Engineering Unit Conversion Factors

How to Use This Table - Example Unit Conversions

If you are given a measurement from the left hand side and want to convert to the units on the right hand side, just multiply your number by the given conversion factor.

Example - Feet to Meters
(10 ft) X (0.304800 m/ ft) X (1/3 yd/ft) = 54.68066 yd

Conversely, you can convert units from the right hand side to those units on the left by dividing by the conversion factor

Example - Millimeters to Inches
(50 mm) / (25.4 mm/in) = 1.97 in.

<table>
<thead>
<tr>
<th>Common Engineering Design Conversion Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Given</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td><strong>Length [L]</strong></td>
</tr>
<tr>
<td>Foot (ft)</td>
</tr>
<tr>
<td>Inch (in)</td>
</tr>
<tr>
<td>Mile (mi)</td>
</tr>
<tr>
<td><strong>Area [L]^2</strong></td>
</tr>
<tr>
<td>ft^2</td>
</tr>
<tr>
<td>in^2</td>
</tr>
<tr>
<td>in^2</td>
</tr>
<tr>
<td><strong>Volume [L]^3 &amp; Capacity</strong></td>
</tr>
<tr>
<td>in^3</td>
</tr>
<tr>
<td>ft^3</td>
</tr>
<tr>
<td>ft^3</td>
</tr>
<tr>
<td>ft^3</td>
</tr>
<tr>
<td>Gallon</td>
</tr>
<tr>
<td>Energy, Work or Heat [M] [L]^2 [t]^-1</td>
</tr>
<tr>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Btu                                         1.05435 kJ</td>
</tr>
<tr>
<td>Btu                                         0.251996 kcal</td>
</tr>
<tr>
<td>Calories (cal)                              4.184* Joules (J)</td>
</tr>
<tr>
<td>ft-lbf                                      1.355818 J</td>
</tr>
<tr>
<td>ft-lbf                                      0.138255 kgf-m</td>
</tr>
<tr>
<td>hp-hr                                       2.6845 MJ</td>
</tr>
<tr>
<td>KWH                                         3.600 MJ</td>
</tr>
<tr>
<td>m-kgf                                       9.80665* J</td>
</tr>
<tr>
<td>N-m                                         1. J</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flow Rate [L]^3 [t]^-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>ft^3/min                                    7.4805 gal/min</td>
</tr>
<tr>
<td>ft^3/min                                    0.471934 l/s</td>
</tr>
<tr>
<td>gal/min                                     0.063090 l/s</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Force or Weight [M] [L] [t]^2</th>
</tr>
</thead>
<tbody>
<tr>
<td>kgf                                         9.80665* Newton (N)</td>
</tr>
<tr>
<td>lbf                                         4.44822 N</td>
</tr>
<tr>
<td>lbf                                         0.453592 Kgf</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fracture Toughness</th>
</tr>
</thead>
<tbody>
<tr>
<td>ksi sqr(in)                                 1.098800 MPa sqr(m)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Heat Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Btu/lbm                                     0.555556 cal/g</td>
</tr>
<tr>
<td>Btu/lbm                                     2.324444 J/g</td>
</tr>
<tr>
<td>Btu/ft^3                                    0.037234 MJ/m^3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Heat Flux</th>
</tr>
</thead>
<tbody>
<tr>
<td>Btu/hr-ft^2                                 7.5346 E-5 cal/s-cm^2</td>
</tr>
<tr>
<td>Btu/hr-ft^2                                 3.1525 W/m^2</td>
</tr>
<tr>
<td>cal/s-cm^2                                  4.184* W/cm^2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mass Density [M] [L]^3</th>
</tr>
</thead>
<tbody>
<tr>
<td>lbm/in^3                                    27.68 g/cm^3</td>
</tr>
<tr>
<td>lbm/ft^3                                    16.0184 kg/m^3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power [M] [L]^2 [t]^-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Btu/hr                                     0.292875 Watt (W)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>ft-lbf/s</td>
</tr>
<tr>
<td>Horsepower (hp)</td>
</tr>
<tr>
<td>Horsepower</td>
</tr>
</tbody>
</table>

### Pressure (fluid) [M] [L]⁻¹ [t]⁻²

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atmosphere (atm)</td>
<td>14.696</td>
<td>lbf/in²</td>
</tr>
<tr>
<td>atm</td>
<td>1.01325</td>
<td>Pascal (Pa)</td>
</tr>
<tr>
<td>lbf/ft²</td>
<td>47.88026</td>
<td>Pa</td>
</tr>
<tr>
<td>lbf/in²</td>
<td>27.6807</td>
<td>in. H₂O at 39.2°F</td>
</tr>
</tbody>
</table>

### Stress [M] [L]⁻¹ [t]⁻²

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>kgf/cm²</td>
<td>9.80665 E²⁻²</td>
<td>MPa</td>
</tr>
<tr>
<td>ksi</td>
<td>6.89476</td>
<td>MPa</td>
</tr>
<tr>
<td>N/mm²</td>
<td>1.</td>
<td>MPa</td>
</tr>
<tr>
<td>kgf/mm²</td>
<td>1.42231</td>
<td>ksi</td>
</tr>
</tbody>
</table>

### Specific Heat

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Btu/lbm-°F</td>
<td>1.</td>
<td>cal/g-°C</td>
</tr>
</tbody>
</table>

### Temperature*

<table>
<thead>
<tr>
<th></th>
<th>Fahrenheit</th>
<th>Celsius</th>
<th>Fahrenheit</th>
<th>Rankine</th>
<th>Celsius</th>
<th>Kelvin</th>
<th>Rankine</th>
<th>Kelvin</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(°F-32) / 1.8</td>
<td></td>
<td>°F+459.67</td>
<td></td>
<td>°C+273.16</td>
<td></td>
<td>R/1.8</td>
<td></td>
</tr>
</tbody>
</table>

### Thermal Conductivity

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Btu-ft/hr-ft²-°F</td>
<td>14.8816</td>
<td>cal-cm/hr-cm²-°C</td>
</tr>
</tbody>
</table>

* Indicates exact conversion(s)