



# Conversion Factors

| Multiply               | By                      | To Obtain              |
|------------------------|-------------------------|------------------------|
| <b>DENSITY</b>         |                         |                        |
| g/cm <sup>3</sup>      | 62.43                   | lb/ft <sup>3</sup>     |
|                        | 0.03613                 | lb/in <sup>3</sup>     |
|                        | 8.345                   | lb/gal                 |
| lb/ft <sup>3</sup>     | 16.02                   | kg/m <sup>3</sup>      |
| lb/in <sup>3</sup>     | 1728                    | lb/ft <sup>3</sup>     |
|                        | 27.68                   | g/cm <sup>3</sup>      |
| <b>PRESSURE</b>        |                         |                        |
| atm                    | 101.3                   | kPa                    |
|                        | 760                     | mm of Hg               |
|                        | 29.92                   | in of Hg               |
|                        | 33.90                   | ft of H <sub>2</sub> O |
|                        | 10330                   | kg/m <sup>2</sup>      |
|                        | 14.70                   | lb/in <sup>2</sup>     |
|                        | 2116                    | lb/ft <sup>2</sup>     |
|                        | 1.013                   | bar                    |
|                        | 1.033                   | kg/cm <sup>2</sup>     |
| bar                    | 100                     | kPa                    |
| cm of Hg               | 5.353                   | in of H <sub>2</sub> O |
|                        | 0.4460                  | ft of H <sub>2</sub> O |
|                        | 1.333                   | kPa                    |
|                        | 0.1934                  | lb/in <sup>2</sup>     |
|                        | 27.84                   | lb/ft <sup>2</sup>     |
|                        | 136.0                   | kg/m <sup>2</sup>      |
| ft of H <sub>2</sub> O | 0.02950                 | atm                    |
|                        | 0.4335                  | lb/in <sup>2</sup>     |
|                        | 62.43                   | lb/ft <sup>2</sup>     |
|                        | 2.989                   | kPa                    |
| in of Hg               | 0.03342                 | atm                    |
|                        | 13.60                   | in of H <sub>2</sub> O |
|                        | 1.133                   | ft of H <sub>2</sub> O |
|                        | 3.386                   | kPa                    |
|                        | 0.4912                  | lb/in <sup>2</sup>     |
|                        | 70.73                   | lb/ft <sup>2</sup>     |
|                        | 345.3                   | kg/m <sup>2</sup>      |
| in of H <sub>2</sub> O | 0.2491                  | kPa                    |
|                        | 0.03612                 | lb/in <sup>2</sup>     |
|                        | 5.202                   | lb/ft <sup>2</sup>     |
|                        | 25.40                   | kg/m <sup>2</sup>      |
| kg/cm <sup>2</sup>     | 0.9678                  | atm                    |
|                        | 98.07                   | kPa                    |
|                        | 14.22                   | lb/in <sup>2</sup>     |
| lb/in <sup>2</sup>     | 70.31                   | g/cm <sup>2</sup>      |
|                        | 6.895                   | kPa                    |
|                        | 2.036                   | in of Hg               |
|                        | 2.307                   | ft of H <sub>2</sub> O |
| <b>FLOW</b>            |                         |                        |
| ft <sup>3</sup> /min   | 471.9                   | cm <sup>3</sup> /sec   |
|                        | 28.32                   | ltr/min                |
| ft <sup>3</sup> /hr    | 7.866                   | cm <sup>3</sup> /sec   |
|                        | .4719                   | ltr/min                |
| ft <sup>3</sup> /sec   | 28.32                   | ltr/sec                |
|                        | 1699                    | ltr/min                |
|                        | 28320                   | cm <sup>3</sup> /sec   |
| gal/hr                 | 6.309 x 10 <sup>5</sup> | m <sup>3</sup> /min    |
|                        | 3.785                   | ltr/hr                 |
| ltr/min                | 0.03531                 | ft <sup>3</sup> /min   |
|                        | 2.119                   | ft <sup>3</sup> /hr    |
| <b>HEATING VALUE</b>   |                         |                        |
| Btu/ft <sup>3</sup>    | 0.03725                 | J/cm <sup>3</sup>      |
| Btu/lb                 | 2.326                   | J/g                    |

| Multiply                                | By                           | To Obtain                            |
|---|------------------------------|--------------------------------------|
| <b>VOLUME</b>                           |                              |                                      |
| cm <sup>3</sup>                         | 0.001                        | ltr                                  |
|   | 0.0610                       | in <sup>3</sup>                      |
| ltr                                     | 0.2642                       | gal                                  |
|   | 0.03531                      | ft <sup>3</sup>                      |
|   | 1.057                        | qt                                   |
|   | 61.02                        | in <sup>3</sup>                      |
| ft <sup>3</sup>                         | 28320                        | cm <sup>3</sup>                      |
|   | 1728                         | in <sup>3</sup>                      |
|   | 0.03704                      | yd <sup>3</sup>                      |
|   | 7.481                        | gal                                  |
|   | 28.32                        | ltr                                  |
|   | 0.02832                      | m <sup>3</sup>                       |
| in <sup>3</sup>                         | 16.39                        | cm <sup>3</sup>                      |
|   | 0.01639                      | ltr                                  |
|   | 4.329 x 10 <sup>3</sup>      | gal                                  |
|   | 0.01732                      | qt                                   |
|   | 1.639 x 10 <sup>5</sup>      | m <sup>3</sup>                       |
| <b>g-mol of</b>                         |                              |                                      |
| Ideal Gas @ 0°C                         |                              |                                      |
| & 760 mm Hg                             | 22.41                        | ltr                                  |
| <b>lb-mol of</b>                        |                              |                                      |
| Ideal Gas @ 0°C                         |                              |                                      |
| & 760 mm Hg                             | 359.0                        | ft <sup>3</sup>                      |
| <b>MASS</b>                             |                              |                                      |
| lb                                      | 0.4536                       | kg                                   |
|   | 453.6                        | g                                    |
| lb of H <sub>2</sub> O                  | 0.01602                      | ft <sup>3</sup>                      |
|   | 27.68                        | in <sup>3</sup>                      |
|   | 0.1198                       | gal                                  |
| oz                                      | 28.35                        | g                                    |
| ton (long)                              | 1016                         | kg                                   |
|   | 2240                         | lb                                   |
| ton (short)                             | 907.2                        | kg                                   |
|   | 2000                         | lb                                   |
| <b>VISCOSITY (Absolute)</b>             |                              |                                      |
| P                                       | 1                            | g/(cm)(sec)                          |
|   | 1                            | (dyn)(sec)/cm <sup>2</sup>           |
|   | 100                          | cP                                   |
| cP                                      | 6.720 x 10 <sup>4</sup>      | lb/(ft)(sec)                         |
|   | 2.089 x 10 <sup>5</sup>      | (lb)(sec)/ft <sup>2</sup>            |
|   | 2.419                        | lb/(ft)(hr)                          |
| <b>VISCOSITY (Kinematic)</b>            |                              |                                      |
| St                                      | 1                            | cm <sup>2</sup> /sec                 |
|   | 0.1549                       | in <sup>2</sup> /sec                 |
|   | 1.076 x 10 <sup>3</sup>      | ft <sup>2</sup> /sec                 |
|   | density (g/cm <sup>3</sup> ) | P                                    |
| <b>TEMPERATURE</b>                      |                              |                                      |
| °F = 1.8 (°C) + 32                      | K = °C + 273.2               | °R = °F + 459.7                      |
| <b>MISCELLANEOUS PHYSICAL CONSTANTS</b> |                              |                                      |
| <b>NUMERICAL</b>                        |                              |                                      |
| <b>CONSTANT</b>                         | <b>VALUE</b>                 | <b>UNITS</b>                         |
| Avogadro's Number                       | 6.022 x 10 <sup>23</sup>     | molecules/g-mol                      |
| Gas-Law Constant R                      | 1.987                        | cal/(g-mol)(K)                       |
|   | 1.987                        | Btu/(lb-mol)(°R)                     |
|   | 82.06                        | (cm <sup>3</sup> )(atm)/(g-mol)(K)   |
|   | 0.08206                      | (ltr)(atm)/(g-mol)(K)                |
|   | 1545                         | (ft)(lb-force)/(lb-mol)(°R)          |
|   | 0.7302                       | (ft <sup>3</sup> )(atm)/(lb-mol)(°R) |
|   | 8314                         | J/(k-mol)(K)                         |

**Key**

|                 |                               |                 |                         |                  |                   |                |                    |                 |                      |
|-----------------|-------------------------------|-----------------|-------------------------|------------------|-------------------|----------------|--------------------|-----------------|----------------------|
| atm             | ..... atmosphere              | dyn             | ..... dyne              | Hg               | ..... mercury     | k-mol          | ..... kilo mole    | m <sup>3</sup>  | ..... cubic meter    |
| bar             | ..... bar                     | °F              | ..... degree Fahrenheit | H <sub>2</sub> O | ..... water       | ltr            | ..... liter        | oz              | ..... ounce          |
| Btu             | ..... British thermal unit    | ft              | ..... foot              | in               | ..... inch        | lb             | ..... pound        | P               | ..... poise          |
| °C              | ..... degree Celsius          | ft <sup>2</sup> | ..... square foot       | in <sup>2</sup>  | ..... square inch | lb-force       | ..... pound force  | qt              | ..... quart          |
| cal             | ..... calorie, thermochemical | ft <sup>3</sup> | ..... cubic foot        | in <sup>3</sup>  | ..... cubic inch  | lb-mol         | ..... pound mole   | °R              | ..... degree Rankine |
| cP              | ..... centipoise              | g               | ..... gram              | J                | ..... joule       | m              | ..... meter        | sec             | ..... second         |
| cm              | ..... centimeter              | gal             | ..... gallon            | K                | ..... kelvin      | min            | ..... minute       | St              | ..... stokes         |
| cm <sup>2</sup> | ..... square centimeter       | g-mol           | ..... gram mole         | kg               | ..... kilogram    | mm             | ..... millimeter   | yd <sup>3</sup> | ..... cubic yard     |
| cm <sup>3</sup> | ..... cubic centimeter        | hr              | ..... hour              | kPa              | ..... kilopascal  | m <sup>2</sup> | ..... square meter |                 |                      |