



# Armstrong® Specific Heat—Specific Gravity

**Table CG-33. Physical Properties of Liquids and Solids**

|  | Liquid (L)<br>or<br>Solid (S) | sp gr @<br>60-70°F | sp ht @<br>60°F<br>Btu/lb-°F |
|--|-------------------------------|--------------------|------------------------------|
| Acetic acid 100%                         | L                             | 1.05               | 0.48                         |
| Acetic acid 10%                          | L                             | 1.01               | 0.96                         |
| <b>Acetone, 100%</b>                     | <b>L</b>                      | <b>0.78</b>        | <b>0.514</b>                 |
| Alcohol, ethyl, 95%                      | L                             | 0.81               | 0.60                         |
| Alcohol, methyl, 90%                     | L                             | 0.82               | 0.65                         |
| <b>Aluminum</b>                          | <b>S</b>                      | <b>2.64</b>        | <b>0.23</b>                  |
| Ammonia, 100%                            | L                             | 0.61               | 1.10                         |
| Ammonia, 26%                             | L                             | 0.90               | 1.00                         |
| <b>Aroclor</b>                           | <b>L</b>                      | <b>1.44</b>        | <b>0.28</b>                  |
| Asbestos board                           | S                             | 0.88               | 0.19                         |
| Asphalt                                  | L                             | 1.00               | 0.42                         |
| <b>Asphalt, solid</b>                    | <b>S</b>                      | <b>1.1-1.5</b>     | <b>0.22-0.4</b>              |
| Benzene                                  | L                             | 0.84               | 0.41                         |
| Brickwork & Masonry                      | S                             | 1.6-2.0            | 0.22                         |
| <b>Brine - calcium chloride, 25%</b>     | <b>L</b>                      | <b>1.23</b>        | <b>0.689</b>                 |
| Brine - sodium chloride, 25%             | L                             | 1.19               | 0.786                        |
| Clay, dry                                | S                             | 1.9-2.4            | 0.224                        |
| <b>Coal</b>                              | <b>S</b>                      | <b>1.2-1.8</b>     | <b>0.26-0.37</b>             |
| Coal tars                                | S                             | 1.20               | 0.35@40                      |
| Coke, solid                              | S                             | 1.0-1.4            | 0.265                        |
| <b>Copper</b>                            | <b>S</b>                      | <b>8.82</b>        | <b>0.10</b>                  |
| Cork                                     | S                             | 0.25               | 0.48                         |
| Cotton, cloth                            | S                             | 1.50               | 0.32                         |
| <b>Cottonseed oil</b>                    | <b>L</b>                      | <b>0.95</b>        | <b>0.47</b>                  |
| Dowtherm A                               | L                             | 0.99               | 0.63                         |
| Dowtherm C                               | L                             | 1.10               | 0.35-0.65                    |
| <b>Ethylene glycol</b>                   | <b>L</b>                      | <b>1.11</b>        | <b>0.58</b>                  |
| Fatty acid - palmitic                    | L                             | 0.85               | 0.653                        |
| Fatty acid - stearic                     | L                             | 0.84               | 0.550                        |
| <b>Fish, fresh, average</b>              | <b>S</b>                      |                    | <b>0.75-0.82</b>             |
| Fruit, fresh, average                    | S                             |                    | 0.80-0.88                    |
| Gasoline                                 | L                             | 0.73               | 0.53                         |
| <b>Glass, Pyrex</b>                      | <b>S</b>                      | <b>2.25</b>        | <b>0.20</b>                  |
| Glass, wool                              | S                             | 0.072              | 0.157                        |
| Glue, 2 parts water<br>1 part dry glue   | L                             | 1.09               | 0.89                         |
| <b>Glycerol, 100% (glycerin)</b>         | <b>L</b>                      | <b>1.26</b>        | <b>0.58</b>                  |
| Honey                                    | L                             |                    | 0.34                         |
| Hydrochloric acid, 31.5% (muriatic)      | L                             | 1.15               | 0.60                         |
| <b>Hydrochloric acid, 10% (muriatic)</b> | <b>L</b>                      | <b>1.05</b>        | <b>0.75</b>                  |
| Ice                                      | S                             | 0.90               | 0.50                         |
| Ice Cream                                | S                             |                    | 0.70                         |
| <b>Lard</b>                              | <b>S</b>                      | <b>0.92</b>        | <b>0.64</b>                  |
| Lead                                     | S                             | 11.34              | 0.031                        |
| Leather                                  | S                             | 0.86-1.02          | 0.36                         |
| <b>Linseed oil</b>                       | <b>L</b>                      | <b>0.93</b>        | <b>0.44</b>                  |
| Magnesia, 85%                            | L                             | 0.208              | 0.27                         |
| Maple syrup                              | L                             |                    | 0.48                         |
| <b>Meat, fresh, average</b>              | <b>S</b>                      |                    | <b>0.780</b>                 |
| Milk                                     | L                             | 1.03               | 0.90-0.93                    |
| Nickel                                   | S                             | 8.90               | 0.11                         |
| <b>Nitric acid, 95%</b>                  | <b>L</b>                      | <b>1.50</b>        | <b>0.50</b>                  |
| Nitric acid, 60%                         | L                             | 1.37               | 0.64                         |
| Nitric acid, 10%                         | L                             | 1.05               | 0.90                         |
| <b>No. 1 Fuel Oil (kerosene)</b>         | <b>L</b>                      | <b>0.81</b>        | <b>0.47</b>                  |
| No. 2 Fuel Oil                           | L                             | 0.86               | 0.44                         |
| No. 3 Fuel Oil                           | L                             | 0.88               | 0.43                         |
| <b>No. 4 Fuel Oil</b>                    | <b>L</b>                      | <b>0.90</b>        | <b>0.42</b>                  |
| No. 5 Fuel Oil                           | L                             | 0.93               | 0.41                         |
| No. 6 Fuel Oil                           | L                             | 0.95               | 0.40                         |

**Table CG-33. (cont.) Physical Properties of Liquids and Solids**

|  | Liquid (L)<br>or<br>Solid (S) | sp gr @<br>60-70°F | sp ht @<br>60°F<br>Btu/lb-°F |
|--|-------------------------------|--------------------|------------------------------|
| API Mid-continent crude                | L                             | .085               | 0.44                         |
| API gas oil                            | L                             | 0.88               | 0.42                         |
| <b>Paper</b>                           | <b>S</b>                      | <b>1.7-1.15</b>    | <b>0.45</b>                  |
| Paraffin                               | S                             | 0.86-0.91          | 0.62                         |
| Paraffin, melted                       | L                             | 0.90               | 0.69                         |
| <b>Phenol (carbolic acid)</b>          | <b>L</b>                      | <b>1.07</b>        | <b>0.56</b>                  |
| Phosphoric acid, 20%                   | L                             | 1.11               | 0.85                         |
| Phosphoric acid, 10%                   | L                             | 1.05               | 0.93                         |
| <b>Phthalic anhydride</b>              | <b>L</b>                      | <b>1.53</b>        | <b>0.232</b>                 |
| Rubber, vulcanized                     | S                             | 1.10               | 0.415                        |
| SAE - SW (#8 machine lube oil)         | L                             | 0.88               |                              |
| <b>SAE - 20 (#20 machine lube oil)</b> | <b>L</b>                      | <b>0.89</b>        |                              |
| SAE - 30 (#30 machine lube oil)        | L                             | 0.89               |                              |
| Sand                                   | S                             | 1.4-1.76           | 0.19                         |
| <b>Sea water</b>                       | <b>L</b>                      | <b>1.03</b>        | <b>0.94</b>                  |
| Silk                                   | S                             | 1.25-1.35          | 0.33                         |
| Sodium hydroxide, 50% (caustic acid)   | L                             | 1.53               | 0.78                         |
| <b>Sodium hydroxide, 30%</b>           | <b>L</b>                      | <b>1.33</b>        | <b>0.84</b>                  |
| Soybean oil                            | L                             | 0.92               | 0.24-0.33                    |
| Steel, mild @ 70                       | S                             | 7.90               | 0.11                         |
| <b>Steel, stainless, 300 series</b>    | <b>S</b>                      | <b>8.04</b>        | <b>0.12</b>                  |
| Sucrose, 60% sugar syrup               | L                             | 1.29               | 0.74                         |
| Sucrose, 40% sugar syrup               | L                             | 1.18               | 0.66                         |
| <b>Sugar, cane &amp; beet</b>          | <b>S</b>                      | <b>1.66</b>        | <b>0.30</b>                  |
| Sulfur                                 | S                             | 2.00               | 0.203                        |
| Sulfuric acid, 110% (fuming)           | L                             |                    | 0.27                         |
| <b>Sulfuric acid, 98%</b>              | <b>L</b>                      | <b>1.84</b>        | <b>0.35</b>                  |
| Sulfuric acid, 60%                     | L                             | 1.50               | 0.52                         |
| Sulfuric acid, 20%                     | L                             | 1.14               | 0.84                         |
| <b>Titanium (commercial)</b>           | <b>S</b>                      | <b>4.50</b>        | <b>0.13</b>                  |
| Toluene                                | L                             | 0.86               | 0.42                         |
| Trichloroethylene                      | L                             | 1.62               | 0.215                        |
| <b>Tetrachloride carbon</b>            | <b>L</b>                      | <b>1.58</b>        | <b>0.21</b>                  |
| Turpentine, spirits of                 | L                             | 0.86               | 0.42                         |
| Vegetables, fresh, average             | S                             |                    | 0.73-0.94                    |
| <b>Water</b>                           | <b>L</b>                      | <b>1.00</b>        | <b>1.00</b>                  |
| Wines, table, dessert, average         | L                             | 1.03               | 0.90                         |
| Woods, vary from                       | S                             | 0.35-0.9           | 0.90                         |
| <b>Wool</b>                            | <b>S</b>                      | <b>1.32</b>        | <b>0.325</b>                 |
| Zinc                                   | S                             | 7.05               | 0.095                        |

**Table CG-34. Physical Properties of Gases**

|                         | sp gr @ 60-70°F | sp ht @ 60°F Btu/lb-°F |
|-------------------------|-----------------|------------------------|
| Air                     | 1.00            | 0.24                   |
| Ammonia                 | 0.60            | 0.54                   |
| <b>Benzene</b>          |                 | <b>0.325</b>           |
| Butane                  | 2.00            | 0.455                  |
| Carbon dioxide          | 1.50            | 0.21                   |
| <b>Carbon monoxide</b>  | <b>0.97</b>     | <b>0.255</b>           |
| Chlorine                | 2.50            | 0.118                  |
| Ethane                  | 1.10            | 0.50                   |
| <b>Ethylene</b>         | <b>0.97</b>     | <b>0.45</b>            |
| Freon - 12              |                 | 0.16                   |
| Hydrogen                | 0.069           | 3.42                   |
| <b>Hydrogen sulfide</b> | <b>1.20</b>     | <b>0.25</b>            |
| Methane                 | 0.55            | 0.60                   |
| Nitrogen                | 0.97            | 0.253                  |
| <b>Oxygen</b>           | <b>1.10</b>     | <b>0.225</b>           |
| Propane                 | 1.50            | 0.46                   |
| Sulfur dioxide          |                 | 0.162                  |
| Water vapor (steam)     | 2.30            | 0.453                  |