

**Manual of Petroleum  
Measurement Standards  
Chapter 11.2.1—Compressibility Factors  
for Hydrocarbons:  
0–90°API Gravity  
Range**

FIRST EDITION, AUGUST 1984

American Petroleum Institute  
1220 L Street, Northwest  
Washington, D.C. 20005



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**Measurement Coordination Department**

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## FOREWORD

This publication provides tables to correct hydrocarbon volumes metered under pressure to corresponding volumes at the equilibrium pressure for the metered temperature. The parallel publication in metric (SI) units is MPMS 11.2.1M.

The table presented in this volume is also available from API as a magnetic tape, along with a manual containing the text information in this publication.

Suggested revisions are invited and should be submitted to the director, Measurement Coordination Department, American Petroleum Institute, 1220 L Street, N.W., Washington, D.C. 20005.

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#### 11.2.1 Compressibility Factors for Hydrocarbons: 0–90°API Gravity Range

##### 11.2.1.1 SCOPE

The purpose of this standard is to correct hydrocarbon volumes metered under pressure to the corresponding volumes at the equilibrium pressure for the metered temperature. This standard contains compressibility factors related to meter temperature and API gravity (60°F) of metered material. The corresponding metric version is Chapter 11.2.1M.

##### 11.2.1.2 HISTORY AND DEVELOPMENT

The previous compressibility standard (API Standard 1101, Appendix B, Table II) for hydrocarbons in the 0–90°API gravity range was developed in 1945 by Jacobson, et al [1]. It is based on limited data obtained mostly on pure compounds and lubricating oil type materials. Also, Standard 1101 was developed without the aid of a mathematical model.

In 1981, a working group of the Committee on Static Petroleum Measurement was set up to revise the compressibility tables of Standard 1101. This group performed an extensive literature search and found only three sources of compressibility information. The resulting data base is broader than that used in the previous standard. Unfortunately, it is not large enough to cover the range of current commercial operations. When new data are available, they will be incorporated into an expanded standard. This standard now replaces the discontinued Standard 1101, Appendix B, Table II, 0–100°API gravity portion.

##### 11.2.1.3 DATA BASE AND LIMITS OF THE STANDARD

The actual standard is the printed table that follows this text. The mathematical model and computer steps used to generate this standard should not be considered the standard. They can, however, be used to develop computer subroutines for various languages and machines to duplicate the results in the printed table. Also, a computer tape is available through API, which con-

tains the same information as the printed table. The tape can be used in the development of various computer subroutines.

The data base (see Table 1) for this standard was obtained from Jessup [2], Downer and Gardiner [3], and Downer [4]. It consists of seven crude oils, five gasolines, and seven middle distillate-gas oils. The lubricating oil data from these sources were not included. Modeling results showed that lubricating oils are a different population than crude oils and other refined products. Their inclusion increases the compressibility correlation uncertainty by a factor of two. Also, lubricating oils are not normally metered under pressure and do not require the use of this standard.

The limits of the experimental data are 20 to 76°API, 32 to 302°F, and 0 to 711 pounds per square inch. As a result of a Committee on Static Petroleum Measurement (COSM) and Committee on Petroleum Measurement (COPM) survey, the actual limits of the standard are broader: 0 to 90°API, –20 to 200°F, and 0 to 1500 pounds per square inch. Hence, certain portions of the standard represent extrapolated results (Figure 1). In these extrapolated portions, the uncertainty analysis discussed in 11.2.1.5 may not be valid.

The increments of this standard are 0.5°F and 0.5°API. Interpolation to smaller increments is not recommended.

##### 11.2.1.4 EXAMPLE USE OF THE STANDARD

In this standard, the compressibility factor ( $F$ ) is used in the normal manner for volume correction ( \* denotes multiplication):

$$V_e = V_m / [1 - F * (P_m - P_e)]$$

Where:

$V_e$  = volume at equilibrium (bubble point) pressure,  $P_e$ .

$V_m$  = volume at the meter pressure,  $P_m$ .

As an example, calculate the volume of 1000 barrels ( $V_m$ ) of a 19.9°API (60°F) fuel oil metered under a pressure of 500 pounds per square inch ( $P_m$ ) and 100°F. Assume a  $P_e$  value of 0 pounds per square inch. First, the gravity is rounded to the nearest 0.5°API, in this

Table 1—Data Base and Experimental Conditions for Chapter 11.2.1

| Sample Name and Origin               | API Gravity 60°F | Temperature °F | Pressure psi | Number of Data Points | Reference |
|--------------------------------------|------------------|----------------|--------------|-----------------------|-----------|
| <b>Crude Oils</b>                    |                  |                |              |                       |           |
| ADMEG (Zakum) export                 | 39.89            | 40.0–170.0     | 0–508        | 5                     | 3         |
| Barrow Island                        | 36.97            | 40.0–170.0     | 0–508        | 5                     | 3         |
| Libyan (Tobruk) export               | 36.37            | 122.0–170.0    | 0–508        | 3                     | 3         |
| Iranian Light export                 | 33.65            | 40.0–170.0     | 0–508        | 5                     | 3         |
| Kuwait export                        | 30.98            | 40.0–170.0     | 0–508        | 5                     | 3         |
| Iranian Heavy export                 | 30.55            | 40.0–170.0     | 0–508        | 5                     | 3         |
| Alaskan (North Slope)                | 27.24            | 60.0–170.0     | 0–508        | 4                     | 3         |
| <b>Gasolines</b>                     |                  |                |              |                       |           |
| Light catalytic cracked              | 76.25            | 40.0–100.0     | 0–493        | 3                     | 4         |
| Straight run                         | 61.12            | 40.0–140.0     | 0–493        | 4                     | 4         |
| Cracked                              | 52.74            | 32.0–149.0     | 0–711        | 5                     | 2         |
| Fighting aviation                    | 71.51            | 32.0–158.0     | 0–711        | 5                     | 2         |
| Fighting aviation                    | 72.10            | 32.0–158.0     | 0–711        | 5                     | 2         |
| <b>Kerosine and Light Fuel Oil</b>   |                  |                |              |                       |           |
| Kerosine (odorless)                  | 47.61            | 40.0–170.0     | 0–493        | 5                     | 4         |
| DERV                                 | 35.36            | 40.0–170.0     | 0–493        | 5                     | 4         |
| <b>Gas Oils and Heavy Fuels Oils</b> |                  |                |              |                       |           |
| Gas oil                              | 38.16            | 40.0–170.0     | 0–493        | 5                     | 4         |
| Commercial fuel oil                  | 19.90            | 100.0–140.0    | 0–493        | 2                     | 4         |
| Los Angeles basin gas oil            | 30.42            | 32.0–302.0     | 0–711        | 3                     | 2         |
| Oklahoma gas oil                     | 29.08            | 32.0–302.0     | 0–711        | 3                     | 2         |
| Midcontinent gas oil                 | 28.66            | 32.0–302.0     | 0–711        | 3                     | 2         |

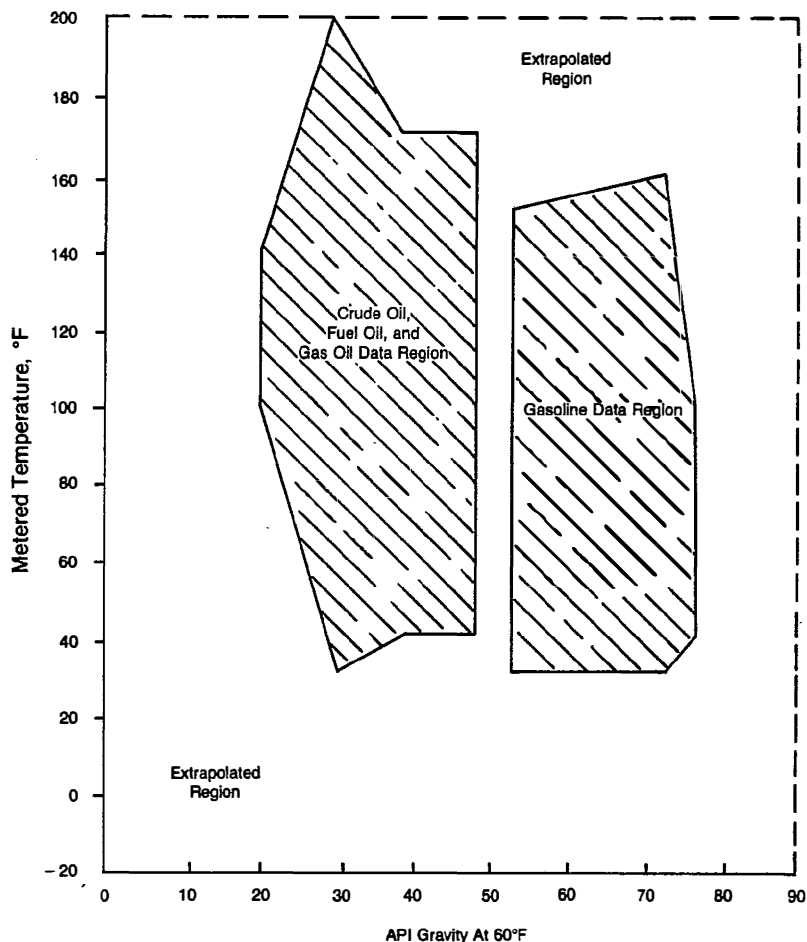


Figure 1—Comparison of Data Base and Extrapolated Regions for Chapter 11.2.1

case 20.0°API. From the compressibility table, the  $F$  factor is 0.448 divided by 100,000 or 0.00000448. Then,

$$V_e = 1000 / (1 - 0.00000448 * 500) = 1002 \text{ barrels}$$

For additional examples and more details, see *Manual of Petroleum Measurement Standards*, Chapter 12.2.

### 11.2.1.5 MATHEMATICAL MODEL FOR THE STANDARD

#### 11.2.1.5.1 Basic Model and Uncertainty Analysis

The basic mathematical model, used to develop this standard, relates the compressibility factor exponentially (EXP) to temperature and the square of molecular volume. That is,

$$F = \text{EXP} (A + B * T + C / \text{RHO}^2 + D * T / \text{RHO}^2)$$

Where:

$A$ ,  $B$ ,  $C$ , and  $D$  = constants.

$T$  = temperature, in °F.

$\text{RHO}$  = density, in grams per cubic centimeter at 60°F.  $1/\text{RHO}$  is proportional to molecular volume.

$\text{RHO} = (141.5 * 0.999012) / (131.5 + ^\circ\text{API at } 60^\circ\text{F})$ .

Hence, compressibility is the result of the interaction of two molecular volumes and temperature. The above equation is consistent with the development of API Standard 2540 (*Manual of Petroleum Measurement Standards*, Chapter 11.1) for the thermal expansion of hydrocarbons. The use of higher powers of  $T$  and  $\text{RHO}$  does not yield further significant minimization of compressibility factor uncertainty.

Using the above equation and data base, maximum compressibility factor uncertainty is  $\pm 6.5$  percent at the 95 percent confidence level. Hence at worst, one should expect that the real compressibility factor for a given material could be either 6.5 percent higher or 6.5 percent lower than the value in the standard. This statement is only true within the limits of the data base. It may not be true for the extrapolated portions of the standard.

To assess the possible uncertainty in the calculated volume at equilibrium pressure using the above data base and equation, two approaches were taken. First, it was assumed that only the correlation uncertainty in mean compressibility of  $\pm 6.5$  percent was significant. With this approach, volumetric uncertainty should be in the range of 0.02 to 0.10 percent, depending on operating conditions (Table 2, Basis A). These uncertainties are in agreement with the maximum uncertainty of 0.10 percent recommended by a COSM and COPM survey.

The first volumetric uncertainty analysis assumes that mean compressibility is not a function of pressure. For low pressures, this assumption is adequate. For higher pressures, mean compressibility will decrease with increasing pressure. At what pressure this effect becomes significant for the materials of this standard is not definitely known. However, analysis of the Jessup [2] data indicates that mean compressibility could possibly decrease by about 0.005 percent per pound per square inch with increasing pressure. Incorporating both the compressibility correlation uncertainty and the potential pressure uncertainty yields volumetric uncertainties in the range of 0.03 to 0.21 percent (Table 2, Basis A + B). Hence, the use of this standard with operating pressures greater than the experimental limit of 711 pounds per square inch could double the uncertainty in calculated volume over the uncertainty based on available data.

Table 2—Volumetric Uncertainty Analysis for Chapter 11.2.1

| Mean<br>Compressibility<br>$\text{psi}^{-1}$ | Percent Uncertainty in Volume for Various Pressures, psi |      |      |                                                   |      |      |
|----------------------------------------------|----------------------------------------------------------|------|------|---------------------------------------------------|------|------|
|                                              | Correlation Uncertainty Only<br>Basis A                  |      |      | Correlation + Pressure Uncertainty<br>Basis A + B |      |      |
|                                              | 500                                                      | 1000 | 1500 | 500                                               | 1000 | 1500 |
| $1.0 * 10^{-5}$ (Note 1)                     | 0.03                                                     | 0.07 | 0.10 | 0.05                                              | 0.12 | 0.21 |
| $0.6 * 10^{-5}$ (Note 2)                     | 0.02                                                     | 0.04 | 0.06 | 0.03                                              | 0.08 | 0.13 |

BASIS: A. 6.5 percent correlation uncertainty in mean compressibility prediction.

B. 0.005 percent/psi uncertainty in mean compressibility due to effect of pressure [2].

NOTES:

1. Typical compressibility value for 65°API gasoline at 100°F or 45°API fuel oil at 200°F.

2. Typical compressibility value for 60°API gasoline at 20°F or 35°API crude oil at 100°F.

### 11.2.1.5.2 Calculation Procedure

This procedure is recommended for computers with 6 to 7 floating point digits of precision or greater.

Step 1: Initialize temperature and gravity.

$T = \text{XXX.X } ^\circ\text{F}$ :  $-20.0 \leq T \leq 200.0$ , rounded to nearest  $0.5^\circ\text{F}$ .

$\text{API} = \text{XX.X}$ :  $0.0 \leq \text{API} \leq 90.0$ , rounded to the nearest  $0.5$  degree by

$X$  is either a temperature or gravity value.

$\text{TX} = \text{INT}(X)$ : i.e., truncation.

$\text{DIFF} = X - \text{TX}$ .

If  $\text{DIFF} \geq 0$  then  $\text{SIGN} = 1.0$  else  $\text{SIGN} = -1.0$ .

$\text{DIFF} = \text{ABS}(\text{DIFF})$ : i.e., absolute value.

If  $\text{DIFF} < 0.25$  then  $X = \text{TX}$ .

If  $\text{DIFF} \geq 0.75$  then  $X = \text{TX} + 1.0 * \text{SIGN}$ .

Else  $X = \text{TX} + 0.5 * \text{SIGN}$

Step 2: Calculate the density in grams per cubic centimeter and the square of density.

$\text{RHO} = 141.36 / (\text{API} + 131.50) = \text{X.XXXXXX}$ , rounded to the nearest  $0.00001$  by

$\text{RHO} = \text{INT}(\text{RHO} * 100000.0 + 0.5) * 0.00001$ .

$\text{RHOSQR} = \text{RHO} * \text{RHO} = \text{X.XXXXXX}$ , rounded to the nearest  $0.00001$  by

$\text{RHOSQR} = \text{INT}(\text{RHOSQR} * 100000.0 + 0.5) * 0.00001$ .

Step 3: Calculate the compressibility factor.

$F = \text{EXP}(-1.99470 + 0.00013427 * T + 0.79392 / \text{RHOSQR} + 0.0023260 * T / \text{RHOSQR})$

by rounding each term to the nearest  $0.00001$  as follows:

If  $T < 0$  then  $\text{SIGN} = -1.0$  else  $\text{SIGN} = 1.0$ .

$\text{TERM1} = -1.99470$ .

$\text{TERM2} = \text{INT}(13.427 * T + 0.5 * \text{SIGN}) * 0.00001$ .

$\text{TERM3} = \text{INT}(79392.0 / \text{RHOSQR} + 0.5) * 0.00001$ .

$\text{TERM4} = \text{INT}(232.60 * T / \text{RHOSQR} + 0.5 * \text{SIGN}) * 0.00001$ .

$F = \text{EXP}(\text{TERM1} + \text{TERM2} + \text{TERM3} + \text{TERM4}) = \text{X.XXXX}$ .

Then round  $F$  to the nearest  $0.001$  by

$F = \text{INT}(F * 1000.0 + 0.5) * 0.001 = \text{X.XXX}$ .

$F$  is now the table value.

The INT intrinsic function returns an integer by truncating all digits to the right of the decimal point. The exponential intrinsic EXP must return a result accurate to the nearest  $0.0001$ .

### 11.2.1.6 REFERENCES

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**CHAPTER 11.2.1 OF THE API MANUAL OF  
PETROLEUM MEASUREMENT STANDARDS**

**COMPRESSIBILITY FACTORS FOR HYDROCARBONS**

**IN THE 0-90 API GRAVITY RANGE**

**RELATED TO API GRAVITY(60 DEG F)**

**AND METERING TEMPERATURE(DEGREES FAHRENHEIT)**

**COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000**

| TEMP<br>DEG F | API GRAVITY AT 60 DEG F |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|---------------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|               | 0.0                     | 0.5   | 1.0   | 1.5   | 2.0   | 2.5   | 3.0   | 3.5   | 4.0   | 4.5   | 5.0   | 5.5   | 6.0   | 6.5   | 7.0   | 7.5   |
| -20.0         | 0.259                   | 0.260 | 0.262 | 0.263 | 0.264 | 0.266 | 0.267 | 0.268 | 0.270 | 0.271 | 0.272 | 0.274 | 0.275 | 0.277 | 0.278 | 0.280 |
| -19.5         | 0.259                   | 0.261 | 0.262 | 0.263 | 0.265 | 0.266 | 0.267 | 0.269 | 0.270 | 0.271 | 0.273 | 0.274 | 0.276 | 0.277 | 0.278 | 0.280 |
| -19.0         | 0.260                   | 0.261 | 0.262 | 0.264 | 0.265 | 0.266 | 0.268 | 0.269 | 0.270 | 0.272 | 0.273 | 0.274 | 0.276 | 0.277 | 0.279 | 0.280 |
| -18.5         | 0.260                   | 0.261 | 0.263 | 0.264 | 0.265 | 0.266 | 0.268 | 0.269 | 0.271 | 0.272 | 0.273 | 0.275 | 0.276 | 0.278 | 0.279 | 0.281 |
| -18.0         | 0.260                   | 0.261 | 0.263 | 0.264 | 0.265 | 0.267 | 0.268 | 0.269 | 0.271 | 0.272 | 0.274 | 0.275 | 0.276 | 0.278 | 0.279 | 0.281 |
| -17.5         | 0.260                   | 0.262 | 0.263 | 0.264 | 0.266 | 0.267 | 0.268 | 0.270 | 0.271 | 0.273 | 0.274 | 0.275 | 0.277 | 0.278 | 0.280 | 0.281 |
| -17.0         | 0.261                   | 0.262 | 0.263 | 0.265 | 0.266 | 0.267 | 0.269 | 0.270 | 0.271 | 0.273 | 0.274 | 0.276 | 0.277 | 0.279 | 0.280 | 0.282 |
| -16.5         | 0.261                   | 0.262 | 0.264 | 0.265 | 0.266 | 0.268 | 0.269 | 0.270 | 0.272 | 0.273 | 0.275 | 0.276 | 0.277 | 0.279 | 0.280 | 0.282 |
| -16.0         | 0.261                   | 0.263 | 0.264 | 0.265 | 0.267 | 0.268 | 0.269 | 0.271 | 0.272 | 0.274 | 0.275 | 0.276 | 0.278 | 0.279 | 0.281 | 0.282 |
| -15.5         | 0.262                   | 0.263 | 0.264 | 0.266 | 0.267 | 0.268 | 0.270 | 0.271 | 0.272 | 0.274 | 0.275 | 0.277 | 0.278 | 0.280 | 0.281 | 0.283 |
| -15.0         | 0.262                   | 0.263 | 0.265 | 0.266 | 0.267 | 0.269 | 0.270 | 0.271 | 0.273 | 0.274 | 0.276 | 0.277 | 0.278 | 0.280 | 0.281 | 0.283 |
| -14.5         | 0.262                   | 0.263 | 0.265 | 0.266 | 0.267 | 0.269 | 0.270 | 0.272 | 0.273 | 0.274 | 0.276 | 0.277 | 0.279 | 0.280 | 0.282 | 0.283 |
| -14.0         | 0.262                   | 0.264 | 0.265 | 0.266 | 0.268 | 0.269 | 0.271 | 0.272 | 0.273 | 0.275 | 0.276 | 0.278 | 0.279 | 0.281 | 0.282 | 0.284 |
| -13.5         | 0.263                   | 0.264 | 0.265 | 0.267 | 0.268 | 0.269 | 0.271 | 0.272 | 0.274 | 0.275 | 0.277 | 0.278 | 0.279 | 0.281 | 0.282 | 0.284 |
| -13.0         | 0.263                   | 0.264 | 0.266 | 0.267 | 0.268 | 0.270 | 0.271 | 0.273 | 0.274 | 0.275 | 0.277 | 0.278 | 0.280 | 0.281 | 0.283 | 0.284 |
| -12.5         | 0.263                   | 0.265 | 0.266 | 0.267 | 0.269 | 0.270 | 0.271 | 0.273 | 0.274 | 0.276 | 0.277 | 0.279 | 0.280 | 0.282 | 0.283 | 0.285 |
| -12.0         | 0.264                   | 0.265 | 0.266 | 0.268 | 0.269 | 0.270 | 0.272 | 0.273 | 0.275 | 0.276 | 0.277 | 0.279 | 0.280 | 0.282 | 0.283 | 0.285 |
| -11.5         | 0.264                   | 0.265 | 0.267 | 0.268 | 0.269 | 0.271 | 0.272 | 0.273 | 0.275 | 0.276 | 0.278 | 0.279 | 0.281 | 0.282 | 0.284 | 0.285 |
| -11.0         | 0.264                   | 0.265 | 0.267 | 0.268 | 0.270 | 0.271 | 0.272 | 0.274 | 0.275 | 0.277 | 0.278 | 0.280 | 0.281 | 0.283 | 0.284 | 0.286 |
| -10.5         | 0.264                   | 0.266 | 0.267 | 0.268 | 0.270 | 0.271 | 0.273 | 0.274 | 0.276 | 0.277 | 0.278 | 0.280 | 0.281 | 0.283 | 0.284 | 0.286 |
| -10.0         | 0.265                   | 0.266 | 0.267 | 0.269 | 0.270 | 0.272 | 0.273 | 0.274 | 0.276 | 0.277 | 0.279 | 0.280 | 0.282 | 0.283 | 0.285 | 0.286 |
| -9.5          | 0.265                   | 0.266 | 0.268 | 0.269 | 0.270 | 0.272 | 0.273 | 0.275 | 0.276 | 0.278 | 0.279 | 0.281 | 0.282 | 0.284 | 0.285 | 0.287 |
| -9.0          | 0.265                   | 0.267 | 0.268 | 0.269 | 0.271 | 0.272 | 0.274 | 0.275 | 0.276 | 0.278 | 0.279 | 0.281 | 0.282 | 0.284 | 0.285 | 0.287 |
| -8.5          | 0.266                   | 0.267 | 0.268 | 0.270 | 0.271 | 0.272 | 0.274 | 0.275 | 0.277 | 0.278 | 0.280 | 0.281 | 0.283 | 0.284 | 0.286 | 0.287 |
| -8.0          | 0.266                   | 0.267 | 0.269 | 0.270 | 0.271 | 0.273 | 0.274 | 0.276 | 0.277 | 0.279 | 0.280 | 0.282 | 0.283 | 0.285 | 0.286 | 0.288 |
| -7.5          | 0.266                   | 0.267 | 0.269 | 0.270 | 0.272 | 0.273 | 0.275 | 0.276 | 0.277 | 0.279 | 0.280 | 0.282 | 0.283 | 0.285 | 0.286 | 0.288 |
| -7.0          | 0.266                   | 0.268 | 0.269 | 0.271 | 0.272 | 0.273 | 0.275 | 0.276 | 0.278 | 0.279 | 0.281 | 0.282 | 0.284 | 0.285 | 0.287 | 0.288 |
| -6.5          | 0.267                   | 0.268 | 0.269 | 0.271 | 0.272 | 0.274 | 0.275 | 0.277 | 0.278 | 0.280 | 0.281 | 0.283 | 0.284 | 0.286 | 0.287 | 0.289 |
| -6.0          | 0.267                   | 0.268 | 0.270 | 0.271 | 0.273 | 0.274 | 0.275 | 0.277 | 0.278 | 0.280 | 0.281 | 0.283 | 0.284 | 0.286 | 0.287 | 0.289 |
| -5.5          | 0.267                   | 0.269 | 0.270 | 0.271 | 0.273 | 0.274 | 0.276 | 0.277 | 0.279 | 0.280 | 0.282 | 0.283 | 0.285 | 0.286 | 0.288 | 0.289 |
| -5.0          | 0.268                   | 0.269 | 0.270 | 0.272 | 0.273 | 0.275 | 0.276 | 0.278 | 0.279 | 0.280 | 0.282 | 0.283 | 0.285 | 0.287 | 0.288 | 0.290 |
| -4.5          | 0.268                   | 0.269 | 0.271 | 0.272 | 0.273 | 0.275 | 0.276 | 0.278 | 0.279 | 0.281 | 0.282 | 0.284 | 0.285 | 0.287 | 0.288 | 0.290 |
| -4.0          | 0.268                   | 0.270 | 0.271 | 0.272 | 0.274 | 0.275 | 0.277 | 0.278 | 0.280 | 0.281 | 0.283 | 0.284 | 0.286 | 0.287 | 0.289 | 0.290 |
| -3.5          | 0.268                   | 0.270 | 0.271 | 0.273 | 0.274 | 0.276 | 0.277 | 0.278 | 0.280 | 0.281 | 0.283 | 0.284 | 0.286 | 0.288 | 0.289 | 0.291 |
| -3.0          | 0.269                   | 0.270 | 0.272 | 0.273 | 0.274 | 0.276 | 0.277 | 0.279 | 0.280 | 0.282 | 0.283 | 0.285 | 0.286 | 0.288 | 0.289 | 0.291 |
| -2.5          | 0.269                   | 0.270 | 0.272 | 0.273 | 0.275 | 0.276 | 0.278 | 0.279 | 0.281 | 0.282 | 0.284 | 0.285 | 0.287 | 0.288 | 0.290 | 0.291 |
| -2.0          | 0.269                   | 0.271 | 0.272 | 0.274 | 0.275 | 0.276 | 0.278 | 0.279 | 0.281 | 0.282 | 0.284 | 0.285 | 0.287 | 0.289 | 0.290 | 0.292 |
| -1.5          | 0.270                   | 0.271 | 0.272 | 0.274 | 0.275 | 0.277 | 0.278 | 0.280 | 0.281 | 0.283 | 0.284 | 0.286 | 0.287 | 0.289 | 0.291 | 0.292 |

| COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|-----------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| API GRAVITY AT 60 DEG F                                                           |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| TEMP<br>DEG F                                                                     | 0.0   | 0.5   | 1.0   | 1.5   | 2.0   | 2.5   | 3.0   | 3.5   | 4.0   | 4.5   | 5.0   | 5.5   | 6.0   | 6.5   | 7.0   | 7.5   |
| -1.0                                                                              | 0.270 | 0.271 | 0.273 | 0.274 | 0.276 | 0.277 | 0.279 | 0.280 | 0.282 | 0.283 | 0.285 | 0.286 | 0.288 | 0.289 | 0.291 | 0.292 |
| -0.5                                                                              | 0.270 | 0.272 | 0.273 | 0.274 | 0.276 | 0.277 | 0.279 | 0.280 | 0.282 | 0.283 | 0.285 | 0.286 | 0.288 | 0.290 | 0.291 | 0.293 |
| 0.0                                                                               | 0.270 | 0.272 | 0.273 | 0.275 | 0.276 | 0.278 | 0.279 | 0.281 | 0.282 | 0.284 | 0.285 | 0.287 | 0.288 | 0.290 | 0.292 | 0.293 |
| 0.5                                                                               | 0.271 | 0.272 | 0.274 | 0.275 | 0.277 | 0.278 | 0.279 | 0.281 | 0.282 | 0.284 | 0.286 | 0.287 | 0.289 | 0.290 | 0.292 | 0.293 |
| 1.0                                                                               | 0.271 | 0.272 | 0.274 | 0.275 | 0.277 | 0.278 | 0.280 | 0.281 | 0.283 | 0.284 | 0.286 | 0.287 | 0.289 | 0.291 | 0.292 | 0.294 |
| 1.5                                                                               | 0.271 | 0.273 | 0.274 | 0.276 | 0.277 | 0.279 | 0.280 | 0.282 | 0.283 | 0.285 | 0.286 | 0.288 | 0.289 | 0.291 | 0.293 | 0.294 |
| 2.0                                                                               | 0.272 | 0.273 | 0.274 | 0.276 | 0.277 | 0.279 | 0.280 | 0.282 | 0.283 | 0.285 | 0.287 | 0.288 | 0.290 | 0.291 | 0.293 | 0.295 |
| 2.5                                                                               | 0.272 | 0.273 | 0.275 | 0.276 | 0.278 | 0.279 | 0.281 | 0.282 | 0.284 | 0.285 | 0.287 | 0.288 | 0.290 | 0.292 | 0.293 | 0.295 |
| 3.0                                                                               | 0.272 | 0.274 | 0.275 | 0.277 | 0.278 | 0.280 | 0.281 | 0.283 | 0.284 | 0.286 | 0.287 | 0.289 | 0.290 | 0.292 | 0.294 | 0.295 |
| 3.5                                                                               | 0.272 | 0.274 | 0.275 | 0.277 | 0.278 | 0.280 | 0.281 | 0.283 | 0.284 | 0.286 | 0.288 | 0.289 | 0.291 | 0.292 | 0.294 | 0.296 |
| 4.0                                                                               | 0.273 | 0.274 | 0.276 | 0.277 | 0.279 | 0.280 | 0.282 | 0.283 | 0.285 | 0.286 | 0.288 | 0.289 | 0.291 | 0.293 | 0.294 | 0.296 |
| 4.5                                                                               | 0.273 | 0.275 | 0.276 | 0.277 | 0.279 | 0.280 | 0.282 | 0.284 | 0.285 | 0.287 | 0.288 | 0.290 | 0.291 | 0.293 | 0.295 | 0.296 |
| 5.0                                                                               | 0.273 | 0.275 | 0.276 | 0.278 | 0.279 | 0.281 | 0.282 | 0.284 | 0.285 | 0.287 | 0.289 | 0.290 | 0.292 | 0.293 | 0.295 | 0.297 |
| 5.5                                                                               | 0.274 | 0.275 | 0.277 | 0.278 | 0.280 | 0.281 | 0.283 | 0.284 | 0.286 | 0.287 | 0.289 | 0.290 | 0.292 | 0.294 | 0.295 | 0.297 |
| 6.0                                                                               | 0.274 | 0.275 | 0.277 | 0.278 | 0.280 | 0.281 | 0.283 | 0.284 | 0.286 | 0.288 | 0.289 | 0.291 | 0.292 | 0.294 | 0.296 | 0.297 |
| 6.5                                                                               | 0.274 | 0.276 | 0.277 | 0.279 | 0.280 | 0.282 | 0.283 | 0.285 | 0.286 | 0.288 | 0.290 | 0.291 | 0.293 | 0.294 | 0.296 | 0.298 |
| 7.0                                                                               | 0.275 | 0.276 | 0.277 | 0.279 | 0.281 | 0.282 | 0.284 | 0.285 | 0.287 | 0.288 | 0.290 | 0.291 | 0.293 | 0.295 | 0.296 | 0.298 |
| 7.5                                                                               | 0.275 | 0.276 | 0.278 | 0.279 | 0.281 | 0.282 | 0.284 | 0.285 | 0.287 | 0.289 | 0.290 | 0.292 | 0.293 | 0.295 | 0.297 | 0.298 |
| 8.0                                                                               | 0.275 | 0.277 | 0.278 | 0.280 | 0.281 | 0.283 | 0.284 | 0.286 | 0.287 | 0.289 | 0.291 | 0.292 | 0.294 | 0.295 | 0.297 | 0.299 |
| 8.5                                                                               | 0.275 | 0.277 | 0.278 | 0.280 | 0.281 | 0.283 | 0.285 | 0.286 | 0.288 | 0.289 | 0.291 | 0.293 | 0.294 | 0.296 | 0.297 | 0.299 |
| 9.0                                                                               | 0.276 | 0.277 | 0.279 | 0.280 | 0.282 | 0.283 | 0.285 | 0.286 | 0.288 | 0.290 | 0.291 | 0.293 | 0.294 | 0.296 | 0.298 | 0.300 |
| 9.5                                                                               | 0.276 | 0.278 | 0.279 | 0.281 | 0.282 | 0.284 | 0.285 | 0.287 | 0.288 | 0.290 | 0.292 | 0.293 | 0.295 | 0.296 | 0.298 | 0.300 |
| 10.0                                                                              | 0.276 | 0.278 | 0.279 | 0.281 | 0.282 | 0.284 | 0.285 | 0.287 | 0.289 | 0.290 | 0.292 | 0.294 | 0.295 | 0.297 | 0.299 | 0.300 |
| 10.5                                                                              | 0.277 | 0.278 | 0.280 | 0.281 | 0.283 | 0.284 | 0.286 | 0.287 | 0.289 | 0.291 | 0.292 | 0.294 | 0.296 | 0.297 | 0.299 | 0.301 |
| 11.0                                                                              | 0.277 | 0.278 | 0.280 | 0.281 | 0.283 | 0.285 | 0.286 | 0.288 | 0.289 | 0.291 | 0.293 | 0.294 | 0.296 | 0.298 | 0.299 | 0.301 |
| 11.5                                                                              | 0.277 | 0.279 | 0.280 | 0.282 | 0.283 | 0.285 | 0.286 | 0.288 | 0.290 | 0.291 | 0.293 | 0.295 | 0.296 | 0.298 | 0.300 | 0.301 |
| 12.0                                                                              | 0.278 | 0.279 | 0.281 | 0.282 | 0.284 | 0.285 | 0.287 | 0.288 | 0.290 | 0.292 | 0.293 | 0.295 | 0.297 | 0.298 | 0.300 | 0.302 |
| 12.5                                                                              | 0.278 | 0.279 | 0.281 | 0.282 | 0.284 | 0.286 | 0.287 | 0.289 | 0.290 | 0.292 | 0.294 | 0.295 | 0.297 | 0.299 | 0.300 | 0.302 |
| 13.0                                                                              | 0.278 | 0.280 | 0.281 | 0.283 | 0.284 | 0.286 | 0.287 | 0.289 | 0.291 | 0.292 | 0.294 | 0.296 | 0.297 | 0.299 | 0.301 | 0.302 |
| 13.5                                                                              | 0.278 | 0.280 | 0.281 | 0.283 | 0.285 | 0.286 | 0.288 | 0.289 | 0.291 | 0.293 | 0.294 | 0.296 | 0.298 | 0.299 | 0.301 | 0.303 |
| 14.0                                                                              | 0.279 | 0.280 | 0.282 | 0.283 | 0.285 | 0.286 | 0.288 | 0.290 | 0.291 | 0.293 | 0.295 | 0.296 | 0.298 | 0.300 | 0.301 | 0.303 |
| 14.5                                                                              | 0.279 | 0.281 | 0.282 | 0.284 | 0.285 | 0.287 | 0.288 | 0.290 | 0.292 | 0.293 | 0.295 | 0.297 | 0.298 | 0.300 | 0.302 | 0.303 |
| 15.0                                                                              | 0.279 | 0.281 | 0.282 | 0.284 | 0.286 | 0.287 | 0.289 | 0.290 | 0.292 | 0.294 | 0.295 | 0.297 | 0.299 | 0.300 | 0.302 | 0.304 |
| 15.5                                                                              | 0.280 | 0.281 | 0.283 | 0.284 | 0.286 | 0.287 | 0.289 | 0.291 | 0.292 | 0.294 | 0.296 | 0.297 | 0.299 | 0.301 | 0.302 | 0.304 |
| 16.0                                                                              | 0.280 | 0.281 | 0.283 | 0.285 | 0.286 | 0.288 | 0.289 | 0.291 | 0.293 | 0.294 | 0.296 | 0.298 | 0.299 | 0.301 | 0.303 | 0.305 |
| 16.5                                                                              | 0.280 | 0.282 | 0.283 | 0.285 | 0.286 | 0.288 | 0.290 | 0.291 | 0.293 | 0.295 | 0.296 | 0.298 | 0.300 | 0.301 | 0.303 | 0.305 |
| 17.0                                                                              | 0.281 | 0.282 | 0.284 | 0.285 | 0.287 | 0.288 | 0.290 | 0.292 | 0.293 | 0.295 | 0.297 | 0.298 | 0.300 | 0.302 | 0.304 | 0.305 |
| 17.5                                                                              | 0.281 | 0.282 | 0.284 | 0.285 | 0.287 | 0.289 | 0.290 | 0.292 | 0.294 | 0.295 | 0.297 | 0.299 | 0.300 | 0.302 | 0.304 | 0.306 |

**COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000**  
**API GRAVITY AT 60 DEG F**

| TEMP<br>DEG F | 0.0   | 0.5   | 1.0   | 1.5   | 2.0   | 2.5   | 3.0   | 3.5   | 4.0   | 4.5   | 5.0   | 5.5   | 6.0   | 6.5   | 7.0   | 7.5   |
|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 18.0          | 0.281 | 0.283 | 0.284 | 0.286 | 0.287 | 0.289 | 0.291 | 0.292 | 0.294 | 0.296 | 0.297 | 0.299 | 0.301 | 0.302 | 0.304 | 0.306 |
| 18.5          | 0.281 | 0.283 | 0.285 | 0.286 | 0.288 | 0.289 | 0.291 | 0.293 | 0.294 | 0.296 | 0.298 | 0.299 | 0.301 | 0.303 | 0.305 | 0.306 |
| 19.0          | 0.282 | 0.283 | 0.285 | 0.286 | 0.288 | 0.290 | 0.291 | 0.293 | 0.295 | 0.296 | 0.298 | 0.300 | 0.301 | 0.303 | 0.305 | 0.307 |
| 19.5          | 0.282 | 0.284 | 0.285 | 0.287 | 0.288 | 0.290 | 0.292 | 0.293 | 0.295 | 0.297 | 0.298 | 0.300 | 0.302 | 0.304 | 0.305 | 0.307 |
| 20.0          | 0.282 | 0.284 | 0.285 | 0.287 | 0.289 | 0.290 | 0.292 | 0.294 | 0.295 | 0.297 | 0.299 | 0.300 | 0.302 | 0.304 | 0.306 | 0.307 |
| 20.5          | 0.283 | 0.284 | 0.286 | 0.287 | 0.289 | 0.291 | 0.292 | 0.294 | 0.296 | 0.297 | 0.299 | 0.301 | 0.302 | 0.304 | 0.306 | 0.308 |
| 21.0          | 0.283 | 0.284 | 0.286 | 0.288 | 0.289 | 0.291 | 0.293 | 0.294 | 0.296 | 0.298 | 0.299 | 0.301 | 0.303 | 0.305 | 0.306 | 0.308 |
| 21.5          | 0.283 | 0.285 | 0.286 | 0.288 | 0.290 | 0.291 | 0.293 | 0.295 | 0.296 | 0.298 | 0.300 | 0.301 | 0.303 | 0.305 | 0.307 | 0.309 |
| 22.0          | 0.284 | 0.285 | 0.287 | 0.288 | 0.290 | 0.292 | 0.293 | 0.295 | 0.297 | 0.298 | 0.300 | 0.302 | 0.304 | 0.305 | 0.307 | 0.309 |
| 22.5          | 0.284 | 0.285 | 0.287 | 0.289 | 0.290 | 0.292 | 0.294 | 0.295 | 0.297 | 0.299 | 0.300 | 0.302 | 0.304 | 0.306 | 0.307 | 0.309 |
| 23.0          | 0.284 | 0.286 | 0.287 | 0.289 | 0.291 | 0.292 | 0.294 | 0.296 | 0.297 | 0.299 | 0.301 | 0.303 | 0.304 | 0.306 | 0.308 | 0.310 |
| 23.5          | 0.284 | 0.286 | 0.288 | 0.289 | 0.291 | 0.293 | 0.294 | 0.296 | 0.298 | 0.299 | 0.301 | 0.303 | 0.305 | 0.306 | 0.308 | 0.310 |
| 24.0          | 0.285 | 0.286 | 0.288 | 0.290 | 0.291 | 0.293 | 0.295 | 0.296 | 0.298 | 0.300 | 0.301 | 0.303 | 0.305 | 0.307 | 0.309 | 0.310 |
| 24.5          | 0.285 | 0.287 | 0.288 | 0.290 | 0.292 | 0.293 | 0.295 | 0.297 | 0.298 | 0.300 | 0.302 | 0.304 | 0.305 | 0.307 | 0.309 | 0.311 |
| 25.0          | 0.285 | 0.287 | 0.289 | 0.290 | 0.292 | 0.294 | 0.295 | 0.297 | 0.299 | 0.300 | 0.302 | 0.304 | 0.306 | 0.307 | 0.309 | 0.311 |
| 25.5          | 0.286 | 0.287 | 0.289 | 0.291 | 0.292 | 0.294 | 0.296 | 0.297 | 0.299 | 0.301 | 0.302 | 0.304 | 0.306 | 0.308 | 0.310 | 0.312 |
| 26.0          | 0.286 | 0.288 | 0.289 | 0.291 | 0.293 | 0.294 | 0.296 | 0.298 | 0.299 | 0.301 | 0.303 | 0.305 | 0.306 | 0.308 | 0.310 | 0.312 |
| 26.5          | 0.286 | 0.288 | 0.290 | 0.291 | 0.293 | 0.295 | 0.296 | 0.298 | 0.300 | 0.301 | 0.303 | 0.305 | 0.307 | 0.309 | 0.310 | 0.312 |
| 27.0          | 0.287 | 0.288 | 0.290 | 0.292 | 0.293 | 0.295 | 0.297 | 0.298 | 0.300 | 0.302 | 0.304 | 0.305 | 0.307 | 0.309 | 0.311 | 0.313 |
| 27.5          | 0.287 | 0.289 | 0.290 | 0.292 | 0.293 | 0.295 | 0.297 | 0.299 | 0.300 | 0.302 | 0.304 | 0.306 | 0.307 | 0.309 | 0.311 | 0.313 |
| 28.0          | 0.287 | 0.289 | 0.290 | 0.292 | 0.294 | 0.296 | 0.297 | 0.299 | 0.301 | 0.302 | 0.304 | 0.306 | 0.308 | 0.310 | 0.312 | 0.313 |
| 28.5          | 0.288 | 0.289 | 0.291 | 0.292 | 0.294 | 0.296 | 0.298 | 0.299 | 0.301 | 0.303 | 0.305 | 0.306 | 0.308 | 0.310 | 0.312 | 0.314 |
| 29.0          | 0.288 | 0.289 | 0.291 | 0.293 | 0.294 | 0.296 | 0.298 | 0.300 | 0.301 | 0.303 | 0.305 | 0.307 | 0.309 | 0.310 | 0.312 | 0.314 |
| 29.5          | 0.288 | 0.290 | 0.291 | 0.293 | 0.295 | 0.297 | 0.298 | 0.300 | 0.302 | 0.304 | 0.305 | 0.307 | 0.309 | 0.311 | 0.313 | 0.315 |
| 30.0          | 0.288 | 0.290 | 0.292 | 0.293 | 0.295 | 0.297 | 0.299 | 0.300 | 0.302 | 0.304 | 0.306 | 0.307 | 0.309 | 0.311 | 0.313 | 0.315 |
| 30.5          | 0.289 | 0.290 | 0.292 | 0.294 | 0.295 | 0.297 | 0.299 | 0.301 | 0.302 | 0.304 | 0.306 | 0.308 | 0.310 | 0.311 | 0.313 | 0.315 |
| 31.0          | 0.289 | 0.291 | 0.292 | 0.294 | 0.296 | 0.297 | 0.299 | 0.301 | 0.303 | 0.305 | 0.306 | 0.308 | 0.310 | 0.312 | 0.314 | 0.316 |
| 31.5          | 0.289 | 0.291 | 0.293 | 0.294 | 0.296 | 0.298 | 0.300 | 0.301 | 0.303 | 0.305 | 0.307 | 0.309 | 0.310 | 0.312 | 0.314 | 0.316 |
| 32.0          | 0.290 | 0.291 | 0.293 | 0.295 | 0.296 | 0.298 | 0.300 | 0.302 | 0.303 | 0.305 | 0.307 | 0.309 | 0.311 | 0.313 | 0.314 | 0.316 |
| 32.5          | 0.290 | 0.292 | 0.293 | 0.295 | 0.297 | 0.298 | 0.300 | 0.302 | 0.304 | 0.306 | 0.307 | 0.309 | 0.311 | 0.313 | 0.315 | 0.317 |
| 33.0          | 0.290 | 0.292 | 0.294 | 0.295 | 0.297 | 0.299 | 0.301 | 0.302 | 0.304 | 0.306 | 0.308 | 0.310 | 0.311 | 0.313 | 0.315 | 0.317 |
| 33.5          | 0.291 | 0.292 | 0.294 | 0.296 | 0.297 | 0.299 | 0.301 | 0.303 | 0.304 | 0.306 | 0.308 | 0.310 | 0.312 | 0.314 | 0.316 | 0.318 |
| 34.0          | 0.291 | 0.293 | 0.294 | 0.296 | 0.298 | 0.299 | 0.301 | 0.303 | 0.305 | 0.307 | 0.308 | 0.310 | 0.312 | 0.314 | 0.316 | 0.318 |
| 34.5          | 0.291 | 0.293 | 0.295 | 0.296 | 0.298 | 0.300 | 0.302 | 0.303 | 0.305 | 0.307 | 0.309 | 0.311 | 0.313 | 0.314 | 0.316 | 0.318 |
| 35.0          | 0.292 | 0.293 | 0.295 | 0.297 | 0.298 | 0.300 | 0.302 | 0.304 | 0.306 | 0.307 | 0.309 | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 |
| 35.5          | 0.292 | 0.294 | 0.295 | 0.297 | 0.299 | 0.300 | 0.302 | 0.304 | 0.306 | 0.308 | 0.310 | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 |
| 36.0          | 0.292 | 0.294 | 0.296 | 0.297 | 0.299 | 0.301 | 0.303 | 0.304 | 0.306 | 0.308 | 0.310 | 0.312 | 0.314 | 0.316 | 0.317 | 0.319 |
| 36.5          | 0.292 | 0.294 | 0.296 | 0.298 | 0.299 | 0.301 | 0.303 | 0.305 | 0.307 | 0.308 | 0.310 | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 |

| COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000 |                         |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|-----------------------------------------------------------------------------------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| TEMP                                                                              | API GRAVITY AT 60 DEG F |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| DEG F                                                                             | 0.0                     | 0.5   | 1.0   | 1.5   | 2.0   | 2.5   | 3.0   | 3.5   | 4.0   | 4.5   | 5.0   | 5.5   | 6.0   | 6.5   | 7.0   | 7.5   |
| 37.0                                                                              | 0.293                   | 0.295 | 0.296 | 0.298 | 0.300 | 0.301 | 0.303 | 0.305 | 0.307 | 0.309 | 0.311 | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 |
| 37.5                                                                              | 0.293                   | 0.295 | 0.297 | 0.298 | 0.300 | 0.302 | 0.304 | 0.305 | 0.307 | 0.309 | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 |
| 38.0                                                                              | 0.293                   | 0.295 | 0.297 | 0.299 | 0.300 | 0.302 | 0.304 | 0.306 | 0.308 | 0.309 | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 |
| 38.5                                                                              | 0.294                   | 0.295 | 0.297 | 0.299 | 0.301 | 0.303 | 0.304 | 0.306 | 0.308 | 0.310 | 0.312 | 0.314 | 0.315 | 0.317 | 0.319 | 0.321 |
| 39.0                                                                              | 0.294                   | 0.296 | 0.298 | 0.299 | 0.301 | 0.303 | 0.305 | 0.306 | 0.308 | 0.310 | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 |
| 39.5                                                                              | 0.294                   | 0.296 | 0.298 | 0.300 | 0.301 | 0.303 | 0.305 | 0.307 | 0.309 | 0.311 | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 |
| 40.0                                                                              | 0.295                   | 0.296 | 0.298 | 0.300 | 0.302 | 0.304 | 0.305 | 0.307 | 0.309 | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 | 0.320 | 0.322 |
| 40.5                                                                              | 0.295                   | 0.297 | 0.299 | 0.300 | 0.302 | 0.304 | 0.306 | 0.308 | 0.309 | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 |
| 41.0                                                                              | 0.295                   | 0.297 | 0.299 | 0.301 | 0.302 | 0.304 | 0.306 | 0.308 | 0.310 | 0.312 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 |
| 41.5                                                                              | 0.296                   | 0.297 | 0.299 | 0.301 | 0.303 | 0.305 | 0.306 | 0.308 | 0.310 | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 |
| 42.0                                                                              | 0.296                   | 0.298 | 0.299 | 0.301 | 0.303 | 0.305 | 0.307 | 0.309 | 0.310 | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 |
| 42.5                                                                              | 0.296                   | 0.298 | 0.300 | 0.302 | 0.303 | 0.305 | 0.307 | 0.309 | 0.311 | 0.313 | 0.315 | 0.317 | 0.318 | 0.320 | 0.322 | 0.324 |
| 43.0                                                                              | 0.297                   | 0.298 | 0.300 | 0.302 | 0.304 | 0.306 | 0.307 | 0.309 | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 |
| 43.5                                                                              | 0.297                   | 0.299 | 0.300 | 0.302 | 0.304 | 0.306 | 0.308 | 0.310 | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 |
| 44.0                                                                              | 0.297                   | 0.299 | 0.301 | 0.303 | 0.304 | 0.306 | 0.308 | 0.310 | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 |
| 44.5                                                                              | 0.298                   | 0.299 | 0.301 | 0.303 | 0.305 | 0.307 | 0.308 | 0.310 | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 |
| 45.0                                                                              | 0.298                   | 0.300 | 0.301 | 0.303 | 0.305 | 0.307 | 0.309 | 0.311 | 0.313 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 |
| 45.5                                                                              | 0.298                   | 0.300 | 0.302 | 0.304 | 0.305 | 0.307 | 0.309 | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 |
| 46.0                                                                              | 0.299                   | 0.300 | 0.302 | 0.304 | 0.306 | 0.308 | 0.309 | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 |
| 46.5                                                                              | 0.299                   | 0.301 | 0.302 | 0.304 | 0.306 | 0.308 | 0.310 | 0.312 | 0.314 | 0.316 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.328 |
| 47.0                                                                              | 0.299                   | 0.301 | 0.303 | 0.305 | 0.306 | 0.308 | 0.310 | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 |
| 47.5                                                                              | 0.299                   | 0.301 | 0.303 | 0.305 | 0.307 | 0.309 | 0.311 | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 |
| 48.0                                                                              | 0.300                   | 0.302 | 0.303 | 0.305 | 0.307 | 0.309 | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 |
| 48.5                                                                              | 0.300                   | 0.302 | 0.304 | 0.306 | 0.307 | 0.309 | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 |
| 49.0                                                                              | 0.300                   | 0.302 | 0.304 | 0.306 | 0.308 | 0.310 | 0.312 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 |
| 49.5                                                                              | 0.301                   | 0.303 | 0.304 | 0.306 | 0.308 | 0.310 | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 |
| 50.0                                                                              | 0.301                   | 0.303 | 0.305 | 0.307 | 0.308 | 0.310 | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 |
| 50.5                                                                              | 0.301                   | 0.303 | 0.305 | 0.307 | 0.309 | 0.311 | 0.313 | 0.315 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.329 | 0.331 |
| 51.0                                                                              | 0.302                   | 0.304 | 0.305 | 0.307 | 0.309 | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 |
| 51.5                                                                              | 0.302                   | 0.304 | 0.306 | 0.308 | 0.309 | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 |
| 52.0                                                                              | 0.302                   | 0.304 | 0.306 | 0.308 | 0.310 | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 |
| 52.5                                                                              | 0.303                   | 0.305 | 0.306 | 0.308 | 0.310 | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 |
| 53.0                                                                              | 0.303                   | 0.305 | 0.307 | 0.309 | 0.311 | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.331 | 0.333 |
| 53.5                                                                              | 0.303                   | 0.305 | 0.307 | 0.309 | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 |
| 54.0                                                                              | 0.304                   | 0.306 | 0.307 | 0.309 | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 |
| 54.5                                                                              | 0.304                   | 0.306 | 0.308 | 0.310 | 0.312 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.330 | 0.332 | 0.334 |
| 55.0                                                                              | 0.304                   | 0.306 | 0.308 | 0.310 | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 |
| 55.5                                                                              | 0.305                   | 0.307 | 0.308 | 0.310 | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.335 |

**COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000**

| TEMP  | API GRAVITY AT 60 DEG F |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|-------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| DEG F | 0.0                     | 0.5   | 1.0   | 1.5   | 2.0   | 2.5   | 3.0   | 3.5   | 4.0   | 4.5   | 5.0   | 5.5   | 6.0   | 6.5   | 7.0   | 7.5   |
| 56.0  | 0.305                   | 0.307 | 0.309 | 0.311 | 0.313 | 0.315 | 0.316 | 0.318 | 0.320 | 0.322 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 |
| 56.5  | 0.305                   | 0.307 | 0.309 | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 |
| 57.0  | 0.306                   | 0.308 | 0.309 | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.332 | 0.334 | 0.336 |
| 57.5  | 0.306                   | 0.308 | 0.310 | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 |
| 58.0  | 0.306                   | 0.308 | 0.310 | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.337 |
| 58.5  | 0.307                   | 0.309 | 0.310 | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.331 | 0.333 | 0.335 | 0.337 |
| 59.0  | 0.307                   | 0.309 | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 |
| 59.5  | 0.307                   | 0.309 | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.336 | 0.338 |
| 60.0  | 0.308                   | 0.310 | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 |
| 60.5  | 0.308                   | 0.310 | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.339 |
| 61.0  | 0.308                   | 0.310 | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.333 | 0.335 | 0.337 | 0.339 |
| 61.5  | 0.309                   | 0.311 | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 |
| 62.0  | 0.309                   | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.338 | 0.340 |
| 62.5  | 0.309                   | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 |
| 63.0  | 0.310                   | 0.312 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.341 |
| 63.5  | 0.310                   | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.337 | 0.339 | 0.341 |
| 64.0  | 0.310                   | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 |
| 64.5  | 0.311                   | 0.313 | 0.315 | 0.316 | 0.318 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.340 | 0.342 |
| 65.0  | 0.311                   | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.336 | 0.338 | 0.340 | 0.342 |
| 65.5  | 0.311                   | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.343 |
| 66.0  | 0.312                   | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.339 | 0.341 | 0.343 |
| 66.5  | 0.312                   | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.335 | 0.337 | 0.339 | 0.341 | 0.343 |
| 67.0  | 0.312                   | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.342 | 0.344 |
| 67.5  | 0.313                   | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.338 | 0.340 | 0.342 | 0.344 |
| 68.0  | 0.313                   | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.345 |
| 68.5  | 0.313                   | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.341 | 0.343 | 0.345 |
| 69.0  | 0.314                   | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.337 | 0.339 | 0.341 | 0.343 | 0.346 |
| 69.5  | 0.314                   | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 | 0.344 | 0.346 |
| 70.0  | 0.314                   | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.340 | 0.342 | 0.344 | 0.346 |
| 70.5  | 0.315                   | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.336 | 0.338 | 0.340 | 0.342 | 0.344 | 0.347 |
| 71.0  | 0.315                   | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.343 | 0.345 | 0.347 |
| 71.5  | 0.315                   | 0.317 | 0.319 | 0.321 | 0.323 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.339 | 0.341 | 0.343 | 0.345 | 0.348 |
| 72.0  | 0.316                   | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.337 | 0.339 | 0.341 | 0.343 | 0.346 | 0.348 |
| 72.5  | 0.316                   | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.342 | 0.344 | 0.346 | 0.348 |
| 73.0  | 0.316                   | 0.318 | 0.320 | 0.322 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.340 | 0.342 | 0.344 | 0.347 | 0.349 |
| 73.5  | 0.317                   | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.336 | 0.338 | 0.340 | 0.342 | 0.345 | 0.347 | 0.349 |
| 74.0  | 0.317                   | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.343 | 0.345 | 0.347 | 0.350 |
| 74.5  | 0.317                   | 0.319 | 0.321 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.339 | 0.341 | 0.343 | 0.345 | 0.348 | 0.350 |

**COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000**

| TEMP<br>DEG F | API GRAVITY AT 60 DEG F |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|---------------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|               | 0.0                     | 0.5   | 1.0   | 1.5   | 2.0   | 2.5   | 3.0   | 3.5   | 4.0   | 4.5   | 5.0   | 5.5   | 6.0   | 6.5   | 7.0   | 7.5   |
| 75.0          | 0.318                   | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.335 | 0.337 | 0.339 | 0.341 | 0.344 | 0.346 | 0.348 | 0.351 |
| 75.5          | 0.318                   | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.342 | 0.344 | 0.346 | 0.349 | 0.351 |
| 76.0          | 0.318                   | 0.320 | 0.322 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.338 | 0.340 | 0.342 | 0.344 | 0.347 | 0.349 | 0.351 |
| 76.5          | 0.319                   | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.345 | 0.347 | 0.349 | 0.352 |
| 77.0          | 0.319                   | 0.321 | 0.323 | 0.325 | 0.327 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.341 | 0.343 | 0.345 | 0.347 | 0.350 | 0.352 |
| 77.5          | 0.319                   | 0.321 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.339 | 0.341 | 0.343 | 0.346 | 0.348 | 0.350 | 0.353 |
| 78.0          | 0.320                   | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.335 | 0.337 | 0.339 | 0.341 | 0.344 | 0.346 | 0.348 | 0.351 | 0.353 |
| 78.5          | 0.320                   | 0.322 | 0.324 | 0.326 | 0.328 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.342 | 0.344 | 0.346 | 0.349 | 0.351 | 0.353 |
| 79.0          | 0.320                   | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.338 | 0.340 | 0.342 | 0.344 | 0.347 | 0.349 | 0.351 | 0.354 |
| 79.5          | 0.321                   | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.334 | 0.336 | 0.338 | 0.340 | 0.343 | 0.345 | 0.347 | 0.350 | 0.352 | 0.354 |
| 80.0          | 0.321                   | 0.323 | 0.325 | 0.327 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.341 | 0.343 | 0.345 | 0.348 | 0.350 | 0.352 | 0.355 |
| 80.5          | 0.321                   | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.337 | 0.339 | 0.341 | 0.343 | 0.346 | 0.348 | 0.350 | 0.353 | 0.355 |
| 81.0          | 0.322                   | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.335 | 0.337 | 0.339 | 0.341 | 0.344 | 0.346 | 0.348 | 0.351 | 0.353 | 0.356 |
| 81.5          | 0.322                   | 0.324 | 0.326 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.340 | 0.342 | 0.344 | 0.346 | 0.349 | 0.351 | 0.354 | 0.356 |
| 82.0          | 0.323                   | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.338 | 0.340 | 0.342 | 0.345 | 0.347 | 0.349 | 0.352 | 0.354 | 0.356 |
| 82.5          | 0.323                   | 0.325 | 0.327 | 0.329 | 0.331 | 0.334 | 0.336 | 0.338 | 0.340 | 0.343 | 0.345 | 0.347 | 0.350 | 0.352 | 0.354 | 0.357 |
| 83.0          | 0.323                   | 0.325 | 0.327 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.341 | 0.343 | 0.345 | 0.348 | 0.350 | 0.352 | 0.355 | 0.357 |
| 83.5          | 0.324                   | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.337 | 0.339 | 0.341 | 0.343 | 0.346 | 0.348 | 0.350 | 0.353 | 0.355 | 0.358 |
| 84.0          | 0.324                   | 0.326 | 0.328 | 0.330 | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 | 0.344 | 0.346 | 0.348 | 0.351 | 0.353 | 0.356 | 0.358 |
| 84.5          | 0.324                   | 0.326 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.340 | 0.342 | 0.344 | 0.347 | 0.349 | 0.351 | 0.354 | 0.356 | 0.359 |
| 85.0          | 0.325                   | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.338 | 0.340 | 0.342 | 0.345 | 0.347 | 0.349 | 0.352 | 0.354 | 0.357 | 0.359 |
| 85.5          | 0.325                   | 0.327 | 0.329 | 0.331 | 0.334 | 0.336 | 0.338 | 0.340 | 0.343 | 0.345 | 0.347 | 0.350 | 0.352 | 0.354 | 0.357 | 0.359 |
| 86.0          | 0.325                   | 0.327 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.341 | 0.343 | 0.345 | 0.348 | 0.350 | 0.352 | 0.355 | 0.357 | 0.360 |
| 86.5          | 0.326                   | 0.328 | 0.330 | 0.332 | 0.334 | 0.337 | 0.339 | 0.341 | 0.343 | 0.346 | 0.348 | 0.350 | 0.353 | 0.355 | 0.358 | 0.360 |
| 87.0          | 0.326                   | 0.328 | 0.330 | 0.333 | 0.335 | 0.337 | 0.339 | 0.342 | 0.344 | 0.346 | 0.349 | 0.351 | 0.353 | 0.356 | 0.358 | 0.361 |
| 87.5          | 0.326                   | 0.328 | 0.331 | 0.333 | 0.335 | 0.337 | 0.340 | 0.342 | 0.344 | 0.347 | 0.349 | 0.351 | 0.354 | 0.356 | 0.359 | 0.361 |
| 88.0          | 0.327                   | 0.329 | 0.331 | 0.333 | 0.335 | 0.338 | 0.340 | 0.342 | 0.345 | 0.347 | 0.349 | 0.352 | 0.354 | 0.357 | 0.359 | 0.362 |
| 88.5          | 0.327                   | 0.329 | 0.331 | 0.334 | 0.336 | 0.338 | 0.340 | 0.343 | 0.345 | 0.347 | 0.350 | 0.352 | 0.355 | 0.357 | 0.359 | 0.362 |
| 89.0          | 0.327                   | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.341 | 0.343 | 0.345 | 0.348 | 0.350 | 0.353 | 0.355 | 0.357 | 0.360 | 0.362 |
| 89.5          | 0.328                   | 0.330 | 0.332 | 0.334 | 0.337 | 0.339 | 0.341 | 0.343 | 0.346 | 0.348 | 0.351 | 0.353 | 0.355 | 0.358 | 0.360 | 0.363 |
| 90.0          | 0.328                   | 0.330 | 0.332 | 0.335 | 0.337 | 0.339 | 0.342 | 0.344 | 0.346 | 0.349 | 0.351 | 0.353 | 0.356 | 0.358 | 0.361 | 0.363 |
| 90.5          | 0.328                   | 0.331 | 0.333 | 0.335 | 0.337 | 0.340 | 0.342 | 0.344 | 0.347 | 0.349 | 0.351 | 0.354 | 0.356 | 0.359 | 0.361 | 0.364 |
| 91.0          | 0.329                   | 0.331 | 0.333 | 0.335 | 0.338 | 0.340 | 0.342 | 0.345 | 0.347 | 0.349 | 0.352 | 0.354 | 0.357 | 0.359 | 0.362 | 0.364 |
| 91.5          | 0.329                   | 0.331 | 0.334 | 0.336 | 0.338 | 0.340 | 0.343 | 0.345 | 0.347 | 0.350 | 0.352 | 0.355 | 0.357 | 0.360 | 0.362 | 0.365 |
| 92.0          | 0.330                   | 0.332 | 0.334 | 0.336 | 0.338 | 0.341 | 0.343 | 0.345 | 0.348 | 0.350 | 0.353 | 0.355 | 0.357 | 0.360 | 0.362 | 0.365 |
| 92.5          | 0.330                   | 0.332 | 0.334 | 0.337 | 0.339 | 0.341 | 0.343 | 0.346 | 0.348 | 0.351 | 0.353 | 0.355 | 0.358 | 0.360 | 0.363 | 0.365 |
| 93.0          | 0.330                   | 0.332 | 0.335 | 0.337 | 0.339 | 0.341 | 0.344 | 0.346 | 0.349 | 0.351 | 0.353 | 0.356 | 0.358 | 0.361 | 0.363 | 0.366 |
| 93.5          | 0.331                   | 0.333 | 0.335 | 0.337 | 0.340 | 0.342 | 0.344 | 0.347 | 0.349 | 0.351 | 0.354 | 0.356 | 0.359 | 0.361 | 0.364 | 0.366 |

| COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000 |                         |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|-----------------------------------------------------------------------------------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| TEMP<br>DEG F                                                                     | API GRAVITY AT 60 DEG F |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|                                                                                   | 0.0                     | 0.5   | 1.0   | 1.5   | 2.0   | 2.5   | 3.0   | 3.5   | 4.0   | 4.5   | 5.0   | 5.5   | 6.0   | 6.5   | 7.0   | 7.5   |
| 94.0                                                                              | 0.331                   | 0.333 | 0.335 | 0.338 | 0.340 | 0.342 | 0.345 | 0.347 | 0.349 | 0.352 | 0.354 | 0.357 | 0.359 | 0.362 | 0.364 | 0.367 |
| 94.5                                                                              | 0.331                   | 0.334 | 0.336 | 0.338 | 0.340 | 0.343 | 0.345 | 0.347 | 0.350 | 0.352 | 0.355 | 0.357 | 0.360 | 0.362 | 0.365 | 0.367 |
| 95.0                                                                              | 0.332                   | 0.334 | 0.336 | 0.338 | 0.341 | 0.343 | 0.345 | 0.348 | 0.350 | 0.353 | 0.355 | 0.357 | 0.360 | 0.363 | 0.365 | 0.368 |
| 95.5                                                                              | 0.332                   | 0.334 | 0.336 | 0.339 | 0.341 | 0.343 | 0.346 | 0.348 | 0.351 | 0.353 | 0.355 | 0.358 | 0.360 | 0.363 | 0.365 | 0.368 |
| 96.0                                                                              | 0.332                   | 0.335 | 0.337 | 0.339 | 0.341 | 0.344 | 0.346 | 0.349 | 0.351 | 0.353 | 0.356 | 0.358 | 0.361 | 0.363 | 0.366 | 0.369 |
| 96.5                                                                              | 0.333                   | 0.335 | 0.337 | 0.340 | 0.342 | 0.344 | 0.347 | 0.349 | 0.351 | 0.354 | 0.356 | 0.359 | 0.361 | 0.364 | 0.366 | 0.369 |
| 97.0                                                                              | 0.333                   | 0.335 | 0.338 | 0.340 | 0.342 | 0.345 | 0.347 | 0.349 | 0.352 | 0.354 | 0.357 | 0.359 | 0.362 | 0.364 | 0.367 | 0.369 |
| 97.5                                                                              | 0.333                   | 0.336 | 0.338 | 0.340 | 0.343 | 0.345 | 0.347 | 0.350 | 0.352 | 0.355 | 0.357 | 0.360 | 0.362 | 0.365 | 0.367 | 0.370 |
| 98.0                                                                              | 0.334                   | 0.336 | 0.338 | 0.341 | 0.343 | 0.345 | 0.348 | 0.350 | 0.353 | 0.355 | 0.357 | 0.360 | 0.363 | 0.365 | 0.368 | 0.370 |
| 98.5                                                                              | 0.334                   | 0.336 | 0.339 | 0.341 | 0.343 | 0.346 | 0.348 | 0.350 | 0.353 | 0.355 | 0.358 | 0.360 | 0.363 | 0.365 | 0.368 | 0.371 |
| 99.0                                                                              | 0.335                   | 0.337 | 0.339 | 0.341 | 0.344 | 0.346 | 0.348 | 0.351 | 0.353 | 0.356 | 0.358 | 0.361 | 0.363 | 0.366 | 0.369 | 0.371 |
| 99.5                                                                              | 0.335                   | 0.337 | 0.339 | 0.342 | 0.344 | 0.346 | 0.349 | 0.351 | 0.354 | 0.356 | 0.359 | 0.361 | 0.364 | 0.366 | 0.369 | 0.372 |
| 100.0                                                                             | 0.335                   | 0.337 | 0.340 | 0.342 | 0.344 | 0.347 | 0.349 | 0.352 | 0.354 | 0.357 | 0.359 | 0.362 | 0.364 | 0.367 | 0.369 | 0.372 |
| 100.5                                                                             | 0.336                   | 0.338 | 0.340 | 0.342 | 0.345 | 0.347 | 0.350 | 0.352 | 0.355 | 0.357 | 0.360 | 0.362 | 0.365 | 0.367 | 0.370 | 0.372 |
| 101.0                                                                             | 0.336                   | 0.338 | 0.341 | 0.343 | 0.345 | 0.348 | 0.350 | 0.352 | 0.355 | 0.357 | 0.360 | 0.362 | 0.365 | 0.368 | 0.370 | 0.373 |
| 101.5                                                                             | 0.336                   | 0.339 | 0.341 | 0.343 | 0.346 | 0.348 | 0.350 | 0.353 | 0.355 | 0.358 | 0.360 | 0.363 | 0.365 | 0.368 | 0.371 | 0.373 |
| 102.0                                                                             | 0.337                   | 0.339 | 0.341 | 0.344 | 0.346 | 0.348 | 0.351 | 0.353 | 0.356 | 0.358 | 0.361 | 0.363 | 0.366 | 0.369 | 0.371 | 0.374 |
| 102.5                                                                             | 0.337                   | 0.339 | 0.342 | 0.344 | 0.346 | 0.349 | 0.351 | 0.354 | 0.356 | 0.359 | 0.361 | 0.364 | 0.366 | 0.369 | 0.372 | 0.374 |
| 103.0                                                                             | 0.337                   | 0.340 | 0.342 | 0.344 | 0.347 | 0.349 | 0.352 | 0.354 | 0.357 | 0.359 | 0.362 | 0.364 | 0.367 | 0.369 | 0.372 | 0.375 |
| 103.5                                                                             | 0.338                   | 0.340 | 0.342 | 0.345 | 0.347 | 0.350 | 0.352 | 0.354 | 0.357 | 0.359 | 0.362 | 0.365 | 0.367 | 0.370 | 0.372 | 0.375 |
| 104.0                                                                             | 0.338                   | 0.340 | 0.343 | 0.345 | 0.348 | 0.350 | 0.352 | 0.355 | 0.357 | 0.360 | 0.362 | 0.365 | 0.368 | 0.370 | 0.373 | 0.376 |
| 104.5                                                                             | 0.338                   | 0.341 | 0.343 | 0.346 | 0.348 | 0.350 | 0.353 | 0.355 | 0.358 | 0.360 | 0.363 | 0.365 | 0.368 | 0.371 | 0.373 | 0.376 |
| 105.0                                                                             | 0.339                   | 0.341 | 0.344 | 0.346 | 0.348 | 0.351 | 0.353 | 0.356 | 0.358 | 0.361 | 0.363 | 0.366 | 0.368 | 0.371 | 0.374 | 0.377 |
| 105.5                                                                             | 0.339                   | 0.342 | 0.344 | 0.346 | 0.349 | 0.351 | 0.354 | 0.356 | 0.359 | 0.361 | 0.364 | 0.366 | 0.369 | 0.372 | 0.374 | 0.377 |
| 106.0                                                                             | 0.340                   | 0.342 | 0.344 | 0.347 | 0.349 | 0.352 | 0.354 | 0.356 | 0.359 | 0.362 | 0.364 | 0.367 | 0.369 | 0.372 | 0.375 | 0.377 |
| 106.5                                                                             | 0.340                   | 0.342 | 0.345 | 0.347 | 0.349 | 0.352 | 0.354 | 0.357 | 0.359 | 0.362 | 0.365 | 0.367 | 0.370 | 0.372 | 0.375 | 0.378 |
| 107.0                                                                             | 0.340                   | 0.343 | 0.345 | 0.347 | 0.350 | 0.352 | 0.355 | 0.357 | 0.360 | 0.362 | 0.365 | 0.368 | 0.370 | 0.373 | 0.376 | 0.378 |
| 107.5                                                                             | 0.341                   | 0.343 | 0.345 | 0.348 | 0.350 | 0.353 | 0.355 | 0.358 | 0.360 | 0.363 | 0.365 | 0.368 | 0.371 | 0.373 | 0.376 | 0.379 |
| 108.0                                                                             | 0.341                   | 0.343 | 0.346 | 0.348 | 0.351 | 0.353 | 0.356 | 0.358 | 0.361 | 0.363 | 0.366 | 0.368 | 0.371 | 0.374 | 0.376 | 0.379 |
| 108.5                                                                             | 0.341                   | 0.344 | 0.346 | 0.349 | 0.351 | 0.353 | 0.356 | 0.358 | 0.361 | 0.364 | 0.366 | 0.369 | 0.372 | 0.374 | 0.377 | 0.380 |
| 109.0                                                                             | 0.342                   | 0.344 | 0.347 | 0.349 | 0.351 | 0.354 | 0.356 | 0.359 | 0.361 | 0.364 | 0.367 | 0.369 | 0.372 | 0.375 | 0.377 | 0.380 |
| 109.5                                                                             | 0.342                   | 0.345 | 0.347 | 0.349 | 0.352 | 0.354 | 0.357 | 0.359 | 0.362 | 0.364 | 0.367 | 0.370 | 0.372 | 0.375 | 0.378 | 0.381 |
| 110.0                                                                             | 0.342                   | 0.345 | 0.347 | 0.350 | 0.352 | 0.355 | 0.357 | 0.360 | 0.362 | 0.365 | 0.367 | 0.370 | 0.373 | 0.376 | 0.378 | 0.381 |
| 110.5                                                                             | 0.343                   | 0.345 | 0.348 | 0.350 | 0.353 | 0.355 | 0.358 | 0.360 | 0.363 | 0.365 | 0.368 | 0.371 | 0.373 | 0.376 | 0.379 | 0.381 |
| 111.0                                                                             | 0.343                   | 0.346 | 0.348 | 0.350 | 0.353 | 0.355 | 0.358 | 0.361 | 0.363 | 0.366 | 0.368 | 0.371 | 0.374 | 0.376 | 0.379 | 0.382 |
| 111.5                                                                             | 0.344                   | 0.346 | 0.348 | 0.351 | 0.353 | 0.356 | 0.358 | 0.361 | 0.363 | 0.366 | 0.369 | 0.371 | 0.374 | 0.377 | 0.380 | 0.382 |
| 112.0                                                                             | 0.344                   | 0.346 | 0.349 | 0.351 | 0.354 | 0.356 | 0.359 | 0.361 | 0.364 | 0.367 | 0.369 | 0.372 | 0.375 | 0.377 | 0.380 | 0.383 |
| 112.5                                                                             | 0.344                   | 0.347 | 0.349 | 0.352 | 0.354 | 0.357 | 0.359 | 0.362 | 0.364 | 0.367 | 0.370 | 0.372 | 0.375 | 0.378 | 0.380 | 0.383 |

**COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000**

| TEMP<br>DEG F | API GRAVITY AT 60 DEG F |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|---------------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|               | 0.0                     | 0.5   | 1.0   | 1.5   | 2.0   | 2.5   | 3.0   | 3.5   | 4.0   | 4.5   | 5.0   | 5.5   | 6.0   | 6.5   | 7.0   | 7.5   |
| 113.0         | 0.345                   | 0.347 | 0.350 | 0.352 | 0.355 | 0.357 | 0.360 | 0.362 | 0.365 | 0.367 | 0.370 | 0.373 | 0.375 | 0.378 | 0.381 | 0.384 |
| 113.5         | 0.345                   | 0.347 | 0.350 | 0.352 | 0.355 | 0.357 | 0.360 | 0.363 | 0.365 | 0.368 | 0.370 | 0.373 | 0.376 | 0.379 | 0.381 | 0.384 |
| 114.0         | 0.345                   | 0.348 | 0.350 | 0.353 | 0.355 | 0.358 | 0.360 | 0.363 | 0.366 | 0.368 | 0.371 | 0.374 | 0.376 | 0.379 | 0.382 | 0.385 |
| 114.5         | 0.346                   | 0.348 | 0.351 | 0.353 | 0.356 | 0.358 | 0.361 | 0.363 | 0.366 | 0.369 | 0.371 | 0.374 | 0.377 | 0.380 | 0.382 | 0.385 |
| 115.0         | 0.346                   | 0.349 | 0.351 | 0.354 | 0.356 | 0.359 | 0.361 | 0.364 | 0.366 | 0.369 | 0.372 | 0.374 | 0.377 | 0.380 | 0.383 | 0.386 |
| 115.5         | 0.347                   | 0.349 | 0.351 | 0.354 | 0.356 | 0.359 | 0.362 | 0.364 | 0.367 | 0.369 | 0.372 | 0.375 | 0.378 | 0.380 | 0.383 | 0.386 |
| 116.0         | 0.347                   | 0.349 | 0.352 | 0.354 | 0.357 | 0.359 | 0.362 | 0.365 | 0.367 | 0.370 | 0.373 | 0.375 | 0.378 | 0.381 | 0.384 | 0.387 |
| 116.5         | 0.347                   | 0.350 | 0.352 | 0.355 | 0.357 | 0.360 | 0.362 | 0.365 | 0.368 | 0.370 | 0.373 | 0.376 | 0.379 | 0.381 | 0.384 | 0.387 |
| 117.0         | 0.348                   | 0.350 | 0.353 | 0.355 | 0.358 | 0.360 | 0.363 | 0.365 | 0.368 | 0.371 | 0.373 | 0.376 | 0.379 | 0.382 | 0.385 | 0.387 |
| 117.5         | 0.348                   | 0.351 | 0.353 | 0.356 | 0.358 | 0.361 | 0.363 | 0.366 | 0.368 | 0.371 | 0.374 | 0.377 | 0.379 | 0.382 | 0.385 | 0.388 |
| 118.0         | 0.348                   | 0.351 | 0.353 | 0.356 | 0.358 | 0.361 | 0.364 | 0.366 | 0.369 | 0.372 | 0.374 | 0.377 | 0.380 | 0.383 | 0.385 | 0.388 |
| 118.5         | 0.349                   | 0.351 | 0.354 | 0.356 | 0.359 | 0.361 | 0.364 | 0.367 | 0.369 | 0.372 | 0.375 | 0.377 | 0.380 | 0.383 | 0.386 | 0.389 |
| 119.0         | 0.349                   | 0.352 | 0.354 | 0.357 | 0.359 | 0.362 | 0.364 | 0.367 | 0.370 | 0.372 | 0.375 | 0.378 | 0.381 | 0.384 | 0.386 | 0.389 |
| 119.5         | 0.350                   | 0.352 | 0.355 | 0.357 | 0.360 | 0.362 | 0.365 | 0.367 | 0.370 | 0.373 | 0.376 | 0.378 | 0.381 | 0.384 | 0.387 | 0.390 |
| 120.0         | 0.350                   | 0.352 | 0.355 | 0.357 | 0.360 | 0.363 | 0.365 | 0.368 | 0.371 | 0.373 | 0.376 | 0.379 | 0.382 | 0.384 | 0.387 | 0.390 |
| 120.5         | 0.350                   | 0.353 | 0.355 | 0.358 | 0.360 | 0.363 | 0.366 | 0.368 | 0.371 | 0.374 | 0.376 | 0.379 | 0.382 | 0.385 | 0.388 | 0.391 |
| 121.0         | 0.351                   | 0.353 | 0.356 | 0.358 | 0.361 | 0.363 | 0.366 | 0.369 | 0.371 | 0.374 | 0.377 | 0.380 | 0.383 | 0.385 | 0.388 | 0.391 |
| 121.5         | 0.351                   | 0.354 | 0.356 | 0.359 | 0.361 | 0.364 | 0.366 | 0.369 | 0.372 | 0.375 | 0.377 | 0.380 | 0.383 | 0.386 | 0.389 | 0.392 |
| 122.0         | 0.351                   | 0.354 | 0.356 | 0.359 | 0.362 | 0.364 | 0.367 | 0.370 | 0.372 | 0.375 | 0.378 | 0.381 | 0.383 | 0.386 | 0.389 | 0.392 |
| 122.5         | 0.352                   | 0.354 | 0.357 | 0.359 | 0.362 | 0.365 | 0.367 | 0.370 | 0.373 | 0.375 | 0.378 | 0.381 | 0.384 | 0.387 | 0.390 | 0.393 |
| 123.0         | 0.352                   | 0.355 | 0.357 | 0.360 | 0.362 | 0.365 | 0.368 | 0.370 | 0.373 | 0.376 | 0.379 | 0.381 | 0.384 | 0.387 | 0.390 | 0.393 |
| 123.5         | 0.353                   | 0.355 | 0.358 | 0.360 | 0.363 | 0.365 | 0.368 | 0.371 | 0.374 | 0.376 | 0.379 | 0.382 | 0.385 | 0.388 | 0.391 | 0.393 |
| 124.0         | 0.353                   | 0.355 | 0.358 | 0.361 | 0.363 | 0.366 | 0.369 | 0.371 | 0.374 | 0.377 | 0.380 | 0.382 | 0.385 | 0.388 | 0.391 | 0.394 |
| 124.5         | 0.353                   | 0.356 | 0.358 | 0.361 | 0.364 | 0.366 | 0.369 | 0.372 | 0.374 | 0.377 | 0.380 | 0.383 | 0.386 | 0.389 | 0.391 | 0.394 |
| 125.0         | 0.354                   | 0.356 | 0.359 | 0.361 | 0.364 | 0.367 | 0.369 | 0.372 | 0.375 | 0.378 | 0.380 | 0.383 | 0.386 | 0.389 | 0.392 | 0.395 |
| 125.5         | 0.354                   | 0.357 | 0.359 | 0.362 | 0.364 | 0.367 | 0.370 | 0.372 | 0.375 | 0.378 | 0.381 | 0.384 | 0.387 | 0.389 | 0.392 | 0.395 |
| 126.0         | 0.354                   | 0.357 | 0.360 | 0.362 | 0.365 | 0.367 | 0.370 | 0.373 | 0.376 | 0.378 | 0.381 | 0.384 | 0.387 | 0.390 | 0.393 | 0.396 |
| 126.5         | 0.355                   | 0.357 | 0.360 | 0.363 | 0.365 | 0.368 | 0.371 | 0.373 | 0.376 | 0.379 | 0.382 | 0.385 | 0.387 | 0.390 | 0.393 | 0.396 |
| 127.0         | 0.355                   | 0.358 | 0.360 | 0.363 | 0.366 | 0.368 | 0.371 | 0.374 | 0.377 | 0.379 | 0.382 | 0.385 | 0.388 | 0.391 | 0.394 | 0.397 |
| 127.5         | 0.356                   | 0.358 | 0.361 | 0.363 | 0.366 | 0.369 | 0.371 | 0.374 | 0.377 | 0.380 | 0.383 | 0.385 | 0.388 | 0.391 | 0.394 | 0.397 |
| 128.0         | 0.356                   | 0.359 | 0.361 | 0.364 | 0.366 | 0.369 | 0.372 | 0.375 | 0.377 | 0.380 | 0.383 | 0.386 | 0.389 | 0.392 | 0.395 | 0.398 |
| 128.5         | 0.356                   | 0.359 | 0.362 | 0.364 | 0.367 | 0.370 | 0.372 | 0.375 | 0.378 | 0.381 | 0.383 | 0.386 | 0.389 | 0.392 | 0.395 | 0.398 |
| 129.0         | 0.357                   | 0.359 | 0.362 | 0.365 | 0.367 | 0.370 | 0.373 | 0.375 | 0.378 | 0.381 | 0.384 | 0.387 | 0.390 | 0.393 | 0.396 | 0.399 |
| 129.5         | 0.357                   | 0.360 | 0.362 | 0.365 | 0.368 | 0.370 | 0.373 | 0.376 | 0.379 | 0.382 | 0.384 | 0.387 | 0.390 | 0.393 | 0.396 | 0.399 |
| 130.0         | 0.358                   | 0.360 | 0.363 | 0.365 | 0.368 | 0.371 | 0.374 | 0.376 | 0.379 | 0.382 | 0.385 | 0.388 | 0.391 | 0.394 | 0.397 | 0.400 |
| 130.5         | 0.358                   | 0.361 | 0.363 | 0.366 | 0.368 | 0.371 | 0.374 | 0.377 | 0.380 | 0.382 | 0.385 | 0.388 | 0.391 | 0.394 | 0.397 | 0.400 |
| 131.0         | 0.358                   | 0.361 | 0.364 | 0.366 | 0.369 | 0.372 | 0.374 | 0.377 | 0.380 | 0.383 | 0.386 | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 |
| 131.5         | 0.359                   | 0.361 | 0.364 | 0.367 | 0.369 | 0.372 | 0.375 | 0.378 | 0.380 | 0.383 | 0.386 | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 |

COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000

| TEMP<br>DEG F | API GRAVITY AT 60 DEG F |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|---------------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|               | 0.0                     | 0.5   | 1.0   | 1.5   | 2.0   | 2.5   | 3.0   | 3.5   | 4.0   | 4.5   | 5.0   | 5.5   | 6.0   | 6.5   | 7.0   | 7.5   |
| 132.0         | 0.359                   | 0.362 | 0.364 | 0.367 | 0.370 | 0.372 | 0.375 | 0.378 | 0.381 | 0.384 | 0.387 | 0.390 | 0.392 | 0.395 | 0.398 | 0.402 |
| 132.5         | 0.359                   | 0.362 | 0.365 | 0.367 | 0.370 | 0.373 | 0.376 | 0.378 | 0.381 | 0.384 | 0.387 | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 |
| 133.0         | 0.360                   | 0.362 | 0.365 | 0.368 | 0.371 | 0.373 | 0.376 | 0.379 | 0.382 | 0.385 | 0.387 | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 |
| 133.5         | 0.360                   | 0.363 | 0.366 | 0.368 | 0.371 | 0.374 | 0.376 | 0.379 | 0.382 | 0.385 | 0.388 | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 |
| 134.0         | 0.361                   | 0.363 | 0.366 | 0.369 | 0.371 | 0.374 | 0.377 | 0.380 | 0.383 | 0.385 | 0.388 | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 |
| 134.5         | 0.361                   | 0.364 | 0.366 | 0.369 | 0.372 | 0.375 | 0.377 | 0.380 | 0.383 | 0.386 | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 |
| 135.0         | 0.361                   | 0.364 | 0.367 | 0.369 | 0.372 | 0.375 | 0.378 | 0.381 | 0.383 | 0.386 | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 |
| 135.5         | 0.362                   | 0.364 | 0.367 | 0.370 | 0.373 | 0.375 | 0.378 | 0.381 | 0.384 | 0.387 | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 |
| 136.0         | 0.362                   | 0.365 | 0.368 | 0.370 | 0.373 | 0.376 | 0.379 | 0.381 | 0.384 | 0.387 | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 |
| 136.5         | 0.363                   | 0.365 | 0.368 | 0.371 | 0.373 | 0.376 | 0.379 | 0.382 | 0.385 | 0.388 | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 |
| 137.0         | 0.363                   | 0.366 | 0.368 | 0.371 | 0.374 | 0.377 | 0.379 | 0.382 | 0.385 | 0.388 | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 |
| 137.5         | 0.363                   | 0.366 | 0.369 | 0.371 | 0.374 | 0.377 | 0.380 | 0.383 | 0.386 | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.407 |
| 138.0         | 0.364                   | 0.366 | 0.369 | 0.372 | 0.375 | 0.377 | 0.380 | 0.383 | 0.386 | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.407 |
| 138.5         | 0.364                   | 0.367 | 0.370 | 0.372 | 0.375 | 0.378 | 0.381 | 0.384 | 0.386 | 0.389 | 0.392 | 0.395 | 0.398 | 0.402 | 0.405 | 0.408 |
| 139.0         | 0.365                   | 0.367 | 0.370 | 0.373 | 0.375 | 0.378 | 0.381 | 0.384 | 0.387 | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 |
| 139.5         | 0.365                   | 0.368 | 0.370 | 0.373 | 0.376 | 0.379 | 0.382 | 0.384 | 0.387 | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 | 0.406 | 0.409 |
| 140.0         | 0.365                   | 0.368 | 0.371 | 0.373 | 0.376 | 0.379 | 0.382 | 0.385 | 0.388 | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 |
| 140.5         | 0.366                   | 0.368 | 0.371 | 0.374 | 0.377 | 0.380 | 0.382 | 0.385 | 0.388 | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 | 0.407 | 0.410 |
| 141.0         | 0.366                   | 0.369 | 0.372 | 0.374 | 0.377 | 0.380 | 0.383 | 0.386 | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 |
| 141.5         | 0.366                   | 0.369 | 0.372 | 0.375 | 0.378 | 0.380 | 0.383 | 0.386 | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.408 | 0.411 |
| 142.0         | 0.367                   | 0.370 | 0.372 | 0.375 | 0.378 | 0.381 | 0.384 | 0.387 | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 |
| 142.5         | 0.367                   | 0.370 | 0.373 | 0.376 | 0.378 | 0.381 | 0.384 | 0.387 | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 | 0.412 |
| 143.0         | 0.368                   | 0.370 | 0.373 | 0.376 | 0.379 | 0.382 | 0.385 | 0.387 | 0.390 | 0.393 | 0.396 | 0.400 | 0.403 | 0.406 | 0.409 | 0.412 |
| 143.5         | 0.368                   | 0.371 | 0.374 | 0.376 | 0.379 | 0.382 | 0.385 | 0.388 | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.413 |
| 144.0         | 0.368                   | 0.371 | 0.374 | 0.377 | 0.380 | 0.383 | 0.385 | 0.388 | 0.391 | 0.394 | 0.397 | 0.400 | 0.404 | 0.407 | 0.410 | 0.413 |
| 144.5         | 0.369                   | 0.372 | 0.374 | 0.377 | 0.380 | 0.383 | 0.386 | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.414 |
| 145.0         | 0.369                   | 0.372 | 0.375 | 0.378 | 0.380 | 0.383 | 0.386 | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 | 0.405 | 0.408 | 0.411 | 0.414 |
| 145.5         | 0.370                   | 0.372 | 0.375 | 0.378 | 0.381 | 0.384 | 0.387 | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.415 |
| 146.0         | 0.370                   | 0.373 | 0.376 | 0.378 | 0.381 | 0.384 | 0.387 | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.409 | 0.412 | 0.415 |
| 146.5         | 0.370                   | 0.373 | 0.376 | 0.379 | 0.382 | 0.385 | 0.388 | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.412 | 0.416 |
| 147.0         | 0.371                   | 0.374 | 0.376 | 0.379 | 0.382 | 0.385 | 0.388 | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 | 0.410 | 0.413 | 0.416 |
| 147.5         | 0.371                   | 0.374 | 0.377 | 0.380 | 0.383 | 0.385 | 0.388 | 0.391 | 0.394 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.413 | 0.417 |
| 148.0         | 0.372                   | 0.374 | 0.377 | 0.380 | 0.383 | 0.386 | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.407 | 0.411 | 0.414 | 0.417 |
| 148.5         | 0.372                   | 0.375 | 0.378 | 0.381 | 0.383 | 0.386 | 0.389 | 0.392 | 0.395 | 0.398 | 0.402 | 0.405 | 0.408 | 0.411 | 0.414 | 0.418 |
| 149.0         | 0.372                   | 0.375 | 0.378 | 0.381 | 0.384 | 0.387 | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 | 0.412 | 0.415 | 0.418 |
| 149.5         | 0.373                   | 0.376 | 0.378 | 0.381 | 0.384 | 0.387 | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 | 0.406 | 0.409 | 0.412 | 0.415 | 0.419 |
| 150.0         | 0.373                   | 0.376 | 0.379 | 0.382 | 0.385 | 0.388 | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.413 | 0.416 | 0.419 |
| 150.5         | 0.374                   | 0.376 | 0.379 | 0.382 | 0.385 | 0.388 | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 | 0.407 | 0.410 | 0.413 | 0.416 | 0.420 |

COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000  
API GRAVITY AT 60 DEG F

| TEMP<br>DEG F | 0.0   | 0.5   | 1.0   | 1.5   | 2.0   | 2.5   | 3.0   | 3.5   | 4.0   | 4.5   | 5.0   | 5.5   | 6.0   | 6.5   | 7.0   | 7.5   |
|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 151.0         | 0.374 | 0.377 | 0.380 | 0.383 | 0.386 | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.414 | 0.417 | 0.420 |
| 151.5         | 0.374 | 0.377 | 0.380 | 0.383 | 0.386 | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.408 | 0.411 | 0.414 | 0.417 | 0.421 |
| 152.0         | 0.375 | 0.378 | 0.381 | 0.383 | 0.386 | 0.389 | 0.392 | 0.395 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.414 | 0.418 | 0.421 |
| 152.5         | 0.375 | 0.378 | 0.381 | 0.384 | 0.387 | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 | 0.412 | 0.415 | 0.418 | 0.422 |
| 153.0         | 0.376 | 0.378 | 0.381 | 0.384 | 0.387 | 0.390 | 0.393 | 0.396 | 0.399 | 0.403 | 0.406 | 0.409 | 0.412 | 0.415 | 0.419 | 0.422 |
| 153.5         | 0.376 | 0.379 | 0.382 | 0.385 | 0.388 | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.413 | 0.416 | 0.419 | 0.423 |
| 154.0         | 0.376 | 0.379 | 0.382 | 0.385 | 0.388 | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 | 0.407 | 0.410 | 0.413 | 0.416 | 0.420 | 0.423 |
| 154.5         | 0.377 | 0.380 | 0.383 | 0.386 | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.414 | 0.417 | 0.420 | 0.424 |
| 155.0         | 0.377 | 0.380 | 0.383 | 0.386 | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.408 | 0.411 | 0.414 | 0.417 | 0.421 | 0.424 |
| 155.5         | 0.378 | 0.381 | 0.383 | 0.386 | 0.389 | 0.392 | 0.395 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.415 | 0.418 | 0.421 | 0.425 |
| 156.0         | 0.378 | 0.381 | 0.384 | 0.387 | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.409 | 0.412 | 0.415 | 0.418 | 0.422 | 0.425 |
| 156.5         | 0.378 | 0.381 | 0.384 | 0.387 | 0.390 | 0.393 | 0.396 | 0.399 | 0.403 | 0.406 | 0.409 | 0.412 | 0.416 | 0.419 | 0.422 | 0.426 |
| 157.0         | 0.379 | 0.382 | 0.385 | 0.388 | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.413 | 0.416 | 0.419 | 0.423 | 0.426 |
| 157.5         | 0.379 | 0.382 | 0.385 | 0.388 | 0.391 | 0.394 | 0.397 | 0.400 | 0.404 | 0.407 | 0.410 | 0.413 | 0.417 | 0.420 | 0.423 | 0.427 |
| 158.0         | 0.380 | 0.383 | 0.386 | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.414 | 0.417 | 0.420 | 0.424 | 0.427 |
| 158.5         | 0.380 | 0.383 | 0.386 | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.408 | 0.411 | 0.414 | 0.418 | 0.421 | 0.424 | 0.428 |
| 159.0         | 0.380 | 0.383 | 0.386 | 0.389 | 0.392 | 0.395 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.415 | 0.418 | 0.421 | 0.425 | 0.428 |
| 159.5         | 0.381 | 0.384 | 0.387 | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.409 | 0.412 | 0.415 | 0.418 | 0.422 | 0.425 | 0.429 |
| 160.0         | 0.381 | 0.384 | 0.387 | 0.390 | 0.393 | 0.396 | 0.399 | 0.403 | 0.406 | 0.409 | 0.412 | 0.416 | 0.419 | 0.422 | 0.426 | 0.429 |
| 160.5         | 0.382 | 0.385 | 0.388 | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 | 0.410 | 0.413 | 0.416 | 0.419 | 0.423 | 0.426 | 0.430 |
| 161.0         | 0.382 | 0.385 | 0.388 | 0.391 | 0.394 | 0.397 | 0.400 | 0.404 | 0.407 | 0.410 | 0.413 | 0.417 | 0.420 | 0.423 | 0.427 | 0.430 |
| 161.5         | 0.383 | 0.386 | 0.388 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.414 | 0.417 | 0.420 | 0.424 | 0.427 | 0.431 |
| 162.0         | 0.383 | 0.386 | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.408 | 0.411 | 0.414 | 0.418 | 0.421 | 0.424 | 0.428 | 0.431 |
| 162.5         | 0.383 | 0.386 | 0.389 | 0.392 | 0.395 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.415 | 0.418 | 0.421 | 0.425 | 0.428 | 0.432 |
| 163.0         | 0.384 | 0.387 | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.409 | 0.412 | 0.415 | 0.419 | 0.422 | 0.425 | 0.429 | 0.432 |
| 163.5         | 0.384 | 0.387 | 0.390 | 0.393 | 0.396 | 0.399 | 0.403 | 0.406 | 0.409 | 0.412 | 0.416 | 0.419 | 0.422 | 0.426 | 0.429 | 0.433 |
| 164.0         | 0.385 | 0.388 | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 | 0.410 | 0.413 | 0.416 | 0.420 | 0.423 | 0.426 | 0.430 | 0.433 |
| 164.5         | 0.385 | 0.388 | 0.391 | 0.394 | 0.397 | 0.400 | 0.404 | 0.407 | 0.410 | 0.413 | 0.417 | 0.420 | 0.423 | 0.427 | 0.430 | 0.434 |
| 165.0         | 0.385 | 0.388 | 0.391 | 0.395 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.414 | 0.417 | 0.420 | 0.424 | 0.427 | 0.431 | 0.434 |
| 165.5         | 0.386 | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.408 | 0.411 | 0.414 | 0.418 | 0.421 | 0.424 | 0.428 | 0.431 | 0.435 |
| 166.0         | 0.386 | 0.389 | 0.392 | 0.395 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.415 | 0.418 | 0.421 | 0.425 | 0.428 | 0.432 | 0.435 |
| 166.5         | 0.387 | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.409 | 0.412 | 0.415 | 0.419 | 0.422 | 0.425 | 0.429 | 0.432 | 0.436 |
| 167.0         | 0.387 | 0.390 | 0.393 | 0.396 | 0.399 | 0.403 | 0.406 | 0.409 | 0.412 | 0.416 | 0.419 | 0.422 | 0.426 | 0.429 | 0.433 | 0.436 |
| 167.5         | 0.388 | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 | 0.410 | 0.413 | 0.416 | 0.420 | 0.423 | 0.426 | 0.430 | 0.433 | 0.437 |
| 168.0         | 0.388 | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 | 0.407 | 0.410 | 0.413 | 0.417 | 0.420 | 0.423 | 0.427 | 0.430 | 0.434 | 0.437 |
| 168.5         | 0.388 | 0.391 | 0.394 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.414 | 0.417 | 0.420 | 0.424 | 0.427 | 0.431 | 0.434 | 0.438 |
| 169.0         | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.408 | 0.411 | 0.414 | 0.418 | 0.421 | 0.424 | 0.428 | 0.431 | 0.435 | 0.439 |
| 169.5         | 0.389 | 0.392 | 0.395 | 0.398 | 0.402 | 0.405 | 0.408 | 0.411 | 0.415 | 0.418 | 0.421 | 0.425 | 0.428 | 0.432 | 0.435 | 0.439 |

COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000

| TEMP  | API GRAVITY AT 60 DEG F |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|-------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| DEG F | 0.0                     | 0.5   | 1.0   | 1.5   | 2.0   | 2.5   | 3.0   | 3.5   | 4.0   | 4.5   | 5.0   | 5.5   | 6.0   | 6.5   | 7.0   | 7.5   |
| 170.0 | 0.390                   | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.409 | 0.412 | 0.415 | 0.419 | 0.422 | 0.425 | 0.429 | 0.432 | 0.436 | 0.440 |
| 170.5 | 0.390                   | 0.393 | 0.396 | 0.399 | 0.403 | 0.406 | 0.409 | 0.412 | 0.416 | 0.419 | 0.422 | 0.426 | 0.429 | 0.433 | 0.436 | 0.440 |
| 171.0 | 0.390                   | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.413 | 0.416 | 0.419 | 0.423 | 0.426 | 0.430 | 0.433 | 0.437 | 0.441 |
| 171.5 | 0.391                   | 0.394 | 0.397 | 0.400 | 0.403 | 0.407 | 0.410 | 0.413 | 0.417 | 0.420 | 0.423 | 0.427 | 0.430 | 0.434 | 0.438 | 0.441 |
| 172.0 | 0.391                   | 0.394 | 0.397 | 0.401 | 0.404 | 0.407 | 0.410 | 0.414 | 0.417 | 0.420 | 0.424 | 0.427 | 0.431 | 0.434 | 0.438 | 0.442 |
| 172.5 | 0.392                   | 0.395 | 0.398 | 0.401 | 0.404 | 0.408 | 0.411 | 0.414 | 0.418 | 0.421 | 0.424 | 0.428 | 0.431 | 0.435 | 0.439 | 0.442 |
| 173.0 | 0.392                   | 0.395 | 0.398 | 0.402 | 0.405 | 0.408 | 0.411 | 0.415 | 0.418 | 0.421 | 0.425 | 0.428 | 0.432 | 0.435 | 0.439 | 0.443 |
| 173.5 | 0.393                   | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 | 0.412 | 0.415 | 0.418 | 0.422 | 0.425 | 0.429 | 0.432 | 0.436 | 0.440 | 0.443 |
| 174.0 | 0.393                   | 0.396 | 0.399 | 0.402 | 0.406 | 0.409 | 0.412 | 0.416 | 0.419 | 0.422 | 0.426 | 0.429 | 0.433 | 0.436 | 0.440 | 0.444 |
| 174.5 | 0.393                   | 0.396 | 0.400 | 0.403 | 0.406 | 0.409 | 0.413 | 0.416 | 0.419 | 0.423 | 0.426 | 0.430 | 0.433 | 0.437 | 0.441 | 0.444 |
| 175.0 | 0.394                   | 0.397 | 0.400 | 0.403 | 0.407 | 0.410 | 0.413 | 0.417 | 0.420 | 0.423 | 0.427 | 0.430 | 0.434 | 0.438 | 0.441 | 0.445 |
| 175.5 | 0.394                   | 0.397 | 0.401 | 0.404 | 0.407 | 0.410 | 0.414 | 0.417 | 0.420 | 0.424 | 0.427 | 0.431 | 0.434 | 0.438 | 0.442 | 0.445 |
| 176.0 | 0.395                   | 0.398 | 0.401 | 0.404 | 0.407 | 0.411 | 0.414 | 0.417 | 0.421 | 0.424 | 0.428 | 0.431 | 0.435 | 0.439 | 0.442 | 0.446 |
| 176.5 | 0.395                   | 0.398 | 0.401 | 0.405 | 0.408 | 0.411 | 0.415 | 0.418 | 0.421 | 0.425 | 0.428 | 0.432 | 0.435 | 0.439 | 0.443 | 0.446 |
| 177.0 | 0.395                   | 0.399 | 0.402 | 0.405 | 0.408 | 0.412 | 0.415 | 0.418 | 0.422 | 0.425 | 0.429 | 0.432 | 0.436 | 0.440 | 0.443 | 0.447 |
| 177.5 | 0.396                   | 0.399 | 0.402 | 0.406 | 0.409 | 0.412 | 0.415 | 0.419 | 0.422 | 0.426 | 0.429 | 0.433 | 0.436 | 0.440 | 0.444 | 0.448 |
| 178.0 | 0.396                   | 0.400 | 0.403 | 0.406 | 0.409 | 0.413 | 0.416 | 0.419 | 0.423 | 0.426 | 0.430 | 0.433 | 0.437 | 0.441 | 0.444 | 0.448 |
| 178.5 | 0.397                   | 0.400 | 0.403 | 0.406 | 0.410 | 0.413 | 0.416 | 0.420 | 0.423 | 0.427 | 0.430 | 0.434 | 0.437 | 0.441 | 0.445 | 0.449 |
| 179.0 | 0.397                   | 0.400 | 0.404 | 0.407 | 0.410 | 0.413 | 0.417 | 0.420 | 0.424 | 0.427 | 0.431 | 0.434 | 0.438 | 0.442 | 0.445 | 0.449 |
| 179.5 | 0.398                   | 0.401 | 0.404 | 0.407 | 0.411 | 0.414 | 0.417 | 0.421 | 0.424 | 0.428 | 0.431 | 0.435 | 0.438 | 0.442 | 0.446 | 0.450 |
| 180.0 | 0.398                   | 0.401 | 0.404 | 0.408 | 0.411 | 0.414 | 0.418 | 0.421 | 0.425 | 0.428 | 0.432 | 0.435 | 0.439 | 0.443 | 0.446 | 0.450 |
| 180.5 | 0.398                   | 0.402 | 0.405 | 0.408 | 0.412 | 0.415 | 0.418 | 0.422 | 0.425 | 0.429 | 0.432 | 0.436 | 0.440 | 0.443 | 0.447 | 0.451 |
| 181.0 | 0.399                   | 0.402 | 0.405 | 0.409 | 0.412 | 0.415 | 0.419 | 0.422 | 0.426 | 0.429 | 0.433 | 0.436 | 0.440 | 0.444 | 0.447 | 0.451 |
| 181.5 | 0.399                   | 0.403 | 0.406 | 0.409 | 0.412 | 0.416 | 0.419 | 0.423 | 0.426 | 0.430 | 0.433 | 0.437 | 0.441 | 0.444 | 0.448 | 0.452 |
| 182.0 | 0.400                   | 0.403 | 0.406 | 0.410 | 0.413 | 0.416 | 0.420 | 0.423 | 0.427 | 0.430 | 0.434 | 0.437 | 0.441 | 0.445 | 0.449 | 0.452 |
| 182.5 | 0.400                   | 0.403 | 0.407 | 0.410 | 0.413 | 0.417 | 0.420 | 0.424 | 0.427 | 0.431 | 0.434 | 0.438 | 0.442 | 0.445 | 0.449 | 0.453 |
| 183.0 | 0.401                   | 0.404 | 0.407 | 0.410 | 0.414 | 0.417 | 0.421 | 0.424 | 0.428 | 0.431 | 0.435 | 0.438 | 0.442 | 0.446 | 0.450 | 0.453 |
| 183.5 | 0.401                   | 0.404 | 0.408 | 0.411 | 0.414 | 0.418 | 0.421 | 0.425 | 0.428 | 0.432 | 0.435 | 0.439 | 0.443 | 0.446 | 0.450 | 0.454 |
| 184.0 | 0.401                   | 0.405 | 0.408 | 0.411 | 0.415 | 0.418 | 0.422 | 0.425 | 0.429 | 0.432 | 0.436 | 0.439 | 0.443 | 0.447 | 0.451 | 0.455 |
| 184.5 | 0.402                   | 0.405 | 0.408 | 0.412 | 0.415 | 0.419 | 0.422 | 0.426 | 0.429 | 0.433 | 0.436 | 0.440 | 0.444 | 0.447 | 0.451 | 0.455 |
| 185.0 | 0.402                   | 0.406 | 0.409 | 0.412 | 0.416 | 0.419 | 0.423 | 0.426 | 0.430 | 0.433 | 0.437 | 0.440 | 0.444 | 0.448 | 0.452 | 0.456 |
| 185.5 | 0.403                   | 0.406 | 0.409 | 0.413 | 0.416 | 0.420 | 0.423 | 0.426 | 0.430 | 0.434 | 0.437 | 0.441 | 0.445 | 0.448 | 0.452 | 0.456 |
| 186.0 | 0.403                   | 0.406 | 0.410 | 0.413 | 0.417 | 0.420 | 0.423 | 0.427 | 0.431 | 0.434 | 0.438 | 0.441 | 0.445 | 0.449 | 0.453 | 0.457 |
| 186.5 | 0.404                   | 0.407 | 0.410 | 0.414 | 0.417 | 0.420 | 0.424 | 0.427 | 0.431 | 0.435 | 0.438 | 0.442 | 0.446 | 0.450 | 0.453 | 0.457 |
| 187.0 | 0.404                   | 0.407 | 0.411 | 0.414 | 0.417 | 0.421 | 0.424 | 0.428 | 0.432 | 0.435 | 0.439 | 0.442 | 0.446 | 0.450 | 0.454 | 0.458 |
| 187.5 | 0.405                   | 0.408 | 0.411 | 0.415 | 0.418 | 0.421 | 0.425 | 0.428 | 0.432 | 0.436 | 0.439 | 0.443 | 0.447 | 0.451 | 0.454 | 0.458 |
| 188.0 | 0.405                   | 0.408 | 0.412 | 0.415 | 0.418 | 0.422 | 0.425 | 0.429 | 0.432 | 0.436 | 0.440 | 0.444 | 0.447 | 0.451 | 0.455 | 0.459 |
| 188.5 | 0.405                   | 0.409 | 0.412 | 0.415 | 0.419 | 0.422 | 0.426 | 0.429 | 0.433 | 0.437 | 0.440 | 0.444 | 0.448 | 0.452 | 0.455 | 0.459 |

| COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000 |                         |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|-----------------------------------------------------------------------------------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| TEMP                                                                              | API GRAVITY AT 60 DEG F |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| DEG F                                                                             | 0.0                     | 0.5   | 1.0   | 1.5   | 2.0   | 2.5   | 3.0   | 3.5   | 4.0   | 4.5   | 5.0   | 5.5   | 6.0   | 6.5   | 7.0   | 7.5   |
| 189.0                                                                             | 0.406                   | 0.409 | 0.412 | 0.416 | 0.419 | 0.423 | 0.426 | 0.430 | 0.433 | 0.437 | 0.441 | 0.445 | 0.448 | 0.452 | 0.456 | 0.460 |
| 189.5                                                                             | 0.406                   | 0.410 | 0.413 | 0.416 | 0.420 | 0.423 | 0.427 | 0.430 | 0.434 | 0.438 | 0.441 | 0.445 | 0.449 | 0.453 | 0.457 | 0.460 |
| 190.0                                                                             | 0.407                   | 0.410 | 0.413 | 0.417 | 0.420 | 0.424 | 0.427 | 0.431 | 0.434 | 0.438 | 0.442 | 0.446 | 0.449 | 0.453 | 0.457 | 0.461 |
| 190.5                                                                             | 0.407                   | 0.410 | 0.414 | 0.417 | 0.421 | 0.424 | 0.428 | 0.431 | 0.435 | 0.439 | 0.442 | 0.446 | 0.450 | 0.454 | 0.458 | 0.462 |
| 191.0                                                                             | 0.408                   | 0.411 | 0.414 | 0.418 | 0.421 | 0.425 | 0.428 | 0.432 | 0.435 | 0.439 | 0.443 | 0.447 | 0.450 | 0.454 | 0.458 | 0.462 |
| 191.5                                                                             | 0.408                   | 0.411 | 0.415 | 0.418 | 0.422 | 0.425 | 0.429 | 0.432 | 0.436 | 0.440 | 0.443 | 0.447 | 0.451 | 0.455 | 0.459 | 0.463 |
| 192.0                                                                             | 0.408                   | 0.412 | 0.415 | 0.419 | 0.422 | 0.426 | 0.429 | 0.433 | 0.436 | 0.440 | 0.444 | 0.448 | 0.451 | 0.455 | 0.459 | 0.463 |
| 192.5                                                                             | 0.409                   | 0.412 | 0.416 | 0.419 | 0.423 | 0.426 | 0.430 | 0.433 | 0.437 | 0.441 | 0.444 | 0.448 | 0.452 | 0.456 | 0.460 | 0.464 |
| 193.0                                                                             | 0.409                   | 0.413 | 0.416 | 0.420 | 0.423 | 0.427 | 0.430 | 0.434 | 0.437 | 0.441 | 0.445 | 0.449 | 0.453 | 0.456 | 0.460 | 0.464 |
| 193.5                                                                             | 0.410                   | 0.413 | 0.417 | 0.420 | 0.423 | 0.427 | 0.431 | 0.434 | 0.438 | 0.442 | 0.445 | 0.449 | 0.453 | 0.457 | 0.461 | 0.465 |
| 194.0                                                                             | 0.410                   | 0.414 | 0.417 | 0.420 | 0.424 | 0.428 | 0.431 | 0.435 | 0.438 | 0.442 | 0.446 | 0.450 | 0.454 | 0.458 | 0.461 | 0.465 |
| 194.5                                                                             | 0.411                   | 0.414 | 0.417 | 0.421 | 0.424 | 0.428 | 0.432 | 0.435 | 0.439 | 0.443 | 0.446 | 0.450 | 0.454 | 0.458 | 0.462 | 0.466 |
| 195.0                                                                             | 0.411                   | 0.414 | 0.418 | 0.421 | 0.425 | 0.428 | 0.432 | 0.436 | 0.439 | 0.443 | 0.447 | 0.451 | 0.455 | 0.459 | 0.463 | 0.467 |
| 195.5                                                                             | 0.412                   | 0.415 | 0.418 | 0.422 | 0.425 | 0.429 | 0.433 | 0.436 | 0.440 | 0.444 | 0.447 | 0.451 | 0.455 | 0.459 | 0.463 | 0.467 |
| 196.0                                                                             | 0.412                   | 0.415 | 0.419 | 0.422 | 0.426 | 0.429 | 0.433 | 0.437 | 0.440 | 0.444 | 0.448 | 0.452 | 0.456 | 0.460 | 0.464 | 0.468 |
| 196.5                                                                             | 0.412                   | 0.416 | 0.419 | 0.423 | 0.426 | 0.430 | 0.434 | 0.437 | 0.441 | 0.445 | 0.448 | 0.452 | 0.456 | 0.460 | 0.464 | 0.468 |
| 197.0                                                                             | 0.413                   | 0.416 | 0.420 | 0.423 | 0.427 | 0.430 | 0.434 | 0.438 | 0.441 | 0.445 | 0.449 | 0.453 | 0.457 | 0.461 | 0.465 | 0.469 |
| 197.5                                                                             | 0.413                   | 0.417 | 0.420 | 0.424 | 0.427 | 0.431 | 0.434 | 0.438 | 0.442 | 0.446 | 0.450 | 0.453 | 0.457 | 0.461 | 0.465 | 0.469 |
| 198.0                                                                             | 0.414                   | 0.417 | 0.421 | 0.424 | 0.428 | 0.431 | 0.435 | 0.439 | 0.442 | 0.446 | 0.450 | 0.454 | 0.458 | 0.462 | 0.466 | 0.470 |
| 198.5                                                                             | 0.414                   | 0.418 | 0.421 | 0.425 | 0.428 | 0.432 | 0.435 | 0.439 | 0.443 | 0.447 | 0.451 | 0.454 | 0.458 | 0.462 | 0.466 | 0.470 |
| 199.0                                                                             | 0.415                   | 0.418 | 0.422 | 0.425 | 0.429 | 0.432 | 0.436 | 0.440 | 0.443 | 0.447 | 0.451 | 0.455 | 0.459 | 0.463 | 0.467 | 0.471 |
| 199.5                                                                             | 0.415                   | 0.419 | 0.422 | 0.426 | 0.429 | 0.433 | 0.436 | 0.440 | 0.444 | 0.448 | 0.452 | 0.456 | 0.459 | 0.463 | 0.468 | 0.472 |
| 200.0                                                                             | 0.416                   | 0.419 | 0.422 | 0.426 | 0.430 | 0.433 | 0.437 | 0.441 | 0.444 | 0.448 | 0.452 | 0.456 | 0.460 | 0.464 | 0.468 | 0.472 |

**COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000**

| TEMP<br>DEG F | API GRAVITY AT 60 DEG F |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|---------------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|               | 8.0                     | 8.5   | 9.0   | 9.5   | 10.0  | 10.5  | 11.0  | 11.5  | 12.0  | 12.5  | 13.0  | 13.5  | 14.0  | 14.5  | 15.0  | 15.5  |
| -20.0         | 0.281                   | 0.282 | 0.284 | 0.285 | 0.287 | 0.288 | 0.290 | 0.292 | 0.293 | 0.295 | 0.296 | 0.298 | 0.300 | 0.301 | 0.303 | 0.304 |
| -19.5         | 0.281                   | 0.283 | 0.284 | 0.286 | 0.287 | 0.289 | 0.290 | 0.292 | 0.293 | 0.295 | 0.297 | 0.298 | 0.300 | 0.302 | 0.303 | 0.305 |
| -19.0         | 0.282                   | 0.283 | 0.285 | 0.286 | 0.288 | 0.289 | 0.291 | 0.292 | 0.294 | 0.295 | 0.297 | 0.299 | 0.300 | 0.302 | 0.304 | 0.305 |
| -18.5         | 0.282                   | 0.283 | 0.285 | 0.286 | 0.288 | 0.290 | 0.291 | 0.293 | 0.294 | 0.296 | 0.297 | 0.299 | 0.301 | 0.302 | 0.304 | 0.306 |
| -18.0         | 0.282                   | 0.284 | 0.285 | 0.287 | 0.288 | 0.290 | 0.291 | 0.293 | 0.295 | 0.296 | 0.298 | 0.299 | 0.301 | 0.303 | 0.304 | 0.306 |
| -17.5         | 0.283                   | 0.284 | 0.286 | 0.287 | 0.289 | 0.290 | 0.292 | 0.293 | 0.295 | 0.297 | 0.298 | 0.300 | 0.301 | 0.303 | 0.305 | 0.307 |
| -17.0         | 0.283                   | 0.284 | 0.286 | 0.288 | 0.289 | 0.291 | 0.292 | 0.294 | 0.295 | 0.297 | 0.299 | 0.300 | 0.302 | 0.304 | 0.305 | 0.307 |
| -16.5         | 0.283                   | 0.285 | 0.286 | 0.288 | 0.289 | 0.291 | 0.293 | 0.294 | 0.296 | 0.297 | 0.299 | 0.301 | 0.302 | 0.304 | 0.306 | 0.307 |
| -16.0         | 0.284                   | 0.285 | 0.287 | 0.288 | 0.290 | 0.291 | 0.293 | 0.294 | 0.296 | 0.298 | 0.299 | 0.301 | 0.303 | 0.304 | 0.306 | 0.308 |
| -15.5         | 0.284                   | 0.286 | 0.287 | 0.289 | 0.290 | 0.292 | 0.293 | 0.295 | 0.296 | 0.298 | 0.300 | 0.301 | 0.303 | 0.305 | 0.306 | 0.308 |
| -15.0         | 0.284                   | 0.286 | 0.287 | 0.289 | 0.290 | 0.292 | 0.294 | 0.295 | 0.297 | 0.298 | 0.300 | 0.302 | 0.303 | 0.305 | 0.307 | 0.309 |
| -14.5         | 0.285                   | 0.286 | 0.288 | 0.289 | 0.291 | 0.292 | 0.294 | 0.296 | 0.297 | 0.299 | 0.300 | 0.302 | 0.304 | 0.306 | 0.307 | 0.309 |
| -14.0         | 0.285                   | 0.287 | 0.288 | 0.290 | 0.291 | 0.293 | 0.294 | 0.296 | 0.298 | 0.299 | 0.301 | 0.303 | 0.304 | 0.306 | 0.308 | 0.309 |
| -13.5         | 0.285                   | 0.287 | 0.288 | 0.290 | 0.292 | 0.293 | 0.295 | 0.296 | 0.298 | 0.300 | 0.301 | 0.303 | 0.305 | 0.306 | 0.308 | 0.310 |
| -13.0         | 0.286                   | 0.287 | 0.289 | 0.290 | 0.292 | 0.294 | 0.295 | 0.297 | 0.298 | 0.300 | 0.302 | 0.303 | 0.305 | 0.307 | 0.308 | 0.310 |
| -12.5         | 0.286                   | 0.288 | 0.289 | 0.291 | 0.292 | 0.294 | 0.295 | 0.297 | 0.299 | 0.300 | 0.302 | 0.304 | 0.305 | 0.307 | 0.309 | 0.311 |
| -12.0         | 0.286                   | 0.288 | 0.290 | 0.291 | 0.293 | 0.294 | 0.296 | 0.297 | 0.299 | 0.301 | 0.302 | 0.304 | 0.306 | 0.308 | 0.309 | 0.311 |
| -11.5         | 0.287                   | 0.288 | 0.290 | 0.291 | 0.293 | 0.295 | 0.296 | 0.298 | 0.299 | 0.301 | 0.303 | 0.305 | 0.306 | 0.308 | 0.310 | 0.311 |
| -11.0         | 0.287                   | 0.289 | 0.290 | 0.292 | 0.293 | 0.295 | 0.297 | 0.298 | 0.300 | 0.302 | 0.303 | 0.305 | 0.307 | 0.308 | 0.310 | 0.312 |
| -10.5         | 0.287                   | 0.289 | 0.291 | 0.292 | 0.294 | 0.295 | 0.297 | 0.299 | 0.300 | 0.302 | 0.304 | 0.305 | 0.307 | 0.309 | 0.310 | 0.312 |
| -10.0         | 0.288                   | 0.289 | 0.291 | 0.292 | 0.294 | 0.296 | 0.297 | 0.299 | 0.301 | 0.302 | 0.304 | 0.306 | 0.307 | 0.309 | 0.311 | 0.313 |
| -9.5          | 0.288                   | 0.290 | 0.291 | 0.293 | 0.294 | 0.296 | 0.298 | 0.299 | 0.301 | 0.303 | 0.304 | 0.306 | 0.308 | 0.310 | 0.311 | 0.313 |
| -9.0          | 0.288                   | 0.290 | 0.292 | 0.293 | 0.295 | 0.296 | 0.298 | 0.300 | 0.301 | 0.303 | 0.305 | 0.306 | 0.308 | 0.310 | 0.312 | 0.313 |
| -8.5          | 0.289                   | 0.290 | 0.292 | 0.294 | 0.295 | 0.297 | 0.298 | 0.300 | 0.302 | 0.303 | 0.305 | 0.307 | 0.309 | 0.310 | 0.312 | 0.314 |
| -8.0          | 0.289                   | 0.291 | 0.292 | 0.294 | 0.296 | 0.297 | 0.299 | 0.300 | 0.302 | 0.304 | 0.306 | 0.307 | 0.309 | 0.311 | 0.313 | 0.314 |
| -7.5          | 0.290                   | 0.291 | 0.293 | 0.294 | 0.296 | 0.298 | 0.299 | 0.301 | 0.303 | 0.304 | 0.306 | 0.308 | 0.309 | 0.311 | 0.313 | 0.315 |
| -7.0          | 0.290                   | 0.291 | 0.293 | 0.295 | 0.296 | 0.298 | 0.300 | 0.301 | 0.303 | 0.305 | 0.306 | 0.308 | 0.310 | 0.312 | 0.313 | 0.315 |
| -6.5          | 0.290                   | 0.292 | 0.293 | 0.295 | 0.297 | 0.298 | 0.300 | 0.302 | 0.303 | 0.305 | 0.307 | 0.308 | 0.310 | 0.312 | 0.314 | 0.316 |
| -6.0          | 0.291                   | 0.292 | 0.294 | 0.295 | 0.297 | 0.299 | 0.300 | 0.302 | 0.304 | 0.305 | 0.307 | 0.309 | 0.311 | 0.312 | 0.314 | 0.316 |
| -5.5          | 0.291                   | 0.293 | 0.294 | 0.296 | 0.297 | 0.299 | 0.301 | 0.302 | 0.304 | 0.306 | 0.308 | 0.309 | 0.311 | 0.313 | 0.315 | 0.316 |
| -5.0          | 0.291                   | 0.293 | 0.294 | 0.296 | 0.298 | 0.299 | 0.301 | 0.303 | 0.304 | 0.306 | 0.308 | 0.310 | 0.311 | 0.313 | 0.315 | 0.317 |
| -4.5          | 0.292                   | 0.293 | 0.295 | 0.296 | 0.298 | 0.300 | 0.301 | 0.303 | 0.305 | 0.307 | 0.308 | 0.310 | 0.312 | 0.314 | 0.315 | 0.317 |
| -4.0          | 0.292                   | 0.294 | 0.295 | 0.297 | 0.298 | 0.300 | 0.302 | 0.304 | 0.305 | 0.307 | 0.309 | 0.310 | 0.312 | 0.314 | 0.316 | 0.318 |
| -3.5          | 0.292                   | 0.294 | 0.296 | 0.297 | 0.299 | 0.301 | 0.302 | 0.304 | 0.306 | 0.307 | 0.309 | 0.311 | 0.313 | 0.314 | 0.316 | 0.318 |
| -3.0          | 0.293                   | 0.294 | 0.296 | 0.298 | 0.299 | 0.301 | 0.303 | 0.304 | 0.306 | 0.308 | 0.309 | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 |
| -2.5          | 0.293                   | 0.295 | 0.296 | 0.298 | 0.300 | 0.301 | 0.303 | 0.305 | 0.306 | 0.308 | 0.310 | 0.312 | 0.313 | 0.315 | 0.317 | 0.319 |
| -2.0          | 0.293                   | 0.295 | 0.297 | 0.298 | 0.300 | 0.302 | 0.303 | 0.305 | 0.307 | 0.309 | 0.310 | 0.312 | 0.314 | 0.316 | 0.318 | 0.319 |
| -1.5          | 0.294                   | 0.295 | 0.297 | 0.299 | 0.300 | 0.302 | 0.304 | 0.305 | 0.307 | 0.309 | 0.311 | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 |

| COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000 |                         |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|-----------------------------------------------------------------------------------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| TEMP<br>DEG F                                                                     | API GRAVITY AT 60 DEG F |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|                                                                                   | 8.0                     | 8.5   | 9.0   | 9.5   | 10.0  | 10.5  | 11.0  | 11.5  | 12.0  | 12.5  | 13.0  | 13.5  | 14.0  | 14.5  | 15.0  | 15.5  |
| -1.0                                                                              | 0.294                   | 0.296 | 0.297 | 0.299 | 0.301 | 0.302 | 0.304 | 0.306 | 0.308 | 0.309 | 0.311 | 0.313 | 0.315 | 0.317 | 0.318 | 0.320 |
| -0.5                                                                              | 0.294                   | 0.296 | 0.298 | 0.299 | 0.301 | 0.303 | 0.304 | 0.306 | 0.308 | 0.310 | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 |
| 0.0                                                                               | 0.295                   | 0.296 | 0.298 | 0.300 | 0.301 | 0.303 | 0.305 | 0.307 | 0.308 | 0.310 | 0.312 | 0.314 | 0.315 | 0.317 | 0.319 | 0.321 |
| 0.5                                                                               | 0.295                   | 0.297 | 0.298 | 0.300 | 0.302 | 0.304 | 0.305 | 0.307 | 0.309 | 0.310 | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.321 |
| 1.0                                                                               | 0.295                   | 0.297 | 0.299 | 0.300 | 0.302 | 0.304 | 0.306 | 0.307 | 0.309 | 0.311 | 0.313 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 |
| 1.5                                                                               | 0.296                   | 0.297 | 0.299 | 0.301 | 0.303 | 0.304 | 0.306 | 0.308 | 0.310 | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 | 0.320 | 0.322 |
| 2.0                                                                               | 0.296                   | 0.298 | 0.300 | 0.301 | 0.303 | 0.305 | 0.306 | 0.308 | 0.310 | 0.312 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 |
| 2.5                                                                               | 0.297                   | 0.298 | 0.300 | 0.302 | 0.303 | 0.305 | 0.307 | 0.309 | 0.310 | 0.312 | 0.314 | 0.316 | 0.318 | 0.319 | 0.321 | 0.323 |
| 3.0                                                                               | 0.297                   | 0.299 | 0.300 | 0.302 | 0.304 | 0.305 | 0.307 | 0.309 | 0.311 | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 |
| 3.5                                                                               | 0.297                   | 0.299 | 0.301 | 0.302 | 0.304 | 0.306 | 0.308 | 0.309 | 0.311 | 0.313 | 0.315 | 0.317 | 0.318 | 0.320 | 0.322 | 0.324 |
| 4.0                                                                               | 0.298                   | 0.299 | 0.301 | 0.303 | 0.304 | 0.306 | 0.308 | 0.310 | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.324 |
| 4.5                                                                               | 0.298                   | 0.300 | 0.301 | 0.303 | 0.305 | 0.307 | 0.308 | 0.310 | 0.312 | 0.314 | 0.316 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 |
| 5.0                                                                               | 0.298                   | 0.300 | 0.302 | 0.303 | 0.305 | 0.307 | 0.309 | 0.310 | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.323 | 0.325 |
| 5.5                                                                               | 0.299                   | 0.300 | 0.302 | 0.304 | 0.306 | 0.307 | 0.309 | 0.311 | 0.313 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 |
| 6.0                                                                               | 0.299                   | 0.301 | 0.302 | 0.304 | 0.306 | 0.308 | 0.309 | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 | 0.320 | 0.322 | 0.324 | 0.326 |
| 6.5                                                                               | 0.299                   | 0.301 | 0.303 | 0.305 | 0.306 | 0.308 | 0.310 | 0.312 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 |
| 7.0                                                                               | 0.300                   | 0.301 | 0.303 | 0.305 | 0.307 | 0.308 | 0.310 | 0.312 | 0.314 | 0.316 | 0.318 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 |
| 7.5                                                                               | 0.300                   | 0.302 | 0.304 | 0.305 | 0.307 | 0.309 | 0.311 | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.327 |
| 8.0                                                                               | 0.300                   | 0.302 | 0.304 | 0.306 | 0.307 | 0.309 | 0.311 | 0.313 | 0.315 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 |
| 8.5                                                                               | 0.301                   | 0.303 | 0.304 | 0.306 | 0.308 | 0.310 | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.324 | 0.326 | 0.328 |
| 9.0                                                                               | 0.301                   | 0.303 | 0.305 | 0.306 | 0.308 | 0.310 | 0.312 | 0.314 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 |
| 9.5                                                                               | 0.302                   | 0.303 | 0.305 | 0.307 | 0.309 | 0.310 | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 |
| 10.0                                                                              | 0.302                   | 0.304 | 0.305 | 0.307 | 0.309 | 0.311 | 0.313 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 |
| 10.5                                                                              | 0.302                   | 0.304 | 0.306 | 0.308 | 0.309 | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 |
| 11.0                                                                              | 0.303                   | 0.304 | 0.306 | 0.308 | 0.310 | 0.312 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 |
| 11.5                                                                              | 0.303                   | 0.305 | 0.307 | 0.308 | 0.310 | 0.312 | 0.314 | 0.316 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 |
| 12.0                                                                              | 0.303                   | 0.305 | 0.307 | 0.309 | 0.310 | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.325 | 0.327 | 0.329 | 0.331 |
| 12.5                                                                              | 0.304                   | 0.306 | 0.307 | 0.309 | 0.311 | 0.313 | 0.315 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 |
| 13.0                                                                              | 0.304                   | 0.306 | 0.308 | 0.309 | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 |
| 13.5                                                                              | 0.304                   | 0.306 | 0.308 | 0.310 | 0.312 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 |
| 14.0                                                                              | 0.305                   | 0.307 | 0.308 | 0.310 | 0.312 | 0.314 | 0.316 | 0.318 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 |
| 14.5                                                                              | 0.305                   | 0.307 | 0.309 | 0.311 | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 |
| 15.0                                                                              | 0.306                   | 0.307 | 0.309 | 0.311 | 0.313 | 0.315 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 |
| 15.5                                                                              | 0.306                   | 0.308 | 0.310 | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.326 | 0.328 | 0.330 | 0.332 | 0.335 |
| 16.0                                                                              | 0.306                   | 0.308 | 0.310 | 0.312 | 0.314 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 |
| 16.5                                                                              | 0.307                   | 0.308 | 0.310 | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 |
| 17.0                                                                              | 0.307                   | 0.309 | 0.311 | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 |
| 17.5                                                                              | 0.307                   | 0.309 | 0.311 | 0.313 | 0.315 | 0.317 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 |

COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000

| TEMP<br>DEG F | API GRAVITY AT 60 DEG F |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|---------------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|               | 8.0                     | 8.5   | 9.0   | 9.5   | 10.0  | 10.5  | 11.0  | 11.5  | 12.0  | 12.5  | 13.0  | 13.5  | 14.0  | 14.5  | 15.0  | 15.5  |
| 18.0          | 0.308                   | 0.310 | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 |
| 18.5          | 0.308                   | 0.310 | 0.312 | 0.314 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 |
| 19.0          | 0.309                   | 0.310 | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.336 | 0.338 |
| 19.5          | 0.309                   | 0.311 | 0.313 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 |
| 20.0          | 0.309                   | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.339 |
| 20.5          | 0.310                   | 0.311 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 |
| 21.0          | 0.310                   | 0.312 | 0.314 | 0.316 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 |
| 21.5          | 0.310                   | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 |
| 22.0          | 0.311                   | 0.313 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 |
| 22.5          | 0.311                   | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.337 | 0.339 | 0.341 |
| 23.0          | 0.312                   | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 |
| 23.5          | 0.312                   | 0.314 | 0.316 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.340 | 0.342 |
| 24.0          | 0.312                   | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 |
| 24.5          | 0.313                   | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.343 |
| 25.0          | 0.313                   | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.324 | 0.326 | 0.328 | 0.330 | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 | 0.343 |
| 25.5          | 0.313                   | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 | 0.343 |
| 26.0          | 0.314                   | 0.316 | 0.318 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.338 | 0.340 | 0.342 | 0.344 |
| 26.5          | 0.314                   | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.344 |
| 27.0          | 0.315                   | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.341 | 0.343 | 0.345 |
| 27.5          | 0.315                   | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 | 0.343 | 0.345 |
| 28.0          | 0.315                   | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 | 0.344 | 0.346 |
| 28.5          | 0.316                   | 0.318 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.336 | 0.338 | 0.340 | 0.342 | 0.344 | 0.346 |
| 29.0          | 0.316                   | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.345 | 0.347 |
| 29.5          | 0.316                   | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.339 | 0.341 | 0.343 | 0.345 | 0.347 |
| 30.0          | 0.317                   | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 | 0.343 | 0.345 | 0.348 |
| 30.5          | 0.317                   | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.342 | 0.344 | 0.346 | 0.348 |
| 31.0          | 0.318                   | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.344 | 0.346 | 0.349 |
| 31.5          | 0.318                   | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.345 | 0.347 | 0.349 |
| 32.0          | 0.318                   | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.339 | 0.341 | 0.343 | 0.345 | 0.347 | 0.349 |
| 32.5          | 0.319                   | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 | 0.343 | 0.345 | 0.348 | 0.350 |
| 33.0          | 0.319                   | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.342 | 0.344 | 0.346 | 0.348 | 0.350 |
| 33.5          | 0.319                   | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.344 | 0.346 | 0.349 | 0.351 |
| 34.0          | 0.320                   | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.345 | 0.347 | 0.349 | 0.351 |
| 34.5          | 0.320                   | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.339 | 0.341 | 0.343 | 0.345 | 0.347 | 0.350 | 0.352 |
| 35.0          | 0.321                   | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 | 0.343 | 0.346 | 0.348 | 0.350 | 0.352 |
| 35.5          | 0.321                   | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.342 | 0.344 | 0.346 | 0.348 | 0.350 | 0.353 |
| 36.0          | 0.321                   | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.344 | 0.346 | 0.349 | 0.351 | 0.353 |
| 36.5          | 0.322                   | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.345 | 0.347 | 0.349 | 0.351 | 0.354 |

**COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000**  
**API GRAVITY AT 60 DEG F**

| TEMP<br>DEG F | 8.0   | 8.5   | 9.0   | 9.5   | 10.0  | 10.5  | 11.0  | 11.5  | 12.0  | 12.5  | 13.0  | 13.5  | 14.0  | 14.5  | 15.0  | 15.5  |
|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 37.0          | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.339 | 0.341 | 0.343 | 0.345 | 0.347 | 0.350 | 0.352 | 0.354 |
| 37.5          | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 | 0.343 | 0.346 | 0.348 | 0.350 | 0.352 | 0.355 |
| 38.0          | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.342 | 0.344 | 0.346 | 0.348 | 0.350 | 0.353 | 0.355 |
| 38.5          | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.344 | 0.346 | 0.349 | 0.351 | 0.353 | 0.356 |
| 39.0          | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.345 | 0.347 | 0.349 | 0.351 | 0.354 | 0.356 |
| 39.5          | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.339 | 0.341 | 0.343 | 0.345 | 0.347 | 0.350 | 0.352 | 0.354 | 0.356 |
| 40.0          | 0.324 | 0.326 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 | 0.343 | 0.346 | 0.348 | 0.350 | 0.352 | 0.355 | 0.357 |
| 40.5          | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.342 | 0.344 | 0.346 | 0.348 | 0.351 | 0.353 | 0.355 | 0.357 |
| 41.0          | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.336 | 0.338 | 0.340 | 0.342 | 0.344 | 0.346 | 0.349 | 0.351 | 0.353 | 0.356 | 0.358 |
| 41.5          | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.345 | 0.347 | 0.349 | 0.351 | 0.354 | 0.356 | 0.358 |
| 42.0          | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.339 | 0.341 | 0.343 | 0.345 | 0.347 | 0.350 | 0.352 | 0.354 | 0.357 | 0.359 |
| 42.5          | 0.326 | 0.328 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 | 0.343 | 0.346 | 0.348 | 0.350 | 0.352 | 0.355 | 0.357 | 0.359 |
| 43.0          | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.342 | 0.344 | 0.346 | 0.348 | 0.351 | 0.353 | 0.355 | 0.357 | 0.360 |
| 43.5          | 0.327 | 0.329 | 0.331 | 0.333 | 0.336 | 0.338 | 0.340 | 0.342 | 0.344 | 0.346 | 0.349 | 0.351 | 0.353 | 0.356 | 0.358 | 0.360 |
| 44.0          | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.345 | 0.347 | 0.349 | 0.351 | 0.354 | 0.356 | 0.358 | 0.361 |
| 44.5          | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.339 | 0.341 | 0.343 | 0.345 | 0.347 | 0.350 | 0.352 | 0.354 | 0.357 | 0.359 | 0.361 |
| 45.0          | 0.328 | 0.330 | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 | 0.343 | 0.346 | 0.348 | 0.350 | 0.352 | 0.355 | 0.357 | 0.359 | 0.362 |
| 45.5          | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.342 | 0.344 | 0.346 | 0.348 | 0.350 | 0.353 | 0.355 | 0.357 | 0.360 | 0.362 |
| 46.0          | 0.329 | 0.331 | 0.333 | 0.335 | 0.338 | 0.340 | 0.342 | 0.344 | 0.346 | 0.349 | 0.351 | 0.353 | 0.356 | 0.358 | 0.360 | 0.363 |
| 46.5          | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.345 | 0.347 | 0.349 | 0.351 | 0.354 | 0.356 | 0.358 | 0.361 | 0.363 |
| 47.0          | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.341 | 0.343 | 0.345 | 0.347 | 0.350 | 0.352 | 0.354 | 0.356 | 0.359 | 0.361 | 0.364 |
| 47.5          | 0.330 | 0.332 | 0.335 | 0.337 | 0.339 | 0.341 | 0.343 | 0.345 | 0.348 | 0.350 | 0.352 | 0.355 | 0.357 | 0.359 | 0.362 | 0.364 |
| 48.0          | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 | 0.344 | 0.346 | 0.348 | 0.350 | 0.353 | 0.355 | 0.357 | 0.360 | 0.362 | 0.365 |
| 48.5          | 0.331 | 0.333 | 0.335 | 0.338 | 0.340 | 0.342 | 0.344 | 0.346 | 0.349 | 0.351 | 0.353 | 0.356 | 0.358 | 0.360 | 0.363 | 0.365 |
| 49.0          | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.345 | 0.347 | 0.349 | 0.351 | 0.354 | 0.356 | 0.358 | 0.361 | 0.363 | 0.366 |
| 49.5          | 0.332 | 0.334 | 0.336 | 0.338 | 0.341 | 0.343 | 0.345 | 0.347 | 0.349 | 0.352 | 0.354 | 0.356 | 0.359 | 0.361 | 0.364 | 0.366 |
| 50.0          | 0.332 | 0.334 | 0.337 | 0.339 | 0.341 | 0.343 | 0.345 | 0.348 | 0.350 | 0.352 | 0.355 | 0.357 | 0.359 | 0.362 | 0.364 | 0.367 |
| 50.5          | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 | 0.344 | 0.346 | 0.348 | 0.350 | 0.353 | 0.355 | 0.357 | 0.360 | 0.362 | 0.365 | 0.367 |
| 51.0          | 0.333 | 0.335 | 0.337 | 0.340 | 0.342 | 0.344 | 0.346 | 0.349 | 0.351 | 0.353 | 0.355 | 0.358 | 0.360 | 0.363 | 0.365 | 0.368 |
| 51.5          | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.344 | 0.347 | 0.349 | 0.351 | 0.354 | 0.356 | 0.358 | 0.361 | 0.363 | 0.366 | 0.368 |
| 52.0          | 0.334 | 0.336 | 0.338 | 0.340 | 0.343 | 0.345 | 0.347 | 0.349 | 0.352 | 0.354 | 0.356 | 0.359 | 0.361 | 0.364 | 0.366 | 0.368 |
| 52.5          | 0.334 | 0.337 | 0.339 | 0.341 | 0.343 | 0.345 | 0.348 | 0.350 | 0.352 | 0.354 | 0.357 | 0.359 | 0.362 | 0.364 | 0.366 | 0.369 |
| 53.0          | 0.335 | 0.337 | 0.339 | 0.341 | 0.344 | 0.346 | 0.348 | 0.350 | 0.353 | 0.355 | 0.357 | 0.360 | 0.362 | 0.365 | 0.367 | 0.369 |
| 53.5          | 0.335 | 0.337 | 0.339 | 0.342 | 0.344 | 0.346 | 0.348 | 0.351 | 0.353 | 0.355 | 0.358 | 0.360 | 0.363 | 0.365 | 0.367 | 0.370 |
| 54.0          | 0.336 | 0.338 | 0.340 | 0.342 | 0.344 | 0.347 | 0.349 | 0.351 | 0.354 | 0.356 | 0.358 | 0.361 | 0.363 | 0.365 | 0.368 | 0.370 |
| 54.5          | 0.336 | 0.338 | 0.340 | 0.343 | 0.345 | 0.347 | 0.349 | 0.352 | 0.354 | 0.356 | 0.359 | 0.361 | 0.363 | 0.366 | 0.368 | 0.371 |
| 55.0          | 0.336 | 0.339 | 0.341 | 0.343 | 0.345 | 0.347 | 0.350 | 0.352 | 0.354 | 0.357 | 0.359 | 0.362 | 0.364 | 0.366 | 0.369 | 0.371 |
| 55.5          | 0.337 | 0.339 | 0.341 | 0.343 | 0.346 | 0.348 | 0.350 | 0.353 | 0.355 | 0.357 | 0.360 | 0.362 | 0.364 | 0.367 | 0.369 | 0.372 |

| COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000 |                         |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|-----------------------------------------------------------------------------------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| TEMP                                                                              | API GRAVITY AT 60 DEG F |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| DEG F                                                                             | 8.0                     | 8.5   | 9.0   | 9.5   | 10.0  | 10.5  | 11.0  | 11.5  | 12.0  | 12.5  | 13.0  | 13.5  | 14.0  | 14.5  | 15.0  | 15.5  |
| 56.0                                                                              | 0.337                   | 0.339 | 0.342 | 0.344 | 0.346 | 0.348 | 0.351 | 0.353 | 0.355 | 0.358 | 0.360 | 0.362 | 0.365 | 0.367 | 0.370 | 0.372 |
| 56.5                                                                              | 0.338                   | 0.340 | 0.342 | 0.344 | 0.346 | 0.349 | 0.351 | 0.353 | 0.356 | 0.358 | 0.361 | 0.363 | 0.365 | 0.368 | 0.370 | 0.373 |
| 57.0                                                                              | 0.338                   | 0.340 | 0.342 | 0.345 | 0.347 | 0.349 | 0.352 | 0.354 | 0.356 | 0.359 | 0.361 | 0.363 | 0.366 | 0.368 | 0.371 | 0.373 |
| 57.5                                                                              | 0.338                   | 0.341 | 0.343 | 0.345 | 0.347 | 0.350 | 0.352 | 0.354 | 0.357 | 0.359 | 0.361 | 0.364 | 0.366 | 0.369 | 0.371 | 0.374 |
| 58.0                                                                              | 0.339                   | 0.341 | 0.343 | 0.345 | 0.348 | 0.350 | 0.352 | 0.355 | 0.357 | 0.359 | 0.362 | 0.364 | 0.367 | 0.369 | 0.372 | 0.374 |
| 58.5                                                                              | 0.339                   | 0.341 | 0.344 | 0.346 | 0.348 | 0.350 | 0.353 | 0.355 | 0.358 | 0.360 | 0.362 | 0.365 | 0.367 | 0.370 | 0.372 | 0.375 |
| 59.0                                                                              | 0.340                   | 0.342 | 0.344 | 0.346 | 0.349 | 0.351 | 0.353 | 0.356 | 0.358 | 0.360 | 0.363 | 0.365 | 0.368 | 0.370 | 0.373 | 0.375 |
| 59.5                                                                              | 0.340                   | 0.342 | 0.344 | 0.347 | 0.349 | 0.351 | 0.354 | 0.356 | 0.358 | 0.361 | 0.363 | 0.366 | 0.368 | 0.371 | 0.373 | 0.376 |
| 60.0                                                                              | 0.340                   | 0.343 | 0.345 | 0.347 | 0.349 | 0.352 | 0.354 | 0.357 | 0.359 | 0.361 | 0.364 | 0.366 | 0.369 | 0.371 | 0.374 | 0.376 |
| 60.5                                                                              | 0.341                   | 0.343 | 0.345 | 0.348 | 0.350 | 0.352 | 0.355 | 0.357 | 0.359 | 0.362 | 0.364 | 0.367 | 0.369 | 0.372 | 0.374 | 0.377 |
| 61.0                                                                              | 0.341                   | 0.343 | 0.346 | 0.348 | 0.350 | 0.353 | 0.355 | 0.357 | 0.360 | 0.362 | 0.365 | 0.367 | 0.370 | 0.372 | 0.375 | 0.377 |
| 61.5                                                                              | 0.342                   | 0.344 | 0.346 | 0.348 | 0.351 | 0.353 | 0.355 | 0.358 | 0.360 | 0.363 | 0.365 | 0.368 | 0.370 | 0.373 | 0.375 | 0.378 |
| 62.0                                                                              | 0.342                   | 0.344 | 0.347 | 0.349 | 0.351 | 0.354 | 0.356 | 0.358 | 0.361 | 0.363 | 0.366 | 0.368 | 0.371 | 0.373 | 0.376 | 0.378 |
| 62.5                                                                              | 0.342                   | 0.345 | 0.347 | 0.349 | 0.352 | 0.354 | 0.356 | 0.359 | 0.361 | 0.364 | 0.366 | 0.369 | 0.371 | 0.374 | 0.376 | 0.379 |
| 63.0                                                                              | 0.343                   | 0.345 | 0.347 | 0.350 | 0.352 | 0.354 | 0.357 | 0.359 | 0.362 | 0.364 | 0.367 | 0.369 | 0.372 | 0.374 | 0.377 | 0.379 |
| 63.5                                                                              | 0.343                   | 0.346 | 0.348 | 0.350 | 0.353 | 0.355 | 0.357 | 0.360 | 0.362 | 0.365 | 0.367 | 0.370 | 0.372 | 0.375 | 0.377 | 0.380 |
| 64.0                                                                              | 0.344                   | 0.346 | 0.348 | 0.351 | 0.353 | 0.355 | 0.358 | 0.360 | 0.363 | 0.365 | 0.368 | 0.370 | 0.373 | 0.375 | 0.378 | 0.380 |
| 64.5                                                                              | 0.344                   | 0.346 | 0.349 | 0.351 | 0.353 | 0.356 | 0.358 | 0.361 | 0.363 | 0.365 | 0.368 | 0.371 | 0.373 | 0.376 | 0.378 | 0.381 |
| 65.0                                                                              | 0.345                   | 0.347 | 0.349 | 0.351 | 0.354 | 0.356 | 0.359 | 0.361 | 0.363 | 0.366 | 0.368 | 0.371 | 0.374 | 0.376 | 0.379 | 0.381 |
| 65.5                                                                              | 0.345                   | 0.347 | 0.350 | 0.352 | 0.354 | 0.357 | 0.359 | 0.361 | 0.364 | 0.366 | 0.369 | 0.371 | 0.374 | 0.377 | 0.379 | 0.382 |
| 66.0                                                                              | 0.345                   | 0.348 | 0.350 | 0.352 | 0.355 | 0.357 | 0.359 | 0.362 | 0.364 | 0.367 | 0.369 | 0.372 | 0.375 | 0.377 | 0.380 | 0.382 |
| 66.5                                                                              | 0.346                   | 0.348 | 0.350 | 0.353 | 0.355 | 0.358 | 0.360 | 0.362 | 0.365 | 0.367 | 0.370 | 0.372 | 0.375 | 0.378 | 0.380 | 0.383 |
| 67.0                                                                              | 0.346                   | 0.349 | 0.351 | 0.353 | 0.356 | 0.358 | 0.360 | 0.363 | 0.365 | 0.368 | 0.370 | 0.373 | 0.375 | 0.378 | 0.381 | 0.383 |
| 67.5                                                                              | 0.347                   | 0.349 | 0.351 | 0.354 | 0.356 | 0.358 | 0.361 | 0.363 | 0.366 | 0.368 | 0.371 | 0.373 | 0.376 | 0.379 | 0.381 | 0.384 |
| 68.0                                                                              | 0.347                   | 0.349 | 0.352 | 0.354 | 0.356 | 0.359 | 0.361 | 0.364 | 0.366 | 0.369 | 0.371 | 0.374 | 0.376 | 0.379 | 0.382 | 0.384 |
| 68.5                                                                              | 0.347                   | 0.350 | 0.352 | 0.354 | 0.357 | 0.359 | 0.362 | 0.364 | 0.367 | 0.369 | 0.372 | 0.374 | 0.377 | 0.380 | 0.382 | 0.385 |
| 69.0                                                                              | 0.348                   | 0.350 | 0.353 | 0.355 | 0.357 | 0.360 | 0.362 | 0.365 | 0.367 | 0.370 | 0.372 | 0.375 | 0.377 | 0.380 | 0.383 | 0.385 |
| 69.5                                                                              | 0.348                   | 0.351 | 0.353 | 0.355 | 0.358 | 0.360 | 0.363 | 0.365 | 0.368 | 0.370 | 0.373 | 0.375 | 0.378 | 0.381 | 0.383 | 0.386 |
| 70.0                                                                              | 0.349                   | 0.351 | 0.353 | 0.356 | 0.358 | 0.361 | 0.363 | 0.366 | 0.368 | 0.371 | 0.373 | 0.376 | 0.378 | 0.381 | 0.384 | 0.386 |
| 70.5                                                                              | 0.349                   | 0.351 | 0.354 | 0.356 | 0.359 | 0.361 | 0.364 | 0.366 | 0.369 | 0.371 | 0.374 | 0.376 | 0.379 | 0.382 | 0.384 | 0.387 |
| 71.0                                                                              | 0.350                   | 0.352 | 0.354 | 0.357 | 0.359 | 0.362 | 0.364 | 0.367 | 0.369 | 0.372 | 0.374 | 0.377 | 0.379 | 0.382 | 0.385 | 0.387 |
| 71.5                                                                              | 0.350                   | 0.352 | 0.355 | 0.357 | 0.360 | 0.362 | 0.364 | 0.367 | 0.370 | 0.372 | 0.375 | 0.377 | 0.380 | 0.383 | 0.385 | 0.388 |
| 72.0                                                                              | 0.350                   | 0.353 | 0.355 | 0.358 | 0.360 | 0.362 | 0.365 | 0.367 | 0.370 | 0.373 | 0.375 | 0.378 | 0.380 | 0.383 | 0.386 | 0.389 |
| 72.5                                                                              | 0.351                   | 0.353 | 0.356 | 0.358 | 0.360 | 0.363 | 0.365 | 0.368 | 0.370 | 0.373 | 0.376 | 0.378 | 0.381 | 0.384 | 0.386 | 0.389 |
| 73.0                                                                              | 0.351                   | 0.354 | 0.356 | 0.358 | 0.361 | 0.363 | 0.366 | 0.368 | 0.371 | 0.373 | 0.376 | 0.379 | 0.381 | 0.384 | 0.387 | 0.390 |
| 73.5                                                                              | 0.352                   | 0.354 | 0.356 | 0.359 | 0.361 | 0.364 | 0.366 | 0.369 | 0.371 | 0.374 | 0.377 | 0.379 | 0.382 | 0.385 | 0.387 | 0.390 |
| 74.0                                                                              | 0.352                   | 0.354 | 0.357 | 0.359 | 0.362 | 0.364 | 0.367 | 0.369 | 0.372 | 0.374 | 0.377 | 0.380 | 0.382 | 0.385 | 0.388 | 0.391 |
| 74.5                                                                              | 0.352                   | 0.355 | 0.357 | 0.360 | 0.362 | 0.365 | 0.367 | 0.370 | 0.372 | 0.375 | 0.378 | 0.380 | 0.383 | 0.386 | 0.388 | 0.391 |

| COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000 |                         |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|-----------------------------------------------------------------------------------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| TEMP                                                                              | API GRAVITY AT 60 DEG F |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| DEG F                                                                             | 8.0                     | 8.5   | 9.0   | 9.5   | 10.0  | 10.5  | 11.0  | 11.5  | 12.0  | 12.5  | 13.0  | 13.5  | 14.0  | 14.5  | 15.0  | 15.5  |
| 75.0                                                                              | 0.353                   | 0.355 | 0.358 | 0.360 | 0.363 | 0.365 | 0.368 | 0.370 | 0.373 | 0.375 | 0.378 | 0.381 | 0.383 | 0.386 | 0.389 | 0.392 |
| 75.5                                                                              | 0.353                   | 0.356 | 0.358 | 0.361 | 0.363 | 0.366 | 0.368 | 0.371 | 0.373 | 0.376 | 0.379 | 0.381 | 0.384 | 0.387 | 0.389 | 0.392 |
| 76.0                                                                              | 0.354                   | 0.356 | 0.359 | 0.361 | 0.364 | 0.366 | 0.369 | 0.371 | 0.374 | 0.376 | 0.379 | 0.382 | 0.384 | 0.387 | 0.390 | 0.393 |
| 76.5                                                                              | 0.354                   | 0.357 | 0.359 | 0.361 | 0.364 | 0.367 | 0.369 | 0.372 | 0.374 | 0.377 | 0.379 | 0.382 | 0.385 | 0.388 | 0.390 | 0.393 |
| 77.0                                                                              | 0.355                   | 0.357 | 0.359 | 0.362 | 0.364 | 0.367 | 0.370 | 0.372 | 0.375 | 0.377 | 0.380 | 0.383 | 0.385 | 0.388 | 0.391 | 0.394 |
| 77.5                                                                              | 0.355                   | 0.357 | 0.360 | 0.362 | 0.365 | 0.367 | 0.370 | 0.373 | 0.375 | 0.378 | 0.380 | 0.383 | 0.386 | 0.389 | 0.391 | 0.394 |
| 78.0                                                                              | 0.355                   | 0.358 | 0.360 | 0.363 | 0.365 | 0.368 | 0.370 | 0.373 | 0.376 | 0.378 | 0.381 | 0.384 | 0.386 | 0.389 | 0.392 | 0.395 |
| 78.5                                                                              | 0.356                   | 0.358 | 0.361 | 0.363 | 0.366 | 0.368 | 0.371 | 0.373 | 0.376 | 0.379 | 0.381 | 0.384 | 0.387 | 0.390 | 0.392 | 0.395 |
| 79.0                                                                              | 0.356                   | 0.359 | 0.361 | 0.364 | 0.366 | 0.369 | 0.371 | 0.374 | 0.377 | 0.379 | 0.382 | 0.385 | 0.387 | 0.390 | 0.393 | 0.396 |
| 79.5                                                                              | 0.357                   | 0.359 | 0.362 | 0.364 | 0.367 | 0.369 | 0.372 | 0.374 | 0.377 | 0.380 | 0.382 | 0.385 | 0.388 | 0.391 | 0.393 | 0.396 |
| 80.0                                                                              | 0.357                   | 0.360 | 0.362 | 0.365 | 0.367 | 0.370 | 0.372 | 0.375 | 0.378 | 0.380 | 0.383 | 0.386 | 0.388 | 0.391 | 0.394 | 0.397 |
| 80.5                                                                              | 0.358                   | 0.360 | 0.363 | 0.365 | 0.368 | 0.370 | 0.373 | 0.375 | 0.378 | 0.381 | 0.383 | 0.386 | 0.389 | 0.392 | 0.395 | 0.397 |
| 81.0                                                                              | 0.358                   | 0.360 | 0.363 | 0.365 | 0.368 | 0.371 | 0.373 | 0.376 | 0.379 | 0.381 | 0.384 | 0.387 | 0.389 | 0.392 | 0.395 | 0.398 |
| 81.5                                                                              | 0.358                   | 0.361 | 0.363 | 0.366 | 0.369 | 0.371 | 0.374 | 0.376 | 0.379 | 0.382 | 0.384 | 0.387 | 0.390 | 0.393 | 0.396 | 0.398 |
| 82.0                                                                              | 0.359                   | 0.361 | 0.364 | 0.366 | 0.369 | 0.372 | 0.374 | 0.377 | 0.379 | 0.382 | 0.385 | 0.388 | 0.390 | 0.393 | 0.396 | 0.399 |
| 82.5                                                                              | 0.359                   | 0.362 | 0.364 | 0.367 | 0.369 | 0.372 | 0.375 | 0.377 | 0.380 | 0.383 | 0.385 | 0.388 | 0.391 | 0.394 | 0.397 | 0.399 |
| 83.0                                                                              | 0.360                   | 0.362 | 0.365 | 0.367 | 0.370 | 0.372 | 0.375 | 0.378 | 0.380 | 0.383 | 0.386 | 0.389 | 0.391 | 0.394 | 0.397 | 0.400 |
| 83.5                                                                              | 0.360                   | 0.363 | 0.365 | 0.368 | 0.370 | 0.373 | 0.376 | 0.378 | 0.381 | 0.384 | 0.386 | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 |
| 84.0                                                                              | 0.361                   | 0.363 | 0.366 | 0.368 | 0.371 | 0.373 | 0.376 | 0.379 | 0.381 | 0.384 | 0.387 | 0.390 | 0.392 | 0.395 | 0.398 | 0.401 |
| 84.5                                                                              | 0.361                   | 0.364 | 0.366 | 0.369 | 0.371 | 0.374 | 0.376 | 0.379 | 0.382 | 0.385 | 0.387 | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 |
| 85.0                                                                              | 0.361                   | 0.364 | 0.367 | 0.369 | 0.372 | 0.374 | 0.377 | 0.380 | 0.382 | 0.385 | 0.388 | 0.391 | 0.393 | 0.396 | 0.399 | 0.402 |
| 85.5                                                                              | 0.362                   | 0.364 | 0.367 | 0.370 | 0.372 | 0.375 | 0.377 | 0.380 | 0.383 | 0.386 | 0.388 | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 |
| 86.0                                                                              | 0.362                   | 0.365 | 0.367 | 0.370 | 0.373 | 0.375 | 0.378 | 0.381 | 0.383 | 0.386 | 0.389 | 0.392 | 0.395 | 0.397 | 0.400 | 0.403 |
| 86.5                                                                              | 0.363                   | 0.365 | 0.368 | 0.370 | 0.373 | 0.376 | 0.378 | 0.381 | 0.384 | 0.387 | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 |
| 87.0                                                                              | 0.363                   | 0.366 | 0.368 | 0.371 | 0.374 | 0.376 | 0.379 | 0.382 | 0.384 | 0.387 | 0.390 | 0.393 | 0.396 | 0.398 | 0.401 | 0.404 |
| 87.5                                                                              | 0.364                   | 0.366 | 0.369 | 0.371 | 0.374 | 0.377 | 0.379 | 0.382 | 0.385 | 0.388 | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 |
| 88.0                                                                              | 0.364                   | 0.367 | 0.369 | 0.372 | 0.374 | 0.377 | 0.380 | 0.383 | 0.385 | 0.388 | 0.391 | 0.394 | 0.397 | 0.399 | 0.402 | 0.405 |
| 88.5                                                                              | 0.365                   | 0.367 | 0.370 | 0.372 | 0.375 | 0.378 | 0.380 | 0.383 | 0.386 | 0.389 | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 |
| 89.0                                                                              | 0.365                   | 0.368 | 0.370 | 0.373 | 0.375 | 0.378 | 0.381 | 0.383 | 0.386 | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 | 0.403 | 0.406 |
| 89.5                                                                              | 0.365                   | 0.368 | 0.371 | 0.373 | 0.376 | 0.379 | 0.381 | 0.384 | 0.387 | 0.390 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.407 |
| 90.0                                                                              | 0.366                   | 0.368 | 0.371 | 0.374 | 0.376 | 0.379 | 0.382 | 0.384 | 0.387 | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 |
| 90.5                                                                              | 0.366                   | 0.369 | 0.371 | 0.374 | 0.377 | 0.379 | 0.382 | 0.385 | 0.388 | 0.391 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 |
| 91.0                                                                              | 0.367                   | 0.369 | 0.372 | 0.375 | 0.377 | 0.380 | 0.383 | 0.385 | 0.388 | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 |
| 91.5                                                                              | 0.367                   | 0.370 | 0.372 | 0.375 | 0.378 | 0.380 | 0.383 | 0.386 | 0.389 | 0.392 | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 |
| 92.0                                                                              | 0.368                   | 0.370 | 0.373 | 0.375 | 0.378 | 0.381 | 0.384 | 0.386 | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 |
| 92.5                                                                              | 0.368                   | 0.371 | 0.373 | 0.376 | 0.379 | 0.381 | 0.384 | 0.387 | 0.390 | 0.393 | 0.395 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 |
| 93.0                                                                              | 0.368                   | 0.371 | 0.374 | 0.376 | 0.379 | 0.382 | 0.385 | 0.387 | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 |
| 93.5                                                                              | 0.369                   | 0.372 | 0.374 | 0.377 | 0.380 | 0.382 | 0.385 | 0.388 | 0.391 | 0.394 | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 |

| COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000 |                         |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|-----------------------------------------------------------------------------------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| TEMP                                                                              | API GRAVITY AT 60 DEG F |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| DEG F                                                                             | 8.0                     | 8.5   | 9.0   | 9.5   | 10.0  | 10.5  | 11.0  | 11.5  | 12.0  | 12.5  | 13.0  | 13.5  | 14.0  | 14.5  | 15.0  | 15.5  |
| 94.0                                                                              | 0.369                   | 0.372 | 0.375 | 0.377 | 0.380 | 0.383 | 0.386 | 0.388 | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.412 |
| 94.5                                                                              | 0.370                   | 0.372 | 0.375 | 0.378 | 0.380 | 0.383 | 0.386 | 0.389 | 0.392 | 0.395 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.412 |
| 95.0                                                                              | 0.370                   | 0.373 | 0.376 | 0.378 | 0.381 | 0.384 | 0.387 | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.413 |
| 95.5                                                                              | 0.371                   | 0.373 | 0.376 | 0.379 | 0.381 | 0.384 | 0.387 | 0.390 | 0.393 | 0.396 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.413 |
| 96.0                                                                              | 0.371                   | 0.374 | 0.376 | 0.379 | 0.382 | 0.385 | 0.387 | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.414 |
| 96.5                                                                              | 0.372                   | 0.374 | 0.377 | 0.380 | 0.382 | 0.385 | 0.388 | 0.391 | 0.394 | 0.397 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.415 |
| 97.0                                                                              | 0.372                   | 0.375 | 0.377 | 0.380 | 0.383 | 0.386 | 0.388 | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.412 | 0.415 |
| 97.5                                                                              | 0.372                   | 0.375 | 0.378 | 0.381 | 0.383 | 0.386 | 0.389 | 0.392 | 0.395 | 0.398 | 0.400 | 0.403 | 0.406 | 0.410 | 0.413 | 0.416 |
| 98.0                                                                              | 0.373                   | 0.376 | 0.378 | 0.381 | 0.384 | 0.387 | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.413 | 0.416 |
| 98.5                                                                              | 0.373                   | 0.376 | 0.379 | 0.382 | 0.384 | 0.387 | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.414 | 0.417 |
| 99.0                                                                              | 0.374                   | 0.377 | 0.379 | 0.382 | 0.385 | 0.388 | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.414 | 0.417 |
| 99.5                                                                              | 0.374                   | 0.377 | 0.380 | 0.382 | 0.385 | 0.388 | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.412 | 0.415 | 0.418 |
| 100.0                                                                             | 0.375                   | 0.377 | 0.380 | 0.383 | 0.386 | 0.389 | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.412 | 0.415 | 0.418 |
| 100.5                                                                             | 0.375                   | 0.378 | 0.381 | 0.383 | 0.386 | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.413 | 0.416 | 0.419 |
| 101.0                                                                             | 0.376                   | 0.378 | 0.381 | 0.384 | 0.387 | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.413 | 0.416 | 0.420 |
| 101.5                                                                             | 0.376                   | 0.379 | 0.382 | 0.384 | 0.387 | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.414 | 0.417 | 0.420 |
| 102.0                                                                             | 0.377                   | 0.379 | 0.382 | 0.385 | 0.388 | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.414 | 0.418 | 0.421 |
| 102.5                                                                             | 0.377                   | 0.380 | 0.382 | 0.385 | 0.388 | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.412 | 0.415 | 0.418 | 0.421 |
| 103.0                                                                             | 0.377                   | 0.380 | 0.383 | 0.386 | 0.389 | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.412 | 0.415 | 0.419 | 0.422 |
| 103.5                                                                             | 0.378                   | 0.381 | 0.383 | 0.386 | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.413 | 0.416 | 0.419 | 0.422 |
| 104.0                                                                             | 0.378                   | 0.381 | 0.384 | 0.387 | 0.390 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.413 | 0.417 | 0.420 | 0.423 |
| 104.5                                                                             | 0.379                   | 0.382 | 0.384 | 0.387 | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.414 | 0.417 | 0.420 | 0.423 |
| 105.0                                                                             | 0.379                   | 0.382 | 0.385 | 0.388 | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.414 | 0.418 | 0.421 | 0.424 |
| 105.5                                                                             | 0.380                   | 0.382 | 0.385 | 0.388 | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.412 | 0.415 | 0.418 | 0.421 | 0.425 |
| 106.0                                                                             | 0.380                   | 0.383 | 0.386 | 0.389 | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.412 | 0.416 | 0.419 | 0.422 | 0.425 |
| 106.5                                                                             | 0.381                   | 0.383 | 0.386 | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.413 | 0.416 | 0.419 | 0.422 | 0.426 |
| 107.0                                                                             | 0.381                   | 0.384 | 0.387 | 0.390 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.413 | 0.417 | 0.420 | 0.423 | 0.426 |
| 107.5                                                                             | 0.382                   | 0.384 | 0.387 | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.414 | 0.417 | 0.420 | 0.424 | 0.427 |
| 108.0                                                                             | 0.382                   | 0.385 | 0.388 | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.415 | 0.418 | 0.421 | 0.424 | 0.427 |
| 108.5                                                                             | 0.382                   | 0.385 | 0.388 | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.412 | 0.415 | 0.418 | 0.421 | 0.425 | 0.428 |
| 109.0                                                                             | 0.383                   | 0.386 | 0.389 | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.412 | 0.416 | 0.419 | 0.422 | 0.425 | 0.429 |
| 109.5                                                                             | 0.383                   | 0.386 | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.413 | 0.416 | 0.419 | 0.423 | 0.426 | 0.429 |
| 110.0                                                                             | 0.384                   | 0.387 | 0.390 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.414 | 0.417 | 0.420 | 0.423 | 0.426 | 0.430 |
| 110.5                                                                             | 0.384                   | 0.387 | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.414 | 0.417 | 0.420 | 0.424 | 0.427 | 0.430 |
| 111.0                                                                             | 0.385                   | 0.388 | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.415 | 0.418 | 0.421 | 0.424 | 0.428 | 0.431 |
| 111.5                                                                             | 0.385                   | 0.388 | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.412 | 0.415 | 0.418 | 0.422 | 0.425 | 0.428 | 0.431 |
| 112.0                                                                             | 0.386                   | 0.389 | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.413 | 0.416 | 0.419 | 0.422 | 0.425 | 0.429 | 0.432 |
| 112.5                                                                             | 0.386                   | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.413 | 0.416 | 0.419 | 0.423 | 0.426 | 0.429 | 0.433 |

| COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000 |                         |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|-----------------------------------------------------------------------------------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| TEMP                                                                              | API GRAVITY AT 60 DEG F |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| DEG F                                                                             | 8.0                     | 8.5   | 9.0   | 9.5   | 10.0  | 10.5  | 11.0  | 11.5  | 12.0  | 12.5  | 13.0  | 13.5  | 14.0  | 14.5  | 15.0  | 15.5  |
| 113.0                                                                             | 0.387                   | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.414 | 0.417 | 0.420 | 0.423 | 0.426 | 0.430 | 0.433 |
| 113.5                                                                             | 0.387                   | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.414 | 0.417 | 0.420 | 0.424 | 0.427 | 0.430 | 0.434 |
| 114.0                                                                             | 0.388                   | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.415 | 0.418 | 0.421 | 0.424 | 0.428 | 0.431 | 0.434 |
| 114.5                                                                             | 0.388                   | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.412 | 0.415 | 0.418 | 0.422 | 0.425 | 0.428 | 0.431 | 0.435 |
| 115.0                                                                             | 0.388                   | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.413 | 0.416 | 0.419 | 0.422 | 0.425 | 0.429 | 0.432 | 0.435 |
| 115.5                                                                             | 0.389                   | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.413 | 0.416 | 0.419 | 0.423 | 0.426 | 0.429 | 0.433 | 0.436 |
| 116.0                                                                             | 0.389                   | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.414 | 0.417 | 0.420 | 0.423 | 0.426 | 0.430 | 0.433 | 0.437 |
| 116.5                                                                             | 0.390                   | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.414 | 0.417 | 0.420 | 0.424 | 0.427 | 0.430 | 0.434 | 0.437 |
| 117.0                                                                             | 0.390                   | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.415 | 0.418 | 0.421 | 0.424 | 0.428 | 0.431 | 0.434 | 0.438 |
| 117.5                                                                             | 0.391                   | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.412 | 0.415 | 0.418 | 0.422 | 0.425 | 0.428 | 0.431 | 0.435 | 0.438 |
| 118.0                                                                             | 0.391                   | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.412 | 0.416 | 0.419 | 0.422 | 0.425 | 0.429 | 0.432 | 0.435 | 0.439 |
| 118.5                                                                             | 0.392                   | 0.395 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.413 | 0.416 | 0.419 | 0.423 | 0.426 | 0.429 | 0.433 | 0.436 | 0.439 |
| 119.0                                                                             | 0.392                   | 0.395 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.414 | 0.417 | 0.420 | 0.423 | 0.426 | 0.430 | 0.433 | 0.437 | 0.440 |
| 119.5                                                                             | 0.393                   | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.414 | 0.417 | 0.420 | 0.424 | 0.427 | 0.430 | 0.434 | 0.437 | 0.441 |
| 120.0                                                                             | 0.393                   | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.415 | 0.418 | 0.421 | 0.424 | 0.428 | 0.431 | 0.434 | 0.438 | 0.441 |
| 120.5                                                                             | 0.394                   | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.412 | 0.415 | 0.418 | 0.422 | 0.425 | 0.428 | 0.432 | 0.435 | 0.438 | 0.442 |
| 121.0                                                                             | 0.394                   | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.412 | 0.416 | 0.419 | 0.422 | 0.425 | 0.429 | 0.432 | 0.435 | 0.439 | 0.442 |
| 121.5                                                                             | 0.395                   | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.413 | 0.416 | 0.419 | 0.423 | 0.426 | 0.429 | 0.433 | 0.436 | 0.439 | 0.443 |
| 122.0                                                                             | 0.395                   | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.413 | 0.417 | 0.420 | 0.423 | 0.426 | 0.430 | 0.433 | 0.437 | 0.440 | 0.444 |
| 122.5                                                                             | 0.396                   | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.414 | 0.417 | 0.420 | 0.424 | 0.427 | 0.430 | 0.434 | 0.437 | 0.441 | 0.444 |
| 123.0                                                                             | 0.396                   | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.415 | 0.418 | 0.421 | 0.424 | 0.428 | 0.431 | 0.434 | 0.438 | 0.441 | 0.445 |
| 123.5                                                                             | 0.396                   | 0.399 | 0.403 | 0.406 | 0.409 | 0.412 | 0.415 | 0.418 | 0.421 | 0.425 | 0.428 | 0.431 | 0.435 | 0.438 | 0.442 | 0.445 |
| 124.0                                                                             | 0.397                   | 0.400 | 0.403 | 0.406 | 0.409 | 0.412 | 0.416 | 0.419 | 0.422 | 0.425 | 0.429 | 0.432 | 0.435 | 0.439 | 0.442 | 0.446 |
| 124.5                                                                             | 0.397                   | 0.400 | 0.403 | 0.407 | 0.410 | 0.413 | 0.416 | 0.419 | 0.423 | 0.426 | 0.429 | 0.433 | 0.436 | 0.439 | 0.443 | 0.447 |
| 125.0                                                                             | 0.398                   | 0.401 | 0.404 | 0.407 | 0.410 | 0.413 | 0.417 | 0.420 | 0.423 | 0.426 | 0.430 | 0.433 | 0.437 | 0.440 | 0.444 | 0.447 |
| 125.5                                                                             | 0.398                   | 0.401 | 0.404 | 0.408 | 0.411 | 0.414 | 0.417 | 0.420 | 0.424 | 0.427 | 0.430 | 0.434 | 0.437 | 0.441 | 0.444 | 0.448 |
| 126.0                                                                             | 0.399                   | 0.402 | 0.405 | 0.408 | 0.411 | 0.414 | 0.418 | 0.421 | 0.424 | 0.427 | 0.431 | 0.434 | 0.438 | 0.441 | 0.445 | 0.448 |
| 126.5                                                                             | 0.399                   | 0.402 | 0.405 | 0.409 | 0.412 | 0.415 | 0.418 | 0.421 | 0.425 | 0.428 | 0.431 | 0.435 | 0.438 | 0.442 | 0.445 | 0.449 |
| 127.0                                                                             | 0.400                   | 0.403 | 0.406 | 0.409 | 0.412 | 0.415 | 0.419 | 0.422 | 0.425 | 0.429 | 0.432 | 0.435 | 0.439 | 0.442 | 0.446 | 0.449 |
| 127.5                                                                             | 0.400                   | 0.403 | 0.406 | 0.410 | 0.413 | 0.416 | 0.419 | 0.422 | 0.426 | 0.429 | 0.433 | 0.436 | 0.439 | 0.443 | 0.446 | 0.450 |
| 128.0                                                                             | 0.401                   | 0.404 | 0.407 | 0.410 | 0.413 | 0.416 | 0.420 | 0.423 | 0.426 | 0.430 | 0.433 | 0.437 | 0.440 | 0.444 | 0.447 | 0.451 |
| 128.5                                                                             | 0.401                   | 0.404 | 0.407 | 0.411 | 0.414 | 0.417 | 0.420 | 0.424 | 0.427 | 0.430 | 0.434 | 0.437 | 0.441 | 0.444 | 0.448 | 0.451 |
| 129.0                                                                             | 0.402                   | 0.405 | 0.408 | 0.411 | 0.414 | 0.418 | 0.421 | 0.424 | 0.427 | 0.431 | 0.434 | 0.438 | 0.441 | 0.445 | 0.448 | 0.452 |
| 129.5                                                                             | 0.402                   | 0.405 | 0.408 | 0.412 | 0.415 | 0.418 | 0.421 | 0.425 | 0.428 | 0.431 | 0.435 | 0.438 | 0.442 | 0.445 | 0.449 | 0.452 |
| 130.0                                                                             | 0.403                   | 0.406 | 0.409 | 0.412 | 0.415 | 0.419 | 0.422 | 0.425 | 0.428 | 0.432 | 0.435 | 0.439 | 0.442 | 0.446 | 0.449 | 0.453 |
| 130.5                                                                             | 0.403                   | 0.406 | 0.409 | 0.413 | 0.416 | 0.419 | 0.422 | 0.426 | 0.429 | 0.432 | 0.436 | 0.439 | 0.443 | 0.446 | 0.450 | 0.454 |
| 131.0                                                                             | 0.404                   | 0.407 | 0.410 | 0.413 | 0.416 | 0.420 | 0.423 | 0.426 | 0.430 | 0.433 | 0.436 | 0.440 | 0.443 | 0.447 | 0.451 | 0.454 |
| 131.5                                                                             | 0.404                   | 0.407 | 0.410 | 0.414 | 0.417 | 0.420 | 0.423 | 0.427 | 0.430 | 0.434 | 0.437 | 0.440 | 0.444 | 0.448 | 0.451 | 0.455 |

COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000  
API GRAVITY AT 60 DEG F

| TEMP<br>DEG F | 8.0   | 8.5   | 9.0   | 9.5   | 10.0  | 10.5  | 11.0  | 11.5  | 12.0  | 12.5  | 13.0  | 13.5  | 14.0  | 14.5  | 15.0  | 15.5  |
|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 132.0         | 0.405 | 0.408 | 0.411 | 0.414 | 0.417 | 0.421 | 0.424 | 0.427 | 0.431 | 0.434 | 0.438 | 0.441 | 0.445 | 0.448 | 0.452 | 0.455 |
| 132.5         | 0.405 | 0.408 | 0.411 | 0.415 | 0.418 | 0.421 | 0.424 | 0.428 | 0.431 | 0.435 | 0.438 | 0.442 | 0.445 | 0.449 | 0.452 | 0.456 |
| 133.0         | 0.406 | 0.409 | 0.412 | 0.415 | 0.418 | 0.422 | 0.425 | 0.428 | 0.432 | 0.435 | 0.439 | 0.442 | 0.446 | 0.449 | 0.453 | 0.457 |
| 133.5         | 0.406 | 0.409 | 0.412 | 0.416 | 0.419 | 0.422 | 0.426 | 0.429 | 0.432 | 0.436 | 0.439 | 0.443 | 0.446 | 0.450 | 0.454 | 0.457 |
| 134.0         | 0.407 | 0.410 | 0.413 | 0.416 | 0.419 | 0.423 | 0.426 | 0.429 | 0.433 | 0.436 | 0.440 | 0.443 | 0.447 | 0.451 | 0.454 | 0.458 |
| 134.5         | 0.407 | 0.410 | 0.413 | 0.417 | 0.420 | 0.423 | 0.427 | 0.430 | 0.433 | 0.437 | 0.440 | 0.444 | 0.447 | 0.451 | 0.455 | 0.459 |
| 135.0         | 0.408 | 0.411 | 0.414 | 0.417 | 0.420 | 0.424 | 0.427 | 0.431 | 0.434 | 0.437 | 0.441 | 0.444 | 0.448 | 0.452 | 0.455 | 0.459 |
| 135.5         | 0.408 | 0.411 | 0.414 | 0.418 | 0.421 | 0.424 | 0.428 | 0.431 | 0.434 | 0.438 | 0.441 | 0.445 | 0.449 | 0.452 | 0.456 | 0.460 |
| 136.0         | 0.409 | 0.412 | 0.415 | 0.418 | 0.421 | 0.425 | 0.428 | 0.432 | 0.435 | 0.439 | 0.442 | 0.446 | 0.449 | 0.453 | 0.457 | 0.460 |
| 136.5         | 0.409 | 0.412 | 0.415 | 0.419 | 0.422 | 0.425 | 0.429 | 0.432 | 0.436 | 0.439 | 0.443 | 0.446 | 0.450 | 0.453 | 0.457 | 0.461 |
| 137.0         | 0.410 | 0.413 | 0.416 | 0.419 | 0.423 | 0.426 | 0.429 | 0.433 | 0.436 | 0.440 | 0.443 | 0.447 | 0.450 | 0.454 | 0.458 | 0.462 |
| 137.5         | 0.410 | 0.413 | 0.416 | 0.420 | 0.423 | 0.426 | 0.430 | 0.433 | 0.437 | 0.440 | 0.444 | 0.447 | 0.451 | 0.455 | 0.458 | 0.462 |
| 138.0         | 0.410 | 0.414 | 0.417 | 0.420 | 0.424 | 0.427 | 0.430 | 0.434 | 0.437 | 0.441 | 0.444 | 0.448 | 0.452 | 0.455 | 0.459 | 0.463 |
| 138.5         | 0.411 | 0.414 | 0.417 | 0.421 | 0.424 | 0.427 | 0.431 | 0.434 | 0.438 | 0.441 | 0.445 | 0.449 | 0.452 | 0.456 | 0.460 | 0.463 |
| 139.0         | 0.411 | 0.415 | 0.418 | 0.421 | 0.425 | 0.428 | 0.431 | 0.435 | 0.438 | 0.442 | 0.445 | 0.449 | 0.453 | 0.456 | 0.460 | 0.464 |
| 139.5         | 0.412 | 0.415 | 0.418 | 0.422 | 0.425 | 0.429 | 0.432 | 0.435 | 0.439 | 0.442 | 0.446 | 0.450 | 0.453 | 0.457 | 0.461 | 0.465 |
| 140.0         | 0.412 | 0.416 | 0.419 | 0.422 | 0.426 | 0.429 | 0.432 | 0.436 | 0.439 | 0.443 | 0.447 | 0.450 | 0.454 | 0.458 | 0.461 | 0.465 |
| 140.5         | 0.413 | 0.416 | 0.419 | 0.423 | 0.426 | 0.430 | 0.433 | 0.437 | 0.440 | 0.444 | 0.447 | 0.451 | 0.455 | 0.458 | 0.462 | 0.466 |
| 141.0         | 0.413 | 0.417 | 0.420 | 0.423 | 0.427 | 0.430 | 0.434 | 0.437 | 0.441 | 0.444 | 0.448 | 0.451 | 0.455 | 0.459 | 0.463 | 0.466 |
| 141.5         | 0.414 | 0.417 | 0.421 | 0.424 | 0.427 | 0.431 | 0.434 | 0.438 | 0.441 | 0.445 | 0.448 | 0.452 | 0.456 | 0.459 | 0.463 | 0.467 |
| 142.0         | 0.414 | 0.418 | 0.421 | 0.424 | 0.428 | 0.431 | 0.435 | 0.438 | 0.442 | 0.445 | 0.449 | 0.453 | 0.456 | 0.460 | 0.464 | 0.468 |
| 142.5         | 0.415 | 0.418 | 0.422 | 0.425 | 0.428 | 0.432 | 0.435 | 0.439 | 0.442 | 0.446 | 0.449 | 0.453 | 0.457 | 0.461 | 0.464 | 0.468 |
| 143.0         | 0.415 | 0.419 | 0.422 | 0.425 | 0.429 | 0.432 | 0.436 | 0.439 | 0.443 | 0.446 | 0.450 | 0.454 | 0.457 | 0.461 | 0.465 | 0.469 |
| 143.5         | 0.416 | 0.419 | 0.423 | 0.426 | 0.429 | 0.433 | 0.436 | 0.440 | 0.443 | 0.447 | 0.451 | 0.454 | 0.458 | 0.462 | 0.466 | 0.470 |
| 144.0         | 0.416 | 0.420 | 0.423 | 0.426 | 0.430 | 0.433 | 0.437 | 0.440 | 0.444 | 0.448 | 0.451 | 0.455 | 0.459 | 0.462 | 0.466 | 0.470 |
| 144.5         | 0.417 | 0.420 | 0.424 | 0.427 | 0.430 | 0.434 | 0.437 | 0.441 | 0.445 | 0.448 | 0.452 | 0.456 | 0.459 | 0.463 | 0.467 | 0.471 |
| 145.0         | 0.417 | 0.421 | 0.424 | 0.428 | 0.431 | 0.434 | 0.438 | 0.441 | 0.445 | 0.449 | 0.452 | 0.456 | 0.460 | 0.464 | 0.468 | 0.471 |
| 145.5         | 0.418 | 0.421 | 0.425 | 0.428 | 0.431 | 0.435 | 0.438 | 0.442 | 0.446 | 0.449 | 0.453 | 0.457 | 0.460 | 0.464 | 0.468 | 0.472 |
| 146.0         | 0.418 | 0.422 | 0.425 | 0.429 | 0.432 | 0.435 | 0.439 | 0.443 | 0.446 | 0.450 | 0.454 | 0.457 | 0.461 | 0.465 | 0.469 | 0.473 |
| 146.5         | 0.419 | 0.422 | 0.426 | 0.429 | 0.433 | 0.436 | 0.440 | 0.443 | 0.447 | 0.450 | 0.454 | 0.458 | 0.462 | 0.466 | 0.469 | 0.473 |
| 147.0         | 0.419 | 0.423 | 0.426 | 0.430 | 0.433 | 0.437 | 0.440 | 0.444 | 0.447 | 0.451 | 0.455 | 0.458 | 0.462 | 0.466 | 0.470 | 0.474 |
| 147.5         | 0.420 | 0.423 | 0.427 | 0.430 | 0.434 | 0.437 | 0.441 | 0.444 | 0.448 | 0.452 | 0.455 | 0.459 | 0.463 | 0.467 | 0.471 | 0.475 |
| 148.0         | 0.420 | 0.424 | 0.427 | 0.431 | 0.434 | 0.438 | 0.441 | 0.445 | 0.448 | 0.452 | 0.456 | 0.460 | 0.463 | 0.467 | 0.471 | 0.475 |
| 148.5         | 0.421 | 0.424 | 0.428 | 0.431 | 0.435 | 0.438 | 0.442 | 0.445 | 0.449 | 0.453 | 0.456 | 0.460 | 0.464 | 0.468 | 0.472 | 0.476 |
| 149.0         | 0.421 | 0.425 | 0.428 | 0.432 | 0.435 | 0.439 | 0.442 | 0.446 | 0.450 | 0.453 | 0.457 | 0.461 | 0.465 | 0.469 | 0.472 | 0.476 |
| 149.5         | 0.422 | 0.425 | 0.429 | 0.432 | 0.436 | 0.439 | 0.443 | 0.446 | 0.450 | 0.454 | 0.458 | 0.461 | 0.465 | 0.469 | 0.473 | 0.477 |
| 150.0         | 0.422 | 0.426 | 0.429 | 0.433 | 0.436 | 0.440 | 0.443 | 0.447 | 0.451 | 0.454 | 0.458 | 0.462 | 0.466 | 0.470 | 0.474 | 0.478 |
| 150.5         | 0.423 | 0.426 | 0.430 | 0.433 | 0.437 | 0.440 | 0.444 | 0.448 | 0.451 | 0.455 | 0.459 | 0.463 | 0.466 | 0.470 | 0.474 | 0.478 |

**COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000**  
**API GRAVITY AT 60 DEG F**

| TEMP<br>DEG F | 8.0   | 8.5   | 9.0   | 9.5   | 10.0  | 10.5  | 11.0  | 11.5  | 12.0  | 12.5  | 13.0  | 13.5  | 14.0  | 14.5  | 15.0  | 15.5  |
|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 151.0         | 0.423 | 0.427 | 0.430 | 0.434 | 0.437 | 0.441 | 0.445 | 0.448 | 0.452 | 0.456 | 0.459 | 0.463 | 0.467 | 0.471 | 0.475 | 0.479 |
| 151.5         | 0.424 | 0.427 | 0.431 | 0.434 | 0.438 | 0.441 | 0.445 | 0.449 | 0.452 | 0.456 | 0.460 | 0.464 | 0.468 | 0.472 | 0.476 | 0.480 |
| 152.0         | 0.425 | 0.428 | 0.431 | 0.435 | 0.438 | 0.442 | 0.446 | 0.449 | 0.453 | 0.457 | 0.461 | 0.464 | 0.468 | 0.472 | 0.476 | 0.480 |
| 152.5         | 0.425 | 0.428 | 0.432 | 0.435 | 0.439 | 0.443 | 0.446 | 0.450 | 0.454 | 0.457 | 0.461 | 0.465 | 0.469 | 0.473 | 0.477 | 0.481 |
| 153.0         | 0.426 | 0.429 | 0.432 | 0.436 | 0.440 | 0.443 | 0.447 | 0.450 | 0.454 | 0.458 | 0.462 | 0.466 | 0.470 | 0.473 | 0.477 | 0.482 |
| 153.5         | 0.426 | 0.429 | 0.433 | 0.436 | 0.440 | 0.444 | 0.447 | 0.451 | 0.455 | 0.459 | 0.462 | 0.466 | 0.470 | 0.474 | 0.478 | 0.482 |
| 154.0         | 0.427 | 0.430 | 0.433 | 0.437 | 0.441 | 0.444 | 0.448 | 0.452 | 0.455 | 0.459 | 0.463 | 0.467 | 0.471 | 0.475 | 0.479 | 0.483 |
| 154.5         | 0.427 | 0.431 | 0.434 | 0.438 | 0.441 | 0.445 | 0.448 | 0.452 | 0.456 | 0.460 | 0.464 | 0.467 | 0.471 | 0.475 | 0.479 | 0.483 |
| 155.0         | 0.428 | 0.431 | 0.435 | 0.438 | 0.442 | 0.445 | 0.449 | 0.453 | 0.456 | 0.460 | 0.464 | 0.468 | 0.472 | 0.476 | 0.480 | 0.484 |
| 155.5         | 0.428 | 0.432 | 0.435 | 0.439 | 0.442 | 0.446 | 0.450 | 0.453 | 0.457 | 0.461 | 0.465 | 0.469 | 0.473 | 0.477 | 0.481 | 0.485 |
| 156.0         | 0.429 | 0.432 | 0.436 | 0.439 | 0.443 | 0.446 | 0.450 | 0.454 | 0.458 | 0.461 | 0.465 | 0.469 | 0.473 | 0.477 | 0.481 | 0.485 |
| 156.5         | 0.429 | 0.433 | 0.436 | 0.440 | 0.443 | 0.447 | 0.451 | 0.454 | 0.458 | 0.462 | 0.466 | 0.470 | 0.474 | 0.478 | 0.482 | 0.486 |
| 157.0         | 0.430 | 0.433 | 0.437 | 0.440 | 0.444 | 0.448 | 0.451 | 0.455 | 0.459 | 0.463 | 0.467 | 0.470 | 0.474 | 0.478 | 0.483 | 0.487 |
| 157.5         | 0.430 | 0.434 | 0.437 | 0.441 | 0.444 | 0.448 | 0.452 | 0.456 | 0.459 | 0.463 | 0.467 | 0.471 | 0.475 | 0.479 | 0.483 | 0.487 |
| 158.0         | 0.431 | 0.434 | 0.438 | 0.441 | 0.445 | 0.449 | 0.452 | 0.456 | 0.460 | 0.464 | 0.468 | 0.472 | 0.476 | 0.480 | 0.484 | 0.488 |
| 158.5         | 0.431 | 0.435 | 0.438 | 0.442 | 0.446 | 0.449 | 0.453 | 0.457 | 0.461 | 0.464 | 0.468 | 0.472 | 0.476 | 0.480 | 0.484 | 0.489 |
| 159.0         | 0.432 | 0.435 | 0.439 | 0.442 | 0.446 | 0.450 | 0.454 | 0.457 | 0.461 | 0.465 | 0.469 | 0.473 | 0.477 | 0.481 | 0.485 | 0.489 |
| 159.5         | 0.432 | 0.436 | 0.439 | 0.443 | 0.447 | 0.450 | 0.454 | 0.458 | 0.462 | 0.466 | 0.470 | 0.474 | 0.478 | 0.482 | 0.486 | 0.490 |
| 160.0         | 0.433 | 0.436 | 0.440 | 0.443 | 0.447 | 0.451 | 0.455 | 0.458 | 0.462 | 0.466 | 0.470 | 0.474 | 0.478 | 0.482 | 0.486 | 0.491 |
| 160.5         | 0.433 | 0.437 | 0.440 | 0.444 | 0.448 | 0.451 | 0.455 | 0.459 | 0.463 | 0.467 | 0.471 | 0.475 | 0.479 | 0.483 | 0.487 | 0.491 |
| 161.0         | 0.434 | 0.437 | 0.441 | 0.445 | 0.448 | 0.452 | 0.456 | 0.460 | 0.463 | 0.467 | 0.471 | 0.475 | 0.479 | 0.483 | 0.488 | 0.492 |
| 161.5         | 0.434 | 0.438 | 0.441 | 0.445 | 0.449 | 0.453 | 0.456 | 0.460 | 0.464 | 0.468 | 0.472 | 0.476 | 0.480 | 0.484 | 0.488 | 0.493 |
| 162.0         | 0.435 | 0.438 | 0.442 | 0.446 | 0.449 | 0.453 | 0.457 | 0.461 | 0.465 | 0.469 | 0.473 | 0.477 | 0.481 | 0.485 | 0.489 | 0.493 |
| 162.5         | 0.435 | 0.439 | 0.443 | 0.446 | 0.450 | 0.454 | 0.457 | 0.461 | 0.465 | 0.469 | 0.473 | 0.477 | 0.481 | 0.485 | 0.490 | 0.494 |
| 163.0         | 0.436 | 0.439 | 0.443 | 0.447 | 0.450 | 0.454 | 0.458 | 0.462 | 0.466 | 0.470 | 0.474 | 0.478 | 0.482 | 0.486 | 0.490 | 0.494 |
| 163.5         | 0.436 | 0.440 | 0.444 | 0.447 | 0.451 | 0.455 | 0.459 | 0.462 | 0.466 | 0.470 | 0.474 | 0.478 | 0.483 | 0.487 | 0.491 | 0.495 |
| 164.0         | 0.437 | 0.441 | 0.444 | 0.448 | 0.452 | 0.455 | 0.459 | 0.463 | 0.467 | 0.471 | 0.475 | 0.479 | 0.483 | 0.487 | 0.492 | 0.496 |
| 164.5         | 0.437 | 0.441 | 0.445 | 0.448 | 0.452 | 0.456 | 0.460 | 0.464 | 0.468 | 0.472 | 0.476 | 0.480 | 0.484 | 0.488 | 0.492 | 0.496 |
| 165.0         | 0.438 | 0.442 | 0.445 | 0.449 | 0.453 | 0.457 | 0.460 | 0.464 | 0.468 | 0.472 | 0.476 | 0.480 | 0.484 | 0.489 | 0.493 | 0.497 |
| 165.5         | 0.438 | 0.442 | 0.446 | 0.450 | 0.453 | 0.457 | 0.461 | 0.465 | 0.469 | 0.473 | 0.477 | 0.481 | 0.485 | 0.489 | 0.493 | 0.498 |
| 166.0         | 0.439 | 0.443 | 0.446 | 0.450 | 0.454 | 0.458 | 0.462 | 0.465 | 0.469 | 0.473 | 0.477 | 0.482 | 0.486 | 0.490 | 0.494 | 0.498 |
| 166.5         | 0.440 | 0.443 | 0.447 | 0.451 | 0.454 | 0.458 | 0.462 | 0.466 | 0.470 | 0.474 | 0.478 | 0.482 | 0.486 | 0.490 | 0.495 | 0.499 |
| 167.0         | 0.440 | 0.444 | 0.447 | 0.451 | 0.455 | 0.459 | 0.463 | 0.467 | 0.471 | 0.475 | 0.479 | 0.483 | 0.487 | 0.491 | 0.495 | 0.500 |
| 167.5         | 0.441 | 0.444 | 0.448 | 0.452 | 0.456 | 0.459 | 0.463 | 0.467 | 0.471 | 0.475 | 0.479 | 0.483 | 0.488 | 0.492 | 0.496 | 0.500 |
| 168.0         | 0.441 | 0.445 | 0.449 | 0.452 | 0.456 | 0.460 | 0.464 | 0.468 | 0.472 | 0.476 | 0.480 | 0.484 | 0.488 | 0.492 | 0.497 | 0.501 |
| 168.5         | 0.442 | 0.445 | 0.449 | 0.453 | 0.457 | 0.460 | 0.464 | 0.468 | 0.472 | 0.476 | 0.480 | 0.485 | 0.489 | 0.493 | 0.497 | 0.502 |
| 169.0         | 0.442 | 0.446 | 0.450 | 0.453 | 0.457 | 0.461 | 0.465 | 0.469 | 0.473 | 0.477 | 0.481 | 0.485 | 0.489 | 0.494 | 0.498 | 0.502 |
| 169.5         | 0.443 | 0.446 | 0.450 | 0.454 | 0.458 | 0.462 | 0.466 | 0.470 | 0.474 | 0.478 | 0.482 | 0.486 | 0.490 | 0.494 | 0.499 | 0.503 |

COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000

| TEMP  | API GRAVITY AT 60 DEG F |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|-------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| DEG F | 8.0                     | 8.5   | 9.0   | 9.5   | 10.0  | 10.5  | 11.0  | 11.5  | 12.0  | 12.5  | 13.0  | 13.5  | 14.0  | 14.5  | 15.0  | 15.5  |
| 170.0 | 0.443                   | 0.447 | 0.451 | 0.454 | 0.458 | 0.462 | 0.466 | 0.470 | 0.474 | 0.478 | 0.482 | 0.487 | 0.491 | 0.495 | 0.499 | 0.504 |
| 170.5 | 0.444                   | 0.447 | 0.451 | 0.455 | 0.459 | 0.463 | 0.467 | 0.471 | 0.475 | 0.479 | 0.483 | 0.487 | 0.491 | 0.496 | 0.500 | 0.504 |
| 171.0 | 0.444                   | 0.448 | 0.452 | 0.456 | 0.459 | 0.463 | 0.467 | 0.471 | 0.475 | 0.479 | 0.484 | 0.488 | 0.492 | 0.496 | 0.501 | 0.505 |
| 171.5 | 0.445                   | 0.449 | 0.452 | 0.456 | 0.460 | 0.464 | 0.468 | 0.472 | 0.476 | 0.480 | 0.484 | 0.488 | 0.493 | 0.497 | 0.501 | 0.506 |
| 172.0 | 0.445                   | 0.449 | 0.453 | 0.457 | 0.461 | 0.465 | 0.468 | 0.472 | 0.477 | 0.481 | 0.485 | 0.489 | 0.493 | 0.498 | 0.502 | 0.506 |
| 172.5 | 0.446                   | 0.450 | 0.453 | 0.457 | 0.461 | 0.465 | 0.469 | 0.473 | 0.477 | 0.481 | 0.485 | 0.490 | 0.494 | 0.498 | 0.503 | 0.507 |
| 173.0 | 0.446                   | 0.450 | 0.454 | 0.458 | 0.462 | 0.466 | 0.470 | 0.474 | 0.478 | 0.482 | 0.486 | 0.490 | 0.495 | 0.499 | 0.503 | 0.508 |
| 173.5 | 0.447                   | 0.451 | 0.455 | 0.458 | 0.462 | 0.466 | 0.470 | 0.474 | 0.478 | 0.482 | 0.487 | 0.491 | 0.495 | 0.500 | 0.504 | 0.508 |
| 174.0 | 0.448                   | 0.451 | 0.455 | 0.459 | 0.463 | 0.467 | 0.471 | 0.475 | 0.479 | 0.483 | 0.487 | 0.492 | 0.496 | 0.500 | 0.505 | 0.509 |
| 174.5 | 0.448                   | 0.452 | 0.456 | 0.460 | 0.463 | 0.467 | 0.471 | 0.475 | 0.480 | 0.484 | 0.488 | 0.492 | 0.497 | 0.501 | 0.505 | 0.510 |
| 175.0 | 0.449                   | 0.452 | 0.456 | 0.460 | 0.464 | 0.468 | 0.472 | 0.476 | 0.480 | 0.484 | 0.489 | 0.493 | 0.497 | 0.502 | 0.506 | 0.510 |
| 175.5 | 0.449                   | 0.453 | 0.457 | 0.461 | 0.465 | 0.469 | 0.473 | 0.477 | 0.481 | 0.485 | 0.489 | 0.493 | 0.498 | 0.502 | 0.507 | 0.511 |
| 176.0 | 0.450                   | 0.453 | 0.457 | 0.461 | 0.465 | 0.469 | 0.473 | 0.477 | 0.481 | 0.486 | 0.490 | 0.494 | 0.498 | 0.503 | 0.507 | 0.512 |
| 176.5 | 0.450                   | 0.454 | 0.458 | 0.462 | 0.466 | 0.470 | 0.474 | 0.478 | 0.482 | 0.486 | 0.490 | 0.495 | 0.499 | 0.503 | 0.508 | 0.512 |
| 177.0 | 0.451                   | 0.455 | 0.458 | 0.462 | 0.466 | 0.470 | 0.474 | 0.478 | 0.483 | 0.487 | 0.491 | 0.495 | 0.500 | 0.504 | 0.509 | 0.513 |
| 177.5 | 0.451                   | 0.455 | 0.459 | 0.463 | 0.467 | 0.471 | 0.475 | 0.479 | 0.483 | 0.487 | 0.492 | 0.496 | 0.500 | 0.505 | 0.509 | 0.514 |
| 178.0 | 0.452                   | 0.456 | 0.460 | 0.463 | 0.467 | 0.471 | 0.476 | 0.480 | 0.484 | 0.488 | 0.492 | 0.497 | 0.501 | 0.505 | 0.510 | 0.515 |
| 178.5 | 0.452                   | 0.456 | 0.460 | 0.464 | 0.468 | 0.472 | 0.476 | 0.480 | 0.484 | 0.489 | 0.493 | 0.497 | 0.502 | 0.506 | 0.511 | 0.515 |
| 179.0 | 0.453                   | 0.457 | 0.461 | 0.465 | 0.469 | 0.473 | 0.477 | 0.481 | 0.485 | 0.489 | 0.494 | 0.498 | 0.502 | 0.507 | 0.511 | 0.516 |
| 179.5 | 0.453                   | 0.457 | 0.461 | 0.465 | 0.469 | 0.473 | 0.477 | 0.481 | 0.486 | 0.490 | 0.494 | 0.499 | 0.503 | 0.507 | 0.512 | 0.517 |
| 180.0 | 0.454                   | 0.458 | 0.462 | 0.466 | 0.470 | 0.474 | 0.478 | 0.482 | 0.486 | 0.491 | 0.495 | 0.499 | 0.504 | 0.508 | 0.513 | 0.517 |
| 180.5 | 0.455                   | 0.458 | 0.462 | 0.466 | 0.470 | 0.474 | 0.479 | 0.483 | 0.487 | 0.491 | 0.496 | 0.500 | 0.504 | 0.509 | 0.513 | 0.518 |
| 181.0 | 0.455                   | 0.459 | 0.463 | 0.467 | 0.471 | 0.475 | 0.479 | 0.483 | 0.488 | 0.492 | 0.496 | 0.501 | 0.505 | 0.509 | 0.514 | 0.519 |
| 181.5 | 0.456                   | 0.460 | 0.463 | 0.467 | 0.472 | 0.476 | 0.480 | 0.484 | 0.488 | 0.492 | 0.497 | 0.501 | 0.506 | 0.510 | 0.515 | 0.519 |
| 182.0 | 0.456                   | 0.460 | 0.464 | 0.468 | 0.472 | 0.476 | 0.480 | 0.485 | 0.489 | 0.493 | 0.497 | 0.502 | 0.506 | 0.511 | 0.515 | 0.520 |
| 182.5 | 0.457                   | 0.461 | 0.465 | 0.469 | 0.473 | 0.477 | 0.481 | 0.485 | 0.489 | 0.494 | 0.498 | 0.502 | 0.507 | 0.511 | 0.516 | 0.521 |
| 183.0 | 0.457                   | 0.461 | 0.465 | 0.469 | 0.473 | 0.477 | 0.482 | 0.486 | 0.490 | 0.494 | 0.499 | 0.503 | 0.508 | 0.512 | 0.517 | 0.521 |
| 183.5 | 0.458                   | 0.462 | 0.466 | 0.470 | 0.474 | 0.478 | 0.482 | 0.486 | 0.491 | 0.495 | 0.499 | 0.504 | 0.508 | 0.513 | 0.517 | 0.522 |
| 184.0 | 0.458                   | 0.462 | 0.466 | 0.470 | 0.474 | 0.479 | 0.483 | 0.487 | 0.491 | 0.496 | 0.500 | 0.504 | 0.509 | 0.513 | 0.518 | 0.523 |
| 184.5 | 0.459                   | 0.463 | 0.467 | 0.471 | 0.475 | 0.479 | 0.483 | 0.488 | 0.492 | 0.496 | 0.501 | 0.505 | 0.510 | 0.514 | 0.519 | 0.523 |
| 185.0 | 0.459                   | 0.463 | 0.467 | 0.471 | 0.476 | 0.480 | 0.484 | 0.488 | 0.492 | 0.497 | 0.501 | 0.506 | 0.510 | 0.515 | 0.519 | 0.524 |
| 185.5 | 0.460                   | 0.464 | 0.468 | 0.472 | 0.476 | 0.480 | 0.485 | 0.489 | 0.493 | 0.497 | 0.502 | 0.506 | 0.511 | 0.515 | 0.520 | 0.525 |
| 186.0 | 0.461                   | 0.465 | 0.469 | 0.473 | 0.477 | 0.481 | 0.485 | 0.489 | 0.494 | 0.498 | 0.503 | 0.507 | 0.512 | 0.516 | 0.521 | 0.526 |
| 186.5 | 0.461                   | 0.465 | 0.469 | 0.473 | 0.477 | 0.482 | 0.486 | 0.490 | 0.494 | 0.499 | 0.503 | 0.508 | 0.512 | 0.517 | 0.522 | 0.526 |
| 187.0 | 0.462                   | 0.466 | 0.470 | 0.474 | 0.478 | 0.482 | 0.486 | 0.491 | 0.495 | 0.499 | 0.504 | 0.508 | 0.513 | 0.518 | 0.522 | 0.527 |
| 187.5 | 0.462                   | 0.466 | 0.470 | 0.474 | 0.479 | 0.483 | 0.487 | 0.491 | 0.496 | 0.500 | 0.504 | 0.509 | 0.514 | 0.518 | 0.523 | 0.528 |
| 188.0 | 0.463                   | 0.467 | 0.471 | 0.475 | 0.479 | 0.483 | 0.488 | 0.492 | 0.496 | 0.501 | 0.505 | 0.510 | 0.514 | 0.519 | 0.524 | 0.528 |
| 188.5 | 0.463                   | 0.467 | 0.471 | 0.476 | 0.480 | 0.484 | 0.488 | 0.493 | 0.497 | 0.501 | 0.506 | 0.510 | 0.515 | 0.520 | 0.524 | 0.529 |

| COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000 |                         |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|-----------------------------------------------------------------------------------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| TEMP                                                                              | API GRAVITY AT 60 DEG F |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| DEG F                                                                             | 8.0                     | 8.5   | 9.0   | 9.5   | 10.0  | 10.5  | 11.0  | 11.5  | 12.0  | 12.5  | 13.0  | 13.5  | 14.0  | 14.5  | 15.0  | 15.5  |
| 189.0                                                                             | 0.464                   | 0.468 | 0.472 | 0.476 | 0.480 | 0.485 | 0.489 | 0.493 | 0.497 | 0.502 | 0.506 | 0.511 | 0.516 | 0.520 | 0.525 | 0.530 |
| 189.5                                                                             | 0.464                   | 0.469 | 0.473 | 0.477 | 0.481 | 0.485 | 0.489 | 0.494 | 0.498 | 0.503 | 0.507 | 0.512 | 0.516 | 0.521 | 0.526 | 0.530 |
| 190.0                                                                             | 0.465                   | 0.469 | 0.473 | 0.477 | 0.481 | 0.486 | 0.490 | 0.494 | 0.499 | 0.503 | 0.508 | 0.512 | 0.517 | 0.522 | 0.526 | 0.531 |
| 190.5                                                                             | 0.466                   | 0.470 | 0.474 | 0.478 | 0.482 | 0.486 | 0.491 | 0.495 | 0.499 | 0.504 | 0.508 | 0.513 | 0.518 | 0.522 | 0.527 | 0.532 |
| 191.0                                                                             | 0.466                   | 0.470 | 0.474 | 0.478 | 0.483 | 0.487 | 0.491 | 0.496 | 0.500 | 0.504 | 0.509 | 0.514 | 0.518 | 0.523 | 0.528 | 0.533 |
| 191.5                                                                             | 0.467                   | 0.471 | 0.475 | 0.479 | 0.483 | 0.488 | 0.492 | 0.496 | 0.501 | 0.505 | 0.510 | 0.514 | 0.519 | 0.524 | 0.528 | 0.533 |
| 192.0                                                                             | 0.467                   | 0.471 | 0.475 | 0.480 | 0.484 | 0.488 | 0.492 | 0.497 | 0.501 | 0.506 | 0.510 | 0.515 | 0.520 | 0.524 | 0.529 | 0.534 |
| 192.5                                                                             | 0.468                   | 0.472 | 0.476 | 0.480 | 0.484 | 0.489 | 0.493 | 0.497 | 0.502 | 0.506 | 0.511 | 0.516 | 0.520 | 0.525 | 0.530 | 0.535 |
| 193.0                                                                             | 0.468                   | 0.472 | 0.477 | 0.481 | 0.485 | 0.489 | 0.494 | 0.498 | 0.503 | 0.507 | 0.512 | 0.516 | 0.521 | 0.526 | 0.531 | 0.535 |
| 193.5                                                                             | 0.469                   | 0.473 | 0.477 | 0.481 | 0.486 | 0.490 | 0.494 | 0.499 | 0.503 | 0.508 | 0.512 | 0.517 | 0.522 | 0.526 | 0.531 | 0.536 |
| 194.0                                                                             | 0.470                   | 0.474 | 0.478 | 0.482 | 0.486 | 0.491 | 0.495 | 0.499 | 0.504 | 0.508 | 0.513 | 0.518 | 0.522 | 0.527 | 0.532 | 0.537 |
| 194.5                                                                             | 0.470                   | 0.474 | 0.478 | 0.483 | 0.487 | 0.491 | 0.496 | 0.500 | 0.504 | 0.509 | 0.514 | 0.518 | 0.523 | 0.528 | 0.533 | 0.538 |
| 195.0                                                                             | 0.471                   | 0.475 | 0.479 | 0.483 | 0.487 | 0.492 | 0.496 | 0.501 | 0.505 | 0.510 | 0.514 | 0.519 | 0.524 | 0.528 | 0.533 | 0.538 |
| 195.5                                                                             | 0.471                   | 0.475 | 0.480 | 0.484 | 0.488 | 0.492 | 0.497 | 0.501 | 0.506 | 0.510 | 0.515 | 0.520 | 0.524 | 0.529 | 0.534 | 0.539 |
| 196.0                                                                             | 0.472                   | 0.476 | 0.480 | 0.484 | 0.489 | 0.493 | 0.497 | 0.502 | 0.506 | 0.511 | 0.516 | 0.520 | 0.525 | 0.530 | 0.535 | 0.540 |
| 196.5                                                                             | 0.472                   | 0.477 | 0.481 | 0.485 | 0.489 | 0.494 | 0.498 | 0.503 | 0.507 | 0.512 | 0.516 | 0.521 | 0.526 | 0.531 | 0.535 | 0.540 |
| 197.0                                                                             | 0.473                   | 0.477 | 0.481 | 0.486 | 0.490 | 0.494 | 0.499 | 0.503 | 0.508 | 0.512 | 0.517 | 0.522 | 0.526 | 0.531 | 0.536 | 0.541 |
| 197.5                                                                             | 0.473                   | 0.478 | 0.482 | 0.486 | 0.490 | 0.495 | 0.499 | 0.504 | 0.508 | 0.513 | 0.518 | 0.522 | 0.527 | 0.532 | 0.537 | 0.542 |
| 198.0                                                                             | 0.474                   | 0.478 | 0.482 | 0.487 | 0.491 | 0.495 | 0.500 | 0.504 | 0.509 | 0.514 | 0.518 | 0.523 | 0.528 | 0.533 | 0.538 | 0.543 |
| 198.5                                                                             | 0.475                   | 0.479 | 0.483 | 0.487 | 0.492 | 0.496 | 0.501 | 0.505 | 0.510 | 0.514 | 0.519 | 0.524 | 0.528 | 0.533 | 0.538 | 0.543 |
| 199.0                                                                             | 0.475                   | 0.479 | 0.484 | 0.488 | 0.492 | 0.497 | 0.501 | 0.506 | 0.510 | 0.515 | 0.520 | 0.524 | 0.529 | 0.534 | 0.539 | 0.544 |
| 199.5                                                                             | 0.476                   | 0.480 | 0.484 | 0.489 | 0.493 | 0.497 | 0.502 | 0.506 | 0.511 | 0.516 | 0.520 | 0.525 | 0.530 | 0.535 | 0.540 | 0.545 |
| 200.0                                                                             | 0.476                   | 0.481 | 0.485 | 0.489 | 0.494 | 0.498 | 0.502 | 0.507 | 0.512 | 0.516 | 0.521 | 0.526 | 0.531 | 0.535 | 0.540 | 0.545 |

**COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000**

| TEMP<br>DEG F | API GRAVITY AT 60 DEG F |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|---------------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|               | 16.0                    | 16.5  | 17.0  | 17.5  | 18.0  | 18.5  | 19.0  | 19.5  | 20.0  | 20.5  | 21.0  | 21.5  | 22.0  | 22.5  | 23.0  | 23.5  |
| -20.0         | 0.306                   | 0.308 | 0.310 | 0.311 | 0.313 | 0.315 | 0.317 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.329 | 0.331 | 0.333 |
| -19.5         | 0.307                   | 0.308 | 0.310 | 0.312 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 |
| -19.0         | 0.307                   | 0.309 | 0.310 | 0.312 | 0.314 | 0.316 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.328 | 0.330 | 0.332 | 0.334 |
| -18.5         | 0.307                   | 0.309 | 0.311 | 0.313 | 0.314 | 0.316 | 0.318 | 0.320 | 0.322 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 |
| -18.0         | 0.308                   | 0.310 | 0.311 | 0.313 | 0.315 | 0.317 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.329 | 0.331 | 0.333 | 0.335 |
| -17.5         | 0.308                   | 0.310 | 0.312 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 |
| -17.0         | 0.309                   | 0.310 | 0.312 | 0.314 | 0.316 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 |
| -16.5         | 0.309                   | 0.311 | 0.313 | 0.314 | 0.316 | 0.318 | 0.320 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 |
| -16.0         | 0.309                   | 0.311 | 0.313 | 0.315 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 |
| -15.5         | 0.310                   | 0.312 | 0.313 | 0.315 | 0.317 | 0.319 | 0.321 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 |
| -15.0         | 0.310                   | 0.312 | 0.314 | 0.316 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 |
| -14.5         | 0.311                   | 0.312 | 0.314 | 0.316 | 0.318 | 0.320 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 |
| -14.0         | 0.311                   | 0.313 | 0.315 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 |
| -13.5         | 0.312                   | 0.313 | 0.315 | 0.317 | 0.319 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 |
| -13.0         | 0.312                   | 0.314 | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 |
| -12.5         | 0.312                   | 0.314 | 0.316 | 0.318 | 0.320 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 |
| -12.0         | 0.313                   | 0.315 | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 |
| -11.5         | 0.313                   | 0.315 | 0.317 | 0.319 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 |
| -11.0         | 0.314                   | 0.315 | 0.317 | 0.319 | 0.321 | 0.323 | 0.325 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 |
| -10.5         | 0.314                   | 0.316 | 0.318 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 | 0.343 |
| -10.0         | 0.314                   | 0.316 | 0.318 | 0.320 | 0.322 | 0.324 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 | 0.343 |
| -9.5          | 0.315                   | 0.317 | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.344 |
| -9.0          | 0.315                   | 0.317 | 0.319 | 0.321 | 0.323 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.344 |
| -8.5          | 0.316                   | 0.318 | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 | 0.343 | 0.345 |
| -8.0          | 0.316                   | 0.318 | 0.320 | 0.322 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 | 0.343 | 0.345 |
| -7.5          | 0.317                   | 0.318 | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.344 | 0.346 |
| -7.0          | 0.317                   | 0.319 | 0.321 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.344 | 0.346 |
| -6.5          | 0.317                   | 0.319 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.334 | 0.336 | 0.339 | 0.341 | 0.343 | 0.345 | 0.347 |
| -6.0          | 0.318                   | 0.320 | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 | 0.343 | 0.345 | 0.347 |
| -5.5          | 0.318                   | 0.320 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.342 | 0.344 | 0.346 | 0.348 |
| -5.0          | 0.319                   | 0.321 | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.344 | 0.346 | 0.348 |
| -4.5          | 0.319                   | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.345 | 0.347 | 0.349 |
| -4.0          | 0.320                   | 0.321 | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 | 0.343 | 0.345 | 0.347 | 0.349 |
| -3.5          | 0.320                   | 0.322 | 0.324 | 0.326 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 | 0.343 | 0.346 | 0.348 | 0.350 |
| -3.0          | 0.320                   | 0.322 | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.344 | 0.346 | 0.348 | 0.350 |
| -2.5          | 0.321                   | 0.323 | 0.325 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.344 | 0.347 | 0.349 | 0.351 |
| -2.0          | 0.321                   | 0.323 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 | 0.343 | 0.345 | 0.347 | 0.349 | 0.351 |
| -1.5          | 0.322                   | 0.324 | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 | 0.343 | 0.345 | 0.348 | 0.350 | 0.352 |

**COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000**

| TEMP<br>DEG F | API GRAVITY AT 60 DEG F |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|---------------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|               | 16.0                    | 16.5  | 17.0  | 17.5  | 18.0  | 18.5  | 19.0  | 19.5  | 20.0  | 20.5  | 21.0  | 21.5  | 22.0  | 22.5  | 23.0  | 23.5  |
| -1.0          | 0.322                   | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.344 | 0.346 | 0.348 | 0.350 | 0.352 |
| -0.5          | 0.323                   | 0.324 | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.344 | 0.346 | 0.349 | 0.351 | 0.353 |
| 0.0           | 0.323                   | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 | 0.343 | 0.345 | 0.347 | 0.349 | 0.351 | 0.353 |
| 0.5           | 0.323                   | 0.325 | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 | 0.343 | 0.345 | 0.347 | 0.350 | 0.352 | 0.354 |
| 1.0           | 0.324                   | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.344 | 0.346 | 0.348 | 0.350 | 0.352 | 0.354 |
| 1.5           | 0.324                   | 0.326 | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.344 | 0.346 | 0.348 | 0.351 | 0.353 | 0.355 |
| 2.0           | 0.325                   | 0.327 | 0.329 | 0.330 | 0.332 | 0.334 | 0.336 | 0.339 | 0.341 | 0.343 | 0.345 | 0.347 | 0.349 | 0.351 | 0.353 | 0.355 |
| 2.5           | 0.325                   | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 | 0.343 | 0.345 | 0.347 | 0.349 | 0.352 | 0.354 | 0.356 |
| 3.0           | 0.326                   | 0.327 | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.342 | 0.344 | 0.346 | 0.348 | 0.350 | 0.352 | 0.354 | 0.357 |
| 3.5           | 0.326                   | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.344 | 0.346 | 0.348 | 0.350 | 0.353 | 0.355 | 0.357 |
| 4.0           | 0.326                   | 0.328 | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.345 | 0.347 | 0.349 | 0.351 | 0.353 | 0.355 | 0.358 |
| 4.5           | 0.327                   | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 | 0.343 | 0.345 | 0.347 | 0.349 | 0.351 | 0.354 | 0.356 | 0.358 |
| 5.0           | 0.327                   | 0.329 | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 | 0.343 | 0.346 | 0.348 | 0.350 | 0.352 | 0.354 | 0.356 | 0.359 |
| 5.5           | 0.328                   | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.344 | 0.346 | 0.348 | 0.350 | 0.352 | 0.355 | 0.357 | 0.359 |
| 6.0           | 0.328                   | 0.330 | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.344 | 0.347 | 0.349 | 0.351 | 0.353 | 0.355 | 0.357 | 0.360 |
| 6.5           | 0.329                   | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 | 0.343 | 0.345 | 0.347 | 0.349 | 0.351 | 0.354 | 0.356 | 0.358 | 0.360 |
| 7.0           | 0.329                   | 0.331 | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 | 0.343 | 0.345 | 0.347 | 0.350 | 0.352 | 0.354 | 0.356 | 0.358 | 0.361 |
| 7.5           | 0.329                   | 0.331 | 0.333 | 0.335 | 0.337 | 0.340 | 0.342 | 0.344 | 0.346 | 0.348 | 0.350 | 0.352 | 0.355 | 0.357 | 0.359 | 0.361 |
| 8.0           | 0.330                   | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.344 | 0.346 | 0.348 | 0.351 | 0.353 | 0.355 | 0.357 | 0.360 | 0.362 |
| 8.5           | 0.330                   | 0.332 | 0.334 | 0.336 | 0.338 | 0.340 | 0.343 | 0.345 | 0.347 | 0.349 | 0.351 | 0.353 | 0.356 | 0.358 | 0.360 | 0.362 |
| 9.0           | 0.331                   | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 | 0.343 | 0.345 | 0.347 | 0.349 | 0.352 | 0.354 | 0.356 | 0.358 | 0.361 | 0.363 |
| 9.5           | 0.331                   | 0.333 | 0.335 | 0.337 | 0.339 | 0.341 | 0.344 | 0.346 | 0.348 | 0.350 | 0.352 | 0.354 | 0.357 | 0.359 | 0.361 | 0.363 |
| 10.0          | 0.332                   | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.344 | 0.346 | 0.348 | 0.350 | 0.353 | 0.355 | 0.357 | 0.359 | 0.362 | 0.364 |
| 10.5          | 0.332                   | 0.334 | 0.336 | 0.338 | 0.340 | 0.342 | 0.344 | 0.347 | 0.349 | 0.351 | 0.353 | 0.355 | 0.358 | 0.360 | 0.362 | 0.364 |
| 11.0          | 0.333                   | 0.335 | 0.337 | 0.339 | 0.341 | 0.343 | 0.345 | 0.347 | 0.349 | 0.351 | 0.354 | 0.356 | 0.358 | 0.360 | 0.363 | 0.365 |
| 11.5          | 0.333                   | 0.335 | 0.337 | 0.339 | 0.341 | 0.343 | 0.345 | 0.348 | 0.350 | 0.352 | 0.354 | 0.356 | 0.359 | 0.361 | 0.363 | 0.366 |
| 12.0          | 0.333                   | 0.335 | 0.338 | 0.340 | 0.342 | 0.344 | 0.346 | 0.348 | 0.350 | 0.352 | 0.355 | 0.357 | 0.359 | 0.361 | 0.364 | 0.366 |
| 12.5          | 0.334                   | 0.336 | 0.338 | 0.340 | 0.342 | 0.344 | 0.346 | 0.349 | 0.351 | 0.353 | 0.355 | 0.357 | 0.360 | 0.362 | 0.364 | 0.367 |
| 13.0          | 0.334                   | 0.336 | 0.338 | 0.341 | 0.343 | 0.345 | 0.347 | 0.349 | 0.351 | 0.353 | 0.356 | 0.358 | 0.360 | 0.362 | 0.365 | 0.367 |
| 13.5          | 0.335                   | 0.337 | 0.339 | 0.341 | 0.343 | 0.345 | 0.347 | 0.350 | 0.352 | 0.354 | 0.356 | 0.358 | 0.361 | 0.363 | 0.365 | 0.368 |
| 14.0          | 0.335                   | 0.337 | 0.339 | 0.341 | 0.344 | 0.346 | 0.348 | 0.350 | 0.352 | 0.354 | 0.357 | 0.359 | 0.361 | 0.364 | 0.366 | 0.368 |
| 14.5          | 0.336                   | 0.338 | 0.340 | 0.342 | 0.344 | 0.346 | 0.348 | 0.351 | 0.353 | 0.355 | 0.357 | 0.359 | 0.362 | 0.364 | 0.366 | 0.369 |
| 15.0          | 0.336                   | 0.338 | 0.340 | 0.342 | 0.344 | 0.347 | 0.349 | 0.351 | 0.353 | 0.355 | 0.358 | 0.360 | 0.362 | 0.365 | 0.367 | 0.369 |
| 15.5          | 0.337                   | 0.339 | 0.341 | 0.343 | 0.345 | 0.347 | 0.349 | 0.351 | 0.354 | 0.356 | 0.358 | 0.360 | 0.363 | 0.365 | 0.367 | 0.370 |
| 16.0          | 0.337                   | 0.339 | 0.341 | 0.343 | 0.345 | 0.348 | 0.350 | 0.352 | 0.354 | 0.356 | 0.359 | 0.361 | 0.363 | 0.366 | 0.368 | 0.370 |
| 16.5          | 0.337                   | 0.340 | 0.342 | 0.344 | 0.346 | 0.348 | 0.350 | 0.352 | 0.355 | 0.357 | 0.359 | 0.362 | 0.364 | 0.366 | 0.369 | 0.371 |
| 17.0          | 0.338                   | 0.340 | 0.342 | 0.344 | 0.346 | 0.349 | 0.351 | 0.353 | 0.355 | 0.357 | 0.360 | 0.362 | 0.364 | 0.367 | 0.369 | 0.371 |
| 17.5          | 0.338                   | 0.340 | 0.343 | 0.345 | 0.347 | 0.349 | 0.351 | 0.353 | 0.356 | 0.358 | 0.360 | 0.363 | 0.365 | 0.367 | 0.370 | 0.372 |

COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000

| TEMP<br>DEG F | API GRAVITY AT 60 DEG F |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|---------------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|               | 16.0                    | 16.5  | 17.0  | 17.5  | 18.0  | 18.5  | 19.0  | 19.5  | 20.0  | 20.5  | 21.0  | 21.5  | 22.0  | 22.5  | 23.0  | 23.5  |
| 18.0          | 0.339                   | 0.341 | 0.343 | 0.345 | 0.347 | 0.350 | 0.352 | 0.354 | 0.356 | 0.358 | 0.361 | 0.363 | 0.365 | 0.368 | 0.370 | 0.373 |
| 18.5          | 0.339                   | 0.341 | 0.343 | 0.346 | 0.348 | 0.350 | 0.352 | 0.354 | 0.357 | 0.359 | 0.361 | 0.364 | 0.366 | 0.368 | 0.371 | 0.373 |
| 19.0          | 0.340                   | 0.342 | 0.344 | 0.346 | 0.348 | 0.350 | 0.353 | 0.355 | 0.357 | 0.359 | 0.362 | 0.364 | 0.366 | 0.369 | 0.371 | 0.374 |
| 19.5          | 0.340                   | 0.342 | 0.344 | 0.347 | 0.349 | 0.351 | 0.353 | 0.355 | 0.358 | 0.360 | 0.362 | 0.365 | 0.367 | 0.369 | 0.372 | 0.374 |
| 20.0          | 0.341                   | 0.343 | 0.345 | 0.347 | 0.349 | 0.351 | 0.354 | 0.356 | 0.358 | 0.360 | 0.363 | 0.365 | 0.368 | 0.370 | 0.372 | 0.375 |
| 20.5          | 0.341                   | 0.343 | 0.345 | 0.348 | 0.350 | 0.352 | 0.354 | 0.356 | 0.359 | 0.361 | 0.363 | 0.366 | 0.368 | 0.370 | 0.373 | 0.375 |
| 21.0          | 0.342                   | 0.344 | 0.346 | 0.348 | 0.350 | 0.352 | 0.355 | 0.357 | 0.359 | 0.362 | 0.364 | 0.366 | 0.369 | 0.371 | 0.373 | 0.376 |
| 21.5          | 0.342                   | 0.344 | 0.346 | 0.348 | 0.351 | 0.353 | 0.355 | 0.357 | 0.360 | 0.362 | 0.364 | 0.367 | 0.369 | 0.371 | 0.374 | 0.376 |
| 22.0          | 0.342                   | 0.345 | 0.347 | 0.349 | 0.351 | 0.353 | 0.356 | 0.358 | 0.360 | 0.363 | 0.365 | 0.367 | 0.370 | 0.372 | 0.374 | 0.377 |
| 22.5          | 0.343                   | 0.345 | 0.347 | 0.349 | 0.352 | 0.354 | 0.356 | 0.358 | 0.361 | 0.363 | 0.365 | 0.368 | 0.370 | 0.373 | 0.375 | 0.377 |
| 23.0          | 0.343                   | 0.346 | 0.348 | 0.350 | 0.352 | 0.354 | 0.357 | 0.359 | 0.361 | 0.364 | 0.366 | 0.368 | 0.371 | 0.373 | 0.376 | 0.378 |
| 23.5          | 0.344                   | 0.346 | 0.348 | 0.350 | 0.353 | 0.355 | 0.357 | 0.359 | 0.362 | 0.364 | 0.366 | 0.369 | 0.371 | 0.374 | 0.376 | 0.379 |
| 24.0          | 0.344                   | 0.346 | 0.349 | 0.351 | 0.353 | 0.355 | 0.358 | 0.360 | 0.362 | 0.365 | 0.367 | 0.369 | 0.372 | 0.374 | 0.377 | 0.379 |
| 24.5          | 0.345                   | 0.347 | 0.349 | 0.351 | 0.354 | 0.356 | 0.358 | 0.360 | 0.363 | 0.365 | 0.367 | 0.370 | 0.372 | 0.375 | 0.377 | 0.380 |
| 25.0          | 0.345                   | 0.347 | 0.350 | 0.352 | 0.354 | 0.356 | 0.359 | 0.361 | 0.363 | 0.366 | 0.368 | 0.370 | 0.373 | 0.375 | 0.378 | 0.380 |
| 25.5          | 0.346                   | 0.348 | 0.350 | 0.352 | 0.355 | 0.357 | 0.359 | 0.361 | 0.364 | 0.366 | 0.369 | 0.371 | 0.373 | 0.376 | 0.378 | 0.381 |
| 26.0          | 0.346                   | 0.348 | 0.351 | 0.353 | 0.355 | 0.357 | 0.360 | 0.362 | 0.364 | 0.367 | 0.369 | 0.371 | 0.374 | 0.376 | 0.379 | 0.381 |
| 26.5          | 0.347                   | 0.349 | 0.351 | 0.353 | 0.356 | 0.358 | 0.360 | 0.362 | 0.365 | 0.367 | 0.370 | 0.372 | 0.374 | 0.377 | 0.379 | 0.382 |
| 27.0          | 0.347                   | 0.349 | 0.351 | 0.354 | 0.356 | 0.358 | 0.361 | 0.363 | 0.365 | 0.368 | 0.370 | 0.373 | 0.375 | 0.377 | 0.380 | 0.382 |
| 27.5          | 0.348                   | 0.350 | 0.352 | 0.354 | 0.356 | 0.359 | 0.361 | 0.363 | 0.366 | 0.368 | 0.371 | 0.373 | 0.376 | 0.378 | 0.381 | 0.383 |
| 28.0          | 0.348                   | 0.350 | 0.352 | 0.355 | 0.357 | 0.359 | 0.362 | 0.364 | 0.366 | 0.369 | 0.371 | 0.374 | 0.376 | 0.379 | 0.381 | 0.384 |
| 28.5          | 0.348                   | 0.351 | 0.353 | 0.355 | 0.357 | 0.360 | 0.362 | 0.364 | 0.367 | 0.369 | 0.372 | 0.374 | 0.377 | 0.379 | 0.382 | 0.384 |
| 29.0          | 0.349                   | 0.351 | 0.353 | 0.356 | 0.358 | 0.360 | 0.363 | 0.365 | 0.367 | 0.370 | 0.372 | 0.375 | 0.377 | 0.380 | 0.382 | 0.385 |
| 29.5          | 0.349                   | 0.352 | 0.354 | 0.356 | 0.358 | 0.361 | 0.363 | 0.365 | 0.368 | 0.370 | 0.373 | 0.375 | 0.378 | 0.380 | 0.383 | 0.385 |
| 30.0          | 0.350                   | 0.352 | 0.354 | 0.357 | 0.359 | 0.361 | 0.364 | 0.366 | 0.368 | 0.371 | 0.373 | 0.376 | 0.378 | 0.381 | 0.383 | 0.386 |
| 30.5          | 0.350                   | 0.353 | 0.355 | 0.357 | 0.359 | 0.362 | 0.364 | 0.366 | 0.369 | 0.371 | 0.374 | 0.376 | 0.379 | 0.381 | 0.384 | 0.386 |
| 31.0          | 0.351                   | 0.353 | 0.355 | 0.358 | 0.360 | 0.362 | 0.365 | 0.367 | 0.369 | 0.372 | 0.374 | 0.377 | 0.379 | 0.382 | 0.384 | 0.387 |
| 31.5          | 0.351                   | 0.353 | 0.356 | 0.358 | 0.360 | 0.363 | 0.365 | 0.368 | 0.370 | 0.372 | 0.375 | 0.377 | 0.380 | 0.382 | 0.385 | 0.388 |
| 32.0          | 0.352                   | 0.354 | 0.356 | 0.359 | 0.361 | 0.363 | 0.366 | 0.368 | 0.370 | 0.373 | 0.375 | 0.378 | 0.380 | 0.383 | 0.386 | 0.388 |
| 32.5          | 0.352                   | 0.354 | 0.357 | 0.359 | 0.361 | 0.364 | 0.366 | 0.369 | 0.371 | 0.373 | 0.376 | 0.378 | 0.381 | 0.384 | 0.386 | 0.389 |
| 33.0          | 0.353                   | 0.355 | 0.357 | 0.360 | 0.362 | 0.364 | 0.367 | 0.369 | 0.371 | 0.374 | 0.376 | 0.379 | 0.382 | 0.384 | 0.387 | 0.389 |
| 33.5          | 0.353                   | 0.355 | 0.358 | 0.360 | 0.362 | 0.365 | 0.367 | 0.370 | 0.372 | 0.374 | 0.377 | 0.380 | 0.382 | 0.385 | 0.387 | 0.390 |
| 34.0          | 0.354                   | 0.356 | 0.358 | 0.361 | 0.363 | 0.365 | 0.368 | 0.370 | 0.373 | 0.375 | 0.378 | 0.380 | 0.383 | 0.385 | 0.388 | 0.390 |
| 34.5          | 0.354                   | 0.356 | 0.359 | 0.361 | 0.363 | 0.366 | 0.368 | 0.371 | 0.373 | 0.376 | 0.378 | 0.381 | 0.383 | 0.386 | 0.388 | 0.391 |
| 35.0          | 0.355                   | 0.357 | 0.359 | 0.362 | 0.364 | 0.366 | 0.369 | 0.371 | 0.374 | 0.376 | 0.379 | 0.381 | 0.384 | 0.386 | 0.389 | 0.392 |
| 35.5          | 0.355                   | 0.357 | 0.360 | 0.362 | 0.364 | 0.367 | 0.369 | 0.372 | 0.374 | 0.377 | 0.379 | 0.382 | 0.384 | 0.387 | 0.389 | 0.392 |
| 36.0          | 0.355                   | 0.358 | 0.360 | 0.362 | 0.365 | 0.367 | 0.370 | 0.372 | 0.375 | 0.377 | 0.380 | 0.382 | 0.385 | 0.387 | 0.390 | 0.393 |
| 36.5          | 0.356                   | 0.358 | 0.361 | 0.363 | 0.365 | 0.368 | 0.370 | 0.373 | 0.375 | 0.378 | 0.380 | 0.383 | 0.385 | 0.388 | 0.391 | 0.393 |

**COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000**  
**API GRAVITY AT 60 DEG F**

| TEMP<br>DEG F | 16.0  | 16.5  | 17.0  | 17.5  | 18.0  | 18.5  | 19.0  | 19.5  | 20.0  | 20.5  | 21.0  | 21.5  | 22.0  | 22.5  | 23.0  | 23.5  |
|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 37.0          | 0.356 | 0.359 | 0.361 | 0.363 | 0.366 | 0.368 | 0.371 | 0.373 | 0.376 | 0.378 | 0.381 | 0.383 | 0.386 | 0.389 | 0.391 | 0.394 |
| 37.5          | 0.357 | 0.359 | 0.362 | 0.364 | 0.366 | 0.369 | 0.371 | 0.374 | 0.376 | 0.379 | 0.381 | 0.384 | 0.386 | 0.389 | 0.392 | 0.394 |
| 38.0          | 0.357 | 0.360 | 0.362 | 0.364 | 0.367 | 0.369 | 0.372 | 0.374 | 0.377 | 0.379 | 0.382 | 0.384 | 0.387 | 0.390 | 0.392 | 0.395 |
| 38.5          | 0.358 | 0.360 | 0.363 | 0.365 | 0.367 | 0.370 | 0.372 | 0.375 | 0.377 | 0.380 | 0.382 | 0.385 | 0.388 | 0.390 | 0.393 | 0.396 |
| 39.0          | 0.358 | 0.361 | 0.363 | 0.365 | 0.368 | 0.370 | 0.373 | 0.375 | 0.378 | 0.380 | 0.383 | 0.386 | 0.388 | 0.391 | 0.393 | 0.396 |
| 39.5          | 0.359 | 0.361 | 0.364 | 0.366 | 0.368 | 0.371 | 0.373 | 0.376 | 0.378 | 0.381 | 0.383 | 0.386 | 0.389 | 0.391 | 0.394 | 0.397 |
| 40.0          | 0.359 | 0.362 | 0.364 | 0.366 | 0.369 | 0.371 | 0.374 | 0.376 | 0.379 | 0.381 | 0.384 | 0.387 | 0.389 | 0.392 | 0.395 | 0.397 |
| 40.5          | 0.360 | 0.362 | 0.365 | 0.367 | 0.369 | 0.372 | 0.374 | 0.377 | 0.379 | 0.382 | 0.385 | 0.387 | 0.390 | 0.393 | 0.395 | 0.398 |
| 41.0          | 0.360 | 0.363 | 0.365 | 0.367 | 0.370 | 0.372 | 0.375 | 0.377 | 0.380 | 0.383 | 0.385 | 0.388 | 0.390 | 0.393 | 0.396 | 0.399 |
| 41.5          | 0.361 | 0.363 | 0.366 | 0.368 | 0.370 | 0.373 | 0.375 | 0.378 | 0.380 | 0.383 | 0.386 | 0.388 | 0.391 | 0.394 | 0.396 | 0.399 |
| 42.0          | 0.361 | 0.364 | 0.366 | 0.368 | 0.371 | 0.373 | 0.376 | 0.378 | 0.381 | 0.384 | 0.386 | 0.389 | 0.392 | 0.394 | 0.397 | 0.400 |
| 42.5          | 0.362 | 0.364 | 0.367 | 0.369 | 0.371 | 0.374 | 0.376 | 0.379 | 0.382 | 0.384 | 0.387 | 0.389 | 0.392 | 0.395 | 0.398 | 0.400 |
| 43.0          | 0.362 | 0.365 | 0.367 | 0.369 | 0.372 | 0.374 | 0.377 | 0.379 | 0.382 | 0.385 | 0.387 | 0.390 | 0.393 | 0.395 | 0.398 | 0.401 |
| 43.5          | 0.363 | 0.365 | 0.367 | 0.370 | 0.372 | 0.375 | 0.377 | 0.380 | 0.383 | 0.385 | 0.388 | 0.391 | 0.393 | 0.396 | 0.399 | 0.401 |
| 44.0          | 0.363 | 0.366 | 0.368 | 0.370 | 0.373 | 0.375 | 0.378 | 0.381 | 0.383 | 0.386 | 0.388 | 0.391 | 0.394 | 0.397 | 0.399 | 0.402 |
| 44.5          | 0.364 | 0.366 | 0.368 | 0.371 | 0.373 | 0.376 | 0.379 | 0.381 | 0.384 | 0.386 | 0.389 | 0.392 | 0.394 | 0.397 | 0.400 | 0.403 |
| 45.0          | 0.364 | 0.367 | 0.369 | 0.371 | 0.374 | 0.376 | 0.379 | 0.382 | 0.384 | 0.387 | 0.390 | 0.392 | 0.395 | 0.398 | 0.400 | 0.403 |
| 45.5          | 0.365 | 0.367 | 0.369 | 0.372 | 0.374 | 0.377 | 0.380 | 0.382 | 0.385 | 0.387 | 0.390 | 0.393 | 0.395 | 0.398 | 0.401 | 0.404 |
| 46.0          | 0.365 | 0.368 | 0.370 | 0.372 | 0.375 | 0.378 | 0.380 | 0.383 | 0.385 | 0.388 | 0.391 | 0.393 | 0.396 | 0.399 | 0.402 | 0.404 |
| 46.5          | 0.366 | 0.368 | 0.370 | 0.373 | 0.376 | 0.378 | 0.381 | 0.383 | 0.386 | 0.388 | 0.391 | 0.394 | 0.397 | 0.399 | 0.402 | 0.405 |
| 47.0          | 0.366 | 0.369 | 0.371 | 0.373 | 0.376 | 0.379 | 0.381 | 0.384 | 0.386 | 0.389 | 0.392 | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 |
| 47.5          | 0.367 | 0.369 | 0.371 | 0.374 | 0.377 | 0.379 | 0.382 | 0.384 | 0.387 | 0.390 | 0.392 | 0.395 | 0.398 | 0.401 | 0.403 | 0.406 |
| 48.0          | 0.367 | 0.369 | 0.372 | 0.375 | 0.377 | 0.380 | 0.382 | 0.385 | 0.387 | 0.390 | 0.393 | 0.396 | 0.398 | 0.401 | 0.404 | 0.407 |
| 48.5          | 0.368 | 0.370 | 0.372 | 0.375 | 0.378 | 0.380 | 0.383 | 0.385 | 0.388 | 0.391 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.407 |
| 49.0          | 0.368 | 0.370 | 0.373 | 0.376 | 0.378 | 0.381 | 0.383 | 0.386 | 0.389 | 0.391 | 0.394 | 0.397 | 0.399 | 0.402 | 0.405 | 0.408 |
| 49.5          | 0.369 | 0.371 | 0.373 | 0.376 | 0.379 | 0.381 | 0.384 | 0.386 | 0.389 | 0.392 | 0.395 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 |
| 50.0          | 0.369 | 0.371 | 0.374 | 0.377 | 0.379 | 0.382 | 0.384 | 0.387 | 0.390 | 0.392 | 0.395 | 0.398 | 0.401 | 0.403 | 0.406 | 0.409 |
| 50.5          | 0.369 | 0.372 | 0.375 | 0.377 | 0.380 | 0.382 | 0.385 | 0.388 | 0.390 | 0.393 | 0.396 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 |
| 51.0          | 0.370 | 0.372 | 0.375 | 0.378 | 0.380 | 0.383 | 0.385 | 0.388 | 0.391 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.407 | 0.410 |
| 51.5          | 0.370 | 0.373 | 0.376 | 0.378 | 0.381 | 0.383 | 0.386 | 0.389 | 0.391 | 0.394 | 0.397 | 0.400 | 0.402 | 0.405 | 0.408 | 0.411 |
| 52.0          | 0.371 | 0.373 | 0.376 | 0.379 | 0.381 | 0.384 | 0.386 | 0.389 | 0.392 | 0.395 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.412 |
| 52.5          | 0.371 | 0.374 | 0.377 | 0.379 | 0.382 | 0.384 | 0.387 | 0.390 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.406 | 0.409 | 0.412 |
| 53.0          | 0.372 | 0.374 | 0.377 | 0.380 | 0.382 | 0.385 | 0.388 | 0.390 | 0.393 | 0.396 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.413 |
| 53.5          | 0.372 | 0.375 | 0.378 | 0.380 | 0.383 | 0.385 | 0.388 | 0.391 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 | 0.410 | 0.413 |
| 54.0          | 0.373 | 0.375 | 0.378 | 0.381 | 0.383 | 0.386 | 0.389 | 0.391 | 0.394 | 0.397 | 0.400 | 0.402 | 0.405 | 0.408 | 0.411 | 0.414 |
| 54.5          | 0.373 | 0.376 | 0.379 | 0.381 | 0.384 | 0.386 | 0.389 | 0.392 | 0.395 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.412 | 0.415 |
| 55.0          | 0.374 | 0.376 | 0.379 | 0.382 | 0.384 | 0.387 | 0.390 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.406 | 0.409 | 0.412 | 0.415 |
| 55.5          | 0.374 | 0.377 | 0.380 | 0.382 | 0.385 | 0.388 | 0.390 | 0.393 | 0.396 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.413 | 0.416 |

COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000

| TEMP<br>DEG F | API GRAVITY AT 60 DEG F |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|---------------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|               | 16.0                    | 16.5  | 17.0  | 17.5  | 18.0  | 18.5  | 19.0  | 19.5  | 20.0  | 20.5  | 21.0  | 21.5  | 22.0  | 22.5  | 23.0  | 23.5  |
| 56.0          | 0.375                   | 0.378 | 0.380 | 0.383 | 0.385 | 0.388 | 0.391 | 0.394 | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.413 | 0.416 |
| 56.5          | 0.375                   | 0.378 | 0.381 | 0.383 | 0.386 | 0.389 | 0.391 | 0.394 | 0.397 | 0.400 | 0.402 | 0.405 | 0.408 | 0.411 | 0.414 | 0.417 |
| 57.0          | 0.376                   | 0.379 | 0.381 | 0.384 | 0.386 | 0.389 | 0.392 | 0.395 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.412 | 0.415 | 0.418 |
| 57.5          | 0.376                   | 0.379 | 0.382 | 0.384 | 0.387 | 0.390 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.406 | 0.409 | 0.412 | 0.415 | 0.418 |
| 58.0          | 0.377                   | 0.380 | 0.382 | 0.385 | 0.388 | 0.390 | 0.393 | 0.396 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.413 | 0.416 | 0.419 |
| 58.5          | 0.377                   | 0.380 | 0.383 | 0.385 | 0.388 | 0.391 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.413 | 0.416 | 0.419 |
| 59.0          | 0.378                   | 0.381 | 0.383 | 0.386 | 0.389 | 0.391 | 0.394 | 0.397 | 0.400 | 0.402 | 0.405 | 0.408 | 0.411 | 0.414 | 0.417 | 0.420 |
| 59.5          | 0.378                   | 0.381 | 0.384 | 0.386 | 0.389 | 0.392 | 0.395 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.412 | 0.415 | 0.418 | 0.421 |
| 60.0          | 0.379                   | 0.382 | 0.384 | 0.387 | 0.390 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.406 | 0.409 | 0.412 | 0.415 | 0.418 | 0.421 |
| 60.5          | 0.379                   | 0.382 | 0.385 | 0.387 | 0.390 | 0.393 | 0.396 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.413 | 0.416 | 0.419 | 0.422 |
| 61.0          | 0.380                   | 0.383 | 0.385 | 0.388 | 0.391 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.414 | 0.416 | 0.420 | 0.423 |
| 61.5          | 0.380                   | 0.383 | 0.386 | 0.389 | 0.391 | 0.394 | 0.397 | 0.400 | 0.402 | 0.405 | 0.408 | 0.411 | 0.414 | 0.417 | 0.420 | 0.423 |
| 62.0          | 0.381                   | 0.384 | 0.386 | 0.389 | 0.392 | 0.395 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.412 | 0.415 | 0.418 | 0.421 | 0.424 |
| 62.5          | 0.382                   | 0.384 | 0.387 | 0.390 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.406 | 0.409 | 0.412 | 0.415 | 0.418 | 0.421 | 0.424 |
| 63.0          | 0.382                   | 0.385 | 0.387 | 0.390 | 0.393 | 0.396 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.413 | 0.416 | 0.419 | 0.422 | 0.425 |
| 63.5          | 0.383                   | 0.385 | 0.388 | 0.391 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.414 | 0.416 | 0.420 | 0.423 | 0.426 |
| 64.0          | 0.383                   | 0.386 | 0.388 | 0.391 | 0.394 | 0.397 | 0.400 | 0.402 | 0.405 | 0.408 | 0.411 | 0.414 | 0.417 | 0.420 | 0.423 | 0.426 |
| 64.5          | 0.384                   | 0.386 | 0.389 | 0.392 | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.412 | 0.415 | 0.418 | 0.421 | 0.424 | 0.427 |
| 65.0          | 0.384                   | 0.387 | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.406 | 0.409 | 0.412 | 0.415 | 0.418 | 0.421 | 0.424 | 0.428 |
| 65.5          | 0.385                   | 0.387 | 0.390 | 0.393 | 0.396 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.413 | 0.416 | 0.419 | 0.422 | 0.425 | 0.428 |
| 66.0          | 0.385                   | 0.388 | 0.391 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 | 0.410 | 0.413 | 0.416 | 0.420 | 0.423 | 0.426 | 0.429 |
| 66.5          | 0.386                   | 0.388 | 0.391 | 0.394 | 0.397 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.414 | 0.417 | 0.420 | 0.423 | 0.426 | 0.429 |
| 67.0          | 0.386                   | 0.389 | 0.392 | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.412 | 0.415 | 0.418 | 0.421 | 0.424 | 0.427 | 0.430 |
| 67.5          | 0.387                   | 0.389 | 0.392 | 0.395 | 0.398 | 0.401 | 0.403 | 0.406 | 0.409 | 0.412 | 0.415 | 0.418 | 0.421 | 0.424 | 0.428 | 0.431 |
| 68.0          | 0.387                   | 0.390 | 0.393 | 0.395 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.413 | 0.416 | 0.419 | 0.422 | 0.425 | 0.428 | 0.431 |
| 68.5          | 0.388                   | 0.390 | 0.393 | 0.396 | 0.399 | 0.402 | 0.405 | 0.407 | 0.410 | 0.413 | 0.416 | 0.419 | 0.423 | 0.426 | 0.429 | 0.432 |
| 69.0          | 0.388                   | 0.391 | 0.394 | 0.397 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.414 | 0.417 | 0.420 | 0.423 | 0.426 | 0.429 | 0.433 |
| 69.5          | 0.389                   | 0.391 | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.412 | 0.415 | 0.418 | 0.421 | 0.424 | 0.427 | 0.430 | 0.433 |
| 70.0          | 0.389                   | 0.392 | 0.395 | 0.398 | 0.400 | 0.403 | 0.406 | 0.409 | 0.412 | 0.415 | 0.418 | 0.421 | 0.424 | 0.427 | 0.431 | 0.434 |
| 70.5          | 0.390                   | 0.392 | 0.395 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.413 | 0.416 | 0.419 | 0.422 | 0.425 | 0.428 | 0.431 | 0.435 |
| 71.0          | 0.390                   | 0.393 | 0.396 | 0.399 | 0.402 | 0.404 | 0.407 | 0.410 | 0.413 | 0.416 | 0.419 | 0.422 | 0.426 | 0.429 | 0.432 | 0.435 |
| 71.5          | 0.391                   | 0.394 | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.414 | 0.417 | 0.420 | 0.423 | 0.426 | 0.429 | 0.433 | 0.436 |
| 72.0          | 0.391                   | 0.394 | 0.397 | 0.400 | 0.403 | 0.406 | 0.408 | 0.411 | 0.414 | 0.418 | 0.421 | 0.424 | 0.427 | 0.430 | 0.433 | 0.436 |
| 72.5          | 0.392                   | 0.395 | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.412 | 0.415 | 0.418 | 0.421 | 0.424 | 0.427 | 0.431 | 0.434 | 0.437 |
| 73.0          | 0.392                   | 0.395 | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.413 | 0.416 | 0.419 | 0.422 | 0.425 | 0.428 | 0.431 | 0.434 | 0.438 |
| 73.5          | 0.393                   | 0.396 | 0.399 | 0.401 | 0.404 | 0.407 | 0.410 | 0.413 | 0.416 | 0.419 | 0.422 | 0.425 | 0.429 | 0.432 | 0.435 | 0.438 |
| 74.0          | 0.393                   | 0.396 | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.414 | 0.417 | 0.420 | 0.423 | 0.426 | 0.429 | 0.432 | 0.436 | 0.439 |
| 74.5          | 0.394                   | 0.397 | 0.400 | 0.402 | 0.405 | 0.408 | 0.411 | 0.414 | 0.417 | 0.420 | 0.424 | 0.427 | 0.430 | 0.433 | 0.436 | 0.440 |

| COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000 |                         |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|-----------------------------------------------------------------------------------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| TEMP                                                                              | API GRAVITY AT 60 DEG F |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| DEG F                                                                             | 16.0                    | 16.5  | 17.0  | 17.5  | 18.0  | 18.5  | 19.0  | 19.5  | 20.0  | 20.5  | 21.0  | 21.5  | 22.0  | 22.5  | 23.0  | 23.5  |
| 75.0                                                                              | 0.394                   | 0.397 | 0.400 | 0.403 | 0.406 | 0.409 | 0.412 | 0.415 | 0.418 | 0.421 | 0.424 | 0.427 | 0.431 | 0.434 | 0.437 | 0.440 |
| 75.5                                                                              | 0.395                   | 0.398 | 0.401 | 0.404 | 0.407 | 0.409 | 0.412 | 0.415 | 0.419 | 0.422 | 0.425 | 0.428 | 0.431 | 0.434 | 0.438 | 0.441 |
| 76.0                                                                              | 0.395                   | 0.398 | 0.401 | 0.404 | 0.407 | 0.410 | 0.413 | 0.416 | 0.419 | 0.422 | 0.425 | 0.429 | 0.432 | 0.435 | 0.438 | 0.442 |
| 76.5                                                                              | 0.396                   | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.414 | 0.417 | 0.420 | 0.423 | 0.426 | 0.429 | 0.432 | 0.436 | 0.439 | 0.442 |
| 77.0                                                                              | 0.397                   | 0.399 | 0.402 | 0.405 | 0.408 | 0.411 | 0.414 | 0.417 | 0.420 | 0.423 | 0.427 | 0.430 | 0.433 | 0.436 | 0.440 | 0.443 |
| 77.5                                                                              | 0.397                   | 0.400 | 0.403 | 0.406 | 0.409 | 0.412 | 0.415 | 0.418 | 0.421 | 0.424 | 0.427 | 0.430 | 0.434 | 0.437 | 0.440 | 0.444 |
| 78.0                                                                              | 0.398                   | 0.400 | 0.403 | 0.406 | 0.409 | 0.412 | 0.415 | 0.418 | 0.421 | 0.425 | 0.428 | 0.431 | 0.434 | 0.438 | 0.441 | 0.444 |
| 78.5                                                                              | 0.398                   | 0.401 | 0.404 | 0.407 | 0.410 | 0.413 | 0.416 | 0.419 | 0.422 | 0.425 | 0.428 | 0.432 | 0.435 | 0.438 | 0.441 | 0.445 |
| 79.0                                                                              | 0.399                   | 0.402 | 0.404 | 0.407 | 0.410 | 0.413 | 0.416 | 0.420 | 0.423 | 0.426 | 0.429 | 0.432 | 0.435 | 0.439 | 0.442 | 0.445 |
| 79.5                                                                              | 0.399                   | 0.402 | 0.405 | 0.408 | 0.411 | 0.414 | 0.417 | 0.420 | 0.423 | 0.426 | 0.430 | 0.433 | 0.436 | 0.439 | 0.443 | 0.446 |
| 80.0                                                                              | 0.400                   | 0.403 | 0.406 | 0.409 | 0.412 | 0.415 | 0.418 | 0.421 | 0.424 | 0.427 | 0.430 | 0.433 | 0.437 | 0.440 | 0.443 | 0.447 |
| 80.5                                                                              | 0.400                   | 0.403 | 0.406 | 0.409 | 0.412 | 0.415 | 0.418 | 0.421 | 0.424 | 0.428 | 0.431 | 0.434 | 0.437 | 0.441 | 0.444 | 0.447 |
| 81.0                                                                              | 0.401                   | 0.404 | 0.407 | 0.410 | 0.413 | 0.416 | 0.419 | 0.422 | 0.425 | 0.428 | 0.431 | 0.435 | 0.438 | 0.441 | 0.445 | 0.448 |
| 81.5                                                                              | 0.401                   | 0.404 | 0.407 | 0.410 | 0.413 | 0.416 | 0.419 | 0.422 | 0.426 | 0.429 | 0.432 | 0.435 | 0.439 | 0.442 | 0.445 | 0.449 |
| 82.0                                                                              | 0.402                   | 0.405 | 0.408 | 0.411 | 0.414 | 0.417 | 0.420 | 0.423 | 0.426 | 0.429 | 0.433 | 0.436 | 0.439 | 0.443 | 0.446 | 0.449 |
| 82.5                                                                              | 0.402                   | 0.405 | 0.408 | 0.411 | 0.414 | 0.417 | 0.421 | 0.424 | 0.427 | 0.430 | 0.433 | 0.437 | 0.440 | 0.443 | 0.447 | 0.450 |
| 83.0                                                                              | 0.403                   | 0.406 | 0.409 | 0.412 | 0.415 | 0.418 | 0.421 | 0.424 | 0.427 | 0.431 | 0.434 | 0.437 | 0.441 | 0.444 | 0.447 | 0.451 |
| 83.5                                                                              | 0.403                   | 0.406 | 0.409 | 0.412 | 0.416 | 0.419 | 0.422 | 0.425 | 0.428 | 0.431 | 0.435 | 0.438 | 0.441 | 0.445 | 0.448 | 0.451 |
| 84.0                                                                              | 0.404                   | 0.407 | 0.410 | 0.413 | 0.416 | 0.419 | 0.422 | 0.425 | 0.429 | 0.432 | 0.435 | 0.438 | 0.442 | 0.445 | 0.449 | 0.452 |
| 84.5                                                                              | 0.405                   | 0.408 | 0.411 | 0.414 | 0.417 | 0.420 | 0.423 | 0.426 | 0.429 | 0.433 | 0.436 | 0.439 | 0.442 | 0.446 | 0.449 | 0.453 |
| 85.0                                                                              | 0.405                   | 0.408 | 0.411 | 0.414 | 0.417 | 0.420 | 0.423 | 0.427 | 0.430 | 0.433 | 0.436 | 0.440 | 0.443 | 0.446 | 0.450 | 0.453 |
| 85.5                                                                              | 0.406                   | 0.409 | 0.412 | 0.415 | 0.418 | 0.421 | 0.424 | 0.427 | 0.430 | 0.434 | 0.437 | 0.440 | 0.444 | 0.447 | 0.451 | 0.454 |
| 86.0                                                                              | 0.406                   | 0.409 | 0.412 | 0.415 | 0.418 | 0.421 | 0.425 | 0.428 | 0.431 | 0.434 | 0.438 | 0.441 | 0.444 | 0.448 | 0.451 | 0.455 |
| 86.5                                                                              | 0.407                   | 0.410 | 0.413 | 0.416 | 0.419 | 0.422 | 0.425 | 0.428 | 0.432 | 0.435 | 0.438 | 0.442 | 0.445 | 0.448 | 0.452 | 0.455 |
| 87.0                                                                              | 0.407                   | 0.410 | 0.413 | 0.416 | 0.420 | 0.423 | 0.426 | 0.429 | 0.432 | 0.436 | 0.439 | 0.442 | 0.446 | 0.449 | 0.453 | 0.456 |
| 87.5                                                                              | 0.408                   | 0.411 | 0.414 | 0.417 | 0.420 | 0.423 | 0.426 | 0.430 | 0.433 | 0.436 | 0.440 | 0.443 | 0.446 | 0.450 | 0.453 | 0.457 |
| 88.0                                                                              | 0.408                   | 0.411 | 0.414 | 0.418 | 0.421 | 0.424 | 0.427 | 0.430 | 0.433 | 0.437 | 0.440 | 0.444 | 0.447 | 0.450 | 0.454 | 0.457 |
| 88.5                                                                              | 0.409                   | 0.412 | 0.415 | 0.418 | 0.421 | 0.424 | 0.428 | 0.431 | 0.434 | 0.437 | 0.441 | 0.444 | 0.448 | 0.451 | 0.455 | 0.458 |
| 89.0                                                                              | 0.409                   | 0.412 | 0.416 | 0.419 | 0.422 | 0.425 | 0.428 | 0.431 | 0.435 | 0.438 | 0.441 | 0.445 | 0.448 | 0.452 | 0.455 | 0.459 |
| 89.5                                                                              | 0.410                   | 0.413 | 0.416 | 0.419 | 0.422 | 0.426 | 0.429 | 0.432 | 0.435 | 0.439 | 0.442 | 0.445 | 0.449 | 0.452 | 0.456 | 0.459 |
| 90.0                                                                              | 0.411                   | 0.414 | 0.417 | 0.420 | 0.423 | 0.426 | 0.429 | 0.433 | 0.436 | 0.439 | 0.443 | 0.446 | 0.449 | 0.453 | 0.456 | 0.460 |
| 90.5                                                                              | 0.411                   | 0.414 | 0.417 | 0.420 | 0.424 | 0.427 | 0.430 | 0.433 | 0.437 | 0.440 | 0.443 | 0.447 | 0.450 | 0.454 | 0.457 | 0.461 |
| 91.0                                                                              | 0.412                   | 0.415 | 0.418 | 0.421 | 0.424 | 0.427 | 0.431 | 0.434 | 0.437 | 0.441 | 0.444 | 0.447 | 0.451 | 0.454 | 0.458 | 0.461 |
| 91.5                                                                              | 0.412                   | 0.415 | 0.418 | 0.422 | 0.425 | 0.428 | 0.431 | 0.434 | 0.438 | 0.441 | 0.445 | 0.448 | 0.451 | 0.455 | 0.459 | 0.462 |
| 92.0                                                                              | 0.413                   | 0.416 | 0.419 | 0.422 | 0.425 | 0.428 | 0.432 | 0.435 | 0.438 | 0.442 | 0.445 | 0.449 | 0.452 | 0.456 | 0.459 | 0.463 |
| 92.5                                                                              | 0.413                   | 0.416 | 0.420 | 0.423 | 0.426 | 0.429 | 0.432 | 0.436 | 0.439 | 0.442 | 0.446 | 0.449 | 0.453 | 0.456 | 0.460 | 0.463 |
| 93.0                                                                              | 0.414                   | 0.417 | 0.420 | 0.423 | 0.426 | 0.430 | 0.433 | 0.436 | 0.440 | 0.443 | 0.446 | 0.450 | 0.453 | 0.457 | 0.461 | 0.464 |
| 93.5                                                                              | 0.414                   | 0.417 | 0.421 | 0.424 | 0.427 | 0.430 | 0.434 | 0.437 | 0.440 | 0.444 | 0.447 | 0.451 | 0.454 | 0.458 | 0.461 | 0.465 |

COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000

| TEMP<br>DEG F | API GRAVITY AT 60 DEG F |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|---------------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|               | 16.0                    | 16.5  | 17.0  | 17.5  | 18.0  | 18.5  | 19.0  | 19.5  | 20.0  | 20.5  | 21.0  | 21.5  | 22.0  | 22.5  | 23.0  | 23.5  |
| 94.0          | 0.415                   | 0.418 | 0.421 | 0.424 | 0.428 | 0.431 | 0.434 | 0.437 | 0.441 | 0.444 | 0.448 | 0.451 | 0.455 | 0.458 | 0.462 | 0.465 |
| 94.5          | 0.415                   | 0.419 | 0.422 | 0.425 | 0.428 | 0.431 | 0.435 | 0.438 | 0.441 | 0.445 | 0.448 | 0.452 | 0.455 | 0.459 | 0.463 | 0.466 |
| 95.0          | 0.416                   | 0.419 | 0.422 | 0.426 | 0.429 | 0.432 | 0.435 | 0.439 | 0.442 | 0.446 | 0.449 | 0.452 | 0.456 | 0.460 | 0.463 | 0.467 |
| 95.5          | 0.417                   | 0.420 | 0.423 | 0.426 | 0.429 | 0.433 | 0.436 | 0.439 | 0.443 | 0.446 | 0.450 | 0.453 | 0.457 | 0.460 | 0.464 | 0.468 |
| 96.0          | 0.417                   | 0.420 | 0.423 | 0.427 | 0.430 | 0.433 | 0.437 | 0.440 | 0.443 | 0.447 | 0.450 | 0.454 | 0.457 | 0.461 | 0.465 | 0.468 |
| 96.5          | 0.418                   | 0.421 | 0.424 | 0.427 | 0.431 | 0.434 | 0.437 | 0.441 | 0.444 | 0.447 | 0.451 | 0.454 | 0.458 | 0.462 | 0.465 | 0.469 |
| 97.0          | 0.418                   | 0.421 | 0.425 | 0.428 | 0.431 | 0.434 | 0.438 | 0.441 | 0.445 | 0.448 | 0.452 | 0.455 | 0.459 | 0.462 | 0.466 | 0.470 |
| 97.5          | 0.419                   | 0.422 | 0.425 | 0.428 | 0.432 | 0.435 | 0.438 | 0.442 | 0.445 | 0.449 | 0.452 | 0.456 | 0.459 | 0.463 | 0.467 | 0.470 |
| 98.0          | 0.419                   | 0.423 | 0.426 | 0.429 | 0.432 | 0.436 | 0.439 | 0.442 | 0.446 | 0.449 | 0.453 | 0.456 | 0.460 | 0.464 | 0.467 | 0.471 |
| 98.5          | 0.420                   | 0.423 | 0.426 | 0.430 | 0.433 | 0.436 | 0.440 | 0.443 | 0.446 | 0.450 | 0.453 | 0.457 | 0.461 | 0.464 | 0.468 | 0.472 |
| 99.0          | 0.421                   | 0.424 | 0.427 | 0.430 | 0.434 | 0.437 | 0.440 | 0.444 | 0.447 | 0.451 | 0.454 | 0.458 | 0.461 | 0.465 | 0.469 | 0.472 |
| 99.5          | 0.421                   | 0.424 | 0.428 | 0.431 | 0.434 | 0.437 | 0.441 | 0.444 | 0.448 | 0.451 | 0.455 | 0.458 | 0.462 | 0.466 | 0.469 | 0.473 |
| 100.0         | 0.422                   | 0.425 | 0.428 | 0.431 | 0.435 | 0.438 | 0.441 | 0.445 | 0.448 | 0.452 | 0.455 | 0.459 | 0.463 | 0.466 | 0.470 | 0.474 |
| 100.5         | 0.422                   | 0.425 | 0.429 | 0.432 | 0.435 | 0.439 | 0.442 | 0.445 | 0.449 | 0.452 | 0.456 | 0.460 | 0.463 | 0.467 | 0.471 | 0.474 |
| 101.0         | 0.423                   | 0.426 | 0.429 | 0.433 | 0.436 | 0.439 | 0.443 | 0.446 | 0.450 | 0.453 | 0.457 | 0.460 | 0.464 | 0.468 | 0.471 | 0.475 |
| 101.5         | 0.423                   | 0.427 | 0.430 | 0.433 | 0.436 | 0.440 | 0.443 | 0.447 | 0.450 | 0.454 | 0.457 | 0.461 | 0.465 | 0.468 | 0.472 | 0.476 |
| 102.0         | 0.424                   | 0.427 | 0.430 | 0.434 | 0.437 | 0.440 | 0.444 | 0.447 | 0.451 | 0.454 | 0.458 | 0.462 | 0.465 | 0.469 | 0.473 | 0.477 |
| 102.5         | 0.424                   | 0.428 | 0.431 | 0.434 | 0.438 | 0.441 | 0.445 | 0.448 | 0.451 | 0.455 | 0.459 | 0.462 | 0.466 | 0.470 | 0.473 | 0.477 |
| 103.0         | 0.425                   | 0.428 | 0.432 | 0.435 | 0.438 | 0.442 | 0.445 | 0.449 | 0.452 | 0.456 | 0.459 | 0.463 | 0.467 | 0.470 | 0.474 | 0.478 |
| 103.5         | 0.426                   | 0.429 | 0.432 | 0.435 | 0.439 | 0.442 | 0.446 | 0.449 | 0.453 | 0.456 | 0.460 | 0.464 | 0.467 | 0.471 | 0.475 | 0.479 |
| 104.0         | 0.426                   | 0.429 | 0.433 | 0.436 | 0.439 | 0.443 | 0.446 | 0.450 | 0.453 | 0.457 | 0.461 | 0.464 | 0.468 | 0.472 | 0.475 | 0.479 |
| 104.5         | 0.427                   | 0.430 | 0.433 | 0.437 | 0.440 | 0.444 | 0.447 | 0.450 | 0.454 | 0.458 | 0.461 | 0.465 | 0.469 | 0.472 | 0.476 | 0.480 |
| 105.0         | 0.427                   | 0.431 | 0.434 | 0.437 | 0.441 | 0.444 | 0.448 | 0.451 | 0.455 | 0.458 | 0.462 | 0.466 | 0.469 | 0.473 | 0.477 | 0.481 |
| 105.5         | 0.428                   | 0.431 | 0.434 | 0.438 | 0.441 | 0.445 | 0.448 | 0.452 | 0.455 | 0.459 | 0.463 | 0.466 | 0.470 | 0.474 | 0.478 | 0.481 |
| 106.0         | 0.428                   | 0.432 | 0.435 | 0.438 | 0.442 | 0.445 | 0.449 | 0.452 | 0.456 | 0.460 | 0.463 | 0.467 | 0.471 | 0.474 | 0.478 | 0.482 |
| 106.5         | 0.429                   | 0.432 | 0.436 | 0.439 | 0.442 | 0.446 | 0.449 | 0.453 | 0.457 | 0.460 | 0.464 | 0.468 | 0.471 | 0.475 | 0.479 | 0.483 |
| 107.0         | 0.430                   | 0.433 | 0.436 | 0.440 | 0.443 | 0.447 | 0.450 | 0.454 | 0.457 | 0.461 | 0.465 | 0.468 | 0.472 | 0.476 | 0.480 | 0.484 |
| 107.5         | 0.430                   | 0.433 | 0.437 | 0.440 | 0.444 | 0.447 | 0.451 | 0.454 | 0.458 | 0.462 | 0.465 | 0.469 | 0.473 | 0.477 | 0.480 | 0.484 |
| 108.0         | 0.431                   | 0.434 | 0.437 | 0.441 | 0.444 | 0.448 | 0.451 | 0.455 | 0.459 | 0.462 | 0.466 | 0.470 | 0.473 | 0.477 | 0.481 | 0.485 |
| 108.5         | 0.431                   | 0.435 | 0.438 | 0.441 | 0.445 | 0.448 | 0.452 | 0.456 | 0.459 | 0.463 | 0.467 | 0.470 | 0.474 | 0.478 | 0.482 | 0.486 |
| 109.0         | 0.432                   | 0.435 | 0.439 | 0.442 | 0.446 | 0.449 | 0.453 | 0.456 | 0.460 | 0.463 | 0.467 | 0.471 | 0.475 | 0.479 | 0.482 | 0.486 |
| 109.5         | 0.432                   | 0.436 | 0.439 | 0.443 | 0.446 | 0.450 | 0.453 | 0.457 | 0.460 | 0.464 | 0.468 | 0.472 | 0.475 | 0.479 | 0.483 | 0.487 |
| 110.0         | 0.433                   | 0.436 | 0.440 | 0.443 | 0.447 | 0.450 | 0.454 | 0.457 | 0.461 | 0.465 | 0.469 | 0.472 | 0.476 | 0.480 | 0.484 | 0.488 |
| 110.5         | 0.434                   | 0.437 | 0.440 | 0.444 | 0.447 | 0.451 | 0.454 | 0.458 | 0.462 | 0.465 | 0.469 | 0.473 | 0.477 | 0.481 | 0.485 | 0.489 |
| 111.0         | 0.434                   | 0.438 | 0.441 | 0.444 | 0.448 | 0.452 | 0.455 | 0.459 | 0.462 | 0.466 | 0.470 | 0.474 | 0.477 | 0.481 | 0.485 | 0.489 |
| 111.5         | 0.435                   | 0.438 | 0.442 | 0.445 | 0.449 | 0.452 | 0.456 | 0.459 | 0.463 | 0.467 | 0.471 | 0.474 | 0.478 | 0.482 | 0.486 | 0.490 |
| 112.0         | 0.435                   | 0.439 | 0.442 | 0.446 | 0.449 | 0.453 | 0.456 | 0.460 | 0.464 | 0.467 | 0.471 | 0.475 | 0.479 | 0.483 | 0.487 | 0.491 |
| 112.5         | 0.436                   | 0.439 | 0.443 | 0.446 | 0.450 | 0.453 | 0.457 | 0.461 | 0.464 | 0.468 | 0.472 | 0.476 | 0.480 | 0.483 | 0.487 | 0.491 |

COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000  
API GRAVITY AT 60 DEG F

| TEMP<br>DEG F | 16.0  | 16.5  | 17.0  | 17.5  | 18.0  | 18.5  | 19.0  | 19.5  | 20.0  | 20.5  | 21.0  | 21.5  | 22.0  | 22.5  | 23.0  | 23.5  |
|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 113.0         | 0.436 | 0.440 | 0.443 | 0.447 | 0.450 | 0.454 | 0.458 | 0.461 | 0.465 | 0.469 | 0.473 | 0.476 | 0.480 | 0.484 | 0.488 | 0.492 |
| 113.5         | 0.437 | 0.441 | 0.444 | 0.447 | 0.451 | 0.455 | 0.458 | 0.462 | 0.466 | 0.469 | 0.473 | 0.477 | 0.481 | 0.485 | 0.489 | 0.493 |
| 114.0         | 0.438 | 0.441 | 0.445 | 0.448 | 0.452 | 0.455 | 0.459 | 0.463 | 0.466 | 0.470 | 0.474 | 0.478 | 0.482 | 0.486 | 0.490 | 0.494 |
| 114.5         | 0.438 | 0.442 | 0.445 | 0.449 | 0.452 | 0.456 | 0.460 | 0.463 | 0.467 | 0.471 | 0.475 | 0.478 | 0.482 | 0.486 | 0.490 | 0.494 |
| 115.0         | 0.439 | 0.442 | 0.446 | 0.449 | 0.453 | 0.457 | 0.460 | 0.464 | 0.468 | 0.471 | 0.475 | 0.479 | 0.483 | 0.487 | 0.491 | 0.495 |
| 115.5         | 0.439 | 0.443 | 0.446 | 0.450 | 0.454 | 0.457 | 0.461 | 0.465 | 0.468 | 0.472 | 0.476 | 0.480 | 0.484 | 0.488 | 0.492 | 0.496 |
| 116.0         | 0.440 | 0.443 | 0.447 | 0.451 | 0.454 | 0.458 | 0.461 | 0.465 | 0.469 | 0.473 | 0.477 | 0.480 | 0.484 | 0.488 | 0.492 | 0.496 |
| 116.5         | 0.441 | 0.444 | 0.448 | 0.451 | 0.455 | 0.458 | 0.462 | 0.466 | 0.470 | 0.473 | 0.477 | 0.481 | 0.485 | 0.489 | 0.493 | 0.497 |
| 117.0         | 0.441 | 0.445 | 0.448 | 0.452 | 0.455 | 0.459 | 0.463 | 0.466 | 0.470 | 0.474 | 0.478 | 0.482 | 0.486 | 0.490 | 0.494 | 0.498 |
| 117.5         | 0.442 | 0.445 | 0.449 | 0.452 | 0.456 | 0.460 | 0.463 | 0.467 | 0.471 | 0.475 | 0.479 | 0.483 | 0.486 | 0.491 | 0.495 | 0.499 |
| 118.0         | 0.442 | 0.446 | 0.449 | 0.453 | 0.457 | 0.460 | 0.464 | 0.468 | 0.472 | 0.475 | 0.479 | 0.483 | 0.487 | 0.491 | 0.495 | 0.499 |
| 118.5         | 0.443 | 0.446 | 0.450 | 0.454 | 0.457 | 0.461 | 0.465 | 0.468 | 0.472 | 0.476 | 0.480 | 0.484 | 0.488 | 0.492 | 0.496 | 0.500 |
| 119.0         | 0.444 | 0.447 | 0.451 | 0.454 | 0.458 | 0.462 | 0.465 | 0.469 | 0.473 | 0.477 | 0.481 | 0.485 | 0.489 | 0.493 | 0.497 | 0.501 |
| 119.5         | 0.444 | 0.448 | 0.451 | 0.455 | 0.459 | 0.462 | 0.466 | 0.470 | 0.474 | 0.477 | 0.481 | 0.485 | 0.489 | 0.493 | 0.497 | 0.502 |
| 120.0         | 0.445 | 0.448 | 0.452 | 0.455 | 0.459 | 0.463 | 0.467 | 0.470 | 0.474 | 0.478 | 0.482 | 0.486 | 0.490 | 0.494 | 0.498 | 0.502 |
| 120.5         | 0.445 | 0.449 | 0.452 | 0.456 | 0.460 | 0.463 | 0.467 | 0.471 | 0.475 | 0.479 | 0.483 | 0.487 | 0.491 | 0.495 | 0.499 | 0.503 |
| 121.0         | 0.446 | 0.449 | 0.453 | 0.457 | 0.460 | 0.464 | 0.468 | 0.472 | 0.476 | 0.479 | 0.483 | 0.487 | 0.491 | 0.496 | 0.500 | 0.504 |
| 121.5         | 0.447 | 0.450 | 0.454 | 0.457 | 0.461 | 0.465 | 0.469 | 0.472 | 0.476 | 0.480 | 0.484 | 0.488 | 0.492 | 0.496 | 0.500 | 0.505 |
| 122.0         | 0.447 | 0.451 | 0.454 | 0.458 | 0.462 | 0.465 | 0.469 | 0.473 | 0.477 | 0.481 | 0.485 | 0.489 | 0.493 | 0.497 | 0.501 | 0.505 |
| 122.5         | 0.448 | 0.451 | 0.455 | 0.459 | 0.462 | 0.466 | 0.470 | 0.474 | 0.478 | 0.481 | 0.485 | 0.489 | 0.494 | 0.498 | 0.502 | 0.506 |
| 123.0         | 0.448 | 0.452 | 0.456 | 0.459 | 0.463 | 0.467 | 0.470 | 0.474 | 0.478 | 0.482 | 0.486 | 0.490 | 0.494 | 0.498 | 0.503 | 0.507 |
| 123.5         | 0.449 | 0.452 | 0.456 | 0.460 | 0.464 | 0.467 | 0.471 | 0.475 | 0.479 | 0.483 | 0.487 | 0.491 | 0.495 | 0.499 | 0.503 | 0.508 |
| 124.0         | 0.449 | 0.453 | 0.457 | 0.460 | 0.464 | 0.468 | 0.472 | 0.476 | 0.480 | 0.484 | 0.488 | 0.492 | 0.496 | 0.500 | 0.504 | 0.508 |
| 124.5         | 0.450 | 0.454 | 0.457 | 0.461 | 0.465 | 0.469 | 0.472 | 0.476 | 0.480 | 0.484 | 0.488 | 0.492 | 0.496 | 0.501 | 0.505 | 0.509 |
| 125.0         | 0.451 | 0.454 | 0.458 | 0.462 | 0.465 | 0.469 | 0.473 | 0.477 | 0.481 | 0.485 | 0.489 | 0.493 | 0.497 | 0.501 | 0.505 | 0.510 |
| 125.5         | 0.451 | 0.455 | 0.459 | 0.462 | 0.466 | 0.470 | 0.474 | 0.478 | 0.482 | 0.486 | 0.490 | 0.494 | 0.498 | 0.502 | 0.506 | 0.511 |
| 126.0         | 0.452 | 0.456 | 0.459 | 0.463 | 0.467 | 0.471 | 0.474 | 0.478 | 0.482 | 0.486 | 0.490 | 0.494 | 0.499 | 0.503 | 0.507 | 0.511 |
| 126.5         | 0.453 | 0.456 | 0.460 | 0.464 | 0.467 | 0.471 | 0.475 | 0.479 | 0.483 | 0.487 | 0.491 | 0.495 | 0.499 | 0.503 | 0.508 | 0.512 |
| 127.0         | 0.453 | 0.457 | 0.460 | 0.464 | 0.468 | 0.472 | 0.476 | 0.480 | 0.484 | 0.488 | 0.492 | 0.496 | 0.500 | 0.504 | 0.508 | 0.513 |
| 127.5         | 0.454 | 0.457 | 0.461 | 0.465 | 0.469 | 0.472 | 0.476 | 0.480 | 0.484 | 0.488 | 0.492 | 0.497 | 0.501 | 0.505 | 0.509 | 0.514 |
| 128.0         | 0.454 | 0.458 | 0.462 | 0.465 | 0.469 | 0.473 | 0.477 | 0.481 | 0.485 | 0.489 | 0.493 | 0.497 | 0.501 | 0.506 | 0.510 | 0.514 |
| 128.5         | 0.455 | 0.459 | 0.462 | 0.466 | 0.470 | 0.474 | 0.478 | 0.482 | 0.486 | 0.490 | 0.494 | 0.498 | 0.502 | 0.506 | 0.511 | 0.515 |
| 129.0         | 0.456 | 0.459 | 0.463 | 0.467 | 0.471 | 0.474 | 0.478 | 0.482 | 0.486 | 0.490 | 0.495 | 0.499 | 0.503 | 0.507 | 0.511 | 0.516 |
| 129.5         | 0.456 | 0.460 | 0.464 | 0.467 | 0.471 | 0.475 | 0.479 | 0.483 | 0.487 | 0.491 | 0.495 | 0.499 | 0.504 | 0.508 | 0.512 | 0.517 |
| 130.0         | 0.457 | 0.460 | 0.464 | 0.468 | 0.472 | 0.476 | 0.480 | 0.484 | 0.488 | 0.492 | 0.496 | 0.500 | 0.504 | 0.509 | 0.513 | 0.517 |
| 130.5         | 0.457 | 0.461 | 0.465 | 0.469 | 0.473 | 0.476 | 0.480 | 0.484 | 0.488 | 0.492 | 0.497 | 0.501 | 0.505 | 0.509 | 0.514 | 0.518 |
| 131.0         | 0.458 | 0.462 | 0.465 | 0.469 | 0.473 | 0.477 | 0.481 | 0.485 | 0.489 | 0.493 | 0.497 | 0.502 | 0.506 | 0.510 | 0.514 | 0.519 |
| 131.5         | 0.459 | 0.462 | 0.466 | 0.470 | 0.474 | 0.478 | 0.482 | 0.486 | 0.490 | 0.494 | 0.498 | 0.502 | 0.506 | 0.511 | 0.515 | 0.520 |

**COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000**

| TEMP<br>DEG F | API GRAVITY AT 60 DEG F |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|---------------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|               | 16.0                    | 16.5  | 17.0  | 17.5  | 18.0  | 18.5  | 19.0  | 19.5  | 20.0  | 20.5  | 21.0  | 21.5  | 22.0  | 22.5  | 23.0  | 23.5  |
| 132.0         | 0.459                   | 0.463 | 0.467 | 0.471 | 0.474 | 0.478 | 0.482 | 0.486 | 0.490 | 0.495 | 0.499 | 0.503 | 0.507 | 0.512 | 0.516 | 0.520 |
| 132.5         | 0.460                   | 0.464 | 0.467 | 0.471 | 0.475 | 0.479 | 0.483 | 0.487 | 0.491 | 0.495 | 0.499 | 0.504 | 0.508 | 0.512 | 0.517 | 0.521 |
| 133.0         | 0.460                   | 0.464 | 0.468 | 0.472 | 0.476 | 0.480 | 0.484 | 0.488 | 0.492 | 0.496 | 0.500 | 0.504 | 0.509 | 0.513 | 0.517 | 0.522 |
| 133.5         | 0.461                   | 0.465 | 0.469 | 0.473 | 0.476 | 0.480 | 0.484 | 0.488 | 0.493 | 0.497 | 0.501 | 0.505 | 0.509 | 0.514 | 0.518 | 0.523 |
| 134.0         | 0.462                   | 0.465 | 0.469 | 0.473 | 0.477 | 0.481 | 0.485 | 0.489 | 0.493 | 0.497 | 0.502 | 0.506 | 0.510 | 0.515 | 0.519 | 0.523 |
| 134.5         | 0.462                   | 0.466 | 0.470 | 0.474 | 0.478 | 0.482 | 0.486 | 0.490 | 0.494 | 0.498 | 0.502 | 0.507 | 0.511 | 0.515 | 0.520 | 0.524 |
| 135.0         | 0.463                   | 0.467 | 0.471 | 0.474 | 0.478 | 0.482 | 0.486 | 0.490 | 0.495 | 0.499 | 0.503 | 0.507 | 0.512 | 0.516 | 0.520 | 0.525 |
| 135.5         | 0.463                   | 0.467 | 0.471 | 0.475 | 0.479 | 0.483 | 0.487 | 0.491 | 0.495 | 0.499 | 0.504 | 0.508 | 0.512 | 0.517 | 0.521 | 0.526 |
| 136.0         | 0.464                   | 0.468 | 0.472 | 0.476 | 0.480 | 0.484 | 0.488 | 0.492 | 0.496 | 0.500 | 0.504 | 0.509 | 0.513 | 0.517 | 0.522 | 0.526 |
| 136.5         | 0.465                   | 0.469 | 0.472 | 0.476 | 0.480 | 0.484 | 0.488 | 0.493 | 0.497 | 0.501 | 0.505 | 0.509 | 0.514 | 0.518 | 0.523 | 0.527 |
| 137.0         | 0.465                   | 0.469 | 0.473 | 0.477 | 0.481 | 0.485 | 0.489 | 0.493 | 0.497 | 0.502 | 0.506 | 0.510 | 0.515 | 0.519 | 0.523 | 0.528 |
| 137.5         | 0.466                   | 0.470 | 0.474 | 0.478 | 0.482 | 0.486 | 0.490 | 0.494 | 0.498 | 0.502 | 0.507 | 0.511 | 0.515 | 0.520 | 0.524 | 0.529 |
| 138.0         | 0.467                   | 0.470 | 0.474 | 0.478 | 0.482 | 0.486 | 0.490 | 0.495 | 0.499 | 0.503 | 0.507 | 0.512 | 0.516 | 0.521 | 0.525 | 0.530 |
| 138.5         | 0.467                   | 0.471 | 0.475 | 0.479 | 0.483 | 0.487 | 0.491 | 0.495 | 0.499 | 0.504 | 0.508 | 0.512 | 0.517 | 0.521 | 0.526 | 0.530 |
| 139.0         | 0.468                   | 0.472 | 0.476 | 0.480 | 0.484 | 0.488 | 0.492 | 0.496 | 0.500 | 0.504 | 0.509 | 0.513 | 0.518 | 0.522 | 0.527 | 0.531 |
| 139.5         | 0.468                   | 0.472 | 0.476 | 0.480 | 0.484 | 0.488 | 0.492 | 0.497 | 0.501 | 0.505 | 0.509 | 0.514 | 0.518 | 0.523 | 0.527 | 0.532 |
| 140.0         | 0.469                   | 0.473 | 0.477 | 0.481 | 0.485 | 0.489 | 0.493 | 0.497 | 0.502 | 0.506 | 0.510 | 0.515 | 0.519 | 0.524 | 0.528 | 0.533 |
| 140.5         | 0.470                   | 0.474 | 0.478 | 0.482 | 0.486 | 0.490 | 0.494 | 0.498 | 0.502 | 0.507 | 0.511 | 0.515 | 0.520 | 0.524 | 0.529 | 0.533 |
| 141.0         | 0.470                   | 0.474 | 0.478 | 0.482 | 0.486 | 0.490 | 0.495 | 0.499 | 0.503 | 0.507 | 0.512 | 0.516 | 0.521 | 0.525 | 0.530 | 0.534 |
| 141.5         | 0.471                   | 0.475 | 0.479 | 0.483 | 0.487 | 0.491 | 0.495 | 0.499 | 0.504 | 0.508 | 0.512 | 0.517 | 0.521 | 0.526 | 0.530 | 0.535 |
| 142.0         | 0.472                   | 0.476 | 0.480 | 0.484 | 0.488 | 0.492 | 0.496 | 0.500 | 0.504 | 0.509 | 0.513 | 0.518 | 0.522 | 0.527 | 0.531 | 0.536 |
| 142.5         | 0.472                   | 0.476 | 0.480 | 0.484 | 0.488 | 0.492 | 0.497 | 0.501 | 0.505 | 0.509 | 0.514 | 0.518 | 0.523 | 0.527 | 0.532 | 0.537 |
| 143.0         | 0.473                   | 0.477 | 0.481 | 0.485 | 0.489 | 0.493 | 0.497 | 0.502 | 0.506 | 0.510 | 0.515 | 0.519 | 0.524 | 0.528 | 0.533 | 0.537 |
| 143.5         | 0.473                   | 0.477 | 0.481 | 0.486 | 0.490 | 0.494 | 0.498 | 0.502 | 0.507 | 0.511 | 0.515 | 0.520 | 0.524 | 0.529 | 0.533 | 0.538 |
| 144.0         | 0.474                   | 0.478 | 0.482 | 0.486 | 0.490 | 0.494 | 0.499 | 0.503 | 0.507 | 0.512 | 0.516 | 0.521 | 0.525 | 0.530 | 0.534 | 0.539 |
| 144.5         | 0.475                   | 0.479 | 0.483 | 0.487 | 0.491 | 0.495 | 0.499 | 0.504 | 0.508 | 0.512 | 0.517 | 0.521 | 0.526 | 0.530 | 0.535 | 0.540 |
| 145.0         | 0.475                   | 0.479 | 0.483 | 0.488 | 0.492 | 0.496 | 0.500 | 0.504 | 0.509 | 0.513 | 0.518 | 0.522 | 0.527 | 0.531 | 0.536 | 0.541 |
| 145.5         | 0.476                   | 0.480 | 0.484 | 0.488 | 0.492 | 0.497 | 0.501 | 0.505 | 0.509 | 0.514 | 0.518 | 0.523 | 0.527 | 0.532 | 0.537 | 0.541 |
| 146.0         | 0.477                   | 0.481 | 0.485 | 0.489 | 0.493 | 0.497 | 0.501 | 0.506 | 0.510 | 0.515 | 0.519 | 0.523 | 0.528 | 0.533 | 0.537 | 0.542 |
| 146.5         | 0.477                   | 0.481 | 0.485 | 0.489 | 0.494 | 0.498 | 0.502 | 0.506 | 0.511 | 0.515 | 0.520 | 0.524 | 0.529 | 0.533 | 0.538 | 0.543 |
| 147.0         | 0.478                   | 0.482 | 0.486 | 0.490 | 0.494 | 0.499 | 0.503 | 0.507 | 0.512 | 0.516 | 0.520 | 0.525 | 0.530 | 0.534 | 0.539 | 0.544 |
| 147.5         | 0.479                   | 0.483 | 0.487 | 0.491 | 0.495 | 0.499 | 0.504 | 0.508 | 0.512 | 0.517 | 0.521 | 0.526 | 0.530 | 0.535 | 0.540 | 0.545 |
| 148.0         | 0.479                   | 0.483 | 0.487 | 0.491 | 0.496 | 0.500 | 0.504 | 0.509 | 0.513 | 0.517 | 0.522 | 0.527 | 0.531 | 0.536 | 0.541 | 0.545 |
| 148.5         | 0.480                   | 0.484 | 0.488 | 0.492 | 0.496 | 0.501 | 0.505 | 0.509 | 0.514 | 0.518 | 0.523 | 0.527 | 0.532 | 0.537 | 0.541 | 0.546 |
| 149.0         | 0.480                   | 0.485 | 0.489 | 0.493 | 0.497 | 0.501 | 0.506 | 0.510 | 0.514 | 0.519 | 0.523 | 0.528 | 0.533 | 0.537 | 0.542 | 0.547 |
| 149.5         | 0.481                   | 0.485 | 0.489 | 0.494 | 0.498 | 0.502 | 0.506 | 0.511 | 0.515 | 0.520 | 0.524 | 0.529 | 0.533 | 0.538 | 0.543 | 0.548 |
| 150.0         | 0.482                   | 0.486 | 0.490 | 0.494 | 0.498 | 0.503 | 0.507 | 0.511 | 0.516 | 0.520 | 0.525 | 0.530 | 0.534 | 0.539 | 0.544 | 0.549 |
| 150.5         | 0.482                   | 0.486 | 0.491 | 0.495 | 0.499 | 0.503 | 0.508 | 0.512 | 0.517 | 0.521 | 0.526 | 0.530 | 0.535 | 0.540 | 0.544 | 0.549 |

| COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000 |                         |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|-----------------------------------------------------------------------------------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| TEMP                                                                              | API GRAVITY AT 60 DEG F |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| DEG F                                                                             | 16.0                    | 16.5  | 17.0  | 17.5  | 18.0  | 18.5  | 19.0  | 19.5  | 20.0  | 20.5  | 21.0  | 21.5  | 22.0  | 22.5  | 23.0  | 23.5  |
| 151.0                                                                             | 0.483                   | 0.487 | 0.491 | 0.496 | 0.500 | 0.504 | 0.508 | 0.513 | 0.517 | 0.522 | 0.526 | 0.531 | 0.536 | 0.540 | 0.545 | 0.550 |
| 151.5                                                                             | 0.484                   | 0.488 | 0.492 | 0.496 | 0.500 | 0.505 | 0.509 | 0.514 | 0.518 | 0.523 | 0.527 | 0.532 | 0.536 | 0.541 | 0.546 | 0.551 |
| 152.0                                                                             | 0.484                   | 0.488 | 0.493 | 0.497 | 0.501 | 0.505 | 0.510 | 0.514 | 0.519 | 0.523 | 0.528 | 0.533 | 0.537 | 0.542 | 0.547 | 0.552 |
| 152.5                                                                             | 0.485                   | 0.489 | 0.493 | 0.498 | 0.502 | 0.506 | 0.511 | 0.515 | 0.519 | 0.524 | 0.529 | 0.533 | 0.538 | 0.543 | 0.548 | 0.553 |
| 153.0                                                                             | 0.486                   | 0.490 | 0.494 | 0.498 | 0.503 | 0.507 | 0.511 | 0.516 | 0.520 | 0.525 | 0.529 | 0.534 | 0.539 | 0.544 | 0.548 | 0.553 |
| 153.5                                                                             | 0.486                   | 0.490 | 0.495 | 0.499 | 0.503 | 0.508 | 0.512 | 0.516 | 0.521 | 0.526 | 0.530 | 0.535 | 0.540 | 0.544 | 0.549 | 0.554 |
| 154.0                                                                             | 0.487                   | 0.491 | 0.495 | 0.500 | 0.504 | 0.508 | 0.513 | 0.517 | 0.522 | 0.526 | 0.531 | 0.536 | 0.540 | 0.545 | 0.550 | 0.555 |
| 154.5                                                                             | 0.488                   | 0.492 | 0.496 | 0.500 | 0.505 | 0.509 | 0.513 | 0.518 | 0.522 | 0.527 | 0.532 | 0.536 | 0.541 | 0.546 | 0.551 | 0.556 |
| 155.0                                                                             | 0.488                   | 0.492 | 0.497 | 0.501 | 0.505 | 0.510 | 0.514 | 0.519 | 0.523 | 0.528 | 0.532 | 0.537 | 0.542 | 0.547 | 0.552 | 0.557 |
| 155.5                                                                             | 0.489                   | 0.493 | 0.497 | 0.502 | 0.506 | 0.510 | 0.515 | 0.519 | 0.524 | 0.529 | 0.533 | 0.538 | 0.543 | 0.548 | 0.552 | 0.557 |
| 156.0                                                                             | 0.490                   | 0.494 | 0.498 | 0.502 | 0.507 | 0.511 | 0.516 | 0.520 | 0.525 | 0.529 | 0.534 | 0.539 | 0.543 | 0.548 | 0.553 | 0.558 |
| 156.5                                                                             | 0.490                   | 0.494 | 0.499 | 0.503 | 0.507 | 0.512 | 0.516 | 0.521 | 0.525 | 0.530 | 0.535 | 0.539 | 0.544 | 0.549 | 0.554 | 0.559 |
| 157.0                                                                             | 0.491                   | 0.495 | 0.499 | 0.504 | 0.508 | 0.512 | 0.517 | 0.521 | 0.526 | 0.531 | 0.535 | 0.540 | 0.545 | 0.550 | 0.555 | 0.560 |
| 157.5                                                                             | 0.491                   | 0.496 | 0.500 | 0.504 | 0.509 | 0.513 | 0.518 | 0.522 | 0.527 | 0.532 | 0.536 | 0.541 | 0.546 | 0.551 | 0.556 | 0.561 |
| 158.0                                                                             | 0.492                   | 0.496 | 0.501 | 0.505 | 0.509 | 0.514 | 0.518 | 0.523 | 0.528 | 0.532 | 0.537 | 0.542 | 0.547 | 0.552 | 0.556 | 0.562 |
| 158.5                                                                             | 0.493                   | 0.497 | 0.501 | 0.506 | 0.510 | 0.515 | 0.519 | 0.524 | 0.528 | 0.533 | 0.538 | 0.543 | 0.547 | 0.552 | 0.557 | 0.562 |
| 159.0                                                                             | 0.493                   | 0.498 | 0.502 | 0.506 | 0.511 | 0.515 | 0.520 | 0.524 | 0.529 | 0.534 | 0.539 | 0.543 | 0.548 | 0.553 | 0.558 | 0.563 |
| 159.5                                                                             | 0.494                   | 0.498 | 0.503 | 0.507 | 0.512 | 0.516 | 0.521 | 0.525 | 0.530 | 0.535 | 0.539 | 0.544 | 0.549 | 0.554 | 0.559 | 0.564 |
| 160.0                                                                             | 0.495                   | 0.499 | 0.503 | 0.508 | 0.512 | 0.517 | 0.521 | 0.526 | 0.531 | 0.535 | 0.540 | 0.545 | 0.550 | 0.555 | 0.560 | 0.565 |
| 160.5                                                                             | 0.495                   | 0.500 | 0.504 | 0.508 | 0.513 | 0.517 | 0.522 | 0.527 | 0.531 | 0.536 | 0.541 | 0.546 | 0.551 | 0.556 | 0.561 | 0.566 |
| 161.0                                                                             | 0.496                   | 0.500 | 0.505 | 0.509 | 0.514 | 0.518 | 0.523 | 0.527 | 0.532 | 0.537 | 0.542 | 0.546 | 0.551 | 0.556 | 0.561 | 0.566 |
| 161.5                                                                             | 0.497                   | 0.501 | 0.505 | 0.510 | 0.514 | 0.519 | 0.523 | 0.528 | 0.533 | 0.538 | 0.542 | 0.547 | 0.552 | 0.557 | 0.562 | 0.567 |
| 162.0                                                                             | 0.497                   | 0.502 | 0.506 | 0.511 | 0.515 | 0.520 | 0.524 | 0.529 | 0.534 | 0.538 | 0.543 | 0.548 | 0.553 | 0.558 | 0.563 | 0.568 |
| 162.5                                                                             | 0.498                   | 0.502 | 0.507 | 0.511 | 0.516 | 0.520 | 0.525 | 0.530 | 0.534 | 0.539 | 0.544 | 0.549 | 0.554 | 0.559 | 0.564 | 0.569 |
| 163.0                                                                             | 0.499                   | 0.503 | 0.508 | 0.512 | 0.516 | 0.521 | 0.526 | 0.530 | 0.535 | 0.540 | 0.545 | 0.550 | 0.555 | 0.560 | 0.565 | 0.570 |
| 163.5                                                                             | 0.499                   | 0.504 | 0.508 | 0.513 | 0.517 | 0.522 | 0.526 | 0.531 | 0.536 | 0.541 | 0.545 | 0.550 | 0.555 | 0.560 | 0.565 | 0.571 |
| 164.0                                                                             | 0.500                   | 0.504 | 0.509 | 0.513 | 0.518 | 0.522 | 0.527 | 0.532 | 0.537 | 0.541 | 0.546 | 0.551 | 0.556 | 0.561 | 0.566 | 0.571 |
| 164.5                                                                             | 0.501                   | 0.505 | 0.510 | 0.514 | 0.519 | 0.523 | 0.528 | 0.533 | 0.537 | 0.542 | 0.547 | 0.552 | 0.557 | 0.562 | 0.567 | 0.572 |
| 165.0                                                                             | 0.501                   | 0.506 | 0.510 | 0.515 | 0.519 | 0.524 | 0.529 | 0.533 | 0.538 | 0.543 | 0.548 | 0.553 | 0.558 | 0.563 | 0.568 | 0.573 |
| 165.5                                                                             | 0.502                   | 0.506 | 0.511 | 0.515 | 0.520 | 0.525 | 0.529 | 0.534 | 0.539 | 0.544 | 0.549 | 0.554 | 0.559 | 0.564 | 0.569 | 0.574 |
| 166.0                                                                             | 0.503                   | 0.507 | 0.512 | 0.516 | 0.521 | 0.525 | 0.530 | 0.535 | 0.540 | 0.544 | 0.549 | 0.554 | 0.559 | 0.564 | 0.570 | 0.575 |
| 166.5                                                                             | 0.503                   | 0.508 | 0.512 | 0.517 | 0.521 | 0.526 | 0.531 | 0.536 | 0.540 | 0.545 | 0.550 | 0.555 | 0.560 | 0.565 | 0.570 | 0.576 |
| 167.0                                                                             | 0.504                   | 0.509 | 0.513 | 0.518 | 0.522 | 0.527 | 0.531 | 0.536 | 0.541 | 0.546 | 0.551 | 0.556 | 0.561 | 0.566 | 0.571 | 0.577 |
| 167.5                                                                             | 0.505                   | 0.509 | 0.514 | 0.518 | 0.523 | 0.528 | 0.532 | 0.537 | 0.542 | 0.547 | 0.552 | 0.557 | 0.562 | 0.567 | 0.572 | 0.577 |
| 168.0                                                                             | 0.505                   | 0.510 | 0.514 | 0.519 | 0.524 | 0.528 | 0.533 | 0.538 | 0.543 | 0.547 | 0.552 | 0.557 | 0.563 | 0.568 | 0.573 | 0.578 |
| 168.5                                                                             | 0.506                   | 0.511 | 0.515 | 0.520 | 0.524 | 0.529 | 0.534 | 0.538 | 0.543 | 0.548 | 0.553 | 0.558 | 0.563 | 0.569 | 0.574 | 0.579 |
| 169.0                                                                             | 0.507                   | 0.511 | 0.516 | 0.520 | 0.525 | 0.530 | 0.534 | 0.539 | 0.544 | 0.549 | 0.554 | 0.559 | 0.564 | 0.569 | 0.575 | 0.580 |
| 169.5                                                                             | 0.507                   | 0.512 | 0.516 | 0.521 | 0.526 | 0.530 | 0.535 | 0.540 | 0.545 | 0.550 | 0.555 | 0.560 | 0.565 | 0.570 | 0.575 | 0.581 |

**COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000**  
**API GRAVITY AT 60 DEG F**

| TEMP<br>DEG F | 16.0  | 16.5  | 17.0  | 17.5  | 18.0  | 18.5  | 19.0  | 19.5  | 20.0  | 20.5  | 21.0  | 21.5  | 22.0  | 22.5  | 23.0  | 23.5  |
|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 170.0         | 0.508 | 0.513 | 0.517 | 0.522 | 0.526 | 0.531 | 0.536 | 0.541 | 0.546 | 0.551 | 0.556 | 0.561 | 0.566 | 0.571 | 0.576 | 0.582 |
| 170.5         | 0.509 | 0.513 | 0.518 | 0.522 | 0.527 | 0.532 | 0.537 | 0.542 | 0.546 | 0.551 | 0.556 | 0.561 | 0.567 | 0.572 | 0.577 | 0.582 |
| 171.0         | 0.510 | 0.514 | 0.519 | 0.523 | 0.528 | 0.533 | 0.537 | 0.542 | 0.547 | 0.552 | 0.557 | 0.562 | 0.567 | 0.573 | 0.578 | 0.583 |
| 171.5         | 0.510 | 0.515 | 0.519 | 0.524 | 0.529 | 0.533 | 0.538 | 0.543 | 0.548 | 0.553 | 0.558 | 0.563 | 0.568 | 0.574 | 0.579 | 0.584 |
| 172.0         | 0.511 | 0.515 | 0.520 | 0.525 | 0.529 | 0.534 | 0.539 | 0.544 | 0.549 | 0.554 | 0.559 | 0.564 | 0.569 | 0.574 | 0.580 | 0.585 |
| 172.5         | 0.512 | 0.516 | 0.521 | 0.525 | 0.530 | 0.535 | 0.540 | 0.545 | 0.549 | 0.554 | 0.560 | 0.565 | 0.570 | 0.575 | 0.581 | 0.586 |
| 173.0         | 0.512 | 0.517 | 0.521 | 0.526 | 0.531 | 0.536 | 0.540 | 0.545 | 0.550 | 0.555 | 0.560 | 0.566 | 0.571 | 0.576 | 0.581 | 0.587 |
| 173.5         | 0.513 | 0.517 | 0.522 | 0.527 | 0.532 | 0.536 | 0.541 | 0.546 | 0.551 | 0.556 | 0.561 | 0.566 | 0.572 | 0.577 | 0.582 | 0.588 |
| 174.0         | 0.514 | 0.518 | 0.523 | 0.527 | 0.532 | 0.537 | 0.542 | 0.547 | 0.552 | 0.557 | 0.562 | 0.567 | 0.572 | 0.578 | 0.583 | 0.588 |
| 174.5         | 0.514 | 0.519 | 0.524 | 0.528 | 0.533 | 0.538 | 0.543 | 0.548 | 0.553 | 0.558 | 0.563 | 0.568 | 0.573 | 0.579 | 0.584 | 0.589 |
| 175.0         | 0.515 | 0.520 | 0.524 | 0.529 | 0.534 | 0.539 | 0.543 | 0.548 | 0.553 | 0.558 | 0.564 | 0.569 | 0.574 | 0.579 | 0.585 | 0.590 |
| 175.5         | 0.516 | 0.520 | 0.525 | 0.530 | 0.534 | 0.539 | 0.544 | 0.549 | 0.554 | 0.559 | 0.564 | 0.570 | 0.575 | 0.580 | 0.586 | 0.591 |
| 176.0         | 0.516 | 0.521 | 0.526 | 0.530 | 0.535 | 0.540 | 0.545 | 0.550 | 0.555 | 0.560 | 0.565 | 0.570 | 0.576 | 0.581 | 0.586 | 0.592 |
| 176.5         | 0.517 | 0.522 | 0.526 | 0.531 | 0.536 | 0.541 | 0.546 | 0.551 | 0.556 | 0.561 | 0.566 | 0.571 | 0.576 | 0.582 | 0.587 | 0.593 |
| 177.0         | 0.518 | 0.522 | 0.527 | 0.532 | 0.537 | 0.541 | 0.546 | 0.551 | 0.556 | 0.562 | 0.567 | 0.572 | 0.577 | 0.583 | 0.588 | 0.594 |
| 177.5         | 0.518 | 0.523 | 0.528 | 0.533 | 0.537 | 0.542 | 0.547 | 0.552 | 0.557 | 0.562 | 0.568 | 0.573 | 0.578 | 0.584 | 0.589 | 0.595 |
| 178.0         | 0.519 | 0.524 | 0.528 | 0.533 | 0.538 | 0.543 | 0.548 | 0.553 | 0.558 | 0.563 | 0.568 | 0.574 | 0.579 | 0.584 | 0.590 | 0.595 |
| 178.5         | 0.520 | 0.524 | 0.529 | 0.534 | 0.539 | 0.544 | 0.549 | 0.554 | 0.559 | 0.564 | 0.569 | 0.574 | 0.580 | 0.585 | 0.591 | 0.596 |
| 179.0         | 0.520 | 0.525 | 0.530 | 0.535 | 0.540 | 0.544 | 0.549 | 0.554 | 0.560 | 0.565 | 0.570 | 0.575 | 0.581 | 0.586 | 0.592 | 0.597 |
| 179.5         | 0.521 | 0.526 | 0.531 | 0.535 | 0.540 | 0.545 | 0.550 | 0.555 | 0.560 | 0.566 | 0.571 | 0.576 | 0.581 | 0.587 | 0.592 | 0.598 |
| 180.0         | 0.522 | 0.527 | 0.531 | 0.536 | 0.541 | 0.546 | 0.551 | 0.556 | 0.561 | 0.566 | 0.572 | 0.577 | 0.582 | 0.588 | 0.593 | 0.599 |
| 180.5         | 0.523 | 0.527 | 0.532 | 0.537 | 0.542 | 0.547 | 0.552 | 0.557 | 0.562 | 0.567 | 0.572 | 0.578 | 0.583 | 0.589 | 0.594 | 0.600 |
| 181.0         | 0.523 | 0.528 | 0.533 | 0.538 | 0.543 | 0.547 | 0.553 | 0.558 | 0.563 | 0.568 | 0.573 | 0.579 | 0.584 | 0.589 | 0.595 | 0.601 |
| 181.5         | 0.524 | 0.529 | 0.534 | 0.538 | 0.543 | 0.548 | 0.553 | 0.558 | 0.564 | 0.569 | 0.574 | 0.579 | 0.585 | 0.590 | 0.596 | 0.602 |
| 182.0         | 0.525 | 0.529 | 0.534 | 0.539 | 0.544 | 0.549 | 0.554 | 0.559 | 0.564 | 0.570 | 0.575 | 0.580 | 0.586 | 0.591 | 0.597 | 0.602 |
| 182.5         | 0.525 | 0.530 | 0.535 | 0.540 | 0.545 | 0.550 | 0.555 | 0.560 | 0.565 | 0.570 | 0.576 | 0.581 | 0.587 | 0.592 | 0.598 | 0.603 |
| 183.0         | 0.526 | 0.531 | 0.536 | 0.541 | 0.546 | 0.551 | 0.556 | 0.561 | 0.566 | 0.571 | 0.577 | 0.582 | 0.587 | 0.593 | 0.599 | 0.604 |
| 183.5         | 0.527 | 0.532 | 0.536 | 0.541 | 0.546 | 0.551 | 0.556 | 0.561 | 0.567 | 0.572 | 0.577 | 0.583 | 0.588 | 0.594 | 0.599 | 0.605 |
| 184.0         | 0.527 | 0.532 | 0.537 | 0.542 | 0.547 | 0.552 | 0.557 | 0.562 | 0.568 | 0.573 | 0.578 | 0.584 | 0.589 | 0.595 | 0.600 | 0.606 |
| 184.5         | 0.528 | 0.533 | 0.538 | 0.543 | 0.548 | 0.553 | 0.558 | 0.563 | 0.568 | 0.574 | 0.579 | 0.584 | 0.590 | 0.595 | 0.601 | 0.607 |
| 185.0         | 0.529 | 0.534 | 0.539 | 0.544 | 0.548 | 0.554 | 0.559 | 0.564 | 0.569 | 0.574 | 0.580 | 0.585 | 0.591 | 0.596 | 0.602 | 0.608 |
| 185.5         | 0.530 | 0.534 | 0.539 | 0.544 | 0.549 | 0.554 | 0.559 | 0.565 | 0.570 | 0.575 | 0.581 | 0.586 | 0.592 | 0.597 | 0.603 | 0.609 |
| 186.0         | 0.530 | 0.535 | 0.540 | 0.545 | 0.550 | 0.555 | 0.560 | 0.565 | 0.571 | 0.576 | 0.581 | 0.587 | 0.592 | 0.598 | 0.604 | 0.610 |
| 186.5         | 0.531 | 0.536 | 0.541 | 0.546 | 0.551 | 0.556 | 0.561 | 0.566 | 0.571 | 0.577 | 0.582 | 0.588 | 0.593 | 0.599 | 0.605 | 0.610 |
| 187.0         | 0.532 | 0.537 | 0.541 | 0.546 | 0.552 | 0.557 | 0.562 | 0.567 | 0.572 | 0.578 | 0.583 | 0.589 | 0.594 | 0.600 | 0.606 | 0.611 |
| 187.5         | 0.532 | 0.537 | 0.542 | 0.547 | 0.552 | 0.557 | 0.563 | 0.568 | 0.573 | 0.578 | 0.584 | 0.589 | 0.595 | 0.601 | 0.606 | 0.612 |
| 188.0         | 0.533 | 0.538 | 0.543 | 0.548 | 0.553 | 0.558 | 0.563 | 0.569 | 0.574 | 0.579 | 0.585 | 0.590 | 0.596 | 0.602 | 0.607 | 0.613 |
| 188.5         | 0.534 | 0.539 | 0.544 | 0.549 | 0.554 | 0.559 | 0.564 | 0.569 | 0.575 | 0.580 | 0.586 | 0.591 | 0.597 | 0.602 | 0.608 | 0.614 |

| COMPRESSIBILITY FACTORS PER POUNDS PER SQUARE INCH - DIVIDE ALL NUMBERS BY 100000 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|-----------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| API GRAVITY AT 60 DEG F                                                           |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| TEMP<br>DEG F                                                                     | 16.0  | 16.5  | 17.0  | 17.5  | 18.0  | 18.5  | 19.0  | 19.5  | 20.0  | 20.5  | 21.0  | 21.5  | 22.0  | 22.5  | 23.0  | 23.5  |
| 189.0                                                                             | 0.535 | 0.539 | 0.544 | 0.549 | 0.555 | 0.560 | 0.565 | 0.570 | 0.576 | 0.581 | 0.586 | 0.592 | 0.598 | 0.603 | 0.609 | 0.615 |
| 189.5                                                                             | 0.535 | 0.540 | 0.545 | 0.550 | 0.555 | 0.560 | 0.566 | 0.571 | 0.576 | 0.582 | 0.587 | 0.593 | 0.598 | 0.604 | 0.610 | 0.616 |
| 190.0                                                                             | 0.536 | 0.541 | 0.546 | 0.551 | 0.556 | 0.561 | 0.566 | 0.572 | 0.577 | 0.583 | 0.588 | 0.594 | 0.599 | 0.605 | 0.611 | 0.617 |
| 190.5                                                                             | 0.537 | 0.542 | 0.547 | 0.552 | 0.557 | 0.562 | 0.567 | 0.573 | 0.578 | 0.583 | 0.589 | 0.595 | 0.600 | 0.606 | 0.612 | 0.618 |
| 191.0                                                                             | 0.537 | 0.542 | 0.547 | 0.552 | 0.558 | 0.563 | 0.568 | 0.573 | 0.579 | 0.584 | 0.590 | 0.595 | 0.601 | 0.607 | 0.613 | 0.619 |
| 191.5                                                                             | 0.538 | 0.543 | 0.548 | 0.553 | 0.558 | 0.564 | 0.569 | 0.574 | 0.580 | 0.585 | 0.591 | 0.596 | 0.602 | 0.608 | 0.614 | 0.619 |
| 192.0                                                                             | 0.539 | 0.544 | 0.549 | 0.554 | 0.559 | 0.564 | 0.570 | 0.575 | 0.580 | 0.586 | 0.591 | 0.597 | 0.603 | 0.609 | 0.614 | 0.620 |
| 192.5                                                                             | 0.540 | 0.545 | 0.550 | 0.555 | 0.560 | 0.565 | 0.570 | 0.576 | 0.581 | 0.587 | 0.592 | 0.598 | 0.604 | 0.609 | 0.615 | 0.621 |
| 193.0                                                                             | 0.540 | 0.545 | 0.550 | 0.555 | 0.561 | 0.566 | 0.571 | 0.577 | 0.582 | 0.588 | 0.593 | 0.599 | 0.605 | 0.610 | 0.616 | 0.622 |
| 193.5                                                                             | 0.541 | 0.546 | 0.551 | 0.556 | 0.561 | 0.567 | 0.572 | 0.577 | 0.583 | 0.588 | 0.594 | 0.600 | 0.605 | 0.611 | 0.617 | 0.623 |
| 194.0                                                                             | 0.542 | 0.547 | 0.552 | 0.557 | 0.562 | 0.567 | 0.573 | 0.578 | 0.584 | 0.589 | 0.595 | 0.601 | 0.606 | 0.612 | 0.618 | 0.624 |
| 194.5                                                                             | 0.542 | 0.547 | 0.553 | 0.558 | 0.563 | 0.568 | 0.574 | 0.579 | 0.584 | 0.590 | 0.596 | 0.601 | 0.607 | 0.613 | 0.619 | 0.625 |
| 195.0                                                                             | 0.543 | 0.548 | 0.553 | 0.558 | 0.564 | 0.569 | 0.574 | 0.580 | 0.585 | 0.591 | 0.597 | 0.602 | 0.608 | 0.614 | 0.620 | 0.626 |
| 195.5                                                                             | 0.544 | 0.549 | 0.554 | 0.559 | 0.564 | 0.570 | 0.575 | 0.581 | 0.586 | 0.592 | 0.597 | 0.603 | 0.609 | 0.615 | 0.621 | 0.627 |
| 196.0                                                                             | 0.545 | 0.550 | 0.555 | 0.560 | 0.565 | 0.571 | 0.576 | 0.581 | 0.587 | 0.593 | 0.598 | 0.604 | 0.610 | 0.616 | 0.622 | 0.628 |
| 196.5                                                                             | 0.545 | 0.550 | 0.556 | 0.561 | 0.566 | 0.571 | 0.577 | 0.582 | 0.588 | 0.593 | 0.599 | 0.605 | 0.611 | 0.617 | 0.623 | 0.629 |
| 197.0                                                                             | 0.546 | 0.551 | 0.556 | 0.562 | 0.567 | 0.572 | 0.578 | 0.583 | 0.589 | 0.594 | 0.600 | 0.606 | 0.612 | 0.617 | 0.623 | 0.630 |
| 197.5                                                                             | 0.547 | 0.552 | 0.557 | 0.562 | 0.568 | 0.573 | 0.578 | 0.584 | 0.589 | 0.595 | 0.601 | 0.607 | 0.612 | 0.618 | 0.624 | 0.630 |
| 198.0                                                                             | 0.548 | 0.553 | 0.558 | 0.563 | 0.568 | 0.574 | 0.579 | 0.585 | 0.590 | 0.596 | 0.602 | 0.607 | 0.613 | 0.619 | 0.625 | 0.631 |
| 198.5                                                                             | 0.548 | 0.553 | 0.559 | 0.564 | 0.569 | 0.575 | 0.580 | 0.585 | 0.591 | 0.597 | 0.602 | 0.608 | 0.614 | 0.620 | 0.626 | 0.632 |
| 199.0                                                                             | 0.549 | 0.554 | 0.559 | 0.565 | 0.570 | 0.575 | 0.581 | 0.586 | 0.592 | 0.598 | 0.603 | 0.609 | 0.615 | 0.621 | 0.627 | 0.633 |
| 199.5                                                                             | 0.550 | 0.555 | 0.560 | 0.565 | 0.571 | 0.576 | 0.582 | 0.587 | 0.593 | 0.598 | 0.604 | 0.610 | 0.616 | 0.622 | 0.628 | 0.634 |
| 200.0                                                                             | 0.550 | 0.556 | 0.561 | 0.566 | 0.571 | 0.577 | 0.582 | 0.588 | 0.594 | 0.599 | 0.605 | 0.611 | 0.617 | 0.623 | 0.629 | 0.635 |