577	.72882	.74187	.75488
890	410.25	27.92	.61714	.63019	.64323	.65622	.66922	.68218	.69512	.70807	.72098	.73389	.74678
900	414.69	28.22	.61054	.62345	.63636	.64922	.66208	.67492	.68773	.70052	.71329	.72608	.73884
910	419.14	28.52	.60409	.61688	.62963	.64237	.65510	.66779	.68049	.69314	.70578	.71844	.73106
920	423.58	28.82	.59778	.61043	.62306	.63567	.64826	.66084	.67338	.68592	.69843	.71095	.72345
930	428.03	29.13	.59159	.60411	.61662	.62910	.64157	.65401	.66644	.67885	.69124	.70363	.71599
940	432.47	29.43	.58552	.59794	.61032	.62267	.63501	.64732	.65963	.67191	.68419	.69645	.70869
950	436.91	29.73	.57960	.59187	.60414	.61638	.62859	.64079	.65297	.66513	.67728	.68942	.70153
960	441.36	30.03	.57378	.58594	.59807	.61021	.62231	.63437	.64645	.65848	.67051	.68253	.69452
970	445.80	30.33	.56807	.58013	.59214	.60415	.61613	.62810	.64004	.65197	.66388	.67578	.68767
980	450.25	30.64	.56249	.57442	.58633	.59822	.61008	.62193	.63377	.64558	.65736	.66916	.68094
990	454.69	30.94	.55701	.56883	.58063	.59241	.60415	.61590	.62760	.63931	.65098	.66267	.67433
1000	459.14	31.24	.55163	.56334	.57504	.58670	.59835	.60997	.62158	.63317	.64473	.65631	.66786
1050	481.36	32.75	.52626	.53746	.54862	.55976	.57089	.58200	.59308	.60416	.61521	.62625	.63729
1100	503.58	34.27	.50313	.51385	.52455	.53521	.54587	.55650	.56712	.57771	.58829	.59885	.60942
1150	525.80	35.78	.48196	.49224	.50251	.51274	.52296	.53316	.54333	.55349	.56365	.57378	.58391
1200	548.02	37.29	.46251	.47239	.48224	.49209	.50192	.51171	.52149	.53126	.54100	.55074	.56046
1250	570.25	38.80	.44458	.45409	.46358	.47305	.48251	.49194	.50135	.51074	.52012	.52949	.53885
1300	592.47	40.31	.42798	.43716	.44631	.45544	.46455	.47365	.48272	.49178	.50081	.50984	.51887
1350	614.69	41.83	.41260	.42146	.43029	.43911	.44790	.45668	.46544	.47418	.48289	.49161	.50032
1400	636.91	43.34	.39829	.40685	.41540	.42391	.43242	.44089	.44937	.45780	.46624	.47466	.48307
1450	659.13	44.85	.38495	.39324	.40151	.40975	.41798	.42618	.43437	.44254	.45070	.45885	.46698
1500	681.36	46.36	.37248	.38050	.38852	.39651	.40449	.41243	.42036	.42829	.43618	.44406	.45195
	500	34.02	.50672	.51751	.52827	.53902	.54975	.56045	.57113	.58181	.59245	.60311	.61373
	600	40.83	.42264	.43170	.44075	.44977	.45877	.46775	.47671	.48567	.49459	.50351	.51242
	700	47.63	.36262	.37046	.37826	.38605	.39382	.40156	.40930	.41701	.42470	.43239	.44007
	800	54.44	.31764	.32455	.33143	.33829	.34513	.35195	.35876	.36555	.37232	.37908	.38584
	900	61.24	.28268	.28887	.29503	.30117	.30729	.31339	.31947	.32554	.33159	.33763	.34367
	1000	68.05	.25474	.26035	.26593	.27149	.27703	.28256	.28807	.29355	.29903	.30450	.30995
	1100	74.85	.23190	.23703	.24214	.24723	.25230	.25735	.26238	.26740	.27240	.27739	.28237
	1200	81.65	.21289	.21762	.22233	.22702	.23170	.23635	.24099	.24562	.25022	.25482	.25941
	1300	88.46	.19682	.20121	.20559	.20995	.21429	.21860	.22291	.22720	.23147	.23574	.23999
	1400	95.26	.18306	.18717	.19126	.19532	.19938	.20341	.20742	.21142	.21541	.21938	.22335
	1500	102.07	.17116	.17501	.17885	.18266	.18646	.19024	.19401	.19776	.20149	.20522	.20895
	1600	108.87	.16075	.16439	.16800	.17160	.17518	.17874	.18229	.18582	.18933	.19284	.19635
	1700	115.68	.15158	.15502	.15844	.16184	.16523	.16860	.17195	.17529	.17861	.18193	.18524
	1800	122.48	.14344	.14671	.14996	.15318	.15640	.15959	.16277	.16594	.16909	.17223	.17537
	1900	129.29	.13618	.13928	.14237	.14545	.14850	.15154	.15457	.15758	.16058	.16357	.16655
	2000	136.09	.12964	.13261	.13556	.13849	.14141	.14431	.14719	.15007	.15292	.15577	.15862
	2100	142.90	.12374	.12658	.12940	.13221	.13500	.13777	.14053	.14327	.14600	.14873	.15144
	2200	149.70	.11838	.12111	.12381	.12650	.12917	.13183	.13447	.13710	.13972	.14233	.14493
	2300	156.51	.11350	.11612	.11872	.12130	.12386	.12641	.12895	.13148	.13398	.13649	.13898
	2400	163.31	.10903	.11155	.11405	.11653	.11900	.12146	.12390	.12632	.12873	.13114	.13355
	2500	170.11	.10493	.10736	.10976	.11216	.11454	.11690	.11925	.12158	.12391	.12623	.12854
	2600	176.92	.10115	.10349	.10582	.10813	.11042	.11270	.11497	.11722	.11946	.12169	.12392
	2700	183.72	.09766	.09992	.10216	.10440	.10661	.10881	.11101	.11318	.11534	.11750	.11966
	2800	190.53	.09442	.09660	.09878	.10094	.10308	.10521	.10733	.10943	.11153	.11361	.11570
	2900	197.33	.09141	.09353	.09563	.09772	.09980	.10186	.10391	.10595	.10797	.11000	.11201
	3000	204.14	.08861	.09066	.09270	.09472	.09674	.09874	.10073	.10270	.10466	.10662	.10858
	3100	210.94	.08599	.08798	.08996	.09193	.09388	.09582	.09775	.09967	.10157	.10347	.10537
	3200	217.75	.08354	.08547	.08740	.08931	.09120	.09309	.09496	.09682	.09867	.10052	.10236
	3300	224.55	.08124	.08312	.08499	.08685	.08870	.09053	.09235	.09416	.09595	.09775	.09954
	3400	231.36	.07908	.08091	.08273	.08454	.08634	.08812	.08989	.09165	.09340	.09514	.09688
	3500	238.16	.07705	.07883	.08061	.08237	.08411	.08585	.08758	.08929	.09099	.09269	.09438
	3600	244.96	.07513	.07687	.07860	.08032	.08202	.08371	.08539	.08706	.08872	.09037	.09202
	3700	251.77	.07333	.07502	.07670	.07838	.08004	.08169	.08333	.08496	.08657	.08819	.08979
	3800	258.57	.07162	.07327	.07492	.07654	.07816	.07977	.08137	.08296	.08454	.08611	.08768
	3900	265.38	.07000	.07161	.07322	.07481	.07639	.07796	.07952	.08108	.08261	.08415	.08568
	4000	272.18	.06846	.07004	.07161	.07316	.07471	.07624	.07777	.07928	.08079	.08229	.08379
	4100	278.99	.06700	.06855	.07008	.07160	.07311	.07461	.07610	.07758	.07905	.08052	.08198
	4200	285.79	.06562	.06713	.06862	.07011	.07159	.07305	.07451	.07596	.07740	.07883	.08026
	4300	292.60	.06430	.06577	.06724	.06869	.07014	.07157	.07300	.07442	.07582	.07723	.07863
	4400	299.40	.06304	.06448	.06592	.06734	.06876	.07016	.07156	.07295	.07432	.07570	.07707
	4500	306.21	.06184	.06326	.06466	.06606	.06744	.06882	.07018	.07154	.07289	.07424	.07558
	4600	313.01	.06069	.06208	.06346	.06482	.06618	.06753	.06887	.07020	.07152	.07284	.07415
	4700	319.81	.05960	.06096	.06231	.06365	.06498	.06630	.06761	.06892	.07021	.07151	.07279
	4800	326.62	.05855	.05988	.06121	.06252	.06382	.06512	.06641	.06769	.06896	.07023	.07149
	4900	333.42	.05755	.05885	.06015	.06144	.06272	.06399	.06526	.06651	.06775	.06900	.07024
	5000	340.23	.05659	.05787	.05914	.06041	.06166	.06291	.06415	.06538	.06660	.06782	.06904

60 % O_2, 40 % He

0.600 OXYGEN 0.400 HELIUM
ENTHALPY,BTU/LB

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	145.74	151.70	157.66	163.63	169.61	175.58
30.00	145.63	151.60	157.56	163.54	169.53	175.50
50.00	145.48	151.46	157.44	163.42	169.42	175.40
100.00	145.11	151.12	157.12	163.13	169.14	175.15
200.00	144.4	150.4	156.5	162.5	168.6	174.7
300.00	143.6	149.7	155.9	162.0	168.1	174.2
400.00	142.9	149.0	155.2	161.4	167.5	173.7
500.00	142.1	148.3	154.6	160.8	167.0	173.2
1000.00	138.3	145.0	151.5	157.9	164.4	170.7
2000.00	131.8	139.1	146.2	153.3	159.9	166.4
3000.00	125.7	133.6	141.6	149.1	156.0	167.1
4000.00	122.6	130.8	138.9	146.6	153.9	161.0
5000.00	120.3	128.1	136.0	144.6	151.9	159.5

0.600 OXYGEN 0.400 HELIUM
ENTROPY,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.9728	1.9846	1.9961	2.0071	2.0179	2.0281
30.00	1.9350	1.9468	1.9583	1.9693	1.9801	1.9904
50.00	1.8856	1.8975	1.9090	1.9200	1.9307	1.9411
100.00	1.8118	1.8238	1.8354	1.8464	1.8572	1.8675
200.00	1.7704	1.7825	1.7942	1.8053	1.8162	1.8265
300.00	1.7289	1.7412	1.7530	1.7642	1.7752	1.7856
400.00	1.6875	1.6999	1.7118	1.7232	1.7342	1.7446
500.00	1.6461	1.6586	1.6706	1.6821	1.6932	1.7037
1000.00	1.5598	1.5730	1.5855	1.5974	1.6089	1.6199
2000.00	1.484	1.499	1.512	1.525	1.537	1.549
3000.00	1.408	1.445	1.460	1.475	1.486	1.499
4000.00	1.397	1.412	1.428	1.441	1.453	1.465
5000.00	1.369	1.385	1.400	1.415	1.428	1.441

0.600 OXYGEN 0.400 HELIUM
CP,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.2977	.2980	.2982	.2986	.2991	.2994
30.00	.2982	.2984	.2986	.2990	.2994	.2997
50.00	.2988	.2990	.2991	.2994	.2999	.3001
100.00	.3004	.3004	.3004	.3006	.3009	.3011
200.00	.3036	.3033	.3031	.3030	.3031	.3031
300.00	.3068	.3061	.3057	.3053	.3052	.3051
400.00	.3100	.3090	.3083	.3077	.3074	.3071
500.00	.3134	.3120	.3110	.3101	.3096	.3091
1000.00	.3306	.3272	.3244	.3223	.3204	.3190
2000.00	.37	.36	.36	.35	.35	.34
3000.00	.40	.38	.38	.37	.37	.36
4000.00	.40	.38	.38	.37	.37	.37
5000.00						

0.600 OXYGEN 0.400 HELIUM
CV,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.2019	.2022	.2025	.2029	.2034	.2037
30.00	.2020	.2022	.2025	.2029	.2034	.2037
50.00	.2020	.2023	.2026	.2030	.2035	.2038
100.00	.2022	.2025	.2027	.2031	.2036	.2039
200.00	.2025	.2028	.2030	.2034	.2038	.2041
300.00	.2029	.2031	.2032	.2036	.2040	.2044
400.00	.2032	.2034	.2035	.2039	.2042	.2046
500.00	.2035	.2037	.2038	.2041	.2044	.2048
1000.00	.2051	.2051	.2051	.2053	.2054	.2057
2000.00	.22	.22	.22	.21	.21	.21
3000.00	.23	.23	.23	.22	.22	.22
4000.00						
5000.00						

0.600 OXYGEN 0.400 HELIUM
THERMAL CONDUCTIVITY,BTU/SEC FT F
(MULTIPLY TABLE ENTRY BY .0000100)

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.76	.79	.81	.83	.85	.87
30.00						
50.00						
100.00						
200.00						
300.00						
400.00						
500.00						
1000.00						
2000.00						
3000.00						
4000.00						
5000.00						

0.600 OXYGEN 0.400 HELIUM
PRANDTL NUMBER

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.53	.53	.53	.53	.53	.53
30.00						
50.00						
100.00						
200.00						
300.00						
400.00						
500.00						
1000.00						
2000.00						
3000.00						
4000.00						
5000.00						

0.600 OXYGEN 0.400 HELIUM
CP/CV

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.474	1.474	1.473	1.472	1.471	1.470
30.00	1.476	1.476	1.475	1.473	1.472	1.471
50.00	1.479	1.478	1.477	1.475	1.474	1.473
100.00	1.486	1.484	1.482	1.480	1.479	1.477
200.00	1.499	1.496	1.493	1.490	1.487	1.485
300.00	1.513	1.507	1.504	1.499	1.496	1.493
400.00	1.526	1.519	1.515	1.509	1.505	1.501
500.00	1.540	1.532	1.526	1.519	1.514	1.509
1000.00	1.612	1.595	1.582	1.570	1.560	1.551
2000.00	1.7	1.6	1.6	1.6	1.6	1.6
3000.00	1.7	1.7	1.7	1.7	1.7	1.6
4000.00						
5000.00						

0.600 OXYGEN 0.400 HELIUM
VISCOSITY,LB/FT SEC
(MULTIPLY TABLE ENTRY BY .0000100)

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.343	1.384	1.427	1.468	1.505	1.548
30.00						
50.00						
100.00						
200.00						
300.00						
400.00						
500.00						
1000.00						
2000.00						
3000.00						
4000.00						
5000.00						

0.600 OXYGEN 0.400 HELIUM
SONIC VELOCITY FT/SEC

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1370	1374	1377	1391	1416	1440
30.00	1370	1374	1378	1392	1417	1441
50.00	1371	1375	1379	1394	1418	1442
100.00	1371	1377	1382	1397	1421	1446
200.00	1373	1381	1388	1404	1428	1453
300.00	1375	1384	1394	1411	1435	1459
400.00	1376	1388	1400	1418	1442	1466
500.00	1378	1392	1406	1425	1449	1473
1000.00	1386	1410	1435	1459	1483	1507
2000.00	1438	1448	1458	1481	1517	1553
3000.00	1490	1486	1482	1504	1532	1600
4000.00						
5000.00						

DENSITY
40 % O_2, 60 % He

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DENSITY,LBS/CUBIC FT

.400 OXYGEN .600 HELIUM AVERAGE MOLECULAR WEIGHT 15.202

DEPTH	PRESSURE		TEMPERATURE,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	.04250	.04165	.04083	.04004	.03929	.03856	.03786	.03718	.03653	.03590	.03529
10	19.14	1.30	.05534	.05424	.05317	.05215	.05116	.05021	.04930	.04842	.04757	.04675	.04596
20	23.58	1.60	.06819	.06682	.06551	.06425	.06304	.06187	.06074	.05966	.05861	.05760	.05662
30	28.03	1.91	.08103	.07941	.07785	.07635	.07491	.07352	.07218	.07089	.06964	.06844	.06728
40	32.47	2.21	.09387	.09199	.09018	.08844	.08677	.08516	.08361	.08212	.08068	.07929	.07794
50	36.92	2.51	.10670	.10456	.10251	.10054	.09864	.09681	.09505	.09335	.09171	.09013	.08860
60	41.36	2.81	.11953	.11714	.11484	.11263	.11050	.10845	.10648	.10457	.10274	.10096	.09925
70	45.81	3.12	.13236	.12971	.12716	.12472	.12236	.12009	.11790	.11580	.11376	.11180	.10990
80	50.25	3.42	.14519	.14228	.13949	.13680	.13422	.13173	.12933	.12701	.12478	.12263	.12055
90	54.70	3.72	.15801	.15485	.15181	.14888	.14607	.14336	.14075	.13823	.13581	.13346	.13120
100	59.14	4.02	.17083	.16741	.16412	.16096	.15792	.15499	.15217	.14945	.14682	.14429	.14184
110	63.58	4.33	.18365	.17997	.17644	.17304	.16977	.16662	.16358	.16066	.15784	.15511	.15248
120	68.03	4.63	.19647	.19253	.18875	.18511	.18161	.17824	.17500	.17187	.16885	.16594	.16312
130	72.47	4.93	.20928	.20508	.20105	.19718	.19345	.18987	.18641	.18308	.17986	.17676	.17376
140	76.92	5.23	.22209	.21764	.21336	.20925	.20529	.20148	.19782	.19428	.19087	.18758	.18439
150	81.36	5.54	.23490	.23019	.22567	.22131	.21713	.21310	.20922	.20548	.20187	.19839	.19502
160	85.81	5.84	.24770	.24273	.23796	.23338	.22896	.22472	.22063	.21668	.21288	.20920	.20565
170	90.25	6.14	.26050	.25528	.25026	.24544	.24080	.23633	.23202	.22788	.22387	.22001	.21627
180	94.70	6.44	.27330	.26782	.26255	.25749	.25262	.24794	.24342	.23907	.23487	.23081	.22690
190	99.14	6.75	.28609	.28036	.27484	.26955	.26445	.25954	.25482	.25026	.24586	.24162	.23752
200	103.58	7.05	.29889	.29289	.28714	.28160	.27627	.27114	.26620	.26145	.25685	.25242	.24814
210	108.03	7.35	.31168	.30543	.29942	.29365	.28810	.28275	.27760	.27263	.26784	.26322	.25875
220	112.47	7.65	.32447	.31796	.31170	.30569	.29991	.29434	.28898	.28382	.27883	.27402	.26936
230	116.92	7.96	.33725	.33048	.32399	.31773	.31173	.30594	.30037	.29499	.28981	.28481	.27998
240	121.36	8.26	.35003	.34301	.33626	.32978	.32353	.31753	.31175	.30617	.30079	.29559	.29058
250	125.81	8.56	.36281	.35553	.34854	.34181	.33535	.32912	.32313	.31735	.31177	.30639	.30119
260	130.25	8.86	.37559	.36804	.36080	.35385	.34715	.34071	.33450	.32851	.32275	.31717	.31179
270	134.69	9.17	.38835	.38056	.37307	.36587	.35896	.35230	.34588	.33969	.33372	.32796	.32239
280	139.14	9.47	.40112	.39308	.38534	.37791	.37075	.36387	.35724	.35085	.34469	.33874	.33299
290	143.58	9.77	.41389	.40558	.39760	.38993	.38256	.37546	.36861	.36202	.35565	.34951	.34358
300	148.03	10.07	.42666	.41809	.40986	.40195	.39435	.38703	.37998	.37318	.36662	.36029	.35417
310	152.47	10.38	.43941	.43060	.42211	.41397	.40614	.39860	.39133	.38433	.37758	.37106	.36477
320	156.92	10.68	.45217	.44309	.43437	.42599	.41793	.41017	.40270	.39549	.38854	.38184	.37535
330	161.36	10.98	.46493	.45559	.44663	.43801	.42972	.42173	.41405	.40664	.39950	.39260	.38593
340	165.81	11.28	.47769	.46809	.45887	.45002	.44150	.43330	.42541	.41780	.41045	.40336	.39652
350	170.25	11.58	.49043	.48058	.47112	.46203	.45328	.44486	.43676	.42894	.42140	.41413	.40709
360	174.69	11.89	.50318	.49307	.48336	.47403	.46506	.45643	.44810	.44008	.43235	.42488	.41768
370	179.14	12.19	.51593	.50556	.49560	.48604	.47684	.46798	.45945	.45123	.44330	.43564	.42825
380	183.58	12.49	.52866	.51804	.50783	.49803	.48860	.47954	.47079	.46236	.45423	.44640	.43882
390	188.03	12.79	.54140	.53052	.52007	.51004	.50038	.49108	.48214	.47351	.46518	.45715	.44939
400	192.47	13.10	.55414	.54299	.53231	.52202	.51214	.50262	.49347	.48464	.47612	.46789	.45995
410	196.92	13.40	.56686	.55547	.54453	.53402	.52391	.51418	.50480	.49576	.48706	.47864	.47051
420	201.36	13.70	.57959	.56795	.55676	.54600	.53567	.52571	.51614	.50690	.49799	.48938	.48108
430	205.81	14.00	.59233	.58041	.56898	.55800	.54743	.53726	.52746	.51802	.50891	.50012	.49164
440	210.25	14.31	.60504	.59288	.58120	.56997	.55918	.54879	.53879	.52914	.51985	.51087	.50219
450	214.69	14.61	.61776	.60534	.59341	.58196	.57093	.56033	.55011	.54027	.53077	.52160	.51275
460	219.14	14.91	.63049	.61780	.60563	.59393	.58269	.57186	.56143	.55138	.54168	.53234	.52330
470	223.58	15.21	.64319	.63027	.61783	.60591	.59443	.58338	.57275	.56250	.55261	.54307	.53384
480	228.03	15.52	.65591	.64271	.63005	.61788	.60618	.59492	.58406	.57361	.56352	.55379	.54440
490	232.47	15.82	.66862	.65517	.64225	.62985	.61791	.60643	.59538	.58471	.57443	.56452	.55493
500	236.92	16.12	.68131	.66761	.65446	.64181	.62966	.61796	.60669	.59583	.58535	.57524	.56547
510	241.36	16.42	.69402	.68006	.66666	.65378	.64139	.62947	.61799	.60693	.59626	.58596	.57602
520	245.80	16.73	.70673	.69251	.67885	.66574	.65313	.64100	.62930	.61802	.60716	.59668	.58655
530	250.25	17.03	.71941	.70494	.69105	.67770	.66485	.65250	.64060	.62913	.61807	.60739	.59708
540	254.69	17.33	.73211	.71739	.70324	.68965	.67657	.66400	.65190	.64022	.62897	.61810	.60762
550	259.14	17.63	.74481	.72981	.71543	.70159	.68831	.67552	.66319	.65131	.63986	.62882	.61814
560	263.58	17.94	.75749	.74225	.72761	.71355	.70002	.68701	.67448	.66241	.65076	.63952	.62866
570	268.03	18.24	.77018	.75467	.73980	.72549	.71175	.69851	.68578	.67349	.66165	.65022	.63919
580	272.47	18.54	.78287	.76710	.75197	.73744	.72346	.71002	.69706	.68457	.67254	.66092	.64971
590	276.92	18.84	.79553	.77953	.76416	.74937	.73516	.72150	.70834	.69566	.68343	.67163	.66022
600	281.36	19.15	.80822	.79194	.77632	.76132	.74689	.73301	.71963	.70674	.69431	.68232	.67074
610	285.80	19.45	.82088	.80436	.78850	.77324	.75859	.74449	.73091	.71781	.70519	.69300	.68125
620	290.25	19.75	.83356	.81677	.80066	.78519	.77030	.75597	.74218	.72889	.71608	.70371	.69176
630	294.69	20.05	.84623	.82919	.81283	.79711	.78200	.76746	.75346	.73996	.72695	.71439	.70226
640	299.14	20.36	.85888	.84158	.82498	.80902	.79371	.77894	.76473	.75102	.73782	.72507	.71277
650	303.58	20.66	.87155	.85400	.83715	.82096	.80539	.79043	.77599	.76210	.74870	.73577	.72327
660	308.03	20.96	.88420	.86639	.84930	.83287	.81708	.80190	.78726	.77316	.75956	.74644	.73376
670	312.47	21.26	.89686	.87880	.86144	.84480	.82878	.81336	.79852	.78421	.77042	.75711	.74427
680	316.92	21.56	.90952	.89118	.87360	.85670	.84046	.82484	.80977	.79528	.78130	.76780	.75476
690	321.36	21.87	.92216	.90358	.88574	.86863	.85214	.83630	.82104	.80633	.79215	.77847	.76524
700	325.80	22.17	.93481	.91596	.89789	.88052	.86383	.84776	.83229	.81738	.80301	.78913	.77575
710	330.25	22.47	.94744	.92836	.91002	.89242	.87550	.85923	.84353	.82844	.81387	.79979	.78623
720	334.69	22.77	.96009	.94073	.92218	.90434	.88719	.87068	.85480	.83948	.82472	.81047	.79670
730	339.14	23.08	.97272	.95312	.93430	.91622	.89886	.88213	.86604	.85052	.83556	.82113	.80718
740	343.58	23.38	.98536	.96549	.94645	.92814	.91052	.89360	.87727	.86157	.84640	.83178	.81767
750	348.03	23.68	.99800	.97788	.95856	.94002	.92220	.90504	.88853	.87260	.85726	.84245	.82814
760	352.47	23.98	1.01062	.99024	.97070	.95192	.93385	.91648	.89976	.88363	.86810	.85310	.83861
770	356.91	24.29	1.02325	1.00262	.98282	.96380	.94551	.92794	.91098	.89468	.87893	.86374	.84909
780	361.36	24.59	1.03586	1.01497	.99493	.97568	.95718	.93937	.92223	.90570	.88978	.87439	.85956
790	365.80	24.89	1.04849	1.02735	1.00704	.98757	.96883	.95080	.93345	.91673	.90061	.88505	.87002

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DENSITY

40 % O_2, 60 % He

DENSITY,LBS/CUBIC FT

.400 OXYGEN .600 HELIUM AVERAGE MOLECULAR WEIGHT 15.202

DEPTH	PRESSURE		TEMPERATURE,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
800	370.25	25.19	1.06109	1.03969	1.01916	.99944	.98050	.96225	.94467	.92774	.91143	.89568	.88047
810	374.69	25.50	1.07372	1.05206	1.03129	1.01131	.99214	.97368	.95591	.93878	.92225	.90632	.89095
820	379.14	25.80	1.08631	1.06441	1.04338	1.02320	1.00378	.98510	.96712	.94979	.93310	.91697	.90140
830	383.58	26.10	1.09893	1.07677	1.05551	1.03506	1.01544	.99654	.97833	.96080	.94391	.92760	.91185
840	388.03	26.40	1.11152	1.08911	1.06760	1.04694	1.02707	1.00796	.98957	.97183	.95472	.93823	.92229
850	392.47	26.71	1.12414	1.10147	1.07968	1.05880	1.03870	1.01937	1.00077	.98284	.96556	.94885	.93276
860	396.91	27.01	1.13675	1.11379	1.09180	1.07065	1.05035	1.03081	1.01197	.99384	.97637	.95950	.94320
870	401.36	27.31	1.14933	1.12615	1.10388	1.08252	1.06197	1.04221	1.02317	1.00484	.98717	.97012	.95364
880	405.80	27.61	1.16193	1.13847	1.11599	1.09437	1.07359	1.05362	1.03439	1.01586	.99797	.98073	.96407
890	410.25	27.92	1.17451	1.15082	1.12806	1.10621	1.08524	1.06505	1.04559	1.02685	1.00880	.99134	.97453
900	414.69	28.22	1.18711	1.16314	1.14017	1.11808	1.09685	1.07645	1.05678	1.03784	1.01959	1.00198	.98496
910	419.14	28.52	1.19967	1.17548	1.15226	1.12992	1.10847	1.08784	1.06799	1.04885	1.03039	1.01259	.99539
920	423.58	28.82	1.2123	1.1878	1.1643	1.1418	1.1201	1.0993	1.0792	1.0598	1.0412	1.0232	1.0058
930	428.03	29.13	1.2248	1.2001	1.1764	1.1536	1.1317	1.1107	1.0904	1.0708	1.0520	1.0338	1.0163
940	432.47	29.43	1.2374	1.2124	1.1885	1.1654	1.1433	1.1220	1.1015	1.0818	1.0628	1.0444	1.0267
950	436.91	29.73	1.2500	1.2247	1.2005	1.1773	1.1549	1.1334	1.1127	1.0928	1.0736	1.0550	1.0371
960	441.36	30.03	1.2626	1.2371	1.2126	1.1891	1.1665	1.1448	1.1239	1.1038	1.0843	1.0656	1.0475
970	445.80	30.33	1.2751	1.2494	1.2247	1.2009	1.1781	1.1562	1.1351	1.1147	1.0951	1.0762	1.0579
980	450.25	30.64	1.2877	1.2617	1.2367	1.2128	1.1398	1.1676	1.1463	1.1257	1.1059	1.0868	1.0684
990	454.69	30.94	1.3002	1.2740	1.2488	1.2246	1.2013	1.1790	1.1575	1.1367	1.1167	1.0974	1.0788
1000	459.14	31.24	1.3128	1.2863	1.2608	1.2364	1.2129	1.1904	1.1686	1.1477	1.1275	1.1080	1.0892
1050	481.36	32.75	1.3755	1.3477	1.3211	1.2955	1.2709	1.2472	1.2244	1.2025	1.1813	1.1609	1.1412
1100	503.58	34.27	1.4382	1.4091	1.3812	1.3544	1.3287	1.3040	1.2802	1.2572	1.2351	1.2137	1.1931
1150	525.80	35.78	1.5007	1.4704	1.4413	1.4134	1.3865	1.3607	1.3358	1.3119	1.2888	1.2665	1.2450
1200	548.02	37.29	1.5632	1.5316	1.5013	1.4722	1.4442	1.4173	1.3914	1.3665	1.3424	1.3192	1.2968
1250	570.25	38.80	1.6257	1.5928	1.5612	1.5310	1.5019	1.4739	1.4470	1.4210	1.3960	1.3719	1.3486
1300	592.47	40.31	1.6880	1.6538	1.6211	1.5896	1.5594	1.5304	1.5024	1.4754	1.4495	1.4244	1.4003
1350	614.69	41.83	1.7503	1.7148	1.6808	1.6482	1.6169	1.5868	1.5578	1.5298	1.5029	1.4769	1.4519
1400	636.91	43.34	1.8124	1.7757	1.7406	1.7068	1.6743	1.6431	1.6131	1.5842	1.5563	1.5294	1.5035
1450	659.13	44.85	1.8745	1.8366	1.8002	1.7652	1.7317	1.6994	1.6683	1.6384	1.6096	1.5818	1.5549
1500	681.36	46.36	1.9365	1.8973	1.8597	1.8236	1.7890	1.7556	1.7235	1.6926	1.6628	1.6341	1.6063
	500	34.02	1.4281	1.3992	1.3716	1.3449	1.3194	1.2948	1.2712	1.2484	1.2265	1.2052	1.1848
	600	40.83	1.7091	1.6745	1.6414	1.6095	1.5789	1.5495	1.5212	1.4939	1.4676	1.4422	1.4178
	700	47.63	1.9886	1.9483	1.9096	1.8726	1.8370	1.8027	1.7698	1.7380	1.7074	1.6779	1.6496
	800	54.44	2.2663	2.2204	2.1763	2.1341	2.0935	2.0544	2.0169	1.9807	1.9459	1.9122	1.8798
	900	61.24	2.5426	2.4910	2.4415	2.3940	2.3484	2.3047	2.2625	2.2219	2.1829	2.1452	2.1088
	1000	68.05	2.8171	2.7599	2.7051	2.6525	2.6019	2.5535	2.5067	2.4618	2.4185	2.3766	2.3364
	1100	74.85	3.0899	3.0272	2.9670	2.9093	2.8539	2.8007	2.7495	2.7002	2.6527	2.6069	2.5628
	1200	81.65	3.3612	3.2928	3.2274	3.1646	3.1043	3.0465	2.9908	2.9372	2.8855	2.8358	2.7877
	1300	88.46	3.6307	3.5568	3.4862	3.4183	3.3532	3.2908	3.2306	3.1728	3.1170	3.0632	3.0114
	1400	95.26	3.8985	3.8192	3.7432	3.6705	3.6006	3.5335	3.4690	3.4068	3.3470	3.2894	3.2337
	1500	102.07	4.1646	4.0799	3.9987	3.9210	3.8464	3.7748	3.7058	3.6395	3.5757	3.5141	3.4547
	1600	108.87	4.4289	4.3389	4.2527	4.1700	4.0906	4.0145	3.9412	3.8708	3.8029	3.7375	3.6744
	1700	115.68	4.6916	4.5962	4.5049	4.4173	4.3333	4.2528	4.1752	4.1006	4.0288	3.9595	3.8927
	1800	122.48	4.9524	4.8518	4.7555	4.6630	4.5745	4.4895	4.4076	4.3291	4.2533	4.1801	4.1098
	1900	129.29	5.2117	5.1059	5.0046	4.9074	4.8142	4.7248	4.6386	4.5559	4.4764	4.3996	4.3254
	2000	136.09	5.4691	5.3581	5.2519	5.1498	5.0523	4.9584	4.8682	4.7815	4.6980	4.6174	4.5398
	2100	142.90	5.7247	5.6087	5.4976	5.3910	5.2887	5.1907	5.0965	5.0057	4.9183	4.8341	4.7529
	2200	149.70	5.9787	5.8576	5.7415	5.6305	5.5239	5.4215	5.3231	5.2283	5.1373	5.0494	4.9647
	2300	156.51	6.2311	6.1049	5.9839	5.8682	5.7571	5.6507	5.5482	5.4498	5.3549	5.2633	5.1751
	2400	163.31	6.4816	6.3504	6.2248	6.1044	5.9892	5.8785	5.7721	5.6695	5.5711	5.4760	5.3845
	2500	170.11	6.7303	6.5943	6.4640	6.3392	6.2196	6.1049	5.9944	5.8882	5.7859	5.6875	5.5924
	2600	176.92	6.9774	6.8364	6.7016	6.5723	6.4485	6.3296	6.2154	6.1052	5.9995	5.8974	5.7988
	2700	183.72	7.2225	7.0769	6.9374	6.8039	6.6758	6.5530	6.4347	6.3210	6.2118	6.1061	6.0043
	2800	190.53	7.4661	7.3160	7.1717	7.0341	6.9019	6.7750	6.6527	6.5354	6.4225	6.3136	6.2083
	2900	197.33	7.7082	7.5532	7.4046	7.2625	7.1260	6.9953	6.8694	6.7486	6.6320	6.5195	6.4114
	3000	204.14	7.9483	7.7888	7.6360	7.4894	7.3491	7.2143	7.0847	6.9601	6.8402	6.7245	6.6130
	3100	210.94	8.1869	8.0227	7.8656	7.7150	7.5704	7.4319	7.2988	7.1704	7.0472	6.9280	6.8134
	3200	217.75	8.4240	8.2550	8.0934	7.9388	7.7904	7.6482	7.5112	7.3794	7.2527	7.1303	7.0124
	3300	224.55	8.6591	8.4858	8.3201	8.1611	8.0089	7.8628	7.7223	7.5872	7.4572	7.3313	7.2106
	3400	231.36	8.8927	8.7152	8.5450	8.3821	8.2262	8.0764	7.9321	7.7933	7.6602	7.5312	7.4070
	3500	238.16	9.1244	8.9426	8.7686	8.6017	8.4417	8.2886	8.1403	7.9986	7.8619	7.7300	7.6025
	3600	244.96	9.3546	9.1687	8.9905	8.8195	8.6559	8.4987	8.3476	8.2023	8.0621	7.9271	7.7967
	3700	251.77	9.5833	9.3928	9.2107	9.0360	8.8687	8.7080	8.5532	8.4047	8.2615	8.1231	7.9899
	3800	258.57	9.8105	9.6160	9.4295	9.2511	9.0802	8.9157	8.7576	8.6056	8.4596	8.3184	8.1819
	3900	265.38	10.0358	9.8372	9.6469	9.4648	9.2900	9.1225	8.9607	8.8056	8.6563	8.5121	8.3728
	4000	272.18	10.2596	10.0571	9.8630	9.6768	9.4985	9.3277	9.1627	9.0044	8.8517	8.7047	8.5626
	4100	278.99	10.4820	10.2751	10.0772	9.8878	9.7056	9.5315	9.3633	9.2016	9.0460	8.8957	8.7509
	4200	285.79	10.7024	10.4921	10.2905	10.0971	9.9115	9.7337	9.5624	9.3976	9.2391	9.0860	8.9385
	4300	292.60	10.9214	10.7073	10.5020	10.3051	10.1162	9.9351	9.7607	9.5925	9.4310	9.2752	9.1246
	4400	299.40	11.1395	10.9211	10.7122	10.5118	10.3195	10.1348	9.9573	9.7861	9.6219	9.4629	9.3097
	4500	306.21	11.3551	11.1335	10.9205	10.7167	10.5211	10.3337	10.1527	9.9786	9.8116	9.6499	9.4936
	4600	313.01	11.5699	11.3440	11.1240	10.9208	10.7220	10.5310	10.3470	10.1700	9.9997	9.8353	9.6765
	4700	319.81	11.7832	11.5537	11.3317	11.1232	10.9211	10.7271	10.5401	10.3602	10.1872	10.0147	9.8583
	4800	326.62	11.995	11.762	11.538	11.324	11.119	10.922	10.732	10.549	10.373	10.203	10.039
	4900	333.42	12.205	11.968	11.742	11.524	11.316	11.116	10.922	10.737	10.558	10.385	10.219
	5000	340.23	12.413	12.173	11.944	11.723	11.511	11.308	11.112	10.923	10.742	10.566	10.398

SP. VOL.
$40\ \%\ O_2$, 60 % He

T-40

SPECIFIC VOLUME,CUBIC FT/LB

.400 OXYGEN .600 HELIUM AVERAGE MOLECULAR WEIGHT 15.202

DEPTH	PRESSURE		TEMPERATURE,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	23.530	24.011	24.492	24.973	25.453	25.934	26.415	26.895	27.376	27.856	28.337
10	19.14	1.30	18.069	18.438	18.807	19.176	19.545	19.915	20.284	20.653	21.022	21.391	21.760
20	23.58	1.60	14.665	14.965	15.265	15.564	15.864	16.164	16.463	16.763	17.062	17.362	17.662
30	28.03	1.91	12.341	12.594	12.846	13.098	13.350	13.602	13.855	14.107	14.359	14.611	14.863
40	32.47	2.21	10.653	10.871	11.049	11.307	11.524	11.742	11.960	12.177	12.395	12.613	12.830
50	36.92	2.51	9.3719	9.5636	9.7550	9.9467	10.1381	10.3295	10.5212	10.7126	10.9041	11.0955	11.2869
60	41.36	2.81	8.3658	8.5369	8.7077	8.8788	9.0497	9.2208	9.3917	9.5626	9.7337	9.9046	10.0754
70	45.81	3.12	7.5549	7.7094	7.8639	8.0182	8.1727	8.3270	8.4816	8.6359	8.7902	8.9445	9.0991
80	50.25	3.42	6.8874	7.0283	7.1691	7.3100	7.4507	7.5916	7.7322	7.8731	8.0138	8.1545	8.2952
90	54.70	3.72	6.3286	6.4580	6.5873	6.7167	6.8462	6.9754	7.1049	7.2341	7.3634	7.4929	7.6221
100	59.14	4.02	5.8536	5.9733	6.0931	6.2128	6.3323	6.4521	6.5716	6.6914	6.8109	6.9305	7.0501
110	63.58	4.33	5.4450	5.5564	5.6678	5.7791	5.8905	6.0017	6.1131	6.2243	6.3355	6.4469	6.5581
120	66.03	4.63	5.0898	5.1939	5.2980	5.4021	5.5062	5.6103	5.7143	5.8184	5.9224	6.0264	6.1305
130	72.47	4.93	4.7782	4.8761	4.9738	5.0715	5.1692	5.2668	5.3646	5.4622	5.5599	5.6575	5.7551
140	76.92	5.23	4.5027	4.5948	4.6869	4.7790	4.8711	4.9632	5.0551	5.1472	5.2392	5.3312	5.4233
150	81.36	5.54	4.2572	4.3443	4.4313	4.5185	4.6055	4.6925	4.7796	4.8666	4.9537	5.0406	5.1276
160	85.81	5.84	4.0371	4.1198	4.2023	4.2849	4.3675	4.4501	4.5325	4.6151	4.6976	4.7802	4.8627
170	90.25	6.14	3.8387	3.9173	3.9958	4.0743	4.1529	4.2314	4.3099	4.3883	4.4668	4.5453	4.6238
180	94.70	6.44	3.6589	3.7339	3.8088	3.8836	3.9585	4.0333	4.1080	4.1829	4.2576	4.3325	4.4072
190	99.14	6.75	3.4954	3.5668	3.6384	3.7099	3.7814	3.8529	3.9244	3.9959	4.0673	4.1387	4.2102
200	103.58	7.05	3.3457	3.4142	3.4827	3.5512	3.6196	3.6881	3.7565	3.8249	3.8933	3.9617	4.0300
210	108.03	7.35	3.2084	3.2741	3.3398	3.4054	3.4711	3.5367	3.6023	3.6680	3.7335	3.7992	3.8647
220	112.47	7.65	3.0820	3.1451	3.2082	3.2713	3.3344	3.3974	3.4604	3.5234	3.5865	3.6494	3.7125
230	116.92	7.96	2.9652	3.0259	3.0866	3.1473	3.2079	3.2686	3.3292	3.3899	3.4505	3.5111	3.5717
240	121.36	8.26	2.8569	2.9154	2.9739	3.0323	3.0909	3.1493	3.2077	3.2661	3.3246	3.3830	3.4414
250	125.81	8.56	2.7563	2.8127	2.8692	2.9256	2.9820	3.0384	3.0948	3.1511	3.2075	3.2638	3.3201
260	130.25	8.86	2.6625	2.7171	2.7716	2.8261	2.8806	2.9351	2.9895	3.0440	3.0984	3.1529	3.2073
270	134.69	9.17	2.5750	2.6277	2.6804	2.7332	2.7859	2.8385	2.8912	2.9439	2.9966	3.0492	3.1019
280	139.14	9.47	2.4930	2.5440	2.5951	2.6462	2.6972	2.7482	2.7992	2.8502	2.9011	2.9522	3.0031
290	143.58	9.77	2.4161	2.4656	2.5151	2.5646	2.6140	2.6634	2.7129	2.7623	2.8117	2.8612	2.9105
300	148.03	10.07	2.3438	2.3918	2.4398	2.4878	2.5359	2.5838	2.6317	2.6797	2.7277	2.7755	2.8235
310	152.47	10.38	2.2758	2.3224	2.3690	2.4156	2.4622	2.5088	2.5554	2.6019	2.6484	2.6950	2.7415
320	156.92	10.68	2.2115	2.2569	2.3022	2.3475	2.3928	2.4380	2.4833	2.5285	2.5737	2.6189	2.6642
330	161.36	10.98	2.1508	2.1949	2.2390	2.2830	2.3271	2.3712	2.4152	2.4592	2.5031	2.5471	2.5911
340	165.81	11.28	2.0934	2.1363	2.1793	2.2221	2.2650	2.3078	2.3507	2.3935	2.4363	2.4792	2.5219
350	170.25	11.58	2.0390	2.0808	2.1226	2.1644	2.2061	2.2479	2.2896	2.3313	2.3730	2.4147	2.4564
360	174.69	11.89	1.9874	2.0281	2.0689	2.1096	2.1503	2.1909	2.2317	2.2723	2.3129	2.3536	2.3942
370	179.14	12.19	1.9383	1.9780	2.0177	2.0574	2.0971	2.1369	2.1765	2.2162	2.2558	2.2955	2.3351
380	183.58	12.49	1.8916	1.9304	1.9692	2.0079	2.0466	2.0853	2.1241	2.1628	2.2015	2.2402	2.2789
390	188.03	12.79	1.8471	1.8849	1.9228	1.9606	1.9985	2.0363	2.0741	2.1119	2.1497	2.1875	2.2252
400	192.47	13.10	1.8046	1.8416	1.8786	1.9156	1.9526	1.9896	2.0265	2.0634	2.1003	2.1373	2.1741
410	196.92	13.40	1.7641	1.8003	1.8364	1.8726	1.9087	1.9449	1.9810	2.0171	2.0531	2.0892	2.1253
420	201.36	13.70	1.7253	1.7607	1.7961	1.8315	1.8668	1.9022	1.9375	1.9728	2.0081	2.0434	2.0786
430	205.81	14.00	1.6883	1.7229	1.7575	1.7921	1.8267	1.8613	1.8959	1.9304	1.9650	1.9995	2.0340
440	210.25	14.31	1.6528	1.6867	1.7206	1.7545	1.7883	1.8222	1.8560	1.8899	1.9236	1.9575	1.9913
450	214.69	14.61	1.6187	1.6520	1.6852	1.7183	1.7515	1.7847	1.8178	1.8509	1.8841	1.9172	1.9503
460	219.14	14.91	1.5861	1.6186	1.6512	1.6837	1.7162	1.7487	1.7812	1.8136	1.8461	1.8785	1.9110
470	223.58	15.21	1.5548	1.5866	1.6186	1.6504	1.6823	1.7141	1.7460	1.7778	1.8096	1.8414	1.8732
480	228.03	15.52	1.5246	1.5559	1.5872	1.6184	1.6497	1.6809	1.7122	1.7433	1.7745	1.8057	1.8369
490	232.47	15.82	1.4956	1.5263	1.5570	1.5877	1.6183	1.6490	1.6796	1.7102	1.7408	1.7714	1.8020
500	236.92	16.12	1.4678	1.4979	1.5280	1.5581	1.5882	1.6182	1.6483	1.6783	1.7084	1.7384	1.7684
510	241.36	16.42	1.4409	1.4705	1.5000	1.5296	1.5591	1.5886	1.6182	1.6476	1.6771	1.7066	1.7361
520	245.80	16.73	1.4150	1.4440	1.4731	1.5021	1.5311	1.5601	1.5891	1.6181	1.6470	1.6759	1.7049
530	250.25	17.03	1.3900	1.4186	1.4471	1.4756	1.5041	1.5326	1.5610	1.5895	1.6179	1.6464	1.6748
540	254.69	17.33	1.3659	1.3940	1.4220	1.4500	1.4780	1.5060	1.5340	1.5620	1.5899	1.6179	1.6458
550	259.14	17.63	1.3426	1.3702	1.3978	1.4253	1.4528	1.4803	1.5079	1.5354	1.5628	1.5903	1.6178
560	263.58	17.94	1.3202	1.3473	1.3744	1.4014	1.4285	1.4556	1.4826	1.5096	1.5367	1.5637	1.5907
570	268.03	18.24	1.2984	1.3251	1.3517	1.3784	1.4050	1.4316	1.4582	1.4848	1.5114	1.5379	1.5645
580	272.47	18.54	1.2774	1.3036	1.3298	1.3560	1.3822	1.4084	1.4346	1.4608	1.4869	1.5131	1.5392
590	276.92	18.84	1.2570	1.2828	1.3086	1.3345	1.3602	1.3860	1.4118	1.4375	1.4632	1.4889	1.5147
600	281.36	19.15	1.2373	1.2627	1.2881	1.3135	1.3389	1.3642	1.3896	1.4150	1.4403	1.4656	1.4909
610	285.80	19.45	1.2182	1.2432	1.2682	1.2933	1.3182	1.3432	1.3682	1.3931	1.4181	1.4430	1.4679
620	290.25	19.75	1.1997	1.2243	1.2490	1.2736	1.2982	1.3228	1.3474	1.3719	1.3965	1.4210	1.4456
630	294.69	20.05	1.1817	1.2060	1.2303	1.2545	1.2788	1.3030	1.3272	1.3514	1.3756	1.3998	1.4240
640	299.14	20.36	1.1643	1.1882	1.2121	1.2361	1.2599	1.2838	1.3077	1.3315	1.3553	1.3792	1.4030
650	303.58	20.66	1.1474	1.1710	1.1945	1.2181	1.2416	1.2651	1.2887	1.3122	1.3356	1.3591	1.3826
660	308.03	20.96	1.1310	1.1542	1.1774	1.2007	1.2239	1.2470	1.2702	1.2934	1.3165	1.3397	1.3628
670	312.47	21.26	1.1150	1.1379	1.1608	1.1837	1.2066	1.2295	1.2523	1.2752	1.2980	1.3208	1.3436
680	316.92	21.56	1.0995	1.1221	1.1447	1.1673	1.1898	1.2124	1.2349	1.2574	1.2799	1.3024	1.3249
690	321.36	21.87	1.0844	1.1067	1.1290	1.1512	1.1735	1.1957	1.2180	1.2402	1.2624	1.2846	1.3068
700	325.80	22.17	1.0697	1.0917	1.1137	1.1357	1.1576	1.1796	1.2015	1.2234	1.2453	1.2672	1.2891
710	330.25	22.47	1.0555	1.0772	1.0989	1.1205	1.1422	1.1638	1.1855	1.2071	1.2287	1.2503	1.2717
720	334.69	22.77	1.0416	1.0630	1.0844	1.1058	1.1272	1.1485	1.1699	1.1912	1.2125	1.2339	1.2552
730	339.14	23.08	1.0280	1.0492	1.0703	1.0914	1.1125	1.1336	1.1547	1.1758	1.1968	1.2178	1.2389
740	343.58	23.38	1.0149	1.0357	1.0566	1.0774	1.0983	1.1191	1.1399	1.1607	1.1815	1.2022	1.2230
750	348.03	23.68	1.0020	1.0226	1.0432	1.0638	1.0844	1.1049	1.1255	1.1460	1.1665	1.1870	1.2075
760	352.47	23.98	.98949	1.00986	1.03018	1.05050	1.07083	1.09113	1.11141	1.13169	1.15196	1.17220	1.19245
770	356.91	24.29	.97727	.99739	1.01748	1.03756	1.05763	1.07766	1.09772	1.11772	1.13775	1.15775	1.17777
780	361.36	24.59	.96538	.98525	1.00510	1.02493	1.04473	1.06454	1.08433	1.10411	1.12387	1.14366	1.16334
790	365.80	24.89	.95375	.97338	.99299	1.01258	1.03218	1.05175	1.07129	1.09084	1.11038	1.12988	1.14941

T-41

SP. VOL.

40 % O_2, 60 % He

SPECIFIC VOLUME,CUBIC FT/LB

.400 OXYGEN .600 HELIUM AVERAGE MOLECULAR WEIGHT 15.202

DEPTH FT	PRESSURE PSIA	PRESSURE ATM	TEMPERATURE,F 30	40	50	60	70	80	90	100	110	120	130
800	370.25	25.19	.94242	.96182	.98120	1.00056	1.01989	1.03923	1.05857	1.07789	1.09717	1.11646	1.13576
810	374.69	25.50	.93134	.95051	.96946	.98882	1.00793	1.02704	1.04612	1.06521	1.08430	1.10336	1.12240
820	379.14	25.80	.92054	.93949	.95842	.97733	.99624	1.01513	1.03399	1.05286	1.07170	1.09054	1.10939
830	383.58	26.10	.90997	.92870	.94741	.96613	.98480	1.00347	1.02215	1.04080	1.05942	1.07805	1.09668
840	388.03	26.40	.89967	.91818	.93668	.95516	.97364	.99211	1.01054	1.02898	1.04742	1.06584	1.08425
850	392.47	26.71	.88957	.90788	.92620	.94447	.96274	.98100	.99923	1.01746	1.03567	1.05391	1.07209
860	396.91	27.01	.87970	.89783	.91592	.93401	.95206	.97011	.98817	1.00620	1.02421	1.04221	1.06022
870	401.36	27.31	.87007	.88798	.90590	.92377	.94164	.95950	.97735	.99519	1.01300	1.03081	1.04862
880	405.80	27.61	.86063	.87837	.89607	.91377	.93145	.94911	.96675	.98439	1.00203	1.01965	1.03727
890	410.25	27.92	.85142	.86895	.88647	.90399	.92145	.93893	.95640	.97385	.99128	1.00873	1.02614
900	414.69	28.22	.84238	.85974	.87707	.89439	.91170	.92898	.94627	.96354	.98078	.99803	1.01527
910	419.14	28.52	.83356	.85072	.86788	.88502	.90215	.91925	.93634	.95342	.97051	.98757	1.00463
920	423.58	28.82	.82490	.84190	.85888	.87583	.89277	.90970	.92663	.94354	.96045	.97734	.99422
930	428.03	29.13	.81644	.83327	.85005	.86685	.88362	.90037	.91713	.93388	.95057	.96731	.98400
940	432.47	29.43	.80813	.82479	.84143	.85805	.87465	.89123	.90782	.92439	.94093	.95747	.97401
950	436.91	29.73	.80002	.81650	.83298	.84941	.86584	.88228	.89868	.91508	.93148	.94785	.96423
960	441.36	30.03	.79204	.80837	.82467	.84096	.85724	.87349	.88975	.90598	.92222	.93843	.95465
970	445.80	30.33	.78425	.80041	.81656	.83269	.84880	.86489	.88099	.89706	.91312	.92920	.94523
980	450.25	30.64	.77661	.79259	.80858	.82455	.84051	.85647	.87241	.88832	.90422	.92012	.93602
990	454.69	30.94	.76910	.78495	.80078	.81660	.83240	.84818	.86397	.87973	.89550	.91124	.92699
1000	459.14	31.24	.76175	.77745	.79313	.80880	.82445	.84008	.85572	.87133	.88695	.90254	.91813
1050	481.36	32.75	.72700	.74200	.75697	.77192	.78686	.80180	.81672	.83162	.84650	.86141	.87627
1100	503.58	34.27	.69533	.70968	.72400	.73832	.75260	.76689	.78114	.79542	.80965	.82391	.83812
1150	525.80	35.78	.66634	.68004	.69381	.70753	.72124	.73492	.74859	.76227	.77591	.78956	.80320
1200	548.02	37.29	.63970	.65290	.66609	.67926	.69241	.70555	.71869	.73182	.74491	.75801	.77111
1250	570.25	38.80	.61514	.62783	.64051	.65318	.66584	.67848	.69111	.70374	.71633	.72892	.74152
1300	592.47	40.31	.59242	.60466	.61687	.62907	.64126	.65344	.66560	.67776	.68989	.70204	.71415
1350	614.69	41.83	.57134	.58314	.59494	.60671	.61846	.63020	.64193	.65366	.66536	.67708	.68876
1400	636.91	43.34	.55175	.56315	.57452	.58590	.59725	.60859	.61992	.63125	.64254	.65386	.66514
1450	659.13	44.85	.53346	.54448	.55550	.56650	.57747	.58844	.59940	.61034	.62128	.63220	.64313
1500	681.36	46.36	.51638	.52705	.53771	.54836	.55899	.56960	.58021	.59080	.60139	.61196	.62254

	500	34.02	.70023	.71468	.72910	.74352	.75791	.77230	.78667	.80103	.81536	.82972	.84403
	600	40.83	.58510	.59719	.60925	.62130	.63334	.64537	.65738	.66939	.68137	.69337	.70533
	700	47.63	.50288	.51328	.52366	.53403	.54438	.55473	.56505	.57538	.58567	.59598	.60627
	800	54.44	.44124	.45037	.45949	.46859	.47768	.48675	.49582	.50488	.51391	.52295	.53198
	900	61.24	.39330	.40145	.40959	.41771	.42581	.43390	.44198	.45006	.45811	.46617	.47421
	1000	68.05	.35498	.36233	.36968	.37701	.38433	.39163	.39892	.40620	.41348	.42074	.42800
	1100	74.85	.32363	.33034	.33704	.34372	.35040	.35705	.36370	.37034	.37697	.38360	.39020
	1200	81.65	.29751	.30369	.30985	.31599	.32213	.32825	.33436	.34046	.34656	.35264	.35871
	1300	88.46	.27543	.28115	.28685	.29254	.29822	.30388	.30954	.31518	.32082	.32645	.33207
	1400	95.26	.25651	.26183	.26715	.27244	.27773	.28300	.28827	.29353	.29877	.30401	.30924
	1500	102.07	.24012	.24511	.25008	.25504	.25999	.26491	.26984	.27476	.27966	.28457	.28946
	1600	108.87	.22579	.23047	.23515	.23981	.24446	.24909	.25373	.25835	.26296	.26756	.27215
	1700	115.68	.21315	.21757	.22198	.22638	.23077	.23514	.23951	.24387	.24821	.25256	.25689
	1800	122.48	.20192	.20611	.21028	.21445	.21860	.22274	.22688	.23100	.23511	.23923	.24332
	1900	129.29	.19188	.19585	.19982	.20377	.20772	.21165	.21558	.21949	.22339	.22729	.23119
	2000	136.09	.18284	.18663	.19041	.19418	.19793	.20168	.20541	.20914	.21286	.21657	.22028
	2100	142.90	.17468	.17829	.18190	.18549	.18908	.19265	.19621	.19977	.20332	.20686	.21040
	2200	149.70	.16726	.17072	.17417	.17761	.18103	.18445	.18786	.19127	.19466	.19806	.20142
	2300	156.51	.16049	.16380	.16711	.17041	.17370	.17697	.18024	.18349	.18674	.18999	.19323
	2400	163.31	.15428	.15747	.16065	.16382	.16697	.17011	.17325	.17638	.17950	.18261	.18572
	2500	170.11	.14858	.15165	.15470	.15775	.16078	.16380	.16682	.16983	.17283	.17582	.17881
	2600	176.92	.14332	.14628	.14922	.15215	.15507	.15799	.16089	.16379	.16668	.16957	.17245
	2700	183.72	.13846	.14130	.14415	.14697	.14980	.15260	.15541	.15820	.16098	.16377	.16655
	2800	190.53	.13394	.13669	.13944	.14217	.14489	.14760	.15031	.15301	.15570	.15839	.16107
	2900	197.33	.12973	.13239	.13505	.13769	.14033	.14295	.14557	.14818	.15078	.15339	.15597
	3000	204.14	.12581	.12839	.13096	.13352	.13607	.13861	.14115	.14368	.14619	.14871	.15122
	3100	210.94	.12215	.12465	.12714	.12962	.13209	.13456	.13701	.13946	.14190	.14434	.14677
	3200	217.75	.11871	.12114	.12358	.12596	.12836	.13075	.13313	.13551	.13788	.14025	.14261
	3300	224.55	.11549	.11784	.12019	.12251	.12486	.12718	.12950	.13180	.13410	.13640	.13869
	3400	231.36	.11245	.11474	.11703	.11930	.12156	.12382	.12607	.12831	.13055	.13278	.13501
	3500	238.16	.10960	.11182	.11405	.11626	.11846	.12065	.12285	.12502	.12720	.12937	.13154
	3600	244.96	.10690	.10907	.11123	.11338	.11553	.11767	.11980	.12192	.12404	.12615	.12826
	3700	251.77	.10435	.10646	.10857	.11067	.11276	.11484	.11692	.11898	.12104	.12311	.12516
	3800	258.57	.10193	.10399	.10605	.10810	.11013	.11216	.11419	.11620	.11821	.12022	.12222
	3900	265.38	.09964	.10165	.10366	.10565	.10764	.10962	.11160	.11356	.11552	.11748	.11943
	4000	272.18	.09747	.09943	.10139	.10334	.10528	.10721	.10914	.11106	.11297	.11488	.11679
	4100	278.99	.09540	.09732	.09923	.10113	.10303	.10491	.10680	.10868	.11055	.11241	.11427
	4200	285.79	.09344	.09531	.09718	.09904	.10089	.10274	.10458	.10641	.10824	.11006	.11188
	4300	292.60	.09156	.09339	.09522	.09704	.09885	.10065	.10245	.10425	.10603	.10781	.10959
	4400	299.40	.08977	.09157	.09335	.09513	.09690	.09867	.10043	.10219	.10393	.10568	.10742
	4500	306.21	.08807	.08982	.09157	.09331	.09505	.09677	.09850	.10021	.10192	.10363	.10533
	4600	313.01	.08643	.08815	.08986	.09157	.09327	.09496	.09665	.09833	.10000	.10167	.10334
	4700	319.81	.08487	.08655	.08823	.08990	.09157	.09322	.09488	.09652	.09816	.09980	.10144
	4800	326.62	.08337	.08502	.08667	.08831	.08994	.09156	.09318	.09480	.09640	.09801	.09961
	4900	333.42	.08194	.08356	.08517	.08677	.08837	.08996	.09156	.09314	.09472	.09629	.09786
	5000	340.23	.08056	.08215	.08373	.08530	.08687	.08844	.08999	.09155	.09309	.09464	.09618

40 % O_2, 60 % He

T-42

0.400 OXYGEN 0.600 HELIUM
ENTHALPY,BTU/LB

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	187.32	194.92	202.54	210.17	217.80	225.43
30.00	187.23	194.84	202.46	210.10	217.74	225.37
50.00	187.11	194.73	202.37	210.01	217.65	225.30
100.00	186.81	194.46	202.12	209.78	217.44	225.11
200.00	186.2	193.9	201.6	207.7	217.0	224.8
300.00	185.6	193.3	201.1	205.6	216.6	224.4
400.00	185.0	192.8	200.6	203.5	216.2	224.1
500.00	184.4	192.2	200.1	201.4	215.8	223.7
1000.00	181.3	189.5	197.7	205.7	213.8	221.8
2000.00	176.1	184.9	193.6	202.2	210.4	218.6
3000.00	171.3	180.7	190.1	199.2	207.6	215.8
4000.00	169.2	178.9	188.3	197.6	206.4	215.2
5000.00	167.7	177.0	186.4	196.5	205.3	214.5

0.400 OXYGEN 0.600 HELIUM
CV,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.2496	.2499	.2502	.2505	.2510	.2513
30.00	.2496	.2499	.2502	.2505	.2510	.2513
50.00	.2497	.2500	.2503	.2506	.2511	.2514
100.00	.2499	.2501	.2504	.2507	.2512	.2515
200.00	.2502	.2504	.2507	.2510	.2513	.2517
300.00	.2505	.2507	.2509	.2512	.2515	.2519
400.00	.2508	.2510	.2512	.2515	.2517	.2521
500.00	.2511	.2513	.2514	.2517	.2519	.2523
1000.00	.2526	.2526	.2526	.2526	.2528	.2531
2000.00	.26	.26	.26	.25	.25	.25
3000.00	.27	.27	.27	.26	.26	.26
4000.00						
5000.00						

0.400 OXYGEN 0.600 HELIUM
ENTROPY,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	2.4151	2.4304	2.4450	2.4591	2.4728	2.4859
30.00	2.3692	2.3845	2.3991	2.4132	2.4269	2.4401
50.00	2.3092	2.3245	2.3391	2.3533	2.3669	2.3802
100.00	2.2045	2.2199	2.2347	2.2488	2.2625	2.2757
200.00	2.1471	2.1626	2.1775	2.1917	2.2054	2.2187
300.00	2.0897	2.1052	2.1202	2.1345	2.1484	2.1617
400.00	2.0323	2.0479	2.0630	2.0774	2.0913	2.1047
500.00	1.9749	1.9906	2.0058	2.0203	2.0343	2.0477
1000.00	1.8573	1.8737	1.8894	1.9043	1.9186	1.9324
2000.00	1.758	1.776	1.792	1.808	1.823	1.837
3000.00	1.688	1.706	1.725	1.742	1.757	1.771
4000.00	1.646	1.665	1.683	1.698	1.713	1.729
5000.00	1.610	1.629	1.648	1.665	1.681	1.696

0.400 OXYGEN 0.600 HELIUM
THERMAL CONDUCTIVITY,BTU/SEC FT F
(MULTIPLY TABLE ENTRY BY .0000100)

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.05	1.08	1.11	1.14	1.17	1.20
30.00						
50.00						
100.00						
200.00						
300.00						
400.00						
500.00						
1000.00						
2000.00						
3000.00						
4000.00						
5000.00						

0.400 OXYGEN 0.600 HELIUM
CP,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.3805	.3808	.3811	.3814	.3818	.3821
30.00	.3810	.3812	.3815	.3817	.3821	.3824
50.00	.3815	.3817	.3819	.3822	.3825	.3828
100.00	.3830	.3830	.3831	.3833	.3835	.3837
200.00	.3860	.3857	.3855	.3854	.3855	.3855
300.00	.3889	.3883	.3879	.3876	.3874	.3874
400.00	.3919	.3909	.3903	.3898	.3894	.3892
500.00	.3950	.3937	.3928	.3920	.3914	.3910
1000.00	.4108	.4076	.4051	.4032	.4015	.4002
2000.00	.44	.43	.43	.43	.43	.42
3000.00	.47	.46	.45	.44	.44	.43
4000.00	.47	.46	.46	.45	.44	.44
5000.00						

0.400 OXYGEN 0.600 HELIUM
PRANDTL NUMBER

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.50	.50	.50	.50	.50	.50
30.00						
50.00						
100.00						
200.00						
300.00						
400.00						
500.00						
1000.00						
2000.00						
3000.00						
4000.00						
5000.00						

0.400 OXYGEN 0.600 HELIUM
CP/CV

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.524	1.524	1.523	1.523	1.521	1.520
30.00	1.526	1.525	1.524	1.524	1.522	1.521
50.00	1.528	1.527	1.526	1.525	1.523	1.522
100.00	1.533	1.531	1.530	1.529	1.527	1.525
200.00	1.543	1.540	1.538	1.536	1.534	1.532
300.00	1.553	1.548	1.546	1.543	1.540	1.538
400.00	1.563	1.557	1.554	1.550	1.547	1.544
500.00	1.573	1.566	1.562	1.557	1.554	1.550
1000.00	1.626	1.614	1.604	1.595	1.588	1.581
2000.00	1.7	1.7	1.7	1.7	1.7	1.7
3000.00	1.7	1.7	1.7	1.7	1.7	1.7
4000.00						
5000.00						

0.400 OXYGEN 0.600 HELIUM
VISCOSITY,LB/FT SEC
(MULTIPLY TABLE ENTRY BY .0000100)

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.369	1.410	1.453	1.491	1.531	1.573
30.00						
50.00						
100.00						
200.00						
300.00						
400.00						
500.00						
1000.00						
2000.00						
3000.00						
4000.00						
5000.00						

0.400 OXYGEN 0.600 HELIUM
SONIC VELOCITY FT/SEC

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1564	1594	1625	1655	1684	1713
30.00	1565	1596	1626	1656	1685	1714
50.00	1567	1598	1628	1658	1687	1716
100.00	1572	1602	1633	1662	1691	1720
200.00	1582	1612	1642	1671	1700	1729
300.00	1591	1621	1651	1680	1708	1737
400.00	1601	1630	1660	1689	1717	1745
500.00	1610	1640	1669	1697	1726	1754
1000.00	1658	1686	1714	1742	1769	1796
2000.00	1729	1761	1793	1825	1856	1888
3000.00	1800	1836	1872	1908	1944	1980
4000.00						
5000.00						

DENSITY
32 % O_2, 68 % He

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DENSITY,LBS/CUBIC FT

.320 OXYGEN .680 HELIUM AVERAGE MOLECULAR WEIGHT 12.962

DEPTH	PRESSURE		TEMPERATURE,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	.03623	.03551	.03481	.03416	.03350	.03288	.03228	.03170	.03115	.03061	.03009
10	19.14	1.30	.04719	.04624	.04533	.04446	.04362	.04281	.04203	.04128	.04056	.03986	.03918
20	23.58	1.60	.05813	.05697	.05585	.05478	.05374	.05275	.05179	.05086	.04997	.04911	.04828
30	28.03	1.91	.06908	.06770	.06637	.06509	.06386	.06268	.06154	.06044	.05938	.05835	.05736
40	32.47	2.21	.08002	.07842	.07688	.07540	.07398	.07261	.07129	.07001	.06879	.06760	.06645
50	36.92	2.51	.09096	.08914	.08739	.08571	.08409	.08253	.08103	.07959	.07819	.07684	.07554
60	41.36	2.81	.10190	.09986	.09790	.09602	.09420	.09246	.09077	.08915	.08759	.08608	.08462
70	45.81	3.12	.11283	.11057	.10840	.10632	.10431	.10238	.10052	.09872	.09699	.09532	.09370
80	50.25	3.42	.12376	.12129	.11891	.11662	.11442	.11230	.11025	.10828	.10638	.10455	.10278
90	54.70	3.72	.13469	.13200	.12941	.12692	.12452	.12221	.11999	.11785	.11578	.11378	.11185
100	59.14	4.02	.14562	.14270	.13990	.13721	.13462	.13213	.12972	.12740	.12517	.12301	.12093
110	63.58	4.33	.15654	.15340	.15039	.14750	.14471	.14204	.13945	.13696	.13456	.13224	.13000
120	68.03	4.63	.16746	.16411	.16089	.15779	.15481	.15194	.14918	.14651	.14394	.14146	.13906
130	72.47	4.93	.17837	.17480	.17137	.16808	.16490	.16185	.15891	.15607	.15333	.15068	.14813
140	76.92	5.23	.18929	.18550	.18186	.17836	.17499	.17175	.16862	.16562	.16271	.15990	.15719
150	81.36	5.54	.20020	.19619	.19234	.18864	.18508	.18165	.17834	.17516	.17209	.16912	.16625
160	85.81	5.84	.21111	.20688	.20282	.19892	.19516	.19155	.18806	.18471	.18146	.17833	.17531
170	90.25	6.14	.22201	.21757	.21329	.20919	.20525	.20144	.19778	.19424	.19084	.18755	.18437
180	94.70	6.44	.23291	.22825	.22377	.21946	.21532	.21133	.20749	.20378	.20021	.19676	.19342
190	99.14	6.75	.24381	.23893	.23424	.22973	.22539	.22122	.21720	.21332	.20958	.20596	.20247
200	103.58	7.05	.25470	.24961	.24471	.24000	.23547	.23110	.22691	.22285	.21895	.21517	.21152
210	108.03	7.35	.26560	.26028	.25518	.25026	.24554	.24099	.23661	.23238	.22831	.22437	.22057
220	112.47	7.65	.27649	.27096	.26564	.26053	.25561	.25087	.24631	.24191	.23766	.23357	.22962
230	116.92	7.96	.28738	.28163	.27609	.27078	.26567	.26075	.25601	.25144	.24702	.24277	.23866
240	121.36	8.26	.29826	.29229	.28655	.28104	.27574	.27063	.26570	.26096	.25638	.25196	.24770
250	125.81	8.56	.30914	.30295	.29700	.29129	.28579	.28050	.27540	.27048	.26574	.26116	.25673
260	130.25	8.86	.32002	.31361	.30746	.30154	.29585	.29037	.28509	.27999	.27509	.27035	.26576
270	134.69	9.17	.33089	.32427	.31791	.31179	.30590	.30023	.29478	.28951	.28444	.27954	.27480
280	139.14	9.47	.34177	.33493	.32835	.32203	.31595	.31010	.30447	.29902	.29378	.28872	.28383
290	143.58	9.77	.35264	.34558	.33879	.33227	.32600	.31996	.31415	.30854	.30313	.29791	.29285
300	148.03	10.07	.36350	.35622	.34923	.34251	.33605	.32982	.32382	.31804	.31247	.30708	.30188
310	152.47	10.38	.37436	.36687	.35967	.35275	.34609	.33968	.33350	.32755	.32181	.31626	.31090
320	156.92	10.68	.38522	.37751	.37010	.36298	.35613	.34954	.34318	.33705	.33115	.32543	.31992
330	161.36	10.98	.39608	.38815	.38054	.37321	.36617	.35938	.35285	.34656	.34047	.33461	.32894
340	165.81	11.28	.40694	.39879	.39096	.38344	.37620	.36923	.36252	.35605	.34980	.34378	.33796
350	170.25	11.58	.41779	.40942	.40138	.39366	.38624	.37908	.37219	.36554	.35913	.35295	.34697
360	174.69	11.89	.42864	.42005	.41181	.40388	.39626	.38892	.38186	.37504	.36846	.36211	.35598
370	179.14	12.19	.43948	.43068	.42223	.41410	.40629	.39877	.39151	.38453	.37779	.37128	.36499
380	183.58	12.49	.45032	.44131	.43265	.42432	.41631	.40861	.40117	.39401	.38711	.38044	.37400
390	188.03	12.79	.46116	.45193	.44305	.43454	.42633	.41844	.41083	.40350	.39643	.38960	.38300
400	192.47	13.10	.47200	.46254	.45347	.44474	.43635	.42827	.42049	.41298	.40575	.39876	.39200
410	196.92	13.40	.48284	.47316	.46388	.45495	.44637	.43810	.43014	.42247	.41506	.40791	.40100
420	201.36	13.70	.49366	.48378	.47429	.46516	.45638	.44793	.43979	.43193	.42436	.41706	.41000
430	205.81	14.00	.50449	.49439	.48469	.47536	.46639	.45776	.44944	.44141	.43367	.42620	.41899
440	210.25	14.31	.51532	.50500	.49508	.48557	.47640	.46758	.45907	.45088	.44298	.43535	.42799
450	214.69	14.61	.52614	.51560	.50548	.49575	.48640	.47739	.46872	.46035	.45228	.44449	.43698
460	219.14	14.91	.53696	.52620	.51588	.50595	.49641	.48721	.47836	.46982	.46159	.45364	.44595
470	223.58	15.21	.54777	.53680	.52627	.51614	.50640	.49703	.48800	.47929	.47089	.46278	.45494
480	228.03	15.52	.55858	.54740	.53666	.52633	.51640	.50684	.49763	.48875	.48018	.47191	.46392
490	232.47	15.82	.56940	.55799	.54704	.53652	.52639	.51665	.50726	.49821	.48948	.48105	.47290
500	236.92	16.12	.58021	.56858	.55742	.54669	.53639	.52646	.51688	.50766	.49877	.49018	.48188
510	241.36	16.42	.59100	.57917	.56781	.55688	.54638	.53625	.52651	.51712	.50805	.49931	.49086
520	245.80	16.73	.60180	.58976	.57819	.56706	.55635	.54606	.53614	.52657	.51734	.50844	.49983
530	250.25	17.03	.61260	.60034	.58855	.57724	.56634	.55586	.54576	.53602	.52662	.51757	.50880
540	254.69	17.33	.62340	.61091	.59892	.58740	.57632	.56566	.55538	.54547	.53591	.52667	.51777
550	259.14	17.63	.63418	.62149	.60929	.59757	.58630	.57545	.56500	.55491	.54519	.53580	.52674
560	263.58	17.94	.64497	.63207	.61966	.60774	.59628	.58523	.57460	.56434	.55447	.54491	.53570
570	268.03	18.24	.65576	.64264	.63003	.61791	.60624	.59502	.58421	.57379	.56374	.55403	.54466
580	272.47	18.54	.66655	.65319	.64038	.62807	.61621	.60481	.59382	.58322	.57301	.56314	.55362
590	276.92	18.84	.67734	.66376	.65074	.63821	.62618	.61459	.60343	.59266	.58227	.57225	.56258
600	281.36	19.15	.68810	.67433	.66110	.64837	.63615	.62438	.61303	.60209	.59154	.58136	.57152
610	285.80	19.45	.69888	.68489	.67145	.65853	.64610	.63414	.62262	.61152	.60080	.59047	.58047
620	290.25	19.75	.70965	.69543	.68179	.66868	.65606	.64392	.63222	.62095	.61007	.59957	.58942
630	294.69	20.05	.72041	.70599	.69214	.67882	.66602	.65369	.64182	.63036	.61933	.60866	.59837
640	299.14	20.36	.73118	.71654	.70248	.68896	.67597	.66346	.65141	.63979	.62859	.61776	.60731
650	303.58	20.66	.74194	.72709	.71243	.69911	.68593	.67323	.66100	.64921	.63784	.62686	.61626
660	308.03	20.96	.75271	.73762	.72315	.70925	.69586	.68298	.67058	.65863	.64708	.63595	.62520
670	312.47	21.26	.76345	.74817	.73349	.71937	.70581	.69275	.68016	.66804	.65633	.64504	.63414
680	316.92	21.56	.77421	.75871	.74383	.72951	.71576	.70251	.68975	.67746	.66558	.65413	.64307
690	321.36	21.87	.78496	.76925	.75416	.73965	.72570	.71227	.69933	.68685	.67483	.66322	.65201
700	325.80	22.17	.79572	.77977	.76447	.74978	.73562	.72203	.70891	.69626	.68407	.67231	.66094
710	330.25	22.47	.80645	.79031	.77480	.75989	.74556	.73176	.71849	.70567	.69331	.68139	.66987
720	334.69	22.77	.81719	.80084	.78512	.77001	.75549	.74151	.72804	.71507	.70255	.69045	.67878
730	339.14	23.08	.82794	.81134	.79542	.78014	.76543	.75126	.73761	.72447	.71177	.69953	.68770
740	343.58	23.38	.83868	.82187	.80574	.79026	.77534	.76101	.74718	.73385	.72101	.70860	.69662
750	348.03	23.68	.84939	.83239	.81606	.80036	.78527	.77073	.75675	.74325	.73024	.71768	.70556
760	352.47	23.98	.86013	.84291	.82638	.81047	.79519	.78047	.76631	.75264	.73947	.72675	.71446
770	356.91	24.29	.87086	.85341	.83666	.82059	.80511	.79021	.77586	.76203	.74869	.73581	.72337
780	361.36	24.59	.88157	.86393	.84697	.83070	.81501	.79995	.78542	.77142	.75792	.74488	.73229
790	365.80	24.89	.89230	.87444	.85728	.84078	.82493	.80966	.79497	.78081	.76714	.75394	.74120

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DENSITY

32 % O_2, 68 % He

DENSITY,LBS/CUBIC FT

.320 OXYGEN .680 HELIUM AVERAGE MOLECULAR WEIGHT 12.962

DEPTH FT	PRESSURE PSIA	PRESSURE ATM	TEMPERATURE,F 30	40	50	60	70	80	90	100	110	120	130
800	370.25	25.19	.90302	.88492	.86756	.85089	.83484	.81939	.80453	.79017	.77634	.76299	.75010
810	374.69	25.50	.91372	.89543	.87786	.86099	.84475	.82912	.81406	.79955	.78556	.77204	.75901
820	379.14	25.80	.92444	.90593	.88816	.87107	.85464	.83885	.82361	.80893	.79477	.78110	.76791
830	383.58	26.10	.93515	.91643	.89845	.88116	.86455	.84857	.83315	.81831	.80398	.79015	.77679
840	388.03	26.40	.94586	.92691	.90872	.89126	.87445	.85827	.84270	.82768	.81319	.79921	.78569
850	392.47	26.71	.95655	.93740	.91901	.90135	.88435	.86799	.85224	.83703	.82240	.80826	.79459
860	396.91	27.01	.96726	.94790	.92930	.91141	.89423	.87770	.86176	.84640	.83159	.81730	.80348
870	401.36	27.31	.97796	.95836	.93956	.92150	.90412	.88742	.87129	.85577	.84079	.82635	.81237
880	405.80	27.61	.98864	.96885	.94984	.93158	.91402	.89710	.88083	.86513	.84999	.83537	.82126
890	410.25	27.92	.99933	.97933	.96012	.94164	.92391	.90681	.89036	.87449	.85919	.84441	.83015
900	414.69	28.22	1.01003	.98979	.97039	.95172	.93377	.91652	.89986	.88383	.86838	.85344	.83904
910	419.14	28.52	1.02070	1.00027	.98066	.96179	.94366	.92622	.90939	.89319	.87757	.86248	.84792
920	423.58	28.82	1.03139	1.01074	.99091	.97187	.95354	.93589	.91891	.90254	.88674	.87151	.85678
930	428.03	29.13	1.04207	1.02119	1.00118	.98191	.96340	.94559	.92844	.91189	.89593	.88054	.86565
940	432.47	29.43	1.05273	1.03166	1.01142	.99198	.97327	.95529	.93795	.92124	.90512	.88957	.87453
950	436.91	29.73	1.06341	1.04213	1.02168	1.00204	.98315	.96498	.94745	.93057	.91430	.89857	.88340
960	441.36	30.03	1.07409	1.05256	1.03194	1.01206	.99302	.97464	.95696	.93991	.92348	.90760	.89227
970	445.80	30.33	1.08474	1.06303	1.04217	1.02214	1.00286	.98433	.96647	.94925	.93266	.91662	.90114
980	450.25	30.64	1.09541	1.07348	1.05242	1.03219	1.01273	.99402	.97598	.95859	.94181	.92563	.91001
990	454.69	30.94	1.10606	1.08391	1.06267	1.04225	1.02260	1.00370	.98546	.96793	.95098	.93465	.91887
1000	459.14	31.24	1.11672	1.09437	1.07249	1.05227	1.03243	1.01335	.99497	.97724	.96016	.94366	.92773
1050	481.36	32.75	1.16998	1.14653	1.12406	1.10246	1.08167	1.06168	1.04242	1.02385	1.00595	.98867	.97198
1100	503.58	34.27	1.2231	1.1987	1.1751	1.1526	1.1308	1.1099	1.0898	1.0704	1.0517	1.0336	1.0162
1150	525.80	35.78	1.2762	1.2507	1.2261	1.2026	1.1799	1.1581	1.1371	1.1169	1.0974	1.0785	1.0603
1200	548.02	37.29	1.3292	1.3026	1.2771	1.2526	1.2289	1.2063	1.1844	1.1633	1.1430	1.1233	1.1044
1250	570.25	38.80	1.3822	1.3545	1.3280	1.3024	1.2779	1.2543	1.2316	1.2097	1.1885	1.1681	1.1484
1300	592.47	40.31	1.4350	1.4063	1.3788	1.3523	1.3268	1.3023	1.2787	1.2560	1.2340	1.2128	1.1924
1350	614.69	41.83	1.4878	1.4580	1.4295	1.4020	1.3756	1.3502	1.3257	1.3022	1.2794	1.2575	1.2363
1400	636.91	43.34	1.5405	1.5097	1.4801	1.4517	1.4244	1.3981	1.3728	1.3483	1.3248	1.3021	1.2801
1450	659.13	44.85	1.5932	1.5613	1.5307	1.5013	1.4730	1.4459	1.4197	1.3944	1.3701	1.3466	1.3239
1500	681.36	46.36	1.6457	1.6128	1.5812	1.5509	1.5217	1.4936	1.4665	1.4405	1.4153	1.3911	1.3676

500	34.02	1.2146	1.1903	1.1669	1.1445	1.1229	1.1022	1.0822	1.0629	1.0443	1.0264	1.0091
600	40.83	1.4529	1.4239	1.3960	1.3691	1.3433	1.3186	1.2946	1.2716	1.2494	1.2280	1.2073
700	47.63	1.6898	1.6560	1.6235	1.5924	1.5624	1.5336	1.5058	1.4790	1.4533	1.4283	1.4043
800	54.44	1.9251	1.8866	1.8497	1.8142	1.7800	1.7472	1.7156	1.6852	1.6558	1.6275	1.6001
900	61.24	2.1588	2.1157	2.0743	2.0345	1.9963	1.9596	1.9242	1.8901	1.8572	1.8254	1.7947
1000	68.05	2.3910	2.3433	2.2975	2.2535	2.2112	2.1705	2.1314	2.0936	2.0572	2.0221	1.9882
1100	74.85	2.6217	2.5695	2.5192	2.4711	2.4247	2.3802	2.3373	2.2960	2.2561	2.2176	2.1805
1200	81.65	2.8509	2.7941	2.7396	2.6872	2.6369	2.5885	2.5419	2.4970	2.4537	2.4119	2.3716
1300	88.46	3.0785	3.0172	2.9584	2.9020	2.8477	2.7955	2.7452	2.6968	2.6501	2.6050	2.5615
1400	95.26	3.3046	3.2389	3.1758	3.1152	3.0571	3.0011	2.9473	2.8953	2.8453	2.7970	2.7503
1500	102.07	3.5291	3.4590	3.3917	3.3272	3.2651	3.2055	3.1480	3.0926	3.0393	2.9877	2.9379
1600	108.87	3.7522	3.6777	3.6062	3.5377	3.4718	3.4085	3.3475	3.2886	3.2320	3.1772	3.1245
1700	115.68	3.9737	3.8949	3.8194	3.7469	3.6772	3.6102	3.5457	3.4834	3.4236	3.3657	3.3098
1800	122.48	4.1937	4.1108	4.0311	3.9547	3.8812	3.8106	3.7425	3.6769	3.6138	3.5529	3.4940
1900	129.29	4.4122	4.3250	4.2414	4.1610	4.0838	4.0097	3.9382	3.8693	3.8031	3.7389	3.6772
2000	136.09	4.6291	4.5378	4.4501	4.3660	4.2852	4.2075	4.1327	4.0605	3.9910	3.9239	3.8590
2100	142.90	4.8446	4.7493	4.6577	4.5696	4.4853	4.4042	4.3259	4.2505	4.1780	4.1077	4.0400
2200	149.70	5.0587	4.9591	4.8637	4.7720	4.6840	4.5994	4.5177	4.4392	4.3636	4.2904	4.2197
2300	156.51	5.2711	5.1676	5.0684	4.9731	4.8813	4.7934	4.7085	4.6269	4.5481	4.4720	4.3986
2400	163.31	5.4824	5.3747	5.2716	5.1726	5.0777	4.9863	4.8979	4.8132	4.7313	4.6524	4.5761
2500	170.11	5.6917	5.5805	5.4737	5.3709	5.2723	5.1776	5.0864	4.9984	4.9135	4.8316	4.7527
2600	176.92	5.9000	5.7847	5.6742	5.5679	5.4660	5.3681	5.2735	5.1825	5.0947	5.0100	4.9281
2700	183.72	6.1068	5.9875	5.8734	5.7637	5.6584	5.5571	5.4594	5.3652	5.2746	5.1871	5.1026
2800	190.53	6.3121	6.1890	6.0714	5.9582	5.8494	5.7449	5.6441	5.5470	5.4536	5.3631	5.2760
2900	197.33	6.5160	6.3892	6.2677	6.1512	6.0391	5.9315	5.8278	5.7277	5.6313	5.5381	5.4481
3000	204.14	6.7185	6.5881	6.4631	6.3430	6.2277	6.1170	6.0100	5.9071	5.8079	5.7120	5.6195
3100	210.94	6.9194	6.7854	6.6570	6.5339	6.4151	6.3013	6.1914	6.0854	5.9834	5.8849	5.7898
3200	217.75	7.1193	6.9817	6.8496	6.7232	6.6013	6.4845	6.3713	6.2629	6.1579	6.0568	5.9589
3300	224.55	7.3175	7.1765	7.0410	6.9110	6.7863	6.6662	6.5505	6.4390	6.3313	6.2274	6.1273
3400	231.36	7.5145	7.3699	7.2311	7.0980	6.9702	6.8472	6.7283	6.6140	6.5037	6.3973	6.2945
3500	238.16	7.7101	7.5622	7.4200	7.2837	7.1526	7.0267	6.9050	6.7880	6.6751	6.5658	6.4606
3600	244.96	7.9041	7.7528	7.6078	7.4680	7.3342	7.2050	7.0806	6.9609	6.8455	6.7337	6.6261
3700	251.77	8.0972	7.9425	7.7939	7.6514	7.5143	7.3823	7.2551	7.1328	7.0145	6.9006	6.7903
3800	258.57	8.2890	8.1307	7.9789	7.8334	7.6933	7.5589	7.4286	7.3037	7.1829	7.0662	6.9536
3900	265.38	8.4792	8.3180	8.1631	8.0142	7.8712	7.7340	7.6011	7.4732	7.3503	7.2309	7.1159
4000	272.18	8.6682	8.5037	8.3457	8.1942	8.0480	7.9080	7.7725	7.6421	7.5163	7.3949	7.2772
4100	278.99	8.8559	8.6883	8.5272	8.3727	8.2237	8.0810	7.9428	7.8099	7.6817	7.5576	7.4377
4200	285.79	9.0424	8.8716	8.7075	8.5501	8.3984	8.2526	8.1122	7.9764	7.8458	7.7193	7.5976
4300	292.60	9.2277	9.0538	8.8867	8.7265	8.5719	8.4235	8.2805	8.1423	8.0093	7.8805	7.7562
4400	299.40	9.4118	9.2348	9.0648	8.9013	8.7444	8.5933	8.4474	8.3071	8.1714	8.0404	7.9139
4500	306.21	9.5948	9.4147	9.2417	9.0754	8.9158	8.7622	8.6138	8.4707	8.3326	8.1994	8.0707
4600	313.01	9.7765	9.5930	9.4175	9.2484	9.0862	8.9296	8.7787	8.6336	8.4933	8.3575	8.2266
4700	319.81	9.9566	9.7706	9.5918	9.4204	9.2551	9.0964	8.9431	8.7952	8.6526	8.5146	8.3817
4800	326.62	10.1361	9.9470	9.7655	9.5909	9.4236	9.2622	9.1064	8.9559	8.8111	8.6713	8.5358
4900	333.42	10.3139	10.1220	9.9380	9.7606	9.5907	9.4266	9.2685	9.1160	8.9690	8.8266	8.6891
5000	340.23	10.4910	10.2962	10.1091	9.9297	9.7566	9.5904	9.4299	9.2748	9.1256	8.9811	8.8416

SP. VOL.
32 % O_2, 68 % He

T-46

SPECIFIC VOLUME,CUBIC FT/LB

.320 OXYGEN .680 HELIUM AVERAGE MOLECULAR WEIGHT 12.962

DEPTH	PRESSURE		TEMPERATURE,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	27.598	28.162	28.726	29.289	29.853	30.417	30.980	31.544	32.108	32.671	33.235
10	19.14	1.30	21.193	21.626	22.059	22.491	22.924	23.357	23.790	24.223	24.656	25.088	25.521
20	23.58	1.60	17.201	17.553	17.904	18.255	18.607	18.958	19.309	19.661	20.012	20.363	20.715
30	28.03	1.91	14.476	14.772	15.068	15.363	15.659	15.955	16.250	16.545	16.841	17.137	17.432
40	32.47	2.21	12.497	12.752	13.007	13.262	13.518	13.773	14.028	14.283	14.538	14.793	15.048
50	36.92	2.51	10.994	11.218	11.443	11.667	11.892	12.116	12.341	12.565	12.790	13.014	13.239
60	41.36	2.81	9.8137	10.0141	10.2145	10.4150	10.6154	10.8158	11.0162	11.2167	11.4168	11.6172	11.8177
70	45.81	3.12	8.8627	9.0437	9.2247	9.4057	9.5867	9.7677	9.9487	10.1297	10.3104	10.4914	10.6724
80	50.25	3.42	8.0799	8.2449	8.4099	8.5749	8.7400	8.9050	9.0700	9.2350	9.4000	9.5648	9.7298
90	54.70	3.72	7.4243	7.5759	7.7276	7.8792	8.0308	8.1825	8.3341	8.4857	8.6373	8.7887	8.9404
100	59.14	4.02	6.8673	7.0075	7.1480	7.2882	7.4283	7.5685	7.7088	7.8490	7.9893	8.1293	8.2696
110	63.58	4.33	6.3881	6.5187	6.6492	6.7797	6.9101	7.0406	7.1709	7.3014	7.4318	7.5621	7.6926
120	68.03	4.63	5.9717	6.0936	6.2156	6.3376	6.4595	6.5815	6.7033	6.8252	6.9472	7.0690	7.1909
130	72.47	4.93	5.6062	5.7207	5.8352	5.9497	6.0642	6.1787	6.2930	6.4075	6.5220	6.6365	6.7508
140	76.92	5.23	5.2830	5.3909	5.4988	5.6067	5.7146	5.8224	5.9303	6.0381	6.1460	6.2539	6.3616
150	81.36	5.54	4.9950	5.0971	5.1991	5.3011	5.4031	5.5051	5.6071	5.7090	5.8110	5.9130	6.0149
160	85.81	5.84	4.7369	4.8337	4.9304	5.0272	5.1239	5.2207	5.3174	5.4140	5.5107	5.6075	5.7041
170	90.25	6.14	4.5043	4.5962	4.6884	4.7804	4.8722	4.9642	5.0562	5.1482	5.2401	5.3320	5.4239
180	94.70	6.44	4.2934	4.3812	4.4689	4.5566	4.6443	4.7318	4.8195	4.9072	4.9948	5.0825	5.1700
190	99.14	6.75	4.1016	4.1854	4.2691	4.3529	4.4367	4.5203	4.6041	4.6878	4.7715	4.8552	4.9389
200	103.58	7.05	3.9261	4.0063	4.0865	4.1667	4.2469	4.3270	4.4071	4.4873	4.5674	4.6475	4.7276
210	108.03	7.35	3.7651	3.8420	3.9189	3.9958	4.0727	4.1496	4.2263	4.3032	4.3800	4.4569	4.5337
220	112.47	7.65	3.6168	3.6906	3.7645	3.8384	3.9122	3.9861	4.0600	4.1337	4.2076	4.2814	4.3551
230	116.92	7.96	3.4797	3.5508	3.6220	3.6930	3.7640	3.8351	3.9062	3.9771	4.0482	4.1191	4.1901
240	121.36	8.26	3.3528	3.4213	3.4898	3.5583	3.6267	3.6951	3.7636	3.8320	3.9004	3.9688	4.0372
250	125.81	8.56	3.2347	3.3009	3.3669	3.4330	3.4991	3.5651	3.6311	3.6971	3.7631	3.8291	3.8952
260	130.25	8.86	3.1248	3.1887	3.2525	3.3163	3.3801	3.4439	3.5077	3.5715	3.6352	3.6989	3.7628
270	134.69	9.17	3.0221	3.0839	3.1456	3.2073	3.2690	3.3307	3.3924	3.4541	3.5157	3.5774	3.6391
280	139.14	9.47	2.9260	2.9857	3.0455	3.1053	3.1650	3.2248	3.2844	3.3442	3.4039	3.4635	3.5233
290	143.58	9.77	2.8358	2.8937	2.9517	3.0096	3.0674	3.1254	3.1832	3.2411	3.2989	3.3568	3.4147
300	148.03	10.07	2.7510	2.8073	2.8634	2.9196	2.9757	3.0319	3.0881	3.1442	3.2003	3.2565	3.3126
310	152.47	10.38	2.6712	2.7258	2.7803	2.8349	2.8895	2.9439	2.9985	3.0530	3.1074	3.1620	3.2165
320	156.92	10.68	2.5959	2.6489	2.7019	2.7550	2.8080	2.8609	2.9139	2.9669	3.0198	3.0728	3.1258
330	161.36	10.98	2.5247	2.5763	2.6279	2.6794	2.7310	2.7826	2.8340	2.8855	2.9371	2.9886	3.0401
340	165.81	11.28	2.4574	2.5076	2.5578	2.6079	2.6581	2.7083	2.7584	2.8086	2.8587	2.9089	2.9590
350	170.25	11.58	2.3935	2.4425	2.4914	2.5403	2.5891	2.6380	2.6868	2.7357	2.7845	2.8333	2.8821
360	174.69	11.89	2.3330	2.3807	2.4283	2.4760	2.5236	2.5712	2.6188	2.6664	2.7140	2.7616	2.8091
370	179.14	12.19	2.2754	2.3219	2.3684	2.4148	2.4613	2.5077	2.5542	2.6006	2.6470	2.6934	2.7398
380	183.58	12.49	2.2206	2.2660	2.3113	2.3567	2.4020	2.4473	2.4927	2.5380	2.5833	2.6285	2.6738
390	188.03	12.79	2.1684	2.2127	2.2571	2.3013	2.3456	2.3898	2.4341	2.4783	2.5225	2.5667	2.6110
400	192.47	13.10	2.1186	2.1620	2.2052	2.2485	2.2917	2.3350	2.3782	2.4214	2.4646	2.5078	2.5510
410	196.92	13.40	2.0711	2.1134	2.1557	2.1980	2.2403	2.2826	2.3248	2.3671	2.4093	2.4515	2.4937
420	201.36	13.70	2.0257	2.0671	2.1084	2.1498	2.1912	2.2325	2.2738	2.3152	2.3565	2.3977	2.4390
430	205.81	14.00	1.9822	2.0227	2.0632	2.1037	2.1441	2.1846	2.2250	2.2655	2.3059	2.3463	2.3867
440	210.25	14.31	1.9406	1.9802	2.0199	2.0595	2.0991	2.1387	2.1783	2.2179	2.2574	2.2970	2.3365
450	214.69	14.61	1.9006	1.9395	1.9783	2.0171	2.0559	2.0947	2.1335	2.1722	2.2110	2.2498	2.2884
460	219.14	14.91	1.8623	1.9004	1.9386	1.9765	2.0145	2.0525	2.0905	2.1285	2.1664	2.2044	2.2424
470	223.58	15.21	1.8256	1.8629	1.9002	1.9374	1.9747	2.0120	2.0492	2.0864	2.1237	2.1609	2.1981
480	228.03	15.52	1.7902	1.8268	1.8634	1.8999	1.9365	1.9730	2.0095	2.0460	2.0825	2.1190	2.1555
490	232.47	15.82	1.7562	1.7922	1.8280	1.8639	1.8997	1.9355	1.9714	2.0072	2.0430	2.0788	2.1146
500	236.92	16.12	1.7235	1.7588	1.7940	1.8292	1.8643	1.8995	1.9347	1.9698	2.0049	2.0401	2.0752
510	241.36	16.42	1.6921	1.7266	1.7612	1.7957	1.8302	1.8648	1.8993	1.9338	1.9683	2.0028	2.0373
520	245.80	16.73	1.6617	1.6956	1.7295	1.7635	1.7974	1.8313	1.8652	1.8991	1.9330	1.9668	2.0007
530	250.25	17.03	1.6324	1.6657	1.6991	1.7324	1.7657	1.7990	1.8323	1.8656	1.8989	1.9321	1.9654
540	254.69	17.33	1.6041	1.6369	1.6697	1.7024	1.7351	1.7679	1.8006	1.8333	1.8660	1.8987	1.9314
550	259.14	17.63	1.5768	1.6090	1.6412	1.6734	1.7056	1.7378	1.7699	1.8021	1.8342	1.8664	1.8985
560	263.58	17.94	1.5504	1.5821	1.6138	1.6454	1.6771	1.7087	1.7404	1.7720	1.8035	1.8352	1.8667
570	268.03	18.24	1.5249	1.5561	1.5872	1.6184	1.6495	1.6806	1.7117	1.7428	1.7739	1.8050	1.8360
580	272.47	18.54	1.5003	1.5309	1.5616	1.5922	1.6228	1.6534	1.6840	1.7146	1.7452	1.7757	1.8063
590	276.92	18.84	1.4764	1.5066	1.5367	1.5669	1.5970	1.6271	1.6572	1.6873	1.7174	1.7475	1.7775
600	281.36	19.15	1.4533	1.4830	1.5126	1.5423	1.5720	1.6016	1.6312	1.6609	1.6905	1.7201	1.7497
610	285.80	19.45	1.4309	1.4601	1.4893	1.5185	1.5478	1.5769	1.6061	1.6353	1.6644	1.6936	1.7227
620	290.25	19.75	1.4091	1.4380	1.4667	1.4955	1.5243	1.5530	1.5817	1.6104	1.6392	1.6678	1.6966
630	294.69	20.05	1.3881	1.4165	1.4448	1.4732	1.5015	1.5298	1.5581	1.5864	1.6146	1.6430	1.6712
640	299.14	20.36	1.3677	1.3956	1.4235	1.4515	1.4793	1.5072	1.5351	1.5630	1.5909	1.6188	1.6466
650	303.58	20.66	1.3478	1.3753	1.4029	1.4304	1.4579	1.4854	1.5129	1.5403	1.5678	1.5953	1.6227
660	308.03	20.96	1.3285	1.3557	1.3828	1.4099	1.4371	1.4642	1.4913	1.5183	1.5454	1.5724	1.5995
670	312.47	21.26	1.3098	1.3366	1.3633	1.3901	1.4168	1.4435	1.4702	1.4969	1.5236	1.5503	1.5769
680	316.92	21.56	1.2916	1.3180	1.3444	1.3708	1.3971	1.4235	1.4498	1.4761	1.5024	1.5287	1.5550
690	321.36	21.87	1.2739	1.3000	1.3260	1.3520	1.3780	1.4040	1.4299	1.4559	1.4819	1.5078	1.5337
700	325.80	22.17	1.2567	1.2824	1.3081	1.3337	1.3594	1.3850	1.4106	1.4362	1.4618	1.4874	1.5130
710	330.25	22.47	1.2400	1.2653	1.2907	1.3160	1.3413	1.3666	1.3918	1.4171	1.4423	1.4676	1.4928
720	334.69	22.77	1.2237	1.2487	1.2737	1.2987	1.3236	1.3486	1.3735	1.3985	1.4234	1.4483	1.4732
730	339.14	23.08	1.2078	1.2325	1.2572	1.2818	1.3065	1.3311	1.3557	1.3803	1.4049	1.4295	1.4541
740	343.58	23.38	1.1924	1.2167	1.2411	1.2654	1.2898	1.3140	1.3384	1.3627	1.3870	1.4112	1.4355
750	348.03	23.68	1.1773	1.2014	1.2254	1.2494	1.2735	1.2975	1.3214	1.3454	1.3694	1.3934	1.4174
760	352.47	23.98	1.1626	1.1864	1.2101	1.2338	1.2576	1.2813	1.3049	1.3287	1.3523	1.3760	1.3997
770	356.91	24.29	1.1483	1.1718	1.1952	1.2186	1.2421	1.2655	1.2889	1.3123	1.3357	1.3590	1.3824
780	361.36	24.59	1.1343	1.1575	1.1807	1.2038	1.2270	1.2501	1.2732	1.2963	1.3194	1.3425	1.3656
790	365.80	24.89	1.1207	1.1436	1.1665	1.1894	1.2122	1.2351	1.2579	1.2807	1.3035	1.3264	1.3492

T-47

SP. VOL.
32 % O_2, 68 % He

SPECIFIC VOLUME,CUBIC FT/LB

.320 OXYGEN .680 HELIUM AVERAGE MOLECULAR WEIGHT 12.962

DEPTH FT	PRESSURE PSIA	PRESSURE ATM	TEMPERATURE,F 30	40	50	60	70	80	90	100	110	120	130
800	370.25	25.19	1.1074	1.1300	1.1527	1.1752	1.1978	1.2204	1.2430	1.2655	1.2881	1.3106	1.3331
810	374.69	25.50	1.0944	1.1168	1.1391	1.1615	1.1838	1.2061	1.2284	1.2507	1.2730	1.2953	1.3175
820	379.14	25.80	1.0817	1.1038	1.1259	1.1480	1.1701	1.1921	1.2142	1.2362	1.2582	1.2802	1.3022
830	383.58	26.10	1.0693	1.0912	1.1130	1.1349	1.1567	1.1785	1.2003	1.2220	1.2438	1.2656	1.2873
840	388.03	26.40	1.0572	1.0789	1.1004	1.1220	1.1436	1.1651	1.1867	1.2082	1.2297	1.2512	1.2728
850	392.47	26.71	1.0454	1.0668	1.0881	1.1094	1.1308	1.1521	1.1734	1.1947	1.2160	1.2372	1.2585
860	396.91	27.01	1.0339	1.0550	1.0761	1.0972	1.1183	1.1393	1.1604	1.1815	1.2025	1.2235	1.2446
870	401.36	27.31	1.0225	1.0434	1.0643	1.0852	1.1060	1.1269	1.1477	1.1685	1.1894	1.2101	1.2310
880	405.80	27.61	1.0115	1.0322	1.0528	1.0734	1.0941	1.1147	1.1353	1.1559	1.1765	1.1971	1.2176
890	410.25	27.92	1.0007	1.0211	1.0415	1.0620	1.0824	1.1028	1.1231	1.1435	1.1639	1.1843	1.2046
900	414.69	28.22	.99007	1.01032	1.03051	1.05073	1.07093	1.09109	1.11128	1.13144	1.15157	1.17172	1.19184
910	419.14	28.52	.97972	.99973	1.01974	1.03973	1.05971	1.07966	1.09964	1.11959	1.13950	1.15945	1.17936
920	423.58	28.82	.96957	.98937	1.00917	1.02895	1.04872	1.06850	1.08824	1.10798	1.12772	1.14743	1.16717
930	428.03	29.13	.95963	.97925	.99882	1.01842	1.03800	1.05754	1.07708	1.09662	1.11616	1.13566	1.15520
940	432.47	29.43	.94991	.96931	.98871	1.00804	1.02746	1.04681	1.06615	1.08549	1.10483	1.12414	1.14347
950	436.91	29.73	.94037	.95958	.97878	.99796	1.01714	1.03629	1.05547	1.07462	1.09373	1.11288	1.13199
960	441.36	30.03	.93104	.95006	.96905	.98807	1.00703	1.02602	1.04498	1.06393	1.08286	1.10181	1.12073
970	445.80	30.33	.92188	.94071	.95954	.97834	.99714	1.01592	1.03469	1.05346	1.07220	1.09097	1.10970
980	450.25	30.64	.91290	.93155	.95019	.96881	.98743	1.00602	1.02461	1.04320	1.06178	1.08034	1.09889
990	454.69	30.94	.90410	.92258	.94102	.95946	.97790	.99632	1.01475	1.03313	1.05154	1.06992	1.08829
1000	459.14	31.24	.89548	.91377	.93206	.95032	.96859	.98682	1.00506	1.02329	1.04150	1.05970	1.07790
1050	481.36	32.75	.85472	.87220	.88963	.90706	.92449	.94190	.95931	.97671	.99408	1.01146	1.02883
1100	503.58	34.27	.81757	.83427	.85097	.86764	.88429	.90094	.91759	.93424	.95086	.96747	.98409
1150	525.80	35.78	.78356	.79957	.81557	.83155	.84751	.86347	.87942	.89535	.91128	.92721	.94311
1200	548.02	37.29	.75231	.76768	.78302	.79837	.81371	.82901	.84433	.85962	.87492	.89021	.90547
1250	570.25	38.80	.72350	.73828	.75303	.76774	.78253	.79726	.81197	.82668	.84139	.85607	.87077
1300	592.47	40.31	.69685	.71108	.72529	.73951	.75370	.76787	.78206	.79621	.81037	.82451	.83865
1350	614.69	41.83	.67212	.68585	.69956	.71327	.72696	.74062	.75429	.76796	.78160	.79524	.80887
1400	636.91	43.34	.64912	.66238	.67562	.68884	.70206	.71526	.72846	.74166	.75483	.76800	.78117
1450	659.13	44.85	.62767	.64049	.65330	.66608	.67886	.69163	.70439	.71713	.72987	.74261	.75534
1500	681.36	46.36	.60764	.62003	.63243	.64480	.65718	.66954	.68187	.69423	.70654	.71887	.73120

500	34.02	.82334	.84015	.85697	.87376	.89053	.90730	.92406	.94082	.95756	.97430	.99103
600	40.83	.68826	.70232	.71635	.73034	.74441	.75841	.77242	.78639	.80038	.81435	.82831
700	47.63	.59179	.60388	.61594	.62800	.64004	.65207	.66410	.67612	.68811	.70012	.71211
800	54.44	.51946	.53006	.54064	.55122	.56179	.57233	.58288	.59341	.60394	.61444	.62496
900	61.24	.46321	.47266	.48209	.49152	.50092	.51032	.51971	.52908	.53845	.54782	.55719
1000	68.05	.41823	.42675	.43526	.44375	.45224	.46072	.46918	.47764	.48609	.49454	.50297
1100	74.85	.38143	.38919	.39695	.40468	.41242	.42013	.42784	.43555	.44324	.45093	.45862
1200	81.65	.35077	.35790	.36502	.37214	.37923	.38632	.39341	.40048	.40754	.41461	.42166
1300	88.46	.32483	.33143	.33802	.34460	.35116	.35772	.36427	.37081	.37734	.38387	.39040
1400	95.26	.30261	.30875	.31488	.32100	.32711	.33321	.33930	.34538	.35146	.35753	.36360
1500	102.07	.28336	.28910	.29483	.30055	.30627	.31196	.31767	.32336	.32903	.33470	.34037
1600	108.87	.26651	.27191	.27730	.28267	.28803	.29339	.29873	.30408	.30940	.31474	.32005
1700	115.68	.25166	.25674	.26182	.26689	.27194	.27700	.28203	.28708	.29209	.29711	.30213
1800	122.48	.23845	.24326	.24807	.25286	.25765	.26243	.26720	.27196	.27671	.28146	.28620
1900	129.29	.22664	.23121	.23577	.24033	.24487	.24939	.25393	.25844	.26294	.26745	.27195
2000	136.09	.21602	.22037	.22471	.22904	.23336	.23767	.24197	.24628	.25056	.25485	.25913
2100	142.90	.20642	.21056	.21470	.21884	.22295	.22706	.23116	.23527	.23935	.24345	.24752
2200	149.70	.19768	.20165	.20560	.20956	.21349	.21742	.22135	.22527	.22917	.23308	.23698
2300	156.51	.18971	.19351	.19730	.20108	.20486	.20862	.21238	.21613	.21987	.22361	.22735
2400	163.31	.18240	.18606	.18970	.19333	.19694	.20055	.20417	.20776	.21136	.21494	.21852
2500	170.11	.17569	.17920	.18269	.18619	.18967	.19314	.19660	.20006	.20352	.20697	.21041
2600	176.92	.16949	.17287	.17624	.17960	.18295	.18629	.18963	.19296	.19628	.19960	.20292
2700	183.72	.16375	.16701	.17026	.17350	.17673	.17995	.18317	.18639	.18959	.19279	.19598
2800	190.53	.15843	.16158	.16471	.16784	.17096	.17407	.17718	.18028	.18337	.18646	.18954
2900	197.33	.15347	.15651	.15955	.16257	.16559	.16859	.17159	.17459	.17758	.18057	.18355
3000	204.14	.14884	.15179	.15472	.15765	.16057	.16348	.16639	.16929	.17218	.17507	.17795
3100	210.94	.14452	.14738	.15022	.15305	.15588	.15870	.16152	.16433	.16713	.16993	.17272
3200	217.75	.14046	.14323	.14599	.14874	.15149	.15421	.15695	.15967	.16239	.16510	.16782
3300	224.55	.13666	.13934	.14203	.14470	.14736	.15001	.15266	.15530	.15794	.16058	.16320
3400	231.36	.13308	.13569	.13829	.14089	.14347	.14605	.14863	.15119	.15376	.15632	.15887
3500	238.16	.12970	.13224	.13477	.13729	.13981	.14232	.14482	.14732	.14981	.15230	.15478
3600	244.96	.12652	.12899	.13144	.13390	.13635	.13879	.14123	.14366	.14608	.14851	.15092
3700	251.77	.12350	.12590	.12830	.13069	.13308	.13546	.13783	.14020	.14256	.14491	.14727
3800	258.57	.12064	.12299	.12533	.12766	.12998	.13229	.13461	.13692	.13922	.14152	.14381
3900	265.38	.11794	.12022	.12250	.12478	.12704	.12930	.13156	.13381	.13605	.13830	.14053
4000	272.18	.11536	.11760	.11982	.12204	.12425	.12645	.12866	.13085	.13304	.13523	.13741
4100	278.99	.11292	.11510	.11727	.11944	.12160	.12375	.12590	.12804	.13018	.13232	.13445
4200	285.79	.11059	.11272	.11484	.11696	.11907	.12117	.12327	.12537	.12746	.12954	.13162
4300	292.60	.10837	.11045	.11253	.11459	.11666	.11872	.12077	.12282	.12486	.12689	.12893
4400	299.40	.10625	.10829	.11032	.11234	.11436	.11637	.11838	.12038	.12238	.12437	.12636
4500	306.21	.10422	.10622	.10821	.11019	.11216	.11413	.11609	.11805	.12001	.12196	.12390
4600	313.01	.10229	.10424	.10619	.10814	.11006	.11199	.11391	.11583	.11774	.11965	.12156
4700	319.81	.10044	.10235	.10426	.10615	.10805	.10993	.11182	.11370	.11557	.11745	.11931
4800	326.62	.09866	.10053	.10240	.10427	.10612	.10797	.10981	.11166	.11349	.11532	.11715
4900	333.42	.09696	.09880	.10062	.10245	.10427	.10608	.10789	.10970	.11150	.11329	.11509
5000	340.23	.09532	.09712	.09892	.10071	.10249	.10427	.10605	.10782	.10958	.11134	.11310

32 % O_2, 68 % He

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0.320 OXYGEN 0.680 HELIUM
ENTHALPY,BTU/LB

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	214.00	222.67	231.35	240.05	248.73	257.43
30.00	213.92	222.60	231.29	239.99	248.68	257.38
50.00	213.82	222.51	231.21	239.91	248.61	257.32
100.00	213.57	222.29	231.00	239.72	248.45	257.17
200.00	213.1	221.8	230.6	239.4	248.1	256.9
300.00	212.5	221.3	230.2	239.0	247.8	256.6
400.00	212.0	220.9	229.8	238.7	247.4	256.3
500.00	211.5	220.4	229.4	238.3	247.1	256.0
1000.00	208.9	218.1	227.3	236.4	245.5	254.5
2000.00	204.6	214.3	224.1	233.7	242.9	252.1
3000.00	200.5	210.9	221.3	231.3	240.8	250.0
4000.00	199.0	209.6	220.1	230.3	240.2	249.9
5000.00	198.2	208.5	218.8	229.8	239.6	249.8

0.320 OXYGEN 0.680 HELIUM
CV,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.2803	.2806	.2809	.2812	.2816	.2819
30.00	.2803	.2806	.2809	.2812	.2815	.2819
50.00	.2804	.2807	.2810	.2813	.2817	.2820
100.00	.2805	.2808	.2811	.2814	.2818	.2821
200.00	.2808	.2811	.2813	.2816	.2819	.2822
300.00	.2811	.2813	.2815	.2819	.2821	.2824
400.00	.2814	.2816	.2817	.2821	.2823	.2826
500.00	.2817	.2818	.2819	.2823	.2825	.2828
1000.00	.2830	.2830	.2830	.2832	.2833	.2835
2000.00	.29	.29	.29	.29	.28	.28
3000.00	.30	.30	.30	.29	.29	.29
4000.00						
5000.00						

0.320 OXYGEN 0.680 HELIUM
ENTROPY,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	2.6922	2.7095	2.7261	2.7423	2.7578	2.7727
30.00	2.6411	2.6584	2.6750	2.6912	2.7067	2.7218
50.00	2.5742	2.5916	2.6083	2.6243	2.6400	2.6553
100.00	2.4497	2.4672	2.4840	2.5000	2.5157	2.5307
200.00	2.3820	2.3996	2.4165	2.4326	2.4483	2.4634
300.00	2.3143	2.3319	2.3489	2.3652	2.3810	2.3961
400.00	2.2466	2.2643	2.2814	2.2979	2.3136	2.3288
500.00	2.1789	2.1967	2.2139	2.2305	2.2463	2.2615
1000.00	2.0412	2.0597	2.0773	2.0942	2.1104	2.1260
2000.00	1.926	1.947	1.965	1.983	1.999	2.015
3000.00	1.846	1.867	1.887	1.906	1.923	1.940
4000.00	1.798	1.819	1.839	1.857	1.877	1.890
5000.00	1.757	1.779	1.799	1.818	1.837	1.853

0.320 OXYGEN 0.680 HELIUM
THERMAL CONDUCTIVITY,BTU/SEC FT F
(MULTIPLY TABLE ENTRY BY .0000100)

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.21	1.24	1.28	1.31	1.34	1.38
30.00						
50.00						
100.00						
200.00						
300.00						
400.00						
500.00						
1000.00						
2000.00						
3000.00						
4000.00						
5000.00						

0.320 OXYGEN 0.680 HELIUM
CP,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.4338	.4340	.4343	.4346	.4350	.4353
30.00	.4342	.4344	.4346	.4349	.4353	.4356
50.00	.4348	.4349	.4351	.4353	.4357	.4359
100.00	.4362	.4361	.4362	.4363	.4366	.4368
200.00	.4389	.4386	.4384	.4384	.4384	.4385
300.00	.4417	.4410	.4407	.4404	.4403	.4402
400.00	.4445	.4435	.4429	.4424	.4421	.4419
500.00	.4475	.4461	.4452	.4445	.4440	.4436
1000.00	.4623	.4593	.4569	.4552	.4535	.4523
2000.00	.49	.49	.49	.48	.48	.47
3000.00	.52	.51	.50	.49	.49	.49
4000.00	.52	.51	.51	.50	.49	.49
5000.00						

0.320 OXYGEN 0.680 HELIUM
PRANDTL NUMBER

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.49	.50	.50	.50	.50	.50
30.00						
50.00						
100.00						
200.00						
300.00						
400.00						
500.00						
1000.00						
2000.00						
3000.00						
4000.00						
5000.00						

32 % O_2, 68 % He

0.320 OXYGEN 0.680 HELIUM
CP/CV

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.548	1.547	1.546	1.546	1.545	1.544
30.00	1.549	1.548	1.547	1.547	1.546	1.545
50.00	1.551	1.550	1.548	1.548	1.547	1.546
100.00	1.555	1.553	1.552	1.551	1.550	1.548
200.00	1.563	1.560	1.559	1.557	1.555	1.554
300.00	1.572	1.568	1.565	1.562	1.561	1.559
400.00	1.580	1.575	1.572	1.568	1.566	1.564
500.00	1.589	1.583	1.579	1.574	1.572	1.569
1000.00	1.633	1.623	1.614	1.607	1.601	1.595
2000.00	1.7	1.7	1.7	1.7	1.7	1.7
3000.00	1.7	1.7	1.7	1.7	1.7	1.7
4000.00						
5000.00						

0.320 OXYGEN 0.680 HELIUM
VISCOSITY,LB/FT SEC
(MULTIPLY TABLE ENTRY BY .0000100)

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.376	1.416	1.457	1.496	1.533	1.574
30.00						
50.00						
100.00						
200.00						
300.00						
400.00						
500.00						
1000.00						
2000.00						
3000.00						
4000.00						
5000.00						

0.320 OXYGEN 0.680 HELIUM
SONIC VELOCITY FT/SEC

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1707	1740	1773	1806	1838	1870
30.00	1709	1742	1775	1807	1839	1871
50.00	1711	1744	1777	1809	1841	1873
100.00	1716	1749	1782	1814	1846	1878
200.00	1726	1759	1791	1823	1855	1887
300.00	1736	1769	1801	1833	1864	1895
400.00	1746	1778	1810	1842	1873	1904
500.00	1757	1788	1820	1851	1882	1913
1000.00	1808	1838	1868	1898	1928	1958
2000.00	1889	1922	1955	1988	2021	2054
3000.00	1970	2006	2042	2078	2114	2150
4000.00						
5000.00						

DENSITY
20 % O_2, 80 % He

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DENSITY,LBS/CUBIC FT

.200 OXYGEN .800 HELIUM AVERAGE MOLECULAR WEIGHT 9.602

DEPTH	PRESSURE		TEMPERATURE,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	.02684	.02630	.02579	.02529	.02481	.02435	.02391	.02348	.02307	.02267	.02229
10	19.14	1.30	.03495	.03425	.03358	.03293	.03231	.03171	.03114	.03058	.03004	.02953	.02903
20	23.58	1.60	.04306	.04220	.04137	.04058	.03981	.03907	.03836	.03768	.03702	.03638	.03576
30	28.03	1.91	.05117	.05014	.04916	.04821	.04731	.04643	.04558	.04477	.04398	.04323	.04249
40	32.47	2.21	.05927	.05809	.05695	.05585	.05480	.05378	.05281	.05186	.05095	.05007	.04923
50	36.92	2.51	.06737	.06602	.06473	.06348	.06229	.06114	.06002	.05895	.05792	.05692	.05595
60	41.36	2.81	.07547	.07396	.07251	.07112	.06978	.06848	.06724	.06604	.06488	.06376	.06268
70	45.81	3.12	.08357	.08190	.08029	.07875	.07726	.07583	.07445	.07312	.07184	.07060	.06941
80	50.25	3.42	.09166	.08983	.08807	.08637	.08475	.08318	.08166	.08021	.07880	.07744	.07613
90	54.70	3.72	.09975	.09776	.09584	.09400	.09223	.09052	.08888	.08729	.08576	.08428	.08285
100	59.14	4.02	.10784	.10569	.10361	.10162	.09970	.09786	.09608	.09437	.09271	.09112	.08957
110	63.58	4.33	.11593	.11361	.11138	.10924	.10718	.10520	.10329	.10145	.09967	.09795	.09629
120	68.03	4.63	.12401	.12153	.11915	.11686	.11466	.11254	.11049	.10852	.10662	.10478	.10301
130	72.47	4.93	.13209	.12945	.12692	.12448	.12213	.11987	.11769	.11559	.11357	.11161	.10972
140	76.92	5.23	.14017	.13737	.13468	.13209	.12960	.12720	.12489	.12266	.12051	.11844	.11643
150	81.36	5.54	.14825	.14528	.14244	.13971	.13707	.13453	.13209	.12973	.12746	.12526	.12314
160	85.81	5.84	.15632	.15320	.15019	.14731	.14453	.14186	.13929	.13680	.13440	.13209	.12985
170	90.25	6.14	.16439	.16111	.15795	.15492	.15200	.14919	.14648	.14386	.14134	.13891	.13656
180	94.70	6.44	.17246	.16901	.16570	.16252	.15946	.15651	.15367	.15093	.14828	.14573	.14326
190	99.14	6.75	.18053	.17692	.17345	.17012	.16692	.16383	.16086	.15799	.15522	.15255	.14997
200	103.58	7.05	.18859	.18482	.18120	.17772	.17437	.17115	.16804	.16505	.16215	.15936	.15667
210	108.03	7.35	.19665	.19272	.18895	.18532	.18183	.17847	.17523	.17210	.16909	.16618	.16337
220	112.47	7.65	.20471	.20062	.19669	.19291	.18928	.18578	.18241	.17916	.17602	.17299	.17007
230	116.92	7.96	.21276	.20851	.20443	.20051	.19673	.19310	.18959	.18621	.18295	.17980	.17676
240	121.36	8.26	.22081	.21640	.21217	.20810	.20418	.20040	.19677	.19326	.18987	.18661	.18345
250	125.81	8.56	.22886	.22429	.21990	.21568	.21162	.20771	.20394	.20031	.19680	.19342	.19015
260	130.25	8.86	.23691	.23218	.22764	.22327	.21907	.21502	.21112	.20736	.20373	.20022	.19683
270	134.69	9.17	.24496	.24007	.23537	.23086	.22651	.22232	.21829	.21440	.21065	.20702	.20352
280	139.14	9.47	.25300	.24795	.24310	.23844	.23395	.22962	.22546	.22144	.21757	.21383	.21021
290	143.58	9.77	.26104	.25583	.25083	.24601	.24138	.23693	.23263	.22848	.22448	.22062	.21689
300	148.03	10.07	.26908	.26371	.25855	.25359	.24882	.24422	.23979	.23552	.23140	.22742	.22358
310	152.47	10.38	.27711	.27159	.26627	.26116	.25625	.25151	.24696	.24256	.23831	.23421	.23026
320	156.92	10.68	.28514	.27946	.27399	.26874	.26368	.25881	.25412	.24959	.24523	.24101	.23693
330	161.36	10.98	.29318	.28733	.28171	.27631	.27110	.26610	.26127	.25662	.25213	.24780	.24361
340	165.81	11.28	.30120	.29520	.28942	.28387	.27853	.27339	.26843	.26365	.25904	.25459	.25029
350	170.25	11.58	.30923	.30306	.29713	.29144	.28596	.28068	.27559	.27068	.26595	.26138	.25696
360	174.69	11.89	.31725	.31093	.30485	.29900	.29338	.28796	.28274	.27771	.27285	.26816	.26363
370	179.14	12.19	.32527	.31879	.31256	.30656	.30079	.29524	.28989	.28473	.27975	.27495	.27030
380	183.58	12.49	.33329	.32664	.32026	.31412	.30821	.30252	.29704	.29175	.28665	.28173	.27697
390	188.03	12.79	.34130	.33450	.32796	.32168	.31563	.30980	.30419	.29878	.29355	.28851	.28363
400	192.47	13.10	.34932	.34235	.33566	.32923	.32304	.31708	.31133	.30579	.30045	.29529	.29030
410	196.92	13.40	.35733	.35020	.34336	.33678	.33044	.32435	.31847	.31280	.30734	.30206	.29696
420	201.36	13.70	.36534	.35805	.35105	.34432	.33786	.33162	.32562	.31982	.31423	.30883	.30362
430	205.81	14.00	.37334	.36590	.35875	.35188	.34526	.33889	.33275	.32683	.32113	.31561	.31028
440	210.25	14.31	.38134	.37374	.36644	.35942	.35266	.34615	.33989	.33384	.32801	.32238	.31693
450	214.69	14.61	.38934	.38158	.37413	.36696	.36006	.35343	.34702	.34085	.33490	.32915	.32359
460	219.14	14.91	.39734	.38942	.38182	.37450	.36747	.36069	.35415	.34786	.34178	.33591	.33025
470	223.58	15.21	.40534	.39726	.38950	.38204	.37486	.36794	.36129	.35486	.34866	.34268	.33689
480	228.03	15.52	.41333	.40509	.39718	.38957	.38225	.37521	.36841	.36187	.35554	.34944	.34354
490	232.47	15.82	.42132	.41292	.40486	.39711	.38964	.38246	.37554	.36886	.36242	.35620	.35019
500	236.92	16.12	.42931	.42075	.41254	.40464	.39704	.38971	.38266	.37586	.36929	.36296	.35683
510	241.36	16.42	.43729	.42857	.42021	.41216	.40442	.39697	.38978	.38285	.37617	.36971	.36348
520	245.80	16.73	.44526	.43640	.42788	.41969	.41181	.40422	.39691	.38985	.38304	.37647	.37012
530	250.25	17.03	.45324	.44422	.43555	.42721	.41919	.41146	.40402	.39684	.38991	.38323	.37676
540	254.69	17.33	.46122	.45204	.44321	.43473	.42657	.41872	.41113	.40383	.39678	.38997	.38340
550	259.14	17.63	.46920	.45985	.45089	.44226	.43395	.42596	.41825	.41082	.40365	.39673	.39004
560	263.58	17.94	.47717	.46767	.45855	.44977	.44133	.43319	.42536	.41780	.41051	.40347	.39667
570	268.03	18.24	.48514	.47548	.46621	.45729	.44870	.44043	.43247	.42479	.41738	.41022	.40330
580	272.47	18.54	.49311	.48329	.47387	.46480	.45607	.44767	.43958	.43177	.42423	.41697	.40994
590	276.92	18.84	.50107	.49111	.48152	.47230	.46345	.45491	.44668	.43875	.43109	.42370	.41656
600	281.36	19.15	.50904	.49891	.48917	.47981	.47081	.46213	.45379	.44572	.43794	.43044	.42319
610	285.80	19.45	.51700	.50671	.49682	.48733	.47817	.46937	.46088	.45271	.44480	.43718	.42982
620	290.25	19.75	.52495	.51451	.50447	.49483	.48553	.47660	.46799	.45967	.45166	.44392	.43643
630	294.69	20.05	.53291	.52231	.51212	.50233	.49290	.48382	.47508	.46664	.45851	.45064	.44306
640	299.14	20.36	.54086	.53011	.51976	.50982	.50026	.49105	.48217	.47362	.46536	.45738	.44968
650	303.58	20.66	.54881	.53790	.52740	.51732	.50761	.49827	.48927	.48058	.47220	.46412	.45629
660	308.03	20.96	.55676	.54569	.53505	.52481	.51497	.50549	.49636	.48755	.47905	.47084	.46291
670	312.47	21.26	.56471	.55347	.54269	.53231	.52233	.51271	.50344	.49451	.48589	.47757	.46953
680	316.92	21.56	.57265	.56126	.55032	.53980	.52967	.51993	.51053	.50148	.49274	.48429	.47613
690	321.36	21.87	.58059	.56904	.55795	.54728	.53702	.52714	.51761	.50843	.49957	.49101	.48275
700	325.80	22.17	.58853	.57682	.56558	.55477	.54436	.53436	.52470	.51539	.50641	.49774	.48936
710	330.25	22.47	.59645	.58460	.57320	.56225	.55172	.54156	.53178	.52234	.51324	.50445	.49596
720	334.69	22.77	.60438	.59238	.58083	.56972	.55905	.54876	.53885	.52930	.52008	.51117	.50257
730	339.14	23.08	.61231	.60015	.58845	.57721	.56639	.55597	.54593	.53625	.52690	.51788	.50918
740	343.58	23.38	.62024	.60792	.59607	.58469	.57372	.56318	.55300	.54319	.53374	.52460	.51577
750	348.03	23.68	.62816	.61569	.60368	.59216	.58105	.57037	.56007	.55015	.54056	.53132	.52237
760	352.47	23.98	.63609	.62345	.61130	.59963	.58840	.57757	.56715	.55709	.54739	.53802	.52896
770	356.91	24.29	.64401	.63122	.61891	.60709	.59572	.58478	.57421	.56404	.55421	.54473	.53556
780	361.36	24.59	.65193	.63898	.62654	.61456	.60305	.59197	.58129	.57097	.56104	.55143	.54216
790	365.80	24.89	.65984	.64673	.63414	.62202	.61037	.59915	.58834	.57792	.56785	.55814	.54874

T-51

DENSITY
20 % O_2, 80 % He

DENSITY,LBS/CUBIC FT

.200 OXYGEN .800 HELIUM AVERAGE MOLECULAR WEIGHT 9.602

DEPTH FT	PRESSURE PSIA	PRESSURE ATM	30	40	50	60	70	80	90	100	110	120	130
			TEMPERATURE,F										
800	370.25	25.19	.66775	.65449	.64175	.62950	.61771	.60635	.59540	.58485	.57467	.56483	.55534
810	374.69	25.50	.67566	.66224	.64935	.63695	.62502	.61354	.60247	.59179	.58148	.57154	.56193
820	379.14	25.80	.68357	.67000	.65695	.64441	.63234	.62072	.60952	.59872	.58830	.57824	.56851
830	383.58	26.10	.69148	.67774	.66455	.65186	.63965	.62790	.61657	.60565	.59511	.58493	.57510
840	388.03	26.40	.69938	.68549	.67214	.65931	.64698	.63509	.62363	.61258	.60192	.59163	.58169
850	392.47	26.71	.70728	.69323	.67974	.66676	.65429	.64226	.63068	.61950	.60872	.59831	.58826
860	396.91	27.01	.71518	.70098	.68733	.67422	.66160	.64944	.63774	.62644	.61554	.60501	.59484
870	401.36	27.31	.72306	.70871	.69492	.68167	.66890	.65662	.64478	.63335	.62233	.61171	.60142
880	405.80	27.61	.73095	.71645	.70250	.68911	.67620	.66379	.65182	.64028	.62914	.61838	.60799
890	410.25	27.92	.73884	.72419	.71009	.69655	.68352	.67096	.65887	.64720	.63593	.62508	.61457
900	414.69	28.22	.74673	.73192	.71767	.70398	.69082	.67814	.66590	.65412	.64274	.63175	.62115
910	419.14	28.52	.75462	.73965	.72527	.71142	.69811	.68530	.67294	.66103	.64956	.63844	.62771
920	423.58	28.82	.76250	.74737	.73284	.71885	.70541	.69246	.67998	.66794	.65633	.64512	.63428
930	428.03	29.13	.77038	.75510	.74042	.72630	.71271	.69962	.68701	.67486	.66313	.65179	.64085
940	432.47	29.43	.77826	.76282	.74799	.73373	.72000	.70679	.69406	.68176	.66991	.65847	.64741
950	436.91	29.73	.78614	.77054	.75556	.74115	.72729	.71394	.70108	.68868	.67671	.66514	.65398
960	441.36	30.03	.79401	.77826	.76313	.74858	.73457	.72109	.70810	.69557	.68349	.67182	.66054
970	445.80	30.33	.80188	.78597	.77069	.75600	.74186	.72826	.71514	.70249	.69028	.67848	.66709
980	450.25	30.64	.80975	.79369	.77825	.76341	.74916	.73541	.72216	.70938	.69705	.68515	.67365
990	454.69	30.94	.81760	.80140	.78581	.77085	.75643	.74255	.72917	.71629	.70384	.69183	.68022
1000	459.14	31.24	.82546	.80910	.79337	.77826	.76371	.74971	.73620	.72318	.71061	.69848	.68676
1050	481.36	32.75	.86474	.84761	.83115	.81530	.80007	.78541	.77128	.75763	.74449	.73177	.71949
1100	503.58	34.27	.90396	.88605	.86885	.85230	.83638	.82105	.80628	.79204	.77829	.76502	.75220
1150	525.80	35.78	.94310	.92444	.90649	.88925	.87264	.85667	.84125	.82641	.81207	.79823	.78485
1200	548.02	37.29	.98220	.96276	.94407	.92611	.90884	.89220	.87617	.86072	.84578	.83138	.81745
1250	570.25	38.80	1.02121	1.00101	.98142	.96295	.94499	.92771	.91105	.89497	.87947	.86449	.85001
1300	592.47	40.31	1.06019	1.03921	1.01908	.99973	.98110	.96315	.94587	.92918	.91308	.89756	.88254
1350	614.69	41.83	1.09908	1.07736	1.05649	1.03643	1.01714	.99855	.98061	.96334	.94667	.93055	.91501
1400	636.91	43.34	1.13794	1.11545	1.09387	1.07310	1.05313	1.03388	1.01533	.99744	.98019	.96352	.94743
1450	659.13	44.85	1.17671	1.15348	1.13117	1.10971	1.08906	1.06916	1.05000	1.03153	1.01368	.99645	.97980
1500	681.36	46.36	1.2154	1.1915	1.1684	1.1462	1.1249	1.1044	1.0846	1.0655	1.0471	1.0293	1.0122

500	34.02	.89763	.87987	.86278	.84636	.83055	.81532	.80066	.78651	.77286	.75967	.74694
600	40.83	1.07337	1.05215	1.03177	1.01218	.99332	.97516	.95764	.94077	.92447	.90873	.89355
700	47.63	1.2479	1.2232	1.1996	1.1769	1.1550	1.1339	1.1136	1.0940	1.0751	1.0569	1.0392
800	54.44	1.4211	1.3931	1.3663	1.3404	1.3156	1.2917	1.2686	1.2463	1.2248	1.2041	1.1841
900	61.24	1.5932	1.5619	1.5318	1.5029	1.4751	1.4483	1.4225	1.3976	1.3736	1.3504	1.3280
1000	68.05	1.7640	1.7294	1.6962	1.6643	1.6336	1.6040	1.5755	1.5480	1.5214	1.4958	1.4710
1100	74.85	1.9336	1.8958	1.8595	1.8246	1.7910	1.7586	1.7274	1.6973	1.6683	1.6402	1.6131
1200	81.65	2.1020	2.0610	2.0216	1.9838	1.9474	1.9122	1.8784	1.8458	1.8143	1.7838	1.7544
1300	88.46	2.2692	2.2251	2.1827	2.1419	2.1027	2.0649	2.0284	1.9932	1.9593	1.9265	1.8940
1400	95.26	2.4353	2.3881	2.3426	2.2990	2.2570	2.2165	2.1774	2.1398	2.1034	2.0683	2.0344
1500	102.07	2.6001	2.5499	2.5016	2.4550	2.4102	2.3671	2.3255	2.2854	2.2467	2.2092	2.1731
1600	108.87	2.7640	2.7105	2.6593	2.6100	2.5625	2.5167	2.4727	2.4301	2.3891	2.3494	2.3110
1700	115.68	2.9266	2.8701	2.8160	2.7639	2.7137	2.6656	2.6189	2.5739	2.5306	2.4886	2.4480
1800	122.48	3.0880	3.0288	2.9717	2.9168	2.8641	2.8133	2.7641	2.7168	2.6712	2.6269	2.5843
1900	129.29	3.2484	3.1862	3.1263	3.0688	3.0134	2.9601	2.9085	2.8580	2.8108	2.7645	2.7190
2000	136.09	3.4077	3.3426	3.2799	3.2197	3.1617	3.1059	3.0519	2.9999	2.9497	2.9013	2.8543
2100	142.90	3.5658	3.4979	3.4324	3.3697	3.3091	3.2508	3.1965	3.1402	3.0878	3.0372	2.9882
2200	149.70	3.7229	3.6522	3.5840	3.5186	3.4555	3.3948	3.3361	3.2796	3.2250	3.1721	3.1211
2300	156.51	3.8788	3.8054	3.7345	3.6666	3.6010	3.5379	3.4769	3.4181	3.3614	3.3045	3.2534
2400	163.31	4.0338	3.9574	3.8841	3.8136	3.7456	3.6801	3.6168	3.5558	3.4969	3.4400	3.3849
2500	170.11	4.1877	4.1086	4.0327	3.9596	3.8892	3.8214	3.7558	3.6926	3.6317	3.5727	3.5157
2600	176.92	4.3406	4.2588	4.1803	4.1047	4.0319	3.9618	3.8942	3.8287	3.7656	3.7046	3.6455
2700	183.72	4.4922	4.4080	4.3269	4.2489	4.1737	4.1013	4.0315	3.9634	3.8988	3.8358	3.7747
2800	190.53	4.6431	4.5562	4.4726	4.3922	4.3146	4.2401	4.1680	4.0982	4.0311	3.9660	3.9032
2900	197.33	4.7930	4.7035	4.6174	4.5345	4.4549	4.3779	4.3036	4.2318	4.1627	4.0956	4.0310
3000	204.14	4.9418	4.8498	4.7612	4.6760	4.5940	4.5149	4.4385	4.3648	4.2935	4.2244	4.1580
3100	210.94	5.0895	4.9949	4.9041	4.8165	4.7323	4.6510	4.5725	4.4967	4.4235	4.3526	4.2840
3200	217.75	5.2364	5.1393	5.0460	4.9562	4.8697	4.7863	4.7056	4.6279	4.5527	4.4799	4.4096
3300	224.55	5.3823	5.2827	5.1871	5.0949	5.0063	4.9207	4.8382	4.7583	4.6812	4.6065	4.5344
3400	231.36	5.5270	5.4253	5.3273	5.2331	5.1420	5.0545	4.9698	4.8879	4.8089	4.7327	4.6586
3500	238.16	5.6711	5.5669	5.4666	5.3701	5.2771	5.1874	5.1006	5.0170	4.9361	4.8578	4.7820
3600	244.96	5.8142	5.7076	5.6050	5.5063	5.4112	5.3193	5.2306	5.1451	5.0624	4.9823	4.9050
3700	251.77	5.9563	5.8474	5.7425	5.6417	5.5444	5.4508	5.3601	5.2725	5.1879	5.1061	5.0270
3800	258.57	6.0976	5.9863	5.8794	5.7762	5.6771	5.5812	5.4886	5.3993	5.3129	5.2291	5.1484
3900	265.38	6.2377	6.1243	6.0152	5.9101	5.8087	5.7108	5.6166	5.5252	5.4370	5.3517	5.2690
4000	272.18	6.3771	6.2615	6.1502	6.0430	5.9395	5.8400	5.7435	5.6506	5.5604	5.4733	5.3890
4100	278.99	6.5157	6.3978	6.2863	6.1750	6.0698	5.9683	5.8700	5.7750	5.6833	5.5946	5.5086
4200	285.79	6.6533	6.5332	6.4179	6.3065	6.1991	6.0956	5.9955	5.8989	5.8053	5.7149	5.6273
4300	292.60	6.7901	6.6681	6.5504	6.4369	6.3278	6.2225	6.1205	6.0219	5.9268	5.8347	5.7456
4400	299.40	6.9261	6.8019	6.6820	6.5669	6.4558	6.3483	6.2448	6.1444	6.0476	5.9537	5.8630
4500	306.21	7.0611	6.9348	6.8132	6.6957	6.5827	6.4737	6.3681	6.2663	6.1675	6.0722	5.9800
4600	313.01	7.1954	7.0669	6.9432	6.8241	6.7092	6.5983	6.4909	6.3874	6.2870	6.1902	6.0960
4700	319.81	7.3291	7.1985	7.0728	6.9517	6.8349	6.7222	6.6131	6.5076	6.4059	6.3071	6.2118
4800	326.62	7.4616	7.3290	7.2013	7.0782	6.9599	6.8454	6.7346	6.6274	6.5241	6.4237	6.3269
4900	333.42	7.5934	7.4590	7.3293	7.2043	7.0839	6.9679	6.8553	6.7465	6.6416	6.5397	6.4414
5000	340.23	7.7246	7.5879	7.4565	7.3297	7.2074	7.0897	6.9754	6.8650	6.7585	6.6551	6.5550

SP. VOL.
20 % O_2, 80 % He

T-52

SPECIFIC VOLUME,CUBIC FT/LB

.200 OXYGEN .800 HELIUM AVERAGE MOLECULAR WEIGHT 9.602

DEPTH	PRESSURF		TEMPERATURE,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	37.257	38.018	38.779	39.540	40.300	41.061	41.822	42.583	43.343	44.103	44.864
10	19.14	1.30	28.611	29.195	29.779	30.363	30.947	31.532	32.115	32.699	33.284	33.868	34.451
20	23.58	1.60	23.223	23.697	24.171	24.645	25.119	25.593	26.067	26.542	27.015	27.489	27.964
30	28.03	1.91	19.544	19.943	20.341	20.741	21.139	21.538	21.937	22.336	22.735	23.134	23.533
40	32.47	2.21	16.872	17.216	17.560	17.905	18.249	18.593	18.938	19.282	19.626	19.971	20.315
50	36.92	2.51	14.843	15.146	15.449	15.752	16.055	16.357	16.660	16.963	17.266	17.569	17.872
60	41.36	2.81	13.250	13.521	13.791	14.061	14.332	14.602	14.872	15.143	15.413	15.683	15.954
70	45.81	3.12	11.966	12.211	12.455	12.699	12.943	13.187	13.431	13.675	13.920	14.164	14.408
80	50.25	3.42	10.910	11.132	11.355	11.578	11.800	12.022	12.245	12.468	12.690	12.913	13.135
90	54.70	3.72	10.025	10.229	10.434	10.638	10.843	11.047	11.252	11.456	11.661	11.865	12.070
100	59.14	4.02	9.2729	9.4620	9.6511	9.8405	10.0296	10.2187	10.4078	10.5969	10.7859	10.9750	11.1641
110	63.58	4.33	8.6261	8.8020	8.9779	9.1538	9.3298	9.5057	9.6816	9.8575	10.0333	10.2095	10.3854
120	68.03	4.63	8.0638	8.2282	8.3927	8.5572	8.7216	8.8861	9.0505	9.2149	9.3793	9.5437	9.7081
130	72.47	4.93	7.5705	7.7249	7.8793	8.0337	8.1881	8.3424	8.4968	8.6504	8.8053	8.9596	9.1140
140	76.92	5.23	7.1341	7.2797	7.4252	7.5707	7.7162	7.8616	8.0069	8.1524	8.2978	8.4433	8.5887
150	81.36	5.54	6.7455	6.8831	7.0207	7.1582	7.2956	7.4332	7.5707	7.7083	7.8458	7.9833	8.1208
160	85.81	5.84	6.3971	6.5276	6.6581	6.7884	6.9188	7.0493	7.1795	7.3100	7.4404	7.5708	7.7010
170	90.25	6.14	6.0830	6.2071	6.3312	6.4551	6.5791	6.7030	6.8270	6.9511	7.0749	7.1989	7.3229
180	94.70	6.44	5.7985	5.9167	6.0348	6.1531	6.2713	6.3896	6.5076	6.6257	6.7439	6.8619	6.9801
190	99.14	6.75	5.5394	5.6524	5.7652	5.8782	5.9910	6.1039	6.2167	6.3297	6.4424	6.5553	6.6681
200	103.58	7.05	5.3025	5.4107	5.5187	5.6268	5.7349	5.8428	5.9509	6.0589	6.1670	6.2749	6.3830
210	108.03	7.35	5.0852	5.1889	5.2925	5.3960	5.4997	5.6031	5.7068	5.8105	5.9140	6.0175	6.1212
220	112.47	7.65	4.8850	4.9846	5.0841	5.1836	5.2831	5.3827	5.4822	5.5816	5.6812	5.7807	5.8801
230	116.92	7.96	4.7000	4.7959	4.8914	4.9874	5.0831	5.1788	5.2746	5.3703	5.4660	5.5616	5.6574
240	121.36	8.26	4.5288	4.6210	4.7132	4.8055	4.8977	4.9899	5.0821	5.1743	5.2666	5.3588	5.4510
250	125.81	8.56	4.3694	4.4585	4.5475	4.6364	4.7254	4.8144	4.9033	4.9923	5.0812	5.1702	5.2591
260	130.25	8.86	4.2210	4.3070	4.3930	4.4789	4.5648	4.6507	4.7367	4.8226	4.9085	4.9944	5.0804
270	134.69	9.17	4.0824	4.1655	4.2486	4.3317	4.4148	4.4980	4.5811	4.6642	4.7473	4.8304	4.9134
280	139.14	9.47	3.9526	4.0330	4.1135	4.1940	4.2745	4.3550	4.4354	4.5159	4.5962	4.6767	4.7571
290	143.58	9.77	3.8308	3.9088	3.9868	4.0648	4.1428	4.2207	4.2987	4.3767	4.4547	4.5326	4.6106
300	148.03	10.07	3.7164	3.7920	3.8677	3.9434	4.0190	4.0946	4.1703	4.2460	4.3215	4.3971	4.4727
310	152.47	10.38	3.6086	3.6821	3.7556	3.8291	3.9024	3.9759	4.0493	4.1227	4.1962	4.2696	4.3429
320	156.92	10.68	3.5070	3.5783	3.6498	3.7211	3.7925	3.8638	3.9352	4.0066	4.0779	4.1492	4.2206
330	161.36	10.98	3.4109	3.4803	3.5498	3.6192	3.6886	3.7580	3.8274	3.8967	3.9662	4.0355	4.1049
340	165.81	11.28	3.3200	3.3876	3.4552	3.5227	3.5902	3.6578	3.7253	3.7929	3.8604	3.9279	3.9954
350	170.25	11.58	3.2339	3.2996	3.3655	3.4313	3.4970	3.5628	3.6286	3.6944	3.7602	3.8259	3.8917
360	174.69	11.89	3.1521	3.2162	3.2803	3.3445	3.4086	3.4727	3.5368	3.6009	3.6650	3.7291	3.7932
370	179.14	12.19	3.0744	3.1369	3.1994	3.2620	3.3246	3.3871	3.4496	3.5120	3.5746	3.6371	3.6995
380	183.58	12.49	3.0004	3.0614	3.1225	3.1835	3.2445	3.3056	3.3666	3.4276	3.4885	3.5495	3.6105
390	188.03	12.79	2.9294	2.9895	3.0491	3.1087	3.1683	3.2279	3.2874	3.3470	3.4066	3.4661	3.5257
400	192.47	13.10	2.8627	2.9210	2.9792	3.0374	3.0956	3.1538	3.2120	3.2702	3.3284	3.3865	3.4447
410	196.92	13.40	2.7986	2.8555	2.9124	2.9693	3.0262	3.0831	3.1400	3.1969	3.2538	3.3106	3.3675
420	201.36	13.70	2.7372	2.7929	2.8486	2.9042	2.9598	3.0155	3.0711	3.1267	3.1824	3.2380	3.2936
430	205.81	14.00	2.6785	2.7330	2.7875	2.8419	2.8964	2.9508	3.0053	3.0597	3.1140	3.1685	3.2229
440	210.25	14.31	2.6223	2.6757	2.7290	2.7823	2.8356	2.8889	2.9421	2.9954	3.0487	3.1020	3.1552
450	214.69	14.61	2.5684	2.6207	2.6728	2.7251	2.7773	2.8295	2.8817	2.9339	2.9860	3.0382	3.0903
460	219.14	14.91	2.5167	2.5679	2.6190	2.6702	2.7213	2.7725	2.8237	2.8747	2.9259	2.9770	3.0280
470	223.58	15.21	2.4671	2.5173	2.5674	2.6176	2.6677	2.7178	2.7679	2.8180	2.8681	2.9182	2.9683
480	228.03	15.52	2.4194	2.4686	2.5177	2.5669	2.6161	2.6652	2.7144	2.7635	2.8126	2.8617	2.9108
490	232.47	15.82	2.3735	2.4218	2.4700	2.5182	2.5665	2.6146	2.6628	2.7111	2.7592	2.8074	2.8556
500	236.92	16.12	2.3293	2.3767	2.4240	2.4713	2.5186	2.5660	2.6133	2.6605	2.7079	2.7551	2.8024
510	241.36	16.42	2.2868	2.3333	2.3798	2.4262	2.4726	2.5191	2.5656	2.6120	2.6584	2.7048	2.7512
520	245.80	16.73	2.2459	2.2915	2.3371	2.3827	2.4283	2.4739	2.5195	2.5651	2.6107	2.6563	2.7018
530	250.25	17.03	2.2063	2.2511	2.2960	2.3408	2.3856	2.4304	2.4751	2.5199	2.5647	2.6094	2.6542
540	254.69	17.33	2.1682	2.2122	2.2562	2.3003	2.3443	2.3883	2.4323	2.4763	2.5203	2.5643	2.6082
550	259.14	17.63	2.1313	2.1746	2.2178	2.2611	2.3044	2.3477	2.3909	2.4342	2.4774	2.5206	2.5638
560	263.58	17.94	2.0957	2.1383	2.1808	2.2233	2.2659	2.3084	2.3510	2.3935	2.4360	2.4785	2.5210
570	268.03	18.24	2.0613	2.1031	2.1450	2.1868	2.2287	2.2705	2.3123	2.3541	2.3959	2.4377	2.4795
580	272.47	18.54	2.0280	2.0692	2.1103	2.1515	2.1927	2.2338	2.2749	2.3161	2.3572	2.3983	2.4394
590	276.92	18.84	1.9957	2.0362	2.0767	2.1173	2.1577	2.1983	2.2388	2.2792	2.3197	2.3602	2.4006
600	281.36	19.15	1.9645	2.0044	2.0443	2.0842	2.1240	2.1639	2.2037	2.2435	2.2834	2.3232	2.3630
610	285.80	19.45	1.9343	1.9735	2.0128	2.0520	2.0913	2.1305	2.1698	2.2089	2.2482	2.2874	2.3266
620	290.25	19.75	1.9049	1.9436	1.9823	2.0209	2.0596	2.0982	2.1368	2.1755	2.2140	2.2527	2.2913
630	294.69	20.05	1.8765	1.9146	1.9527	1.9907	2.0288	2.0669	2.1049	2.1430	2.1810	2.2190	2.2570
640	299.14	20.36	1.8489	1.8864	1.9240	1.9615	1.9990	2.0364	2.0740	2.1114	2.1489	2.1864	2.2238
650	303.58	20.66	1.8221	1.8591	1.8961	1.9331	1.9700	2.0069	2.0439	2.0808	2.1177	2.1546	2.1915
660	308.03	20.96	1.7961	1.8326	1.8690	1.9055	1.9419	1.9783	2.0147	2.0511	2.0875	2.1239	2.1602
670	312.47	21.26	1.7708	1.8068	1.8427	1.8786	1.9145	1.9504	1.9863	2.0222	2.0581	2.0939	2.1298
680	316.92	21.56	1.7463	1.7817	1.8171	1.8525	1.8880	1.9233	1.9587	1.9941	2.0295	2.0649	2.1002
690	321.36	21.87	1.7224	1.7573	1.7923	1.8272	1.8621	1.8970	1.9319	1.9668	2.0017	2.0366	2.0715
700	325.80	22.17	1.6992	1.7336	1.7681	1.8026	1.8370	1.8714	1.9058	1.9403	1.9747	2.0091	2.0435
710	330.25	22.47	1.6766	1.7106	1.7446	1.7786	1.8125	1.8465	1.8805	1.9145	1.9484	1.9824	2.0163
720	334.69	22.77	1.6546	1.6881	1.7217	1.7552	1.7887	1.8223	1.8558	1.8893	1.9228	1.9564	1.9898
730	339.14	23.08	1.6332	1.6663	1.6994	1.7325	1.7656	1.7987	1.8317	1.8648	1.8979	1.9309	1.9640
740	343.58	23.38	1.6123	1.6450	1.6777	1.7103	1.7430	1.7756	1.8083	1.8410	1.8736	1.9062	1.9389
750	348.03	23.68	1.5919	1.6242	1.6565	1.6887	1.7210	1.7532	1.7855	1.8177	1.8499	1.8821	1.9143
760	352.47	23.98	1.5721	1.6040	1.6359	1.6677	1.6996	1.7314	1.7632	1.7951	1.8268	1.8587	1.8905
770	356.91	24.29	1.5528	1.5842	1.6157	1.6472	1.6786	1.7101	1.7415	1.7729	1.8044	1.8358	1.8672
780	361.36	24.59	1.5339	1.5650	1.5961	1.6272	1.6582	1.6893	1.7203	1.7514	1.7824	1.8135	1.8445
790	365.80	24.89	1.5155	1.5462	1.5769	1.6077	1.6383	1.6690	1.6997	1.7303	1.7610	1.7917	1.8223

T-53

SP. VOL.

20 % O_2, 80 % He

SPECIFIC VOLUME,CUBIC FT/LB

.200 OXYGEN .800 HELIUM AVERAGE MOLECULAR WEIGHT 9.602

DEPTH FT	PRESSURE PSIA	ATM	TEMPERATURE,F 30	40	50	60	70	80	90	100	110	120	130
800	370.25	25.19	1.4976	1.5279	1.5587	1.5886	1.6189	1.6492	1.6795	1.7098	1.7401	1.7704	1.8007
810	374.69	25.50	1.4800	1.5100	1.5400	1.5700	1.5999	1.6299	1.6598	1.6898	1.7197	1.7497	1.7796
820	379.14	25.80	1.4629	1.4925	1.5222	1.5518	1.5814	1.6110	1.6406	1.6702	1.6998	1.7294	1.7590
830	383.58	26.10	1.4462	1.4755	1.5048	1.5341	1.5633	1.5926	1.6219	1.6511	1.6804	1.7096	1.7388
840	388.03	26.40	1.4298	1.4588	1.4878	1.5167	1.5456	1.5746	1.6035	1.6324	1.6613	1.6902	1.7191
850	392.47	26.71	1.4139	1.4425	1.4712	1.4998	1.5284	1.5570	1.5856	1.6142	1.6428	1.6714	1.6999
860	396.91	27.01	1.3983	1.4266	1.4549	1.4832	1.5115	1.5398	1.5680	1.5963	1.6246	1.6529	1.6811
870	401.36	27.31	1.3830	1.4110	1.4390	1.4670	1.4950	1.5229	1.5509	1.5789	1.6069	1.6348	1.6627
880	405.80	27.61	1.3681	1.3958	1.4235	1.4512	1.4788	1.5065	1.5342	1.5618	1.5895	1.6171	1.6448
890	410.25	27.92	1.3535	1.3809	1.4083	1.4357	1.4630	1.4904	1.5178	1.5451	1.5725	1.5998	1.6272
900	414.69	28.22	1.3392	1.3663	1.3934	1.4205	1.4476	1.4746	1.5017	1.5288	1.5558	1.5829	1.6099
910	419.14	28.52	1.3252	1.3520	1.3788	1.4056	1.4324	1.4592	1.4860	1.5128	1.5395	1.5663	1.5931
920	423.58	28.82	1.3115	1.3380	1.3646	1.3911	1.4176	1.4441	1.4706	1.4971	1.5236	1.5501	1.5766
930	428.03	29.13	1.2981	1.3243	1.3506	1.3768	1.4031	1.4294	1.4556	1.4818	1.5080	1.5342	1.5604
940	432.47	29.43	1.2849	1.3109	1.3369	1.3629	1.3889	1.4148	1.4408	1.4668	1.4927	1.5187	1.5446
950	436.91	29.73	1.2720	1.2978	1.3235	1.3493	1.3750	1.4007	1.4264	1.4521	1.4777	1.5034	1.5291
960	441.36	30.03	1.2594	1.2849	1.3104	1.3359	1.3613	1.3868	1.4122	1.4377	1.4631	1.4885	1.5139
970	445.80	30.33	1.2471	1.2723	1.2975	1.3228	1.3480	1.3731	1.3983	1.4235	1.4487	1.4739	1.4990
980	450.25	30.64	1.2349	1.2599	1.2849	1.3099	1.3348	1.3598	1.3847	1.4097	1.4346	1.4595	1.4844
990	454.69	30.94	1.2231	1.2478	1.2726	1.2973	1.3220	1.3467	1.3714	1.3961	1.4208	1.4455	1.4701
1000	459.14	31.24	1.2114	1.2359	1.2604	1.2849	1.3094	1.3338	1.3583	1.3828	1.4072	1.4317	1.4561
1050	481.36	32.75	1.1564	1.1798	1.2032	1.2265	1.2499	1.2732	1.2965	1.3199	1.3432	1.3665	1.3899
1100	503.58	34.27	1.1062	1.1286	1.1510	1.1733	1.1956	1.2179	1.2403	1.2626	1.2849	1.3071	1.3294
1150	525.80	35.78	1.0603	1.0817	1.1032	1.1245	1.1460	1.1673	1.1887	1.2101	1.2314	1.2528	1.2741
1200	548.02	37.29	1.0181	1.0387	1.0592	1.0798	1.1003	1.1208	1.1413	1.1618	1.1823	1.2028	1.2233
1250	570.25	38.80	.97923	.99900	1.01873	1.03849	1.05822	1.07792	1.09764	1.11735	1.13705	1.15675	1.17646
1300	592.47	40.31	.94323	.96227	.98127	1.00027	1.01926	1.03826	1.05723	1.07622	1.09520	1.11413	1.13309
1350	614.69	41.83	.90985	.92819	.94653	.96485	.98314	1.00145	1.01977	1.03806	1.05634	1.07463	1.09289
1400	636.91	43.34	.87878	.89650	.91418	.93188	.94955	.96723	.98490	1.00256	1.02021	1.03786	1.05549
1450	659.13	44.85	.84983	.86694	.88404	.90114	.91822	.93532	.95238	.96943	.98650	1.00356	1.02061
1500	681.36	46.36	.82277	.83931	.85587	.87242	.88893	.90546	.92198	.93849	.95501	.97151	.98799

	500	34.02	1.1140	1.1365	1.1590	1.1815	1.2040	1.2265	1.2490	1.2714	1.2939	1.3164	1.3388
	600	40.83	.93165	.95043	.96921	.98797	1.00672	1.02547	1.04423	1.06295	1.08170	1.10043	1.11913
	700	47.63	.80136	.81750	.83361	.84970	.86581	.88189	.89798	.91406	.93013	.94619	.96224
	800	54.44	.70367	.71780	.73191	.74602	.76011	.77420	.78829	.80236	.81643	.83051	.84455
	900	61.24	.62769	.64026	.65281	.66537	.67791	.69045	.70297	.71551	.72801	.74053	.75304
	1000	68.05	.56690	.57823	.58955	.60085	.61215	.62344	.63474	.64601	.65728	.66855	.67983
	1100	74.85	.51717	.52748	.53778	.54807	.55835	.56862	.57889	.58916	.59941	.60967	.61991
	1200	81.65	.47574	.48520	.49465	.50409	.51352	.52295	.53237	.54178	.55119	.56059	.56999
	1300	88.46	.44068	.44942	.45815	.46687	.47558	.48429	.49299	.50170	.51038	.51908	.52776
	1400	95.26	.41063	.41875	.42687	.43497	.44307	.45117	.45925	.46734	.47542	.48348	.49155
	1500	102.07	.38460	.39218	.39975	.40733	.41490	.42246	.43001	.43757	.44510	.45264	.46017
	1600	108.87	.36180	.36893	.37603	.38315	.39025	.39734	.40442	.41151	.41857	.42564	.43271
	1700	115.68	.34170	.34842	.35511	.36181	.36850	.37516	.38184	.38852	.39517	.40183	.40849
	1800	122.48	.32383	.33017	.33651	.34284	.34915	.35546	.36178	.36808	.37436	.38067	.38695
	1900	129.29	.30784	.31385	.31987	.32586	.33185	.33783	.34382	.34980	.35577	.36173	.36768
	2000	136.09	.29346	.29917	.30489	.31058	.31628	.32197	.32766	.33334	.33902	.34468	.35035
	2100	142.90	.28044	.28589	.29134	.29677	.30220	.30762	.31304	.31845	.32386	.32925	.33465
	2200	149.70	.26861	.27381	.27902	.28420	.28939	.29457	.29975	.30492	.31008	.31524	.32040
	2300	156.51	.25781	.26279	.26777	.27273	.27770	.28265	.28761	.29256	.29750	.30244	.30737
	2400	163.31	.24791	.25269	.25746	.26222	.26698	.27173	.27649	.28123	.28596	.29070	.29543
	2500	170.11	.23880	.24339	.24798	.25255	.25712	.26169	.26625	.27081	.27535	.27990	.28444
	2600	176.92	.23038	.23481	.23922	.24362	.24802	.25241	.25679	.26119	.26556	.26993	.27431
	2700	183.72	.22261	.22686	.23111	.23535	.23960	.24383	.24805	.25228	.25649	.26070	.26492
	2800	190.53	.21537	.21948	.22358	.22768	.23177	.23584	.23992	.24401	.24807	.25215	.25620
	2900	197.33	.20864	.21261	.21657	.22053	.22447	.22842	.23236	.23631	.24023	.24417	.24808
	3000	204.14	.20235	.20619	.21003	.21386	.21767	.22149	.22530	.22911	.23291	.23672	.24050
	3100	210.94	.19648	.20020	.20391	.20762	.21131	.21501	.21870	.22238	.22607	.22975	.23342
	3200	217.75	.19097	.19458	.19818	.20177	.20535	.20893	.21251	.21608	.21965	.22322	.22678
	3300	224.55	.18579	.18930	.19279	.19627	.19975	.20322	.20669	.21016	.21362	.21708	.22053
	3400	231.36	.18093	.18432	.18771	.19109	.19448	.19784	.20121	.20459	.20795	.21130	.21466
	3500	238.16	.17633	.17963	.18293	.18622	.18950	.19278	.19605	.19932	.20259	.20585	.20912
	3600	244.96	.17199	.17521	.17841	.18161	.18480	.18799	.19118	.19436	.19753	.20071	.20388
	3700	251.77	.16789	.17102	.17414	.17725	.18036	.18346	.18656	.18966	.19276	.19585	.19893
	3800	258.57	.16400	.16705	.17008	.17313	.17615	.17917	.18220	.18521	.18822	.19124	.19424
	3900	265.38	.16032	.16328	.16624	.16920	.17216	.17511	.17804	.18099	.18392	.18686	.18979
	4000	272.18	.15681	.15971	.16260	.16548	.16836	.17123	.17411	.17697	.17984	.18270	.18556
	4100	278.99	.15348	.15630	.15913	.16194	.16475	.16755	.17036	.17316	.17595	.17874	.18153
	4200	285.79	.15030	.15306	.15581	.15857	.16131	.16405	.16679	.16952	.17226	.17498	.17770
	4300	292.60	.14727	.14997	.15266	.15535	.15803	.16071	.16339	.16606	.16873	.17139	.17405
	4400	299.40	.14438	.14702	.14965	.15228	.15490	.15752	.16013	.16275	.16535	.16796	.17056
	4500	306.21	.14162	.14420	.14677	.14935	.15191	.15447	.15703	.15958	.16214	.16468	.16723
	4600	313.01	.13898	.14150	.14403	.14654	.14905	.15155	.15406	.15656	.15906	.16155	.16404
	4700	319.81	.13644	.13892	.14139	.14385	.14631	.14876	.15122	.15367	.15611	.15855	.16098
	4800	326.62	.13402	.13644	.13886	.14128	.14368	.14608	.14849	.15089	.15328	.15567	.15806
	4900	333.42	.13169	.13407	.13644	.13881	.14117	.14351	.14587	.14822	.15057	.15291	.15525
	5000	340.23	.12946	.13179	.13411	.13643	.13875	.14105	.14336	.14567	.14796	.15026	.15256

20 % O_2, 80 % He

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0.200 OXYGEN 0.800 HELIUM
ENTHALPY,BTU/LB

PRESSURE PSIA	TEMPERATURE					
	30	50	70	90	110	130
14.70	277.37	288.58	299.78	310.99	322.20	333.41
30.00	277.33	288.54	299.75	310.96	322.18	333.39
50.00	277.27	288.49	299.71	310.93	322.15	333.37
100.00	277.13	288.37	299.60	310.84	322.08	333.32
200.00	276.8	288.1	299.4	310.7	321.9	333.2
300.00	276.6	287.8	299.1	310.5	321.8	333.1
400.00	276.3	287.6	298.9	310.3	321.6	333.0
500.00	276.0	287.3	298.7	310.1	321.5	332.9
1000.00	274.4	286.2	297.8	309.3	320.8	332.4
2000.00	272.0	284.2	296.4	308.3	320.1	331.7
3000.00	269.9	282.6	295.3	307.7	319.6	331.2
4000.00	270.0	282.8	295.6	308.1	320.3	332.4
5000.00	270.4	283.5	295.7	308.9	321.1	333.6

0.200 OXYGEN 0.800 HELIUM
CV,BTU/LB F

PRESSURE PSIA	TEMPERATURE					
	30	50	70	90	110	130
14.70	.3532	.3534	.3536	.3539	.3542	.3544
30.00	.3532	.3534	.3536	.3539	.3542	.3544
50.00	.3533	.3535	.3537	.3540	.3543	.3545
100.00	.3534	.3536	.3538	.3541	.3543	.3545
200.00	.3536	.3538	.3539	.3542	.3545	.3547
300.00	.3539	.3540	.3541	.3544	.3546	.3548
400.00	.3541	.3542	.3543	.3546	.3548	.3550
500.00	.3541	.3544	.3545	.3546	.3549	.3551
1000.00	.3554	.3554	.3554	.3556	.3557	.3559
2000.00	.36	.35	.36	.35	.35	.35
3000.00	.38	.37	.37	.36	.36	.36
4000.00						
5000.00						

0.200 OXYGEN 0.800 HELIUM
ENTROPY,BTU/LB F

PRESSURE PSIA	TEMPERATURE					
	30	50	70	90	110	130
14.70	3.3381	3.3605	3.3820	3.4028	3.4229	3.4422
30.00	3.2746	3.2970	3.3185	3.3393	3.3708	3.3788
50.00	3.1917	3.2141	3.2356	3.2564	3.2765	3.2959
100.00	3.0201	3.0426	3.0643	3.0850	3.1052	3.1245
200.00	2.9280	2.9506	2.9723	2.9931	3.0136	3.0327
300.00	2.8359	2.8585	2.8804	2.9012	2.9215	2.9410
400.00	2.7438	2.7665	2.7884	2.8094	2.8297	2.8492
500.00	2.6517	2.6745	2.6965	2.7175	2.7379	2.7575
1000.00	2.4664	2.4897	2.5121	2.5335	2.5542	2.5740
2000.00	2.318	2.341	2.364	2.386	2.407	2.427
3000.00	2.212	2.238	2.262	2.285	2.306	2.327
4000.00	2.149	2.174	2.199	2.221	2.242	2.263
5000.00	2.097	2.123	2.147	2.171	2.193	2.402

0.200 OXYGEN 0.800 HELIUM
THERMAL CONDUCTIVITY,BTU/SEC FT F
(MULTIPLY TABLE ENTRY BY .0000100)

PRESSURE PSIA	TEMPERATURE					
	30	50	70	90	110	130
14.70	1.53	1.57	1.61	1.66	1.70	1.75
30.00						
50.00						
100.00						
200.00						
300.00						
400.00						
500.00						
1000.00						
2000.00						
3000.00						
4000.00						
5000.00						

0.200 OXYGEN 0.800 HELIUM
CP,BTU/LB F

PRESSURE PSIA	TEMPERATURE					
	30	50	70	90	110	130
14.70	.5601	.5603	.5605	.5607	.5611	.5613
30.00	.5605	.5606	.5608	.5610	.5614	.5615
50.00	.5610	.5611	.5612	.5613	.5617	.5618
100.00	.5622	.5621	.5622	.5622	.5625	.5626
200.00	.5646	.5643	.5642	.5640	.5641	.5641
300.00	.5670	.5664	.5661	.5658	.5658	.5657
400.00	.5694	.5686	.5681	.5676	.5674	.5672
500.00	.5719	.5709	.5701	.5694	.5689	.5687
1000.00	.5847	.5822	.5801	.5786	.5762	.5761
2000.00	.61	.60	.60	.59	.59	.59
3000.00	.63	.62	.61	.61	.61	.60
4000.00	.63	.62	.62	.61	.61	.61
5000.00						

0.200 OXYGEN 0.800 HELIUM
PRANDTL NUMBER

PRESSURE PSIA	TEMPERATURE					
	30	50	70	90	110	130
14.70	.50	.50	.50	.50	.50	.50
30.00						
50.00						
100.00						
200.00						
300.00						
400.00						
500.00						
1000.00						
2000.00						
3000.00						
4000.00						
5000.00						

0.200 OXYGEN 0.800 HELIUM
CP/CV

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.586	1.585	1.585	1.584	1.584	1.584
30.00	1.587	1.586	1.586	1.585	1.585	1.585
50.00	1.588	1.587	1.587	1.586	1.585	1.585
100.00	1.591	1.589	1.589	1.588	1.587	1.587
200.00	1.597	1.595	1.594	1.592	1.591	1.591
300.00	1.602	1.600	1.598	1.597	1.595	1.594
400.00	1.608	1.605	1.603	1.601	1.599	1.598
500.00	1.614	1.610	1.608	1.605	1.602	1.601
1000.00	1.645	1.638	1.632	1.627	1.620	1.619
2000.00	1.7	1.7	1.7	1.7	1.7	1.7
3000.00	1.7	1.7	1.7	1.7	1.7	1.7
4000.00						
5000.00						

0.200 OXYGEN 0.800 HELIUM
VISCOSITY,LB/FT SEC
(MULTIPLY TABLE ENTRY BY .0000100)

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.370	1.409	1.449	1.489	1.526	1.566
30.00						
50.00						
100.00						
200.00						
300.00						
400.00						
500.00						
1000.00						
2000.00						
3000.00						
4000.00						
5000.00						

0.200 OXYGEN 0.800 HELIUM
SONIC VELOCITY FT/SEC

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	2008	2047	2086	2125	2163	2201
30.00	2010	2049	2088	2127	2164	2202
50.00	2012	2051	2090	2129	2166	2204
100.00	2017	2056	2095	2134	2171	2209
200.00	2028	2067	2106	2144	2181	2218
300.00	2040	2078	2116	2154	2191	2228
400.00	2051	2088	2126	2164	2200	2237
500.00	2062	2099	2137	2174	2210	2247
1000.00	2117	2153	2188	2224	2259	2294
2000.00	2208	2246	2284	2322	2359	2397
3000.00	2300	2340	2380	2420	2460	2500
4000.00						
5000.00						

DENSITY
15 % O_2, 85 % He

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DENSITY,LBS/CUBIC FT

.150 OXYGEN .850 HELIUM AVERAGE MOLECULAR WEIGHT 8.203

DEPTH	PRESSURE		TEMPERATURE,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	.02293	.02247	.02203	.02160	.02120	.02080	.02043	.02006	.01971	.01937	.01904
10	19.14	1.30	.02986	.02926	.02868	.02813	.02760	.02709	.02660	.02612	.02566	.02522	.02479
20	23.58	1.60	.03678	.03605	.03534	.03466	.03401	.03338	.03277	.03218	.03162	.03107	.03055
30	28.03	1.91	.04371	.04283	.04199	.04118	.04041	.03966	.03894	.03824	.03757	.03692	.03630
40	32.47	2.21	.05063	.04962	.04864	.04771	.04681	.04594	.04511	.04430	.04352	.04277	.04205
50	36.92	2.51	.05755	.05640	.05529	.05423	.05321	.05222	.05127	.05036	.04947	.04862	.04780
60	41.36	2.81	.06447	.06318	.06194	.06075	.05960	.05850	.05744	.05641	.05542	.05447	.05354
70	45.81	3.12	.07138	.06995	.06858	.06727	.06600	.06477	.06360	.06246	.06137	.06031	.05929
80	50.25	3.42	.07830	.07673	.07523	.07378	.07239	.07105	.06976	.06851	.06731	.06615	.06503
90	54.70	3.72	.08520	.08350	.08187	.08029	.07878	.07732	.07592	.07456	.07326	.07199	.07077
100	59.14	4.02	.09211	.09027	.08851	.08680	.08517	.08359	.08207	.08061	.07920	.07783	.07652
110	63.58	4.33	.09902	.09704	.09514	.09331	.09155	.08986	.08823	.08665	.08514	.08367	.08225
120	68.03	4.63	.10592	.10381	.10178	.09982	.09794	.09613	.09438	.09270	.09107	.08951	.08799
130	72.47	4.93	.11283	.11057	.10841	.10632	.10432	.10239	.10053	.09874	.09701	.09534	.09373
140	76.92	5.23	.11972	.11733	.11504	.11283	.11070	.10865	.10668	.10478	.10294	.10117	.09946
150	81.36	5.54	.12662	.12409	.12167	.11933	.11708	.11491	.11283	.11082	.10888	.10700	.10519
160	85.81	5.84	.13352	.13085	.12829	.12583	.12346	.12118	.11897	.11685	.11481	.11283	.11092
170	90.25	6.14	.14041	.13761	.13492	.13232	.12983	.12743	.12512	.12289	.12074	.11866	.11665
180	94.70	6.44	.14730	.14436	.14154	.13882	.13620	.13369	.13126	.12892	.12666	.12448	.12238
190	99.14	6.75	.15419	.15111	.14815	.14531	.14257	.13994	.13740	.13495	.13259	.13031	.12811
200	103.58	7.05	.16108	.15786	.15477	.15180	.14895	.14619	.14354	.14098	.13851	.13613	.13383
210	108.03	7.35	.16796	.16461	.16139	.15829	.15531	.15244	.14968	.14701	.14444	.14195	.13955
220	112.47	7.65	.17484	.17135	.16800	.16478	.16168	.15869	.15581	.15303	.15035	.14777	.14527
230	116.92	7.96	.18172	.17810	.17461	.17126	.16804	.16493	.16194	.15906	.15628	.15359	.15099
240	121.36	8.26	.18860	.18484	.18122	.17775	.17440	.17118	.16807	.16508	.16219	.15940	.15671
250	125.81	8.56	.19547	.19158	.18783	.18423	.18076	.17742	.17420	.17110	.16811	.16522	.16242
260	130.25	8.86	.20235	.19831	.19443	.19070	.18712	.18366	.18033	.17712	.17402	.17103	.16814
270	134.69	9.17	.20922	.20505	.20103	.19718	.19347	.18990	.18646	.18313	.17993	.17684	.17385
280	139.14	9.47	.21609	.21177	.20763	.20365	.19983	.19614	.19258	.18915	.18584	.18265	.17956
290	143.58	9.77	.22295	.21850	.21423	.21013	.20618	.20237	.19870	.19516	.19175	.18846	.18527
300	148.03	10.07	.22981	.22523	.22083	.21660	.21252	.20860	.20482	.20118	.19766	.19426	.19098
310	152.47	10.38	.23668	.23196	.22742	.22307	.21887	.21483	.21094	.20719	.20357	.20007	.19669
320	156.92	10.68	.24354	.23868	.23402	.22953	.22522	.22107	.21706	.21320	.20947	.20587	.20239
330	161.36	10.98	.25040	.24540	.24061	.23600	.23156	.22729	.22317	.21920	.21537	.21167	.20810
340	165.81	11.28	.25725	.25212	.24720	.24246	.23790	.23351	.22928	.22520	.22127	.21747	.21380
350	170.25	11.58	.26410	.25884	.25378	.24892	.24424	.23974	.23540	.23121	.22717	.22327	.21950
360	174.69	11.89	.27095	.26556	.26037	.25538	.25058	.24596	.24151	.23721	.23306	.22907	.22520
370	179.14	12.19	.27780	.27226	.26695	.26184	.25692	.25218	.24761	.24321	.23896	.23486	.23089
380	183.58	12.49	.28465	.27897	.27353	.26829	.26326	.25840	.25372	.24921	.24485	.24065	.23659
390	188.03	12.79	.29149	.28568	.28011	.27475	.26959	.26461	.25982	.25520	.25075	.24644	.24229
400	192.47	13.10	.29833	.29239	.28668	.28120	.27592	.27083	.26592	.26120	.25663	.25223	.24797
410	196.92	13.40	.30517	.29910	.29326	.28764	.28224	.27704	.27203	.26719	.26253	.25802	.25367
420	201.36	13.70	.31201	.30580	.29983	.29409	.28857	.28325	.27812	.27318	.26841	.26381	.25936
430	205.81	14.00	.31884	.31250	.30640	.30053	.29489	.28946	.28422	.27917	.27430	.26959	.26504
440	210.25	14.31	.32567	.31920	.31297	.30698	.30121	.29567	.29032	.28516	.28018	.27537	.27073
450	214.69	14.61	.33251	.32589	.31953	.31342	.30754	.30187	.29641	.29114	.28606	.28116	.27642
460	219.14	14.91	.33934	.33258	.32610	.31985	.31386	.30807	.30250	.29712	.29194	.28693	.28209
470	223.58	15.21	.34617	.33927	.33266	.32629	.32017	.31427	.30859	.30311	.29782	.29271	.28778
480	228.03	15.52	.35298	.34596	.33922	.33273	.32648	.32048	.31468	.30909	.30369	.29849	.29346
490	232.47	15.82	.35981	.35265	.34578	.33917	.33280	.32667	.32076	.31507	.30957	.30426	.29913
500	236.92	16.12	.36663	.35934	.35233	.34560	.33911	.33287	.32685	.32104	.31544	.31004	.30481
510	241.36	16.42	.37345	.36602	.35888	.35202	.34542	.33906	.33293	.32702	.32132	.31581	.31049
520	245.80	16.73	.38026	.37270	.36544	.35845	.35173	.34526	.33901	.33299	.32718	.32158	.31616
530	250.25	17.03	.38707	.37938	.37199	.36487	.35803	.35144	.34509	.33896	.33306	.32734	.32183
540	254.69	17.33	.39388	.38605	.37853	.37130	.36433	.35763	.35117	.34494	.33892	.33311	.32751
550	259.14	17.63	.40069	.39272	.38508	.37772	.37063	.36381	.35724	.35090	.34479	.33888	.33317
560	263.58	17.94	.40750	.39940	.39162	.38414	.37693	.37000	.36332	.35687	.35065	.34464	.33884
570	268.03	18.24	.41430	.40607	.39816	.39055	.38324	.37618	.36939	.36283	.35651	.35041	.34451
580	272.47	18.54	.42110	.41274	.40470	.39697	.38953	.38236	.37545	.36879	.36237	.35616	.35017
590	276.92	18.84	.42790	.41940	.41124	.40338	.39582	.38854	.38153	.37476	.36823	.36192	.35583
600	281.36	19.15	.43470	.42607	.41777	.40979	.40211	.39472	.38759	.38072	.37408	.36768	.36150
610	285.80	19.45	.44150	.43273	.42431	.41620	.40840	.40090	.39365	.38668	.37994	.37343	.36715
620	290.25	19.75	.44829	.43939	.43084	.42260	.41469	.40707	.39972	.39263	.38579	.37919	.37281
630	294.69	20.05	.45508	.44604	.43737	.42902	.42097	.41324	.40578	.39858	.39164	.38494	.37847
640	299.14	20.36	.46187	.45270	.44388	.43542	.42727	.41941	.41184	.40454	.39749	.39069	.38412
650	303.58	20.66	.46866	.45935	.45041	.44182	.43355	.42558	.41790	.41049	.40334	.39644	.38977
660	308.03	20.96	.47545	.46600	.45693	.44822	.43982	.43174	.42395	.41644	.40918	.40219	.39543
670	312.47	21.26	.48222	.47265	.46345	.45462	.44610	.43790	.43000	.42238	.41503	.40794	.40107
680	316.92	21.56	.48900	.47930	.46997	.46101	.45238	.44407	.43606	.42834	.42087	.41368	.40672
690	321.36	21.87	.49578	.48595	.47649	.46740	.45865	.45023	.44211	.43428	.42672	.41942	.41236
700	325.80	22.17	.50256	.49259	.48300	.47379	.46493	.45639	.44815	.44021	.43255	.42516	.41801
710	330.25	22.47	.50932	.49922	.48951	.48018	.47120	.46254	.45421	.44616	.43840	.43090	.42366
720	334.69	22.77	.51610	.50586	.49602	.48657	.47747	.46870	.46025	.45209	.44423	.43663	.42929
730	339.14	23.08	.52287	.51250	.50253	.49295	.48373	.47485	.46629	.45804	.45007	.44237	.43494
740	343.58	23.38	.52964	.51913	.50904	.49933	.49000	.48100	.47234	.46397	.45589	.44811	.44058
750	348.03	23.68	.53641	.52577	.51554	.50571	.49626	.48715	.47837	.46990	.46173	.45384	.44621
760	352.47	23.98	.54316	.53240	.52205	.51209	.50252	.49329	.48441	.47584	.46756	.45957	.45185
770	356.91	24.29	.54992	.53903	.52855	.51847	.50879	.49945	.49045	.48176	.47339	.46530	.45749
780	361.36	24.59	.55668	.54566	.53505	.52484	.51504	.50559	.49648	.48770	.47921	.47103	.46311
790	365.80	24.89	.56344	.55227	.54154	.53121	.52130	.51173	.50251	.49362	.48504	.47676	.46875

T-57

DENSITY
15 % O_2, 85 % He

DENSITY.LBS/CUBIC FT

.150 OXYGEN .850 HELIUM AVERAGE MOLECULAR WEIGHT 8.203

DEPTH	PRESSURE		TEMPERATURE,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
800	370.25	25.19	.57020	.55889	.54804	.53760	.52755	.51786	.50855	.49955	.49086	.48248	.47438
810	374.69	25.50	.57694	.56551	.55453	.54397	.53380	.52401	.51457	.50547	.49669	.48821	.48000
820	379.14	25.80	.58369	.57213	.56102	.55034	.54004	.53015	.52060	.51139	.50250	.49392	.48563
830	383.58	26.10	.59044	.57875	.56751	.55670	.54630	.53628	.52643	.51731	.50832	.49964	.49126
840	388.03	26.40	.59719	.58536	.57399	.56306	.55255	.54241	.53265	.52323	.51413	.50536	.49687
850	392.47	26.71	.60392	.59197	.58048	.56943	.55879	.54855	.53867	.52915	.51996	.51108	.50250
860	396.91	27.01	.61067	.59859	.58696	.57578	.56503	.55467	.54470	.53506	.52576	.51680	.50813
870	401.36	27.31	.61741	.60518	.59344	.58214	.57127	.56080	.55071	.54097	.53158	.52250	.51374
880	405.80	27.61	.62415	.61178	.59992	.58850	.57750	.56692	.55672	.54689	.53738	.52822	.51936
890	410.25	27.92	.63089	.61839	.60640	.59485	.58374	.57305	.56275	.55279	.54320	.53392	.52498
900	414.69	28.22	.63761	.62499	.61287	.60120	.58999	.57917	.56875	.55871	.54900	.53964	.53058
910	419.14	28.52	.64434	.63159	.61934	.60755	.59622	.58529	.57476	.56461	.55481	.54535	.53620
920	423.58	28.82	.65107	.63819	.62581	.61390	.60245	.59140	.58078	.57052	.56061	.55105	.54181
930	428.03	29.13	.65780	.64479	.63228	.62024	.60867	.59753	.58678	.57642	.56641	.55676	.54741
940	432.47	29.43	.66451	.65138	.63875	.62660	.61490	.60364	.59278	.58231	.57221	.56245	.55303
950	436.91	29.73	.67124	.65796	.64521	.63294	.62112	.60975	.59880	.58822	.57801	.56816	.55864
960	441.36	30.03	.67796	.66455	.65167	.63928	.62736	.61586	.60479	.59411	.58380	.57385	.56423
970	445.80	30.33	.68468	.67113	.65813	.64562	.63358	.62198	.61079	.60002	.58960	.57955	.56984
980	450.25	30.64	.69140	.67772	.66458	.65195	.63979	.62808	.61680	.60590	.59539	.58525	.57545
990	454.69	30.94	.69810	.68430	.67103	.65829	.64601	.63419	.62279	.61179	.60119	.59094	.58104
1000	459.14	31.24	.70481	.69089	.67749	.66462	.65222	.64028	.62878	.61769	.60697	.59664	.58664
1050	481.36	32.75	.73834	.72374	.70973	.69625	.68328	.67079	.65874	.64712	.63590	.62508	.61461
1100	503.58	34.27	.77180	.75657	.74192	.72783	.71429	.70123	.68865	.67650	.66478	.65348	.64255
1150	525.80	35.78	.80522	.78933	.77406	.75938	.74523	.73161	.71850	.70585	.69363	.68182	.67043
1200	548.02	37.29	.83858	.82203	.80615	.79086	.77615	.76198	.74833	.73515	.72243	.71015	.69828
1250	570.25	38.80	.87187	.85470	.83819	.82229	.80702	.79229	.77809	.76440	.75120	.73843	.72611
1300	592.47	40.31	.90512	.88730	.87016	.85370	.83784	.82257	.80783	.79362	.77991	.76667	.75388
1350	614.69	41.83	.93833	.91985	.90210	.88504	.86862	.85279	.83753	.82279	.80860	.79487	.78161
1400	636.91	43.34	.97148	.95237	.93400	.91633	.89933	.88296	.86716	.85195	.83723	.82304	.80933
1450	659.13	44.85	1.00457	.98482	.96584	.94759	.93001	.91308	.89677	.88104	.86584	.85116	.83699
1500	681.36	46.36	1.03762	1.01721	.99764	.97879	.96065	.94317	.92634	.91009	.89439	.87925	.86460

	500	34.02	.76642	.75127	.73674	.72275	.70929	.69632	.68383	.67178	.66014	.64890	.63805
	600	40.83	.91640	.89835	.88100	.86433	.84827	.83281	.81791	.80352	.78964	.77624	.76329
	700	47.63	1.06527	1.04438	1.02425	1.00493	.98631	.96838	.95110	.93442	.91832	.90278	.88776
	800	54.44	1.2131	1.1893	1.1665	1.1446	1.1234	1.1031	1.0834	1.0645	1.0462	1.0285	1.0115
	900	61.24	1.3599	1.3333	1.3078	1.2832	1.2596	1.2369	1.2149	1.1937	1.1733	1.1535	1.1344
	1000	68.05	1.5056	1.4763	1.4481	1.4210	1.3949	1.3698	1.3455	1.3221	1.2996	1.2777	1.2566
	1100	74.85	1.6503	1.6183	1.5875	1.5578	1.5293	1.5018	1.4753	1.4497	1.4250	1.4011	1.3781
	1200	81.65	1.7940	1.7593	1.7259	1.6937	1.6628	1.6330	1.6043	1.5765	1.5497	1.5238	1.4988
	1300	88.46	1.9367	1.8993	1.8633	1.8288	1.7954	1.7633	1.7324	1.7025	1.6736	1.6458	1.6188
	1400	95.26	2.0783	2.0383	1.9998	1.9628	1.9272	1.8928	1.8597	1.8277	1.7968	1.7670	1.7381
	1500	102.07	2.2190	2.1764	2.1354	2.0960	2.0580	2.0215	1.9862	1.9521	1.9192	1.8874	1.8567
	1600	108.87	2.3587	2.3136	2.2701	2.2284	2.1880	2.1493	2.1119	2.0758	2.0409	2.0072	1.9745
	1700	115.68	2.4975	2.4498	2.4038	2.3598	2.3173	2.2763	2.2368	2.1986	2.1618	2.1262	2.0918
	1800	122.48	2.6351	2.5851	2.5368	2.4904	2.4456	2.4026	2.3610	2.3208	2.2820	2.2445	2.2082
	1900	129.29	2.7720	2.7194	2.6688	2.6200	2.5732	2.5279	2.4842	2.4421	2.4014	2.3621	2.3241
	2000	136.09	2.9079	2.8529	2.7999	2.7490	2.6959	2.6526	2.6069	2.5628	2.5202	2.4790	2.4392
	2100	142.90	3.0429	2.9855	2.9302	2.8770	2.8257	2.7764	2.7288	2.6827	2.6383	2.5952	2.5537
	2200	149.70	3.1770	3.1172	3.0596	3.0042	2.9509	2.8995	2.8498	2.8019	2.7555	2.7108	2.6674
	2300	156.51	3.3101	3.2480	3.1882	3.1307	3.0753	3.0218	2.9702	2.9204	2.8722	2.8257	2.7806
	2400	163.31	3.4422	3.3779	3.3159	3.2562	3.1988	3.1433	3.0898	3.0382	2.9882	2.9398	2.8932
	2500	170.11	3.5736	3.5070	3.4428	3.3811	3.3216	3.2641	3.2088	3.1551	3.1035	3.0533	3.0049
	2600	176.92	3.7041	3.6353	3.5690	3.5052	3.4436	3.3842	3.3268	3.2715	3.2179	3.1662	3.1162
	2700	183.72	3.8339	3.7627	3.6942	3.6283	3.5647	3.5036	3.4443	3.3871	3.3319	3.2785	3.2268
	2800	190.53	3.9626	3.8893	3.8188	3.7508	3.6853	3.6222	3.5611	3.5021	3.4451	3.3901	3.3368
	2900	197.33	4.0905	4.0151	3.9425	3.8726	3.8051	3.7401	3.6771	3.6164	3.5579	3.5010	3.4461
	3000	204.14	4.2176	4.1400	4.0653	3.9934	3.9241	3.8573	3.7927	3.7301	3.6698	3.6114	3.5549
	3100	210.94	4.3438	4.2643	4.1876	4.1136	4.0424	3.9737	3.9074	3.8432	3.7811	3.7210	3.6630
	3200	217.75	4.4694	4.3876	4.3090	4.2331	4.1600	4.0895	4.0214	3.9555	3.8918	3.8301	3.7705
	3300	224.55	4.5940	4.5103	4.4295	4.3518	4.2769	4.2045	4.1347	4.0671	4.0018	3.9387	3.8776
	3400	231.36	4.7178	4.6320	4.5494	4.4696	4.3930	4.3191	4.2475	4.1783	4.1114	4.0466	3.9840
	3500	238.16	4.8410	4.7531	4.6686	4.5873	4.5087	4.4328	4.3595	4.2887	4.2201	4.1540	4.0897
	3600	244.96	4.9633	4.8735	4.7870	4.7038	4.6234	4.5460	4.4710	4.3986	4.3285	4.2606	4.1950
	3700	251.77	5.0847	4.9931	4.9049	4.8197	4.7375	4.6583	4.5817	4.5076	4.4360	4.3668	4.2996
	3800	258.57	5.2056	5.1120	5.0219	4.9348	4.8511	4.7702	4.6920	4.6163	4.5431	4.4722	4.4038
	3900	265.38	5.3256	5.2301	5.1381	5.0494	4.9640	4.8812	4.8013	4.7243	4.6496	4.5773	4.5072
	4000	272.18	5.4450	5.3475	5.2536	5.1632	5.0760	4.9918	4.9103	4.8315	4.7555	4.6817	4.6103
	4100	278.99	5.5635	5.4641	5.3687	5.2765	5.1876	5.1018	5.0187	4.9383	4.8609	4.7856	4.7128
	4200	285.79	5.6813	5.5803	5.4828	5.3891	5.2985	5.2111	5.1264	5.0445	4.9656	4.8890	4.8148
	4300	292.60	5.7984	5.6955	5.5965	5.5008	5.4088	5.3197	5.2335	5.1502	5.0698	4.9917	4.9162
	4400	299.40	5.9148	5.8100	5.7092	5.6121	5.5182	5.4278	5.3400	5.2552	5.1734	5.0939	5.0170
	4500	306.21	6.0304	5.9241	5.8215	5.7227	5.6272	5.5352	5.4459	5.3599	5.2764	5.1956	5.1174
	4600	313.01	6.1456	6.0375	5.9332	5.8327	5.7358	5.6420	5.5515	5.4637	5.3789	5.2967	5.2172
	4700	319.81	.2598	6.1499	6.0442	5.9420	5.8435	5.7482	5.6562	5.5670	5.4808	5.3973	5.3164
	4800	326.62	6.3736	6.2620	6.1545	6.0507	5.9506	5.8541	5.7603	5.6700	5.5823	5.4975	5.4156
	4900	333.42	6.4864	6.3733	6.2647	6.1588	6.0572	5.9591	5.8641	5.7721	5.6831	5.5970	5.5136
	5000	340.23	6.5988	6.4840	6.3732	6.2665	6.1633	6.0638	5.9671	5.8740	5.7837	5.6962	5.6113

SP. VOL.
15 % O_2, 85 % He

T-58

SPECIFIC VOLUME,CUBIC FT/LB

.150 OXYGEN .850 HELIUM AVERAGE MOLECULAR WEIGHT 8.203

DEPTH	PRESSURE		TEMPERATURE,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	43.617	44.508	45.397	46.288	47.179	48.068	48.959	49.850	50.741	51.630	52.521
10	19.14	1.30	33.494	34.178	34.862	35.546	36.229	36.913	37.597	38.280	38.964	39.648	40.331
20	23.58	1.60	27.187	27.742	28.297	28.852	29.406	29.962	30.516	31.071	31.626	32.181	32.736
30	28.03	1.91	22.880	23.347	23.814	24.281	24.747	25.215	25.681	26.149	26.615	27.082	27.549
40	32.47	2.21	19.752	20.155	20.558	20.961	21.364	21.767	22.170	22.573	22.976	23.379	23.782
50	36.92	2.51	17.377	17.731	18.086	18.440	18.795	19.149	19.504	19.858	20.213	20.567	20.922
60	41.36	2.81	15.512	15.828	16.145	16.461	16.778	17.094	17.411	17.727	18.044	18.360	18.676
70	45.81	3.12	14.009	14.295	14.581	14.866	15.152	15.438	15.724	16.010	16.295	16.581	16.866
80	50.25	3.42	12.772	13.033	13.293	13.554	13.814	14.075	14.335	14.595	14.856	15.117	15.377
90	54.70	3.72	11.737	11.976	12.215	12.454	12.694	12.933	13.172	13.412	13.651	13.890	14.129
100	59.14	4.02	10.856	11.078	11.299	11.521	11.742	11.963	12.184	12.406	12.627	12.848	13.069
110	63.58	4.33	10.099	10.305	10.511	10.717	10.923	11.129	11.334	11.540	11.746	11.952	12.158
120	68.03	4.63	9.4407	9.6332	9.8255	10.0181	10.2106	10.4028	10.5953	10.7878	10.9803	11.1728	11.3649
130	72.47	4.93	8.8631	9.0439	9.2244	9.4052	9.5859	9.7666	9.9471	10.1276	10.3083	10.4890	10.6694
140	76.92	5.23	8.3525	8.5227	8.6928	8.8631	9.0332	9.2035	9.3738	9.5439	9.7142	9.8842	10.0545
150	81.36	5.54	7.8975	8.0584	8.2192	8.3803	8.5411	8.7022	8.8630	9.0240	9.1847	9.3457	9.5066
160	85.61	5.84	7.4896	7.6422	7.7947	7.9475	8.1000	8.2525	8.4052	8.5577	8.7104	8.8628	9.0153
170	90.25	6.14	7.1219	7.2670	7.4121	7.5573	7.7023	7.8473	7.9923	8.1375	8.2825	8.4275	8.5727
180	94.70	6.44	6.7887	6.9270	7.0653	7.2037	7.3420	7.4802	7.6184	7.7566	7.8950	8.0332	8.1714
190	99.14	6.75	6.4856	6.6177	6.7498	6.8819	7.0139	7.1460	7.2780	7.4101	7.5421	7.6741	7.8061
200	103.58	7.05	6.2083	6.3347	6.4612	6.5875	6.7139	6.8403	6.9667	7.0931	7.2195	7.3460	7.4723
210	108.03	7.35	5.9538	6.0751	6.1963	6.3174	6.4387	6.5599	6.6811	6.8023	6.9235	7.0447	7.1659
220	112.47	7.65	5.7194	5.8359	5.9526	6.0687	6.1852	6.3017	6.4181	6.5345	6.6510	6.7674	6.8839
230	116.92	7.96	5.5024	5.6150	5.7271	5.8390	5.9510	6.0631	6.1749	6.2870	6.3990	6.5110	6.6229
240	121.36	8.26	5.3023	5.4102	5.5182	5.6260	5.7340	5.8418	5.9497	6.0577	6.1656	6.2733	6.3812
250	125.81	8.56	5.1158	5.2199	5.3241	5.4281	5.5323	5.6363	5.7405	5.8444	5.9486	6.0527	6.1568
260	130.25	8.86	4.9420	5.0426	5.1432	5.2437	5.3442	5.4448	5.5453	5.6459	5.7465	5.8470	5.9475
270	134.69	9.17	4.7797	4.8769	4.9741	5.0715	5.1687	5.2660	5.3632	5.4605	5.5576	5.6548	5.7520
280	139.14	9.47	4.6278	4.7220	4.8162	4.9103	5.0044	5.0985	5.1927	5.2867	5.3809	5.4750	5.5691
290	143.58	9.77	4.4853	4.5766	4.6678	4.7590	4.8502	4.9414	5.0326	5.1239	5.2150	5.3062	5.3974
300	148.03	10.07	4.3513	4.4399	4.5286	4.6169	4.7053	4.7938	4.8823	4.9707	5.0593	5.1477	5.2361
310	152.47	10.38	4.2252	4.3111	4.3971	4.4830	4.5689	4.6548	4.7407	4.8266	4.9124	4.9983	5.0842
320	156.92	10.68	4.1061	4.1897	4.2732	4.3567	4.4401	4.5236	4.6070	4.6905	4.7740	4.8575	4.9409
330	161.36	10.98	3.9937	4.0749	4.1561	4.2374	4.3185	4.3997	4.4808	4.5620	4.6432	4.7243	4.8054
340	165.81	11.28	3.8873	3.9663	4.0454	4.1243	4.2034	4.2824	4.3614	4.4404	4.5194	4.5984	4.6773
350	170.25	11.58	3.7864	3.8634	3.9404	4.0173	4.0943	4.1712	4.2481	4.3251	4.4020	4.4789	4.5558
360	174.69	11.89	3.6907	3.7657	3.8407	3.9157	3.9907	4.0657	4.1407	4.2157	4.2907	4.3655	4.4405
370	179.14	12.19	3.5997	3.6729	3.7460	3.8191	3.8923	3.9654	4.0386	4.1116	4.1848	4.2579	4.3310
380	183.58	12.49	3.5131	3.5846	3.6559	3.7273	3.7986	3.8700	3.9413	4.0127	4.0841	4.1554	4.2267
390	188.03	12.79	3.4307	3.5004	3.5701	3.6397	3.7094	3.7791	3.8488	3.9185	3.9881	4.0578	4.1274
400	192.47	13.10	3.3520	3.4201	3.4882	3.5562	3.6243	3.6923	3.7605	3.8285	3.8966	3.9646	4.0327
410	196.92	13.40	3.2768	3.3434	3.4100	3.4765	3.5431	3.6096	3.6761	3.7427	3.8092	3.8756	3.9422
420	201.36	13.70	3.2050	3.2701	3.3352	3.4003	3.4654	3.5305	3.5955	3.6605	3.7257	3.7907	3.8557
430	205.81	14.00	3.1364	3.2000	3.2637	3.3274	3.3911	3.4548	3.5186	3.5821	3.6457	3.7093	3.7730
440	210.25	14.31	3.0705	3.1329	3.1952	3.2576	3.3199	3.3822	3.4445	3.5068	3.5692	3.6315	3.6937
450	214.69	14.61	3.0075	3.0685	3.1296	3.1906	3.2516	3.3127	3.3737	3.4347	3.4957	3.5567	3.6177
460	219.14	14.91	2.9469	3.0068	3.0666	3.1264	3.1862	3.2460	3.3056	3.3656	3.4254	3.4851	3.5449
470	223.58	15.21	2.8888	2.9475	3.0061	3.0648	3.1233	3.1820	3.2405	3.2991	3.3577	3.4163	3.4749
480	228.03	15.52	2.8330	2.8905	2.9480	3.0054	3.0629	3.1204	3.1778	3.2353	3.2928	3.3502	3.4076
490	232.47	15.82	2.7793	2.8357	2.8920	2.9484	3.0048	3.0612	3.1176	3.1739	3.2303	3.2866	3.3430
500	236.92	16.12	2.7276	2.7829	2.8382	2.8936	2.9489	3.0042	3.0595	3.1148	3.1702	3.2254	3.2807
510	241.36	16.42	2.6778	2.7321	2.7864	2.8407	2.8950	2.9494	3.0036	3.0580	3.1122	3.1665	3.2207
520	245.80	16.73	2.6298	2.6831	2.7365	2.7898	2.8431	2.8964	2.9498	3.0031	3.0564	3.1098	3.1630
530	250.25	17.03	2.5835	2.6359	2.6883	2.7407	2.7930	2.8454	2.8978	2.9502	3.0025	3.0549	3.1072
540	254.69	17.33	2.5388	2.5903	2.6418	2.6933	2.7447	2.7962	2.8476	2.8991	2.9506	3.0020	3.0534
550	259.14	17.63	2.4957	2.5463	2.5969	2.6475	2.6981	2.7487	2.7992	2.8498	2.9003	2.9509	3.0015
560	263.58	17.94	2.4540	2.5038	2.5535	2.6033	2.6530	2.7027	2.7524	2.8021	2.8519	2.9016	2.9512
570	268.03	18.24	2.4137	2.4626	2.5115	2.5605	2.6094	2.6583	2.7072	2.7561	2.8050	2.8538	2.9027
580	272.47	18.54	2.3747	2.4228	2.4710	2.5191	2.5672	2.6153	2.6634	2.7115	2.7596	2.8077	2.8558
590	276.92	18.84	2.3370	2.3843	2.4317	2.4791	2.5264	2.5737	2.6210	2.6684	2.7157	2.7630	2.8103
600	281.36	19.15	2.3004	2.3470	2.3936	2.4403	2.4869	2.5334	2.5800	2.6266	2.6732	2.7197	2.7663
610	285.80	19.45	2.2650	2.3109	2.3568	2.4027	2.4486	2.4944	2.5403	2.5861	2.6320	2.6778	2.7237
620	290.25	19.75	2.2307	2.2759	2.3211	2.3663	2.4115	2.4566	2.5017	2.5469	2.5921	2.6372	2.6824
630	294.69	20.05	2.1974	2.2419	2.2864	2.3309	2.3755	2.4199	2.4644	2.5089	2.5533	2.5978	2.6422
640	299.14	20.36	2.1651	2.2090	2.2528	2.2966	2.3405	2.3843	2.4282	2.4719	2.5158	2.5596	2.6034
650	303.58	20.66	2.1337	2.1770	2.2202	2.2634	2.3066	2.3497	2.3929	2.4361	2.4793	2.5225	2.5657
660	308.03	20.96	2.1033	2.1459	2.1885	2.2311	2.2736	2.3162	2.3588	2.4013	2.4439	2.4864	2.5289
670	312.47	21.26	2.0737	2.1157	2.1577	2.1997	2.2416	2.2836	2.3256	2.3675	2.4094	2.4514	2.4933
680	316.92	21.56	2.0450	2.0864	2.1278	2.1692	2.2106	2.2519	2.2933	2.3346	2.3760	2.4174	2.4587
690	321.36	21.87	2.0170	2.0578	2.0987	2.1395	2.1803	2.2211	2.2619	2.3027	2.3435	2.3842	2.4251
700	325.80	22.17	1.9898	2.0301	2.0704	2.1106	2.1509	2.1911	2.2314	2.2716	2.3119	2.3521	2.3924
710	330.25	22.47	1.9634	2.0031	2.0428	2.0825	2.1222	2.1620	2.2016	2.2413	2.2810	2.3207	2.3604
720	334.69	22.77	1.9376	1.9768	2.0160	2.0552	2.0944	2.1335	2.1727	2.2119	2.2511	2.2903	2.3295
730	339.14	23.08	1.9125	1.9512	1.9899	2.0286	2.0673	2.1059	2.1446	2.1832	2.2219	2.2605	2.2992
740	343.58	23.38	1.8881	1.9263	1.9645	2.0027	2.0408	2.0790	2.1171	2.1553	2.1935	2.2316	2.2697
750	348.03	23.68	1.8643	1.9020	1.9397	1.9774	2.0151	2.0528	2.0904	2.1281	2.1658	2.2034	2.2411
760	352.47	23.98	1.8411	1.8783	1.9155	1.9528	1.9900	2.0272	2.0644	2.1016	2.1388	2.1759	2.2131
770	356.91	24.29	1.8184	1.8552	1.8920	1.9288	1.9655	2.0022	2.0389	2.0757	2.1124	2.1492	2.1859
780	361.36	24.59	1.7963	1.8327	1.8690	1.9053	1.9416	1.9779	2.0142	2.0505	2.0868	2.1230	2.1593
790	365.80	24.89	1.7748	1.8107	1.8466	1.8824	1.9183	1.9542	1.9900	2.0259	2.0617	2.0975	2.1333

T-59

SP. VOL.

15 % O_2, 85 % He

SPECIFIC VOLUME,CUBIC FT/LB

.150 OXYGEN .850 HELIUM AVERAGE MOLECULAR WEIGHT 8.203

DEPTH	PRESSURE		TEMPERATURE,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
800	370.25	25.19	1.7538	1.7893	1.8247	1.8601	1.8956	1.9310	1.9664	2.0018	2.0372	2.0726	2.1080
810	374.69	25.50	1.7333	1.7683	1.8033	1.8383	1.8734	1.9083	1.9434	1.9784	2.0133	2.0483	2.0833
820	379.14	25.80	1.7132	1.7479	1.7825	1.8171	1.8517	1.8863	1.9209	1.9555	1.9901	2.0246	2.0592
830	383.58	26.10	1.6936	1.7279	1.7621	1.7963	1.8305	1.8647	1.8989	1.9331	1.9673	2.0014	2.0356
840	388.03	26.40	1.6745	1.7083	1.7422	1.7760	1.8098	1.8436	1.8774	1.9112	1.9450	1.9788	2.0126
850	392.47	26.71	1.6558	1.6893	1.7227	1.7562	1.7896	1.8230	1.8564	1.8898	1.9232	1.9567	1.9900
860	396.91	27.01	1.6376	1.6706	1.7037	1.7368	1.7698	1.8029	1.8359	1.8690	1.9020	1.9350	1.9680
870	401.36	27.31	1.6197	1.6524	1.6851	1.7178	1.7505	1.7832	1.8158	1.8485	1.8812	1.9139	1.9465
880	405.80	27.61	1.6022	1.6346	1.6669	1.6992	1.7316	1.7639	1.7962	1.8285	1.8609	1.8931	1.9255
890	410.25	27.92	1.5851	1.6171	1.6491	1.6811	1.7131	1.7450	1.7770	1.8090	1.8409	1.8729	1.9048
900	414.69	28.22	1.5684	1.6000	1.6317	1.6633	1.6950	1.7266	1.7582	1.7898	1.8215	1.8531	1.8847
910	419.14	28.52	1.5520	1.5833	1.6146	1.6460	1.6772	1.7086	1.7399	1.7711	1.8024	1.8337	1.8650
920	423.58	28.82	1.5359	1.5669	1.5979	1.6289	1.6599	1.6909	1.7218	1.7528	1.7838	1.8147	1.8457
930	428.03	29.13	1.5202	1.5509	1.5816	1.6123	1.6429	1.6736	1.7042	1.7349	1.7655	1.7961	1.8268
940	432.47	29.43	1.5049	1.5352	1.5656	1.5959	1.6263	1.6566	1.6870	1.7173	1.7476	1.7779	1.8082
950	436.91	29.73	1.4898	1.5199	1.5499	1.5799	1.6100	1.6400	1.6700	1.7000	1.7301	1.7601	1.7901
960	441.36	30.03	1.4750	1.5048	1.5345	1.5643	1.5940	1.6237	1.6535	1.6832	1.7129	1.7426	1.7723
970	445.80	30.33	1.4605	1.4900	1.5194	1.5489	1.5783	1.6078	1.6372	1.6666	1.6961	1.7255	1.7549
980	450.25	30.64	1.4463	1.4755	1.5047	1.5338	1.5630	1.5921	1.6213	1.6504	1.6796	1.7087	1.7378
990	454.69	30.94	1.4325	1.4613	1.4902	1.5191	1.5480	1.5768	1.6057	1.6345	1.6634	1.6922	1.7211
1000	459.14	31.24	1.4188	1.4474	1.4760	1.5046	1.5332	1.5618	1.5904	1.6189	1.6475	1.6761	1.7046
1050	481.36	32.75	1.3544	1.3817	1.4090	1.4363	1.4635	1.4908	1.5181	1.5453	1.5726	1.5998	1.6271
1100	503.58	34.27	1.2957	1.3218	1.3479	1.3740	1.4000	1.4261	1.4521	1.4782	1.5043	1.5303	1.5563
1150	525.80	35.78	1.2419	1.2669	1.2919	1.3169	1.3419	1.3668	1.3918	1.4167	1.4417	1.4667	1.4916
1200	548.02	37.29	1.1925	1.2165	1.2405	1.2644	1.2884	1.3124	1.3363	1.3603	1.3842	1.4082	1.4321
1250	570.25	38.80	1.1470	1.1700	1.1930	1.2161	1.2391	1.2622	1.2852	1.3082	1.3312	1.3542	1.3772
1300	592.47	40.31	1.1048	1.1270	1.1492	1.1714	1.1935	1.2157	1.2379	1.2600	1.2822	1.3043	1.3265
1350	614.69	41.83	1.0657	1.0871	1.1085	1.1299	1.1513	1.1726	1.1940	1.2154	1.2367	1.2581	1.2794
1400	636.91	43.34	1.0294	1.0500	1.0707	1.0913	1.1119	1.1326	1.1532	1.1738	1.1944	1.2150	1.2356
1450	659.13	44.85	.99545	1.01541	1.03537	1.05530	1.07525	1.09519	1.11511	1.13502	1.15495	1.17486	1.19476
1500	681.36	46.36	.96375	.98308	1.00237	1.02167	1.04096	1.06026	1.07952	1.09879	1.11808	1.13733	1.15660
	500	34.02	1.3048	1.3311	1.3573	1.3836	1.4099	1.4361	1.4624	1.4886	1.5148	1.5411	1.5673
	600	40.83	1.0912	1.1131	1.1351	1.1570	1.1789	1.2008	1.2226	1.2445	1.2664	1.2883	1.3101
	700	47.63	.93873	.95751	.97632	.99510	1.01388	1.03265	1.05141	1.07019	1.08895	1.10769	1.12643
	800	54.44	.82433	.84080	.85725	.87370	.89012	.90656	.92301	.93941	.95583	.97227	.98866
	900	61.24	.73535	.75000	.76463	.77927	.79389	.80851	.82311	.83772	.85232	.86691	.88151
	1000	68.05	.66418	.67737	.69056	.70372	.71690	.73004	.74321	.75635	.76950	.78265	.79578
	1100	74.85	.60594	.61794	.62993	.64192	.65389	.66586	.67783	.68979	.70174	.71370	.72565
	1200	81.65	.55742	.56842	.57942	.59041	.60140	.61237	.62334	.63431	.64527	.65623	.66718
	1300	88.46	.51635	.52651	.53668	.54682	.55697	.56711	.57725	.58738	.59750	.60762	.61773
	1400	95.26	.48117	.49060	.50005	.50947	.51890	.52831	.53772	.54714	.55654	.56594	.57534
	1500	102.07	.45066	.45947	.46830	.47710	.48590	.49468	.50347	.51227	.52105	.52983	.53859
	1600	108.87	.42396	.43223	.44051	.44876	.45703	.46526	.47351	.48174	.48998	.49821	.50645
	1700	115.68	.40041	.40820	.41600	.42376	.43153	.43931	.44708	.45483	.46258	.47033	.47806
	1800	122.48	.37949	.38684	.39419	.40155	.40889	.41622	.42356	.43088	.43821	.44553	.45285
	1900	129.29	.36075	.36772	.37470	.38167	.38862	.39558	.40254	.40948	.41642	.42336	.43028
	2000	136.09	.34389	.35052	.35715	.36377	.37038	.37699	.38360	.39019	.39679	.40338	.40998
	2100	142.90	.32863	.33495	.34128	.34758	.35389	.36018	.36646	.37276	.37903	.38533	.39159
	2200	149.70	.31477	.32080	.32684	.33287	.33888	.34489	.35090	.35690	.36291	.36890	.37490
	2300	156.51	.30210	.30789	.31365	.31942	.32517	.33092	.33668	.34242	.34817	.35390	.35963
	2400	163.31	.29051	.29604	.30157	.30711	.31262	.31814	.32364	.32915	.33465	.34016	.34564
	2500	170.11	.27983	.28515	.29046	.29576	.30106	.30636	.31165	.31695	.32222	.32751	.33279
	2600	176.92	.26997	.27508	.28019	.28529	.29039	.29549	.30059	.30567	.31076	.31583	.32091
	2700	183.72	.26083	.26577	.27070	.27561	.28052	.28542	.29034	.29523	.30013	.30502	.30991
	2800	190.53	.25236	.25712	.26187	.26661	.27135	.27608	.28082	.28554	.29027	.29498	.29969
	2900	197.33	.24447	.24906	.25364	.25823	.26281	.26737	.27195	.27652	.28107	.28563	.29018
	3000	204.14	.23710	.24154	.24598	.25042	.25484	.25925	.26367	.26809	.27249	.27690	.28130
	3100	210.94	.23021	.23450	.23880	.24310	.24738	.25165	.25593	.26020	.26447	.26874	.27300
	3200	217.75	.22374	.22792	.23207	.23624	.24038	.24453	.24867	.25281	.25695	.26109	.26521
	3300	224.55	.21767	.22172	.22576	.22979	.23382	.23784	.24186	.24587	.24989	.25389	.25789
	3400	231.36	.21196	.21589	.21981	.22372	.22763	.23153	.23543	.23933	.24323	.24712	.25101
	3500	238.16	.20657	.21039	.21420	.21799	.22180	.22559	.22938	.23317	.23696	.24073	.24452
	3600	244.96	.20148	.20519	.20890	.21259	.21629	.21997	.22366	.22735	.23103	.23471	.23838
	3700	251.77	.19667	.20028	.20388	.20748	.21108	.21467	.21826	.22185	.22543	.22900	.23258
	3800	258.57	.19210	.19562	.19913	.20264	.20614	.20963	.21313	.21662	.22011	.22360	.22708
	3900	265.38	.18777	.19120	.19462	.19804	.20145	.20487	.20828	.21167	.21507	.21847	.22187
	4000	272.18	.18366	.18700	.19034	.19368	.19701	.20033	.20365	.20697	.21028	.21360	.21691
	4100	278.99	.17974	.18301	.18627	.18952	.19277	.19601	.19926	.20250	.20573	.20896	.21219
	4200	285.79	.17601	.17920	.18239	.18556	.18873	.19190	.19507	.19823	.20139	.20454	.20769
	4300	292.60	.17246	.17558	.17868	.18179	.18488	.18798	.19108	.19417	.19725	.20033	.20341
	4400	299.40	.16907	.17212	.17516	.17819	.18122	.18424	.18727	.19029	.19330	.19631	.19932
	4500	306.21	.16583	.16880	.17178	.17474	.17771	.18066	.18362	.18657	.18952	.19247	.19541
	4600	313.01	.16272	.16563	.16854	.17145	.17434	.17724	.18013	.18303	.18591	.18880	.19168
	4700	319.81	.15975	.16260	.16545	.16829	.17113	.17397	.17680	.17963	.18246	.18528	.18810
	4800	326.62	.15690	.15969	.16248	.16527	.16805	.17082	.17360	.17637	.17914	.18190	.18466
	4900	333.42	.15417	.15690	.15964	.16237	.16509	.16781	.17053	.17325	.17596	.17867	.18137
	5000	340.23	.15154	.15423	.15691	.15958	.16225	.16491	.16758	.17024	.17290	.17555	.17821

0.150 OXYGEN 0.850 HELIUM
ENTHALPY,BTU/LB

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	319.11	331.97	344.82	357.71	370.58	383.46
30.00	319.09	331.95	344.81	357.70	370.58	383.46
50.00	319.06	331.93	344.80	357.69	370.58	383.46
100.00	318.99	331.88	344.77	357.66	370.57	383.46
200.00	318.8	331.8	344.7	357.6	370.6	383.5
300.00	318.7	331.6	344.6	357.6	370.5	383.5
400.00	318.5	331.5	344.5	357.5	370.5	383.5
500.00	318.4	331.4	344.4	357.5	370.5	383.5
1000.00	317.6	330.8	344.1	357.3	370.5	383.7
2000.00	316.6	330.2	343.9	357.4	370.8	384.1
3000.00	315.8	329.9	344.0	357.9	371.4	384.7
4000.00	316.7	331.2	345.3	359.3	373.1	386.8
5000.00	318.1	332.2	346.3	360.9	374.7	388.7

0.150 OXYGEN 0.850 HELIUM
CV,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.401	.401	.401	.402	.402	.402
30.00	.401	.401	.401	.402	.402	.402
50.00	.401	.401	.401	.402	.402	.402
100.00	.401	.401	.401	.402	.402	.402
200.00	.401	.401	.401	.402	.402	.402
300.00	.402	.402	.402	.402	.402	.403
400.00	.402	.402	.402	.402	.402	.403
500.00	.402	.402	.402	.402	.402	.403
1000.00	.403	.403	.403	.403	.403	.403
2000.00	.41	.41	.41	.40	.40	.40
3000.00	.41	.41	.41	.41	.41	.41
4000.00						
5000.00						

0.150 OXYGEN 0.850 HELIUM
ENTROPY,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	3.7573	3.7830	3.8077	3.8317	3.8547	3.8768
30.00	3.6857	3.7114	3.7361	3.7601	3.7831	3.8052
50.00	3.5921	3.6178	3.6426	3.6664	3.6895	3.7117
100.00	3.3897	3.4153	3.4402	3.4640	3.4871	3.5093
200.00	3.2815	3.3072	3.3322	3.3560	3.3792	3.4014
300.00	3.1732	3.1991	3.2241	3.2481	3.2712	3.2936
400.00	3.0650	3.0910	3.1161	3.1401	3.1633	3.1857
500.00	2.9568	2.9829	3.0081	3.0322	3.0554	3.0779
1000.00	2.7402	2.7667	2.7922	2.8167	2.8403	2.8629
2000.00	2.565	2.593	2.619	2.644	2.668	2.691
3000.00	2.446	2.474	2.501	2.527	2.551	2.575
4000.00	2.372	2.401	2.428	2.454	2.477	2.501
5000.00	2.314	2.342	2.370	2.396	2.421	2.445

0.150 OXYGEN 0.850 HELIUM
THERMAL CONDUCTIVITY,BTU/SEC FT F
(MULTIPLY TABLE ENTRY BY .0000100)

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.68	1.73	1.78	1.82	1.87	1.92
30.00						
50.00						
100.00						
200.00						
300.00						
400.00						
500.00						
1000.00						
2000.00						
3000.00						
4000.00						
5000.00						

0.150 OXYGEN 0.850 HELIUM
CP,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.6433	.6434	.6437	.6439	.6442	.6444
30.00	.6436	.6437	.6440	.6441	.6444	.6446
50.00	.6441	.6441	.6443	.6445	.6447	.6449
100.00	.6451	.6450	.6452	.6453	.6454	.6455
200.00	.6473	.6469	.6469	.6468	.6469	.6469
300.00	.6494	.6488	.6486	.6484	.6483	.6482
400.00	.6516	.6507	.6503	.6500	.6498	.6495
500.00	.6539	.6527	.6521	.6516	.6512	.6508
1000.00	.6652	.6629	.6610	.6598	.6584	.6576
2000.00	.69	.68	.68	.68	.68	.66
3000.00	.72	.69	.68	.68	.68	.67
4000.00	.72	.70	.70	.69	.69	.68
5000.00						

0.150 OXYGEN 0.850 HELIUM
PRANDTL NUMBER

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.52	.52	.52	.52	.52	.52
30.00						
50.00						
100.00						
200.00						
300.00						
400.00						
500.00						
1000.00						
2000.00						
3000.00						
4000.00						
5000.00						

T-61 15 % O_2, 85 % He

0.150 OXYGEN 0.850 HELIUM
CP/CV

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.604	1.604	1.604	1.603	1.603	1.602
30.00	1.605	1.605	1.605	1.604	1.603	1.602
50.00	1.606	1.605	1.605	1.604	1.604	1.603
100.00	1.608	1.607	1.607	1.606	1.606	1.604
200.00	1.613	1.611	1.611	1.609	1.609	1.607
300.00	1.617	1.615	1.614	1.613	1.612	1.610
400.00	1.622	1.619	1.618	1.616	1.615	1.613
500.00	1.627	1.623	1.622	1.619	1.618	1.616
1000.00	1.651	1.645	1.640	1.637	1.633	1.630
2000.00	1.7	1.7	1.7	1.7	1.7	1.7
3000.00	1.7	1.7	1.7	1.7	1.7	1.7
4000.00						
5000.00						

0.150 OXYGEN 0.850 HELIUM
VISCOSITY,LB/FT SEC
(MULTIPLY TABLE ENTRY BY .0000100)

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.359	1.398	1.437	1.476	1.512	1.551
30.00						
50.00						
100.00						
200.00						
300.00						
400.00						
500.00						
1000.00						
2000.00						
3000.00						
4000.00						
5000.00						

0.150 OXYGEN 0.850 HELIUM
SONIC VELOCITY FT/SEC

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	2185	2227	2270	2312	2353	2395
30.00	2187	2229	2271	2313	2355	2396
50.00	2189	2231	2274	2315	2357	2398
100.00	2195	2237	2279	2321	2362	2403
200.00	2206	2248	2290	2331	2372	2413
300.00	2217	2259	2300	2341	2382	2423
400.00	2229	2270	2311	2352	2392	2433
500.00	2240	2281	2321	2362	2402	2442
1000.00	2297	2336	2375	2413	2452	2491
2000.00	2433	2459	2484	2517	2556	2595
3000.00	2570	2582	2594	2620	2660	2700
4000.00						
5000.00						

DENSITY
10 % O_2, 90 % He

T-62

DENSITY,LBS/CUBIC FT

.100 OXYGEN .900 HELIUM AVERAGE MOLECULAR WEIGHT 6.803

DEPTH FT	PRESSURE PSIA	PRESSURE ATM	TEMPERATURE,F 30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	.01901	.01863	.01827	.01792	.01758	.01725	.01694	.01664	.01635	.01606	.01579
10	19.14	1.30	.02476	.02426	.02379	.02333	.02289	.02247	.02206	.02167	.02128	.02092	.02056
20	23.58	1.60	.03050	.02989	.02931	.02874	.02820	.02768	.02718	.02669	.02622	.02577	.02533
30	28.03	1.91	.03625	.03552	.03481	.03416	.03351	.03289	.03229	.03172	.03116	.03062	.03010
40	32.47	2.21	.04199	.04115	.04034	.03957	.03882	.03810	.03741	.03674	.03610	.03547	.03487
50	36.92	2.51	.04773	.04677	.04586	.04497	.04413	.04331	.04252	.04176	.04103	.04032	.03964
60	41.36	2.81	.05346	.05239	.05137	.05038	.04943	.04852	.04763	.04678	.04596	.04517	.04441
70	45.81	3.12	.05920	.05801	.05688	.05578	.05473	.05372	.05274	.05180	.05089	.05002	.04917
80	50.25	3.42	.06493	.06363	.06239	.06119	.06004	.05892	.05785	.05682	.05583	.05486	.05393
90	54.70	3.72	.07066	.06925	.06789	.06659	.06533	.06413	.06296	.06184	.06075	.05971	.05870
100	59.14	4.02	.07639	.07487	.07340	.07199	.07063	.06933	.06807	.06685	.06568	.06455	.06346
110	63.58	4.33	.08212	.08048	.07890	.07739	.07593	.07452	.07317	.07187	.07061	.06939	.06822
120	68.03	4.63	.08785	.08609	.08440	.08278	.08122	.07972	.07827	.07688	.07553	.07423	.07298
130	72.47	4.93	.09357	.09170	.08990	.08818	.08652	.08492	.08338	.08189	.08046	.07907	.07773
140	76.92	5.23	.09929	.09731	.09540	.09357	.09181	.09011	.08848	.08690	.08538	.08391	.08249
150	81.36	5.54	.10501	.10291	.10090	.09896	.09710	.09530	.09357	.09191	.09030	.08874	.08724
160	85.81	5.84	.11073	.10852	.10639	.10435	.10239	.10050	.09867	.09691	.09522	.09358	.09200
170	90.25	6.14	.11644	.11412	.11189	.10974	.10767	.10568	.10377	.10192	.10013	.09841	.09674
180	94.70	6.44	.12216	.11972	.11738	.11513	.11296	.11087	.10886	.10692	.10505	.10324	.10150
190	99.14	6.75	.12787	.12532	.12287	.12051	.11824	.11606	.11395	.11192	.10996	.10807	.10625
200	103.58	7.05	.13358	.13092	.12835	.12589	.12352	.12124	.11904	.11692	.11488	.11290	.11099
210	108.03	7.35	.13929	.13651	.13384	.13127	.12880	.12643	.12413	.12192	.11979	.11773	.11574
220	112.47	7.65	.14500	.14211	.13932	.13665	.13408	.13161	.12922	.12692	.12470	.12256	.12048
230	116.92	7.96	.15070	.14769	.14481	.14203	.13936	.13679	.13431	.13192	.12961	.12738	.12523
240	121.36	8.26	.15640	.15328	.15029	.14741	.14464	.14197	.13939	.13691	.13451	.13220	.12997
250	125.81	8.56	.16210	.15887	.15577	.15278	.14991	.14714	.14448	.14190	.13942	.13703	.13471
260	130.25	8.86	.16781	.16446	.16125	.15815	.15518	.15232	.14956	.14690	.14433	.14185	.13945
270	134.69	9.17	.17350	.17004	.16672	.16353	.16045	.15749	.15464	.15188	.14923	.14667	.14419
280	139.14	9.47	.17920	.17563	.17220	.16889	.16572	.16266	.15972	.15688	.15413	.15148	.14893
290	143.58	9.77	.18489	.18128	.17767	.17426	.17099	.16783	.16479	.16186	.15903	.15630	.15366
300	148.03	10.07	.19058	.18678	.18314	.17963	.17625	.17300	.16987	.16685	.16393	.16112	.15840
310	152.47	10.38	.19627	.19236	.18861	.18499	.18152	.17817	.17495	.17183	.16883	.16593	.16313
320	156.92	10.68	.20196	.19794	.19407	.19036	.18678	.18334	.18002	.17682	.17373	.17074	.16786
330	161.36	10.98	.20765	.20351	.19954	.19572	.19204	.18850	.18509	.18180	.17862	.17556	.17259
340	165.81	11.28	.21333	.20909	.20500	.20108	.19730	.19366	.19016	.18678	.18352	.18036	.17732
350	170.25	11.58	.21901	.21465	.21047	.20644	.20256	.19883	.19523	.19176	.18841	.18517	.18205
360	174.69	11.89	.22469	.22022	.21593	.21179	.20782	.20399	.20030	.19673	.19330	.18998	.18678
370	179.14	12.19	.23037	.22579	.22138	.21715	.21307	.20914	.20536	.20171	.19819	.19479	.19150
380	183.58	12.49	.23605	.23135	.22684	.22250	.21832	.21430	.21042	.20668	.20308	.19959	.19622
390	188.03	12.79	.24172	.23692	.23229	.22785	.22357	.21946	.21549	.21166	.20797	.20439	.20095
400	192.47	13.10	.24740	.24248	.23775	.23320	.22882	.22461	.22055	.21663	.21285	.20920	.20567
410	196.92	13.40	.25307	.24803	.24320	.23855	.23407	.22976	.22560	.22160	.21773	.21400	.21039
420	201.36	13.70	.25874	.25359	.24865	.24389	.23932	.23491	.23067	.22657	.22261	.21880	.21511
430	205.81	14.00	.26441	.25915	.25410	.24924	.24456	.24006	.23572	.23153	.22750	.22360	.21983
440	210.25	14.31	.27007	.26470	.25954	.25458	.24981	.24521	.24077	.23650	.23237	.22839	.22454
450	214.69	14.61	.27573	.27026	.26499	.25992	.25505	.25035	.24583	.24146	.23726	.23319	.22926
460	219.14	14.91	.28140	.27581	.27043	.26526	.26029	.25550	.25088	.24643	.24213	.23798	.23397
470	223.58	15.21	.28706	.28135	.27587	.27060	.26552	.26064	.25594	.25139	.24701	.24278	.23868
480	228.03	15.52	.29272	.28690	.28131	.27593	.27077	.26578	.26098	.25635	.25188	.24756	.24340
490	232.47	15.82	.29837	.29244	.28675	.28127	.27600	.27092	.26603	.26131	.25675	.25236	.24810
500	236.92	16.12	.30403	.29799	.29219	.28660	.28123	.27606	.27108	.26627	.26163	.25714	.25281
510	241.36	16.42	.30968	.30353	.29762	.29193	.28646	.28120	.27612	.27122	.26649	.26193	.25752
520	245.80	16.73	.31533	.30907	.30305	.29727	.29169	.28633	.28116	.27618	.27137	.26672	.26223
530	250.25	17.03	.32098	.31460	.30849	.30260	.29692	.29147	.28621	.28113	.27623	.27150	.26693
540	254.69	17.33	.32663	.32014	.31392	.30792	.30216	.29660	.29124	.28608	.28110	.27629	.27164
550	259.14	17.63	.33228	.32568	.31934	.31325	.30738	.30173	.29628	.29103	.28596	.28107	.27634
560	263.58	17.94	.33791	.33121	.32476	.31857	.31260	.30686	.30132	.29598	.29083	.28585	.28103
570	268.03	18.24	.34356	.33674	.33019	.32389	.31783	.31198	.30636	.30093	.29568	.29063	.28574
580	272.47	18.54	.34920	.34227	.33561	.32921	.32305	.31711	.31139	.30587	.30055	.29541	.29044
590	276.92	18.84	.35484	.34780	.34103	.33453	.32826	.32224	.31643	.31082	.30541	.30018	.29514
600	281.36	19.15	.36047	.35332	.34645	.33984	.33349	.32736	.32145	.31576	.31026	.30496	.29983
610	285.80	19.45	.36611	.35885	.35187	.34516	.33870	.33248	.32649	.32071	.31512	.30973	.30452
620	290.25	19.75	.37174	.36437	.35728	.35047	.34392	.33760	.33151	.32564	.31997	.31450	.30922
630	294.69	20.05	.37737	.36989	.36270	.35578	.34913	.34272	.33654	.33058	.32483	.31928	.31391
640	299.14	20.36	.38300	.37541	.36811	.36109	.35434	.34784	.34157	.33552	.32968	.32404	.31860
650	303.58	20.66	.38863	.38093	.37352	.36640	.35955	.35295	.34659	.34045	.33453	.32881	.32329
660	308.03	20.96	.39426	.38644	.37893	.37171	.36476	.35807	.35161	.34539	.33938	.33358	.32798
670	312.47	21.26	.39987	.39195	.38434	.37701	.36997	.36318	.35664	.35032	.34423	.33834	.33266
680	316.92	21.56	.40550	.39746	.38974	.38231	.37517	.36829	.36165	.35525	.34907	.34311	.33735
690	321.36	21.87	.41112	.40297	.39515	.38761	.38038	.37339	.36667	.36018	.35392	.34788	.34203
700	325.80	22.17	.41674	.40848	.40055	.39292	.38558	.37851	.37169	.36511	.35877	.35264	.34672
710	330.25	22.47	.42235	.41349	.40595	.39822	.39077	.38361	.37670	.37004	.36361	.35740	.35139
720	334.69	22.77	.42797	.41949	.41135	.40352	.39597	.38872	.38171	.37497	.36845	.36215	.35608
730	339.14	23.08	.43358	.42499	.41675	.40881	.40118	.39382	.38673	.37989	.37329	.36691	.36076
740	343.58	23.38	.43918	.43049	.42215	.41411	.40637	.39892	.39174	.38482	.37813	.37167	.36544
750	348.03	23.68	.44480	.43599	.42753	.41940	.41157	.40402	.39675	.38973	.38296	.37642	.37011
760	352.47	23.98	.45041	.44149	.43292	.42469	.41676	.40912	.40176	.39465	.38780	.38118	.37478
770	356.91	24.29	.45601	.44699	.43831	.42998	.42195	.41421	.40676	.39958	.39263	.38594	.37946
780	361.36	24.59	.46161	.45248	.44370	.43526	.42713	.41932	.41177	.40449	.39747	.39068	.38414
790	365.80	24.89	.46721	.45797	.44909	.44055	.43233	.42441	.41677	.40941	.40231	.39544	.38880

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DENSITY
10 % O_2, 90 % He

DENSITY,LBS/CUBIC FT

.100 OXYGEN .900 HELIUM AVERAGE MOLECULAR WEIGHT 6.803

DEPTH	PRESSURE		TEMPERATURE,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
800	370.25	25.19	.47282	.46346	.45447	.44583	.43752	.42950	.42177	.41432	.40713	.40019	.39347
810	374.69	25.50	.47842	.46895	.45986	.45111	.44270	.43458	.42678	.41924	.41196	.40493	.39815
820	379.14	25.80	.48401	.47444	.46524	.45639	.44788	.43968	.43177	.42415	.41679	.40968	.40281
830	383.58	26.10	.48960	.47993	.47062	.46167	.45306	.44477	.43677	.42906	.42162	.41443	.40747
840	388.03	26.40	.49520	.48541	.47600	.46695	.45824	.44985	.44177	.43397	.42644	.41917	.41214
850	392.47	26.71	.50078	.49088	.48138	.47222	.46343	.45494	.44676	.43888	.43126	.42391	.41681
860	396.91	27.01	.50637	.49637	.48675	.47750	.46860	.46003	.45176	.44378	.43608	.42865	.42146
870	401.36	27.31	.51196	.50185	.49213	.48278	.47378	.46510	.45675	.44869	.44091	.43339	.42613
880	405.80	27.61	.51755	.50732	.49750	.48805	.47895	.47018	.46173	.45359	.44572	.43813	.43079
890	410.25	27.92	.52313	.51280	.50287	.49332	.48412	.47527	.46673	.45849	.45054	.44286	.43545
900	414.69	28.22	.52871	.51828	.50824	.49859	.48929	.48034	.47171	.46339	.45536	.44760	.44010
910	419.14	28.52	.53430	.52374	.51361	.50385	.49447	.48542	.47670	.46829	.46017	.45234	.44476
920	423.58	28.82	.53988	.52921	.51897	.50912	.49963	.49049	.48169	.47319	.46499	.45706	.44942
930	428.03	29.13	.54544	.53468	.52434	.51438	.50480	.49557	.48667	.47808	.46980	.46180	.45407
940	432.47	29.43	.55102	.54015	.52970	.51964	.50996	.50064	.49164	.48298	.47462	.46654	.45872
950	436.91	29.73	.55660	.54561	.53506	.52490	.51512	.50570	.49663	.48787	.47942	.47126	.46337
960	441.36	30.03	.56216	.55108	.54040	.53015	.52028	.51077	.50161	.49277	.48423	.47599	.46803
970	445.80	30.33	.56773	.55653	.54576	.53541	.52545	.51585	.50659	.49766	.48903	.48072	.47266
980	450.25	30.64	.57330	.56199	.55112	.54066	.53061	.52091	.51156	.50255	.49384	.48544	.47732
990	454.69	30.94	.57887	.56745	.55647	.54592	.53576	.52597	.51653	.50743	.49865	.49017	.48196
1000	459.14	31.24	.58442	.57290	.561[illegible]	.55117	.54091	.53104	.52151	.51233	.50345	.49489	.48661
1050	481.36	32.75	.61222	.60015	.58856	.57741	.56667	.55633	.54636	.53674	.52745	.51848	.50981
1100	503.58	34.27	.63997	.62736	.61525	.60360	.59239	.58157	.57116	.56111	.55141	.54204	.53299
1150	525.80	35.78	.66766	.65454	.64191	.62975	.61807	.60680	.59593	.58546	.57535	.56557	.55613
1200	548.02	37.29	.69533	.68166	.66850	.65587	.64369	.63197	.62067	.60976	.59923	.58907	.57923
1250	570.25	38.80	.72295	.70873	.69507	.68194	.66929	.65711	.64537	.63403	.62309	.61253	.60232
1300	592.47	40.31	.75050	.73576	.72160	.70797	.69485	.68222	.67004	.65828	.64693	.63596	.62537
1350	614.69	41.83	.77803	.76277	.74809	.73398	.72038	.70728	.69467	.68248	.67072	.65936	.64839
1400	636.91	43.34	.80552	.78972	.77454	.75993	.74587	.73233	.71926	.70665	.69449	.68274	.67136
1450	659.13	44.85	.83294	.81662	.80093	.78584	.77132	.75731	.74380	.73079	.71820	.70607	.69432
1500	681.36	46.36	.86034	.84349	.82730	.81173	.79673	.78226	.76833	.75489	.74190	.72937	.71725
	500	34.02	.63551	.62298	.61096	.59939	.58824	.57752	.56717	.55719	.54755	.53825	.52925
	600	40.83	.75985	.74493	.73059	.71679	.70351	.69072	.67838	.66648	.65500	.64390	.63317
	700	47.63	.88329	.86601	.84939	.83341	.81801	.80318	.78889	.77509	.76177	.74890	.73646
	800	54.44	1.00585	.98622	.96736	.94923	.93174	.91491	.89866	.88301	.86786	.85326	.83913
	900	61.24	1.12753	1.10561	1.08455	1.06425	1.04474	1.02590	1.00775	.99024	.97331	.95698	.94118
	1000	68.05	1.2484	1.2242	1.2009	1.1785	1.1570	1.1362	1.1161	1.0968	1.0781	1.0601	1.0426
	1100	74.85	1.3683	1.3419	1.3165	1.2920	1.2684	1.2458	1.2238	1.2027	1.1823	1.1625	1.1434
	1200	81.65	1.4875	1.4588	1.4313	1.4048	1.3792	1.3546	1.3309	1.3079	1.2858	1.2644	1.2437
	1300	88.46	1.6058	1.5750	1.5453	1.5168	1.4893	1.4628	1.4372	1.4125	1.3887	1.3657	1.3434
	1400	95.26	1.7233	1.6903	1.6586	1.6281	1.5986	1.5703	1.5429	1.5165	1.4910	1.4663	1.4424
	1500	102.07	1.8399	1.8048	1.7711	1.7385	1.7072	1.6770	1.6479	1.6198	1.5926	1.5663	1.5409
	1600	108.87	1.9558	1.9186	1.8829	1.8484	1.8152	1.7832	1.7523	1.7225	1.6937	1.6658	1.6389
	1700	115.68	2.0708	2.0316	1.9939	1.9575	1.9224	1.8887	1.8560	1.8245	1.7941	1.7647	1.7363
	1800	122.48	2.1852	2.1439	2.1041	2.0659	2.0291	1.9934	1.9591	1.9260	1.8940	1.8630	1.8330
	1900	129.29	2.2987	2.2555	2.2137	2.1735	2.1349	2.0976	2.0616	2.0269	1.9933	1.9607	1.9293
	2000	136.09	2.4114	2.3661	2.3226	2.2807	2.2401	2.2011	2.1635	2.1270	2.0919	2.0579	2.0250
	2100	142.90	2.5235	2.4762	2.4307	2.3870	2.3448	2.3040	2.2646	2.2267	2.1900	2.1545	2.1202
	2200	149.70	2.6348	2.5856	2.5383	2.4926	2.4486	2.4063	2.3653	2.3258	2.2875	2.2506	2.2148
	2300	156.51	2.7452	2.6942	2.6450	2.5977	2.5520	2.5080	2.4653	2.4242	2.3845	2.3461	2.3089
	2400	163.31	2.8550	2.8021	2.7511	2.7019	2.6547	2.6090	2.5648	2.5221	2.4810	2.4410	2.4025
	2500	170.11	2.9642	2.9093	2.8566	2.8057	2.7567	2.7094	2.6636	2.6194	2.5768	2.5355	2.4955
	2600	176.92	3.0725	3.0158	2.9613	2.9088	2.8581	2.8092	2.7620	2.7163	2.6721	2.6295	2.5881
	2700	183.72	3.1802	3.1218	3.0655	3.0113	2.9589	2.9084	2.8596	2.8125	2.7668	2.7228	2.6801
	2800	190.53	3.2872	3.2269	3.1689	3.1131	3.0591	3.0070	2.9567	2.9082	2.8612	2.8157	2.7717
	2900	197.33	3.3934	3.3315	3.2717	3.2143	3.1587	3.1052	3.0534	3.0033	2.9550	2.9080	2.8627
	3000	204.14	3.4990	3.4353	3.3740	3.3148	3.2577	3.2026	3.1493	3.0979	3.0481	2.9999	2.9533
	3100	210.94	3.6040	3.5386	3.4755	3.4148	3.3562	3.2995	3.2448	3.1919	3.1408	3.0913	3.0434
	3200	217.75	3.7082	3.6412	3.5765	3.5141	3.4540	3.3959	3.3398	3.2854	3.2330	3.1821	3.1329
	3300	224.55	3.8120	3.7432	3.6788	3.6130	3.5513	3.4918	3.4342	3.3785	3.3247	3.2725	3.2220
	3400	231.36	3.9150	3.8445	3.7767	3.7111	3.6479	3.5871	3.5280	3.4710	3.4159	3.3623	3.3107
	3500	238.16	4.0174	3.9453	3.8758	3.8089	3.7441	3.6818	3.6213	3.5630	3.5065	3.4519	3.3988
	3600	244.96	4.1192	4.0453	3.9745	3.9058	3.8398	3.7760	3.7143	3.6544	3.5967	3.5408	3.4867
	3700	251.77	4.2203	4.1450	4.0724	4.0023	3.9348	3.8697	3.8066	3.7455	3.6864	3.6292	3.5739
	3800	258.57	4.3208	4.2439	4.1698	4.0983	4.0293	3.9628	3.8983	3.8360	3.7757	3.7172	3.6607
	3900	265.38	4.4206	4.3423	4.2667	4.1937	4.1233	4.0554	3.9895	3.9259	3.8644	3.8048	3.7471
	4000	272.18	4.5199	4.4400	4.3628	4.2884	4.2169	4.1476	4.0804	4.0155	3.9528	3.8918	3.8330
	4100	278.99	4.6187	4.5372	4.4586	4.3826	4.3098	4.2391	4.1706	4.1047	4.0405	3.9785	3.9185
	4200	285.79	4.7167	4.6339	4.5540	4.4768	4.4021	4.3303	4.2605	4.1931	4.1279	4.0648	4.0035
	4300	292.60	4.8141	4.7300	4.6486	4.5700	4.4941	4.4208	4.3499	4.2813	4.2149	4.1506	4.0881
	4400	299.40	4.9113	4.8255	4.7426	4.6628	4.5856	4.5110	4.4388	4.3690	4.3014	4.2357	4.1724
	4500	306.21	5.0078	4.9204	4.8361	4.7549	4.6764	4.6006	4.5273	4.4562	4.3874	4.3206	4.2562
	4600	313.01	5.1037	5.0148	4.9293	4.8467	4.7669	4.6898	4.6152	4.5429	4.4730	4.4053	4.3395
	4700	319.81	5.1989	5.1089	5.0219	4.9380	4.8568	4.7785	4.7027	4.6292	4.5581	4.4893	4.4225
	4800	326.62	5.2937	5.2021	5.1138	5.0287	4.9463	4.8667	4.7896	4.7150	4.6427	4.5729	4.5050
	4900	333.42	5.3878	5.2951	5.2056	5.1190	5.0352	4.9544	4.8761	4.8005	4.7272	4.6560	4.5873
	5000	340.23	5.4817	5.3873	5.2944	5.2087	5.1239	5.0418	4.9624	4.8854	4.8110	4.7389	4.6690

SP. VOL.
10 % O_2, 90 % He

T-64

SPECIFIC VOLUME,CUBIC FT/LB

.100 OXYGEN .900 HELIUM AVERAGE MOLECULAR WEIGHT 6.803

DEPTH	PRESSURE		TEMPERATURE,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	52.592	53.667	54.739	55.813	56.887	57.960	59.034	60.108	61.181	62.255	63.329
10	19.14	1.30	40.387	41.212	42.035	42.860	43.685	44.509	45.333	46.157	46.982	47.805	48.630
20	23.58	1.60	32.782	33.451	34.119	34.789	35.458	36.127	36.795	37.465	38.133	38.803	39.471
30	28.03	1.91	27.588	28.151	28.715	29.277	29.840	30.403	30.966	31.529	32.092	32.654	33.218
40	32.47	2.21	23.816	24.302	24.789	25.274	25.760	26.246	26.732	27.218	27.703	28.190	28.675
50	36.92	2.51	20.953	21.380	21.808	22.235	22.662	23.090	23.517	23.944	24.372	24.799	25.226
60	41.36	2.81	18.705	19.086	19.468	19.849	20.231	20.612	20.993	21.375	21.756	22.138	22.519
70	45.81	3.12	16.892	17.237	17.582	17.926	18.271	18.615	18.959	19.304	19.648	19.993	20.337
80	50.25	3.42	15.401	15.715	16.029	16.343	16.657	16.971	17.285	17.599	17.913	18.227	18.541
90	54.70	3.72	14.152	14.440	14.729	15.018	15.306	15.594	15.883	16.171	16.460	16.748	17.037
100	59.14	4.02	13.091	13.357	13.624	13.891	14.158	14.425	14.692	14.958	15.225	15.492	15.759
110	63.58	4.33	12.177	12.426	12.674	12.922	13.170	13.419	13.666	13.915	14.163	14.411	14.659
120	68.03	4.63	11.384	11.616	11.848	12.080	12.312	12.544	12.776	13.007	13.239	13.472	13.703
130	72.47	4.93	10.688	10.905	11.123	11.341	11.559	11.776	11.994	12.212	12.429	12.647	12.865
140	76.92	5.23	10.072	10.277	10.482	10.687	10.892	11.097	11.302	11.508	11.713	11.918	12.123
150	81.36	5.54	9.5224	9.7169	9.9108	10.1048	10.2987	10.4929	10.6866	10.8806	11.0745	11.2686	11.4624
160	85.81	5.84	9.0313	9.2150	9.3990	9.5829	9.7668	9.9507	10.1346	10.3187	10.5025	10.6863	10.8701
170	90.25	6.14	8.5879	8.7628	8.9375	9.1124	9.2873	9.4622	9.6370	9.8118	9.9866	10.1614	10.3365
180	94.70	6.44	8.1861	8.3529	8.5196	8.6861	8.8528	9.0195	9.1861	9.3528	9.5194	9.6860	9.8526
190	99.14	6.75	7.8204	7.9797	8.1387	8.2980	8.4573	8.6165	8.7755	8.9347	9.0938	9.2530	9.4122
200	103.58	7.05	7.4862	7.6385	7.7910	7.9432	8.0957	8.2479	8.4003	8.5527	8.7050	8.8574	9.0097
210	108.03	7.35	7.1793	7.3254	7.4716	7.6176	7.7638	7.9098	8.0559	8.2019	8.3480	8.4941	8.6402
220	112.47	7.65	6.8967	7.0370	7.1775	7.3178	7.4580	7.5984	7.7386	7.8790	8.0194	8.1595	8.2998
230	116.92	7.96	6.6358	6.7708	6.9057	7.0407	7.1756	7.3107	7.4456	7.5805	7.7155	7.8506	7.9854
240	121.36	8.26	6.3938	6.5238	6.6539	6.7839	6.9139	7.0439	7.1741	7.3040	7.4342	7.5641	7.6942
250	125.81	8.56	6.1689	6.2943	6.4198	6.5453	6.6707	6.7961	6.9215	7.0471	7.1725	7.2978	7.4233
260	130.25	8.86	5.9593	6.0805	6.2017	6.3229	6.4441	6.5653	6.6864	6.8075	6.9286	7.0499	7.1710
270	134.69	9.17	5.7637	5.8808	5.9980	6.1154	6.2325	6.3496	6.4668	6.5839	6.7011	6.8182	6.9352
280	139.14	9.47	5.5805	5.6939	5.8074	5.9209	6.0342	6.1476	6.2610	6.3745	6.4879	6.6014	6.7148
290	143.58	9.77	5.4086	5.5186	5.6285	5.7385	5.8483	5.9583	6.0682	6.1781	6.2880	6.3979	6.5078
300	148.03	10.07	5.2470	5.3538	5.4604	5.5671	5.6736	5.7803	5.8869	5.9934	6.1000	6.2066	6.3132
310	152.47	10.38	5.0950	5.1985	5.3020	5.4056	5.5091	5.6127	5.7161	5.8196	5.9231	6.0267	6.1301
320	156.92	10.68	4.9515	5.0521	5.1527	5.2532	5.3539	5.4544	5.5550	5.6555	5.7561	5.8567	5.9573
330	161.36	10.98	4.8159	4.9137	5.0115	5.1093	5.2072	5.3050	5.4027	5.5006	5.5985	5.6962	5.7940
340	165.81	11.28	4.6876	4.7827	4.8779	4.9731	5.0685	5.1636	5.2588	5.3540	5.4491	5.5443	5.6394
350	170.25	11.58	4.5660	4.6587	4.7514	4.8441	4.9368	5.0295	5.1223	5.2149	5.3077	5.4003	5.4930
360	174.69	11.89	4.4505	4.5409	4.6312	4.7216	4.8119	4.9023	4.9926	5.0830	5.1733	5.2636	5.3540
370	179.14	12.19	4.3408	4.4289	4.5171	4.6052	4.6933	4.7814	4.8695	4.9576	5.0456	5.1338	5.2218
380	183.58	12.49	4.2364	4.3224	4.4085	4.4944	4.5804	4.6664	4.7524	4.8383	4.9243	5.0102	5.0962
390	188.03	12.79	4.1370	4.2209	4.3049	4.3888	4.4728	4.5567	4.6406	4.7246	4.8085	4.8925	4.9764
400	192.47	13.10	4.0421	4.1241	4.2062	4.2882	4.3702	4.4522	4.5342	4.6162	4.6982	4.7802	4.8621
410	196.92	13.40	3.9515	4.0317	4.1119	4.1920	4.2721	4.3523	4.4325	4.5126	4.5928	4.6729	4.7530
420	201.36	13.70	3.8649	3.9434	4.0218	4.1001	4.1785	4.2570	4.3353	4.4137	4.4921	4.5705	4.6488
430	205.81	14.00	3.7821	3.8588	3.9355	4.0122	4.0889	4.1656	4.2423	4.3190	4.3957	4.4724	4.5490
440	210.25	14.31	3.7027	3.7778	3.8529	3.9280	4.0031	4.0781	4.1533	4.2283	4.3034	4.3784	4.4535
450	214.69	14.61	3.6267	3.7002	3.7738	3.8473	3.9208	3.9943	4.0678	4.1414	4.2149	4.2884	4.3618
460	219.14	14.91	3.5537	3.6257	3.6978	3.7699	3.8419	3.9139	3.9860	4.0580	4.1300	4.2020	4.2740
470	223.58	15.21	3.4836	3.5543	3.6249	3.6955	3.7661	3.8366	3.9072	3.9779	4.0485	4.1190	4.1896
480	228.03	15.52	3.4162	3.4856	3.5548	3.6240	3.6932	3.7625	3.8317	3.9009	3.9701	4.0393	4.1085
490	232.47	15.82	3.3515	3.4195	3.4874	3.5553	3.6232	3.6911	3.7590	3.8269	3.8948	3.9626	4.0306
500	236.92	16.12	3.2892	3.3558	3.4225	3.4892	3.5558	3.6224	3.6890	3.7556	3.8222	3.8889	3.9555
510	241.36	16.42	3.2291	3.2946	3.3600	3.4255	3.4908	3.5562	3.6216	3.6870	3.7524	3.8178	3.8832
520	245.80	16.73	3.1713	3.2355	3.2997	3.3640	3.4282	3.4924	3.5567	3.6208	3.6851	3.7493	3.8134
530	250.25	17.03	3.1155	3.1786	3.2416	3.3047	3.3679	3.4309	3.4940	3.5571	3.6202	3.6832	3.7463
540	254.69	17.33	3.0616	3.1236	3.1856	3.2476	3.3095	3.3716	3.4335	3.4956	3.5575	3.6194	3.6814
550	259.14	17.63	3.0095	3.0705	3.1314	3.1924	3.2533	3.3142	3.3752	3.4360	3.4970	3.5578	3.6187
560	263.58	17.94	2.9593	3.0192	3.0792	3.1390	3.1989	3.2588	3.3187	3.3786	3.4385	3.4984	3.5563
570	268.03	18.24	2.9107	2.9696	3.0286	3.0875	3.1464	3.2053	3.2642	3.3230	3.3820	3.4408	3.4997
580	272.47	18.54	2.8637	2.9216	2.9797	3.0376	3.0955	3.1535	3.2114	3.2694	3.3273	3.3851	3.4431
590	276.92	18.84	2.8182	2.8752	2.9323	2.9893	3.0463	3.1033	3.1603	3.2173	3.2743	3.3313	3.3887
600	281.36	19.15	2.7742	2.8303	2.8864	2.9425	2.9986	3.0547	3.1109	3.1670	3.2231	3.2791	3.3354
610	285.80	19.45	2.7314	2.7867	2.8420	2.8972	2.9524	3.0077	3.0629	3.1161	3.1734	3.2296	3.2838
620	290.25	19.75	2.6900	2.7445	2.7989	2.8533	2.9077	2.9621	3.0165	3.0709	3.1252	3.1796	3.2340
630	294.69	20.05	2.6499	2.7035	2.7571	2.8107	2.8643	2.9178	2.9714	3.0249	3.0785	3.1321	3.1856
640	299.14	20.36	2.6110	2.6638	2.7166	2.7694	2.8222	2.8749	2.9277	2.9805	3.0332	3.0860	3.1388
650	303.58	20.66	2.5732	2.6252	2.6772	2.7293	2.7813	2.8333	2.8853	2.9373	2.9892	3.0412	3.0932
660	308.03	20.96	2.5364	2.5878	2.6390	2.6903	2.7415	2.7928	2.8441	2.8953	2.9466	2.9977	3.0490
670	312.47	21.26	2.5008	2.5513	2.6019	2.6524	2.7029	2.7535	2.8040	2.8545	2.9050	2.9554	3.0061
680	316.92	21.56	2.4661	2.5160	2.5658	2.6157	2.6654	2.7153	2.7651	2.8149	2.8647	2.9145	2.9643
690	321.36	21.87	2.4324	2.4815	2.5307	2.5799	2.6290	2.6781	2.7273	2.7764	2.8255	2.8746	2.9237
700	325.80	22.17	2.3996	2.4481	2.4966	2.5450	2.5935	2.6419	2.6904	2.7389	2.7873	2.8358	[illegible]
710	330.25	22.47	2.3677	2.4155	2.4633	2.5112	2.5590	2.6068	2.6546	2.7024	2.7502	2.7980	2.8458
720	334.69	22.77	2.3366	2.3839	2.4310	2.4782	2.5254	2.5726	2.6198	2.6669	2.7140	2.7613	2.8084
730	339.14	23.08	2.3064	2.3530	2.3995	2.4461	2.4927	2.5393	2.5858	2.6323	2.6789	2.7244	2.7719
740	343.58	23.38	2.2770	2.3229	2.3689	2.4148	2.4608	2.5067	2.5527	2.5986	2.6446	2.6905	2.7364
750	348.03	23.68	2.2482	2.2936	2.3390	2.3844	2.4297	2.4751	2.5205	2.5658	2.6112	2.6566	2.7019
760	352.47	23.98	2.2202	2.2650	2.3099	2.3547	2.3995	2.4443	2.4891	2.5339	2.5786	2.6234	2.6682
770	356.91	24.29	2.1929	2.2372	2.2815	2.3257	2.3700	2.4142	2.4584	2.5027	2.5469	2.5911	2.6354
780	361.36	24.59	2.1663	2.2101	2.2538	2.2975	2.3412	2.3848	2.4285	2.4723	2.5159	2.5596	2.6032
790	365.80	24.89	2.1403	2.1836	2.2267	2.2699	2.3130	2.3562	2.3994	2.4425	2.4857	2.5288	2.5720

T-65

SP. VOL.
10 % O_2, 90 % He

SPECIFIC VOLUME,CUBIC FT/LB

.100 OXYGEN   .900 HELIUM   AVERAGE MOLECULAR WEIGHT   6.803

DEPTH FT	PRESSURE PSIA	ATM	TEMPERATURE,F 30	40	50	60	70	80	90	100	110	120	130
800	370.25	25.19	2.1150	2.1577	2.2003	2.2430	2.2856	2.3283	2.3710	2.4136	2.4562	2.4988	2.5415
810	374.69	25.50	2.0902	2.1324	2.1746	2.2167	2.2589	2.3010	2.3431	2.3853	2.4274	2.4696	2.5116
820	379.14	25.80	2.0661	2.1077	2.1494	2.1911	2.2327	2.2744	2.3160	2.3577	2.3993	2.4409	2.4826
830	383.58	26.10	2.0425	2.0836	2.1249	2.1660	2.2072	2.2484	2.2896	2.3307	2.3718	2.4130	2.4541
840	388.03	26.40	2.0194	2.0601	2.1008	2.1416	2.1823	2.2230	2.2636	2.3043	2.3450	2.3857	2.4263
850	392.47	26.71	1.9969	2.0371	2.0774	2.1176	2.1578	2.1981	2.2383	2.2785	2.3188	2.3590	2.3992
860	396.91	27.01	1.9748	2.0146	2.0544	2.0943	2.1340	2.1738	2.2136	2.2534	2.2932	2.3329	2.3727
870	401.36	27.31	1.9533	1.9926	2.0320	2.0713	2.1107	2.1501	2.1894	2.2287	2.2681	2.3074	2.3467
880	405.80	27.61	1.9322	1.9711	2.0101	2.0490	2.0879	2.1268	2.1657	2.2046	2.2436	2.2824	2.3213
890	410.25	27.92	1.9116	1.9501	1.9886	2.0271	2.0656	2.1041	2.1426	2.1811	2.2195	2.2580	2.2965
900	414.69	28.22	1.8914	1.9295	1.9676	2.0057	2.0438	2.0818	2.1199	2.1580	2.1960	2.2341	2.2722
910	419.14	28.52	1.8716	1.9094	1.9470	1.9847	2.0224	2.0601	2.0978	2.1354	2.1731	2.2107	2.2484
920	423.58	28.82	1.8523	1.8896	1.9269	1.9642	2.0015	2.0388	2.0760	2.1133	2.1506	2.1879	2.2251
930	428.03	29.13	1.8334	1.8703	1.9072	1.9441	1.9810	2.0179	2.0548	2.0917	2.1286	2.1654	2.2023
940	432.47	29.43	1.8146	1.8514	1.8879	1.9244	1.9609	1.9975	2.0340	2.0705	2.1070	2.1435	2.1800
950	436.91	29.73	1.7966	1.8328	1.8690	1.9051	1.9413	1.9774	2.0136	2.0497	2.0859	2.1220	2.1581
960	441.36	30.03	1.7789	1.8146	1.8505	1.8862	1.9220	1.9578	1.9936	2.0293	2.0651	2.1009	2.1366
970	445.80	30.33	1.7614	1.7969	1.8323	1.8677	1.9031	1.9386	1.9740	2.0094	2.0449	2.0802	2.1157
980	450.25	30.64	1.7443	1.7794	1.8145	1.8496	1.8846	1.9197	1.9548	1.9898	2.0249	2.0600	2.0951
990	454.69	30.94	1.7275	1.7623	1.7970	1.8318	1.8665	1.9013	1.9360	1.9707	2.0054	2.0401	2.0748
1000	459.14	31.24	1.7111	1.7455	1.7799	1.8143	1.8487	1.8831	1.9175	1.9519	1.9863	2.0206	2.0550
1050	481.36	32.75	1.6334	1.6662	1.6991	1.7319	1.7647	1.7975	1.8303	1.8631	1.8959	1.9287	1.9615
1100	503.58	34.27	1.5626	1.5940	1.6253	1.6567	1.6881	1.7195	1.7508	1.7822	1.8135	1.8449	1.8762
1150	525.80	35.78	1.4978	1.5278	1.5579	1.5879	1.6180	1.6480	1.6781	1.7081	1.7381	1.7681	1.7981
1200	548.02	37.29	1.4382	1.4670	1.4959	1.5247	1.5535	1.5823	1.6112	1.6400	1.6688	1.6976	1.7264
1250	570.25	38.80	1.3832	1.4110	1.4387	1.4664	1.4941	1.5218	1.5495	1.5772	1.6049	1.6326	1.6603
1300	592.47	40.31	1.3324	1.3591	1.3858	1.4125	1.4392	1.4658	1.4925	1.5191	1.5458	1.5724	1.5991
1350	614.69	41.83	1.2853	1.3110	1.3367	1.3624	1.3882	1.4139	1.4395	1.4652	1.4909	1.5166	1.5423
1400	636.91	43.34	1.2414	1.2663	1.2911	1.3159	1.3407	1.3655	1.3903	1.4151	1.4399	1.4647	1.4895
1450	659.13	44.85	1.2006	1.2246	1.2486	1.2725	1.2965	1.3205	1.3444	1.3684	1.3924	1.4163	1.4402
1500	681.36	46.36	1.1623	1.1856	1.2088	1.2319	1.2551	1.2783	1.3015	1.3247	1.3479	1.3711	1.3942
	500	34.02	1.5735	1.6052	1.6368	1.6684	1.7000	1.7316	1.7631	1.7947	1.8263	1.8579	1.8895
	600	40.83	1.3161	1.3424	1.3688	1.3951	1.4214	1.4478	1.4741	1.5004	1.5267	1.5530	1.5793
	700	47.63	1.1321	1.1547	1.1773	1.1999	1.2225	1.2451	1.2676	1.2902	1.3127	1.3353	1.3578
	800	54.44	.99418	1.01397	1.03374	1.05348	1.07326	1.09300	1.11277	1.13249	1.15226	1.17198	1.19171
	900	61.24	.88689	.90448	.92204	.93963	.95718	.97475	.99231	1.00985	1.02743	1.04496	1.06250
	1000	68.05	.80104	.81688	.83270	.84853	.86433	.88014	.89595	.91174	.92753	.94334	.95912
	1100	74.85	.73081	.74519	.75959	.77399	.78837	.80272	.81710	.83146	.84583	.86020	.87455
	1200	81.65	.67228	.68547	.69866	.71185	.72504	.73821	.75140	.76457	.77774	.79089	.80405
	1300	88.46	.62274	.63494	.64711	.65930	.67146	.68362	.69578	.70795	.72011	.73225	.74439
	1400	95.26	.58030	.59162	.60291	.61423	.62553	.63684	.64813	.65943	.67071	.68200	.69328
	1500	102.07	.54350	.55408	.56463	.57520	.58574	.59629	.60683	.61737	.62789	.63844	.64896
	1600	108.87	.51130	.52120	.53111	.54102	.55091	.56078	.57069	.58055	.59043	.60031	.61018
	1700	115.68	.48290	.49222	.50153	.51086	.52018	.52948	.53878	.54809	.55739	.56666	.57595
	1800	122.48	.45762	.46644	.47526	.48406	.49284	.50165	.51044	.51921	.52799	.53678	.54555
	1900	129.29	.43503	.44337	.45173	.46008	.46840	.47673	.48506	.49337	.50169	.51002	.51833
	2000	136.09	.41470	.42263	.43056	.43847	.44640	.45432	.46222	.47014	.47804	.48593	.49383
	2100	142.90	.39628	.40384	.41140	.41894	.42648	.43403	.44157	.44910	.45663	.46414	.47166
	2200	149.70	.37954	.38676	.39397	.40119	.40839	.41558	.42278	.42997	.43716	.44433	.45151
	2300	156.51	.36427	.37117	.37807	.38496	.39186	.39873	.40562	.41250	.41938	.42624	.43311
	2400	163.31	.35026	.35688	.36349	.37010	.37670	.38329	.38990	.39649	.40306	.40966	.41624
	2500	170.11	.33736	.34373	.35007	.35642	.36275	.36908	.37543	.38176	.38807	.39441	.40072
	2600	176.92	.32546	.33159	.33769	.34378	.34988	.35597	.36206	.36815	.37424	.38031	.38638
	2700	183.72	.31445	.32033	.32621	.33209	.33796	.34383	.34969	.35556	.36142	.36727	.37312
	2800	190.53	.30421	.30990	.31557	.32123	.32689	.33255	.33821	.34385	.34951	.35515	.36079
	2900	197.33	.29469	.30016	.30565	.31111	.31659	.32204	.32751	.33297	.33842	.34388	.34932
	3000	204.14	.28580	.29110	.29639	.30167	.30697	.31224	.31753	.32280	.3[illegible]08	.33334	.33860
	3100	210.94	.27747	.28260	.28773	.29284	.29796	.30308	.30818	.31329	[illegible]839	.32349	.32858
	3200	217.75	.26967	.27463	.27960	.28457	.28952	.29447	.29942	.30437	.30931	.31426	.31919
	3300	224.55	.26233	.26715	.27197	.27678	.28159	.28639	.29118	.29599	.30078	.30558	.31037
	3400	231.36	.25543	.26011	.26478	.26946	.27413	.27878	.28345	.28810	.29275	.29741	.30205
	3500	238.16	.24892	.25347	.25801	.26255	.26709	.27160	.27614	.28067	.28518	.28970	.29422
	3600	244.96	.24277	.24720	.25161	.25603	.26043	.26483	.26923	.27364	.27803	.28242	.28681
	3700	251.77	.23695	.24125	.24556	.24985	.25414	.25842	.26270	.26698	.27127	.27554	.27981
	3800	258.57	.23144	.23563	.23982	.24400	.24818	.25235	.25652	.26069	.26485	.26902	.27317
	3900	265.38	.22621	.23029	.23437	.23845	.24252	.24659	.25066	.25472	.25877	.26282	.26687
	4000	272.18	.22125	.22523	.22921	.23318	.23714	.24110	.24507	.24903	.25299	.25695	.26089
	4100	278.99	.21651	.22040	.22429	.22816	.23203	.23590	.23977	.24363	.24750	.25135	.25520
	4200	285.79	.21201	.21580	.21959	.22338	.22716	.23093	.23471	.23849	.24225	.24602	.24978
	4300	292.60	.20771	.21142	.21512	.21882	.22251	.22620	.22989	.23358	.23726	.24093	.24461
	4400	299.40	.20361	.20723	.21085	.21446	.21807	.22168	.22528	.22889	.23248	.23609	.23967
	4500	306.21	.19969	.20323	.20678	.21031	.21384	.21736	.22088	.22441	.22793	.23145	.23495
	4600	313.01	.19594	.19941	.20287	.20633	.20978	.21323	.21668	.22012	.22357	.22700	.23044
	4700	319.81	.19235	.19574	.19913	.20251	.20590	.20927	.21265	.21602	.21939	.22275	.22612
	4800	326.62	.18890	.19223	.19555	.19886	.20217	.20548	.20878	.21209	.21539	.21868	.22198
	4900	333.42	.18560	.18885	.19211	.19535	.19860	.20184	.20508	.20831	.21154	.21478	.21799
	5000	340.23	.18243	.18562	.18881	.19199	.19516	.19834	.20152	.20469	.20786	.21102	.21418

10 % O_2, 90 % He T-66

0.010 OXYGEN 0.990 HELIUM
ENTHALPY,BTU/LB

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	581.05	604.67	627.64	650.94	674.24	697.53
30.00	581.17	604.73	627.76	651.06	674.36	697.65
50.00	581.32	604.81	627.92	651.22	674.52	697.81
100.00	581.71	605.01	628.31	651.62	674.91	698.21
200.00	582.45	605.77	629.08	652.39	675.69	699.00
300.00	583.20	606.52	629.84	653.17	676.48	699.79
400.00	583.94	607.28	630.61	653.94	677.26	700.59
500.00	584.69	608.04	631.38	654.72	678.05	701.38
1000.00	588.38	611.77	635.17	658.54	681.92	705.28
2000.00	595.63	619.12	642.60	666.05	689.47	712.90
3000.00	602.78	626.37	649.95	673.47	696.95	720.40
4000.00	609.93	633.57	657.19	680.77	704.33	727.86
5000.00	616.95	640.59	664.22	687.92	711.50	734.88

0.010 OXYGEN 0.990 HELIUM
CV,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.702	.702	.702	.702	.702	.702
30.00	.702	.702	.702	.702	.702	.702
50.00	.702	.702	.702	.702	.702	.702
100.00	.702	.702	.702	.702	.702	.702
200.00	.702	.702	.702	.702	.702	.702
300.00	.702	.702	.702	.702	.702	.702
400.00	.702	.702	.702	.702	.702	.702
500.00	.702	.702	.702	.702	.702	.702
1000.00	.702	.702	.702	.702	.702	.702
2000.00	.703	.703	.703	.702	.702	.702
3000.00	.704	.704	.704	.703	.703	.703
4000.00						
5000.00						

0.010 OXYGEN 0.990 HELIUM
ENTROPY,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	6.3200	6.3667	6.4114	6.4547	6.4963	6.5365
30.00	6.1973	6.2440	6.2887	6.3320	6.3736	6.4138
50.00	6.0368	6.0835	6.1283	6.1715	6.2132	6.2533
100.00	5.6398	5.6864	5.7313	5.7745	5.8161	5.8563
200.00	5.4307	5.4773	5.5223	5.5655	5.6071	5.6473
300.00	5.2216	5.2683	5.3132	5.3564	5.3981	5.4383
400.00	5.0126	5.0592	5.1042	5.1474	5.1891	5.2294
500.00	4.8035	4.8502	4.8952	4.9384	4.9801	5.0204
1000.00	4.3900	4.4368	4.4818	4.5252	4.5670	4.6073
2000.00	4.0654	4.1125	4.1576	4.2011	4.2429	4.2834
3000.00	3.8489	3.8961	3.9415	3.9831	4.0271	4.0676
4000.00	3.7136	3.7609	3.8064	3.8500	3.8919	3.9326
5000.00	3.6080	3.6553	3.7009	3.7447	3.7868	3.8275

0.010 OXYGEN 0.990 HELIUM
THERMAL CONDUCTIVITY,BTU/SEC FT F
(MULTIPLY TABLE ENTRY BY .0000100)

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	2.20	2.26	2.32	2.39	2.45	2.51
30.00						
50.00						
100.00						
200.00						
300.00						
400.00						
500.00						
1000.00						
2000.00						
3000.00						
4000.00						
5000.00						

0.010 OXYGEN 0.990 HELIUM
CP,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.1655	1.1656	1.1656	1.1656	1.1657	1.1657
30.00	1.1656	1.1657	1.1657	1.1657	1.1658	1.1658
50.00	1.1657	1.1658	1.1658	1.1657	1.1658	1.1658
100.00	1.1660	1.1660	1.1660	1.1660	1.1660	1.1660
200.00	1.1665	1.1665	1.1664	1.1664	1.1664	1.1664
300.00	1.1671	1.1669	1.1669	1.1668	1.1668	1.1667
400.00	1.1676	1.1674	1.1673	1.1672	1.1672	1.1671
500.00	1.1681	1.1679	1.1677	1.1676	1.1675	1.1674
1000.00	1.1708	1.1703	1.1699	1.1697	1.1694	1.1691
2000.00	1.176	1.174	1.174	1.173	1.173	1.172
3000.00	1.180	1.179	1.178	1.177	1.177	1.176
4000.00	1.172	1.180	1.180	1.179	1.178	1.178
5000.00						

0.010 OXYGEN 0.990 HELIUM
PRANDTL NUMBER

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.67	.67	.67	.67	.67	.67
30.00						
50.00						
100.00						
200.00						
300.00						
400.00						
500.00						
1000.00						
2000.00						
3000.00						
4000.00						
5000.00						

0.010 OXYGEN 0.990 HELIUM
CP/CV

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.660	1.660	1.660	1.660	1.661	1.661
30.00	1.660	1.660	1.660	1.660	1.661	1.661
50.00	1.660	1.660	1.660	1.660	1.661	1.661
100.00	1.661	1.661	1.661	1.661	1.661	1.661
200.00	1.661	1.661	1.661	1.661	1.662	1.661
300.00	1.662	1.662	1.662	1.662	1.662	1.662
400.00	1.663	1.663	1.663	1.663	1.663	1.662
500.00	1.664	1.664	1.663	1.663	1.663	1.662
1000.00	1.667	1.667	1.666	1.666	1.666	1.665
2000.00	1.67	1.67	1.67	1.67	1.67	1.67
3000.00	1.67	1.67	1.67	1.67	1.67	1.67
4000.00						
5000.00						

0.010 OXYGEN 0.990 HELIUM
VISCOSITY,LB/FT SEC
(MULTIPLY TABLE ENTRY BY .0000100)

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.269	1.303	1.336	1.371	1.403	1.437
30.00						
50.00						
100.00						
200.00						
300.00						
400.00						
500.00						
1000.00						
2000.00						
3000.00						
4000.00						
5000.00						

0.010 OXYGEN 0.990 HELIUM
SONIC VELOCITY FT/SEC

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	3076	3137	3198	3257	3314	3372
30.00	3078	3139	3199	3258	3316	3374
50.00	3080	3141	3202	3261	3318	3376
100.00	3086	3147	3207	3266	3324	3381
200.00	3098	3158	3218	3277	3334	3392
300.00	3109	3169	3229	3288	3345	3402
400.00	3121	3181	3240	3299	3356	3413
500.00	3133	3192	3251	3310	3366	3423
1000.00	3191	3249	3307	3364	3420	3476
2000.00	3305	3358	3411	3465	3519	3573
3000.00	3420	3468	3516	3566	3618	3670
4000.00						
5000.00						

DENSITY
6 % O_2, 94 % He

T-68

DENSITY,LBS/CUBIC FT

.060 OXYGEN .940 HELIUM AVERAGE MOLECULAR WEIGHT 5.683

DEPTH	PRESSURE		TEMPERATURE,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	.01588	.01557	.01526	.01497	.01468	.01441	.01415	.01390	.01365	.01342	.01319
10	19.14	1.30	.02068	.02027	.01987	.01949	.01912	.01877	.01843	.01810	.01778	.01747	.01718
20	23.58	1.60	.02548	.02497	.02448	.02401	.02356	.02312	.02270	.02230	.02191	.02153	.02116
30	28.03	1.91	.03028	.02967	.02909	.02853	.02800	.02748	.02698	.02650	.02603	.02558	.02515
40	32.47	2.21	.03508	.0343[illegible]	.03370	.03305	.03243	.03183	.03125	.03069	.03015	.02963	.02913
50	36.92	2.51	.03987	.03907	.03831	.03757	.03686	.03618	.03552	.03489	.03428	.03369	.03312
60	41.36	2.81	.04466	.04377	.04291	.04209	.04129	.04053	.03979	.03908	.03840	.03774	.03710
70	45.81	3.12	.04945	.04846	.04752	.04660	.04572	.04488	.04406	.04328	.04252	.04179	.04108
80	50.25	3.42	.05424	.05316	.05212	.05112	.05015	.04922	.04833	.04747	.04664	.04583	.04506
90	54.70	3.72	.05903	.05785	.05672	.05561	.05458	.05357	.05260	.05166	.05075	.04988	.04904
100	59.14	4.02	.06382	.06254	.06132	.06014	.05901	.05791	.05686	.05585	.05487	.05393	.05301
110	63.58	4.33	.06860	.06723	.06591	.06465	.06343	.06226	.06113	.06004	.05899	.05797	.05699
120	68.03	4.63	.07338	.07192	.07051	.06916	.06785	.06660	.06539	.06422	.06310	.06201	.06096
130	72.47	4.93	.07816	.07660	.07510	.07366	.07228	.07094	.06965	.06841	.06721	.06605	.06494
140	76.92	5.23	.08294	.08129	.07970	.07817	.07670	.07528	.07391	.07260	.07133	.07010	.06891
150	81.36	5.54	.08772	.08597	.08429	.08267	.08112	.07962	.07817	.07678	.07543	.07414	.07288
160	85.81	5.84	.09250	.09065	.08888	.08718	.08553	.08395	.08243	.08096	.07954	.07818	.07685
170	90.25	6.14	.09727	.09533	.09347	.09168	.08995	.08829	.08669	.08514	.08365	.08221	.08082
180	94.70	6.44	.10205	.10001	.09806	.09618	.09437	.09262	.09094	.08932	.08776	.08625	.08479
190	99.14	6.75	.10682	.10469	.10264	.10067	.09878	.09696	.09520	.09350	.09187	.09029	.08876
200	103.58	7.05	.11159	.10936	.10723	.10517	.10319	.10129	.09945	.09768	.09597	.09432	.09273
210	108.03	7.35	.11636	.11404	.11181	.10967	.10760	.10562	.10370	.10185	.10007	.09835	.09669
220	112.47	7.65	.12113	.11871	.11639	.11416	.11201	.10995	.10795	.10603	.10418	.10239	.10065
230	116.92	7.96	.12589	.12338	.12097	.11865	.11642	.11427	.11220	.11021	.10828	.10642	.10462
240	121.36	8.26	.13066	.12805	.12555	.12314	.12083	.11860	.11645	.11438	.11238	.11045	.10858
250	125.81	8.56	.13542	.13272	.13013	.12763	.12524	.12293	.12070	.11855	.11648	.11448	.11254
260	130.25	8.86	.14018	.13739	.13470	.13213	.12964	.12725	.12494	.12272	.12058	.11850	.11650
270	134.69	9.17	.14494	.14206	.13928	.13661	.13404	.13157	.12919	.12689	.12467	.12253	.12046
280	139.14	9.47	.14970	.14672	.14385	.14110	.13844	.13589	.13343	.13106	.12877	.12656	.12442
290	143.58	9.77	.15445	.15138	.14842	.14558	.14284	.14021	.13767	.13523	.13286	.13058	.12838
300	148.03	10.07	.15921	.15604	.15299	.15006	.14725	.14453	.14191	.13939	.13696	.13460	.13233
310	152.47	10.38	.16396	.16070	.15756	.15455	.15164	.14885	.14615	.14356	.14105	.13862	.13629
320	156.92	10.68	.16871	.16536	.16213	.15903	.15604	.15316	.15039	.14772	.14514	.14265	.14024
330	161.36	10.98	.17346	.17001	.16670	.16350	.16043	.15748	.15463	.15188	.14923	.14667	.14419
340	165.81	11.28	.17821	.17467	.17126	.16798	.16483	.16179	.15887	.15604	.15332	.15069	.14814
350	170.25	11.58	.18296	.17932	.17582	.17246	.16922	.16611	.16310	.16020	.15741	.15470	.15209
360	174.69	11.89	.18770	.18397	.18039	.17694	.17361	.17041	.16733	.16436	.16149	.15872	.15605
370	179.14	12.19	.19245	.18862	.18495	.18141	.17800	.17473	.17157	.16852	.16558	.16274	.15999
380	183.58	12.49	.19719	.19327	.18950	.18588	.18239	.17903	.17580	.17267	.16966	.16675	.16394
390	188.03	12.79	.20194	.19792	.19406	.19035	.18678	.18334	.18003	.17683	.17374	.17076	.16788
400	192.47	13.10	.20667	.20257	.19862	.19482	.19117	.18765	.18425	.18099	.17783	.17478	.17183
410	196.92	13.40	.21141	.20721	.20317	.19929	.19555	.19195	.18848	.18514	.18190	.17879	.17578
420	201.36	13.70	.21615	.21185	.20773	.20375	.19993	.19625	.19271	.18929	.18599	.18280	.17972
430	205.81	14.00	.22088	.21649	.21228	.20822	.20431	.20056	.19693	.19344	.19007	.18681	.18366
440	210.25	14.31	.22561	.22113	.21683	.21268	.20870	.20486	.20116	.19759	.19414	.19082	.18760
450	214.69	14.61	.23035	.22577	.22138	.21714	.21308	.20916	.20538	.20173	.19822	.19482	.19154
460	219.14	14.91	.23508	.23041	.22592	.22161	.21745	.21345	.20960	.20588	.20230	.19883	.19548
470	223.58	15.21	.23981	.23505	.23047	.22607	.22183	.21775	.21382	.21003	.20637	.20283	.19942
480	228.03	15.52	.24453	.23968	.23501	.23053	.22621	.22205	.21804	.21417	.21044	.20684	.20336
490	232.47	15.82	.24926	.24431	.23956	.23498	.23058	.22634	.22226	.21831	.21451	.21084	.20729
500	236.92	16.12	.25398	.24894	.24410	.23944	.23495	.23064	.22647	.22246	.21858	.21484	.21122
510	241.36	16.42	.25871	.25357	.24864	.24389	.23932	.23493	.23069	.22660	.22265	.21884	.21516
520	245.80	16.73	.26342	.25820	.25318	.24834	.24369	.23922	.23490	.23074	.22672	.22284	.21909
530	250.25	17.03	.26815	.26283	.25772	.25280	.24807	.24351	.23912	.23487	.23079	.22683	.22302
540	254.69	17.33	.27286	.26745	.26225	.25725	.25243	.24779	.24332	.23901	.23485	.23083	.22695
550	259.14	17.63	.27758	.27208	.26679	.26170	.25680	.25208	.24754	.24315	.23892	.23483	.23088
560	263.58	17.94	.28229	.27670	.27132	.26615	.26116	.25637	.25174	.24728	.24298	.23883	.23481
570	268.03	18.24	.28701	.28132	.27585	.27059	.26553	.26065	.25595	.25142	.24705	.24282	.23873
580	272.47	18.54	.29172	.28593	.28038	.27504	.26989	.26493	.26016	.25555	.25110	.24681	.24266
590	276.92	18.84	.29643	.29055	.28491	.27948	.27425	.26922	.26436	.25969	.25517	.25080	.24659
600	281.36	19.15	.30114	.29517	.28944	.28392	.27861	.27350	.26857	.26381	.25923	.25480	.25051
610	285.80	19.45	.30585	.29979	.29397	.28836	.28297	.27777	.27277	.26794	.26328	.25878	.25443
620	290.25	19.75	.31055	.30440	.29849	.29280	.28733	.28206	.27698	.27207	.26734	.26277	.25835
630	294.69	20.05	.31526	.30901	.30301	.29724	.29168	.28633	.28117	.27620	.27139	.26676	.26228
640	299.14	20.36	.31996	.31363	.30754	.30168	.29604	.29060	.28538	.28032	.27545	.27075	.26620
650	303.58	20.66	.32466	.31824	.31206	.30611	.30039	.29488	.28957	.28445	.27951	.27473	.27012
660	308.03	20.96	.32936	.32284	.31658	.31055	.30475	.29915	.29376	.28857	.28355	.27871	.27404
670	312.47	21.26	.33406	.32744	.32109	.31498	.30910	.30342	.29796	.29269	.28761	.28270	.27795
680	316.92	21.56	.33875	.33205	.32561	.31941	.31344	.30770	.30216	.29682	.29166	.28667	.28186
690	321.36	21.87	.34345	.33665	.33012	.32384	.31779	.31197	.30635	.30093	.29570	.29066	.28578
700	325.80	22.17	.34814	.34126	.33464	.32827	.32213	.31623	.31054	.30506	.29976	.29464	.28969
710	330.25	22.47	.35284	.34586	.33915	.33269	.32649	.32050	.31474	.30917	.30380	.29862	.29361
720	334.69	22.77	.35752	.35046	.34366	.33712	.33083	.32477	.31892	.31329	.30785	.30259	.29752
730	339.14	23.08	.36221	.35506	.34817	.34155	.33517	.32903	.32311	.31740	.31189	.30657	.30142
740	343.58	23.38	.36690	.35964	.35268	.34597	.33951	.33330	.32730	.32152	.31593	.31054	.30533
750	348.03	23.68	.37159	.36424	.35718	.35039	.34386	.33755	.33148	.32563	.31998	.31452	.30924
760	352.47	23.98	.37627	.36883	.36169	.35481	.34819	.34181	.33567	.32974	.32402	.31849	.31315
770	356.91	24.29	.38095	.37343	.36619	.35923	.35253	.34608	.33985	.33385	.32806	.32246	.31706
780	361.36	24.59	.38564	.37802	.37070	.36365	.35686	.35033	.34404	.33796	.33210	.32644	.32097
790	365.80	24.89	.39032	.38261	.37520	.36806	.36120	.35459	.34822	.34207	.33614	.33041	.32486

DENSITY,LBS/CUBIC FT

.060 OXYGEN .940 HELIUM AVERAGE MOLECULAR WEIGHT 5.683

DEPTH	PRESSURE		TEMPERATURE,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
800	370.25	25.19	.39499	.38720	.37970	.37249	.36554	.35885	.35240	.34618	.34017	.33437	.32877
810	374.69	25.50	.39967	.39178	.38419	.37689	.36987	.36310	.35658	.35029	.34421	.33834	.33267
820	379.14	25.80	.40435	.39637	.38849	.38131	.37420	.36735	.36075	.35439	.34825	.34231	.33657
830	383.58	26.10	.40902	.40094	.39319	.38572	.37852	.37161	.36493	.35849	.35227	.34628	.34047
840	388.03	26.40	.41370	.40552	.39768	.39013	.38285	.37585	.36910	.36259	.35631	.35023	.34437
850	392.47	26.71	.41836	.41011	.40217	.39454	.38719	.38010	.37328	.36670	.36034	.35420	.34826
860	396.91	27.01	.42303	.41469	.40666	.39894	.39151	.38435	.37745	.37079	.36437	.35816	.35216
870	401.36	27.31	.42770	.41926	.41115	.40335	.39583	.38860	.38163	.37489	.36840	.36213	.35606
880	405.80	27.61	.43237	.42384	.41564	.40775	.40016	.39285	.38579	.37899	.37242	.36608	.35996
890	410.25	27.92	.43703	.42842	.42013	.41215	.40448	.39709	.38997	.38309	.37645	.37004	.36385
900	414.69	28.22	.44170	.43299	.42461	.41656	.40880	.40133	.39413	.38719	.38048	.37400	.36775
910	419.14	28.52	.44636	.43755	.42910	.42096	.41312	.40558	.39829	.39128	.38450	.37796	.37163
920	423.58	28.82	.45102	.44212	.43358	.42536	.41744	.40982	.40246	.39537	.38852	.38191	.37552
930	428.03	29.13	.45567	.44669	.43806	.42975	.42176	.41405	.40662	.39946	.39255	.38587	.37941
940	432.47	29.43	.46033	.45126	.44254	.43415	.42607	.41830	.41079	.40356	.39656	.38982	.38330
950	436.91	29.73	.46499	.45583	.44702	.43854	.43039	.42253	.41495	.40764	.40059	.39378	.38719
960	441.36	30.03	.46965	.46039	.45150	.44294	.43470	.42676	.41912	.41173	.40461	.39772	.39108
970	445.80	30.33	.47429	.46496	.45597	.44733	.43902	.43100	.42327	.41582	.40862	.40168	.39496
980	450.25	30.64	.47895	.46952	.46045	.45173	.44333	.43523	.42744	.41991	.41264	.40563	.39884
990	454.69	30.94	.48360	.47408	.46492	.45612	.44763	.43946	.43159	.42399	.41666	.40957	.40273
1000	459.14	31.24	.48825	.47863	.46939	.46050	.45194	.44370	.43574	.42808	.42067	.41352	.40661
1050	481.36	32.75	.51147	.50141	.49173	.48242	.47347	.46483	.45651	.44848	.44073	.43324	.42600
1100	503.58	34.27	.53465	.52413	.51404	.50431	.49496	.48593	.47724	.46886	.46076	.45294	.44537
1150	525.80	35.78	.55779	.54684	.53630	.52617	.51641	.50701	.49794	.48919	.48076	.47261	.46472
1200	548.02	37.29	.58090	.56950	.55854	.54799	.53783	.52806	.51862	.50951	.50072	.49224	.48404
1250	570.25	38.80	.60398	.59213	.58074	.56978	.55923	.54906	.53927	.52981	.52068	.51186	.50333
1300	592.47	40.31	.62702	.61472	.60290	.59155	.58060	.57005	.55988	.55007	.54059	.53145	.52259
1350	614.69	41.83	.65002	.63728	.62504	.61326	.60193	.59100	.58046	.57031	.56048	.55101	.54185
1400	636.91	43.34	.67298	.65980	.64713	.63496	.62322	.61193	.60102	.59050	.58035	.57053	.56106
1450	659.13	44.85	.69591	.68229	.66921	.65662	.64449	.63282	.62155	.61068	.60019	.59004	.58025
1500	681.36	46.36	.71878	.70474	.69125	.67824	.66574	.65367	.64204	.63083	.61999	.60953	.59941
	500	34.02	.53092	.52048	.51045	.50079	.49149	.48254	.47390	.46557	.45753	.44977	.44226
	600	40.83	.63481	.62237	.61041	.59891	.58783	.57716	.56686	.55693	.54734	.53808	.52913
	700	47.63	.73796	.72356	.70971	.69637	.68354	.67116	.65922	.64771	.63660	.62586	.61548
	800	54.44	.84039	.82404	.80830	.79317	.77859	.76455	.75101	.73793	.72531	.71310	.70131
	900	61.24	.94208	.92381	.90624	.88934	.87306	.85736	.84221	.82759	.81349	.79985	.78666
	1000	68.05	1.04308	1.02293	1.00354	.98488	.96689	.94955	.93285	.91671	.90112	.88607	.87151
	1100	74.85	1.14337	1.12133	1.10016	1.07978	1.06011	1.04118	1.02291	1.00527	.98825	.97179	.95586
	1200	81.65	1.2430	1.2191	1.1961	1.1741	1.1528	1.1322	1.1124	1.0933	1.0748	1.0570	1.0397
	1300	88.46	1.3418	1.3162	1.2915	1.2677	1.2448	1.2227	1.2014	1.1808	1.1609	1.1417	1.1231
	1400	95.26	1.4401	1.4127	1.3862	1.3608	1.3363	1.3126	1.2898	1.2678	1.2465	1.2259	1.2068
	1500	102.07	1.5376	1.5084	1.4803	1.4532	1.4271	1.4020	1.3777	1.3542	1.3316	1.3097	1.2885
	1600	108.87	1.6345	1.6036	1.5738	1.5451	1.5175	1.4908	1.4650	1.4402	1.4161	1.3929	1.3704
	1700	115.68	1.7308	1.6982	1.6667	1.6364	1.6072	1.5791	1.5519	1.5256	1.5002	1.4757	1.4519
	1800	122.48	1.8264	1.7920	1.7589	1.7271	1.6964	1.6667	1.6382	1.6105	1.5838	1.5580	1.5330
	1900	129.29	1.9214	1.8854	1.8507	1.8173	1.7851	1.7540	1.7239	1.6950	1.6669	1.6399	1.6136
	2000	136.09	2.0157	1.9781	1.9418	1.9069	1.8732	1.8406	1.8093	1.7789	1.7496	1.7212	1.6938
	2100	142.90	2.1095	2.0702	2.0323	1.9959	1.9607	1.9268	1.8941	1.8624	1.8318	1.3021	1.7735
	2200	149.70	2.2026	2.1617	2.1223	2.0844	2.0477	2.0124	1.9783	1.9454	1.9135	1.8827	1.8528
	2300	156.51	2.2951	2.2526	2.2117	2.1723	2.1342	2.0975	2.0621	2.0278	1.9948	1.9627	1.9316
	2400	163.31	2.3870	2.3430	2.3005	2.2597	2.2202	2.1823	2.1455	2.1099	2.0755	2.0423	2.0101
	2500	170.11	2.4783	2.4328	2.3889	2.3465	2.3058	2.2664	2.2282	2.1915	2.1559	2.1215	2.0881
	2600	176.92	2.5692	2.5220	2.4767	2.4330	2.3907	2.3501	2.3106	2.2725	2.2358	2.2002	2.1657
	2700	183.72	2.6593	2.6107	2.5639	2.5188	2.4752	2.4332	2.3926	2.3532	2.3153	2.2785	2.2429
	2800	190.53	2.7489	2.6989	2.6506	2.6041	2.5592	2.5159	2.4740	2.4334	2.3943	2.3564	2.3197
	2900	197.33	2.8380	2.7865	2.7368	2.6890	2.6427	2.5981	2.5549	2.5132	2.4729	2.4339	2.3960
	3000	204.14	2.9266	2.8736	2.8225	2.7732	2.7257	2.6799	2.6355	2.5925	2.5510	2.5109	2.4720
	3100	210.94	3.0144	2.9601	2.9076	2.8571	2.8082	2.7612	2.7156	2.6715	2.6289	2.5876	2.5476
	3200	217.75	3.1019	3.0461	2.9922	2.9405	2.8903	2.8420	2.7952	2.7499	2.7062	2.6638	2.6228
	3300	224.55	3.1887	3.1315	3.0744	3.0232	2.9719	2.9223	2.8743	2.8281	2.7832	2.7397	2.6976
	3400	231.36	3.2751	3.2166	3.1601	3.1056	3.0531	3.0022	2.9532	2.9056	2.8596	2.8151	2.7720
	3500	238.16	3.3611	3.3012	3.2434	3.1876	3.1338	3.0818	3.0316	2.9829	2.9358	2.8902	2.8460
	3600	244.96	3.4463	3.3851	3.3261	3.2691	3.2140	3.1609	3.1094	3.0597	3.0115	2.9649	2.9197
	3700	251.77	3.5312	3.4686	3.4083	3.3500	3.2939	3.2394	3.1869	3.1360	3.0869	3.0392	2.9930
	3800	258.57	3.6155	3.5516	3.4900	3.4306	3.3732	3.3177	3.2640	3.2120	3.1618	3.1131	3.0660
	3900	265.38	3.6993	3.6342	3.5714	3.5106	3.4520	3.3955	3.3407	3.2877	3.2364	3.1867	3.1385
	4000	272.18	3.7827	3.7162	3.6522	3.5903	3.5305	3.4728	3.4170	3.3629	3.3105	3.2598	3.2107
	4100	278.99	3.8656	3.7979	3.7326	3.6696	3.6086	3.5498	3.4928	3.4377	3.3843	3.3326	3.2825
	4200	285.79	3.9474	3.8790	3.8125	3.7484	3.6862	3.6263	3.5684	3.5121	3.4578	3.4051	3.3541
	4300	292.60	4.0298	3.9598	3.8920	3.8267	3.7634	3.7025	3.6434	3.5862	3.5308	3.4771	3.4251
	4400	299.40	4.1114	4.0399	3.9711	3.9046	3.8404	3.7782	3.7182	3.6600	3.6035	3.5489	3.4960
	4500	306.21	4.1923	4.1197	4.0497	3.9821	3.9167	3.8536	3.7924	3.7332	3.6759	3.6204	3.5665
	4600	313.01	4.2729	4.1991	4.1279	4.0591	3.9928	3.9285	3.8664	3.8062	3.7479	3.6914	3.6365
	4700	319.81	4.3530	4.2780	4.2058	4.1359	4.0683	4.0031	3.9400	3.8788	3.8194	3.7620	3.7063
	4800	326.62	4.4327	4.3565	4.2831	4.2121	4.1436	4.0773	4.0132	3.9510	3.8907	3.8323	3.7758
	4900	333.42	4.5119	4.4347	4.3600	4.2880	4.2185	4.1512	4.0860	4.0228	3.9618	3.9025	3.8449
	5000	340.23	4.5907	4.5123	4.4366	4.3635	4.2929	4.2246	4.1584	4.0943	4.0323	3.9722	3.9137

SP. VOL.
6 % O_2, 94 % He

T-70

SPECIFIC VOLUME,CUBIC FT/LB

.060 OXYGEN .940 HELIUM AVERAGE MOLECULAR WEIGHT 5.683

DEPTH	PRESSURE		TEMPERATURE,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	62.956	64.242	65.526	66.812	68.098	69.382	70.668	71.951	73.237	74.523	75.808
10	19.14	1.30	48.346	49.333	50.319	51.306	52.292	53.280	54.266	55.253	56.240	57.226	58.213
20	23.58	1.60	39.242	40.043	40.843	41.645	42.445	43.246	44.047	44.847	45.648	46.448	47.250
30	28.03	1.91	33.025	33.699	34.372	35.047	35.720	36.394	37.068	37.742	38.415	39.089	39.763
40	32.47	2.21	28.510	29.091	29.673	30.255	30.836	31.418	31.999	32.581	33.163	33.744	34.325
50	36.92	2.51	25.082	25.593	26.105	26.616	27.128	27.640	28.151	28.663	29.174	29.686	30.197
60	41.36	2.81	22.391	22.847	23.303	23.760	24.217	24.673	25.130	25.586	26.043	26.500	26.957
70	45.81	3.12	20.221	20.634	21.046	21.458	21.870	22.283	22.695	23.107	23.520	23.932	24.344
80	50.25	3.42	18.436	18.812	19.187	19.563	19.939	20.315	20.691	21.066	21.442	21.818	22.194
90	54.70	3.72	16.940	17.286	17.631	17.976	18.322	18.667	19.012	19.358	19.703	20.048	20.393
100	59.14	4.02	15.670	15.989	16.309	16.628	16.947	17.267	17.586	17.905	18.225	18.544	18.863
110	63.58	4.33	14.577	14.874	15.171	15.468	15.765	16.062	16.359	16.656	16.953	17.250	17.547
120	68.03	4.63	13.627	13.905	14.182	14.460	14.738	15.015	15.293	15.570	15.848	16.125	16.403
130	72.47	4.93	12.794	13.054	13.315	13.575	13.836	14.096	14.357	14.618	14.878	15.139	15.399
140	76.92	5.23	12.056	12.302	12.547	12.793	13.039	13.284	13.529	13.775	14.020	14.266	14.511
150	81.36	5.54	11.400	11.632	11.864	12.096	12.328	12.560	12.792	13.024	13.257	13.489	13.721
160	85.81	5.84	10.811	11.031	11.251	11.471	11.691	11.911	12.131	12.351	12.572	12.792	13.012
170	90.25	6.14	10.280	10.489	10.699	10.908	11.117	11.327	11.536	11.745	11.954	12.164	12.373
180	94.70	6.44	9.7993	9.9987	10.1983	10.3976	10.5971	10.7966	10.9958	11.1953	11.3948	11.5942	11.7936
190	99.14	6.75	9.3615	9.5519	9.7426	9.9330	10.1236	10.3140	10.5045	10.6951	10.8856	11.0759	11.2664
200	103.58	7.05	8.9612	9.1438	9.3260	9.5083	9.6905	9.8730	10.0551	10.2375	10.4199	10.6020	10.7844
210	108.03	7.35	8.5941	8.7690	8.9438	9.1185	9.2933	9.4683	9.6430	9.8179	9.9926	10.1674	10.3420
220	112.47	7.65	8.2558	8.4238	8.5917	8.7596	8.9275	9.0953	9.2634	9.4312	9.5989	9.7670	9.9349
230	116.92	7.96	7.9432	8.1048	8.2664	8.4279	8.5895	8.7509	8.9124	9.0739	9.2355	9.3969	9.5585
240	121.36	8.26	7.6535	7.8092	7.9649	8.1206	8.2762	8.4318	8.5874	8.7429	8.8985	9.0542	9.2097
250	125.81	8.56	7.3845	7.5345	7.6847	7.8349	7.9849	8.1350	8.2851	8.4352	8.5854	8.7355	8.8855
260	130.25	8.86	7.1337	7.2786	7.4237	7.5686	7.7136	7.8586	8.0036	8.1486	8.2936	8.4385	8.5834
270	134.69	9.17	6.8994	7.0395	7.1799	7.3200	7.4603	7.6005	7.7406	7.8808	8.0210	8.1611	8.3015
280	139.14	9.47	6.6800	6.8159	6.9516	7.0873	7.2231	7.3587	7.4945	7.6302	7.7660	7.9017	8.0374
290	143.58	9.77	6.4744	6.6060	6.7375	6.8690	7.0006	7.1320	7.2636	7.3950	7.5266	7.6581	7.7896
300	148.03	10.07	6.2810	6.4086	6.5362	6.6638	6.7913	6.9190	7.0465	7.1741	7.3016	7.4291	7.5567
310	152.47	10.38	6.0989	6.2228	6.3467	6.4706	6.5944	6.7182	6.8422	6.9659	7.0898	7.2137	7.3374
320	156.92	10.68	5.9272	6.0475	6.1679	6.2883	6.4086	6.5289	6.6492	6.7697	6.8899	7.0103	7.1305
330	161.36	10.98	5.7649	5.8819	5.9990	6.1160	6.2331	6.3501	6.4671	6.5841	6.7012	6.8181	6.9352
340	165.81	11.28	5.6112	5.7251	5.8391	5.9530	6.0668	6.1807	6.2946	6.4086	6.5224	6.6362	6.7502
350	170.25	11.58	5.4656	5.5767	5.6875	5.7985	5.9093	6.0203	6.1312	6.2421	6.3530	6.4640	6.5748
360	174.69	11.89	5.3275	5.4356	5.5437	5.6517	5.7599	5.8680	5.9762	6.0843	6.1923	6.3004	6.4084
370	179.14	12.19	5.1962	5.3016	5.4070	5.5124	5.6179	5.7232	5.8287	5.9341	6.0395	6.1449	6.2502
380	183.58	12.49	5.0712	5.1741	5.2769	5.3798	5.4827	5.5855	5.6884	5.7913	5.8940	5.9969	6.0999
390	188.03	12.79	4.9521	5.0526	5.1530	5.2534	5.3538	5.4544	5.5547	5.6552	5.7556	5.8561	5.9565
400	192.47	13.10	4.8386	4.9367	5.0348	5.1329	5.2310	5.3291	5.4273	5.5253	5.6235	5.7216	5.8197
410	196.92	13.40	4.7301	4.8260	4.9219	5.0179	5.1138	5.2096	5.3055	5.4014	5.4974	5.5932	5.6891
420	201.36	13.70	4.6265	4.7203	4.8141	4.9079	5.0017	5.0954	5.1892	5.2829	5.3768	5.4706	5.5642
430	205.81	14.00	4.5273	4.6191	4.7108	4.8026	4.8944	4.9861	5.0779	5.1696	5.2613	5.3531	5.4448
440	210.25	14.31	4.4324	4.5222	4.6120	4.7019	4.7916	4.8814	4.9712	5.0610	5.1509	5.2407	5.3305
450	214.69	14.61	4.3413	4.4293	4.5172	4.6052	4.6931	4.7811	4.8691	4.9570	5.0449	5.1328	5.2209
460	219.14	14.91	4.2539	4.3401	4.4263	4.5124	4.5987	4.6849	4.7710	4.8571	4.9433	5.0295	5.1156
470	223.58	15.21	4.1700	4.2545	4.3390	4.4234	4.5080	4.5924	4.6768	4.7613	4.8458	4.9302	5.0146
480	228.03	15.52	4.0895	4.1722	4.2551	4.3379	4.4207	4.5035	4.5863	4.6691	4.7519	4.8347	4.9175
490	232.47	15.82	4.0119	4.0931	4.1744	4.2556	4.3368	4.4181	4.4993	4.5806	4.6617	4.7429	4.8242
500	236.92	16.12	3.9373	4.0170	4.0967	4.1764	4.2561	4.3358	4.4156	4.4952	4.5750	4.6547	4.7344
510	241.36	16.42	3.8654	3.9437	4.0219	4.1002	4.1784	4.2566	4.3349	4.4131	4.4913	4.5696	4.6478
520	245.80	16.73	3.7962	3.8730	3.9498	4.0267	4.1035	4.1803	4.2571	4.3339	4.4108	4.4875	4.5643
530	250.25	17.03	3.7293	3.8048	3.8802	3.9558	4.0312	4.1066	4.1821	4.2576	4.3330	4.4085	4.4839
540	254.69	17.33	3.6648	3.7390	3.8131	3.8873	3.9614	4.0356	4.1097	4.1839	4.2580	4.3321	4.4062
550	259.14	17.63	3.6025	3.6754	3.7483	3.8212	3.8941	3.9670	4.0398	4.1126	4.1856	4.2584	4.3313
560	263.58	17.94	3.5424	3.6140	3.6857	3.7573	3.8290	3.9006	3.9723	4.0439	4.1155	4.1872	4.2588
570	268.03	18.24	3.4842	3.5546	3.6251	3.6956	3.7660	3.8365	3.9070	3.9774	4.0478	4.1183	4.1887
580	272.47	18.54	3.4279	3.4973	3.5666	3.6359	3.7052	3.7745	3.8438	3.9131	3.9824	4.0517	4.1210
590	276.92	18.84	3.3734	3.4417	3.5099	3.5781	3.6463	3.7144	3.7827	3.8508	3.9190	3.9872	4.0553
600	281.36	19.15	3.3208	3.3879	3.4550	3.5221	3.5892	3.6563	3.7234	3.7906	3.8576	3.9247	3.9918
610	285.80	19.45	3.2696	3.3357	3.4018	3.4679	3.5340	3.6000	3.6661	3.7321	3.7982	3.8643	3.9303
620	290.25	19.75	3.2201	3.2851	3.3502	3.4153	3.4803	3.5454	3.6104	3.6755	3.7405	3.8056	3.8707
630	294.69	20.05	3.1720	3.2361	3.3002	3.3643	3.4284	3.4925	3.5565	3.6206	3.6847	3.7487	3.8128
640	299.14	20.36	3.1254	3.1885	3.2517	3.3148	3.3780	3.4411	3.5041	3.5673	3.6304	3.6935	3.7566
650	303.58	20.66	3.0802	3.1423	3.2046	3.2668	3.3290	3.3912	3.4534	3.5156	3.5777	3.6400	3.7021
660	308.03	20.96	3.0362	3.0975	3.1588	3.2201	3.2814	3.3428	3.4041	3.4654	3.5267	3.5879	3.6492
670	312.47	21.26	2.9935	3.0540	3.1144	3.1748	3.2352	3.2957	3.3561	3.4165	3.4770	3.5374	3.5978
680	316.92	21.56	2.9520	3.0116	3.0712	3.1308	3.1904	3.2499	3.3096	3.3691	3.4286	3.4883	3.5478
690	321.36	21.87	2.9116	2.9704	3.0292	3.0880	3.1467	3.2055	3.2642	3.3230	3.3818	3.4405	3.4992
700	325.80	22.17	2.8724	2.9304	2.9883	3.0463	3.1043	3.1622	3.2202	3.2781	3.3361	3.3940	3.4519
710	330.25	22.47	2.8342	2.8914	2.9486	3.0058	3.0629	3.1201	3.1773	3.2345	3.2916	3.3488	3.4059
720	334.69	22.77	2.7970	2.8534	2.9098	2.9663	3.0227	3.0791	3.1356	3.1919	3.2484	3.3048	3.3611
730	339.14	23.08	2.7608	2.8165	2.8722	2.9278	2.9836	3.0393	3.0949	3.1506	3.2062	3.2619	3.3176
740	343.58	23.38	2.7255	2.7805	2.8354	2.8904	2.9454	3.0003	3.0553	3.1102	3.1652	3.2201	3.2751
750	348.03	23.68	2.6911	2.7455	2.7997	2.8539	2.9082	2.9625	3.0168	3.0710	3.1252	3.1794	3.2337
760	352.47	23.98	2.6577	2.7113	2.7648	2.8184	2.8720	2.9256	2.9791	3.0327	3.0862	3.1398	3.1933
770	356.91	24.29	2.6250	2.6779	2.7308	2.7837	2.8366	2.8895	2.9425	2.9954	3.0483	3.1011	3.1540
780	361.36	24.59	2.5931	2.6454	2.6976	2.7499	2.8022	2.8544	2.9067	2.9589	3.0112	3.0634	3.1156
790	365.80	24.89	2.5620	2.6136	2.6653	2.7169	2.7686	2.8202	2.8718	2.9233	2.9750	3.0266	3.0782

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SP. VOL.

6 % O_2, 94 % He

SPECIFIC VOLUME,CUBIC FT/LB

.060 OXYGEN .940 HELIUM AVERAGE MOLECULAR WEIGHT 5.683

DEPTH FT	PRESSURE PSIA	PRESSURE ATM	30	40	50	60	70	80	90	100	110	120	130
			TEMPERATURE,F										
800	370.25	25.19	2.5317	2.5827	2.6337	2.6847	2.7357	2.7867	2.8377	2.8887	2.9397	2.9907	3.0417
810	374.69	25.50	2.5021	2.5524	2.6029	2.6533	2.7037	2.7541	2.8045	2.8548	2.9052	2.9556	3.0060
820	379.14	25.80	2.4731	2.5229	2.5727	2.6225	2.6724	2.7222	2.7720	2.8218	2.8715	2.9213	2.9711
830	383.58	26.10	2.4448	2.4941	2.5433	2.5926	2.6418	2.6910	2.7402	2.7895	2.8387	2.8879	2.9371
840	388.03	26.40	2.4172	2.4659	2.5146	2.5633	2.6119	2.6606	2.7093	2.7579	2.8066	2.8552	2.9038
850	392.47	26.71	2.3903	2.4384	2.4865	2.5346	2.5827	2.6309	2.6789	2.7271	2.7751	2.8233	2.8714
860	396.91	27.01	2.3639	2.4115	2.4590	2.5066	2.5542	2.6018	2.6494	2.6969	2.7445	2.7920	2.8396
870	401.36	27.31	2.3381	2.3851	2.4322	2.4793	2.5263	2.5734	2.6204	2.6674	2.7144	2.7615	2.8085
880	405.80	27.61	2.3128	2.3594	2.4059	2.4525	2.4990	2.5455	2.5921	2.6386	2.6851	2.7316	2.7781
890	410.25	27.92	2.2882	2.3342	2.3802	2.4263	2.4723	2.5183	2.5643	2.6104	2.6564	2.7024	2.7484
900	414.69	28.22	2.2640	2.3095	2.3551	2.4006	2.4462	2.4917	2.5372	2.5827	2.6283	2.6738	2.7193
910	419.14	28.52	2.2403	2.2854	2.3305	2.3755	2.4206	2.4656	2.5107	2.5557	2.6008	2.6458	2.6909
920	423.58	28.82	2.2172	2.2618	2.3064	2.3510	2.3956	2.4401	2.4847	2.5292	2.5738	2.6184	2.6630
930	428.03	29.13	2.1946	2.2387	2.2828	2.3269	2.3710	2.4152	2.4593	2.5034	2.5474	2.5916	2.6357
940	432.47	29.43	2.1723	2.2160	2.2597	2.3034	2.3470	2.3906	2.4343	2.4780	2.5217	2.5653	2.6089
950	436.91	29.73	2.1506	2.1938	2.2370	2.2803	2.3235	2.3667	2.4099	2.4531	2.4963	2.5395	2.5827
960	441.36	30.03	2.1292	2.1721	2.2148	2.2577	2.3005	2.3432	2.3860	2.4288	2.4715	2.5143	2.5570
970	445.80	30.33	2.1084	2.1507	2.1931	2.2355	2.2778	2.3202	2.3625	2.4049	2.4473	2.4896	2.5319
980	450.25	30.64	2.0879	2.1298	2.1718	2.2137	2.2557	2.2976	2.3395	2.3815	2.4234	2.4653	2.5073
990	454.69	30.94	2.0678	2.1093	2.1509	2.1924	2.2340	2.2755	2.3170	2.3586	2.4000	2.4416	2.4831
1000	459.14	31.24	2.0481	2.0893	2.1304	2.1715	2.2127	2.2538	2.2949	2.3360	2.3772	2.4183	2.4594
1050	481.36	32.75	1.9551	1.9944	2.0336	2.0729	2.1121	2.1513	2.1905	2.2297	2.2689	2.3082	2.3474
1100	503.58	34.27	1.8704	1.9079	1.9454	1.9829	2.0204	2.0579	2.0954	2.1328	2.1703	2.2078	2.2453
1150	525.80	35.78	1.7928	1.8287	1.8646	1.9005	1.9364	1.9723	2.0083	2.0442	2.0801	2.1159	2.1518
1200	548.02	37.29	1.7215	1.7559	1.7904	1.8249	1.8593	1.8937	1.9282	1.9627	1.9971	2.0315	2.0659
1250	570.25	38.80	1.6557	1.6888	1.7219	1.7551	1.7882	1.8213	1.8544	1.8875	1.9206	1.9537	1.9868
1300	592.47	40.31	1.5949	1.6268	1.6586	1.6905	1.7224	1.7542	1.7861	1.8180	1.8498	1.8817	1.9135
1350	614.69	41.83	1.5384	1.5692	1.5999	1.6306	1.6613	1.6920	1.7228	1.7534	1.7842	1.8148	1.8455
1400	636.91	43.34	1.4859	1.5156	1.5453	1.5749	1.6046	1.6342	1.6638	1.6935	1.7231	1.7527	1.7823
1450	659.13	44.85	1.4370	1.4656	1.4943	1.5229	1.5516	1.5802	1.6089	1.6375	1.6661	1.6948	1.7234
1500	681.36	46.36	1.3912	1.4190	1.4467	1.4744	1.5021	1.5298	1.5575	1.5852	1.6129	1.6406	1.6683

500	34.02	1.8835	1.9213	1.9591	1.9968	2.0346	2.0724	2.1102	2.1479	2.1856	2.2234	2.2611
600	40.83	1.5753	1.6068	1.6382	1.6697	1.7012	1.7326	1.7641	1.7955	1.8270	1.8585	1.8899
700	47.63	1.3551	1.3821	1.4090	1.4360	1.4630	1.4900	1.5169	1.5439	1.5709	1.5978	1.6248
800	54.44	1.1899	1.2135	1.2372	1.2608	1.2844	1.3080	1.3315	1.3551	1.3787	1.4023	1.4259
900	61.24	1.0615	1.0825	1.1035	1.1244	1.1454	1.1664	1.1873	1.2083	1.2293	1.2502	1.2712
1000	68.05	.95870	.97759	.99647	1.01536	1.03424	1.05313	1.07199	1.09085	1.10973	1.12858	1.14743
1100	74.85	.87461	.89180	.90898	.92612	.94329	.96045	.97760	.99476	1.01189	1.02903	1.04617
1200	81.65	.80454	.82029	.83603	.85175	.86748	.88322	.89893	.91466	.93037	.94608	.96179
1300	88.46	.74524	.75978	.77430	.78882	.80334	.81785	.83238	.84688	.86138	.87589	.89039
1400	95.26	.69441	.70788	.72140	.73487	.74836	.76184	.77531	.78878	.80225	.81572	.82917
1500	102.07	.65035	.66294	.67553	.68813	.70071	.71327	.72586	.73843	.75099	.76356	.77611
1600	108.87	.61179	.62361	.63539	.64722	.65898	.67079	.68258	.69437	.70614	.71793	.72970
1700	115.68	.57777	.58887	.59998	.61108	.62220	.63328	.64438	.65548	.66656	.67766	.68873
1800	122.48	.54753	.55803	.56852	.57899	.58949	.59997	.61042	.62091	.63138	.64186	.65232
1900	129.29	.52045	.53040	.54033	.55028	.56021	.57014	.58007	.58998	.59990	.60980	.61974
2000	136.09	.49610	.50554	.51498	.52441	.53385	.54329	.55270	.56215	.57157	.58098	.59039
2100	142.90	.47405	.48305	.49204	.50104	.51003	.51900	.52797	.53694	.54591	.55490	.56386
2200	149.70	.45400	.46260	.47119	.47978	.48835	.49691	.50548	.51404	.52261	.53116	.53971
2300	156.51	.43572	.44393	.45213	.46033	.46855	.47675	.48494	.49314	.50131	.50952	.51770
2400	163.31	.41894	.42681	.43468	.44255	.45041	.45824	.46610	.47396	.48181	.48965	.49749
2500	170.11	.40350	.41105	.41861	.42616	.43369	.44124	.44878	.45631	.46385	.47137	.47890
2600	176.92	.38923	.39651	.40377	.41102	.41828	.42552	.43278	.44003	.44727	.45450	.46174
2700	183.72	.37603	.38304	.39003	.39702	.40401	.41099	.41796	.42495	.43191	.43888	.44585
2800	190.53	.36378	.37052	.37727	.38401	.39075	.39748	.40420	.41094	.41766	.42437	.43109
2900	197.33	.35236	.35887	.36539	.37189	.37839	.38489	.39141	.39790	.40438	.41087	.41735
3000	204.14	.34170	.34800	.35429	.36059	.36688	.37315	.37943	.38572	.39200	.39827	.40453
3100	210.94	.33174	.33783	.34392	.35001	.35610	.36217	.36824	.37432	.38039	.38646	.39252
3200	217.75	.32239	.32829	.33420	.34008	.34599	.35187	.35776	.36364	.36952	.37540	.38128
3300	224.55	.31360	.31933	.32505	.33077	.33649	.34219	.34791	.35360	.35930	.36500	.37070
3400	231.36	.30533	.31089	.31644	.32200	.32751	.33309	.33862	.34416	.34970	.35523	.36075
3500	238.16	.29753	.30292	.30832	.31371	.31910	.32449	.32986	.33525	.34062	.34600	.35136
3600	244.96	.29016	.29542	.30066	.30590	.31114	.31636	.32161	.32683	.33206	.33728	.34250
3700	251.77	.28319	.28830	.29340	.29851	.30360	.30870	.31378	.31888	.32395	.32903	.33411
3800	258.57	.27659	.28156	.28652	.29149	.29645	.30142	.30637	.31133	.31627	.32122	.32616
3900	265.38	.27032	.27517	.28000	.28485	.28968	.29451	.29934	.30416	.30899	.31381	.31862
4000	272.18	.26436	.26909	.27381	.27851	.28324	.28795	.29266	.29736	.30207	.30677	.31146
4100	278.99	.25869	.26330	.26791	.27251	.27711	.28171	.28630	.29089	.29548	.30007	.30465
4200	285.79	.25330	.25780	.26230	.26678	.27128	.27576	.28024	.28473	.28920	.29368	.29814
4300	292.60	.24815	.25254	.25694	.26132	.26571	.27008	.27447	.27884	.28322	.28759	.29196
4400	299.40	.24323	.24753	.25182	.25611	.26039	.26468	.26895	.27322	.27750	.28178	.28604
4500	306.21	.23853	.24273	.24693	.25112	.25532	.25949	.26369	.26787	.27204	.27622	.28038
4600	313.01	.23403	.23815	.24225	.24636	.25045	.25455	.25864	.26273	.26681	.27090	.27499
4700	319.81	.22972	.23375	.23777	.24178	.24580	.24981	.25381	.25781	.26182	.26582	.26981
4800	326.62	.22560	.22954	.23347	.23741	.24134	.24526	.24918	.25310	.25702	.26094	.26484
4900	333.42	.22164	.22550	.22936	.23321	.23705	.24090	.24474	.24858	.25241	.25625	.26008
5000	340.23	.21783	.22162	.22540	.22917	.23294	.23671	.24048	.24424	.24800	.25175	.25551

6 % O_2, 94 % He **T-72**

0.060 OXYGEN 0.940 HELIUM
ENTHALPY,BTU/LB

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	446.02	463.93	481.85	499.78	517.70	535.62
30.00	446.06	463.98	481.90	499.84	517.76	535.68
50.00	446.12	464.05	481.97	499.91	517.83	535.76
100.00	446.27	464.21	482.14	500.09	518.02	535.96
200.00	446.55	464.52	482.47	500.44	518.39	536.36
300.00	446.84	464.82	482.80	500.80	518.77	536.75
400.00	447.12	465.13	483.14	501.15	519.14	537.15
500.00	447.41	465.44	483.47	501.51	519.52	537.55
1000.00	448.78	466.97	485.13	503.25	521.37	539.45
2000.00	451.74	470.21	488.63	506.98	525.19	543.38
3000.00	454.78	473.52	492.27	510.81	529.13	547.33
4000.00	458.76	477.62	496.40	515.07	533.57	552.02
5000.00	462.88	481.62	500.35	519.36	537.90	556.56

0.060 OXYGEN 0.940 HELIUM
CV,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.547	.547	.547	.547	.547	.548
30.00	.547	.547	.547	.547	.547	.548
50.00	.547	.547	.547	.547	.547	.548
100.00	.547	.547	.547	.547	.54	.548
200.00	.547	.547	.547	.547	.547	.548
300.00	.547	.547	.547	.548	.548	.548
400.00	.547	.547	.547	.548	.548	.548
500.00	.547	.547	.547	.548	.548	.548
1000.00	.548	.549	.548	.548	.548	.548
2000.00	.551	.551	.551	[illegible]	[illegible]	[illegible]
3000.00	.556	.556	.556	.553	.553	.553
4000.00						
5000.00						

0.060 OXYGEN 0.940 HELIUM
ENTROPY,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	5.0129	5.0488	5.0832	5.1165	5.1485	5.1794
30.00	4.9165	4.9524	4.9868	5.0201	5.0521	5.0830
50.00	4.7905	4.8264	4.8609	4.8941	4.9262	4.9571
100.00	4.4937	4.5297	4.5326	4.5974	4.6295	4.8364
200.00	4.3366	4.3727	4.3835	4.4405	4.4726	4.6355
300.00	4.1796	4.2156	4.2345	4.2835	4.3157	4.4347
400.00	4.0225	4.0586	4.0854	4.1266	4.1588	4.2338
500.00	3.8655	3.9016	3.9364	3.9697	4.0019	4.0330
1000.00	3.5535	3.5898	3.6248	3.6584	3.6908	3.7220
2000.00	3.3240	3.3430	3.3787	3.3332	3.4451	3.4766
3000.00	3.1399	3.1772	3.2131	3.2478	3.2804	3.3123
4000.00	3.0363	3.0738	3.1058	3.1443	3.1769	3.2087
5000.00	2.9390	2.9925	3.0287	3.0634	3.0968	3.1287

0.060 OXYGEN 0.940 HELIUM
THERMAL CONDUCTIVITY,BTU/SEC FT F
(MULTIPLY TABLE ENTRY BY .0000100)

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.97	2.03	2.08	2.14	2.20	2.25
30.00						
50.00						
100.00						
200.00						
300.00						
400.00						
500.00						
1000.00						
2000.00						
3000.00						
4000.00						
5000.00						

0.060 OXYGEN 0.940 HELIUM
CP,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.8962	.8964	.8964	.8965	.8967	.8969
30.00	.8964	.8966	.8966	.8967	.8968	.8970
50.00	.8967	.8968	.8968	.8969	.8970	.8972
100.00	.8974	.8974	.8974	.8974	.8975	.8976
200.00	.8988	.8987	.8985	.8985	.8985	.8985
300.00	.9002	.8999	.8997	.8995	.8994	.8993
400.00	.9016	.9011	.9008	.9006	.9004	.9002
500.00	.9030	.9024	.9019	.9016	.9013	.9010
1000.00	.9101	.9087	.9074	.9067	.9059	.9053
2000.00	.92	.92	.92	.92	.92	.91
3000.00	.94	.93	.93	.93	.93	.92
4000.00	.94	.93	.93	.93	.93	.93
5000.00						

0.060 OXYGEN 0.940 HELIUM
PRANDTL NUMBER

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.60	.60	.60	.60	.60	.60
30.00						
50.00						
100.00						
200.00						
300.00						
400.00						
500.00						
1000.00						
2000.00						
3000.00						
4000.00						
5000.00						

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6 % O_2, 94 % He

0.040 OXYGEN 0.940 HELIUM
CP/CV

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.639	1.639	1.638	1.638	1.638	1.638
30.00	1.639	1.639	1.638	1.638	1.638	1.638
50.00	1.640	1.640	1.639	1.639	1.639	1.638
100.00	1.641	1.641	1.640	1.640	1.639	1.639
200.00	1.643	1.642	1.642	1.641	1.641	1.640
300.00	1.645	1.644	1.644	1.643	1.642	1.642
400.00	1.647	1.646	1.646	1.645	1.644	1.643
500.00	1.649	1.648	1.648	1.646	1.645	1.644
1000.00	1.661	1.658	1.656	1.654	1.653	1.651
2000.00	1.7	1.7	1.7	1.7	1.7	1.7
3000.00	1.7	1.7	1.7	1.7	1.7	1.7
4000.00						
5000.00						

0.040 OXYGEN 0.940 HELIUM
VISCOSITY,LB/FT SEC
(MULTIPLY TABLE ENTRY BY .0000100)

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.316	1.351	1.387	1.424	1.458	1.495
30.00						
50.00						
100.00						
200.00						
300.00						
400.00						
500.00						
1000.00						
2000.00						
3000.00						
4000.00						
5000.00						

0.040 OXYGEN 0.940 HELIUM
SONIC VELOCITY FT/SEC

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	2653	2705	2756	2807	2858	2909
30.00	2655	2706	2758	2809	2860	2911
50.00	2657	2709	2760	2811	2862	2913
100.00	2663	2714	2766	2817	2867	2917
200.00	2675	2726	2777	2827	2877	2927
300.00	2686	2737	2788	2838	2888	2937
400.00	2698	2748	2799	2849	2898	2947
500.00	2710	2760	2810	2859	2908	2957
1000.00	2768	2816	2865	2913	2960	3007
2000.00	2879	2927	2975	3023	3071	3118
3000.00	2990	3038	3086	3134	3182	3230
4000.00						
5000.00						

DENSITY

3 % O_2, 97 % He

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DENSITY,LBS/CUBIC FT

.030 OXYGEN .970 HELIUM AVERAGE MOLECULAR WEIGHT 4.843

DEPTH	PRESSURE		TEMPERATURE,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	.01354	.01327	.01301	.01276	.01251	.01228	.01206	.01184	.01164	.01144	.01124
10	19.14	1.30	.01763	.01727	.01694	.01661	.01630	.01600	.01570	.01542	.01515	.01489	.01464
20	23.58	1.60	.02172	.02128	.02087	.02046	.02008	.01971	.01935	.01900	.01867	.01835	.01804
30	28.03	1.91	.02580	.02529	.02479	.02432	.02386	.02342	.02299	.02258	.02218	.02180	.02143
40	32.47	2.21	.02989	.02929	.02872	.02817	.02764	.02713	.02663	.02616	.02570	.02526	.02483
50	36.92	2.51	.03398	.03330	.03265	.03202	.03141	.03083	.03027	.02973	.02921	.02871	.02822
60	41.36	2.81	.03806	.03730	.03657	.03587	.03519	.03454	.03391	.03331	.03272	.03216	.03161
70	45.81	3.12	.04214	.04130	.04049	.03971	.03897	.03825	.03755	.03688	.03623	.03561	.03501
80	50.25	3.42	.04623	.04530	.04441	.04356	.04274	.04195	.04119	.04045	.03974	.03906	.03840
90	54.70	3.72	.05031	.04930	.04834	.04741	.04651	.04565	.04482	.04402	.04325	.04251	.04179
100	59.14	4.02	.05438	.05330	.05225	.05125	.05029	.04936	.04846	.04760	.04676	.04596	.04518
110	63.58	4.33	.05846	.05730	.05617	.05509	.05406	.05306	.05209	.05117	.05027	.04940	.04857
120	68.03	4.63	.06254	.06129	.06009	.05894	.05783	.05676	.05573	.05473	.05378	.05285	.05196
130	72.47	4.93	.06661	.06528	.06401	.06278	.06160	.06046	.05936	.05830	.05728	.05630	.05534
140	76.92	5.23	.07069	.06928	.06792	.06662	.06536	.06416	.06299	.06187	.06079	.05974	.05873
150	81.36	5.54	.07476	.07327	.07184	.07046	.06913	.06785	.06662	.06543	.06429	.06318	.06211
160	85.81	5.84	.07883	.07726	.07575	.07429	.07289	.07155	.07025	.06900	.06779	.06663	.06550
170	90.25	6.14	.08290	.08125	.07966	.07813	.07666	.07524	.07388	.07256	.07129	.07007	.06888
180	94.70	6.44	.08697	.08523	.08357	.08196	.08042	.07894	.07751	.07613	.07479	.07351	.07226
190	99.14	6.75	.09104	.08922	.08748	.08580	.08418	.08263	.08113	.07969	.07829	.07695	.07565
200	103.58	7.05	.09510	.09321	.09138	.08963	.08794	.08632	.08476	.08325	.08179	.08039	.07903
210	108.03	7.35	.09917	.09719	.09529	.09346	.09171	.09001	.08838	.08681	.08529	.08382	.08241
220	112.47	7.65	.10323	.10117	.09919	.09729	.09546	.09370	.09200	.09036	.08879	.08726	.08579
230	116.92	7.96	.10729	.10515	.10310	.10112	.09922	.09739	.09562	.09392	.09228	.09069	.08916
240	121.36	8.26	.11135	.10913	.10700	.10495	.10298	.10108	.09925	.09748	.09577	.09413	.09254
250	125.81	8.56	.11541	.11311	.11090	.10878	.10673	.10476	.10287	.10103	.09927	.09756	.09592
260	130.25	8.86	.11947	.11709	.11480	.11260	.11049	.10845	.10649	.10459	.10276	.10100	.09929
270	134.69	9.17	.12352	.12106	.11870	.11643	.11424	.11213	.11010	.10814	.10626	.10443	.10266
280	139.14	9.47	.12758	.12504	.12260	.12025	.11799	.11581	.11372	.11170	.10974	.10786	.10604
290	143.58	9.77	.13163	.12901	.12649	.12407	.12174	.11950	.11733	.11525	.11323	.11129	.10941
300	148.03	10.07	.13569	.13298	.13039	.12789	.12549	.12318	.12095	.11880	.11672	.11472	.11278
310	152.47	10.38	.13974	.13696	.13428	.13171	.12924	.12686	.12456	.12235	.12021	.11815	.11615
320	156.92	10.68	.14378	.14093	.13817	.13553	.13299	.13054	.12818	.12590	.12370	.12158	.11952
330	161.36	10.98	.14783	.14489	.14207	.13935	.13673	.13421	.13179	.12944	.12718	.12500	.12289
340	165.81	11.28	.15188	.14886	.14596	.14317	.14048	.13789	.13540	.13299	.13067	.12843	.12626
350	170.25	11.58	.15593	.15283	.14985	.14698	.14422	.14157	.13900	.13654	.13415	.13185	.12963
360	174.69	11.89	.15997	.15679	.15374	.15079	.14797	.14524	.14262	.14008	.13764	.13528	.13300
370	179.14	12.19	.16401	.16076	.15762	.15461	.15171	.14891	.14622	.14363	.14112	.13870	.13636
380	183.58	12.49	.16806	.16472	.16151	.15842	.15545	.15259	.14983	.14717	.14460	.14212	.13973
390	188.03	12.79	.17210	.16868	.16539	.16223	.15919	.15626	.15343	.15071	.14808	.14554	.14309
400	192.47	13.10	.17614	.17264	.16928	.16604	.16293	.15993	.15704	.15425	.15156	.14896	.14645
410	196.92	13.40	.18018	.17660	.17316	.16985	.16667	.16360	.16064	.15779	.15504	.15238	.14981
420	201.36	13.70	.18421	.18055	.17704	.17366	.17040	.16727	.16424	.16133	.15851	.15580	.15317
430	205.81	14.00	.18825	.18451	.18092	.17746	.17414	.17093	.16784	.16486	.16199	.15922	.15653
440	210.25	14.31	.19228	.18846	.18479	.18127	.17787	.17460	.17144	.16840	.16547	.16263	.15989
450	214.69	14.61	.19632	.19242	.18867	.18507	.18160	.17826	.17504	.17194	.16894	.16605	.16325
460	219.14	14.91	.20035	.19637	.19255	.18887	.18533	.18193	.17864	.17547	.17241	.16946	.16661
470	223.58	15.21	.20438	.20032	.19642	.19267	.18906	.18559	.18224	.17901	.17589	.17288	.16997
480	228.03	15.52	.20841	.20427	.20030	.19648	.19280	.18925	.18583	.18254	.17936	.17629	.17332
490	232.47	15.82	.21243	.20822	.20417	.20027	.19652	.19291	.18943	.18607	.18283	.17970	.17668
500	236.92	16.12	.21646	.21217	.20804	.20407	.20025	.19657	.19302	.18960	.18630	.18311	.18003
510	241.36	16.42	.22049	.21612	.21191	.20787	.20397	.20023	.19662	.19313	.18977	.18652	.18339
520	245.80	16.73	.22451	.22006	.21578	.21166	.20770	.20389	.20021	.19666	.19324	.18993	.18674
530	250.25	17.03	.22853	.22400	.21965	.21546	.21143	.20754	.20380	.20019	.19670	.19334	.19008
540	254.69	17.33	.23255	.22795	.22351	.21925	.21515	.21120	.20739	.20371	.20017	.19675	.19344
550	259.14	17.63	.23658	.23189	.22738	.22304	.21887	.21485	.21098	.20724	.20364	.20015	.19679
560	263.58	17.94	.24060	.23582	.23124	.22683	.22259	.21851	.21457	.21077	.20710	.20356	.20013
570	268.03	18.24	.24461	.23976	.23511	.23062	.22631	.22216	.21815	.21429	.21056	.20696	.20348
580	272.47	18.54	.24862	.24370	.23897	.23441	.23003	.22581	.22174	.21781	.21402	.21036	.20683
590	276.92	18.84	.25264	.24764	.24283	.23820	.23375	.22946	.22532	.22133	.21749	.21377	.21018
600	281.36	19.15	.25666	.25157	.24669	.24199	.23746	.23311	.22891	.22486	.22095	.21717	.21352
610	285.80	19.45	.26067	.25551	.25054	.24577	.24118	.23676	.23249	.22838	.22440	.22057	.21687
620	290.25	19.75	.26468	.25944	.25440	.24956	.24490	.24040	.23607	.23189	.22786	.22397	.22021
630	294.69	20.05	.26869	.26337	.25826	.25334	.24861	.24405	.23965	.23541	.23132	.22737	.22355
640	299.14	20.36	.27270	.26730	.26211	.25713	.25232	.24769	.24323	.23893	.23478	.23077	.22689
650	303.58	20.66	.27670	.27123	.26596	.26090	.25603	.25133	.24681	.24245	.23823	.23417	.23024
660	308.03	20.96	.28071	.27516	.26982	.26468	.25974	.25498	.25039	.24596	.24169	.23756	.23358
670	312.47	21.26	.28472	.27908	.27367	.26846	.26345	.25862	.25397	.24947	.24514	.24096	.23692
680	316.92	21.56	.28872	.28301	.27752	.27224	.26716	.26226	.25754	.25299	.2485[illegible]	.24435	.24025
690	321.36	21.87	.29272	.28693	.28137	.27602	.27086	.26590	.26112	.25650	.25205	.24774	.24359
700	325.80	22.17	.29672	.29086	.28522	.27979	.27457	.26954	.26469	.26001	.25550	.25114	.24692
710	330.25	22.47	.30072	.29478	.28906	.28356	.27828	.27318	.26826	.26352	.25895	.25453	.25026
720	334.69	22.77	.30472	.29870	.29291	.28734	.28198	.27681	.27184	.26703	.26239	.25792	.25359
730	339.14	23.08	.30872	.30262	.29675	.29111	.28568	.28045	.27540	.27054	.26584	.26131	.25693
740	343.58	23.38	.31271	.30653	.30059	.29488	.28938	.28408	.27898	.27405	.26929	.26470	.26026
750	348.03	23.68	.31670	.31045	.30443	.29865	.29308	.28772	.28254	.27756	.27274	.26808	.26359
760	352.47	23.98	.32070	.31436	.30827	.30242	.29678	.29135	.28611	.28106	.27618	.27147	.26692
770	356.91	24.29	.32469	.31828	.31211	.30618	.30047	.29498	.28967	.28456	.27963	.27486	.27025
780	361.36	24.59	.32868	.32219	.31595	.30995	.30418	.29861	.29324	.28806	.28307	.27825	.27358
790	365.80	24.89	.33267	.32610	.31979	.31371	.30787	.30223	.29680	.29157	.28652	.28163	.27691

T-75

DENSITY

3 % O_2, 97 % He

DENSITY,LBS/CUBIC FT

.030 OXYGEN .970 HELIUM AVERAGE MOLECULAR WEIGHT 4.843

DEPTH	PRESSURE		TEMPERATURE,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
800	370.25	25.19	.33666	.33001	.32363	.31748	.31156	.30587	.30037	.29507	.28995	.28502	.28024
810	374.69	25.50	.34064	.33392	.32744	.32124	.31526	.30949	.30393	.29857	.29340	.28839	.28357
820	379.14	25.80	.34463	.33783	.33129	.32500	.31895	.31312	.30749	.30207	.29684	.29178	.28689
830	383.58	26.10	.34862	.34174	.33513	.32876	.32264	.31674	.31106	.30557	.30028	.29516	.29022
840	388.03	26.40	.35260	.34564	.33896	.33252	.32633	.32037	.31461	.30906	.30371	.29854	.29354
850	392.47	26.71	.35658	.34955	.34279	.33628	.33002	.32399	.31818	.31256	.30715	.30192	.29686
860	396.91	27.01	.36056	.35345	.34661	.34004	.33371	.32761	.32173	.31606	.31059	.30530	.30018
870	401.36	27.31	.36454	.35735	.35044	.34379	.33740	.33123	.32529	.31955	.31402	.30868	.30351
880	405.80	27.61	.36852	.36125	.35427	.34755	.34108	.33485	.32884	.32305	.31745	.31205	.30683
890	410.25	27.92	.37250	.36515	.35810	.35131	.34476	.33847	.33240	.32654	.32089	.31542	.31015
900	414.69	28.22	.37647	.36905	.36191	.35506	.34845	.34209	.33595	.33003	.32432	.31880	.31347
910	419.14	28.52	.38044	.37295	.36574	.35881	.35213	.34571	.33950	.33352	.32775	.32217	.31678
920	423.58	28.82	.38441	.37685	.36957	.36256	.35581	.34932	.34305	.33702	.33118	.32555	.32010
930	428.03	29.13	.38839	.38074	.37339	.36630	.35950	.35293	.34661	.34050	.33461	.32892	.32342
940	432.47	29.43	.39236	.38463	.37720	.37005	.36318	.35655	.35015	.34399	.33804	.33229	.32674
950	436.91	29.73	.39633	.38853	.38102	.37381	.36685	.36016	.35370	.34747	.34147	.33566	.33005
960	441.36	30.03	.40030	.39241	.38484	.37755	.37053	.36377	.35726	.35096	.34489	.33903	.33336
970	445.80	30.33	.40426	.39630	.38865	.38129	.37421	.36738	.36080	.35445	.34832	.34240	.33668
980	450.25	30.64	.40822	.40019	.39247	.38504	.37788	.37099	.36435	.35793	.35175	.34577	.33999
990	454.69	30.94	.41219	.40408	.39628	.38877	.38155	.37460	.36789	.36142	.35517	.34913	.34330
1000	459.14	31.24	.41615	.40796	.40009	.39252	.38523	.37820	.37143	.36490	.35859	.35250	.34661
1050	481.36	32.75	.43595	.42738	.41914	.41121	.40357	.39623	.38913	.38229	.37569	.36931	.36314
1100	503.58	34.27	.45571	.44676	.43815	.42984	.42190	.41422	.40681	.39966	.39277	.38610	.37966
1150	525.80	35.78	.47544	.46611	.45715	.44851	.44020	.43219	.42447	.41701	.40983	.40287	.39616
1200	548.02	37.29	.49515	.48544	.47610	.46712	.45846	.45013	.44210	.43434	.42685	.41963	.41264
1250	570.25	38.80	.51482	.50473	.49503	.48569	.47671	.46805	.45970	.45164	.44386	.43635	.42908
1300	592.47	40.31	.53445	.52399	.51393	.50425	.49493	.48594	.47727	.46892	.46085	.45305	.44552
1350	614.69	41.83	.55406	.54322	.53281	.52277	.51311	.50381	.49483	.48618	.47782	.46974	.46193
1400	636.91	43.34	.57365	.56243	.55164	.54126	.53128	.52165	.51237	.50340	.49476	.48640	.47832
1450	659.13	44.85	.59319	.58160	.57047	.55973	.54942	.53947	.52987	.52061	.51168	.50303	.49469
1500	681.36	46.36	.61270	.60075	.58925	.57819	.56753	.55726	.54736	.53780	.52856	.51966	.51103

	500	34.02	.45253	.44364	.43510	.42686	.41896	.41132	.40397	.39688	.39002	.38340	.37700
	600	40.83	.54111	.53051	.52033	.51052	.50109	.49200	.48323	.47477	.46660	.45872	.45109
	700	47.63	.62905	.61679	.60498	.59363	.58270	.57217	.56200	.55219	.54272	.53357	.52473
	800	54.44	.71639	.70248	.68908	.67626	.66379	.65182	.64029	.62915	.61839	.60800	.59795
	900	61.24	.80313	.78750	.77261	.75821	.74435	.73098	.71808	.70563	.69361	.68200	.67075
	1000	68.05	.88925	.87209	.85559	.83970	.82439	.80964	.79540	.78166	.76839	.75555	.74316
	1100	74.85	.97480	.95606	.93803	.92065	.90393	.88781	.87226	.85723	.84272	.82868	.81513
	1200	81.65	1.05975	1.03946	1.01991	1.00111	.98298	.96549	.94862	.93235	.91661	.90141	.88671
	1300	88.46	1.14413	1.12229	1.10127	1.08102	1.06152	1.04271	1.02454	1.00702	.99009	.97372	.95788
	1400	95.26	1.2280	1.2046	1.1821	1.1604	1.1396	1.1195	1.1000	1.0813	1.0631	1.0456	1.0287
	1500	102.07	1.3112	1.2863	1.2624	1.2394	1.2172	1.1957	1.1750	1.1551	1.1358	1.1171	1.0990
	1600	108.87	1.3939	1.3676	1.3422	1.3178	1.2942	1.2715	1.2496	1.2285	1.2080	1.1882	1.1690
	1700	115.68	1.4761	1.4482	1.4215	1.3958	1.3709	1.3469	1.3238	1.3014	1.2798	1.2589	1.2387
	1800	122.48	1.5577	1.5284	1.5003	1.4732	1.4470	1.4218	1.3975	1.3739	1.3511	1.3292	1.3079
	1900	129.29	1.6388	1.6081	1.5786	1.5502	1.5227	1.4963	1.4707	1.4460	1.4222	1.3991	1.3767
	2000	136.09	1.7193	1.6873	1.6565	1.6267	1.5980	1.5703	1.5436	1.5178	1.4927	1.4686	1.4453
	2100	142.90	1.7994	1.7659	1.7337	1.7027	1.6728	1.6439	1.6160	1.5890	1.5630	1.5378	1.5133
	2200	149.70	1.8789	1.8441	1.8106	1.7783	1.7471	1.7171	1.6880	1.6600	1.6328	1.6065	1.5811
	2300	156.51	1.9579	1.9218	1.8870	1.8534	1.8211	1.7898	1.7596	1.7305	1.7023	1.6750	1.6485
	2400	163.31	2.0365	1.9990	1.9629	1.9281	1.8946	1.8622	1.8309	1.8006	1.7713	1.7430	1.7155
	2500	170.11	2.1145	2.0758	2.0386	2.0023	1.9676	1.9340	1.9016	1.8703	1.8400	1.8107	1.7822
	2600	176.92	2.1921	2.1520	2.1134	2.0762	2.0402	2.0055	1.9720	1.9397	1.9083	1.8779	1.8486
	2700	183.72	2.2691	2.2277	2.1879	2.1495	2.1125	2.0766	2.0421	2.0086	1.9762	1.9450	1.9146
	2800	190.53	2.3457	2.3032	2.2621	2.2225	2.1843	2.1473	2.1117	2.0772	2.0439	2.0115	1.9803
	2900	197.33	2.4219	2.3781	2.3357	2.2951	2.2557	2.2177	2.1809	2.1455	2.1111	2.0778	2.0456
	3000	204.14	2.4976	2.4525	2.4090	2.3672	2.3267	2.2876	2.2499	2.2133	2.1780	2.1437	2.1106
	3100	210.94	2.5728	2.5264	2.4819	2.4389	2.3973	2.3571	2.3183	2.2808	2.2444	2.2093	2.1753
	3200	217.75	2.6475	2.6000	2.5543	2.5102	2.4674	2.4263	2.3865	2.3480	2.3106	2.2746	2.2395
	3300	224.55	2.7218	2.6732	2.6263	2.5810	2.5373	2.4950	2.4543	2.4147	2.3765	2.3395	2.3035
	3400	231.36	2.7957	2.7460	2.6979	2.6515	2.6067	2.5635	2.5216	2.4811	2.4420	2.4041	2.3672
	3500	238.16	2.8691	2.8181	2.7690	2.7216	2.6758	2.6315	2.5886	2.5473	2.5071	2.4683	2.4307
	3600	244.96	2.9422	2.8901	2.8398	2.7913	2.7445	2.6992	2.6554	2.6130	2.5720	2.5322	2.4938
	3700	251.77	3.0148	2.9616	2.9102	2.8606	2.8128	2.7665	2.7218	2.6784	2.6365	2.5959	2.5565
	3800	258.57	3.0869	3.0326	2.9801	2.9296	2.8807	2.8334	2.7877	2.7434	2.7006	2.6591	2.6190
	3900	265.38	3.1587	3.1033	3.0498	2.9982	2.9483	2.9001	2.8533	2.8083	2.7645	2.7222	2.6811
	4000	272.18	3.2300	3.1735	3.1190	3.0664	3.0154	2.9663	2.9187	2.8727	2.8281	2.7848	2.7430
	4100	278.99	3.3010	3.2434	3.1879	3.1342	3.0824	3.0323	2.9838	2.9367	2.8912	2.8472	2.8046
	4200	285.79	3.3715	3.3130	3.2563	3.2017	3.1488	3.0978	3.0483	3.0005	2.9542	2.9093	2.8658
	4300	292.60	3.4417	3.3821	3.3244	3.2688	3.2150	3.1630	3.1127	3.0640	3.0168	2.9711	2.9267
	4400	299.40	3.5115	3.4508	3.3922	3.3356	3.2809	3.2280	3.1767	3.1271	3.0791	3.0325	2.9875
	4500	306.21	3.5809	3.5191	3.4595	3.4019	3.3464	3.2925	3.2404	3.1899	3.1410	3.0937	3.0479
	4600	313.01	3.6499	3.5871	3.5266	3.4680	3.4114	3.3568	3.3039	3.2524	3.2028	3.1547	3.1080
	4700	319.81	3.7185	3.6548	3.5933	3.5338	3.4763	3.4206	3.3669	3.3147	3.2642	3.2153	3.1677
	4800	326.62	3.7867	3.7221	3.6595	3.5991	3.5408	3.4844	3.4296	3.3766	3.3254	3.2755	3.2274
	4900	333.42	3.8547	3.7889	3.7255	3.6642	3.6049	3.5476	3.4921	3.4383	3.3861	3.3356	3.2866
	5000	340.23	3.9221	3.8555	3.7911	3.7290	3.6688	3.6105	3.5541	3.4995	3.4467	3.3955	3.3457

SP. VOL.

T-76

3 % O_2, 97 % He

SPECIFIC VOLUME,CUBIC FT/LB

.030 OXYGEN .970 HELIUM AVERAGE MOLECULAR WEIGHT 4.843

DEPTH	PRESSURE		TEMPERATURE,F									
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	73.875	75.382	76.891	78.399	79.906	81.415	82.923	84.430	85.939	87.445	88.954
10	19.14	1.30	56.730	57.889	59.046	60.203	61.361	62.518	63.677	64.835	65.992	67.151	68.308
20	23.58	1.60	46.047	46.987	47.927	48.866	49.806	50.745	51.686	52.625	53.564	54.504	55.443
30	28.03	1.91	38.753	39.543	40.334	41.124	41.914	42.706	43.496	44.286	45.077	45.868	46.658
40	32.47	2.21	33.454	34.137	34.819	35.501	36.183	36.866	37.549	38.231	38.913	39.595	40.278
50	36.92	2.51	29.431	30.032	30.632	31.232	31.832	32.433	33.033	33.633	34.233	34.833	35.434
60	41.36	2.81	26.273	26.809	27.345	27.881	28.417	28.952	29.488	30.024	30.559	31.095	31.631
70	45.81	3.12	23.728	24.212	24.696	25.180	25.663	26.147	26.630	27.114	27.598	28.082	28.566
80	50.25	3.42	21.633	22.074	22.515	22.956	23.397	23.838	24.278	24.719	25.160	25.602	26.043
90	54.70	3.72	19.878	20.283	20.689	21.094	21.499	21.904	22.309	22.714	23.119	23.524	23.930
100	59.14	4.02	18.387	18.762	19.137	19.511	19.886	20.261	20.635	21.010	21.385	21.759	22.134
110	63.58	4.33	17.105	17.453	17.802	18.151	18.499	18.848	19.196	19.544	19.893	20.242	20.590
120	68.03	4.63	15.990	16.316	16.642	16.967	17.293	17.619	17.944	18.270	18.596	18.922	19.247
130	72.47	4.93	15.012	15.318	15.623	15.924	16.235	16.541	16.846	17.152	17.458	17.764	18.069
140	76.92	5.23	14.147	14.435	14.723	15.011	15.299	15.587	15.875	16.163	16.451	16.739	17.027
150	81.36	5.54	13.376	13.649	13.921	14.193	14.466	14.738	15.010	15.283	15.555	15.827	16.100
160	85.81	5.84	12.685	12.944	13.202	13.460	13.718	13.977	14.235	14.493	14.751	15.009	15.268
170	90.25	6.14	12.063	12.308	12.554	12.799	13.045	13.290	13.536	13.781	14.027	14.272	14.518
180	94.70	6.44	11.499	11.732	11.966	12.200	12.434	12.668	12.902	13.136	13.370	13.604	13.838
190	99.14	6.75	10.985	11.208	11.432	11.655	11.879	12.102	12.326	12.549	12.773	12.996	13.220
200	103.58	7.05	10.515	10.729	10.943	11.157	11.371	11.585	11.798	12.012	12.226	12.440	12.654
210	108.03	7.35	10.084	10.289	10.494	10.699	10.904	11.110	11.315	11.520	11.725	11.930	12.135
220	112.47	7.65	9.6874	9.8842	10.0812	10.2782	10.4752	10.6722	10.8691	11.0663	11.2631	11.4602	11.6570
230	116.92	7.96	9.3206	9.5100	9.6995	9.8891	10.0786	10.2681	10.4576	10.6470	10.8364	11.0260	11.2154
240	121.36	8.26	8.9807	9.1631	9.3458	9.5284	9.7108	9.8934	10.0759	10.2584	10.4412	10.6236	10.8061
250	125.81	8.56	8.6648	8.8408	9.0170	9.1930	9.3692	9.5453	9.7215	9.8976	10.0736	10.2497	10.4257
260	130.25	8.86	8.3704	8.5407	8.7107	8.8807	9.0509	9.2211	9.3910	9.5611	9.7312	9.9012	10.0713
270	134.69	9.17	8.0957	8.2602	8.4246	8.5890	8.7536	8.9180	9.0825	9.2471	9.4113	9.5758	9.7405
280	139.14	9.47	7.8383	7.9976	8.1568	8.3160	8.4751	8.6345	8.7936	8.9529	9.1121	9.2714	9.4306
290	143.58	9.77	7.5969	7.7512	7.9056	8.0598	8.2141	8.3683	8.5227	8.6769	8.8312	8.9856	9.1399
300	148.03	10.07	7.3700	7.5197	7.6694	7.8191	7.9687	8.1183	8.2679	8.4177	8.5672	8.7169	8.8666
310	152.47	10.38	7.1563	7.3017	7.4470	7.5922	7.7374	7.8829	8.0282	8.1734	8.3188	8.4639	8.6093
320	156.92	10.68	6.9548	7.0960	7.2372	7.3783	7.5195	7.6607	7.8018	7.9431	8.0842	8.2253	8.3665
330	161.36	10.98	6.7643	6.9016	7.0388	7.1762	7.3135	7.4508	7.5881	7.7254	7.8626	8.0000	8.1371
340	165.81	11.28	6.5841	6.7176	6.8512	6.9849	7.1186	7.2520	7.3857	7.5193	7.6528	7.7866	7.9201
350	170.25	11.58	6.4132	6.5433	6.6734	6.8036	6.9337	7.0638	7.1940	7.3241	7.4542	7.5843	7.7143
360	174.69	11.89	6.2510	6.3778	6.5046	6.6316	6.7583	6.8852	7.0119	7.1387	7.2655	7.3923	7.5190
370	179.14	12.19	6.0970	6.2206	6.3442	6.4679	6.5917	6.7153	6.8390	6.9625	7.0862	7.2098	7.3334
380	183.58	12.49	5.9503	6.0709	6.1916	6.3123	6.4329	6.5537	6.6743	6.7950	6.9157	7.0362	7.1568
390	188.03	12.79	5.8106	5.9284	6.0462	6.1641	6.2819	6.3996	6.5175	6.6353	6.7531	6.8710	6.9886
400	192.47	13.10	5.6773	5.7925	5.9075	6.0227	6.1378	6.2528	6.3679	6.4831	6.5980	6.7132	6.8283
410	196.92	13.40	5.5501	5.6627	5.7751	5.8877	6.0000	6.1125	6.2251	6.3376	6.4500	6.5625	6.6750
420	201.36	13.70	5.4285	5.5385	5.6495	5.7585	5.8685	5.9785	6.0885	6.1985	6.3086	6.4185	6.5286
430	205.81	14.00	5.3121	5.4198	5.5274	5.6350	5.7427	5.8503	5.9580	6.0656	6.1732	6.2807	6.3884
440	210.25	14.31	5.2007	5.3060	5.4114	5.5167	5.6222	5.7274	5.8328	5.9381	6.0435	6.1488	6.2542
450	214.69	14.61	5.0938	5.1970	5.3002	5.4034	5.5065	5.6097	5.7129	5.8160	5.9191	6.0224	6.1255
460	219.14	14.91	4.9913	5.0924	5.1935	5.2946	5.3957	5.4967	5.5978	5.6989	5.8000	5.9010	6.0021
470	223.58	15.21	4.8929	4.9920	5.0911	5.1902	5.2892	5.3882	5.4872	5.5863	5.6854	5.7845	5.8835
480	228.03	15.52	4.7983	4.8954	4.9926	5.0897	5.1868	5.2841	5.3811	5.4783	5.5753	5.6725	5.7696
490	232.47	15.82	4.7073	4.8026	4.8979	4.9931	5.0884	5.1837	5.2789	5.3743	5.4696	5.5648	5.6600
500	236.92	16.12	4.6197	4.7132	4.8068	4.9002	4.9938	5.0873	5.1807	5.2742	5.3677	5.4611	5.5546
510	241.36	16.42	4.5354	4.6272	4.7189	4.8108	4.9026	4.9942	5.0860	5.1778	5.2695	5.3614	5.4530
520	245.80	16.73	4.4541	4.5442	4.6343	4.7245	4.8146	4.9047	4.9948	5.0849	5.1749	5.2651	5.3551
530	250.25	17.03	4.3758	4.4642	4.5527	4.6412	4.7298	4.8183	4.9067	4.9952	5.0838	5.1723	5.2608
540	254.69	17.33	4.3001	4.3870	4.4740	4.5609	4.6480	4.7349	4.8219	4.9088	4.9958	5.0827	5.1697
550	259.14	17.63	4.2270	4.3124	4.3979	4.4834	4.5689	4.6544	4.7398	4.8253	4.9107	4.9962	5.0817
560	263.58	17.94	4.1564	4.2405	4.3244	4.4085	4.4925	4.5765	4.6606	4.7445	4.8285	4.9125	4.9967
570	268.03	18.24	4.0881	4.1708	4.2534	4.3361	4.4187	4.5013	4.5839	4.6666	4.7492	4.8318	4.9144
580	272.47	18.54	4.0221	4.1034	4.1847	4.2660	4.3472	4.4285	4.5098	4.5911	4.6724	4.7536	4.8349
590	276.92	18.84	3.9582	4.0382	4.1182	4.1981	4.2781	4.3581	4.4380	4.5181	4.5980	4.6780	4.7579
600	281.36	19.15	3.8963	3.9750	4.0537	4.1324	4.2112	4.2899	4.3686	4.4473	4.5259	4.6047	4.6834
610	285.80	19.45	3.8363	3.9138	3.9913	4.0688	4.1462	4.2237	4.3012	4.3787	4.4562	4.5336	4.6111
620	290.25	19.75	3.7781	3.8545	3.9308	4.0071	4.0834	4.1597	4.2360	4.3123	4.3886	4.4648	4.5411
630	294.69	20.05	3.7218	3.7969	3.8721	3.9473	4.0224	4.0975	4.1727	4.2478	4.3230	4.3982	4.4732
640	299.14	20.36	3.6671	3.7411	3.8152	3.8892	3.9633	4.0373	4.1113	4.1853	4.2594	4.3334	4.4075
650	303.58	20.66	3.6140	3.6869	3.7599	3.8328	3.9058	3.9788	4.0517	4.1246	4.1976	4.2705	4.3434
660	308.03	20.96	3.5624	3.6343	3.7062	3.7781	3.8500	3.9219	3.9938	4.0657	4.1376	4.2094	4.2813
670	312.47	21.26	3.5123	3.5832	3.6540	3.7249	3.7958	3.8667	3.9375	4.0085	4.0792	4.1501	4.2209
680	316.92	21.56	3.4635	3.5335	3.6033	3.6733	3.7431	3.8130	3.8828	3.9528	4.0227	4.0924	4.1624
690	321.36	21.87	3.4163	3.4851	3.5541	3.6229	3.6919	3.7608	3.8297	3.8986	3.9675	4.0364	4.1053
700	325.80	22.17	3.3702	3.4381	3.5061	3.5741	3.6421	3.7100	3.7780	3.8460	3.9139	3.9819	4.0499
710	330.25	22.47	3.3253	3.3924	3.4595	3.5265	3.5936	3.6606	3.7277	3.7947	3.8617	3.9288	3.9959
720	334.69	22.77	3.2817	3.3479	3.4141	3.4802	3.5464	3.6126	3.6787	3.7448	3.8111	3.8772	3.9434
730	339.14	23.08	3.2392	3.3045	3.3698	3.4352	3.5005	3.5657	3.6310	3.6963	3.7615	3.8268	3.8922
740	343.58	23.38	3.1979	3.2623	3.3268	3.3913	3.4556	3.5201	3.5845	3.6490	3.7134	3.7778	3.8423
750	348.03	23.68	3.1575	3.2212	3.2848	3.3484	3.4120	3.4756	3.5393	3.6029	3.6665	3.7302	3.7937
760	352.47	23.98	3.1182	3.1811	3.2439	3.3067	3.3695	3.4323	3.4951	3.5580	3.6208	3.6836	3.7464
770	356.91	24.29	3.0798	3.1419	3.2040	3.2660	3.3281	3.3900	3.4522	3.5141	3.5762	3.6382	3.7002
780	361.36	24.59	3.0424	3.1038	3.1651	3.2263	3.2876	3.3489	3.4101	3.4715	3.5327	3.5939	3.6552
790	365.80	24.89	3.0059	3.0665	3.1270	3.1876	3.2481	3.3087	3.3692	3.4297	3.4902	3.5507	3.6112

T-77

SP. VOL.
3 % O_2, 97 % He

SPECIFIC VOLUME,CUBIC FT/LB

.030 OXYGEN .970 HELIUM AVERAGE MOLECULAR WEIGHT 4.843

DEPTH	PRESSURE		TEMPERATURE,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
800	370.25	25.19	2.9704	3.0302	3.0900	3.1498	3.2097	3.2694	3.3292	3.3890	3.4488	3.5086	3.5684
810	374.69	25.50	2.9356	2.9947	3.0538	3.1129	3.1720	3.2311	3.2902	3.3493	3.4084	3.4675	3.5265
820	379.14	25.80	2.9017	2.9601	3.0185	3.0769	3.1353	3.1937	3.2521	3.3105	3.3689	3.4273	3.4856
830	383.58	26.10	2.8685	2.9262	2.9840	3.0417	3.0994	3.1572	3.2148	3.2726	3.3303	3.3880	3.4457
840	388.03	26.40	2.8361	2.8932	2.9502	3.0073	3.0643	3.1214	3.1785	3.2356	3.2926	3.3496	3.4067
850	392.47	26.71	2.8045	2.8608	2.9173	2.9737	3.0301	3.0865	3.1429	3.1993	3.2558	3.3121	3.3686
860	396.91	27.01	2.7735	2.8293	2.8851	2.9408	2.9966	3.0524	3.1082	3.1639	3.2197	3.2755	3.3313
870	401.36	27.31	2.7432	2.7984	2.8536	2.9087	2.9639	3.0190	3.0742	3.1294	3.1845	3.2396	3.2948
880	405.80	27.61	2.7136	2.7681	2.8227	2.8773	2.9318	2.9864	3.0410	3.0955	3.1501	3.2046	3.2592
890	410.25	27.92	2.6846	2.7386	2.7926	2.8466	2.9005	2.9545	3.0084	3.0624	3.1164	3.1703	3.2243
900	414.69	28.22	2.6562	2.7096	2.7631	2.8164	2.8698	2.9232	2.9766	3.0300	3.0834	3.1368	3.1901
910	419.14	28.52	2.6285	2.6813	2.7342	2.7870	2.8398	2.8926	2.9455	2.9983	3.0511	3.1039	3.1567
920	423.58	28.82	2.6014	2.6536	2.7059	2.7582	2.8105	2.8627	2.9150	2.9672	3.0195	3.0717	3.1240
930	428.03	29.13	2.5748	2.6265	2.6782	2.7300	2.7816	2.8334	2.8851	2.9368	2.9886	3.0402	3.0920
940	432.47	29.43	2.5487	2.5999	2.6511	2.7023	2.7535	2.8047	2.8559	2.9070	2.9582	3.0095	3.0606
950	436.91	29.73	2.5232	2.5738	2.6245	2.6752	2.7259	2.7766	2.8272	2.8779	2.9285	2.9792	3.0298
960	441.36	30.03	2.4981	2.5484	2.5985	2.6487	2.6989	2.7490	2.7991	2.8493	2.8995	2.9496	2.9997
970	445.80	30.33	2.4737	2.5233	2.5730	2.6227	2.6723	2.7220	2.7716	2.8213	2.8709	2.9206	2.9702
980	450.25	30.64	2.4496	2.4988	2.5480	2.5972	2.6463	2.6955	2.7446	2.7939	2.8430	2.8921	2.9413
990	454.69	30.94	2.4261	2.4748	2.5235	2.5722	2.6209	2.6695	2.7182	2.7669	2.8155	2.8642	2.9129
1000	459.14	31.24	2.4030	2.4512	2.4994	2.5476	2.5958	2.6441	2.6923	2.7405	2.7887	2.8369	2.8851
1050	481.36	32.75	2.2939	2.3399	2.3858	2.4318	2.4779	2.5238	2.5698	2.6158	2.6618	2.7077	2.7537
1100	503.58	34.27	2.1944	2.2383	2.2823	2.3263	2.3702	2.4142	2.4581	2.5021	2.5460	2.5900	2.6339
1150	525.80	35.78	2.1033	2.1454	2.1875	2.2296	2.2717	2.3138	2.3559	2.3980	2.4401	2.4822	2.5242
1200	548.02	37.29	2.0196	2.0600	2.1004	2.1408	2.1812	2.2216	2.2619	2.3023	2.3427	2.3831	2.4234
1250	570.25	38.80	1.9424	1.9812	2.0201	2.0589	2.0977	2.1365	2.1753	2.2141	2.2530	2.2917	2.3306
1300	592.47	40.31	1.8711	1.9084	1.9458	1.9832	2.0205	2.0578	2.0952	2.1326	2.1699	2.2073	2.2446
1350	614.69	41.83	1.8049	1.8409	1.8769	1.9129	1.9489	1.9849	2.0209	2.0569	2.0929	2.1288	2.1648
1400	636.91	43.34	1.7432	1.7780	1.8128	1.8475	1.8823	1.9170	1.9517	1.9865	2.0212	2.0559	2.0906
1450	659.13	44.85	1.6858	1.7194	1.7529	1.7866	1.8201	1.8537	1.8872	1.9208	1.9544	1.9879	2.0215
1500	681.36	46.36	1.6321	1.6646	1.6971	1.7295	1.7620	1.7945	1.8270	1.8594	1.8919	1.9243	1.9568
	500	34.02	2.2098	2.2541	2.2983	2.3427	2.3869	2.4312	2.4754	2.5197	2.5640	2.6082	2.6525
	600	40.83	1.8481	1.8850	1.9219	1.9588	1.9956	2.0325	2.0694	2.1063	2.1432	2.1800	2.2169
	700	47.63	1.5897	1.6213	1.6529	1.6846	1.7161	1.7477	1.7793	1.8110	1.8426	1.8742	1.9058
	800	54.44	1.3959	1.4235	1.4512	1.4789	1.5065	1.5342	1.5618	1.5894	1.6171	1.6447	1.6724
	900	61.24	1.2451	1.2697	1.2943	1.3189	1.3435	1.3680	1.3926	1.4172	1.4417	1.4663	1.4909
	1000	68.05	1.1245	1.1467	1.1688	1.1909	1.2130	1.2351	1.2572	1.2793	1.3014	1.3235	1.3456
	1100	74.85	1.0259	1.0460	1.0661	1.0862	1.1063	1.1264	1.1465	1.1665	1.1866	1.2067	1.2268
	1200	81.65	.94362	.96204	.98048	.99889	1.01732	1.03574	1.05416	1.07256	1.09098	1.10937	1.12777
	1300	88.46	.87403	.89103	.90804	.92505	.94205	.95904	.97605	.99303	1.01001	1.02699	1.04397
	1400	95.26	.81435	.83016	.84596	.86174	.87753	.89329	.90907	.92484	.94061	.95638	.97214
	1500	102.07	.76264	.77741	.79214	.80687	.82158	.83631	.85104	.86574	.88046	.89518	.90989
	1600	108.87	.71740	.73121	.74503	.75886	.77265	.78646	.80024	.81402	.82782	.84163	.85540
	1700	115.68	.67747	.69049	.70347	.71646	.72945	.74245	.75542	.76840	.78139	.79435	.80733
	1800	122.48	.64199	.65426	.66653	.67880	.69108	.70333	.71558	.72784	.74011	.75235	.76461
	1900	129.29	.61020	.62184	.63348	.64508	.65672	.66832	.67994	.69155	.70314	.71474	.72635
	2000	136.09	.58163	.59267	.60370	.61476	.62579	.63682	.64786	.65886	.66991	.68093	.69192
	2100	142.90	.55575	.56627	.57679	.58730	.59781	.60832	.61880	.62932	.63980	.65030	.66080
	2200	149.70	.53222	.54227	.55229	.56233	.57237	.58238	.59242	.60243	.61244	.62245	.63248
	2300	156.51	.51074	.52034	.52995	.53954	.54912	.55872	.56830	.57787	.58745	.59703	.60662
	2400	163.31	.49105	.50025	.50945	.51864	.52783	.53701	.54619	.55537	.56455	.57373	.58291
	2500	170.11	.47293	.48175	.49059	.49942	.50824	.51706	.52587	.53466	.54347	.55229	.56110
	2600	176.92	.45619	.46468	.47318	.48165	.49014	.49862	.50710	.51555	.52402	.53250	.54095
	2700	183.72	.44070	.44889	.45706	.46522	.47338	.48155	.48969	.49785	.50601	.51415	.52231
	2800	190.53	.42630	.43418	.44207	.44994	.45781	.46569	.47355	.48142	.48927	.49713	.50497
	2900	197.33	.41290	.42051	.42813	.43572	.44332	.45091	.45852	.46610	.47370	.48127	.48886
	3000	204.14	.40039	.40775	.41510	.42244	.42979	.43714	.44447	.45182	.45914	.46648	.47380
	3100	210.94	.38868	.39582	.40292	.41002	.41714	.42425	.43135	.43844	.44555	.45263	.45971
	3200	217.75	.37771	.38461	.39149	.39838	.40528	.41215	.41903	.42590	.43278	.43964	.44652
	3300	224.55	.36740	.37408	.38076	.38744	.39412	.40080	.40745	.41413	.42079	.42744	.43411
	3400	231.36	.35769	.36417	.37066	.37715	.38363	.39010	.39658	.40304	.40951	.41596	.42243
	3500	238.16	.34854	.35485	.36114	.36743	.37372	.38001	.38630	.39257	.39887	.40514	.41140
	3600	244.96	.33989	.34601	.35214	.35826	.36437	.37048	.37658	.38270	.38880	.39491	.40100
	3700	251.77	.33170	.33766	.34362	.34957	.35552	.36147	.36741	.37335	.37929	.38522	.39116
	3800	258.57	.32394	.32975	.33556	.34135	.34714	.35293	.35871	.36451	.37029	.37606	.38183
	3900	265.38	.31659	.32223	.32789	.33354	.33918	.34481	.35047	.35609	.36173	.36735	.37299
	4000	272.18	.30960	.31511	.32061	.32612	.33163	.33712	.34262	.34810	.35359	.35909	.36457
	4100	278.99	.30293	.30831	.31369	.31906	.32442	.32978	.33515	.34052	.34587	.35122	.35656
	4200	285.79	.29660	.30184	.30710	.31233	.31758	.32281	.32805	.33328	.33851	.34373	.34894
	4300	292.60	.29055	.29568	.30081	.30592	.31104	.31615	.32127	.32637	.33148	.33658	.34168
	4400	299.40	.28478	.28979	.29479	.29980	.30479	.30979	.31479	.31978	.32477	.32976	.33473
	4500	306.21	.27926	.28416	.28906	.29395	.29883	.30372	.30861	.31349	.31837	.32324	.32810
	4600	313.01	.27398	.27878	.28356	.28835	.29314	.29791	.30268	.30746	.31222	.31699	.32175
	4700	319.81	.26892	.27361	.27830	.28299	.28766	.29234	.29701	.30168	.30635	.31102	.31568
	4800	326.62	.26408	.26866	.27326	.27784	.28242	.28700	.29158	.29616	.30072	.30529	.30985
	4900	333.42	.25942	.26393	.26847	.27291	.27740	.28188	.28636	.29084	.29532	.29979	.30427
	5000	340.23	.25496	.25937	.26378	.26817	.27257	.27697	.28136	.28575	.29013	.29451	.29889

0.030 OXYGEN 0.970 HELIUM
ENTHALPY,BTU/LB

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	519.60	540.45	561.29	582.15	603.00	623.85
30.00	519.68	540.54	561.38	582.24	603.09	623.94
50.00	519.79	540.65	561.50	582.36	603.22	624.07
100.00	520.07	540.93	561.79	582.66	603.52	624.37
200.00	520.60	541.48	562.35	583.24	604.11	624.97
300.00	521.13	542.02	562.91	583.82	604.70	625.58
400.00	521.67	542.57	563.48	584.41	605.30	626.18
500.00	522.20	543.12	564.04	584.99	605.89	626.79
1000.00	524.81	545.84	566.85	587.83	608.82	629.76
2000.00	530.06	551.28	572.47	593.59	614.64	635.68
3000.00	535.30	556.69	578.09	599.34	620.48	641.55
4000.00	541.00	562.46	583.88	605.25	626.50	647.73
5000.00	546.67	568.08	589.50	611.08	632.34	653.73

0.030 OXYGEN 0.970 HELIUM
CV,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.632	.632	.632	.632	.632	.632
30.00	.632	.632	.632	.632	.632	.632
50.00	.632	.632	.632	.632	.632	.632
100.00	.632	.632	.632	.632	.632	.632
200.00	.632	.632	.632	.632	.632	.632
300.00	.632	.632	.632	.632	.632	.632
400.00	.632	.632	.632	.632	.632	.632
500.00	.632	.632	.632	.632	.632	.632
1000.00	.632	.632	.632	.632	.632	.632
2000.00	.634	.634	.634	.632	.632	.632
3000.00	.637	.637	.637	.635	.635	.635
4000.00						
5000.00						

0.030 OXYGEN 0.970 HELIUM
ENTROPY,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	5.7320	5.7738	5.8139	5.8526	5.8898	5.9258
30.00	5.6213	5.6630	5.7031	5.7418	5.7791	5.8150
50.00	5.4765	5.5182	5.5583	5.5970	5.6343	5.6702
100.00	5.1252	5.1669	5.2071	5.2457	5.2831	5.3190
200.00	4.9398	4.9816	5.0218	5.0605	5.0978	5.1338
300.00	4.7545	4.7963	4.8365	4.8752	4.9126	4.9486
400.00	4.5691	4.6110	4.6513	4.6900	4.7273	4.7634
500.00	4.3838	4.4257	4.4660	4.5048	4.5421	4.5782
1000.00	4.0165	4.0586	4.0991	4.1380	4.1755	4.2116
2000.00	3.7272	3.8081	3.8104	3.8490	3.8514	3.9236
3000.00	3.5334	3.5762	3.6172	3.6570	3.6945	3.7311
4000.00	3.4126	3.4556	3.4968	3.5362	3.5737	3.6105
5000.00	3.3181	3.3611	3.4023	3.4421	3.4807	3.5169

0.030 OXYGEN 0.970 HELIUM
THERMAL CONDUCTIVITY,BTU/SEC FT F
(MULTIPLY TABLE ENTRY BY .0000100)

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	2.10	2.16	2.22	2.28	2.34	2.40
30.00						
50.00						
100.00						
200.00						
300.00						
400.00						
500.00						
1000.00						
2000.00						
3000.00						
4000.00						
5000.00						

0.030 OXYGEN 0.970 HELIUM
CP,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.0431	1.0431	1.0432	1.0433	1.0434	1.0435
30.00	1.0432	1.0432	1.0433	1.0434	1.0435	1.0436
50.00	1.0434	1.0434	1.0435	1.0435	1.0436	1.0437
100.00	1.0439	1.0438	1.0438	1.0439	1.0440	1.0440
200.00	1.0448	1.0446	1.0446	1.0446	1.0446	1.0446
300.00	1.0457	1.0455	1.0453	1.0452	1.0453	1.0451
400.00	1.0466	1.0463	1.0461	1.0459	1.0457	1.0457
500.00	1.0476	1.0472	1.0469	1.0466	1.0465	1.0463
1000.00	1.0524	1.0515	1.0507	1.0502	1.0496	1.0492
2000.00	1.061	1.061	1.061	1.059	1.059	1.057
3000.00	1.072	1.067	1.065	1.063	1.053	1.061
4000.00	1.074	1.069	1.065	1.063	1.063	1.063
5000.00						

0.030 OXYGEN 0.970 HELIUM
PRANDTL NUMBER

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.64	.64	.64	.64	.64	.64
30.00						
50.00						
100.00						
200.00						
300.00						
400.00						
500.00						
1000.00						
2000.00						
3000.00						
4000.00						
5000.00						

3 % O_2, 97 % He

0.030 OXYGEN 0.970 HELIUM
CP/CV

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.652	1.652	1.652	1.652	1.652	1.651
30.00	1.652	1.652	1.652	1.652	1.652	1.651
50.00	1.652	1.652	1.652	1.652	1.652	1.651
100.00	1.653	1.653	1.653	1.653	1.653	1.652
200.00	1.654	1.654	1.654	1.653	1.653	1.653
300.00	1.656	1.655	1.655	1.654	1.654	1.654
400.00	1.657	1.656	1.656	1.655	1.655	1.655
500.00	1.658	1.657	1.657	1.656	1.656	1.656
1000.00	1.665	1.663	1.662	1.661	1.660	1.659
2000.00	1.67	1.67	1.67	1.67	1.67	1.67
3000.00	1.68	1.68	1.67	1.67	1.67	1.67
4000.00						
5000.00						

0.030 OXYGEN 0.970 HELIUM
VISCOSITY,LB/FT SEC
(MULTIPLY TABLE ENTRY BY .0000100)

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.290	1.325	1.359	1.395	1.428	1.463
30.00						
50.00						
100.00						
200.00						
300.00						
400.00						
500.00						
1000.00						
2000.00						
3000.00						
4000.00						
5000.00						

0.030 OXYGEN 0.970 HELIUM
SONIC VELOCITY FT/SEC

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	2886	2942	2999	3054	3109	3164
30.00	2888	2944	3000	3056	3111	3166
50.00	2890	2946	3003	3058	3113	3168
100.00	2896	2952	3008	3064	3118	3173
200.00	2907	2963	3019	3074	3129	3183
300.00	2919	2975	3030	3085	3139	3193
400.00	2931	2986	3041	3096	3149	3203
500.00	2942	2997	3052	3106	3160	3213
1000.00	3000	3054	3107	3160	3212	3264
2000.00	3110	3161	3212	3262	3312	3362
3000.00	3220	3268	3316	3364	3412	3460
4000.00						
5000.00						

DENSITY
1.5 % O_2, 98.5 % He

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DENSITY,LBS/CUBIC FT

.015 OXYGEN .985 HELIUM AVERAGE MOLECULAR WEIGHT 4.423

DEPTH FT	PRESSURE PSIA	PRESSURE ATM	TEMPERATURE,F 30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	.01236	.01212	.01188	.01165	.01143	.01122	.01101	.01082	.01063	.01044	.01027
10	19.14	1.30	.01610	.01578	.01547	.01517	.01488	.01461	.01434	.01409	.01386	.01360	.01337
20	23.58	1.60	.01983	.01944	.01906	.01869	.01834	.01800	.01767	.01735	.01705	.01676	.01647
30	28.03	1.91	.02357	.02310	.02264	.02221	.02179	.02139	.02100	.02062	.02026	.01991	.01957
40	32.47	2.21	.02730	.02675	.02623	.02573	.02524	.02477	.02432	.02389	.02347	.02307	.02267
50	36.92	2.51	.03103	.03041	.02982	.02924	.02869	.02816	.02765	.02715	.02668	.02622	.02577
60	41.36	2.81	.03476	.03407	.03340	.03276	.03214	.03155	.03097	.03042	.02989	.02937	.02887
70	45.81	3.12	.03849	.03772	.03698	.03627	.03559	.03493	.03430	.03368	.03309	.03252	.03197
80	50.25	3.42	.04222	.04137	.04056	.03978	.03904	.03831	.03762	.03695	.03630	.03567	.03507
90	54.70	3.72	.04594	.04503	.04415	.04330	.04248	.04170	.04094	.04021	.03950	.03882	.03817
100	59.14	4.02	.04967	.04868	.04772	.04681	.04593	.04508	.04426	.04347	.04271	.04197	.04126
110	63.58	4.33	.05339	.05233	.05130	.05032	.04937	.04846	.04758	.04673	.04591	.04512	.04436
120	68.03	4.63	.05712	.05598	.05488	.05383	.05281	.05184	.05090	.04999	.04911	.04827	.04745
130	72.47	4.93	.06084	.05962	.05846	.05733	.05626	.05522	.05421	.05325	.05231	.05141	.05055
140	76.92	5.23	.06456	.06327	.06203	.06084	.05970	.05859	.05753	.05650	.05552	.05456	.05364
150	81.36	5.54	.06828	.06692	.06561	.06435	.06314	.06197	.06085	.05976	.05872	.05771	.05673
160	85.81	5.84	.07200	.07056	.06918	.06785	.06658	.06534	.06416	.06302	.06191	.06085	.05982
170	90.25	6.14	.07571	.07420	.07275	.07136	.07001	.06872	.06747	.06627	.06511	.06399	.06291
180	94.70	6.44	.07943	.07784	.07632	.07486	.07345	.07209	.07079	.06953	.06831	.06713	.06600
190	99.14	6.75	.08314	.08149	.07989	.07836	.07689	.07547	.07410	.07278	.07151	.07028	.06909
200	103.58	7.05	.08686	.08513	.08346	.08186	.08032	.07884	.07741	.07603	.07470	.07342	.07218
210	108.03	7.35	.09057	.08876	.08703	.08536	.08376	.08221	.08072	.07928	.07790	.07656	.07526
220	112.47	7.65	.09428	.09240	.09059	.08886	.08719	.08558	.08403	.08253	.08109	.07970	.07835
230	116.92	7.96	.09799	.09604	.09416	.09236	.09062	.08895	.08734	.08578	.08428	.08283	.08143
240	121.36	8.26	.10170	.09967	.09772	.09585	.09405	.09232	.09064	.08903	.08747	.08597	.08452
250	125.81	8.56	.10540	.10331	.10129	.09935	.09748	.09568	.09395	.09228	.09067	.08911	.08760
260	130.25	8.86	.10911	.10694	.10485	.10284	.10091	.09905	.09725	.09552	.09385	.09224	.09068
270	134.69	9.17	.11282	.11057	.10841	.10633	.10434	.10241	.10056	.09877	.09704	.09538	.09377
280	139.14	9.47	.11652	.11420	.11197	.10983	.10776	.10578	.10386	.10202	.10023	.09851	.09685
290	143.58	9.77	.12022	.11783	.11553	.11332	.11119	.10914	.10716	.10526	.10342	.10164	.09993
300	148.03	10.07	.12392	.12146	.11909	.11681	.11461	.11250	.11047	.10850	.10661	.10478	.10301
310	152.47	10.38	.12762	.12509	.12264	.12030	.11804	.11586	.11377	.11174	.10979	.10791	.10609
320	156.92	10.68	.13132	.12871	.12620	.12378	.12146	.11922	.11707	.11498	.11298	.11104	.10917
330	161.36	10.98	.13502	.13234	.12975	.12727	.12488	.12258	.12036	.11823	.11616	.11417	.11224
340	165.81	11.28	.13872	.13596	.13331	.13076	.12830	.12594	.12366	.12147	.11935	.11730	.11532
350	170.25	11.58	.14241	.13958	.13686	.13424	.13172	.12930	.12696	.12470	.12253	.12042	.11839
360	174.69	11.89	.14611	.14320	.14041	.13772	.13514	.13265	.13025	.12794	.12571	.12355	.12147
370	179.14	12.19	.14980	.14682	.14396	.14121	.13856	.13601	.13355	.13118	.12889	.12668	.12454
380	183.58	12.49	.15349	.15044	.14751	.14469	.14198	.13936	.13684	.13442	.13207	.12980	.12762
390	188.03	12.79	.15718	.15406	.15106	.14817	.14539	.14272	.14014	.13765	.13525	.13293	.13069
400	192.47	13.10	.16087	.15767	.15460	.15165	.14881	.14607	.14343	.14088	.13842	.13605	.13376
410	196.92	13.40	.16456	.16129	.15815	.15513	.15222	.14942	.14672	.14412	.14160	.13918	.13683
420	201.36	13.70	.16825	.16490	.16169	.15861	.15563	.15277	.15001	.14735	.14478	.14230	.13990
430	205.81	14.00	.17193	.16852	.16524	.16208	.15904	.15612	.15330	.15058	.14796	.14542	.14297
440	210.25	14.31	.17562	.17213	.16878	.16556	.16246	.15947	.15659	.15381	.15113	.14854	.14604
450	214.69	14.61	.17930	.17574	.17232	.16903	.16586	.16282	.15988	.15704	.15430	.15166	.14911
460	219.14	14.91	.18299	.17935	.17586	.17251	.16928	.16616	.16316	.16027	.15748	.15478	.15217
470	223.58	15.21	.18667	.18296	.17940	.17598	.17268	.16951	.16645	.16350	.16065	.15790	.15524
480	228.03	15.52	.19034	.18657	.18294	.17945	.17609	.17285	.16973	.16672	.16382	.16102	.15831
490	232.47	15.82	.19402	.19017	.18648	.18292	.17950	.17620	.17301	.16995	.16699	.16413	.16137
500	236.92	16.12	.19770	.19378	.19001	.18639	.18290	.17954	.17630	.17318	.17016	.16725	.16443
510	241.36	16.42	.20138	.19738	.19355	.18986	.18630	.18288	.17958	.17640	.17333	.17036	.16750
520	245.80	16.73	.20506	.20099	.19708	.19332	.18971	.18622	.18286	.17962	.17650	.17347	.17056
530	250.25	17.03	.20873	.20459	.20061	.19679	.19311	.18956	.18614	.18285	.17966	.17659	.17362
540	254.69	17.33	.21240	.20819	.20414	.20026	.19651	.19290	.18942	.18606	.18283	.17970	.17668
550	259.14	17.63	.21607	.21179	.20768	.20372	.19991	.19624	.19270	.18929	.18599	.18281	.17974
560	263.58	17.94	.21974	.21539	.21121	.20718	.20331	.19957	.19597	.19251	.18916	.18592	.18280
570	268.03	18.24	.22341	.21899	.21474	.21064	.20670	.20291	.19925	.19573	.19232	.18903	.18586
580	272.47	18.54	.22708	.22258	.21826	.21410	.21010	.20625	.20253	.19894	.19549	.19214	.18891
590	276.92	18.84	.23075	.22618	.22179	.21756	.21350	.20958	.20580	.20216	.19864	.19525	.19197
600	281.36	19.15	.23442	.22977	.22531	.22102	.21689	.21291	.20908	.20538	.20181	.19836	.19503
610	285.80	19.45	.23808	.23337	.22884	.22448	.22029	.21624	.21235	.20859	.20497	.20146	.19808
620	290.25	19.75	.24174	.23696	.23236	.22793	.22368	.21958	.21562	.21181	.20813	.20457	.20113
630	294.69	20.05	.24541	.24055	.23589	.23139	.22707	.22290	.21889	.21502	.21129	.20767	.20419
640	299.14	20.36	.24907	.24414	.23941	.23485	.23046	.22624	.22216	.21823	.21444	.21078	.20724
650	303.58	20.66	.25273	.24773	.24292	.23830	.23385	.22956	.22543	.22144	.21760	.21388	.21029
660	308.03	20.96	.25639	.25132	.24644	.24175	.23724	.23289	.22870	.22466	.22075	.21698	.21334
670	312.47	21.26	.26005	.25490	.24996	.24521	.24063	.23622	.23197	.22786	.22391	.22009	.21639
680	316.92	21.56	.26371	.25849	.25348	.24866	.24401	.23955	.23523	.23107	.22706	.22319	.21944
690	321.36	21.87	.26736	.26207	.25699	.25210	.24740	.24287	.23850	.23428	.23021	.22629	.22249
700	325.80	22.17	.27101	.26566	.26050	.25555	.25078	.24619	.24176	.23749	.23337	.22939	.22554
710	330.25	22.47	.27466	.26924	.26402	.25900	.25416	.24951	.24502	.24070	.23652	.23248	.22859
720	334.69	22.77	.27832	.27282	.26753	.26245	.25755	.25283	.24829	.24390	.23967	.23558	.23163
730	339.14	23.08	.28197	.27640	.27104	.26589	.26093	.25616	.25155	.24711	.24282	.23868	.23468
740	343.58	23.38	.28562	.27998	.27455	.26931	.26432	.25947	.25481	.25031	.24597	.24177	.23772
750	348.03	23.68	.28927	.28355	.27806	.27278	.26769	.26279	.25807	.25351	.24912	.24487	.24077
760	352.47	23.98	.29292	.28713	.28157	.27622	.27107	.26611	.26133	.25672	.25226	.24796	.24381
770	356.91	24.29	.29656	.29071	.28508	.27966	.27445	.26943	.26459	.25992	.25541	.25106	.24685
780	361.36	24.59	.30021	.29428	.28858	.28310	.27783	.27274	.26784	.26312	.25856	.25415	.24989
790	365.80	24.89	.30385	.29785	.29208	.28655	.28120	.27606	.27110	.26632	.26170	.25724	.25293

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DENSITY

1. 5 % O_2, 98.5 % He

DENSITY,LBS/CUBIC FT

.015 OXYGEN .985 HELIUM AVERAGE MOLECULAR WEIGHT 4.423

DEPTH FT	PRESSURE PSIA	PRESSURE ATM	TEMPERATURE,F 30	40	50	60	70	80	90	100	110	120	130
800	370.25	25.19	.30749	.30143	.29560	.28998	.28458	.27937	.27436	.26951	.26484	.26034	.25597
810	374.69	25.50	.31114	.30500	.29910	.29342	.28795	.28269	.27761	.27271	.26799	.26342	.25901
820	379.14	25.80	.31478	.30857	.30260	.29685	.29132	.28600	.28087	.27591	.27113	.26651	.26205
830	383.58	26.10	.31842	.31213	.30610	.30029	.29470	.28931	.28411	.27911	.27427	.26960	.26509
840	388.03	26.40	.32205	.31570	.30960	.30372	.29807	.29262	.28737	.28230	.27741	.27269	.26812
850	392.47	26.71	.32569	.31927	.31309	.30716	.30144	.29593	.29062	.28550	.28055	.27577	.27116
860	396.91	27.01	.32933	.32283	.31659	.31059	.30481	.29924	.29387	.28869	.28369	.27886	.27420
870	401.36	27.31	.33296	.32640	.32009	.31402	.30817	.30255	.29712	.29188	.28683	.28195	.27723
880	405.80	27.61	.33660	.32996	.32359	.31745	.31155	.30585	.30036	.29507	.28997	.28503	.28026
890	410.25	27.92	.34023	.33352	.32708	.32088	.31491	.30916	.30361	.29827	.29310	.28812	.28330
900	414.69	28.22	.34386	.33708	.33057	.32430	.31827	.31246	.30686	.30146	.29624	.29120	.28633
910	419.14	28.52	.34749	.34064	.33406	.32774	.32164	.31577	.31010	.30464	.29937	.29428	.28936
920	423.58	28.82	.35111	.34420	.33755	.33116	.32500	.31907	.31335	.30783	.30251	.29736	.29239
930	428.03	29.13	.35474	.34776	.34104	.33458	.32837	.32237	.31659	.31102	.30564	.30044	.29542
940	432.47	29.43	.35837	.35132	.34453	.33800	.33173	.32567	.31984	.31420	.30877	.30352	.29845
950	436.91	29.73	.36200	.35487	.34803	.34143	.33508	.32898	.32307	.31739	.31190	.30660	.30148
960	441.36	30.03	.36562	.35843	.35151	.34485	.33845	.33227	.32632	.32058	.31503	.30968	.30450
970	445.80	30.33	.36925	.36198	.35500	.34827	.34180	.33557	.32956	.32376	.31816	.31276	.30753
980	450.25	30.64	.37287	.36553	.35848	.35169	.34516	.33887	.33280	.32694	.32129	.31583	.31056
990	454.69	30.94	.37649	.36908	.36196	.35512	.34852	.34217	.33604	.33013	.32441	.31891	.31358
1000	459.14	31.24	.38011	.37263	.36544	.35853	.35187	.34546	.33927	.33331	.32754	.32198	.31661
1050	481.36	32.75	.39820	.39037	.38284	.37560	.36863	.36193	.35544	.34920	.34317	.33734	.33171
1100	503.58	34.27	.41625	.40807	.40022	.39266	.38537	.37836	.37160	.36507	.35877	.35269	.34680
1150	525.80	35.78	.43428	.42575	.41756	.40968	.40209	.39477	.38773	.38092	.37436	.36800	.36187
1200	548.02	37.29	.45227	.44340	.43488	.42668	.41878	.41117	.40383	.39675	.38992	.38331	.37692
1250	570.25	38.80	.47025	.46104	.45218	.44366	.43545	.42753	.41992	.41255	.40546	.39859	.39196
1300	592.47	40.31	.48818	.47863	.46945	.46060	.45209	.44389	.43598	.42834	.42097	.41385	.40697
1350	614.69	41.83	.50610	.49620	.48668	.47752	.46871	.46021	.45202	.44411	.43647	.42910	.42196
1400	636.91	43.34	.52398	.51375	.50390	.49443	.48531	.47651	.46803	.45985	.45195	.44431	.43693
1450	659.13	44.85	.54185	.53126	.52109	.51130	.50188	.49279	.48403	.47557	.46740	.45952	.45190
1500	681.36	46.36	.55967	.54875	.53826	.52816	.51843	.50904	.50000	.49128	.48284	.47470	.46683
	500	34.02	.41334	.40522	.39742	.38991	.38269	.37571	.36900	.36252	.35626	.35022	.34438
	600	40.83	.49426	.48459	.47529	.46634	.45772	.44942	.44142	.43369	.42623	.41902	.41206
	700	47.63	.57462	.56341	.55263	.54228	.53228	.52266	.51339	.50442	.49578	.48743	.47935
	800	54.44	.65441	.64169	.62947	.61770	.60637	.59545	.58491	.57474	.56493	.55544	.54625
	900	61.24	.73365	.71946	.70580	.69265	.67999	.66778	.65600	.64464	.63366	.62305	.61279
	1000	68.05	.81237	.79669	.78163	.76712	.75315	.73966	.72666	.71412	.70199	.69028	.67894
	1100	74.85	.89054	.87342	.85695	.84110	.82584	.81111	.79690	.78318	.76994	.75711	.74473
	1200	81.65	.96817	.94963	.93179	.91462	.89808	.88210	.86671	.85185	.83746	.82358	.81016
	1300	88.46	1.04528	1.02536	1.00615	.98768	.96986	.95268	.93610	.92009	.90464	.88969	.87522
	1400	95.26	1.12188	1.10058	1.08005	1.06027	1.04122	1.02285	1.00509	.98795	.97141	.95540	.93991
	1500	102.07	1.1980	1.1753	1.1535	1.1324	1.1121	1.0926	1.0737	1.0554	1.0378	1.0208	1.0043
	1600	108.87	1.2736	1.2496	1.2264	1.2041	1.1826	1.1619	1.1418	1.1225	1.1038	1.0858	1.0683
	1700	115.68	1.3487	1.3233	1.2989	1.2754	1.2527	1.2308	1.2096	1.1892	1.1695	1.1504	1.1319
	1800	122.48	1.4233	1.3967	1.3709	1.3462	1.3223	1.2993	1.2770	1.2555	1.2348	1.2147	1.1952
	1900	129.29	1.4975	1.4695	1.4426	1.4166	1.3915	1.3673	1.3441	1.3215	1.2997	1.2786	1.2582
	2000	136.09	1.5711	1.5419	1.5137	1.4865	1.4603	1.4350	1.4107	1.3870	1.3642	1.3422	1.3208
	2100	142.90	1.6443	1.6138	1.5844	1.5561	1.5288	1.5024	1.4769	1.4523	1.4285	1.4055	1.3831
	2200	149.70	1.7171	1.6853	1.6547	1.6252	1.5968	1.5693	1.5428	1.5171	1.4923	1.4683	1.4451
	2300	156.51	1.7893	1.7564	1.7246	1.6940	1.6644	1.6359	1.6082	1.5817	1.5559	1.5309	1.5068
	2400	163.31	1.8611	1.8270	1.7940	1.7623	1.7316	1.7020	1.6734	1.6458	1.6190	1.5932	1.5681
	2500	170.11	1.9325	1.8971	1.8630	1.8302	1.7984	1.7678	1.7382	1.7096	1.6818	1.6551	1.6291
	2600	176.92	2.0034	1.9669	1.9317	1.8977	1.8649	1.8332	1.8026	1.7730	1.7444	1.7167	1.6898
	2700	183.72	2.0740	2.0362	1.9999	1.9648	1.9310	1.8983	1.8667	1.8361	1.8065	1.7779	1.7503
	2800	190.53	2.1441	2.1052	2.0677	2.0315	1.9966	1.9629	1.9304	1.8989	1.8684	1.8389	1.8103
	2900	197.33	2.2138	2.1737	2.1351	2.0979	2.0620	2.0273	1.9937	1.9613	1.9300	1.8995	1.8701
	3000	204.14	2.2829	2.2418	2.2022	2.1639	2.1270	2.0913	2.0567	2.0234	1.9911	1.9599	1.9296
	3100	210.94	2.3518	2.3095	2.2688	2.2295	2.1916	2.1550	2.1195	2.0852	2.0521	2.0199	1.9888
	3200	217.75	2.4202	2.3769	2.3351	2.2948	2.2558	2.2182	2.1818	2.1466	2.1126	2.0796	2.0477
	3300	224.55	2.4882	2.4438	2.4010	2.3597	2.3197	2.2812	2.2439	2.2078	2.1729	2.1391	2.1063
	3400	231.36	2.5558	2.5104	2.4665	2.4242	2.3833	2.3438	2.3055	2.2687	2.2329	2.1982	2.1645
	3500	238.16	2.6231	2.5765	2.5317	2.4883	2.4465	2.4060	2.3670	2.3291	2.2925	2.2569	2.2226
	3600	244.96	2.6899	2.6423	2.5964	2.5522	2.5094	2.4680	2.4280	2.3893	2.3519	2.3156	2.2803
	3700	251.77	2.7564	2.7078	2.6610	2.6156	2.5719	2.5297	2.4888	2.4492	2.4109	2.3738	2.3378
	3800	258.57	2.8225	2.7728	2.7250	2.6788	2.6341	2.5910	2.5492	2.5088	2.4697	2.4318	2.3951
	3900	265.38	2.8882	2.8376	2.7888	2.7416	2.6960	2.6520	2.6093	2.5681	2.5281	2.4894	2.4519
	4000	272.18	2.9536	2.9019	2.8521	2.8041	2.7575	2.7126	2.6692	2.6271	2.5864	2.5469	2.5085
	4100	278.99	3.0185	2.9659	2.9152	2.8662	2.8187	2.7731	2.7287	2.6858	2.6442	2.6040	2.5650
	4200	285.79	3.0831	3.0296	2.9779	2.9280	2.8798	2.8331	2.7880	2.7442	2.7019	2.6609	2.6211
	4300	292.60	3.1474	3.0929	3.0403	2.9894	2.9403	2.8929	2.8468	2.8023	2.7593	2.7175	2.6769
	4400	299.40	3.2113	3.1559	3.1023	3.0506	3.0007	2.9522	2.9055	2.8602	2.8162	2.7736	2.7325
	4500	306.21	3.2749	3.2185	3.1640	3.1115	3.0606	3.0114	2.9639	2.9178	2.8730	2.8298	2.7878
	4600	313.01	3.3381	3.2808	3.2255	3.1719	3.1203	3.0703	3.0219	2.9750	2.9296	2.8856	2.8429
	4700	319.81	3.4010	3.3427	3.2865	3.2322	3.1797	3.1289	3.0797	3.0320	2.9859	2.9412	2.8977
	4800	326.62	3.4635	3.4044	3.3473	3.2921	3.2388	3.1871	3.1372	3.0887	3.0419	2.9964	2.9523
	4900	333.42	3.5257	3.4657	3.4078	3.3517	3.2975	3.2451	3.1944	3.1453	3.0976	3.0514	3.0067
	5000	340.23	3.5875	3.5267	3.4678	3.4110	3.3560	3.3029	3.2514	3.2014	3.1532	3.1063	3.0608

SP. VOL
1.5 % O_2, 98.5 % He

T-82

SPECIFIC VOLUME,CUBIC FT/LB

.015 OXYGEN .985 HELIUM AVERAGE MOLECULAR WEIGHT 4.423

DEPTH FT	PRESSURE PSIA	ATM	TEMPERATURE,F 30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	80.889	82.539	84.191	85.841	87.493	89.145	90.795	92.445	94.098	95.748	97.400
10	19.14	1.30	62.117	63.384	64.652	65.919	67.188	68.454	69.723	70.990	72.258	73.525	74.793
20	23.58	1.60	50.419	51.448	52.477	53.506	54.534	55.563	56.592	57.621	58.649	59.679	60.707
30	28.03	1.91	42.431	43.297	44.163	45.029	45.894	46.759	47.626	48.491	49.356	50.223	51.088
40	32.47	2.21	36.630	37.377	38.125	38.872	39.619	40.366	41.113	41.860	42.608	43.355	44.102
50	36.92	2.51	32.226	32.883	33.540	34.197	34.854	35.511	36.167	36.826	37.483	38.140	38.797
60	41.36	2.81	28.768	29.355	29.940	30.527	31.114	31.700	32.287	32.874	33.460	34.047	34.633
70	45.81	3.12	25.981	26.511	27.040	27.570	28.099	28.629	29.158	29.688	30.218	30.747	31.277
80	50.25	3.42	23.687	24.170	24.652	25.135	25.618	26.101	26.584	27.067	27.549	28.032	28.514
90	54.70	3.72	21.765	22.209	22.653	23.096	23.540	23.983	24.427	24.870	25.314	25.757	26.201
100	59.14	4.02	20.133	20.543	20.953	21.364	21.774	22.184	22.595	23.005	23.415	23.825	24.235
110	63.58	4.33	18.724	19.110	19.492	19.873	20.255	20.637	21.018	21.400	21.781	22.163	22.544
120	68.03	4.63	17.508	17.865	18.221	18.578	18.934	19.291	19.648	20.004	20.361	20.718	21.074
130	72.47	4.93	16.437	16.772	17.107	17.441	17.776	18.111	18.445	18.780	19.115	19.449	19.784
140	76.92	5.23	15.490	15.805	16.121	16.436	16.751	17.067	17.382	17.698	18.013	18.328	18.644
150	81.36	5.54	14.646	14.944	15.243	15.540	15.839	16.137	[illegible]	[illegible]	17.041	[illegible]	[illegible]
160	85.81	5.84	13.889	14.172	14.455	14.738	15.021	15.303	[illegible]	15.869	16.151	[illegible]	16.717
170	90.25	6.14	13.208	13.477	13.745	14.014	14.283	14.552	14.821	15.089	15.358	15.627	15.895
180	94.70	6.44	12.590	12.846	13.102	13.359	13.615	13.871	14.127	14.383	14.639	[illegible]	15.152
190	99.14	6.75	12.027	12.272	12.517	12.761	13.006	13.251	13.496	13.740	13.985	14.230	14.474
200	103.58	7.05	11.513	11.767	11.982	12.216	12.450	12.686	12.918	13.153	13.387	[illegible]	13.855
210	108.03	7.35	11.041	11.266	11.490	11.715	11.940	[illegible]	12.389	12.613	12.838	13.062	13.287
220	112.47	7.65	10.607	10.822	11.038	11.254	11.470	11.685	11.901	12.116	12.332	12.548	12.764
230	116.92	7.96	10.205	10.413	10.620	10.828	11.035	11.242	11.450	11.658	11.865	12.072	12.280
240	121.36	8.26	9.8331	10.0329	10.2329	10.4326	10.6325	10.8324	11.0323	11.2322	11.4320	11.6317	11.8318
250	125.81	8.56	9.4872	9.6800	9.8729	10.0656	10.2585	10.4511	10.6440	10.8368	11.0295	11.2223	11.4153
260	130.25	8.86	9.1649	9.3511	9.5373	9.7237	9.9098	10.0961	10.2824	10.4686	10.6549	10.8411	11.0272
270	134.69	9.17	8.8639	9.0440	9.2241	9.4041	9.5843	9.7645	9.9444	10.1245	10.3046	10.4847	10.6648
280	139.14	9.47	8.5821	8.7565	8.9308	9.1051	9.2796	9.4538	9.6283	9.8024	9.9768	10.1511	10.3255
290	143.58	9.77	8.3180	8.4868	8.6557	8.8247	8.9935	9.1626	9.3315	9.5005	9.6692	9.8382	10.0072
300	148.03	10.07	8.0695	8.2333	8.3972	8.5610	8.7249	8.8887	9.0525	9.2164	9.3802	9.5441	9.7080
310	152.47	10.38	7.8355	7.9945	8.1537	8.3128	8.4719	8.6309	8.7900	8.9490	9.1082	9.2671	9.4262
320	156.92	10.68	7.6148	7.7693	7.9240	8.0785	8.2330	8.3876	8.5421	8.6969	8.8513	9.0058	9.1604
330	161.36	10.98	7.4062	7.5565	7.7069	7.8571	8.0075	8.1578	8.3081	8.4584	8.6087	8.7589	8.9093
340	165.81	11.28	7.2088	7.3551	7.5015	7.6477	7.7941	7.9402	8.0865	8.2328	8.3790	8.5254	8.6716
350	170.25	11.58	7.0219	7.1642	7.3068	7.4492	7.5916	7.7341	7.8766	8.0191	8.1615	8.3040	8.4463
360	174.69	11.89	6.8443	6.9830	7.1219	7.2609	7.3996	7.5384	7.6772	7.8161	7.9549	8.0938	8.2325
370	179.14	12.19	6.6756	6.8110	6.9463	7.0816	7.2172	7.3525	7.4878	7.6232	7.7586	7.8940	8.0293
380	183.58	12.49	6.5150	6.6472	6.7792	6.9113	7.0434	7.1756	7.3076	7.4396	7.5718	7.7039	7.8360
390	188.03	12.79	6.3620	6.4911	6.6200	6.7490	6.8780	7.0069	7.1358	7.2649	7.3937	7.5228	7.6517
400	192.47	13.10	6.2161	6.3422	6.4681	6.5942	6.7202	6.8462	6.9721	7.0981	7.2241	7.3500	7.4760
410	196.92	13.40	6.0767	6.2000	6.3231	6.4462	6.5694	6.6925	6.8157	6.9388	7.0620	7.1851	7.3083
420	201.36	13.70	5.9437	6.0641	6.1845	6.3049	6.4254	6.5458	6.6663	6.7867	6.9070	7.0274	7.1479
430	205.81	14.00	5.8162	5.9341	6.0519	6.1697	6.2876	6.4053	6.5232	6.6410	6.7588	6.8767	6.9944
440	210.25	14.31	5.6942	5.8096	5.9249	6.0402	6.1555	6.2709	6.3861	6.5014	6.6168	6.7322	6.8475
450	214.69	14.61	5.5772	5.6902	5.8032	5.9161	6.0290	6.1419	6.2549	6.3679	6.4808	6.5937	6.7066
460	219.14	14.91	5.4649	5.5756	5.6862	5.7969	5.9075	6.0183	6.1288	6.2395	6.3502	6.4608	6.5714
470	223.58	15.21	5.3571	5.4657	5.5740	5.6825	5.7910	5.8994	6.0079	6.1163	6.2248	6.3332	6.4416
480	228.03	15.52	5.2536	5.3600	5.4663	5.5726	5.6790	5.7853	5.8916	5.9980	6.1042	6.2106	6.3169
490	232.47	15.82	5.1540	5.2583	5.3626	5.4670	5.5711	5.6755	5.7799	5.8841	5.9885	6.0927	6.1970
500	236.92	16.12	5.0581	5.1605	5.2628	5.3651	5.4675	5.5699	5.6722	5.7745	5.8769	5.9791	6.0815
510	241.36	16.42	4.9658	5.0662	5.1667	5.2671	5.3677	5.4680	5.5685	5.6690	5.7694	5.8698	5.9703
520	245.80	16.73	4.8767	4.9754	5.0741	5.1727	5.2713	5.3700	5.4686	5.5673	5.6659	5.7646	5.8631
530	250.25	17.03	4.7909	4.8878	4.9847	5.0816	5.1785	5.2754	5.3722	5.4691	5.5660	5.6629	5.7597
540	254.69	17.33	4.7080	4.8033	4.8985	4.9936	5.0889	5.1840	5.2793	5.3745	5.4697	5.5648	5.6600
550	259.14	17.63	4.6281	4.7216	4.8151	4.9087	5.0023	5.0959	5.1894	5.2830	5.3766	5.4701	5.5636
560	263.58	17.94	4.5508	4.6427	4.7347	4.8267	4.9187	5.0107	5.1027	5.1946	5.2866	5.3786	5.4705
570	268.03	18.24	4.4760	4.5665	4.6569	4.7474	4.8379	4.9283	5.0188	5.1091	5.1996	5.2901	5.3805
580	272.47	18.54	4.4037	4.4927	4.5816	4.6707	4.7596	4.8486	4.9375	5.0266	5.1155	5.2045	5.2934
590	276.97	18.84	4.3337	4.4213	4.5088	4.5963	4.6839	4.7715	4.8590	4.9465	5.0342	5.1216	5.2091
600	281.36	19.15	4.2659	4.3521	4.4383	4.5244	4.6107	4.6967	4.7829	4.8690	4.9553	5.0413	5.1275
610	285.80	19.45	4.2002	4.2851	4.3700	4.4548	4.5396	4.6244	4.7093	4.7941	4.8789	4.9637	5.0484
620	290.25	19.75	4.1366	4.2201	4.3037	4.3872	4.4707	4.5542	4.6378	4.7213	4.8048	4.8884	4.9718
630	294.69	20.05	4.0749	4.1571	4.2394	4.3216	4.4039	4.4862	4.5684	4.6507	4.7329	4.8151	4.8974
640	299.14	20.36	4.0150	4.0960	4.1770	4.2581	4.3391	4.4201	4.5012	4.5823	4.6633	4.7443	4.8253
650	303.58	20.66	3.9568	4.0367	4.1165	4.1964	4.2763	4.3561	4.4359	4.5158	4.5957	4.6755	[illegible]
660	308.03	20.96	3.9003	3.9791	4.0577	4.1365	4.2151	4.2938	4.3726	4.4512	4.5299	[illegible]	[illegible]
670	312.47	21.26	3.8454	3.9231	4.0007	4.0782	4.1558	4.2334	4.3110	4.3885	4.4661	[illegible]	[illegible]
680	316.92	21.56	3.7921	3.8687	3.9452	4.0216	4.0982	4.1746	4.2512	4.3276	4.4040	4.4805	[illegible]
690	321.36	21.87	3.7403	3.8157	3.8912	3.9666	4.0420	4.1175	4.1929	4.2683	4.3438	[illegible]	[illegible]
700	325.80	22.17	3.6899	3.7643	3.8387	3.9131	3.9875	4.0618	4.1363	4.2106	4.2851	4.3594	4.4338
710	330.25	22.47	3.6408	3.7142	3.7876	3.8610	3.9345	4.0078	4.0812	4.1546	4.2280	4.3014	4.3747
720	334.69	22.77	3.5930	3.6654	3.7378	3.8103	3.8827	3.9552	4.0276	4.1000	4.1724	4.2449	4.3172
730	339.14	23.08	3.5465	3.6180	3.6894	3.7609	3.8324	3.9039	3.9754	4.0468	4.1182	4.1898	4.2612
740	343.58	23.38	3.5011	3.5717	3.6423	3.7129	3.7833	3.8540	3.9245	3.9950	4.0656	4.1361	4.2066
750	348.03	23.68	3.4570	3.5267	3.5963	3.6659	3.7356	3.8053	3.8749	3.9445	4.0142	4.0838	4.1534
760	352.47	23.98	3.4139	3.4827	3.5515	3.6203	3.6891	3.7579	3.8266	3.8953	3.9641	4.0328	4.1016
770	356.91	24.29	3.3720	3.4399	3.5078	3.5757	3.6436	3.7115	3.7794	3.8474	3.9152	3.9831	4.0510
780	361.36	24.59	3.3311	3.3981	3.4652	3.5323	3.5994	3.6665	3.7335	3.8006	3.8676	3.9347	4.0017
790	365.80	24.89	3.2911	3.3574	3.4237	3.4899	3.5562	3.6224	3.6887	3.7549	3.8212	3.8874	3.9536

T-83

SP. VOL.
1.5 % O_2, 98.5 % He

SPECIFIC VOLUME,CUBIC FT/LB

.015 OXYGEN .985 HELIUM AVERAGE MOLECULAR WEIGHT 4.423

DEPTH	PRESSURE		TEMPERATURE,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
800	370.25	25.19	3.2521	3.3176	3.3830	3.4485	3.5139	3.5795	3.6448	3.7104	3.7758	3.8412	3.9067
810	374.69	25.50	3.2140	3.2787	3.3434	3.4081	3.4728	3.5375	3.6022	3.6669	3.7315	3.7962	3.8608
820	379.14	25.80	3.1768	3.2408	3.3047	3.3687	3.4326	3.4965	3.5604	3.6243	3.6882	3.7522	3.8161
830	383.58	26.10	3.1405	3.2037	3.2669	3.3301	3.3933	3.4565	3.5197	3.5828	3.6460	3.7092	3.7723
840	388.03	26.40	3.1051	3.1675	3.2300	3.2925	3.3550	3.4174	3.4798	3.5423	3.6048	3.6672	3.7296
850	392.47	26.71	3.0704	3.1322	3.1939	3.2557	3.3174	3.3792	3.4409	3.5027	3.5644	3.6262	3.6879
860	396.91	27.01	3.0365	3.0976	3.1587	3.2197	3.2808	3.3418	3.4029	3.4639	3.5250	3.5860	3.6470
870	401.36	27.31	3.0034	3.0637	3.1241	3.1845	3.2449	3.3053	3.3656	3.4261	3.4864	3.5468	3.6071
880	405.80	27.61	2.9709	3.0307	3.0904	3.1501	3.2098	3.2696	3.3293	3.3890	3.4486	3.5084	3.5681
890	410.25	27.92	2.9392	2.9983	3.0573	3.1165	3.1755	3.2346	3.2936	3.3527	3.4118	3.4708	3.5299
900	414.69	28.22	2.9081	2.9666	3.0251	3.0835	3.1420	3.2004	3.2589	3.3172	3.3757	3.4341	3.4925
910	419.14	28.52	2.8777	2.9356	2.9934	3.0512	3.1091	3.1669	3.2247	3.2825	3.3403	3.3981	3.4559
920	423.58	28.82	2.8481	2.9053	2.9625	3.0197	3.0769	3.1341	3.1913	3.2485	3.3057	3.3630	3.4201
930	428.03	29.13	2.8189	2.8755	2.9322	2.9886	3.0454	3.1020	3.1586	3.2152	3.2718	3.3285	3.3850
940	432.47	29.43	2.7904	2.8464	2.9026	2.9585	3.0145	3.0706	3.1266	3.1827	3.2387	3.2947	3.3507
950	436.91	29.73	2.7624	2.8179	2.8733	2.9288	2.9843	3.0397	3.0953	3.1507	3.2062	3.2616	3.3170
960	441.36	30.03	2.7350	2.7900	2.8449	2.8998	2.9547	3.0096	3.0645	3.1194	3.1743	3.2292	3.2840
970	445.80	30.33	2.7082	2.7626	2.8169	2.8713	2.9257	2.9800	3.0343	3.0887	3.1430	3.1974	3.2517
980	450.25	30.64	2.6819	2.7357	2.7896	2.8434	2.8972	2.9510	3.0049	3.0587	3.1124	3.1662	3.2200
990	454.69	30.94	2.6561	2.7094	2.7627	2.8160	2.8693	2.9226	2.9759	3.0291	3.0825	3.1357	3.1890
1000	459.14	31.24	2.6308	2.6836	2.7364	2.7892	2.8419	2.8947	2.9475	3.0002	3.0530	3.1057	3.1585
1050	481.36	32.75	2.5113	2.5617	2.6120	2.6624	2.7127	2.7630	2.8134	2.8637	2.9140	2.9644	3.0146
1100	503.58	34.27	2.4024	2.4505	2.4986	2.5467	2.5949	2.6430	2.6911	2.7392	2.7873	2.8354	2.8835
1150	525.80	35.78	2.3027	2.3488	2.3949	2.4409	2.4870	2.5331	2.5791	2.6252	2.6712	2.7174	2.7634
1200	548.02	37.29	2.2111	2.2553	2.2995	2.3437	2.3879	2.4321	2.4763	2.5205	2.5647	2.6089	2.6531
1250	570.25	38.80	2.1265	2.1690	2.2115	2.2540	2.2965	2.3390	2.3814	2.4239	2.4664	2.5088	2.5513
1300	592.47	40.31	2.0484	2.0893	2.1302	2.1711	2.2119	2.2528	2.2937	2.3346	2.3754	2.4163	2.4572
1350	614.69	41.83	1.9759	2.0153	2.0547	2.0941	2.1335	2.1729	2.2123	2.2517	2.2911	2.3305	2.3699
1400	636.91	43.34	1.9085	1.9465	1.9845	2.0225	2.0606	2.0986	2.1366	2.1746	2.2126	2.2507	2.2887
1450	659.13	44.85	1.8455	1.8823	1.9190	1.9558	1.9925	2.0293	2.0660	2.1027	2.1395	2.1762	2.2129
1500	681.36	46.36	1.7868	1.8223	1.8578	1.8934	1.9289	1.9645	2.0000	2.0355	2.0711	2.1066	2.1421
	500	34.02	2.4193	2.4678	2.5162	2.5647	2.6131	2.6616	2.7100	2.7585	2.8069	2.8554	2.9038
	600	40.83	2.0232	2.0636	2.1040	2.1444	2.1847	2.2251	2.2654	2.3058	2.3462	2.3865	2.4269
	700	47.63	1.7403	1.7749	1.8095	1.8441	1.8787	1.9133	1.9478	1.9825	2.0170	2.0516	2.0862
	800	54.44	1.5281	1.5584	1.5886	1.6189	1.6492	1.6794	1.7097	1.7399	1.7701	1.8004	1.8306
	900	61.24	1.3630	1.3899	1.4168	1.4437	1.4706	1.4975	1.5244	1.5513	1.5781	1.6050	1.6319
	1000	68.05	1.2310	1.2552	1.2794	1.3036	1.3278	1.3520	1.3762	1.4003	1.4245	1.4487	1.4729
	1100	74.85	1.1229	1.1449	1.1669	1.1889	1.2109	1.2329	1.2549	1.2769	1.2988	1.3208	1.3428
	1200	81.65	1.0329	1.0530	1.0732	1.0934	1.1135	1.1337	1.1538	1.1739	1.1941	1.2142	1.2343
	1300	88.46	.95668	.97527	.99389	1.01247	1.03108	1.04967	1.06826	1.08685	1.10541	1.12399	1.14257
	1400	95.26	.89136	.90861	.92588	.94316	.96041	.97767	.99493	1.01220	1.02943	1.04668	1.06394
	1500	102.07	.83472	.85084	.86696	.88309	.89918	.91528	.93138	.94747	.96358	.97966	.99576
	1600	108.87	.78516	.80028	.81537	.83050	.84560	.86066	.87578	.89087	.90594	.92101	.93610
	1700	115.68	.74147	.75568	.76989	.78410	.79828	.81250	.82669	.84089	.85507	.86925	.88346
	1800	122.48	.70260	.71599	.72942	.74285	.75625	.76965	.78306	.79647	.80986	.82326	.83667
	1900	129.29	.66778	.69052	.69322	.70591	.71865	.73135	.74402	.75673	.76941	.78210	.79481
	2000	136.09	.63648	.64856	.66063	.67270	.68477	.69684	.70888	.72096	.73301	.74506	.75709
	2100	142.90	.60816	.61964	.63115	.64265	.65412	.66562	.67709	.68856	.70003	.71152	.72300
	2200	149.70	.58239	.59336	.60435	.61530	.62626	.63724	.64819	.65914	.67009	.68105	.69198
	2300	156.51	.55888	.56936	.57985	.59033	.60082	.61129	.62180	.63225	.64272	.65321	.66366
	2400	163.31	.53731	.54735	.55742	.56745	.57750	.58754	.59758	.60762	.61767	.62768	.63770
	2500	170.11	.51746	.52711	.53676	.54639	.55604	.56569	.57530	.58494	.59458	.60420	.61384
	2600	176.92	.49914	.50841	.51768	.52695	.53624	.54549	.55476	.56401	.57328	.58252	.59179
	2700	183.72	.48215	.49111	.50002	.50895	.51787	.52679	.53572	.54462	.55355	.56245	.57134
	2800	190.53	.46640	.47502	.48362	.49224	.50085	.50944	.51804	.52662	.53523	.54381	.55239
	2900	197.33	.45172	.46004	.46836	.47666	.48497	.49327	.50157	.50986	.51815	.52645	.53473
	3000	204.14	.43803	.44607	.45409	.46214	.47015	.47818	.48620	.49422	.50223	.51023	.51824
	3100	210.94	.42521	.43299	.44076	.44853	.45629	.46404	.47181	.47956	.48731	.49508	.50283
	3200	217.75	.41319	.42071	.42824	.43577	.44330	.45081	.45833	.46585	.47335	.48086	.48836
	3300	224.55	.40189	.40920	.41650	.42379	.43109	.43837	.44565	.45294	.46022	.46749	.47476
	3400	231.36	.39126	.39834	.40543	.41251	.41958	.42665	.43374	.44079	.44786	.45492	.46199
	3500	238.16	.38122	.38812	.39500	.40188	.40875	.41562	.42248	.42936	.43620	.44308	.44991
	3600	244.96	.37176	.37845	.38514	.39182	.39850	.40518	.41186	.41854	.42519	.43186	.43853
	3700	251.77	.36274	.36931	.37580	.38232	.38882	.39531	.40180	.40830	.41478	.42126	.42776
	3800	258.57	.35429	.36064	.36697	.37330	.37964	.38595	.39228	.39859	.40491	.41122	.41753
	3900	265.38	.34623	.35241	.35858	.36475	.37092	.37708	.38324	.38939	.39555	.40170	.40784
	4000	272.18	.33857	.34460	.35062	.35662	.36264	.36865	.37464	.38065	.38664	.39264	.39864
	4100	278.99	.33127	.33717	.34303	.34889	.35477	.36061	.36647	.37233	.37818	.38403	.38987
	4200	285.79	.32435	.33008	.33581	.34153	.34725	.35297	.35868	.36441	.37011	.37582	.38152
	4300	292.60	.31772	.32332	.32892	.33451	.34010	.34568	.35127	.35685	.36241	.36799	.37357
	4400	299.40	.31141	.31687	.32234	.32781	.33326	.33872	.34417	.34963	.35508	.36051	.36596
	4500	306.21	.30536	.31070	.31606	.32139	.32674	.33207	.33740	.34273	.34806	.35339	.35870
	4600	313.01	.29957	.30481	.31003	.31527	.32048	.32570	.33091	.33613	.34135	.34655	.35175
	4700	319.81	.29403	.29916	.30428	.30939	.31450	.31960	.32471	.32981	.33490	.34000	.34510
	4800	326.62	.28873	.29374	.29875	.30376	.30876	.31376	.31876	.32376	.32874	.33373	.33871
	4900	333.42	.28364	.28855	.29344	.29835	.30326	.30816	.31305	.31795	.32283	.32772	.33259
	5000	340.23	.27875	.28355	.28837	.29317	.29797	.30276	.30756	.31236	.31714	.32194	.32672

DENSITY
1.0 % O_2, 99.0 % He

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DENSITY.LBS/CUBIC FT

.010 OXYGEN .990 HELIUM AVERAGE MOLECULAR WEIGHT 4.283

DEPTH FT	PRESSURF PSIA	ATM	TEMPERATURE.F 30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	.01197	.01173	.01150	.01128	.01107	.01086	.01067	.01047	.01029	.01011	.00994
10	19.14	1.30	.01559	.01528	.01498	.01469	.01441	.01415	.01389	.01364	.01340	.01317	.01295
20	23.58	1.60	.01921	.01882	.01845	.01810	.01776	.01743	.01711	.01681	.01651	.01623	.01595
30	28.03	1.91	.02282	.02237	.02193	.02151	.02110	.02071	.02033	.01997	.01962	.01928	.01895
40	32.47	2.21	.02644	.02591	.02540	.02491	.02444	.02399	.02355	.02313	.02273	.02234	.02196
50	36.92	2.51	.03005	.02945	.02887	.02832	.02778	.02727	.02677	.02630	.02583	.02539	.02496
60	41.36	2.81	.03366	.03299	.03234	.03172	.03112	.03055	.02999	.02946	.02894	.02844	.02796
70	45.81	3.12	.03727	.03653	.03581	.03512	.03446	.03382	.03321	.03262	.03205	.03149	.03096
80	50.25	3.42	.04088	.04007	.03928	.03853	.03780	.03710	.03643	.03578	.03515	.03454	.03396
90	54.70	3.72	.04449	.04360	.04275	.04193	.04114	.04038	.03964	.03894	.03825	.03760	.03696
100	59.14	4.02	.04810	.04714	.04621	.04533	.04447	.04365	.04286	.04209	.04136	.04064	.03996
110	63.58	4.33	.05170	.05067	.04968	.04873	.04781	.04692	.04607	.04525	.04446	.04369	.04295
120	68.03	4.63	.05531	.05420	.05314	.05212	.05114	.05020	.04929	.04841	.04756	.04674	.04595
130	72.47	4.93	.05891	.05774	.05661	.05552	.05448	.05347	.05250	.05156	.05066	.04979	.04895
140	76.92	5.23	.06252	.06127	.06007	.05892	.05781	.05674	.05571	.05472	.05376	.05284	.05194
150	81.36	5.54	.06612	.06480	.06353	.06231	.06114	.06001	.05892	.05787	.05686	.05588	.05493
160	85.81	5.84	.06972	.06833	.06699	.06571	.06447	.06328	.06213	.06102	.05996	.05892	.05793
170	90.25	6.14	.07332	.07185	.07045	.06910	.06780	.06655	.06534	.06418	.06305	.06197	.06092
180	94.70	6.44	.07692	.07538	.07391	.07249	.07113	.06981	.06855	.06733	.06615	.06501	.06391
190	99.14	6.75	.08051	.07891	.07736	.07588	.07445	.07308	.07175	.07048	.06924	.06805	.06690
200	103.58	7.05	.08411	.08243	.08082	.07927	.07778	.07634	.07496	.07363	.07234	.07109	.06989
210	108.03	7.35	.08770	.08595	.08427	.08266	.08110	.07961	.07817	.07677	.07543	.07414	.07288
220	112.47	7.65	.09130	.08948	.08773	.08605	.08443	.08287	.08137	.07992	.07852	.07717	.07587
230	116.92	7.96	.09489	.09300	.09118	.08943	.08775	.08613	.08457	.08307	.08162	.08021	.07886
240	121.36	8.26	.09848	.09652	.09463	.09282	.09107	.08940	.08778	.08621	.08471	.08325	.08185
250	125.81	8.56	.10207	.10004	.09808	.09620	.09440	.09266	.09098	.08936	.08780	.08629	.08483
260	130.25	8.86	.10566	.10355	.10153	.09959	.09772	.09592	.09418	.09250	.09089	.08932	.08782
270	134.69	9.17	.10925	.10707	.10498	.10297	.10104	.09917	.09738	.09565	.09397	.09236	.09080
280	139.14	9.47	.11283	.11059	.10843	.10635	.10436	.10243	.10058	.09879	.09706	.09540	.09379
290	143.58	9.77	.11642	.11410	.11187	.10973	.10767	.10569	.10378	.10193	.10015	.09843	.09677
300	148.03	10.07	.12000	.11761	.11532	.11311	.11099	.10894	.10697	.10507	.10323	.10146	.09975
310	152.47	10.38	.12359	.12113	.11877	.11649	.11430	.11220	.11017	.10821	.10632	.10450	.10273
320	156.92	10.68	.12717	.12464	.12221	.11987	.11762	.11545	.11336	.11135	.10940	.10753	.10571
330	161.36	10.98	.13075	.12815	.12565	.12324	.12093	.11870	.11656	.11449	.11249	.11056	.10869
340	165.81	11.28	.13433	.13166	.12909	.12662	.12424	.12196	.11975	.11762	.11557	.11359	.11167
350	170.25	11.58	.13791	.13516	.13253	.13000	.12756	.12521	.12294	.12076	.11865	.11662	.11465
360	174.69	11.89	.14149	.13867	.13597	.13337	.13087	.12846	.12614	.12389	.12173	.11964	.11763
370	179.14	12.19	.14506	.14218	.13941	.13674	.13418	.13171	.12932	.12703	.12481	.12267	.12060
380	183.58	12.49	.14864	.14568	.14284	.14012	.13749	.13495	.13252	.13016	.12789	.12570	.12358
390	188.03	12.79	.15221	.14919	.14628	.14348	.14079	.13820	.13570	.13330	.13097	.12873	.12656
400	192.47	13.10	.15578	.15269	.14972	.14685	.14410	.14145	.13889	.13643	.13405	.13175	.12953
410	196.92	13.40	.15935	.15619	.15315	.15022	.14741	.14469	.14208	.13956	.13712	.13478	.13250
420	201.36	13.70	.16293	.15969	.15658	.15359	.15071	.14794	.14526	.14269	.14020	.13780	.13548
430	205.81	14.00	.16650	.16319	.16001	.15696	.15401	.15118	.14845	.14582	.14328	.14082	.13845
440	210.25	14.31	.17006	.16669	.16344	.16032	.15732	.15442	.15163	.14895	.14635	.14384	.14142
450	214.69	14.61	.17363	.17018	.16687	.16368	.16062	.15767	.15482	.15207	.14942	.14686	.14439
460	219.14	14.91	.17720	.17368	.17030	.16705	.16392	.16091	.15800	.15520	.15250	.14988	.14736
470	223.58	15.21	.18076	.17717	.17373	.17041	.16722	.16415	.16118	.15833	.15557	.15290	.15033
480	228.03	15.52	.18432	.18067	.17716	.17377	.17052	.16739	.16437	.16145	.15864	.15592	.15330
490	232.47	15.82	.18789	.18416	.18058	.17713	.17382	.17063	.16754	.16457	.16171	.15894	.15627
500	236.92	16.12	.19145	.18765	.18400	.18050	.17712	.17386	.17072	.16770	.16478	.16196	.15923
510	241.36	16.42	.19501	.19114	.18743	.18385	.18041	.17710	.17390	.17082	.16785	.16498	.16220
520	245.80	16.73	.19857	.19463	.19085	.18721	.18371	.18033	.17708	.17394	.17091	.16799	.16516
530	250.25	17.03	.20213	.19812	.19427	.19056	.18700	.18357	.18026	.17706	.17398	.17101	.16813
540	254.69	17.33	.20569	.20161	.19769	.19392	.19029	.18680	.18343	.18018	.17705	.17402	.17109
550	259.14	17.63	.20924	.20509	.20111	.19728	.19359	.19003	.18661	.18330	.18011	.17703	.17406
560	263.58	17.94	.21279	.20858	.20453	.20064	.19688	.19326	.18978	.18642	.18318	.18004	.17702
570	268.03	18.24	.21635	.21206	.20794	.20398	.20017	.19650	.19295	.18954	.18624	.18306	.17998
580	272.47	18.54	.21990	.21555	.21136	.20734	.20346	.19972	.19613	.19265	.18930	.18607	.18294
590	276.92	18.84	.22345	.21903	.21477	.21068	.20674	.20295	.19929	.19577	.19237	.18908	.18590
600	281.36	19.15	.22700	.22251	.21819	.21403	.21003	.20618	.20247	.19888	.19543	.19209	.18886
610	285.80	19.45	.23055	.22599	.22160	.21738	.21332	.20940	.20564	.20200	.19848	.19510	.19182
620	290.25	19.75	.23410	.22947	.22502	.22073	.21660	.21263	.20880	.20511	.20154	.19810	.19477
630	294.69	20.05	.23764	.23294	.22843	.22408	.21989	.21586	.21197	.20822	.20460	.20111	.19773
640	299.14	20.36	.24119	.23642	.23183	.22742	.22317	.21908	.21514	.21134	.20766	.20411	.20068
650	303.58	20.66	.24474	.23989	.23524	.23076	.22646	.22230	.21830	.21444	.21072	.20712	.20364
660	308.03	20.96	.24828	.24337	.23865	.23411	.22974	.22553	.22147	.21755	.21377	.21012	.20659
670	312.47	21.26	.25182	.24684	.24205	.23745	.23302	.22875	.22463	.22066	.21683	.21313	.20955
680	316.92	21.56	.25537	.25031	.24546	.24079	.23630	.23197	.22780	.22377	.21988	.21613	.21250
690	321.36	21.87	.25891	.25378	.24887	.24413	.23958	.23519	.23096	.22688	.22294	.21913	.21546
700	325.80	22.17	.26245	.25725	.25227	.24747	.24285	.23841	.23412	.22998	.22599	.22213	.21841
710	330.25	22.47	.26598	.26072	.25567	.25081	.24613	.24162	.23728	.23309	.22904	.22514	.22136
720	334.69	22.77	.26952	.26419	.25907	.25415	.24941	.24484	.24044	.23619	.23209	.22814	.22431
730	339.14	23.08	.27305	.26766	.26247	.25749	.25269	.24806	.24360	.23930	.23514	.23113	.22726
740	343.58	23.38	.27659	.27112	.26587	.26082	.25596	.25127	.24676	.24240	.23819	.23413	.23020
750	348.03	23.68	.28012	.27459	.26927	.26416	.25923	.25448	.24991	.24550	.24124	.23713	.23315
760	352.47	23.98	.28366	.27805	.27267	.26749	.26250	.25770	.25307	.24860	.24429	.24013	.23610
770	356.91	24.29	.28719	.28151	.27607	.27082	.26577	.26091	.25622	.25170	.24733	.24312	.23904
780	361.36	24.59	.29072	.28497	.27946	.27415	.26905	.26412	.25938	.25480	.25038	.24611	.24199
790	365.80	24.89	.29424	.28843	.28285	.27748	.27231	.26733	.26254	.25790	.25343	.24911	.24493

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DENSITY

1.0 % O_2, 99.0 % He

DENSITY,LBS/CUBIC FT

.010 OXYGEN .990 HELIUM AVERAGE MOLECULAR WEIGHT 4.283

DEPTH FT	PRESSURE PSIA	ATM	TEMPERATURE,F 30	40	50	60	70	80	90	100	110	120	130
800	370.25	25.19	.29777	.29189	.28625	.28081	.27558	.27054	.26568	.26100	.25647	.25210	.24788
810	374.69	25.50	.30130	.29535	.28964	.28415	.27885	.27375	.26884	.26410	.25952	.25510	.25083
820	379.14	25.80	.30482	.29881	.29303	.28747	.28212	.27696	.27198	.26719	.26256	.25809	.25377
830	383.58	26.10	.30835	.30226	.29642	.29080	.28538	.28016	.27514	.27028	.26560	.26108	.25671
840	388.03	26.40	.31187	.30573	.29981	.29412	.28865	.28337	.27829	.27338	.26864	.26407	.25965
850	392.47	26.71	.31540	.30918	.30320	.29745	.29191	.28657	.28143	.27648	.27169	.26706	.26259
860	396.91	27.01	.31892	.31263	.30659	.30077	.29518	.28978	.28458	.27957	.27473	.27005	.26553
870	401.36	27.31	.32244	.31608	.30997	.30409	.29844	.29298	.28773	.28266	.27777	.27304	.26847
880	405.80	27.61	.32595	.31953	.31335	.30742	.30169	.29619	.29087	.28575	.28080	.27603	.27141
890	410.25	27.92	.32947	.32298	.31674	.31074	.30496	.29938	.29402	.28884	.28384	.27901	.27434
900	414.69	28.22	.33299	.32643	.32013	.31406	.30821	.30259	.29716	.29193	.28687	.28200	.27728
910	419.14	28.52	.33650	.32988	.32351	.31737	.31148	.30578	.30031	.29502	.28991	.28498	.28022
920	423.58	28.82	.34002	.33333	.32689	.32070	.31473	.30899	.30345	.29811	.29295	.28796	.28315
930	428.03	29.13	.34353	.33677	.33027	.32401	.31798	.31218	.30659	.30119	.29598	.29094	.28608
940	432.47	29.43	.34705	.34022	.33344	.32732	.32124	.31538	.30973	.30427	.29901	.29393	.28902
950	436.91	29.73	.35056	.34366	.33702	.33064	.32449	.31858	.31286	.30736	.30204	.29691	.29195
960	441.36	30.03	.35407	.34710	.34040	.33396	.32775	.32177	.31601	.31045	.30508	.29989	.29488
970	445.80	30.33	.35758	.35054	.34378	.33727	.33100	.32497	.31915	.31353	.30811	.30287	.29781
980	450.25	30.64	.36108	.35398	.34715	.34056	.33425	.32816	.32228	.31661	.31114	.30585	.30074
990	454.69	30.94	.36459	.35742	.35052	.34389	.33751	.33135	.32542	.31969	.31417	.30883	.30367
1000	459.14	31.24	.36810	.36086	.35390	.34720	.34075	.33454	.32856	.32278	.31719	.31181	.30660
1050	481.36	32.75	.38561	.37803	.37075	.36373	.35699	.35049	.34422	.33816	.33233	.32669	.32123
1100	503.58	34.27	.40309	.39518	.38757	.38025	.37320	.36640	.35986	.35354	.34744	.34154	.33584
1150	525.80	35.78	.42055	.41230	.40437	.39673	.38938	.38231	.37548	.36889	.36253	.35638	.35045
1200	548.02	37.29	.43798	.42940	.42114	.41320	.40555	.39818	.39107	.38421	.37760	.37121	.36502
1250	570.25	38.80	.45539	.44647	.43789	.42964	.42169	.41403	.40665	.39953	.39264	.38600	.37958
1300	592.47	40.31	.47276	.46351	.45461	.44605	.43781	.42987	.42220	.41482	.40768	.40078	.39412
1350	614.69	41.83	.49011	.48052	.47131	.46244	.45390	.44567	.43774	.43008	.42269	.41555	.40864
1400	636.91	43.34	.50744	.49753	.48799	.47881	.46997	.46146	.45325	.44533	.43768	.43029	.42315
1450	659.13	44.85	.52473	.51449	.50464	.49516	.48603	.47723	.46874	.46056	.45265	.44501	.43763
1500	681.36	46.36	.54200	.53142	.52126	.51147	.50206	.49297	.48421	.47577	.46761	.45972	.45209
	500	34.02	.40028	.39242	.38486	.37759	.37059	.36385	.35734	.35106	.34501	.33915	.33349
	600	40.83	.47864	.46928	.46027	.45161	.44327	.43522	.42747	.41999	.41277	.40579	.39905
	700	47.63	.55646	.54562	.53518	.52515	.51548	.50616	.49718	.48851	.48013	.47204	.46421
	800	54.44	.63375	.62145	.60960	.59821	.58723	.57666	.56645	.55661	.54709	.53791	.52902
	900	61.24	.71051	.69675	.68353	.67080	.65854	.64671	.63530	.62430	.61367	.60339	.59346
	1000	68.05	.78673	.77155	.75697	.74291	.72938	.71634	.70376	.69160	.67986	.66850	.65753
	1100	74.85	.86244	.84588	.82993	.81458	.79978	.78554	.77178	.75849	.74566	.73326	.72127
	1200	81.65	.93765	.91969	.90242	.88579	.86976	.85431	.83941	.82499	.81108	.79763	.78462
	1300	88.46	1.01235	.99303	.97445	.95656	.93931	.92266	.90663	.89113	.87614	.86166	.84765
	1400	95.26	1.08653	1.06589	1.04602	1.02687	1.00841	.99062	.97345	.95685	.94083	.92532	.91032
	1500	102.07	1.16026	1.13828	1.11712	1.09677	1.07714	1.05817	1.03988	1.02222	1.00513	.98863	.97267
	1600	108.87	1.2335	1.2102	1.1878	1.1662	1.1454	1.1253	1.1059	1.0872	1.0691	1.0516	1.0347
	1700	115.68	1.3062	1.2817	1.2580	1.2352	1.2132	1.1921	1.1716	1.1518	1.1327	1.1142	1.0963
	1800	122.48	1.3785	1.3527	1.3278	1.3038	1.2807	1.2584	1.2369	1.2160	1.1959	1.1765	1.1577
	1900	129.29	1.4504	1.4232	1.3972	1.3720	1.3478	1.3244	1.3018	1.2800	1.2589	1.2384	1.2187
	2000	136.09	1.5217	1.4934	1.4661	1.4399	1.4145	1.3900	1.3663	1.3435	1.3214	1.3000	1.2794
	2100	142.90	1.5926	1.5631	1.5346	1.5072	1.4807	1.4552	1.4305	1.4067	1.3836	1.3613	1.3397
	2200	149.70	1.6631	1.6324	1.6027	1.5742	1.5466	1.5201	1.4943	1.4695	1.4455	1.4223	1.3998
	2300	156.51	1.7331	1.7012	1.6704	1.6407	1.6121	1.5845	1.5578	1.5320	1.5070	1.4829	1.4595
	2400	163.31	1.8027	1.7696	1.7377	1.7069	1.6772	1.6486	1.6209	1.5941	1.5682	1.5432	1.5190
	2500	170.11	1.8719	1.8376	1.8046	1.7727	1.7420	1.7123	1.6837	1.6559	1.6291	1.6032	1.5781
	2600	176.92	1.9406	1.9052	1.8711	1.8382	1.8064	1.7757	1.7461	1.7174	1.6897	1.6628	1.6369
	2700	183.72	2.0090	1.9724	1.9372	1.9032	1.8704	1.8388	1.8082	1.7785	1.7499	1.7223	1.6954
	2800	190.53	2.0768	2.0392	2.0029	1.9679	1.9341	1.9014	1.8699	1.8394	1.8098	1.7813	1.7536
	2900	197.33	2.1443	2.1056	2.0682	2.0322	1.9974	1.9638	1.9313	1.8999	1.8695	1.8401	1.8116
	3000	204.14	2.2114	2.1716	2.1332	2.0962	2.0603	2.0258	1.9924	1.9601	1.9288	1.8985	1.8692
	3100	210.94	2.2781	2.2372	2.1978	2.1598	2.1230	2.0875	2.0531	2.0199	1.9878	1.9567	1.9266
	3200	217.75	2.3444	2.3025	2.2620	2.2230	2.1853	2.1489	2.1136	2.0795	2.0465	2.0146	1.9836
	3300	224.55	2.4104	2.3674	2.3258	2.2858	2.2471	2.2098	2.1737	2.1387	2.1049	2.0722	2.0404
	3400	231.36	2.4759	2.4319	2.3893	2.3483	2.3088	2.2705	2.2335	2.1977	2.1630	2.1295	2.0969
	3500	238.16	2.5411	2.4960	2.4526	2.4106	2.3701	2.3309	2.2930	2.2563	2.2208	2.1864	2.1532
	3600	244.96	2.6059	2.5598	2.5153	2.4725	2.4310	2.3909	2.3522	2.3146	2.2784	2.2433	2.2092
	3700	251.77	2.6702	2.6232	2.5778	2.5339	2.4915	2.4506	2.4110	2.3728	2.3356	2.2997	2.2649
	3800	258.57	2.7343	2.6862	2.6399	2.5951	2.5519	2.5100	2.4697	2.4305	2.3926	2.3559	2.3202
	3900	265.38	2.7980	2.7490	2.7017	2.6560	2.6119	2.5692	2.5279	2.4880	2.4493	2.4118	2.3755
	4000	272.18	2.8613	2.8113	2.7631	2.7165	2.6715	2.6280	2.5860	2.5451	2.5057	2.4674	2.4304
	4100	278.99	2.9242	2.8733	2.8242	2.7766	2.7309	2.6865	2.6436	2.6020	2.5616	2.5228	2.4851
	4200	285.79	2.9869	2.9350	2.8850	2.8366	2.7899	2.7447	2.7010	2.6587	2.6177	2.5780	2.5394
	4300	292.60	3.0492	2.9964	2.9456	2.8961	2.8487	2.8026	2.7581	2.7150	2.6733	2.6328	2.5935
	4400	299.40	3.1112	3.0574	3.0056	2.9555	2.9072	2.8603	2.8150	2.7711	2.7286	2.6874	2.6475
	4500	306.21	3.1728	3.1182	3.0654	3.0145	2.9653	2.9176	2.8715	2.8269	2.7837	2.7417	2.7011
	4600	313.01	3.2340	3.1785	3.1249	3.0732	3.0232	2.9746	2.9278	2.8825	2.8384	2.7958	2.7545
	4700	319.81	3.2950	3.2387	3.1842	3.1316	3.0807	3.0315	2.9839	2.9377	2.8930	2.8497	2.8076
	4800	326.62	3.3555	3.2983	3.2431	3.1896	3.1380	3.0880	3.0395	2.9928	2.9473	2.9032	2.8606
	4900	333.42	3.4159	3.3578	3.3017	3.2474	3.1949	3.1443	3.0951	3.0474	3.0013	2.9566	2.9132
	5000	340.23	3.4759	3.4169	3.3600	3.3046	3.2517	3.2001	3.1502	3.1020	3.0552	3.0098	2.9657

SP. VOL.
T-86
1.0 % O_2, 99.0 % He

SPECIFIC VOLUME,CUBIC FT/LB

.010 OXYGEN .990 HELIUM AVERAGE MOLECULAR WEIGHT 4.283

DEPTH	PRESSURE		TEMPERATURE,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	83.533	85.237	86.943	88.647	90.353	92.059	93.762	95.468	97.174	98.877	100.583
10	19.14	1.30	64.147	65.455	66.765	68.074	69.384	70.692	72.002	73.310	74.620	75.928	77.238
20	23.58	1.60	52.067	53.129	54.192	55.254	56.316	57.379	58.441	59.505	60.566	61.628	62.691
30	28.03	1.91	43.818	44.712	45.607	46.500	47.394	48.288	49.182	50.076	50.969	51.864	52.757
40	32.47	2.21	37.827	38.598	39.370	40.142	40.914	41.685	42.457	43.228	43.999	44.772	45.543
50	36.92	2.51	33.278	33.957	34.636	35.315	35.993	36.672	37.350	38.029	38.709	39.387	40.065
60	41.36	2.81	29.708	30.313	30.919	31.525	32.131	32.737	33.342	33.948	34.554	35.159	35.765
70	45.81	3.12	26.830	27.376	27.924	28.471	29.018	29.564	30.111	30.658	31.205	31.752	32.299
80	50.25	3.42	24.461	24.959	25.458	25.957	26.455	26.954	27.452	27.950	28.449	28.948	29.446
90	54.70	3.72	22.477	22.935	23.393	23.851	24.309	24.767	25.225	25.683	26.141	26.599	27.057
100	59.14	4.02	20.791	21.214	21.638	22.062	22.486	22.909	23.333	23.756	24.180	24.603	25.027
110	63.58	4.33	19.341	19.735	20.129	20.523	20.917	21.311	21.705	22.099	22.493	22.887	23.281
120	68.03	4.63	18.080	18.449	18.817	19.185	19.553	19.921	20.290	20.658	21.026	21.395	21.763
130	72.47	4.93	16.974	17.320	17.665	18.011	18.357	18.703	19.048	19.394	19.739	20.085	20.431
140	76.92	5.23	15.996	16.322	16.647	16.973	17.299	17.624	17.950	18.276	18.601	18.927	19.253
150	81.36	5.54	15.125	15.433	15.740	16.048	16.356	16.664	16.972	17.280	17.588	17.896	18.204
160	85.81	5.84	14.343	14.636	14.927	15.219	15.511	15.803	16.095	16.387	16.679	16.971	17.263
170	90.25	6.14	13.639	13.917	14.194	14.472	14.750	15.027	15.305	15.582	15.860	16.137	16.415
180	94.70	6.44	13.001	13.266	13.530	13.795	14.060	14.324	14.589	14.853	15.117	15.382	15.647
190	99.14	6.75	12.421	12.673	12.926	13.178	13.431	13.684	13.936	14.189	14.442	14.694	4.947
200	103.58	7.05	11.890	12.131	12.373	12.615	12.857	13.098	13.341	13.582	13.824	14.066	14.308
210	108.03	7.35	11.402	11.634	11.866	12.098	12.330	12.562	12.793	13.025	13.257	13.489	13.721
220	112.47	7.65	10.953	11.176	11.399	11.621	11.844	12.067	12.290	12.512	12.735	12.958	13.180
230	116.92	7.96	10.539	10.753	10.967	11.181	11.396	11.610	11.824	12.038	12.252	12.467	12.681
240	121.36	8.26	10.154	10.361	10.567	10.774	10.980	11.186	11.393	11.599	11.806	12.012	12.218
250	125.81	8.56	9.7971	9.9964	10.1954	10.3946	10.5935	10.7927	10.9918	11.1910	11.3900	11.5891	11.7881
260	130.25	8.86	9.4645	9.6568	9.8490	10.0412	10.2337	10.4258	10.6182	10.8105	11.0028	11.1951	11.3873
270	134.69	9.17	9.1536	9.3396	9.5255	9.7114	9.8973	10.0834	10.2694	10.4552	10.6412	10.8271	11.0130
280	139.14	9.47	8.8626	9.0427	9.2227	9.4027	9.5826	9.7626	9.9427	10.1228	10.3026	10.4826	10.6627
290	143.58	9.77	8.5896	8.7642	8.9386	9.1131	9.2875	9.4619	9.6362	9.8107	9.9853	10.1595	10.3340
300	148.03	10.07	8.3331	8.5024	8.6716	8.8406	9.0098	9.1792	9.3483	9.5174	9.6867	9.8558	10.0250
310	152.47	10.38	8.0914	8.2558	8.4200	8.5843	8.7486	8.9128	9.0770	9.2415	9.4056	9.5697	9.7341
320	156.92	10.68	7.8635	8.0232	8.1828	8.3424	8.5021	8.6617	8.8213	8.9809	9.1404	9.3001	9.4596
330	161.36	10.98	7.6483	7.8035	7.9586	8.1139	8.2690	8.4243	8.5795	8.7347	8.8898	9.0452	9.2002
340	165.81	11.28	7.4444	7.5955	7.7465	7.8975	8.0486	8.1997	8.3506	8.5016	8.6529	8.8039	8.9548
350	170.25	11.58	7.2512	7.3984	7.5455	7.6925	7.8397	7.9867	8.1339	8.2810	8.4281	8.5751	8.7222
360	174.69	11.89	7.0679	7.2113	7.3546	7.4980	7.6413	7.7847	7.9280	8.0714	8.2147	8.3581	8.5014
370	179.14	12.19	6.8936	7.0335	7.1733	7.3131	7.4529	7.5926	7.7325	7.8721	8.0120	8.1518	8.2915
380	183.58	12.49	6.7278	6.8643	7.0007	7.1370	7.2734	7.4099	7.5463	7.6828	7.8190	7.9555	8.0919
390	188.03	12.79	6.5698	6.7031	6.8361	6.9694	7.1026	7.2357	7.3691	7.5021	7.6354	7.7684	7.9016
400	192.47	13.10	6.4192	6.5493	6.6793	6.8095	6.9397	7.0698	7.1998	7.3299	7.4601	7.5900	7.7202
410	196.92	13.40	6.2753	6.4025	6.5296	6.6569	6.7839	6.9111	7.0382	7.1656	7.2926	7.4197	7.5469
420	201.36	13.70	6.1378	6.2621	6.3865	6.5108	6.6352	6.7596	6.8840	7.0083	7.1326	7.2569	7.3813
430	205.81	14.00	6.0062	6.1279	6.2495	6.3712	6.4929	6.6145	6.7362	6.8579	6.9795	7.1013	7.2229
440	210.25	14.31	5.8801	5.9993	6.1184	6.2375	6.3565	6.4757	6.5948	6.7138	6.8328	6.9521	7.0711
450	214.69	14.61	5.7593	5.8760	5.9927	6.1093	6.2259	6.3425	6.4592	6.5758	6.6924	6.8090	6.9256
460	219.14	14.91	5.6434	5.7577	5.8720	5.9862	6.1006	6.2148	6.3290	6.4433	6.5576	6.6718	6.7860
470	223.58	15.21	5.5322	5.6442	5.7561	5.8681	5.9801	6.0921	6.2041	6.3160	6.4281	6.5400	6.6520
480	228.03	15.52	5.4252	5.5350	5.6448	5.7546	5.8645	5.9742	6.0840	6.1939	6.3036	6.4134	6.5232
490	232.47	15.82	5.3223	5.4300	5.5377	5.6455	5.7531	5.8608	5.9686	6.0763	6.1839	6.2916	6.3993
500	236.92	16.12	5.2233	5.3290	5.4347	5.5403	5.6460	5.7517	5.8574	5.9631	6.0688	6.1744	6.2801
510	241.36	16.42	5.1279	5.2317	5.3354	5.4391	5.5429	5.6466	5.7503	5.8540	5.9578	6.0615	6.1653
520	245.80	16.73	5.0360	5.1379	5.2398	5.3416	5.4434	5.5453	5.6472	5.7491	5.8509	5.9527	6.0546
530	250.25	17.03	4.9473	5.0474	5.1475	5.2476	5.3476	5.4476	5.5476	5.6477	5.7477	5.8477	5.9478
540	254.69	17.33	4.8617	4.9601	5.0585	5.1567	5.2551	5.3533	5.4517	5.5499	5.6482	5.7466	5.8449
550	259.14	17.63	4.7792	4.8758	4.9724	5.0690	5.1656	5.2622	5.3589	5.4555	5.5522	5.6487	5.7453
560	263.58	17.94	4.6994	4.7944	4.8893	4.9843	5.0793	5.1743	5.2692	5.3642	5.4592	5.5542	5.6492
570	268.03	18.24	4.6222	4.7156	4.8090	4.9024	4.9958	5.0892	5.1827	5.2760	5.3694	5.4628	5.5562
580	272.47	18.54	4.5475	4.6394	4.7313	4.8231	4.9150	5.0069	5.0988	5.1907	5.2825	5.3744	5.4663
590	276.92	18.84	4.4752	4.5657	4.6561	4.7464	4.8369	4.9272	5.0177	5.1081	5.1986	5.2889	5.3794
600	281.36	19.15	4.4052	4.4942	4.5832	4.6722	4.7611	4.8501	4.9391	5.0281	5.1170	5.2060	5.2950
610	285.80	19.45	4.3374	4.4250	4.5127	4.6003	4.6878	4.7755	4.8629	4.9505	5.0382	5.1257	5.2133
620	290.25	19.75	4.2716	4.3580	4.4441	4.5304	4.6167	4.7029	4.7892	4.8755	4.9617	5.0479	5.1342
630	294.69	20.05	4.2080	4.2929	4.3778	4.4628	4.5477	4.6327	4.7176	4.8026	4.8875	4.9724	5.0574
640	299.14	20.36	4.1461	4.2298	4.3134	4.3972	4.4808	4.5645	4.6482	4.7318	4.8155	4.8991	4.9829
650	303.58	20.66	4.0860	4.1685	4.2509	4.3335	4.4158	4.4986	4.5808	4.6633	4.7456	4.8280	4.9104
660	308.03	20.96	4.0277	4.1090	4.1903	4.2715	4.3528	4.4340	4.5153	4.5966	4.6779	4.7591	4.8404
670	312.47	21.26	3.9710	4.0512	4.1313	4.2114	4.2915	4.3717	4.4517	4.5318	4.6119	4.6920	4.7721
680	316.92	21.56	3.9159	3.9950	4.0740	4.1530	4.2319	4.3109	4.3899	4.4688	4.5478	4.6268	4.7058
690	321.36	21.87	3.8624	3.9404	4.0182	4.0962	4.1740	4.2520	4.3297	4.4077	4.4855	4.5634	4.6413
700	325.80	22.17	3.8103	3.8872	3.9640	4.0408	4.1177	4.1945	4.2713	4.3481	4.4249	4.5018	4.5786
710	330.25	22.47	3.7597	3.8355	3.9112	3.9871	4.0628	4.1387	4.2144	4.2902	4.3661	4.4418	4.5176
720	334.69	22.77	3.7103	3.7851	3.8599	3.9347	4.0095	4.0843	4.1591	4.2339	4.3086	4.3834	4.4582
730	339.14	23.08	3.6623	3.7361	3.8099	3.8837	3.9575	4.0314	4.1051	4.1789	4.2527	4.3265	4.4003
740	343.58	23.38	3.6155	3.6884	3.7612	3.8340	3.9069	3.9797	4.0525	4.1254	4.1983	4.2711	4.3440
750	348.03	23.68	3.5699	3.6418	3.7138	3.7857	3.8576	3.9295	4.0014	4.0733	4.1452	4.2171	4.2890
760	352.47	23.98	3.5254	3.5965	3.6674	3.7385	3.8095	3.8805	3.9515	4.0225	4.0934	4.1644	4.2355
770	356.91	24.29	3.4820	3.5522	3.6223	3.6924	3.7626	3.8328	3.9029	3.9729	4.0431	4.1131	4.1833
780	361.36	24.59	3.4398	3.5091	3.5783	3.6476	3.7168	3.7861	3.8554	3.9246	3.9939	4.0632	4.1324
790	365.80	24.89	3.3986	3.4670	3.5354	3.6038	3.6722	3.7407	3.8090	3.8775	3.9459	4.0143	4.0827

T-87

SP. VOL.
1.0 % O_2, 99.0 % He

SPECIFIC VOLUME,CUBIC FT/LB

.010 OXYGEN .990 HEL.UM AVERAGE MOLECULAR WEIGHT 4.283

DEPTH	PRESSURF		TEMPERATURE,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
800	370.25	25.19	3.3583	3.4259	3.4935	3.5611	3.6287	3.6963	3.7639	3.8315	3.8990	3.9666	4.0342
810	374.69	25.50	3.3190	3.3858	3.4526	3.5193	3.5861	3.6530	3.7197	3.7865	3.8533	3.9201	3.9868
820	379.14	25.80	3.2806	3.3466	3.4126	3.4786	3.5446	3.6106	3.6767	3.7426	3.8086	3.8747	3.9406
830	383.58	26.10	3.2431	3.3084	3.3735	3.4388	3.5041	3.5694	3.6346	3.6998	3.7651	3.8303	3.8954
840	388.03	26.40	3.2064	3.2709	3.3354	3.4000	3.4644	3.5289	3.5934	3.6579	3.7224	3.7869	3.8513
850	392.47	26.71	3.1706	3.2344	3.2982	3.3619	3.4257	3.4895	3.5532	3.6170	3.6807	3.7445	3.8082
860	396.91	27.01	3.1356	3.1986	3.2617	3.3248	3.3878	3.4509	3.5139	3.5769	3.6400	3.7030	3.7660
870	401.36	27.31	3.1014	3.1637	3.2261	3.2885	3.3508	3.4132	3.4755	3.5379	3.6001	3.6625	3.7248
880	405.80	27.61	3.0679	3.1295	3.1911	3.2529	3.3146	3.3763	3.4379	3.4996	3.5613	3.6229	3.6845
890	410.25	27.92	3.0352	3.0961	3.1572	3.2181	3.2791	3.3402	3.4011	3.4621	3.5231	3.5841	3.6451
900	414.69	28.22	3.0031	3.0634	3.1238	3.1842	3.2445	3.3048	3.3652	3.4255	3.4858	3.5461	3.6065
910	419.14	28.52	2.9717	3.0314	3.0911	3.1509	3.2105	3.2703	3.3299	3.3896	3.4493	3.5090	3.5687
920	423.58	28.82	2.9410	3.0001	3.0592	3.1182	3.1773	3.2364	3.2954	3.3545	3.4136	3.4727	3.5317
930	428.03	29.13	2.9109	2.9694	3.0279	3.0863	3.1448	3.2033	3.2617	3.3201	3.3786	3.4371	3.4955
940	432.47	29.43	2.8814	2.9393	2.9972	3.0551	3.1129	3.1708	3.2286	3.2865	3.3444	3.4022	3.4600
950	436.91	29.73	2.8526	2.9099	2.9672	3.0245	3.0817	3.1389	3.1963	3.2535	3.3108	3.3680	3.4252
960	441.36	30.03	2.8243	2.8810	2.9378	2.9944	3.0511	3.1078	3.1645	3.2211	3.2779	3.3345	3.3912
970	445.80	30.33	2.7966	2.8527	2.9088	2.9650	3.0211	3.0772	3.1333	3.1895	3.2456	3.3017	3.3578
980	450.25	30.64	2.7695	2.8250	2.8806	2.9362	2.9918	3.0473	3.1029	3.1585	3.2140	3.2696	3.3251
990	454.69	30.94	2.7428	2.7978	2.8529	2.9079	2.9629	3.0179	3.0730	3.1280	3.1830	3.2380	3.2930
1000	459.14	31.24	2.7167	2.7712	2.8257	2.8802	2.9347	2.9892	3.0436	3.0981	3.1527	3.2071	3.2616
1050	481.36	32.75	2.5933	2.6453	2.6973	2.7493	2.8012	2.8532	2.9051	2.9571	3.0091	3.0610	3.1130
1100	503.58	34.27	2.4808	2.5305	2.5802	2.6298	2.6796	2.7292	2.7789	2.8286	2.8782	2.9279	2.9776
1150	525.80	35.78	2.3778	2.4254	2.4730	2.5206	2.5682	2.6157	2.6633	2.7108	2.7584	2.8060	2.8535
1200	548.02	37.29	2.2832	2.3288	2.3745	2.4201	2.4658	2.5115	2.5571	2.6027	2.6483	2.6939	2.7396
1250	570.25	38.80	2.1959	2.2398	2.2837	2.3275	2.3714	2.4153	2.4591	2.5030	2.5468	2.5907	2.6345
1300	592.47	40.31	2.1153	2.1575	2.1997	2.2419	2.2841	2.3263	2.3685	2.4107	2.4529	2.4951	2.5373
1350	614.69	41.83	2.0404	2.0811	2.1217	2.1624	2.2031	2.2438	2.2844	2.3252	2.3658	2.4065	2.4472
1400	636.91	43.34	1.9707	2.0099	2.0492	2.0885	2.1278	2.1670	2.2063	2.2455	2.2848	2.3240	2.3632
1450	659.13	44.85	1.9058	1.9437	1.9816	2.0196	2.0575	2.0954	2.1334	2.1713	2.2092	2.2472	2.2850
1500	681.36	46.36	1.8450	1.8817	1.9184	1.9552	1.9918	2.0285	2.0652	2.1019	2.1386	2.1753	2.2119

500	34.02	2.4983	2.5483	2.5984	2.6484	2.6984	2.7484	2.7985	2.8485	2.8985	2.9485	2.9986
600	40.83	2.0892	2.1309	2.1726	2.2143	2.2560	2.2977	2.3394	2.3810	2.4227	2.4643	2.5060
700	47.63	1.7971	1.8328	1.8685	1.9042	1.9400	1.9757	2.0113	2.0471	2.0828	2.1185	2.1542
800	54.44	1.5779	1.6091	1.6404	1.6716	1.7029	1.7341	1.7654	1.7966	1.8279	1.8590	1.8903
900	61.24	1.4074	1.4352	1.4630	1.4908	1.5185	1.5463	1.5741	1.6018	1.6295	1.6573	1.6850
1000	68.05	1.2711	1.2961	1.3211	1.3461	1.3710	1.3960	1.4209	1.4459	1.4709	1.4999	1.5208
1100	74.85	1.1595	1.1822	1.2049	1.2276	1.2503	1.2730	1.2957	1.3184	1.3411	1.3638	1.3865
1200	81.65	1.0665	1.0873	1.1081	1.1289	1.1497	1.1705	1.1913	1.2121	1.2329	1.2537	1.2745
1300	88.46	.98780	1.00702	1.02622	1.04541	1.06462	1.08382	1.10299	1.12218	1.14136	1.16055	1.17974
1400	95.26	.92036	.93818	.95600	.97383	.99166	1.00947	1.02727	1.04509	1.06289	1.08070	1.09852
1500	102.07	.86188	.87852	.89516	.91177	.92839	.94503	.96165	.97827	.99490	1.01150	1.02810
1600	108.87	.81070	.82632	.84189	.85747	.87306	.88866	.90422	.91980	.93536	.95095	.96651
1700	115.68	.76555	.78022	.79489	.80957	.82424	.83889	.85354	.86821	.88284	.89749	.91215
1800	122.48	.72542	.73925	.75311	.76698	.78081	.79465	.80849	.82234	.83616	.85000	.86388
1900	129.29	.68947	.70262	.71573	.72884	.74195	.75506	.76818	.78127	.79436	.80746	.82058
2000	136.09	.65716	.66962	.68209	.69452	.70698	.71944	.73190	.74434	.75678	.76922	.78164
2100	142.90	.62788	.63977	.65162	.66349	.67533	.68721	.69905	.71089	.72274	.73459	.74641
2200	149.70	.60128	.61260	.62395	.63526	.64657	.65787	.66921	.68052	.69179	.70310	.71439
2300	156.51	.57701	.58782	.59865	.60948	.62030	.63112	.64193	.65275	.66357	.67436	.68518
2400	163.31	.55471	.56511	.57547	.58585	.59622	.60657	.61693	.62730	.63767	.64800	.65834
2500	170.11	.53422	.54418	.55414	.56411	.57405	.58401	.59393	.60388	.61384	.62376	.63368
2600	176.92	.51531	.52487	.53445	.54402	.55357	.56315	.57270	.58227	.59181	.60138	.61092
2700	183.72	.49777	.50699	.51622	.52544	.53464	.54385	.55304	.56226	.57145	.58063	.58984
2800	190.53	.48151	.49038	.49929	.50816	.51704	.52592	.53479	.54365	.55253	.56139	.57025
2900	197.33	.46635	.47492	.48350	.49207	.50065	.50923	.51779	.52635	.53490	.54345	.55200
3000	204.14	.45220	.46049	.46877	.47706	.48536	.49362	.50190	.51018	.51844	.52673	.53499
3100	210.94	.43896	.44699	.45501	.46301	.47103	.47905	.48706	.49507	.50307	.51107	.51906
3200	217.75	.42655	.43432	.44209	.44985	.45761	.46536	.47313	.48089	.48864	.49638	.50412
3300	224.55	.41487	.42241	.42995	.43748	.44501	.45253	.46006	.46756	.47508	.48259	.49009
3400	231.36	.40390	.41120	.41853	.42584	.43313	.44043	.44772	.45502	.46232	.46960	.47689
3500	238.16	.39354	.40064	.40774	.41484	.42193	.42902	.43611	.44320	.45029	.45736	.46443
3600	244.96	.38375	.39066	.39756	.40445	.41135	.41825	.42514	.43203	.43890	.44578	.45265
3700	251.77	.37451	.38122	.38792	.39465	.40136	.40806	.41476	.42145	.42815	.43484	.44153
3800	258.57	.36572	.37227	.37881	.38534	.39186	.39840	.40491	.41144	.41795	.42446	.43099
3900	265.38	.35740	.36377	.37014	.37651	.38287	.38922	.39558	.40193	.40829	.41463	.42097
4000	272.18	.34949	.35571	.36191	.36812	.37432	.38052	.38670	.39291	.39909	.40528	.41146
4100	278.99	.34197	.34803	.35408	.36013	.36618	.37222	.37828	.38432	.39034	.39638	.40240
4200	285.79	.33480	.34071	.34662	.35253	.35844	.36434	.37023	.37613	.38201	.38790	.39380
4300	292.60	.32795	.33374	.33951	.34527	.35104	.35681	.36256	.36832	.37407	.37982	.38558
4400	299.40	.32142	.32708	.33271	.33835	.34398	.34962	.35524	.36087	.36649	.37211	.37771
4500	306.21	.31518	.32070	.32622	.33173	.33723	.34275	.34825	.35375	.35924	.36473	.37022
4600	313.01	.30921	.31461	.32001	.32539	.33078	.33618	.34156	.34692	.35231	.35768	.36304
4700	319.81	.30349	.30877	.31405	.31933	.32460	.32987	.33514	.34040	.34566	.35092	.35618
4800	326.62	.29802	.30319	.30835	.31351	.31868	.32384	.32900	.33414	.33930	.34445	.34958
4900	333.42	.29275	.29782	.30287	.30794	.31300	.31804	.32309	.32815	.33318	.33822	.34327
5000	340.23	.28769	.29266	.29762	.30259	.30753	.31249	.31744	.32238	.32731	.33225	.33719

1.0 % O_2, 99.0 % He

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0.100 OXYGEN 0.900 HELIUM
ENTHALPY,BTU/LB

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	378.00	393.21	408.42	423.64	438.85	454.07
30.00	378.01	393.22	408.44	423.66	438.88	454.10
50.00	378.02	393.24	408.46	423.69	438.91	454.14
100.00	378.06	393.29	408.52	423.76	439.00	454.24
200.00	378.11	393.37	408.63	423.90	439.16	454.44
300.00	378.17	393.44	408.75	424.05	439.33	454.63
400.00	378.22	393.52	408.86	424.19	439.49	454.83
500.00	378.28	393.60	408.98	424.34	439.66	455.03
1000.00	378.46	394.03	409.56	425.03	440.51	455.93
2000.00	379.27	395.20	411.07	426.85	442.44	457.99
3000.00	380.25	396.53	412.85	428.88	444.62	460.18
4000.00	382.63	399.06	415.41	431.60	447.56	463.46
5000.00	385.27	401.54	417.81	434.49	450.47	466.64

0.100 OXYGEN 0.900 HELIUM
CV,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.469	.469	.469	.469	.469	.470
30.00	.469	.469	.469	.469	.469	.470
50.00	.469	.469	.469	.469	.469	.470
100.00	.469	.469	.469	.469	.469	.470
200.00	.469	.469	.469	.469	.469	.470
300.00	.469	.469	.470	.470	.470	.470
400.00	.469	.469	.470	.470	.470	.470
500.00	.469	.469	.470	.470	.470	.470
1000.00	.470	.470	.470	.470	.471	.471
2000.00	.475	.475	.475	.470	.470	.470
3000.00	.481	.481	.481	.475	.475	.475
4000.00						
5000.00						

0.100 OXYGEN 0.900 HELIUM
ENTROPY,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	4.3433	4.3737	4.4029	4.4312	4.4584	4.4846
30.00	4.2602	4.2906	4.3199	4.3481	4.3751	4.4015
50.00	4.1515	4.1819	4.2113	4.2394	4.2667	4.2929
100.00	3.9053	4.0828	3.9651	3.9932	4.0206	4.1938
200.00	3.7744	3.9152	3.8343	3.8625	3.8899	4.0264
300.00	3.6435	3.7476	3.7036	3.7319	3.7593	3.8591
400.00	3.5127	3.5801	3.5728	3.6012	3.6286	3.6917
500.00	3.3818	3.4125	3.4421	3.4706	3.4980	3.5244
1000.00	3.1209	3.1520	3.1819	3.2106	3.2382	3.2649
2000.00	2.9123	2.9445	2.9749	3.0042	3.0320	3.0593
3000.00	2.7713	2.8040	2.8350	2.9577	2.8931	2.9205
4000.00	2.6842	2.7166	2.7483	2.7775	2.8053	2.8329
5000.00	2.6147	2.6473	2.6790	2.7092	2.7380	2.7654

0.100 OXYGEN 0.900 HELIUM
THERMAL CONDUCTIVITY,BTU/SEC FT F
(MULTIPLY TABLE ENTRY BY .0000100)

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.83	1.89	1.94	1.99	2.04	2.10
30.00						
50.00						
100.00						
200.00						
300.00						
400.00						
500.00						
1000.00						
2000.00						
3000.00						
4000.00						
5000.00						

0.100 OXYGEN 0.900 HELIUM
CP,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.7607	.7610	.7611	.7614	.7614	.7618
30.00	.7610	.7612	.7613	.7616	.7618	.7620
50.00	.7613	.7615	.7616	.7619	.7618	.7622
100.00	.7622	.7623	.7623	.7625	.7624	.7627
200.00	.7640	.7639	.7638	.7638	.7637	.7637
300.00	.7658	.7654	.7652	.7651	.7649	.7648
400.00	.7676	.7670	.7667	.7664	.7661	.7658
500.00	.7695	.7687	.7682	.7677	.7673	.7669
1000.00	.7789	.7771	.7755	.7744	.7733	.7726
2000.00	.80	.79	.79	.79	.79	.78
3000.00	.82	.81	.81	.80	.80	.79
4000.00	.82	.81	.81	.81	.80	.79
5000.00						

0.100 OXYGEN 0.900 HELIUM
PRANDTL NUMBER

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.56	.56	.56	.56	.56	.55
30.00						
50.00						
100.00						
200.00						
300.00						
400.00						
500.00						
1000.00						
2000.00						
3000.00						
4000.00						
5000.00						

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1.0 % O_2, 99.0 % He

0.100 OXYGEN 0.900 HELIUM
CP/CV

PRESSURE	TEMPERATURE					
PSIA	30	50	70	90	110	130
14.70	1.622	1.623	1.623	1.623	1.623	1.623
30.00	1.623	1.623	1.623	1.623	1.623	1.623
50.00	1.623	1.624	1.624	1.624	1.624	1.624
100.00	1.625	1.625	1.625	1.625	1.625	1.624
200.00	1.628	1.628	1.628	1.627	1.626	1.626
300.00	1.632	1.631	1.630	1.630	1.628	1.627
400.00	1.635	1.634	1.633	1.632	1.630	1.629
500.00	1.638	1.637	1.636	1.634	1.632	1.631
1000.00	1.656	1.652	1.649	1.646	1.644	1.642
2000.00	1.7	1.7	1.7	1.7	1.7	1.7
3000.00	1.7	1.7	1.7	1.7	1.7	1.7
4000.00						
5000.00						

0.100 OXYGEN 0.900 HELIUM
VISCOSITY,LB/FT SEC
(MULTIPLY TABLE ENTRY BY .0000100)

PRESSURE	TEMPERATURE					
PSIA	30	50	70	90	110	130
14.70	1.344	1.377	1.415	1.452	1.488	1.525
30.00						
50.00						
100.00						
200.00						
300.00						
400.00						
500.00						
1000.00						
2000.00						
3000.00						
4000.00						
5000.00						

0.100 OXYGEN 0.900 HELIUM
SONIC VELOCITY FT/SEC

PRESSURE	TEMPERATURE					
PSIA	30	50	70	90	110	130
14.70	2412	2460	2507	2554	2600	2646
30.00	2414	2461	2509	2556	2602	2648
50.00	2416	2464	2511	2558	2604	2649
100.00	2422	2469	2516	2563	2609	2654
200.00	2433	2480	2527	2573	2619	2664
300.00	2445	2492	2538	2584	2629	2674
400.00	2457	2503	2549	2594	2639	2684
500.00	2468	2514	2560	2605	2649	2694
1000.00	2526	2570	2614	2657	2700	2743
2000.00	2633	2677	2721	2765	2808	2851
3000.00	2740	2784	2823	2872	2916	2960
4000.00						
5000.00						

DENSITY
$0.7\ \%\ O_2$, 99.3 % He

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DENSITY,LBS/CUBIC FT

.007 OXYGEN .993 HELIUM AVERAGE MOLECULAR WEIGHT 4.199

DEPTH	PRESSURE		TEMPERATURE,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	.01174	.01150	.01128	.01106	.01085	.01065	.01046	.01027	.01009	.00992	.00975
10	19.14	1.30	.01528	.01498	.01468	.01440	.01413	.01387	.01362	.01337	.01314	.01291	.01269
20	23.58	1.60	.01883	.01845	.01809	.01774	.01741	.01709	.01678	.01648	.01619	.01591	.01564
30	28.03	1.91	.02237	.02193	.02150	.02108	.02069	.02030	.01993	.01958	.01923	.01890	.01858
40	32.47	2.21	.02592	.02540	.02490	.02442	.02396	.02352	.02309	.02268	.02228	.02190	.02153
50	36.92	2.51	.02946	.02887	.02831	.02776	.02724	.02673	.02625	.02578	.02533	.02489	.02447
60	41.36	2.81	.03300	.03234	.03171	.03110	.03051	.02995	.02940	.02888	.02837	.02788	.02741
70	45.81	3.12	.03654	.03581	.03511	.03444	.03379	.03316	.03256	.03198	.03142	.03088	.03035
80	50.25	3.42	.04008	.03928	.03851	.03777	.03706	.03637	.03571	.03508	.03446	.03387	.03329
90	54.70	3.72	.04362	.04275	.04191	.04111	.04033	.03958	.03887	.03817	.03750	.03686	.03623
100	59.14	4.02	.04715	.04621	.04531	.04444	.04360	.04279	.04202	.04127	.04055	.03985	.03917
110	63.58	4.33	.05069	.04968	.04871	.04777	.04687	.04600	.04517	.04436	.04359	.04284	.04211
120	68.03	4.63	.05423	.05314	.05210	.05110	.05014	.04921	.04832	.04746	.04663	.04582	.04505
130	72.47	4.93	.05776	.05661	.05550	.05443	.05341	.05242	.05147	.05055	.04967	.04881	.04799
140	76.92	5.23	.06129	.06007	.05889	.05776	.05667	.05563	.05462	.05364	.05271	.05180	.05092
150	81.36	5.54	.06482	.06353	.06229	.06109	.05994	.05883	.05777	.05674	.05574	.05478	.05386
160	85.81	5.84	.06835	.06699	.06548	.06442	.06321	.06204	.06091	.05983	.05878	.05777	.05679
170	90.25	6.14	.07188	.07045	.06907	.06774	.06647	.06524	.06406	.06292	.06182	.06075	.05973
180	94.70	6.44	.07541	.07390	.07246	.07107	.06973	.06844	.06720	.06601	.06485	.06374	.06266
190	99.14	6.75	.07893	.07736	.07585	.07439	.07299	.07165	.07035	.06909	.06789	.06672	.06559
200	103.58	7.05	.08246	.08082	.07924	.07772	.07625	.07485	.07349	.07218	.07092	.06970	.06852
210	108.03	7.35	.08598	.08427	.08262	.08104	.07952	.07805	.07663	.07527	.07395	.07268	.07145
220	112.47	7.65	.08951	.08772	.08601	.08436	.08277	.08125	.07978	.07836	.07698	.07566	.07438
230	116.92	7.96	.09303	.09118	.08939	.08768	.08603	.08444	.08291	.08144	.08002	.07864	.07731
240	121.36	8.26	.09655	.09463	.09278	.09100	.08929	.08764	.08605	.08452	.08305	.08162	.08024
250	125.81	8.56	.10007	.09808	.09616	.09432	.09255	.09084	.08919	.08761	.08608	.08460	.08317
260	130.25	8.86	.10359	.10153	.09954	.09764	.09580	.09403	.09233	.09069	.08910	.08757	.08609
270	134.69	9.17	.10711	.10497	.10292	.10095	.09906	.09723	.09547	.09377	.09213	.09055	.08902
280	139.14	9.47	.11062	.10842	.10630	.10427	.10231	.10042	.09860	.09685	.09516	.09353	.09195
290	143.58	9.77	.11414	.11187	.10968	.10758	.10556	.10361	.10174	.09993	.09819	.09650	.09487
300	148.03	10.07	.11765	.11531	.11306	.11090	.10881	.10681	.10488	.10301	.10121	.09947	.09779
310	152.47	10.38	.12116	.11875	.11644	.11421	.11206	.11000	.10801	.10609	.10424	.10245	.10072
320	156.92	10.68	.12468	.12220	.11981	.11752	.11531	.11319	.11114	.10917	.10726	.10542	.10364
330	161.36	10.98	.12819	.12564	.12319	.12083	.11856	.11638	.11427	.11224	.11028	.10839	.10656
340	165.81	11.28	.13170	.12908	.12656	.12414	.12181	.11957	.11740	.11532	.11331	.11136	.10948
350	170.25	11.58	.13520	.13252	.12993	.12745	.12506	.12275	.12053	.11839	.11633	.11433	.11240
360	174.69	11.89	.13871	.13596	.13331	.13076	.12830	.12594	.12366	.12147	.11935	.11730	.11532
370	179.14	12.19	.14222	.13939	.13668	.13406	.13155	.12912	.12679	.12454	.12237	.12027	.11824
380	183.58	12.49	.14572	.14283	.14006	.13737	.13479	.13231	.12992	.12761	.12539	.12323	.12116
390	188.03	12.79	.14923	.14626	.14341	.14067	.13803	.13549	.13304	.13068	.12840	.12620	.12408
400	192.47	13.10	.15273	.14970	.14678	.14398	.14128	.13868	.13617	.13375	.13142	.12917	.12699
410	196.92	13.40	.15623	.15313	.15015	.14728	.14452	.14186	.13929	.13682	.13444	.13213	.12991
420	201.36	13.70	.15973	.15656	.15351	.15058	.14776	.14504	.14242	.13989	.13745	.13510	.13282
430	205.81	14.00	.16323	.15999	.15688	.15388	.15100	.14822	.14554	.14296	.14047	.13806	.13574
440	210.25	14.31	.16673	.16342	.16024	.15718	.15423	.15140	.14866	.14603	.14348	.14102	.13865
450	214.69	14.61	.17023	.16685	.16360	.16048	.15747	.15458	.15179	.14909	.14650	.14399	.14156
460	219.14	14.91	.17372	.17028	.16696	.16378	.16071	.15775	.15490	.15216	.14951	.14695	.14448
470	223.58	15.21	.17722	.17370	.17032	.16707	.16394	.16093	.15803	.15522	.15252	.14991	.14739
480	228.03	15.52	.18071	.17713	.17368	.17037	.16718	.16411	.16114	.15829	.15553	.15287	.15030
490	232.47	15.82	.18421	.18055	.17704	.17366	.17041	.16728	.16426	.16135	.15854	.15583	.15321
500	236.92	16.12	.18770	.18398	.18040	.17696	.17365	.17046	.16738	.16441	.16155	.15878	.15611
510	241.36	16.42	.19119	.18740	.18376	.18025	.17688	.17363	.17049	.16747	.16456	.16174	.15902
520	245.80	16.73	.19468	.19082	.18711	.18354	.18011	.17680	.17361	.17053	.16757	.16470	.16193
530	250.25	17.03	.19817	.19424	.19046	.18683	.18334	.17997	.17673	.17360	.17057	.16765	.16484
540	254.69	17.33	.20165	.19766	.19382	.19012	.18656	.18314	.17984	.17665	.17358	.17061	.16774
550	259.14	17.63	.20514	.20108	.19717	.19341	.18979	.18631	.18295	.17971	.17658	.17356	.17065
560	263.58	17.94	.20863	.20449	.20052	.19670	.19302	.18948	.18606	.18277	.17959	.17652	.17355
570	268.03	18.24	.21211	.20791	.20387	.19998	.19624	.19264	.18917	.18583	.18259	.17947	.17645
580	272.47	18.54	.21559	.21132	.20722	.20327	.19947	.19581	.19228	.18888	.18560	.18242	.17936
590	276.92	18.84	.21908	.21474	.21057	.20656	.20269	.19897	.19539	.19193	.18859	.18537	.18226
600	281.36	19.15	.22255	.21815	.21391	.20984	.20592	.20214	.19850	.19499	.19160	.18832	.18516
610	285.80	19.45	.22603	.22156	.21726	.21312	.20914	.20530	.20160	.19804	.19460	.19127	.18806
620	290.25	19.75	.22951	.22497	.22060	.21640	.21236	.20847	.20471	.20109	.19760	.19422	.19096
630	294.69	20.05	.23299	.22838	.22395	.21969	.21558	.21163	.20782	.20414	.20060	.19717	.19386
640	299.14	20.36	.23647	.23179	.22729	.22297	.21880	.21479	.21092	.20720	.20360	.20011	.19676
650	303.58	20.66	.23994	.23520	.23063	.22624	.22202	.21795	.21403	.21024	.20659	.20306	.19965
660	308.03	20.96	.24342	.23860	.23397	.22952	.22524	.22111	.21713	.21329	.20959	.20601	.20255
670	312.47	21.26	.24689	.24201	.23731	.23280	.22845	.22427	.22023	.21634	.21258	.20895	.20545
680	316.92	21.56	.25036	.24541	.24065	.23608	.23167	.22743	.22334	.21938	.21558	.21190	.20834
690	321.36	21.87	.25383	.24881	.24399	.23935	.23488	.23058	.22643	.22243	.21857	.21484	.21124
700	325.80	22.17	.25730	.25222	.24732	.24263	.23810	.23374	.22953	.22548	.22157	.21778	.21413
710	330.25	22.47	.26077	.25562	.25067	.24590	.24131	.23689	.23263	.22853	.22455	.22073	.21702
720	334.69	22.77	.26424	.25902	.25400	.24917	.24452	.24005	.23573	.23156	.22755	.22367	.21991
730	339.14	23.08	.26771	.26242	.25733	.25244	.24774	.24320	.23883	.23461	.23054	.22661	.22281
740	343.58	23.38	.27117	.26581	.26066	.25571	.25094	.24635	.24193	.23765	.23353	.22955	.22570
750	348.03	23.68	.27464	.26921	.26400	.25898	.25415	.24950	.24502	.24070	.23652	.23249	.22859
760	352.47	23.98	.27810	.27260	.26732	.26225	.25736	.25265	.24811	.24373	.23951	.23543	.23147
770	356.91	24.29	.28156	.27600	.27066	.26552	.26057	.25580	.25120	.24677	.24249	.23836	.23436
780	361.36	24.59	.28502	.27939	.27399	.26879	.26378	.25895	.25430	.24981	.24548	.24130	.23726
790	365.80	24.89	.28848	.28278	.27732	.27205	.26698	.26210	.25739	.25285	.24847	.24423	.24014

T-91

DENSITY

0.7 % O_2, 99.3 % He

DENSITY,LBS/CUBIC FT

.007 OXYGEN .993 HELIUM AVERAGE MOLECULAR WEIGHT 4.199

DEPTH FT	PRESSURE PSIA	ATM	TEMPERATURE,F 30	40	50	60	70	80	90	100	110	120	130
800	370.25	25.19	.29194	.28618	.28064	.27531	.27018	.26525	.26048	.25589	.25145	.24716	.24303
810	374.69	25.50	.29540	.28957	.28397	.27858	.27339	.26839	.26357	.25892	.25444	.25010	.24592
820	379.14	25.80	.29885	.29296	.28729	.28184	.27659	.27154	.26666	.26196	.25742	.25303	.24880
830	383.58	26.10	.30231	.29634	.29062	.28510	.27980	.27468	.26975	.26499	.26040	.25597	.25168
840	388.03	26.40	.30577	.29973	.29394	.28836	.28299	.27782	.27284	.26803	.26338	.25890	.25457
850	392.47	26.71	.30922	.30312	.29726	.29162	.28619	.28097	.27592	.27106	.26636	.26183	.25745
860	396.91	27.01	.31267	.30651	.30058	.29488	.28940	.28411	.27901	.27409	.26935	.26476	.26033
870	401.36	27.31	.31612	.30989	.30390	.29814	.29259	.28725	.28210	.27712	.27233	.26769	.26321
880	405.80	27.61	.31957	.31328	.30722	.30140	.29579	.29039	.28518	.28015	.27531	.27062	.26609
890	410.25	27.92	.32302	.31666	.31053	.30465	.29898	.29353	.28826	.28318	.27829	.27355	.26897
900	414.69	28.22	.32647	.32004	.31386	.30790	.30218	.29666	.29135	.28622	.28126	.27648	.27185
910	419.14	28.52	.32991	.32342	.31717	.31116	.30538	.29980	.29442	.28924	.28423	.27940	.27473
920	423.58	28.82	.33336	.32680	.32049	.31442	.30857	.30293	.29751	.29227	.28721	.28233	.27761
930	428.03	29.13	.33681	.33018	.32380	.31766	.31176	.30607	.30058	.29530	.29019	.28525	.28048
940	432.47	29.43	.34025	.33355	.32711	.32091	.31495	.30920	.30366	.29832	.29316	.28818	.28336
950	436.91	29.73	.34369	.33693	.33042	.32417	.31814	.31234	.30675	.30134	.29614	.29110	.28623
960	441.36	30.03	.34714	.34030	.33374	.32742	.32133	.31547	.30982	.30437	.29910	.29402	.28911
970	445.80	30.33	.35058	.34368	.33705	.33066	.32452	.31860	.31290	.30739	.30207	.29694	.29198
980	450.25	30.64	.35401	.34705	.34035	.33391	.32771	.32173	.31598	.31042	.30505	.29986	.29485
990	454.69	30.94	.35745	.35042	.34366	.33716	.33090	.32486	.31904	.31343	.30802	.30278	.29772
1000	459.14	31.24	.36089	.35379	.34696	.34040	.33408	.32799	.32212	.31646	.31099	.30570	.30060
1050	481.36	32.75	.37806	.37063	.36349	.35662	.34999	.34362	.33748	.33155	.32582	.32029	.31495
1100	503.58	34.27	.39520	.38744	.37998	.37280	.36590	.35924	.35281	.34661	.34063	.33486	.32928
1150	525.80	35.78	.41232	.40423	.39645	.38896	.38177	.37482	.36812	.36167	.35544	.34940	.34358
1200	548.02	37.29	.42941	.42099	.41290	.40511	.39762	.39039	.38342	.37670	.37021	.36394	.35787
1250	570.25	38.80	.44647	.43772	.42932	.42122	.41344	.40594	.39869	.39171	.38496	.37845	.37215
1300	592.47	40.31	.46351	.45443	.44572	.43732	.42924	.42145	.41394	.40669	.39970	.39294	.38641
1350	614.69	41.83	.48051	.47112	.46208	.45340	.44502	.43695	.42917	.42166	.41442	.40742	.40064
1400	636.91	43.34	.49750	.48778	.47843	.46944	.46078	.45244	.44439	.43662	.42912	.42187	.41486
1450	659.13	44.85	.51446	.50441	.49476	.48547	.47651	.46789	.45957	.45155	.44379	.43630	.42907
1500	681.36	46.36	.53139	.52103	.51106	.50146	.49222	.48333	.47474	.46646	.45846	.45072	.44325
	500	34.02	.39244	.38473	.37733	.37020	.36333	.35672	.35035	.34420	.33825	.33252	.32697
	600	40.83	.46928	.46009	.45127	.44277	.43459	.42671	.41911	.41178	.40469	.39785	.39123
	700	47.63	.54558	.53494	.52472	.51487	.50539	.49626	.48745	.47895	.47074	.46281	.45513
	800	54.44	.62135	.60929	.59769	.58651	.57575	.56538	.55538	.54572	.53640	.52739	.51867
	900	61.24	.69661	.68313	.67016	.65768	.64565	.63408	.62289	.61210	.60168	.59160	.58187
	1000	68.05	.77134	.75648	.74218	.72840	.71514	.70235	.68999	.67809	.66658	.65544	.64469
	1100	74.85	.84559	.82933	.81372	.79866	.78418	.77019	.75670	.74369	.73109	.71894	.70718
	1200	81.65	.91933	.90172	.88481	.86850	.85279	.83762	.82301	.80889	.79526	.78207	.76931
	1300	88.46	.99257	.97363	.95544	.93788	.92098	.90466	.88892	.87372	.85905	.84485	.83111
	1400	95.26	1.06533	1.04509	1.02561	1.00683	.98874	.97129	.95446	.93818	.92248	.90727	.89258
	1500	102.07	1.13762	1.11607	1.09532	1.07537	1.05612	1.03752	1.01959	1.00227	.98554	.96937	.95369
	1600	108.87	1.2094	1.1866	1.1646	1.1435	1.1230	1.1034	1.0843	1.0660	1.0482	1.0311	1.0145
	1700	115.68	1.2808	1.2567	1.2335	1.2111	1.1896	1.1689	1.1487	1.1294	1.1106	1.0925	1.0750
	1800	122.48	1.3517	1.3263	1.3019	1.2784	1.2558	1.2339	1.2128	1.1924	1.1727	1.1536	1.1351
	1900	129.29	1.4221	1.3955	1.3700	1.3453	1.3216	1.2986	1.2764	1.2551	1.2343	1.2143	1.1949
	2000	136.09	1.4921	1.4643	1.4375	1.4118	1.3869	1.3629	1.3397	1.3173	1.2957	1.2747	1.2545
	2100	142.90	1.5616	1.5326	1.5048	1.4778	1.4519	1.4268	1.4027	1.3793	1.3567	1.3348	1.3137
	2200	149.70	1.6307	1.6006	1.5715	1.5435	1.5165	1.4905	1.4653	1.4409	1.4174	1.3946	1.3726
	2300	156.51	1.6994	1.6681	1.6379	1.6088	1.5807	1.5536	1.5275	1.5022	1.4777	1.4540	1.4311
	2400	163.31	1.7677	1.7352	1.7039	1.6738	1.6446	1.6165	1.5894	1.5632	1.5378	1.5132	1.4894
	2500	170.11	1.8354	1.8018	1.7695	1.7383	1.7082	1.6791	1.6509	1.6238	1.5975	1.5720	1.5474
	2600	176.92	1.9029	1.8681	1.8347	1.8025	1.7713	1.7412	1.7122	1.6841	1.6569	1.6305	1.6051
	2700	183.72	1.9698	1.9340	1.8995	1.8662	1.8341	1.8030	1.7731	1.7440	1.7160	1.6888	1.6625
	2800	190.53	2.0365	1.9996	1.9640	1.9297	1.8965	1.8645	1.8336	1.8037	1.7748	1.7467	1.7196
	2900	197.33	2.1027	2.0647	2.0281	1.9928	1.9586	1.9257	1.8939	1.8631	1.8332	1.8044	1.7764
	3000	204.14	2.1685	2.1294	2.0918	2.0555	2.0204	1.9865	1.9537	1.9220	1.8914	1.8617	1.8330
	3100	210.94	2.2339	2.1938	2.1552	2.1178	2.0818	2.0470	2.0133	1.9808	1.9493	1.9188	1.8892
	3200	217.75	2.2990	2.2578	2.2182	2.1798	2.1429	2.1071	2.0726	2.0392	2.0068	1.9755	1.9452
	3300	224.55	2.3636	2.3215	2.2808	2.2415	2.2036	2.1670	2.1316	2.0973	2.0641	2.0320	2.0009
	3400	231.36	2.4279	2.3848	2.3430	2.3028	2.2640	2.2265	2.1903	2.1551	2.1211	2.0882	2.0563
	3500	238.16	2.4918	2.4477	2.4050	2.3639	2.3241	2.2857	2.2486	2.2127	2.1779	2.1442	2.1115
	3600	244.96	2.5554	2.5102	2.4666	2.4245	2.3839	2.3446	2.3066	2.2697	2.2343	2.1998	2.1664
	3700	251.77	2.6185	2.5723	2.5279	2.4849	2.4434	2.4033	2.3644	2.3268	2.2905	2.2552	2.2211
	3800	258.57	2.6813	2.6343	2.5889	2.5449	2.5025	2.4615	2.4218	2.3835	2.3463	2.3104	2.2754
	3900	265.38	2.7438	2.6958	2.6494	2.6046	2.5614	2.5196	2.4790	2.4399	2.4019	2.3651	2.3295
	4000	272.18	2.8059	2.7569	2.7097	2.6639	2.6198	2.5772	2.5360	2.4960	2.4572	2.4197	2.3836
	4100	278.99	2.8676	2.8178	2.7696	2.7231	2.6781	2.6346	2.5926	2.5518	2.5123	2.4741	2.4370
	4200	285.79	2.9291	2.8783	2.8292	2.7818	2.7361	2.6917	2.6489	2.6074	2.5671	2.5281	2.4904
	4300	292.60	2.9902	2.9386	2.8886	2.8403	2.7936	2.7486	2.7049	2.6626	2.6216	2.5819	2.5435
	4400	299.40	3.0510	2.9984	2.9475	2.8984	2.8509	2.8051	2.7607	2.7176	2.6760	2.6356	2.5963
	4500	306.21	3.1114	3.0579	3.0062	2.9563	2.9080	2.8613	2.8161	2.7723	2.7300	2.6888	2.6490
	4600	313.01	3.1716	3.1172	3.0646	3.0139	2.9648	2.9172	2.8714	2.8269	2.7837	2.7420	2.7013
	4700	319.81	3.2314	3.1762	3.1227	3.0711	3.0213	2.9730	2.9263	2.8810	2.8372	2.7947	2.7535
	4800	326.62	3.2909	3.2347	3.1805	3.1281	3.0774	3.0284	2.9810	2.9350	2.8905	2.8473	2.8054
	4900	333.42	3.3500	3.2930	3.2380	3.1849	3.1334	3.0836	3.0354	2.9888	2.9436	2.8997	2.8571
	5000	340.23	3.4089	3.3511	3.2951	3.2412	3.1891	3.1385	3.0895	3.0422	2.9962	2.9517	2.9086

SP. VOL.
0.7 % O_2, 99.3 % He

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SPECIFIC VOLUME,CUBIC FT/LB

.007 OXYGEN .993 HELIUM AVERAGE MOLECULAR WEIGHT 4.199

DEPTH FT	PRESSURF PSIA	ATM	TEMPERATURE,F 30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	85.204	86.942	88.682	90.420	92.160	93.900	95.638	97.378	99.118	100.855	102.595
10	19.14	1.30	65.430	66.765	68.101	69.435	70.772	72.106	73.442	74.776	76.112	77.447	78.783
20	23.58	1.60	53.109	54.192	55.276	56.360	57.443	58.527	59.610	60.693	61.778	62.861	63.945
30	28.03	1.91	44.694	45.606	46.518	47.430	48.342	49.253	50.165	51.076	51.989	52.900	53.813
40	32.47	2.21	38.584	39.371	40.157	40.944	41.732	42.519	43.306	44.093	44.879	45.667	46.454
50	36.92	2.51	33.944	34.636	35.329	36.021	36.713	37.405	38.098	38.790	39.483	40.175	40.867
60	41.36	2.81	30.302	30.920	31.538	32.156	32.773	33.391	34.009	34.627	35.245	35.863	36.481
70	45.81	3.12	27.366	27.924	28.482	29.040	29.598	30.156	30.714	31.272	31.829	32.387	32.945
80	50.25	3.42	24.950	25.458	25.967	26.475	26.984	27.493	28.002	28.510	29.018	29.527	30.035
90	54.70	3.72	22.926	23.393	23.861	24.328	24.795	25.262	25.730	26.197	26.664	27.131	27.598
100	59.14	4.02	21.207	21.639	22.071	22.503	22.935	23.367	23.799	24.231	24.664	25.095	25.528
110	63.58	4.33	19.727	20.129	20.532	20.933	21.335	21.737	22.139	22.541	22.943	23.344	23.747
120	68.03	4.63	18.442	18.817	19.193	19.568	19.944	20.320	20.695	21.071	21.447	21.822	22.198
130	72.47	4.93	17.314	17.666	18.019	18.371	18.724	19.076	19.429	19.782	20.134	20.487	20.840
140	76.92	5.23	16.316	16.648	16.980	17.312	17.645	17.977	18.309	18.641	18.973	19.306	19.638
150	81.36	5.54	15.427	15.741	16.055	16.369	16.683	16.997	17.311	17.625	17.939	18.254	18.568
160	85.81	5.84	14.630	14.928	15.226	15.524	15.821	16.119	16.417	16.715	17.013	17.310	17.608
170	90.25	6.14	13.912	14.195	14.478	14.761	15.045	15.327	15.611	15.894	16.177	16.460	16.743
180	94.70	6.44	13.261	13.531	13.801	14.071	14.340	14.610	14.880	15.150	15.420	15.690	15.960
190	99.14	6.75	12.669	12.926	13.184	13.442	13.700	13.957	14.215	14.473	14.730	14.988	15.246
200	103.58	7.05	12.127	12.374	12.620	12.867	13.114	13.360	13.607	13.854	14.100	14.347	14.594
210	108.03	7.35	11.630	11.867	12.103	12.340	12.576	12.813	13.049	13.286	13.522	13.759	13.995
220	112.47	7.65	11.172	11.399	11.627	11.854	12.081	12.308	12.535	12.762	12.990	13.217	13.444
230	116.92	7.96	10.749	10.968	11.186	11.405	11.624	11.842	12.061	12.279	12.498	12.716	12.935
240	121.36	8.26	10.357	10.568	10.778	10.989	11.199	11.410	11.620	11.831	12.041	12.252	12.463
250	125.81	8.56	9.9930	10.1960	10.3993	10.6022	10.8054	11.0086	11.2116	11.4145	11.6176	11.8206	12.0239
260	130.25	8.86	9.6535	9.8497	10.0460	10.2421	10.4381	10.6343	10.8306	11.0267	11.2229	11.4190	11.6151
270	134.69	9.17	9.3365	9.5262	9.7161	9.9057	10.0953	10.2851	10.4746	10.6643	10.8540	11.0437	11.2333
280	139.14	9.47	9.0399	9.2233	9.4069	9.5908	9.7743	9.9578	10.1416	10.3250	10.5087	10.6923	10.8759
290	143.58	9.77	8.7615	8.9392	9.1172	9.2951	9.4730	9.6511	9.8289	10.0070	10.1847	10.3627	10.5407
300	148.03	10.07	8.4997	8.6722	8.8448	9.0175	9.1900	9.3626	9.5351	9.7078	9.8802	10.0529	10.2255
310	152.47	10.38	8.2533	8.4207	8.5884	8.7560	8.9236	9.0911	9.2586	9.4261	9.5935	9.7611	9.9288
320	156.92	10.68	8.0208	8.1835	8.3464	8.5091	8.6719	8.8348	8.9975	9.1603	9.3232	9.4859	9.6488
330	161.36	10.98	7.8011	7.9594	8.1178	8.2760	8.4344	8.5928	8.7511	8.9094	9.0676	9.2258	9.3843
340	165.81	11.28	7.5932	7.7472	7.9015	8.0554	8.2096	8.3635	8.5176	8.6717	8.8257	8.9797	9.1339
350	170.25	11.58	7.3963	7.5462	7.6962	7.8464	7.9963	8.1465	8.2963	8.4464	8.5964	8.7464	8.8966
360	174.69	11.89	7.2092	7.3553	7.5016	7.6478	7.7941	7.9402	8.0865	8.2328	8.3788	8.5250	8.6714
370	179.14	12.19	7.0315	7.1740	7.3166	7.4592	7.6017	7.7445	7.8870	8.0296	8.1722	8.3148	8.4574
380	183.58	12.49	6.8623	7.0014	7.1406	7.2797	7.4189	7.5580	7.6972	7.8362	7.9754	8.1146	8.2537
390	188.03	12.79	6.7012	6.8370	6.9729	7.1088	7.2446	7.3805	7.5163	7.6520	7.7879	7.9238	8.0595
400	192.47	13.10	6.5475	6.6801	6.8129	6.9455	7.0783	7.2110	7.3437	7.4765	7.6091	7.7419	7.8744
410	196.92	13.40	6.4007	6.5304	6.6602	6.7898	6.9196	7.0493	7.1790	7.3087	7.4383	7.5681	7.6977
420	201.36	13.70	6.2604	6.3872	6.5142	6.6410	6.7678	6.8946	7.0215	7.1483	7.2753	7.4020	7.5288
430	205.81	14.00	6.1263	6.2503	6.3744	6.4986	6.6226	6.7468	6.8709	6.9950	7.1191	7.2431	7.3671
440	210.25	14.31	5.9977	6.1191	6.2406	6.3621	6.4837	6.6050	6.7266	6.8481	6.9695	7.0909	7.2123
450	214.69	14.61	5.8745	5.9934	6.1124	6.2313	6.3503	6.4693	6.5882	6.7072	6.8261	6.9451	7.0640
460	219.14	14.91	5.7563	5.8727	5.9893	6.1059	6.2225	6.3389	6.4556	6.5720	6.6886	6.8051	6.9216
470	223.58	15.21	5.6427	5.7569	5.8712	5.9855	6.0997	6.2139	6.3281	6.4424	6.5565	6.6707	6.7849
480	228.03	15.52	5.5336	5.6456	5.7577	5.8696	5.9816	6.0936	6.2057	6.3176	6.4297	6.5415	6.6535
490	232.47	15.82	5.4286	5.5385	5.6485	5.7583	5.8682	5.9780	6.0879	6.1977	6.3076	6.4173	6.5272
500	236.92	16.12	5.3276	5.4355	5.5432	5.6511	5.7588	5.8666	5.9744	6.0823	6.1901	6.2979	6.4056
510	241.36	16.42	5.2305	5.3362	5.4420	5.5479	5.6537	5.7595	5.8653	5.9711	6.0769	6.1827	6.2884
520	245.80	16.73	5.1367	5.2405	5.3445	5.4483	5.5523	5.6561	5.7600	5.8639	5.9678	6.0717	6.1755
530	250.25	17.03	5.0463	5.1483	5.2504	5.3524	5.4544	5.5565	5.6585	5.7605	5.8625	5.9647	6.0666
540	254.69	17.33	4.9590	5.0592	5.1595	5.2598	5.3601	5.4603	5.5606	5.6609	5.7611	5.8614	5.9615
550	259.14	17.63	4.8747	4.9732	5.0718	5.1703	5.2690	5.3675	5.4659	5.5645	5.6631	5.7616	5.8601
560	263.58	17.94	4.7933	4.8901	4.9871	5.0839	5.1808	5.2777	5.3746	5.4714	5.5683	5.6652	5.7620
570	268.03	18.24	4.7145	4.8098	4.9050	5.0004	5.0957	5.1909	5.2862	5.3814	5.4767	5.5720	5.6672
580	272.47	18.54	4.6383	4.7321	4.8258	4.9196	5.0132	5.1069	5.2006	5.2944	5.3880	5.4818	5.5755
590	276.92	18.84	4.5646	4.6569	4.7491	4.8413	4.9335	5.0258	5.1180	5.2101	5.3024	5.3945	5.4867
600	281.36	19.15	4.4933	4.5840	4.6749	4.7655	4.8564	4.9470	5.0378	5.1285	5.2193	5.3100	5.4007
610	285.80	19.45	4.4241	4.5134	4.6028	4.6921	4.7815	4.8708	4.9602	5.0495	5.1388	5.2281	5.3175
620	290.25	19.75	4.3571	4.4450	4.5330	4.6210	4.7090	4.7969	4.8849	4.9729	5.0608	5.1487	5.2367
630	294.69	20.05	4.2920	4.3787	4.4654	4.5519	4.6386	4.7253	4.8118	4.8985	4.9851	5.0717	5.1584
640	299.14	20.36	4.2289	4.3143	4.3996	4.4850	4.5704	4.6557	4.7411	4.8263	4.9117	4.9971	5.0824
650	303.58	20.66	4.1676	4.2518	4.3359	4.4200	4.5041	4.5882	4.6723	4.7564	4.8405	4.9246	5.0087
660	308.03	20.96	4.1082	4.1911	4.2740	4.3569	4.4397	4.5226	4.6055	4.6884	4.7713	4.8542	4.9370
670	312.47	21.26	4.0504	4.1321	4.2138	4.2955	4.3773	4.4590	4.5407	4.6223	4.7041	4.7858	4.8675
680	316.92	21.56	3.9942	4.0748	4.1554	4.2359	4.3164	4.3970	4.4776	4.5582	4.6387	4.7193	4.7998
690	321.36	21.87	3.9396	4.0191	4.0986	4.1780	4.2574	4.3369	4.4163	4.4958	4.5751	4.6546	4.7341
700	325.80	22.17	3.8865	3.9649	4.0433	4.1215	4.2000	4.2783	4.3567	4.4350	4.5133	4.5917	4.6701
710	330.25	22.47	3.8348	3.9121	3.9894	4.0667	4.1440	4.2214	4.2986	4.3759	4.4533	4.5305	4.6078
720	334.69	22.77	3.7845	3.8608	3.9370	4.0133	4.0896	4.1658	4.2422	4.3185	4.3947	4.4709	4.5472
730	339.14	23.08	3.7355	3.8108	3.8860	3.9613	4.0365	4.1119	4.1871	4.2624	4.3377	4.4129	4.4882
740	343.58	23.38	3.6877	3.7620	3.8364	3.9106	3.9849	4.0592	4.1335	4.2078	4.2821	4.3564	4.4307
750	348.03	23.68	3.6412	3.7146	3.7879	3.8613	3.9347	4.0080	4.0813	4.1546	4.2280	4.3013	4.3747
760	352.47	23.98	3.5958	3.6683	3.7408	3.8132	3.8856	3.9580	4.0304	4.1029	4.1752	4.2476	4.3201
770	356.91	24.29	3.5516	3.6232	3.6947	3.7662	3.8378	3.9093	3.9808	4.0523	4.1239	4.1953	4.2669
780	361.36	24.59	3.5086	3.5792	3.6498	3.7204	3.7911	3.8617	3.9324	4.0030	4.0737	4.1442	4.2148
790	365.80	24.89	3.4665	3.5363	3.6060	3.6758	3.7456	3.8154	3.8851	3.9549	4.0247	4.0945	4.1642

T-93

SP. VOL.

0.7 % O_2, 99.3 % He

SPECIFIC VOLUME,CUBIC FT/LB

.007 OXYGEN .993 HELIUM AVERAGE MOLECULAR WEIGHT 4.199

DEPTH FT	PRESSURE PSIA	PRESSURE ATM	TEMPERATURE,F 30	40	50	60	70	80	90	100	110	120	130
800	370.25	25.19	3.4256	3.4944	3.5633	3.6323	3.7012	3.7701	3.8391	3.9080	3.9769	4.0459	4.1147
810	374.69	25.50	3.3853	3.4534	3.5216	3.5896	3.6578	3.7260	3.7940	3.8621	3.9302	3.9984	4.0664
820	379.14	25.80	3.3461	3.4135	3.4808	3.5481	3.6154	3.6828	3.7501	3.8174	3.8847	3.9521	4.0193
830	383.58	26.10	3.3079	3.3745	3.4409	3.5075	3.5740	3.6407	3.7072	3.7737	3.8403	3.9068	3.9732
840	388.03	26.40	3.2705	3.3363	3.4020	3.4679	3.5336	3.5994	3.6652	3.7310	3.7968	3.8625	3.9282
850	392.47	26.71	3.2339	3.2991	3.3640	3.4291	3.4942	3.5591	3.6242	3.6892	3.7543	3.8193	3.8843
860	396.91	27.01	3.1982	3.2625	3.3269	3.3912	3.4555	3.5198	3.5841	3.6484	3.7127	3.7770	3.8413
870	401.36	27.31	3.1633	3.2269	3.2906	3.3542	3.4177	3.4813	3.5449	3.6085	3.6721	3.7357	3.7992
880	405.80	27.61	3.1292	3.1921	3.2550	3.3179	3.3808	3.4437	3.5066	3.5695	3.6323	3.6952	3.7581
890	410.25	27.92	3.0958	3.1580	3.2203	3.2824	3.3446	3.4068	3.4691	3.5313	3.5934	3.6557	3.7179
900	414.69	28.22	3.0631	3.1246	3.1862	3.2478	3.3093	3.3708	3.4323	3.4939	3.5555	3.6170	3.6785
910	419.14	28.52	3.0311	3.0920	3.1529	3.2138	3.2746	3.3355	3.3965	3.4574	3.5182	3.5791	3.6400
920	423.58	28.82	2.9998	3.0600	3.1203	3.1805	3.2408	3.3010	3.3613	3.4215	3.4818	3.5420	3.6022
930	428.03	29.13	2.9691	3.0287	3.0883	3.1480	3.2076	3.2672	3.3269	3.3864	3.4461	3.5056	3.5653
940	432.47	29.43	2.9390	2.9980	3.0571	3.1161	3.1751	3.2341	3.2931	3.3521	3.4111	3.4701	3.5291
950	436.91	29.73	2.9096	2.9680	3.0265	3.0848	3.1433	3.2016	3.2600	3.3185	3.3768	3.4352	3.4937
960	441.36	30.03	2.8807	2.9386	2.9964	3.0542	3.1120	3.1699	3.2277	3.2855	3.3433	3.4012	3.4589
970	445.80	30.33	2.8524	2.9097	2.9670	3.0242	3.0815	3.1387	3.1959	3.2532	3.3104	3.3677	3.4249
980	450.25	30.64	2.8248	2.8814	2.9381	2.9948	3.0515	3.1082	3.1648	3.2215	3.2782	3.3349	3.3915
990	454.69	30.94	2.7976	2.8537	2.9099	2.9660	3.0221	3.0782	3.1344	3.1905	3.2466	3.3027	3.3588
1000	459.14	31.24	2.7710	2.8265	2.8821	2.9377	2.9933	3.0489	3.1044	3.1600	3.2155	3.2712	3.3267
1050	481.36	32.75	2.6451	2.6981	2.7511	2.8041	2.8572	2.9102	2.9632	3.0161	3.0692	3.1222	3.1751
1100	503.58	34.27	2.5304	2.5811	2.6317	2.6824	2.7330	2.7837	2.8344	2.8851	2.9357	2.9863	3.0370
1150	525.80	35.78	2.4251	2.4738	2.5224	2.5709	2.6194	2.6680	2.7165	2.7650	2.8134	2.8620	2.9105
1200	548.02	37.29	2.3288	2.3753	2.4219	2.4685	2.5150	2.5616	2.6081	2.6546	2.7012	2.7477	2.7943
1250	570.25	38.80	2.2398	2.2845	2.3293	2.3740	2.4187	2.4634	2.5082	2.5529	2.5977	2.6424	2.6871
1300	592.47	40.31	2.1575	2.2006	2.2436	2.2866	2.3297	2.3728	2.4158	2.4589	2.5019	2.5449	2.5879
1350	614.69	41.83	2.0811	2.1226	2.1641	2.2056	2.2471	2.2886	2.3301	2.3716	2.4130	2.4545	2.4960
1400	636.91	43.34	2.0100	2.0501	2.0902	2.1302	2.1702	2.2103	2.2503	2.2903	2.3304	2.3704	2.4105
1450	659.13	44.85	1.9438	1.9825	2.0212	2.0599	2.0986	2.1373	2.1759	2.2146	2.2533	2.2920	2.3306
1500	681.36	46.36	1.8819	1.9193	1.9567	1.9942	2.0316	2.0690	2.1064	2.1438	2.1812	2.2187	2.2561
	500	34.02	2.5482	2.5992	2.6502	2.7012	2.7523	2.8033	2.8543	2.9053	2.9564	3.0074	3.0584
	600	40.83	2.1309	2.1735	2.2160	2.2585	2.3010	2.3435	2.3860	2.4285	2.4710	2.5135	2.5560
	700	47.63	1.8329	1.8694	1.9058	1.9422	1.9787	2.0151	2.0515	2.0879	2.1243	2.1607	2.1972
	800	54.44	1.6094	1.6413	1.6731	1.7050	1.7369	1.7687	1.8006	1.8324	1.8643	1.8961	1.9280
	900	61.24	1.4355	1.4638	1.4922	1.5205	1.5488	1.5771	1.6054	1.6337	1.6620	1.6903	1.7186
	1000	68.05	1.2964	1.3219	1.3474	1.3729	1.3983	1.4238	1.4493	1.4747	1.5002	1.5257	1.5511
	1100	74.85	1.1826	1.2058	1.2289	1.2521	1.2752	1.2984	1.3215	1.3447	1.3678	1.3909	1.4141
	1200	81.65	1.0877	1.1090	1.1302	1.1514	1.1726	1.1939	1.2151	1.2363	1.2575	1.2787	1.2999
	1300	88.46	1.0075	1.0271	1.0466	1.0662	1.0858	1.1054	1.1250	1.1445	1.1641	1.1836	1.2032
	1400	95.26	.93867	.95685	.97503	.99321	1.01139	1.02956	1.04771	1.06589	1.08404	1.10221	1.12035
	1500	102.07	.87903	.89600	.91298	.92991	.94686	.96384	.98079	.99773	1.01467	1.03160	1.04856
	1600	108.87	.82684	.84272	.85865	.87454	.89044	.90630	.92222	.93806	.95397	.96985	.98571
	1700	115.68	.78079	.79575	.81071	.82568	.84061	.85554	.87053	.88544	.90041	.91535	.93025
	1800	122.48	.73982	.75396	.76810	.78221	.79631	.81042	.82454	.83867	.85276	.86687	.88099
	1900	129.29	.70319	.71657	.72994	.74331	.75668	.77005	.78343	.79678	.81017	.82349	.83687
	2000	136.09	.67020	.68292	.69563	.70834	.72101	.73372	.74643	.75911	.77180	.78449	.79716
	2100	142.90	.64035	.65247	.66455	.67667	.68874	.70085	.71292	.72500	.73708	.74917	.76123
	2200	149.70	.61324	.62476	.63634	.64787	.65940	.67093	.68246	.69399	.70552	.71706	.72857
	2300	156.51	.58844	.59949	.61054	.62158	.63262	.64365	.65468	.66568	.67671	.68774	.69875
	2400	163.31	.56572	.57630	.58689	.59745	.60803	.61861	.62918	.63972	.65029	.66084	.67141
	2500	170.11	.54483	.55499	.56514	.57528	.58542	.59557	.60572	.61584	.62599	.63611	.64623
	2600	176.92	.52551	.53529	.54503	.55479	.56457	.57431	.58404	.59380	.60353	.61329	.62307
	2700	183.72	.50765	.51705	.52644	.53584	.54523	.55462	.56399	.57339	.58276	.59213	.60150
	2800	190.53	.49105	.50010	.50918	.51822	.52728	.53633	.54538	.55442	.56345	.57251	.58154
	2900	197.33	.47559	.48433	.49308	.50182	.51057	.51929	.52802	.53675	.54550	.55421	.56293
	3000	204.14	.46116	.46961	.47806	.48651	.49495	.50340	.51184	.52028	.52871	.53716	.54556
	3100	210.94	.44766	.45583	.46400	.47218	.48036	.48851	.49669	.50485	.51301	.52117	.52932
	3200	217.75	.43498	.44290	.45083	.45876	.46665	.47458	.48248	.49039	.49829	.50619	.51408
	3300	224.55	.42309	.43076	.43845	.44612	.45380	.46147	.46913	.47680	.48447	.49212	.49978
	3400	231.36	.41188	.41933	.42680	.43425	.44169	.44913	.45657	.46401	.47145	.47888	.48631
	3500	238.16	.40132	.40855	.41579	.42304	.43027	.43750	.44472	.45194	.45916	.46638	.47359
	3600	244.96	.39133	.39838	.40542	.41245	.41948	.42651	.43354	.44055	.44757	.45459	.46160
	3700	251.77	.38189	.38875	.39559	.40243	.40927	.41610	.42294	.42978	.43659	.44342	.45023
	3800	258.57	.37295	.37961	.38628	.39294	.39961	.40626	.41291	.41955	.42621	.43287	.43949
	3900	265.38	.36446	.37095	.37744	.38394	.39041	.39690	.40338	.40985	.41616	.42241	.42927
	4000	272.18	.35639	.36273	.36905	.37538	.38170	.38802	.39433	.40064	.40696	.41327	.41957
	4100	278.99	.34872	.35489	.36106	.36723	.37340	.37956	.38572	.39187	.39804	.40419	.41034
	4200	285.79	.34140	.34743	.35346	.35948	.36549	.37151	.37752	.38353	.38954	.39555	.40155
	4300	292.60	.33442	.34030	.34619	.35208	.35796	.36383	.36970	.37557	.38144	.38731	.39316
	4400	299.40	.32776	.33351	.33927	.34501	.35076	.35650	.36223	.36797	.37369	.37942	.38516
	4500	306.21	.32140	.32702	.33264	.33826	.34388	.34949	.35510	.36071	.36631	.37191	.37750
	4600	313.01	.31530	.32080	.32630	.33180	.33729	.34279	.34826	.35375	.35924	.36470	.37019
	4700	319.81	.30947	.31485	.32023	.32561	.33099	.33636	.34173	.34710	.35246	.35782	.36317
	4800	326.62	.30387	.30915	.31441	.31968	.32495	.33021	.33545	.34071	.34596	.35121	.35646
	4900	333.42	.29851	.30368	.30883	.31398	.31914	.32430	.32945	.33459	.33972	.34486	.35001
	5000	340.23	.29335	.29841	.30348	.30853	.31357	.31862	.32367	.32871	.33375	.33879	.34381

DENSITY

T-94

0.5 % O_2, 99.5 % He

DENSITY,LBS/CUBIC FT

.005 OXYGEN .995 HELIUM AVERAGE MOLECULAR WEIGHT 4.143

DEPTH	PRESSURF		TEMPERATURE,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	.01158	.01135	.01113	.01091	.01071	.01051	.01032	.01013	.00995	.00978	.00962
10	19.14	1.30	.01508	.01478	.01449	.01421	.01394	.01368	.01343	.01319	.01296	.01274	.01252
20	23.58	1.60	.01858	.01821	.01785	.01751	.01718	.01686	.01655	.01626	.01597	.01570	.01543
30	28.03	1.91	.02208	.02163	.02121	.02080	.02041	.02003	.01967	.01932	.01898	.01865	.01834
40	32.47	2.21	.02557	.02506	.02457	.02410	.02364	.02321	.02278	.02238	.02198	.02161	.02124
50	36.92	2.51	.02907	.02849	.02793	.02739	.02687	.02638	.02590	.02544	.02499	.02456	.02414
60	41.36	2.81	.03256	.03191	.03129	.03068	.03011	.02955	.02901	.02849	.02799	.02751	.02705
70	45.81	3.12	.03605	.03533	.03464	.03398	.03334	.03272	.03212	.03155	.03100	.03046	.02995
80	50.25	3.42	.03955	.03876	.03800	.03727	.03656	.03589	.03524	.03461	.03400	.03342	.03285
90	54.70	3.72	.04304	.04218	.04135	.04056	.03979	.03906	.03835	.03766	.03700	.03637	.03575
100	59.14	4.02	.04653	.04560	.04470	.04385	.04302	.04222	.04146	.04072	.04001	.03932	.03865
110	63.58	4.33	.05001	.04902	.04806	.04713	.04625	.04539	.04457	.04377	.04301	.04227	.04155
120	68.03	4.63	.05350	.05243	.05141	.05042	.04947	.04856	.04768	.04683	.04601	.04521	.04445
130	72.47	4.93	.05699	.05585	.05476	.05371	.05270	.05172	.05078	.04988	.04900	.04816	.04735
140	76.92	5.23	.06047	.05927	.05811	.05699	.05592	.05489	.05389	.05293	.05200	.05111	.05024
150	81.36	5.54	.06396	.06268	.06145	.06028	.05914	.05805	.05700	.05598	.05500	.05405	.05314
160	85.81	5.84	.06744	.06610	.06480	.06356	.06236	.06121	.06010	.05903	.05800	.05700	.05603
170	90.25	6.14	.07092	.06951	.06815	.06684	.06558	.06437	.06320	.06208	.06099	.05994	.05893
180	94.70	6.44	.07440	.07292	.07149	.07012	.06880	.06753	.06631	.06513	.06399	.06289	.06182
190	99.14	6.75	.07788	.07633	.07484	.07340	.07202	.07069	.06941	.06817	.06698	.06583	.06472
200	103.58	7.05	.08136	.07974	.07818	.07668	.07524	.07385	.07251	.07122	.06997	.06877	.06761
210	108.03	7.35	.08484	.08315	.08152	.07996	.07846	.07701	.07561	.07427	.07297	.07171	.07050
220	112.47	7.65	.08831	.08655	.08486	.08324	.08167	.08016	.07871	.07731	.07596	.07465	.07339
230	116.92	7.96	.09179	.08996	.08820	.08651	.08489	.08332	.08181	.08035	.07895	.07759	.07628
240	121.36	8.26	.09526	.09337	.09154	.08979	.08810	.08647	.08491	.08340	.08194	.08053	.07917
250	125.81	8.56	.09874	.09677	.09488	.09306	.09131	.08963	.08801	.08644	.08493	.08347	.08206
260	130.25	8.86	.10221	.10017	.09822	.09633	.09453	.09278	.09110	.08948	.08792	.08641	.08495
270	134.69	9.17	.10568	.10357	.10155	.09961	.09774	.09593	.09420	.09252	.09091	.08936	.08784
280	139.14	9.47	.10915	.10697	.10489	.10289	.10094	.09908	.09729	.09556	.09389	.09228	.09072
290	143.58	9.77	.11261	.11037	.10822	.10615	.10416	.10224	.10038	.09860	.09688	.09521	.09361
300	148.03	10.07	.11608	.11377	.11155	.10942	.10736	.10538	.10348	.10164	.09986	.09815	.09649
310	152.47	10.38	.11955	.11717	.11488	.11269	.11057	.10853	.10657	.10467	.10285	.10108	.09938
320	156.92	10.68	.12301	.12057	.11821	.11595	.11378	.11168	.10966	.10771	.10583	.10401	.10226
330	161.36	10.98	.12648	.12396	.12155	.11922	.11698	.11483	.11275	.11075	.10881	.10695	.10514
340	165.81	11.28	.12994	.12736	.12487	.12248	.12019	.11797	.11584	.11378	.11179	.10988	.10802
350	170.25	11.58	.13340	.13075	.12820	.12575	.12339	.12112	.11893	.11681	.11478	.11281	.11091
360	174.69	11.89	.13686	.13414	.13153	.12901	.12659	.12426	.12202	.11985	.11776	.11574	.11379
370	179.14	12.19	.14032	.13753	.13485	.13228	.12979	.12741	.12510	.12288	.12074	.11867	.11667
380	183.58	12.49	.14378	.14092	.13818	.13554	.13299	.13055	.12819	.12591	.12372	.12159	.11954
390	188.03	12.79	.14724	.14431	.14150	.13880	.13620	.13369	.13127	.12894	.12669	.12452	.12242
400	192.47	13.10	.15069	.14770	.14483	.14206	.13939	.13683	.13436	.13197	.12967	.12745	.12530
410	196.92	13.40	.15415	.15109	.14815	.14531	.14259	.13997	.13744	.13500	.13265	.13037	.12818
420	201.36	13.70	.15760	.15447	.15147	.14857	.14579	.14311	.14052	.13803	.13562	.13330	.13105
430	205.81	14.00	.16106	.15786	.15479	.15183	.14898	.14625	.14360	.14106	.13860	.13622	.13393
440	210.25	14.31	.16451	.16124	.15810	.15509	.15218	.14938	.14668	.14408	.14157	.13914	.13680
450	214.69	14.61	.16796	.16463	.16142	.15834	.15537	.15252	.14976	.14711	.14454	.14207	.13968
460	219.14	14.91	.17141	.16801	.16474	.16160	.15857	.15565	.15284	.15013	.14752	.14499	.14255
470	223.58	15.21	.17486	.17139	.16806	.16485	.16176	.15879	.15592	.15316	.15049	.14791	.14542
480	228.03	15.52	.17830	.17477	.17137	.16810	.16495	.16192	.15900	.15618	.15346	.15083	.14829
490	232.47	15.82	.18175	.17815	.17468	.17135	.16814	.16505	.16208	.15920	.15643	.15375	.15116
500	236.92	16.12	.18520	.18152	.17799	.17460	.17133	.16818	.16515	.16222	.15940	.15667	.15403
510	241.36	16.42	.18864	.18490	.18131	.17785	.17452	.17131	.16822	.16524	.16236	.15959	.15690
520	245.80	16.73	.19209	.18828	.18461	.18109	.17771	.17444	.17130	.16826	.16533	.16251	.15977
530	250.25	17.03	.19553	.19165	.18792	.18434	.18089	.17757	.17437	.17128	.16830	.16542	.16264
540	254.69	17.33	.19897	.19502	.19124	.18759	.18408	.18070	.17744	.17430	.17127	.16834	.16550
550	259.14	17.63	.20241	.19840	.19454	.19083	.18726	.18383	.18051	.17732	.17423	.17125	.16837
560	263.58	17.94	.20584	.20177	.19785	.19408	.19045	.18695	.18358	.18033	.17720	.17417	.17124
570	268.03	18.24	.20928	.20514	.20115	.19732	.19363	.19008	.18665	.18335	.18016	.17708	.17410
580	272.47	18.54	.21272	.20851	.20446	.20056	.19681	.19320	.18972	.18636	.18312	.17999	.17696
590	276.92	18.84	.21616	.21187	.20776	.20380	.20000	.19633	.19279	.18937	.18608	.18290	.17983
600	281.36	19.15	.21959	.21524	.21106	.20704	.20318	.19945	.19585	.19239	.18905	.18581	.18270
610	285.80	19.45	.22302	.21861	.21437	.21029	.20635	.20257	.19892	.19540	.19201	.18872	.18556
620	290.25	19.75	.22646	.22197	.21767	.21352	.20953	.20569	.20194	.19842	.19497	.19163	.18842
630	294.69	20.05	.22989	.22534	.22097	.21676	.21271	.20881	.20505	.20142	.19792	.19454	.19128
640	299.14	20.36	.23331	.22870	.22426	.21999	.21589	.21193	.20811	.20443	.20088	.19745	.19414
650	303.58	20.66	.23674	.23206	.22756	.22324	.21906	.21505	.21117	.20744	.20384	.20036	.19700
660	308.03	20.96	.24017	.23542	.23085	.22647	.22224	.21816	.21424	.21045	.20680	.20327	.19985
670	312.47	21.26	.24360	.23879	.23416	.22970	.22541	.22128	.21730	.21346	.20975	.20617	.20271
680	316.92	21.56	.24703	.24214	.23745	.23293	.22858	.22439	.22036	.21646	.21271	.20908	.20557
690	321.36	21.87	.25045	.24550	.24074	.23616	.23176	.22751	.22342	.21947	.21566	.21198	.20842
700	325.80	22.17	.25388	.24886	.24403	.23939	.23493	.23062	.22648	.22248	.21861	.21489	.21128
710	330.25	22.47	.25730	.25221	.24732	.24262	.23809	.23374	.22953	.22548	.22157	.21779	.21413
720	334.69	22.77	.26072	.25557	.25061	.24585	.24127	.23685	.23259	.22848	.22452	.22069	.21699
730	339.14	23.08	.26414	.25892	.25391	.24908	.24443	.23996	.23565	.23149	.22747	.22359	.21984
740	343.58	23.38	.26756	.26227	.25720	.25230	.24760	.24307	.23870	.23449	.23042	.22649	.22269
750	348.03	23.68	.27097	.26563	.26048	.25553	.25077	.24618	.24176	.23749	.23337	.22939	.22554
760	352.47	23.98	.27439	.26898	.26377	.25876	.25393	.24929	.24481	.24049	.23631	.23229	.22839
770	356.91	24.29	.27781	.27233	.26705	.26198	.25710	.25239	.24786	.24349	.23926	.23518	.23124
780	361.36	24.59	.28122	.27567	.27033	.26520	.26026	.25550	.25091	.24648	.24221	.23808	.23409
790	365.80	24.89	.28464	.27902	.27362	.26843	.26343	.25861	.25396	.24948	.24516	.24098	.23694

T-95

DENSITY
0.5 % O_2, 99.5 % He

DENSITY,LBS/CUBIC FT

.005 OXYGEN .995 HELIUM AVERAGE MOLECULAR WEIGHT 4.143

DEPTH	PRESSURE		TEMPERATURE,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
800	370.25	25.19	.28805	.28237	.27691	.27165	.26659	.26171	.25701	.25248	.24811	.24388	.23979
810	374.69	25.50	.29146	.28571	.28019	.27487	.26975	.26482	.26006	.25548	.25105	.24677	.24264
820	379.14	25.80	.29488	.28906	.28347	.27809	.27291	.26792	.26311	.25847	.25399	.24967	.24548
830	383.58	26.10	.29829	.29240	.28674	.28131	.27607	.27102	.26616	.26146	.25693	.25256	.24833
840	388.03	26.40	.30169	.29574	.29002	.28452	.27923	.27412	.26920	.26446	.25988	.25545	.25118
850	392.47	26.71	.30510	.29908	.29330	.28773	.28238	.27722	.27225	.26745	.26282	.25834	.25402
860	396.91	27.01	.30850	.30242	.29658	.29096	.28554	.28032	.27530	.27044	.26576	.26124	.25687
870	401.36	27.31	.31191	.30576	.29985	.29417	.28870	.28342	.27833	.27343	.26870	.26413	.25971
880	405.80	27.61	.31531	.30910	.30313	.29738	.29185	.28652	.28138	.27642	.27163	.26702	.26255
890	410.25	27.92	.31872	.31244	.30640	.30060	.29501	.28961	.28443	.27942	.27457	.26991	.26539
900	414.69	28.22	.32212	.31577	.30967	.30381	.29816	.29271	.28746	.28240	.27751	.27280	.26823
910	419.14	28.52	.32552	.31911	.31295	.30701	.30130	.29580	.29051	.28539	.28045	.27568	.27107
920	423.58	28.82	.32892	.32244	.31622	.31023	.30446	.29890	.29355	.28838	.28339	.27857	.27391
930	428.03	29.13	.33232	.32577	.31949	.31344	.30761	.30199	.29658	.29137	.28632	.28145	.27675
940	432.47	29.43	.33572	.32911	.32276	.31664	.31076	.30509	.29962	.29434	.28926	.28434	.27959
950	436.91	29.73	.33911	.33244	.32602	.31985	.31391	.30818	.30266	.29733	.29219	.28722	.28242
960	441.36	30.03	.34251	.33577	.32929	.32306	.31706	.31127	.30569	.30032	.29512	.29010	.28526
970	445.80	30.33	.34590	.33910	.33256	.32626	.32020	.31436	.30873	.30330	.29805	.29299	.28809
980	450.25	30.64	.34930	.34243	.33582	.32946	.32334	.31745	.31176	.30628	.30099	.29587	.29093
990	454.69	30.94	.35269	.34576	.33909	.33267	.32649	.32054	.31480	.30926	.30392	.29875	.29376
1000	459.14	31.24	.35608	.34908	.34235	.33587	.32963	.32362	.31783	.31224	.30685	.30163	.29659
1050	481.36	32.75	.37303	.36569	.35865	.35186	.34534	.33905	.33299	.32714	.32148	.31603	.31076
1100	503.58	34.27	.38994	.38228	.37492	.36784	.36102	.35446	.34811	.34200	.33610	.33040	.32489
1150	525.80	35.78	.40683	.39885	.39118	.38379	.37669	.36983	.36322	.35685	.35071	.34476	.33901
1200	548.02	37.29	.42369	.41539	.40740	.39972	.39232	.38519	.37832	.37168	.36528	.35909	.35311
1250	570.25	38.80	.44053	.43190	.42361	.41563	.40794	.40053	.39339	.38650	.37984	.37341	.36720
1300	592.47	40.31	.45734	.44839	.43979	.43150	.42353	.41584	.40843	.40129	.39439	.38771	.38127
1350	614.69	41.83	.47412	.46485	.45594	.44736	.43910	.43114	.42347	.41605	.40891	.40200	.39531
1400	636.91	43.34	.49088	.48129	.47208	.46319	.45465	.44642	.43847	.43080	.42340	.41626	.40935
1450	659.13	44.85	.50762	.49771	.48818	.47901	.47018	.46167	.45346	.44554	.43790	.43051	.42336
1500	681.36	46.36	.52433	.51410	.50427	.49479	.48568	.47689	.46842	.46025	.45236	.44472	.43735
	500	34.02	.38722	.37961	.37231	.36527	.35850	.35197	.34568	.33961	.33375	.32809	.32262
	600	40.83	.46302	.45397	.44526	.43688	.42881	.42103	.41353	.40630	.39931	.39255	.38603
	700	47.63	.53832	.52782	.51773	.50803	.49867	.48966	.48097	.47258	.46447	.45665	.44909
	800	54.44	.61308	.60118	.58973	.57871	.56810	.55786	.54799	.53847	.52926	.52038	.51178
	900	61.24	.68734	.67404	.66125	.64894	.63708	.62564	.61462	.60396	.59367	.58374	.57414
	1000	68.05	.76110	.74643	.73230	.71872	.70563	.69300	.68082	.66907	.65772	.64674	.63612
	1100	74.85	.83436	.81832	.80291	.78805	.77376	.75996	.74665	.73381	.72138	.70939	.69778
	1200	81.65	.90712	.88974	.87305	.85696	.84146	.82652	.81207	.79815	.78469	.77168	.75911
	1300	88.46	.97938	.96072	.94274	.92544	.90874	.89267	.87713	.86213	.84764	.83364	.82009
	1400	95.26	1.05118	1.03121	1.01199	.99348	.97563	.95841	.94178	.92574	.91024	.89524	.88072
	1500	102.07	1.12250	1.10124	1.08082	1.06108	1.04209	1.02376	1.00607	.98898	.97247	.95651	.94105
	1600	108.87	1.1934	1.1709	1.1492	1.1283	1.1082	1.0887	1.0700	1.0519	1.0344	1.0174	1.0010
	1700	115.68	1.2638	1.2400	1.2172	1.1951	1.1739	1.1533	1.1335	1.1144	1.0959	1.0780	1.0607
	1800	122.48	1.3337	1.3088	1.2847	1.2615	1.2391	1.2175	1.1967	1.1766	1.1571	1.1383	1.1201
	1900	129.29	1.4033	1.3771	1.3518	1.3275	1.3040	1.2814	1.2595	1.2384	1.2180	1.1983	1.1791
	2000	136.09	1.4723	1.4449	1.4185	1.3931	1.3686	1.3449	1.3220	1.2999	1.2785	1.2578	1.2378
	2100	142.90	1.5409	1.5123	1.4848	1.4583	1.4327	1.4080	1.3841	1.3610	1.3387	1.3171	1.2963
	2200	149.70	1.6092	1.5794	1.5508	1.5231	1.4964	1.4707	1.4459	1.4219	1.3986	1.3762	1.3544
	2300	156.51	1.6769	1.6460	1.6162	1.5876	1.5599	1.5331	1.5073	1.4823	1.4582	1.4349	1.4122
	2400	163.31	1.7442	1.7122	1.6814	1.6516	1.6229	1.5952	1.5684	1.5425	1.5174	1.4932	1.4697
	2500	170.11	1.8112	1.7781	1.7461	1.7153	1.6856	1.6569	1.6291	1.6023	1.5764	1.5512	1.5269
	2600	176.92	1.8777	1.8435	1.8105	1.7786	1.7479	1.7183	1.6895	1.6618	1.6350	1.6090	1.5839
	2700	183.72	1.9439	1.9085	1.8745	1.8416	1.8099	1.7793	1.7497	1.7210	1.6933	1.6665	1.6405
	2800	190.53	2.0096	1.9731	1.9380	1.9042	1.8715	1.8399	1.8094	1.7799	1.7514	1.7237	1.6969
	2900	197.33	2.0749	2.0375	2.0013	1.9665	1.9328	1.9003	1.8689	1.8385	1.8090	1.7806	1.7530
	3000	204.14	2.1399	2.1013	2.0642	2.0283	1.9938	1.9603	1.9279	1.8967	1.8664	1.8372	1.8088
	3100	210.94	2.2044	2.1649	2.1267	2.0899	2.0543	2.0200	1.9868	1.9546	1.9236	1.8935	1.8643
	3200	217.75	2.2686	2.2281	2.1889	2.1511	2.1146	2.0794	2.0453	2.0123	1.9804	1.9495	1.9195
	3300	224.55	2.3325	2.2909	2.2507	2.2120	2.1746	2.1385	2.1035	2.0697	2.0370	2.0053	1.9746
	3400	231.36	2.3958	2.3533	2.3122	2.2725	2.2342	2.1972	2.1614	2.1268	2.0932	2.0607	2.0293
	3500	238.16	2.4589	2.4154	2.3733	2.3328	2.2935	2.2557	2.2190	2.1835	2.1491	2.1160	2.0837
	3600	244.96	2.5216	2.4771	2.4341	2.3927	2.3526	2.3138	2.2763	2.2400	2.2049	2.1709	2.1379
	3700	251.77	2.5840	2.5385	2.4946	2.4522	2.4112	2.3717	2.3333	2.2962	2.2604	2.2256	2.1919
	3800	258.57	2.6461	2.5996	2.5548	2.5114	2.4696	2.4291	2.3900	2.3521	2.3154	2.2800	2.2455
	3900	265.38	2.7077	2.6602	2.6146	2.5703	2.5277	2.4864	2.4464	2.4078	2.3703	2.3340	2.2989
	4000	272.18	2.7690	2.7206	2.6740	2.6289	2.5854	2.5433	2.5026	2.4632	2.4249	2.3879	2.3521
	4100	278.99	2.8301	2.7807	2.7332	2.6873	2.6429	2.6000	2.5585	2.5183	2.4793	2.4416	2.4050
	4200	285.79	2.8906	2.8405	2.7921	2.7453	2.7001	2.6563	2.6141	2.5731	2.5335	2.4950	2.4576
	4300	292.60	2.9509	2.8999	2.8506	2.8029	2.7570	2.7124	2.6693	2.6276	2.5873	2.5481	2.5101
	4400	299.40	3.0110	2.9589	2.9089	2.8603	2.8136	2.7683	2.7244	2.6820	2.6408	2.6009	2.5623
	4500	306.21	3.0706	3.0178	2.9668	2.9174	2.8699	2.8238	2.7792	2.7360	2.6942	2.6536	2.6143
	4600	313.01	3.1299	3.0763	3.0245	2.9744	2.9258	2.8790	2.8336	2.7898	2.7472	2.7059	2.6659
	4700	319.81	3.1890	3.1344	3.0818	3.0309	2.9817	2.9340	2.8879	2.8432	2.8000	2.7581	2.7175
	4800	326.62	3.2476	3.1922	3.1388	3.0871	3.0371	2.9887	2.9420	2.8965	2.8526	2.8100	2.7686
	4900	333.42	3.3060	3.2498	3.1955	3.1431	3.0923	3.0432	2.9957	2.9496	2.9050	2.8617	2.8196
	5000	340.23	3.3641	3.3072	3.2521	3.1987	3.1473	3.0974	3.0490	3.0024	2.9571	2.9131	2.8704

SP. VOL.
0.5 % O_2, 99.5 % He

T-96

SPECIFIC VOLUME,CUBIC FT/LB

.005 OXYGEN   .995 HELIUM   AVERAGE MOLECULAR WEIGHT   4.143

DEPTH	PRESSURE		TEMPERATURE,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	86.356	88.117	89.881	91.642	93.406	95.169	96.930	98.694	100.457	102.218	103.982
10	19.14	1.30	66.314	67.667	69.021	70.374	71.728	73.080	74.435	75.787	77.141	78.493	79.848
20	23.58	1.60	53.826	54.924	56.023	57.121	58.219	59.318	60.416	61.513	62.613	63.710	64.809
30	28.03	1.91	45.299	46.222	47.146	48.071	48.995	49.919	50.843	51.768	52.691	53.615	54.540
40	32.47	2.21	39.105	39.903	40.700	41.498	42.295	43.094	43.891	44.689	45.486	46.284	47.082
50	36.92	2.51	34.403	35.104	35.806	36.508	37.209	37.911	38.612	39.314	40.015	40.718	41.419
60	41.36	2.81	30.711	31.337	31.964	32.590	33.216	33.843	34.469	35.095	35.721	36.347	36.974
70	45.81	3.12	27.736	28.301	28.867	29.433	29.998	30.563	31.129	31.694	32.260	32.825	33.391
80	50.25	3.42	25.287	25.802	26.318	26.833	27.349	27.864	28.379	28.895	29.410	29.926	30.441
90	54.70	3.72	23.236	23.709	24.183	24.657	25.130	25.604	26.077	26.550	27.024	27.498	27.971
100	59.14	4.02	21.493	21.931	22.369	22.807	23.245	23.683	24.121	24.559	24.997	25.435	25.873
110	63.58	4.33	19.994	20.401	20.809	21.216	21.624	22.031	22.438	22.845	23.253	23.660	24.067
120	68.03	4.63	18.691	19.072	19.452	19.833	20.214	20.595	20.975	21.356	21.737	22.117	22.498
130	72.47	4.93	17.547	17.905	18.262	18.620	18.977	19.334	19.691	20.049	20.406	20.763	21.121
140	76.92	5.23	16.536	16.873	17.210	17.546	17.883	18.220	18.557	18.893	19.230	19.566	19.903
150	81.36	5.54	15.636	15.954	16.272	16.591	16.909	17.227	17.545	17.863	18.182	18.500	18.819
160	85.81	5.84	14.828	15.130	15.432	15.733	16.035	16.337	16.639	16.941	17.242	17.544	17.846
170	90.25	6.14	14.100	14.387	14.674	14.961	15.248	15.535	15.822	16.109	16.396	16.683	16.970
180	94.70	6.44	13.440	13.714	13.988	14.261	14.534	14.808	15.081	15.355	15.628	15.902	16.175
190	99.14	6.75	12.840	13.101	13.362	13.624	13.885	14.146	14.407	14.668	14.930	15.191	15.452
200	103.58	7.05	12.291	12.541	12.791	13.041	13.291	13.541	13.791	14.041	14.291	14.541	14.791
210	108.03	7.35	11.787	12.027	12.267	12.506	12.746	12.986	13.226	13.465	13.705	13.945	14.184
220	112.47	7.65	11.323	11.553	11.784	12.014	12.244	12.474	12.705	12.935	13.165	13.395	13.626
230	116.92	7.96	10.895	11.116	11.338	11.559	11.780	12.002	12.223	12.445	12.666	12.888	13.109
240	121.36	8.26	10.497	10.711	10.924	11.137	11.351	11.564	11.778	11.991	12.204	12.417	12.631
250	125.81	8.56	10.128	10.334	10.540	10.746	10.951	11.157	11.363	11.569	11.775	11.980	12.186
260	130.25	8.86	9.7840	9.9828	10.1815	10.3805	10.5792	10.7781	10.9769	11.1755	11.3743	11.5731	11.7718
270	134.69	9.17	9.4627	9.6549	9.8471	10.0396	10.2317	10.4238	10.6161	10.8084	11.0004	11.1927	11.3849
280	139.14	9.47	9.1618	9.3480	9.5341	9.7201	9.9064	10.0924	10.2784	10.4646	10.6507	10.8366	11.0226
290	143.58	9.77	8.8799	9.0601	9.2404	9.4208	9.6010	9.7813	9.9618	10.1420	10.3224	10.5028	10.6829
300	148.03	10.07	8.6146	8.7894	8.9644	9.1393	9.3142	9.4891	9.6639	9.8390	10.0138	10.1888	10.3635
310	152.47	10.38	8.3648	8.5345	8.7045	8.8741	9.0439	9.2137	9.3837	9.5535	9.7231	9.8931	10.0627
320	156.92	10.68	8.1292	8.2941	8.4592	8.6241	8.7891	8.9542	9.1191	9.2841	9.4490	9.6141	9.7790
330	161.36	10.98	7.9065	8.0669	8.2273	8.3879	8.5484	8.7087	8.8691	9.0295	9.1902	9.3505	9.5109
340	165.81	11.28	7.6958	7.8519	8.0080	8.1643	8.3203	8.4766	8.6327	8.7889	8.9450	9.1011	9.2571
350	170.25	11.58	7.4960	7.6481	7.8002	7.9522	8.1044	8.2564	8.4085	8.5606	8.7126	8.8647	9.0166
360	174.69	11.89	7.3065	7.4547	7.6029	7.7511	7.8993	8.0476	8.1956	8.3439	8.4921	8.6403	8.7884
370	179.14	12.19	7.1265	7.2709	7.4155	7.5600	7.7045	7.8489	7.9935	8.1379	8.2825	8.4270	8.5715
380	183.58	12.49	6.9551	7.0960	7.2371	7.3781	7.5191	7.6601	7.8010	7.9421	8.0830	8.2241	8.3651
390	188.03	12.79	6.7917	6.9294	7.0671	7.2047	7.3424	7.4800	7.6178	7.7554	7.8932	8.0307	8.1684
400	192.47	13.10	6.6359	6.7704	6.9048	7.0394	7.1739	7.3084	7.4429	7.5773	7.7119	7.8463	7.9808
410	196.92	13.40	6.4872	6.6186	6.7501	6.8816	7.0131	7.1444	7.2759	7.4075	7.5389	7.6702	7.8017
420	201.36	13.70	6.3450	6.4736	6.6021	6.7308	6.8592	6.9878	7.1164	7.2449	7.3734	7.5021	7.6305
430	205.81	14.00	6.2089	6.3348	6.4605	6.5863	6.7122	6.8378	6.9636	7.0894	7.2151	7.3410	7.4667
440	210.25	14.31	6.0786	6.2018	6.3250	6.4481	6.5711	6.6943	6.8175	6.9404	7.0635	7.1868	7.3098
450	214.69	14.61	5.9537	6.0744	6.1950	6.3156	6.4361	6.5566	6.6772	6.7978	6.9184	7.0389	7.1594
460	219.14	14.91	5.8340	5.9521	6.0703	6.1883	6.3066	6.4246	6.5427	6.6608	6.7790	6.8971	7.0151
470	223.58	15.21	5.7190	5.8347	5.9504	6.0662	6.1820	6.2977	6.4136	6.5293	6.6451	6.7608	6.8766
480	228.03	15.52	5.6084	5.7219	5.8353	5.9489	6.0624	6.1759	6.2894	6.4030	6.5164	6.6299	6.7434
490	232.47	15.82	5.5020	5.6134	5.7247	5.8361	5.9473	6.0587	6.1700	6.2814	6.3927	6.5040	6.6154
500	236.92	16.12	5.3996	5.5089	5.6182	5.7274	5.8367	5.9459	6.0552	6.1644	6.2736	6.3829	6.4921
510	241.36	16.42	5.3010	5.4083	5.5156	5.6228	5.7301	5.8372	5.9444	6.0517	6.1590	6.2661	6.3734
520	245.80	16.73	5.2060	5.3114	5.4167	5.5220	5.6272	5.7326	5.8379	5.9437	6.0484	6.1536	6.2590
530	250.25	17.03	5.1143	5.2179	5.3213	5.4247	5.5281	5.6315	5.7349	5.8384	5.9418	6.0451	6.1486
540	254.69	17.33	5.0259	5.1276	5.2291	5.3308	5.4324	5.5341	5.6356	5.7372	5.8388	5.9404	6.0421
550	259.14	17.63	4.9406	5.0404	5.1403	5.2402	5.3400	5.4399	5.5398	5.6396	5.7395	5.8393	5.9393
560	263.58	17.94	4.8580	4.9562	5.0544	5.1526	5.2508	5.3490	5.4471	5.5454	5.6434	5.7416	5.8399
570	268.03	18.24	4.7782	4.8748	4.9713	5.0678	5.1644	5.2610	5.3576	5.4541	5.5507	5.6473	5.7438
580	272.47	18.54	4.7010	4.7960	4.8910	4.9859	5.0810	5.1760	5.2709	5.3658	5.4609	5.5559	5.6508
590	276.92	18.84	4.6263	4.7198	4.8133	4.9067	5.0001	5.0936	5.1870	5.2805	5.3739	5.4674	5.5609
600	281.36	19.15	4.5539	4.6460	4.7380	4.8299	4.9219	5.0139	5.1059	5.1978	5.2897	5.3817	5.4736
610	285.80	19.45	4.4838	4.5744	4.6649	4.7554	4.8461	4.9365	5.0271	5.1176	5.2081	5.2987	5.3892
620	290.25	19.75	4.4158	4.5051	4.5942	4.6834	4.7725	4.8617	4.9508	5.0399	5.1291	5.2183	5.3074
630	294.69	20.05	4.3499	4.4378	4.5256	4.6134	4.7012	4.7890	4.8769	4.9647	5.0525	5.1403	5.2280
640	299.14	20.36	4.2861	4.3726	4.4591	4.5456	4.6320	4.7186	4.8050	4.8916	4.9781	5.0645	5.1510
650	303.58	20.66	4.2240	4.3092	4.3945	4.4796	4.5649	4.6501	4.7354	4.8206	4.9058	4.9911	5.0762
660	308.03	20.96	4.1637	4.2477	4.3317	4.4157	4.4997	4.5837	4.6677	4.7517	4.8357	4.9197	5.0036
670	312.47	21.26	4.1051	4.1878	4.2707	4.3536	4.4363	4.5191	4.6019	4.6848	4.7675	4.8503	4.9331
680	316.92	21.56	4.0482	4.1298	4.2114	4.2931	4.3748	4.4565	4.5381	4.6197	4.7013	4.7829	4.8646
690	321.36	21.87	3.9928	4.0733	4.1538	4.2344	4.3148	4.3954	4.4759	4.5564	4.6370	4.7174	4.7979
700	325.80	22.17	3.9389	4.0183	4.0978	4.1772	4.2566	4.3361	4.4154	4.4948	4.5743	4.6536	4.7331
710	330.25	22.47	3.8865	3.9649	4.0433	4.1217	4.2000	4.2783	4.3567	4.4350	4.5133	4.5916	4.6700
720	334.69	22.77	3.8355	3.9128	3.9902	4.0675	4.1448	4.2222	4.2994	4.3767	4.4540	4.5312	4.6085
730	339.14	23.08	3.7858	3.8622	3.9384	4.0148	4.0911	4.1674	4.2436	4.3199	4.3962	4.4724	4.5488
740	343.58	23.38	3.7375	3.8128	3.8881	3.9635	4.0387	4.1140	4.1894	4.2646	4.3399	4.4153	4.4905
750	348.03	23.69	3.6904	3.7647	3.8390	3.9134	3.9877	4.0621	4.1364	4.2108	4.2851	4.3594	4.4337
760	352.47	23.98	3.6444	3.7178	3.7912	3.8646	3.9381	4.0114	4.0849	4.1582	4.2316	4.3050	4.3784
770	356.91	24.29	3.5996	3.6721	3.7446	3.8171	3.8895	3.9620	4.0345	4.1070	4.1795	4.2520	4.3244
780	361.36	24.59	3.5559	3.6275	3.6991	3.7707	3.8423	3.9138	3.9854	4.0571	4.1286	4.2002	4.2718
790	365.80	24.89	3.5132	3.5840	3.6546	3.7254	3.7961	3.8669	3.9376	4.0083	4.0790	4.1497	4.2205

T-97

SP. VOL.
0.5 % O_2, 99.5 % He

SPECIFIC VOLUME,CUBIC FT/LB

.005 OXYGEN .995 HELIUM AVERAGE MOLECULAR WEIGHT 4.143

DEPTH	PRESSURE		TEMPERATURE,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
800	370.25	25.19	3.4716	3.5415	3.6113	3.6812	3.7511	3.8210	3.8909	3.9607	4.0306	4.1005	4.1703
810	374.69	25.50	3.4309	3.5000	3.5691	3.6381	3.7072	3.7762	3.8452	3.9142	3.9833	4.0523	4.1214
820	379.14	25.80	3.3913	3.4595	3.5278	3.5960	3.6642	3.7324	3.8007	3.8690	3.9372	4.0054	4.0736
830	383.58	26.10	3.3525	3.4200	3.4874	3.5549	3.6223	3.6898	3.7572	3.8246	3.8921	3.9595	4.0269
840	388.03	26.40	3.3147	3.3813	3.4480	3.5147	3.5813	3.6480	3.7147	3.7813	3.8480	3.9146	3.9812
850	392.47	26.71	3.2777	3.3436	3.4094	3.4754	3.5413	3.6072	3.6731	3.7390	3.8049	3.8708	3.9367
860	396.91	27.01	3.2415	3.3066	3.3718	3.4369	3.5022	3.5673	3.6325	3.6977	3.7628	3.8279	3.8931
870	401.36	27.31	3.2061	3.2705	3.3349	3.3994	3.4639	3.5283	3.5928	3.6572	3.7216	3.7860	3.8505
880	405.80	27.61	3.1714	3.2352	3.2989	3.3627	3.4264	3.4901	3.5539	3.6176	3.6814	3.7451	3.8088
890	410.25	27.92	3.1376	3.2007	3.2637	3.3267	3.3898	3.4529	3.5159	3.5789	3.6420	3.7050	3.7680
900	414.69	28.22	3.1044	3.1668	3.2292	3.2916	3.3540	3.4163	3.4787	3.5411	3.6034	3.6657	3.7281
910	419.14	28.52	3.0720	3.1337	3.1954	3.2572	3.3189	3.3806	3.4423	3.5040	3.5657	3.6273	3.6891
920	423.58	28.82	3.0402	3.1013	3.1624	3.2234	3.2845	3.3456	3.4066	3.4677	3.5287	3.5897	3.6508
930	428.03	29.13	3.0091	3.0696	3.1300	3.1904	3.2509	3.3113	3.3718	3.4321	3.4925	3.5530	3.6134
940	432.47	29.43	2.9787	3.0385	3.0983	3.1581	3.2179	3.2777	3.3375	3.3974	3.4571	3.5170	3.5767
950	436.91	29.73	2.9489	3.0080	3.0673	3.1265	3.1857	3.2448	3.3040	3.3633	3.4225	3.4816	3.5408
960	441.36	30.03	2.9196	2.9782	3.0369	3.0954	3.1540	3.2126	3.2712	3.3298	3.3884	3.4470	3.5056
970	445.80	30.33	2.8910	2.9490	3.0070	3.0650	3.1230	3.1810	3.2391	3.2970	3.3551	3.4131	3.4711
980	450.25	30.64	2.8629	2.9203	2.9778	3.0352	3.0927	3.1501	3.2076	3.2650	3.3224	3.3799	3.4373
990	454.69	30.94	2.8353	2.8922	2.9491	3.0060	3.0629	3.1197	3.1766	3.2335	3.2904	3.3473	3.4041
1000	459.14	31.24	2.8083	2.8647	2.9210	2.9773	3.0337	3.0900	3.1463	3.2026	3.2589	3.3153	3.3716
1050	481.36	32.75	2.6808	2.7345	2.7882	2.8420	2.8957	2.9494	3.0031	3.0568	3.1106	3.1643	3.2179
1100	503.58	34.27	2.5645	2.6159	2.6677	2.7186	2.7699	2.8212	2.8726	2.9240	2.9753	3.0266	3.0779
1150	525.80	35.78	2.4580	2.5072	2.5564	2.6056	2.6547	2.7039	2.7531	2.8023	2.8514	2.9006	2.9498
1200	548.02	37.29	2.3602	2.4074	2.4546	2.5018	2.5489	2.5961	2.6433	2.6905	2.7376	2.7848	2.8320
1250	570.25	38.80	2.2700	2.3154	2.3607	2.4060	2.4514	2.4967	2.5420	2.5873	2.6327	2.6780	2.7233
1300	592.47	40.31	2.1866	2.2302	2.2738	2.3175	2.3611	2.4048	2.4484	2.4920	2.5356	2.5792	2.6228
1350	614.69	41.83	2.1092	2.1512	2.1933	2.2353	2.2774	2.3194	2.3614	2.4035	2.4456	2.4876	2.5297
1400	636.91	43.34	2.0372	2.0778	2.1183	2.1589	2.1995	2.2401	2.2806	2.3212	2.3618	2.4023	2.4429
1450	659.13	44.85	1.9700	2.0092	2.0484	2.0876	2.1268	2.1660	2.2053	2.2445	2.2836	2.3228	2.3621
1500	681.36	46.36	1.9072	1.9452	1.9831	2.0211	2.0589	2.0969	2.1348	2.1727	2.2106	2.2486	2.2865

500	34.02	2.5825	2.6343	2.6859	2.7377	2.7894	2.8411	2.8929	2.9445	2.9963	3.0479	3.0996
600	40.83	2.1597	2.2028	2.2459	2.2890	2.3320	2.3751	2.4182	2.4613	2.5043	2.5474	2.5905
700	47.63	1.8576	1.8946	1.9315	1.9684	2.0053	2.0422	2.0792	2.1161	2.1530	2.1899	2.2267
800	54.44	1.6311	1.6634	1.6957	1.7280	1.7603	1.7926	1.8249	1.8571	1.8894	1.9217	1.9540
900	61.24	1.4549	1.4836	1.5123	1.5410	1.5697	1.5984	1.6270	1.6557	1.6844	1.7131	1.7417
1000	68.05	1.3139	1.3397	1.3656	1.3914	1.4172	1.4430	1.4688	1.4946	1.5204	1.5462	1.5720
1100	74.85	1.1985	1.2220	1.2455	1.2689	1.2924	1.3159	1.3393	1.3628	1.3862	1.4097	1.4331
1200	81.65	1.1024	1.1239	1.1454	1.1669	1.1884	1.2099	1.2314	1.2529	1.2744	1.2959	1.3173
1300	88.46	1.0211	1.0409	1.0607	1.0806	1.1004	1.1202	1.1401	1.1599	1.1798	1.1996	1.2194
1400	95.26	.95131	.96974	.98816	1.00656	1.02498	1.04339	1.06182	1.08022	1.09861	1.11702	1.13543
1500	102.07	.89086	.90806	.92522	.94244	.95961	.97679	.99397	1.01114	1.02831	1.04547	1.06265
1600	108.87	.83797	.85407	.87017	.88627	.90238	.91850	.93459	.95069	.96677	.98286	.99896
1700	115.68	.79126	.80642	.82159	.83675	.85188	.86706	.88221	.89736	.91249	.92762	.94273
1800	122.48	.74978	.76407	.77841	.79270	.80703	.82133	.83564	.84992	.86420	.87850	.89281
1900	129.29	.71263	.72618	.73973	.75332	.76687	.78038	.79394	.80751	.82104	.83454	.84809
2000	136.09	.67919	.69208	.70496	.71784	.73068	.74356	.75645	.76930	.78215	.79502	.80785
2100	142.90	.64897	.66123	.67347	.68574	.69798	.71025	.72249	.73473	.74697	.75922	.77144
2200	149.70	.62144	.63314	.64484	.65656	.66825	.67993	.69162	.70330	.71499	.72665	.73834
2300	156.51	.59633	.60754	.61873	.62989	.64107	.65225	.66343	.67461	.68579	.69694	.70812
2400	163.31	.57331	.58403	.59474	.60547	.61619	.62688	.63759	.64831	.65902	.66970	.68039
2500	170.11	.55211	.56241	.57270	.58300	.59327	.60353	.61382	.62411	.63436	.64465	.65490
2600	176.92	.53256	.54245	.55235	.56223	.57211	.58198	.59188	.60174	.61163	.62149	.63135
2700	183.72	.51444	.52397	.53348	.54301	.55252	.56203	.57153	.58106	.59055	.60005	.60957
2800	190.53	.49761	.50681	.51598	.52515	.53433	.54350	.55267	.56183	.57098	.58016	.58931
2900	197.33	.48194	.49080	.49967	.50853	.51740	.52623	.53508	.54392	.55279	.56162	.57046
3000	204.14	.46732	.47589	.48445	.49301	.50156	.51013	.51869	.52724	.53578	.54432	.55286
3100	210.94	.45364	.46192	.47021	.47850	.48678	.49505	.50333	.51160	.51987	.52813	.53639
3200	217.75	.44080	.44882	.45685	.46487	.47289	.48091	.48893	.49695	.50496	.51296	.52096
3300	224.55	.42873	.43652	.44431	.45209	.45985	.46762	.47540	.48315	.49092	.49868	.50643
3400	231.36	.41739	.42496	.43248	.44004	.44759	.45512	.46267	.47020	.47773	.48526	.49279
3500	238.16	.40668	.41402	.42135	.42867	.43602	.44333	.45065	.45798	.46530	.47259	.47992
3600	244.96	.39657	.40371	.41092	.41794	.42507	.43220	.43931	.44642	.45354	.46065	.46775
3700	251.77	.38700	.39393	.40086	.40779	.41473	.42165	.42857	.43550	.44241	.44932	.45623
3800	258.57	.37792	.38467	.39143	.39818	.40493	.41167	.41841	.42514	.43189	.43860	.44534
3900	265.38	.36932	.37591	.38247	.38904	.39562	.40218	.40876	.41532	.42188	.42844	.43499
4000	272.18	.36114	.36756	.37397	.38039	.38679	.39319	.39958	.40598	.41238	.41877	.42516
4100	278.99	.35335	.35962	.36588	.37212	.37837	.38462	.39086	.39710	.40334	.40956	.41580
4200	285.79	.34595	.35205	.35815	.36426	.37036	.37646	.38255	.38864	.39472	.40080	.40690
4300	292.60	.33888	.34484	.35081	.35677	.36272	.36868	.37462	.38057	.38651	.39245	.39838
4400	299.40	.33212	.33796	.34378	.34961	.35542	.36123	.36706	.37286	.37867	.38448	.39028
4500	306.21	.32567	.33137	.33706	.34277	.34845	.35413	.35982	.36550	.37117	.37685	.38251
4600	313.01	.31950	.32506	.33064	.33620	.34178	.34734	.35290	.35845	.36401	.36956	.37510
4700	319.81	.31358	.31904	.32449	.32994	.33538	.34083	.34627	.35171	.35714	.36257	.36799
4800	326.62	.30792	.31326	.31859	.32393	.32927	.33460	.33991	.34524	.35055	.35587	.36119
4900	333.42	.30248	.30771	.31294	.31816	.32338	.32861	.33381	.33903	.34424	.34944	.35465
5000	340.23	.29725	.30237	.30750	.31263	.31774	.32286	.32797	.33307	.33817	.34327	.34838

$0.5\ \%\ O_2$, 99.5 % He

0.005 OXYGEN 0.995 HELIUM
ENTHALPY,BTU/LB

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	599.57	623.60	647.63	671.68	695.71	719.74
30.00	599.70	623.73	647.76	671.81	695.84	719.87
50.00	599.86	623.90	647.93	671.98	696.01	720.04
100.00	600.28	624.32	648.36	672.40	696.43	720.47
200.00	601.09	625.14	649.18	673.23	697.27	721.32
300.00	601.90	625.96	650.01	674.06	698.11	722.16
400.00	602.71	626.78	650.83	674.90	698.95	723.01
500.00	603.52	627.60	651.66	675.73	699.79	723.86
1000.00	607.53	631.64	655.75	679.84	703.94	728.02
2000.00	615.36	639.55	663.72	687.87	712.01	736.15
3000.00	623.08	647.34	671.58	695.79	719.96	744.13
4000.00	630.66	654.96	679.24	703.50	726.79	751.98
5000.00	638.09	662.40	686.70	711.04	735.31	759.60

0.005 OXYGEN 0.995 HELIUM
ENTROPY,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	6.4955	6.5439	6.5900	6.6347	6.6776	6.7190
30.00	6.3692	6.4175	6.4637	6.5083	6.5513	6.5927
50.00	6.2042	6.2523	6.2986	6.3431	6.3861	6.4275
100.00	5.7934	5.8415	5.8878	5.9323	5.9752	6.0168
200.00	5.5772	5.6253	5.6716	5.7161	5.7591	5.8007
300.00	5.3610	5.4091	5.4554	5.5000	5.5429	5.5845
400.00	5.1448	5.1930	5.2393	5.2838	5.3268	5.3684
500.00	4.9286	4.9768	5.0231	5.0677	5.1107	5.1523
1000.00	4.5011	4.5494	4.5958	4.6405	4.6836	4.7252
2000.00	4.1659	4.2149	4.2608	4.3057	4.3488	4.3905
3000.00	3.9426	3.9911	4.0378	4.0827	4.1259	4.1676
4000.00	3.8029	3.8515	3.8983	3.9432	3.9864	4.0282
5000.00	3.6940	3.7427	3.7895	3.8345	3.8779	3.9198

0.005 OXYGEN 0.995 HELIUM
CP,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.2025	1.2025	1.2025	1.2025	1.2026	1.2026
30.00	1.2026	1.2026	1.2026	1.2026	1.2026	1.2026
50.00	1.2026	1.2026	1.2026	1.2026	1.2027	1.2027
100.00	1.2029	1.2028	1.2028	1.2028	1.2029	1.2028
200.00	1.2033	1.2032	1.2032	1.2031	1.2032	1.2031
300.00	1.2037	1.2035	1.2035	1.2035	1.2035	1.2033
400.00	1.2041	1.2039	1.2039	1.2038	1.2038	1.2036
500.00	1.2045	1.2043	1.2042	1.2041	1.2041	1.2039
1000.00	1.2065	1.2062	1.2059	1.2057	1.2055	1.2053
2000.00	1.210	1.209	1.209	1.208	1.208	1.208
3000.00	1.214	1.213	1.212	1.211	1.211	1.210
4000.00	1.215	1.214	1.214	1.213	1.213	1.212
5000.00						

0.005 OXYGEN 0.995 HELIUM
CV,BTU/LB F

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.723	.723	.723	.723	.723	.723
30.00	.723	.723	.723	.723	.723	.723
50.00	.723	.723	.723	.723	.723	.723
100.00	.723	.723	.723	.723	.723	.723
200.00	.723	.723	.723	.723	.723	.723
300.00	.723	.723	.723	.723	.723	.723
400.00	.723	.723	.723	.723	.723	.723
500.00	.723	.723	.723	.723	.723	.723
1000.00	.723	.723	.723	.723	.723	.723
2000.00	.724	.724	.724	.723	.723	.723
3000.00	.724	.724	.724	.724	.724	.724
4000.00						
5000.00						

0.005 OXYGEN 0.995 HELIUM
THERMAL CONDUCTIVITY,BTU/SEC FT F
(MULTIPLY TABLE ENTRY BY .0000100)

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	2.23	2.29	2.36	2.42	2.49	2.55
30.00						
50.00						
100.00						
200.00						
300.00						
400.00						
500.00						
1000.00						
2000.00						
3000.00						
4000.00						
5000.00						

0.005 OXYGEN 0.995 HELIUM
PRANDTL NUMBER

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	.68	.68	.68	.68	.67	.67
30.00						
50.00						
100.00						
200.00						
300.00						
400.00						
500.00						
1000.00						
2000.00						
3000.00						
4000.00						
5000.00						

T-99

0.5 % O_2, 99.5 % He

0.005 OXYGEN 0.995 HELIUM
CP/CV

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.663	1.663	1.663	1.663	1.663	1.663
30.00	1.663	1.663	1.663	1.663	1.663	1.663
50.00	1.663	1.663	1.663	1.663	1.663	1.663
100.00	1.663	1.663	1.663	1.663	1.663	1.663
200.00	1.664	1.663	1.663	1.663	1.663	1.663
300.00	1.664	1.664	1.664	1.664	1.664	1.664
400.00	1.665	1.664	1.664	1.664	1.664	1.664
500.00	1.665	1.664	1.664	1.664	1.664	1.664
1000.00	1.668	1.667	1.667	1.667	1.666	1.666
2000.00	1.67	1.67	1.67	1.67	1.67	1.67
3000.00	1.68	1.67	1.67	1.67	1.67	1.67
4000.00						
5000.00						

0.005 OXYGEN 0.995 HELIUM
VISCOSITY,LB/FT SEC
(MULTIPLY TABLE ENTRY BY .0000100)

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	1.263	1.296	1.329	1.364	1.396	1.429
30.00						
50.00						
100.00						
200.00						
300.00						
400.00						
500.00						
1000.00						
2000.00						
3000.00						
4000.00						
5000.00						

0.005 OXYGEN 0.995 HELIUM
SONIC VELOCITY FT/SEC

PRESSURE PSIA	TEMPERATURE 30	50	70	90	110	130
14.70	3130	3192	3253	3314	3373	3433
30.00	3132	3193	3255	3315	3375	3435
50.00	3134	3196	3257	3318	3377	3437
100.00	3140	3201	3263	3323	3382	3442
200.00	3152	3213	3274	3334	3393	3452
300.00	3163	3224	3285	3345	3404	3463
400.00	3175	3235	3296	3356	3414	3473
500.00	3187	3247	3307	3366	3425	3483
1000.00	3245	3304	3363	3421	3478	3535
2000.00	3362	3416	3469	3523	3578	3632
3000.00	3480	3528	3576	3626	3678	3730
4000.00						
5000.00						

DENSITY

T-100

0.3 % O_2, 99.7 % He

DENSITY.LBS/CUBIC FT

.003 OXYGEN .997 HELIUM AVERAGE MOLECULAR WEIGHT 4.087

DEPTH	PRESSURE		TEMPERATURE.F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	.01142	.01120	.01098	.01076	.01056	.01037	.01018	.01000	.00982	.00965	.00949
10	19.14	1.30	.01488	.01458	.01429	.01402	.01375	.01350	.01325	.01302	.01279	.01257	.01235
20	23.58	1.60	.01833	.01796	.01761	.01727	.01694	.01663	.01633	.01604	.01576	.01548	.01522
30	28.03	1.91	.02178	.02134	.02092	.02052	.02013	.01976	.01940	.01906	.01872	.01840	.01809
40	32.47	2.21	.02523	.02472	.02424	.02377	.02332	.02289	.02248	.02207	.02169	.02131	.02095
50	36.92	2.51	.02867	.02810	.02755	.02702	.02651	.02602	.02555	.02509	.02465	.02423	.02382
60	41.36	2.81	.03212	.03148	.03086	.03027	.02970	.02915	.02862	.02811	.02762	.02714	.02668
70	45.81	3.12	.03557	.03486	.03417	.03352	.03289	.03228	.03169	.03113	.03058	.03005	.02954
80	50.25	3.42	.03901	.03823	.03748	.03676	.03607	.03540	.03476	.03414	.03354	.03296	.03241
90	54.70	3.72	.04245	.04161	.04079	.04001	.03925	.03853	.03783	.03716	.03650	.03588	.03527
100	59.14	4.02	.04590	.04498	.04410	.04325	.04244	.04165	.04090	.04017	.03946	.03879	.03813
110	63.58	4.33	.04934	.04835	.04741	.04650	.04562	.04478	.04396	.04318	.04243	.04169	.04099
120	68.03	4.63	.05278	.05173	.05071	.04974	.04880	.04790	.04703	.04619	.04538	.04460	.04385
130	72.47	4.93	.05622	.05510	.05402	.05298	.05198	.05102	.05010	.04920	.04834	.04751	.04671
140	76.92	5.23	.05966	.05847	.05732	.05622	.05516	.05414	.05316	.05221	.05130	.05042	.04957
150	81.36	5.54	.06309	.06183	.06062	.05946	.05834	.05726	.05623	.05522	.05426	.05332	.05242
160	85.81	5.84	.06653	.06520	.06393	.06270	.06152	.06038	.05929	.05823	.05721	.05623	.05528
170	90.25	6.14	.06996	.06857	.06723	.06594	.06470	.06350	.06235	.06124	.06017	.05913	.05813
180	94.70	6.44	.07340	.07193	.07053	.06917	.06787	.06662	.06541	.06425	.06312	.06204	.06099
190	99.14	6.75	.07683	.07530	.07383	.07241	.07105	.06974	.06847	.06725	.06608	.06494	.06384
200	103.58	7.05	.08026	.07866	.07712	.07565	.07422	.07285	.07153	.07026	.06903	.06784	.06670
210	108.03	7.35	.08369	.08202	.08042	.07888	.07740	.07597	.07459	.07326	.07198	.07074	.06955
220	112.47	7.65	.08712	.08538	.08372	.08211	.08057	.07908	.07765	.07627	.07493	.07364	.07240
230	116.92	7.96	.09055	.08874	.08701	.08534	.08374	.08219	.08071	.07927	.07788	.07654	.07525
240	121.36	8.26	.09397	.09210	.09031	.08857	.08691	.08531	.08376	.08227	.08083	.07944	.07810
250	125.81	8.56	.09740	.09546	.09360	.09180	.09008	.08842	.08682	.08527	.08378	.08234	.08095
260	130.25	8.86	.10083	.09882	.09689	.09503	.09325	.09153	.08987	.08827	.08673	.08524	.08380
270	134.69	9.17	.10425	.10217	.10018	.09826	.09641	.09464	.09292	.09127	.08968	.08814	.08665
280	139.14	9.47	.10767	.10553	.10347	.10149	.09958	.09775	.09598	.09427	.09262	.09103	.08950
290	143.58	9.77	.11110	.10888	.10676	.10471	.10275	.10085	.09903	.09727	.09557	.09393	.09234
300	148.03	10.07	.11452	.11224	.11004	.10794	.10591	.10396	.10208	.10027	.09851	.09682	.09519
310	152.47	10.38	.11793	.11559	.11333	.11116	.10908	.10707	.10513	.10326	.10146	.09972	.09803
320	156.92	10.68	.12135	.11894	.11662	.11439	.11224	.11017	.10818	.10626	.10440	.10261	.10088
330	161.36	10.98	.12477	.12229	.11990	.11761	.11540	.11328	.11123	.10925	.10734	.10550	.10372
340	165.81	11.28	.12819	.12564	.12319	.12083	.11856	.11638	.11428	.11225	.11029	.10839	.10656
350	170.25	11.58	.13160	.12898	.12647	.12405	.12172	.11948	.11732	.11524	.11322	.11128	.10941
360	174.69	11.89	.13501	.13233	.12975	.12727	.12488	.12258	.12037	.11823	.11617	.11417	.11225
370	179.14	12.19	.13843	.13568	.13303	.13049	.12804	.12568	.12341	.12122	.11911	.11706	.11509
380	183.58	12.49	.14184	.13902	.13631	.13371	.13120	.12878	.12646	.12421	.12204	.11995	.11793
390	188.03	12.79	.14525	.14236	.13959	.13692	.13436	.13188	.12950	.12720	.12498	.12284	.12077
400	192.47	13.10	.14866	.14571	.14287	.14014	.13751	.13498	.13254	.13019	.12792	.12573	.12361
410	196.92	13.40	.15207	.14905	.14614	.14335	.14067	.13808	.13558	.13318	.13085	.12861	.12644
420	201.36	13.70	.15547	.15239	.14942	.14657	.14382	.14118	.13863	.13617	.13379	.13150	.12928
430	205.81	14.00	.15888	.15573	.15269	.14978	.14697	.14427	.14166	.13915	.13672	.13438	.13212
440	210.25	14.31	.16229	.15906	.15597	.15299	.15012	.14737	.14470	.14214	.13966	.13727	.13495
450	214.69	14.61	.16569	.16240	.15924	.15620	.15327	.15046	.14774	.14512	.14259	.14015	.13779
460	219.14	14.91	.16910	.16574	.16251	.15941	.15643	.15355	.15078	.14810	.14553	.14303	.14063
470	223.58	15.21	.17250	.16907	.16578	.16262	.15957	.15664	.15382	.15109	.14845	.14592	.14346
480	228.03	15.52	.17590	.17241	.16905	.16583	.16272	.15973	.15685	.15407	.15138	.14880	.14629
490	232.47	15.82	.17930	.17574	.17232	.16904	.16587	.16282	.15988	.15705	.15432	.15167	.14912
500	236.92	16.12	.18269	.17907	.17559	.17224	.16902	.16591	.16292	.16003	.15725	.15455	.15195
510	241.36	16.42	.18609	.18241	.17886	.17544	.17216	.16900	.16595	.16301	.16017	.15743	.15479
520	245.80	16.73	.18949	.18574	.18212	.17865	.17531	.17209	.16898	.16599	.16310	.16031	.15761
530	250.25	17.03	.19289	.18906	.18539	.18185	.17845	.17517	.17201	.16897	.16603	.16319	.16044
540	254.69	17.33	.19628	.19239	.18865	.18505	.18159	.17826	.17505	.17194	.16895	.16606	.16327
550	259.14	17.63	.19967	.19572	.19191	.18825	.18473	.18134	.17808	.17492	.17188	.16894	.16610
560	263.58	17.94	.20307	.19904	.19517	.19146	.18788	.18443	.18110	.17790	.17480	.17181	.16893
570	268.03	18.24	.20646	.20237	.19843	.19466	.19102	.18751	.18413	.18087	.17773	.17469	.17175
580	272.47	18.54	.20985	.20569	.20170	.19785	.19416	.19059	.18716	.18385	.18065	.17756	.17458
590	276.92	18.84	.21323	.20902	.20496	.20105	.19729	.19367	.19018	.18682	.18357	.18043	.17740
600	281.36	19.15	.21662	.21234	.20821	.20425	.20043	.19676	.19321	.18979	.18649	.18331	.18023
610	285.80	19.45	.22001	.21566	.21147	.20744	.20357	.19983	.19624	.19277	.18941	.18618	.18305
620	290.25	19.75	.22340	.21898	.21472	.21064	.20670	.20291	.19926	.19573	.19233	.18905	.18587
630	294.69	20.05	.22678	.22230	.21798	.21383	.20984	.20599	.20228	.19870	.19525	.19192	.18869
640	299.14	20.36	.23017	.22561	.22124	.21703	.21297	.20907	.20530	.20168	.19817	.19479	.19151
650	303.58	20.66	.23355	.22893	.22449	.22022	.21610	.21214	.20833	.20464	.20109	.19766	.19433
660	308.03	20.96	.23693	.23224	.22774	.22341	.21924	.21522	.21135	.20761	.20400	.20052	.19715
670	312.47	21.26	.24031	.23556	.23099	.22660	.22237	.21829	.21436	.21058	.20692	.20339	.19997
680	316.92	21.56	.24369	.23887	.23424	.22979	.22550	.22137	.21738	.21354	.20983	.20625	.20279
690	321.36	21.87	.24707	.24218	.23749	.23297	.22863	.22444	.22040	.21651	.21275	.20912	.20561
700	325.80	22.17	.25044	.24550	.24074	.23616	.23176	.22751	.22342	.21947	.21566	.21198	.20843
710	330.25	22.47	.25382	.24881	.24399	.23935	.23488	.23058	.22644	.22244	.21858	.21484	.21124
720	334.69	22.77	.25720	.25211	.24723	.24253	.23801	.23365	.22945	.22540	.22149	.21771	.21406
730	339.14	23.08	.26057	.25542	.25048	.24572	.24114	.23672	.23246	.22836	.22440	.22057	.21687
740	343.58	23.38	.26395	.25873	.25372	.24890	.24426	.23979	.23548	.23132	.22731	.22343	.21969
750	348.03	23.68	.26732	.26204	.25696	.25208	.24739	.24286	.23849	.23428	.23022	.22629	.22250
760	352.47	23.98	.27069	.26534	.26021	.25526	.25051	.24592	.24150	.23724	.23313	.22915	.22531
770	356.91	24.29	.27406	.26865	.26345	.25845	.25363	.24899	.24452	.24020	.23604	.23201	.22812
780	361.36	24.59	.27743	.27195	.26669	.26162	.25675	.25205	.24752	.24316	.23894	.23487	.23094
790	365.80	24.89	.28080	.27526	.26993	.26480	.25987	.25512	.25053	.24612	.24185	.23773	.23375

T-101

DENSITY

0.3 % O_2, 99.7 % He

DENSITY,LBS/CUBIC FT

.003 OXYGEN .997 HELIUM AVERAGE MOLECULAR WEIGHT 4.087

DEPTH	PRESSURE		TEMPERATURE,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
800	370.25	25.19	.28416	.27856	.27316	.26798	.26299	.25818	.25355	.24907	.24475	.24059	.23655
810	374.69	25.50	.28753	.28186	.27640	.27116	.26611	.26124	.25655	.25202	.24766	.24344	.23936
820	379.14	25.80	.29089	.28516	.27964	.27433	.26923	.26430	.25956	.25498	.25056	.24630	.24217
830	383.58	26.10	.29426	.28846	.28288	.27751	.27234	.26736	.26257	.25794	.25347	.24915	.24498
840	388.03	26.40	.29762	.29175	.28611	.28068	.27545	.27042	.26557	.26089	.25637	.25201	.24778
850	392.47	26.71	.30098	.29505	.28934	.28385	.27857	.27348	.26858	.26384	.25927	.25486	.25059
860	396.91	27.01	.30434	.29834	.29257	.28702	.28168	.27654	.27158	.26679	.26218	.25771	.25339
870	401.36	27.31	.30770	.30164	.29581	.29020	.28480	.27960	.27458	.26974	.26507	.26056	.25620
880	405.80	27.61	.31106	.30493	.29904	.29337	.28791	.28266	.27758	.27270	.26797	.26342	.25901
890	410.25	27.92	.31442	.30822	.30227	.29653	.29102	.28571	.28058	.27564	.27087	.26626	.26181
900	414.69	28.22	.31778	.31151	.30549	.29971	.29413	.28876	.28358	.27857	.27377	.26911	.26461
910	419.14	28.52	.32113	.31480	.30872	.30287	.29724	.29181	.28659	.28154	.27667	.27196	.26741
920	423.58	28.82	.32448	.31809	.31195	.30604	.30035	.29487	.28958	.28449	.27957	.27481	.27022
930	428.03	29.13	.32783	.32138	.31518	.30921	.30346	.29792	.29258	.28743	.28246	.27765	.27302
940	432.47	29.43	.33118	.32466	.31840	.31237	.30657	.30097	.29558	.29037	.28535	.28050	.27581
950	436.91	29.73	.33454	.32795	.32162	.31554	.30967	.30402	.29857	.29332	.28825	.28335	.27861
960	441.36	30.03	.33789	.33124	.32486	.31869	.31277	.30707	.30157	.29627	.29114	.28619	.28141
970	445.80	30.33	.34124	.33452	.32807	.32186	.31588	.31012	.30457	.29920	.29403	.28904	.28421
980	450.25	30.64	.34459	.33780	.33129	.32502	.31898	.31317	.30756	.30215	.29693	.29188	.28700
990	454.69	30.94	.34793	.34109	.33451	.32818	.32209	.31622	.31055	.30509	.29982	.29472	.28980
1000	459.14	31.24	.35128	.34437	.33773	.33134	.32519	.31926	.31355	.30805	.30271	.29756	.29259
1050	481.36	32.75	.36799	.36076	.35381	.34712	.34068	.33448	.32849	.32272	.31715	.31177	.30656
1100	503.58	34.27	.38468	.37712	.36987	.36288	.35615	.34967	.34342	.33739	.33157	.32595	.32051
1150	525.80	35.78	.40134	.39347	.38590	.37861	.37161	.36484	.35832	.35204	.34597	.34011	.33444
1200	548.02	37.29	.41797	.40978	.40191	.39433	.38703	.38000	.37322	.36667	.36035	.35425	.34836
1250	570.25	38.80	.43458	.42607	.41789	.41002	.40241	.39513	.38808	.38128	.37472	.36837	.36225
1300	592.47	40.31	.45117	.44235	.43386	.42568	.41782	.41023	.40292	.39588	.38907	.38248	.37612
1350	614.69	41.83	.46772	.45858	.44979	.44133	.43317	.42532	.41776	.41045	.40339	.39657	.38999
1400	636.91	43.34	.48426	.47480	.46571	.45694	.44852	.44039	.43256	.42500	.41769	.41065	.40383
1450	659.13	44.85	.50077	.49100	.48166	.47255	.46384	.45544	.44734	.43953	.43199	.42470	.41765
1500	681.36	46.36	.51725	.50716	.49746	.48813	.47913	.47047	.46211	.45404	.44625	.43874	.43146
	500	34.02	.38199	.37449	.36728	.36034	.35366	.34723	.34101	.33503	.32924	.32366	.31827
	600	40.83	.45679	.44784	.43926	.43094	.42303	.41535	.40795	.40082	.39392	.38727	.38083
	700	47.63	.53105	.52070	.51075	.50118	.49195	.48306	.47448	.46620	.45822	.45050	.44303
	800	54.44	.60481	.59307	.58178	.57091	.56044	.55035	.54061	.53121	.52214	.51336	.50489
	900	61.24	.67808	.66497	.65235	.64020	.62850	.61721	.60632	.59582	.58568	.57588	.56639
	1000	68.05	.75085	.73636	.72244	.70904	.69613	.68367	.67166	.66006	.64887	.63803	.62756
	1100	74.85	.82312	.80730	.79210	.77744	.76334	.74973	.73659	.72393	.71169	.69985	.68840
	1200	81.65	.89490	.87778	.86130	.84543	.83013	.81539	.80116	.78742	.77415	.76131	.74889
	1300	88.46	.96622	.94778	.93005	.91298	.89653	.88064	.86532	.85054	.83624	.82242	.80906
	1400	95.26	1.03707	1.01735	.99838	.98010	.96251	.94553	.92912	.91330	.89799	.88321	.86888
	1500	102.07	1.10744	1.08647	1.06627	1.04684	1.02809	1.01000	.99254	.97569	.95940	.94365	.92840
	1600	108.87	1.17735	1.15516	1.13373	1.11313	1.09326	1.07412	1.05563	1.03775	1.02047	1.00377	.98761
	1700	115.68	1.2468	1.2233	1.2008	1.1791	1.1581	1.1378	1.1183	1.0994	1.0812	1.0636	1.0465
	1800	122.48	1.3158	1.2911	1.2674	1.2445	1.2225	1.2012	1.1806	1.1608	1.1416	1.1230	1.1050
	1900	129.29	1.3844	1.3585	1.3336	1.3096	1.2865	1.2642	1.2426	1.2218	1.2016	1.1822	1.1633
	2000	136.09	1.4525	1.4255	1.3995	1.3744	1.3502	1.3268	1.3042	1.2824	1.2614	1.2410	1.2212
	2100	142.90	1.5202	1.4921	1.4649	1.4387	1.4135	1.3891	1.3655	1.3428	1.3208	1.2995	1.2789
	2200	149.70	1.5876	1.5582	1.5300	1.5027	1.4764	1.4510	1.4265	1.4028	1.3799	1.3577	1.3363
	2300	156.51	1.6544	1.6239	1.5946	1.5663	1.5390	1.5126	1.4871	1.4625	1.4387	1.4156	1.3933
	2400	163.31	1.7208	1.6893	1.6588	1.6295	1.6012	1.5738	1.5474	1.5219	1.4971	1.4732	1.4500
	2500	170.11	1.7869	1.7542	1.7227	1.6924	1.6630	1.6347	1.6073	1.5809	1.5552	1.5305	1.5065
	2600	176.92	1.8526	1.8186	1.7862	1.7546	1.7245	1.6952	1.6669	1.6395	1.6131	1.5875	1.5627
	2700	183.72	1.9178	1.8830	1.8493	1.8170	1.7857	1.7555	1.7262	1.6980	1.6707	1.6442	1.6186
	2800	190.53	1.9826	1.9468	1.9121	1.8787	1.8465	1.8153	1.7852	1.7561	1.7279	1.7006	1.6742
	2900	197.33	2.0472	2.0101	1.9745	1.9402	1.9069	1.8749	1.8439	1.8139	1.7848	1.7567	1.7295
	3000	204.14	2.1112	2.0732	2.0366	2.0012	1.9671	1.9341	1.9022	1.8714	1.8415	1.8126	1.7846
	3100	210.94	2.1749	2.1359	2.0983	2.0619	2.0268	1.9930	1.9602	1.9286	1.8979	1.8682	1.8394
	3200	217.75	2.2383	2.1983	2.1596	2.1224	2.0864	2.0515	2.0179	1.9855	1.9540	1.9235	1.8940
	3300	224.55	2.3013	2.2602	2.2207	2.1823	2.1455	2.1099	2.0754	2.0420	2.0097	1.9785	1.9482
	3400	231.36	2.3639	2.3218	2.2813	2.2421	2.2044	2.1678	2.1325	2.0983	2.0653	2.0333	2.0022
	3500	238.16	2.4261	2.3832	2.3417	2.3016	2.2629	2.2255	2.1893	2.1544	2.1205	2.0877	2.0559
	3600	244.96	2.4880	2.4440	2.4017	2.3607	2.3211	2.2829	2.2459	2.2102	2.1755	2.1419	2.1094
	3700	251.77	2.5495	2.5047	2.4613	2.4194	2.3791	2.3399	2.3022	2.2656	2.2302	2.1959	2.1627
	3800	258.57	2.6107	2.5648	2.5206	2.4780	2.4366	2.3968	2.3581	2.3208	2.2847	2.2496	2.2155
	3900	265.38	2.6716	2.6248	2.5797	2.5361	2.4940	2.4533	2.4138	2.3757	2.3387	2.3030	2.2683
	4000	272.18	2.7321	2.6844	2.6384	2.5940	2.5509	2.5095	2.4692	2.4303	2.3927	2.3562	2.3208
	4100	278.99	2.7923	2.7437	2.6967	2.6514	2.6077	2.5654	2.5244	2.4847	2.4463	2.4091	2.3730
	4200	285.79	2.8522	2.8027	2.7549	2.7087	2.6641	2.6210	2.5792	2.5388	2.4997	2.4617	2.4250
	4300	292.60	2.9117	2.8612	2.8127	2.7657	2.7202	2.6764	2.6339	2.5927	2.5528	2.5142	2.4767
	4400	299.40	2.9708	2.9196	2.8701	2.8223	2.7761	2.7314	2.6882	2.6462	2.6057	2.5664	2.5282
	4500	306.21	3.0297	2.9775	2.9273	2.8787	2.8317	2.7863	2.7423	2.6996	2.6584	2.6183	2.5794
	4600	313.01	3.0883	3.0353	2.9841	2.9347	2.8870	2.8407	2.7960	2.7527	2.7107	2.6700	2.6305
	4700	319.81	3.1466	3.0927	3.0408	2.9906	2.9420	2.8951	2.8496	2.8055	2.7628	2.7214	2.6814
	4800	326.62	3.2044	3.1498	3.0971	3.0450	2.9967	2.9491	2.9029	2.8581	2.8147	2.7727	2.7319
	4900	333.42	3.2621	3.2066	3.1530	3.1013	3.0512	3.0027	2.9559	2.9104	2.8664	2.8237	2.7823
	5000	340.23	3.3194	3.2632	3.2088	3.1563	3.1054	3.0562	3.0087	2.9625	2.9178	2.8744	2.8324

SP. VOL.

0.3 % O_2, 99.7 % He

T-102

SPECIFIC VOLUME,CUBIC FT/LB

.003 OXYGEN .997 HELIUM AVERAGE MOLECULAR WEIGHT 4.087

DEPTH	PRESSURE		TEMPERATURE,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
0	14.70	1.00	87.539	89.324	91.112	92.897	94.685	96.473	98.258	100.046	101.831	103.619	105.406
10	19.14	1.30	67.223	68.594	69.967	71.338	72.711	74.082	75.454	76.825	78.198	79.569	80.942
20	23.58	1.60	54.564	55.677	56.790	57.904	59.017	60.131	61.244	62.356	63.470	64.583	65.697
30	28.03	1.91	45.919	46.856	47.792	48.730	49.667	50.603	51.539	52.477	53.413	54.350	55.287
40	32.47	2.21	39.641	40.449	41.258	42.066	42.875	43.684	44.493	45.301	46.109	46.917	47.727
50	36.92	2.51	34.874	35.585	36.297	37.008	37.719	38.430	39.141	39.853	40.564	41.276	41.987
60	41.36	2.81	31.132	31.767	32.402	33.037	33.672	34.306	34.941	35.576	36.211	36.845	37.480
70	45.81	3.12	28.116	28.689	29.263	29.836	30.409	30.982	31.555	32.128	32.702	33.275	33.848
80	50.25	3.42	25.634	26.156	26.679	27.201	27.723	28.246	28.768	29.291	29.813	30.336	30.858
90	54.70	3.72	23.554	24.034	24.515	24.994	25.475	25.954	26.435	26.914	27.394	27.875	28.355
100	59.14	4.02	21.788	22.232	22.675	23.120	23.563	24.008	24.451	24.895	25.339	25.783	26.227
110	63.58	4.33	20.268	20.681	21.094	21.507	21.920	22.332	22.746	23.158	23.571	23.984	24.397
120	68.03	4.63	18.947	19.333	19.719	20.105	20.490	20.877	21.262	21.648	22.034	22.420	22.806
130	72.47	4.93	17.788	18.150	18.512	18.875	19.237	19.599	19.961	20.324	20.686	21.048	21.411
140	76.92	5.23	16.763	17.104	17.445	17.787	18.128	18.469	18.811	19.152	19.493	19.834	20.176
150	81.36	5.54	15.850	16.172	16.495	16.817	17.140	17.463	17.786	18.108	18.431	18.753	19.076
160	85.81	5.84	15.031	15.337	15.643	15.949	16.255	16.561	16.867	17.173	17.478	17.784	18.090
170	90.25	6.14	14.293	14.584	14.875	15.166	15.456	15.747	16.038	16.329	16.620	16.911	17.202
180	94.70	6.44	13.625	13.902	14.179	14.456	14.733	15.011	15.288	15.565	15.842	16.120	16.396
190	99.14	6.75	13.016	13.281	13.545	13.810	14.075	14.340	14.605	14.869	15.134	15.399	15.663
200	103.58	7.05	12.459	12.713	12.966	13.220	13.473	13.727	13.980	14.233	14.487	14.740	14.993
210	108.03	7.35	11.949	12.192	12.435	12.678	12.921	13.164	13.406	13.650	13.892	14.136	14.378
220	112.47	7.65	11.478	11.712	11.945	12.179	12.412	12.645	12.879	13.112	13.345	13.579	13.812
230	116.92	7.96	11.044	11.268	11.493	11.717	11.942	12.166	12.391	12.615	12.840	13.064	13.289
240	121.36	8.26	10.641	10.857	11.073	11.290	11.506	11.723	11.939	12.155	12.371	12.588	12.804
250	125.81	8.56	10.267	10.475	10.684	10.893	11.101	11.310	11.519	11.727	11.936	12.144	12.353
260	130.25	8.86	9.9181	10.1196	10.3210	10.5227	10.7241	10.9257	11.1270	11.3286	11.5301	11.7316	11.9331
270	134.69	9.17	9.5923	9.7872	9.9820	10.1768	10.3719	10.5666	10.7616	10.9562	11.1511	11.3460	11.5408
280	139.14	9.47	9.2874	9.4761	9.6647	9.8533	10.0419	10.2307	10.4192	10.6079	10.7963	10.9850	11.1737
290	143.58	9.77	9.0013	9.1842	9.3670	9.5498	9.7326	9.9153	10.0980	10.2809	10.4638	10.6464	10.8292
300	148.03	10.07	8.7324	8.9098	9.0872	9.2643	9.4416	9.6191	9.7964	9.9735	10.1510	10.3281	10.5054
310	152.47	10.38	8.4794	8.6515	8.8235	8.9957	9.1678	9.3400	9.5120	9.6843	9.8564	10.0283	10.2006
320	156.92	10.68	8.2405	8.4077	8.5749	8.7423	8.9096	9.0768	9.2441	9.4113	9.5784	9.7456	9.9129
330	161.36	10.98	8.0148	8.1775	8.3400	8.5028	8.6653	8.8280	8.9906	9.1533	9.3158	9.4786	9.6412
340	165.81	11.28	7.8012	7.9595	8.1177	8.2760	8.4343	8.5927	8.7508	8.9091	9.0673	9.2258	9.3840
350	170.25	11.58	7.5987	7.7529	7.9071	8.0612	8.2154	8.3695	8.5237	8.6779	8.8320	8.9861	9.1402
360	174.69	11.89	7.4066	7.5569	7.7071	7.8573	8.0075	8.1578	8.3079	8.4582	8.6084	8.7586	8.9088
370	179.14	12.19	7.2240	7.3705	7.5171	7.6636	7.8100	7.9565	8.1031	8.2494	8.3959	8.5424	8.6889
380	183.58	12.49	7.0502	7.1932	7.3361	7.4790	7.6220	7.7651	7.9079	8.0508	8.1938	8.3367	8.4797
390	188.03	12.79	6.8846	7.0243	7.1638	7.3034	7.4430	7.5825	7.7220	7.8617	8.0011	8.1407	8.2803
400	192.47	13.10	6.7269	6.8632	6.9994	7.1359	7.2722	7.4086	7.5449	7.6812	7.8174	7.9538	8.0902
410	196.92	13.40	6.5761	6.7093	6.8425	6.9757	7.1090	7.2423	7.3756	7.5088	7.6421	7.7753	7.9086
420	201.36	13.70	6.4319	6.5623	6.6926	6.8228	6.9532	7.0834	7.2137	7.3440	7.4744	7.6047	7.7351
430	205.81	14.00	6.2940	6.4215	6.5491	6.6765	6.8039	6.9315	7.0590	7.1865	7.3140	7.4414	7.5690
440	210.25	14.31	6.1619	6.2868	6.4116	6.5364	6.6611	6.7859	6.9107	7.0355	7.1603	7.2851	7.4100
450	214.69	14.61	6.0353	6.1576	6.2797	6.4019	6.5243	6.6464	6.7687	6.8908	7.0130	7.1352	7.2575
460	219.14	14.91	5.9138	6.0337	6.1533	6.2731	6.3928	6.5125	6.6323	6.7521	6.8717	6.9914	7.1111
470	223.58	15.21	5.7972	5.9146	6.0319	6.1493	6.2667	6.3840	6.5013	6.6187	6.7361	6.8533	6.9706
480	228.03	15.52	5.6851	5.8003	5.9153	6.0304	6.1453	6.2604	6.3756	6.4906	6.6057	6.7206	6.8357
490	232.47	15.82	5.5774	5.6903	5.8031	5.9159	6.0288	6.1417	6.2545	6.3673	6.4802	6.5931	6.7058
500	236.92	16.12	5.4736	5.5843	5.6951	5.8058	5.9166	6.0272	6.1380	6.2488	6.3595	6.4703	6.5809
510	241.36	16.42	5.3737	5.4823	5.5910	5.6998	5.8084	5.9172	6.0259	6.1346	6.2432	6.3520	6.4606
520	245.80	16.73	5.2773	5.3840	5.4908	5.5975	5.7043	5.8109	5.9177	6.0244	6.1311	6.2379	6.3446
530	250.25	17.03	5.1844	5.2892	5.3941	5.4989	5.6037	5.7086	5.8135	5.9182	6.0230	6.1280	6.2327
540	254.69	17.33	5.0947	5.1977	5.3008	5.4038	5.5068	5.6098	5.7128	5.8158	5.9188	6.0218	6.1247
550	259.14	17.63	5.0081	5.1094	5.2107	5.3120	5.4132	5.5144	5.6156	5.7168	5.8181	5.9193	6.0205
560	263.58	17.94	4.9245	5.0240	5.1236	5.2231	5.3226	5.4221	5.5217	5.6212	5.7207	5.8203	5.9197
570	268.03	18.24	4.8436	4.9415	5.0394	5.1373	5.2352	5.3330	5.4309	5.5287	5.6266	5.7245	5.8223
580	272.47	18.54	4.7653	4.8616	4.9579	5.0543	5.1504	5.2467	5.3430	5.4394	5.5355	5.6318	5.7281
590	276.92	18.84	4.6897	4.7843	4.8791	4.9738	5.0686	5.1633	5.2581	5.3528	5.4474	5.5422	5.6369
600	281.36	19.15	4.6163	4.7095	4.8028	4.8960	4.9893	5.0824	5.1757	5.2689	5.3622	5.4553	5.5486
610	285.80	19.45	4.5452	4.6370	4.7288	4.8206	4.9123	5.0042	5.0959	5.1876	5.2795	5.3712	5.4630
620	290.25	19.75	4.4763	4.5667	4.6571	4.7475	4.8379	4.9282	5.0186	5.1090	5.1993	5.2896	5.3801
630	294.69	20.05	4.4095	4.4985	4.5876	4.6765	4.7655	4.8546	4.9436	5.0326	5.1216	5.2105	5.2996
640	299.14	20.36	4.3447	4.4324	4.5200	4.6078	4.6955	4.7831	4.8709	4.9585	5.0461	5.1338	5.2216
650	303.58	20.66	4.2817	4.3682	4.4546	4.5410	4.6274	4.7138	4.8002	4.8866	4.9729	5.0593	5.1458
660	308.03	20.96	4.2206	4.3058	4.3910	4.4761	4.5613	4.6464	4.7315	4.8168	4.9019	4.9869	5.0722
670	312.47	21.26	4.1612	4.2452	4.3292	4.4131	4.4971	4.5810	4.6650	4.7489	4.8328	4.9168	5.0007
680	316.92	21.56	4.1035	4.1863	4.2691	4.3519	4.4346	4.5174	4.6001	4.6829	4.7657	4.8485	4.9312
690	321.36	21.87	4.0475	4.1291	4.2107	4.2924	4.3739	4.4555	4.5371	4.6188	4.7004	4.7820	4.8635
700	325.80	22.17	3.9929	4.0734	4.1538	4.2344	4.3148	4.3954	4.4759	4.5564	4.6369	4.7174	4.7978
710	330.25	22.47	3.9398	4.0192	4.0986	4.1780	4.2574	4.3368	4.4163	4.4957	4.5751	4.6545	4.7338
720	334.69	22.77	3.8881	3.9664	4.0448	4.1232	4.2016	4.2799	4.3582	4.4366	4.5149	4.5933	4.6716
730	339.14	23.08	3.8377	3.9151	3.9924	4.0697	4.1470	4.2243	4.3017	4.3791	4.4564	4.5337	4.6110
740	343.58	23.38	3.7887	3.8650	3.9414	4.0177	4.0940	4.1704	4.2466	4.3230	4.3993	4.4756	4.5519
750	348.03	23.68	3.7409	3.8163	3.8916	3.9670	4.0423	4.1176	4.1931	4.2684	4.3437	4.4191	4.4944
760	352.47	23.98	3.6943	3.7687	3.8431	3.9176	3.9919	4.0663	4.1407	4.2151	4.2895	4.3639	4.4383
770	356.91	24.29	3.6488	3.7224	3.7958	3.8693	3.9428	4.0162	4.0897	4.1632	4.2366	4.3101	4.3836
780	361.36	24.59	3.6045	3.6771	3.7497	3.8223	3.8948	3.9674	4.0400	4.1126	4.1851	4.2577	4.3302
790	365.80	24.89	3.5613	3.6330	3.7047	3.7764	3.8481	3.9198	3.9915	4.0631	4.1348	4.2065	4.2782

T-103

SP. VOL.

0.3 % O_2, 99.7 % He

SPECIFIC VOLUME,CUBIC FT/LB

.003 OXYGEN .997 HELIUM AVERAGE MOLECULAR WEIGHT 4.087

DEPTH	PRESSURE		TEMPERATURE,F										
FT	PSIA	ATM	30	40	50	60	70	80	90	100	110	120	130
800	370.25	25.19	3.5192	3.5899	3.6608	3.7316	3.8024	3.8733	3.9441	4.0149	4.0858	4.1565	4.2274
810	374.69	25.50	3.4780	3.5479	3.6180	3.6879	3.7579	3.8279	3.8979	3.9679	4.0378	4.1078	4.1778
820	379.14	25.80	3.4377	3.5068	3.5760	3.6452	3.7143	3.7836	3.8527	3.9219	3.9910	4.0601	4.1293
830	383.58	26.10	3.3984	3.4667	3.5351	3.6035	3.6719	3.7402	3.8085	3.8769	3.9453	4.0136	4.0820
840	388.03	26.40	3.3600	3.4276	3.4952	3.5627	3.6304	3.6980	3.7655	3.8330	3.9006	3.9682	4.0358
850	392.47	26.71	3.3225	3.3893	3.4561	3.5229	3.5897	3.6565	3.7233	3.7902	3.8569	3.9237	3.9906
860	396.91	27.01	3.2858	3.3518	3.4180	3.4840	3.5501	3.6161	3.6821	3.7482	3.8142	3.8803	3.9464
870	401.36	27.31	3.2499	3.3152	3.3806	3.4459	3.5112	3.5766	3.6419	3.7072	3.7726	3.8378	3.9032
880	405.80	27.61	3.2148	3.2794	3.3440	3.4087	3.4733	3.5379	3.6025	3.6671	3.7318	3.7963	3.8609
890	410.25	27.92	3.1805	3.2444	3.3083	3.3723	3.4362	3.5001	3.5640	3.6279	3.6918	3.7557	3.8195
900	414.69	28.22	3.1469	3.2101	3.2734	3.3366	3.3998	3.4630	3.5263	3.5895	3.6527	3.7160	3.7791
910	419.14	28.52	3.1140	3.1766	3.2392	3.3017	3.3643	3.4268	3.4893	3.5519	3.6144	3.6770	3.7395
920	423.58	28.82	3.0819	3.1438	3.2057	3.2676	3.3294	3.3913	3.4533	3.5151	3.5770	3.6389	3.7008
930	428.03	29.13	3.0503	3.1116	3.1728	3.2341	3.2954	3.3566	3.4179	3.4791	3.5403	3.6016	3.6628
940	432.47	29.43	3.0195	3.0801	3.1407	3.2013	3.2619	3.3226	3.3832	3.4438	3.5045	3.5651	3.6256
950	436.91	29.73	2.9892	3.0492	3.1092	3.1693	3.2292	3.2893	3.3493	3.4092	3.4693	3.5293	3.5892
960	441.36	30.03	2.9596	3.0190	3.0784	3.1378	3.1972	3.2566	3.3160	3.3753	3.4348	3.4942	3.5535
970	445.80	30.33	2.9305	2.9894	3.0482	3.1069	3.1658	3.2246	3.2833	3.3422	3.4010	3.4598	3.5186
980	450.25	30.64	2.9020	2.9603	3.0185	3.0768	3.1350	3.1932	3.2514	3.3097	3.3678	3.4261	3.4843
990	454.69	30.94	2.8741	2.9318	2.9894	3.0471	3.1047	3.1624	3.2201	3.2777	3.3353	3.3930	3.4507
1000	459.14	31.24	2.8467	2.9038	2.9610	3.0180	3.0752	3.1323	3.1893	3.2464	3.3035	3.3606	3.4177
1050	481.36	32.75	2.7175	2.7719	2.8264	2.8804	2.9353	2.9897	3.0442	3.0986	3.1531	3.2075	3.2620
1100	503.58	34.27	2.5996	2.6516	2.7037	2.7557	2.8078	2.8599	2.9119	2.9640	3.0160	3.0680	3.1200
1150	525.80	35.78	2.4916	2.5415	2.5913	2.6412	2.6910	2.7409	2.7908	2.8406	2.8904	2.9402	2.9901
1200	548.02	37.29	2.3925	2.4403	2.4881	2.5360	2.5838	2.6316	2.6794	2.7272	2.7750	2.8229	2.8706
1250	570.25	38.80	2.3011	2.3470	2.3930	2.4389	2.4849	2.5308	2.5768	2.6227	2.6687	2.7146	2.7605
1300	592.47	40.31	2.2165	2.2607	2.3049	2.3492	2.3934	2.4376	2.4819	2.5260	2.5703	2.6145	2.6587
1350	614.69	41.83	2.1380	2.1806	2.2232	2.2659	2.3085	2.3512	2.3937	2.4364	2.4790	2.5216	2.5642
1400	636.91	43.34	2.0650	2.1062	2.1473	2.1885	2.2295	2.2707	2.3118	2.3529	2.3941	2.4352	2.4763
1450	659.13	44.85	1.9969	2.0367	2.0764	2.1162	2.1559	2.1957	2.2354	2.2752	2.3149	2.3546	2.3944
1500	681.36	46.36	1.9333	1.9718	2.0102	2.0486	2.0871	2.1255	2.1640	2.2024	2.2409	2.2793	2.3177
	500	34.02	2.6178	2.6703	2.7227	2.7752	2.8276	2.8800	2.9324	2.9848	3.0373	3.0896	3.1420
	600	40.83	2.1892	2.2329	2.2766	2.3202	2.3639	2.4076	2.4513	2.4949	2.5386	2.5822	2.6259
	700	47.63	1.8831	1.9205	1.9579	1.9953	2.0327	2.0701	2.1076	2.1450	2.1824	2.2198	2.2572
	800	54.44	1.6534	1.6861	1.7189	1.7516	1.7843	1.8170	1.8498	1.8825	1.9152	1.9479	1.9806
	900	61.24	1.4747	1.5038	1.5329	1.5620	1.5911	1.6202	1.6493	1.6783	1.7074	1.7365	1.7656
	1000	68.05	1.3318	1.3580	1.3842	1.4103	1.4365	1.4627	1.4889	1.5150	1.5412	1.5673	1.5935
	1100	74.85	1.2149	1.2387	1.2625	1.2863	1.3100	1.3338	1.3576	1.3814	1.4051	1.4289	1.4526
	1200	81.65	1.1174	1.1392	1.1610	1.1828	1.2046	1.2264	1.2482	1.2700	1.2917	1.3135	1.3353
	1300	88.46	1.0350	1.0551	1.0752	1.0953	1.1154	1.1355	1.1556	1.1757	1.1958	1.2159	1.2360
	1400	95.26	.96425	.98295	1.00162	1.02030	1.03895	1.05761	1.07629	1.09493	1.11360	1.13224	1.15090
	1500	102.07	.90298	.92041	.93785	.95525	.97267	.99010	1.00751	1.02492	1.04232	1.05971	1.07713
	1600	108.87	.84937	.86568	.88204	.89837	.91470	.93099	.94730	.96362	.97994	.99625	1.01255
	1700	115.68	.80206	.81743	.83280	.84813	.86351	.87885	.89420	.90957	.92490	.94024	.95560
	1800	122.48	.75998	.77450	.78899	.80352	.81801	.83250	.84701	.86148	.87595	.89044	.90495
	1900	129.29	.72232	.73610	.74983	.76356	.77730	.79104	.80474	.81849	.83220	.84589	.85963
	2000	136.09	.68846	.70149	.71455	.72761	.74062	.75368	.76674	.77976	.79279	.80579	.81884
	2100	142.90	.65780	.67022	.68263	.69507	.70747	.71991	.73231	.74472	.75713	.76951	.78194
	2200	149.70	.62989	.64176	.65361	.66546	.67734	.68918	.70102	.71287	.72471	.73653	.74835
	2300	156.51	.60444	.61580	.62712	.63846	.64979	.66112	.67245	.68378	.69508	.70642	.71772
	2400	163.31	.58111	.59198	.60283	.61370	.62454	.63540	.64626	.65709	.66795	.67878	.68964
	2500	170.11	.55962	.57006	.58049	.59090	.60131	.61174	.62217	.63256	.64299	.65338	.66378
	2600	176.92	.53978	.54983	.55983	.56985	.57987	.58990	.59990	.60993	.61992	.62991	.63990
	2700	183.72	.52144	.53107	.54074	.55037	.56001	.56965	.57931	.58893	.59856	.60821	.61783
	2800	190.53	.50438	.51368	.52298	.53227	.54157	.55087	.56016	.56944	.57872	.58803	.59730
	2900	197.33	.48848	.49748	.50645	.51542	.52441	.53336	.54233	.55130	.56028	.56924	.57819
	3000	204.14	.47366	.48234	.49102	.49970	.50836	.51704	.52572	.53436	.54304	.55170	.56035
	3100	210.94	.45979	.46818	.47658	.48498	.49338	.50176	.51015	.51851	.52689	.53527	.54366
	3200	217.75	.44677	.45491	.46305	.47117	.47930	.48742	.49556	.50366	.51178	.51989	.52799
	3300	224.55	.43454	.44244	.45031	.45819	.46608	.47396	.48183	.48970	.49757	.50544	.51330
	3400	231.36	.42303	.43070	.43835	.44600	.45364	.46129	.46892	.47657	.48419	.49182	.49944
	3500	238.16	.41218	.41961	.42705	.43449	.44191	.44934	.45676	.46417	.47159	.47900	.48640
	3600	244.96	.40193	.40916	.41637	.42361	.43083	.43804	.44525	.45245	.45965	.46687	.47406
	3700	251.77	.39223	.39926	.40630	.41332	.42033	.42736	.43436	.44137	.44838	.45539	.46239
	3800	258.57	.38304	.38989	.39673	.40356	.41040	.41723	.42407	.43090	.43770	.44452	.45136
	3900	265.38	.37431	.38099	.38764	.39431	.40096	.40762	.41428	.42093	.42758	.43421	.44087
	4000	272.18	.36602	.37253	.37902	.38551	.39201	.39849	.40498	.41146	.41793	.42441	.43088
	4100	278.99	.35813	.36447	.37082	.37715	.38349	.38980	.39614	.40246	.40877	.41509	.42140
	4200	285.79	.35061	.35680	.36299	.36918	.37536	.38153	.38772	.39389	.40005	.40622	.41237
	4300	292.60	.34344	.34950	.35553	.36157	.36762	.37364	.37967	.38570	.39173	.39776	.40377
	4400	299.40	.33661	.34251	.34842	.35432	.36022	.36611	.37200	.37789	.38377	.38966	.39553
	4500	306.21	.33007	.33585	.34162	.34738	.35314	.35890	.36466	.37042	.37617	.38192	.38768
	4600	313.01	.32380	.32946	.33511	.34075	.34639	.35202	.35766	.36327	.36891	.37454	.38015
	4700	319.81	.31780	.32334	.32884	.33438	.33990	.34542	.35093	.35645	.36195	.36745	.37295
	4800	326.62	.31207	.31748	.32288	.32829	.33370	.33909	.34449	.34989	.35527	.36066	.36604
	4900	333.42	.30655	.31186	.31715	.32244	.32774	.33303	.33831	.34360	.34887	.35415	.35941
	5000	340.23	.30126	.30645	.31164	.31682	.32202	.32720	.33237	.33756	.34273	.34790	.35305

END