

## Appendix A: British Thermal Unit Conversion Factors

The thermal conversion factors presented in the following tables can be used to estimate the heat content in British thermal units (Btu) of a given amount of energy measured in physical units, such as barrels or cubic feet. For example, 10 barrels of asphalt has a heat content of approximately 66.36 million Btu (10 barrels x 6.636 million Btu per barrel = 66.36 million Btu).

The heat content rates (i.e., thermal conversion factors) provided in this section represent the gross (or higher or upper) energy content of the fuels. Gross heat content rates are applied in all Btu calculations for the *Monthly Energy Review* and are commonly used in energy calculations in the United States; net (or lower) heat content rates are typically used in European energy calculations. The difference between the two rates is the amount of energy that is consumed to vaporize water that is created during the combustion process. Generally, the difference ranges from 2% to 10%, depending on the specific fuel and its hydrogen content. Some fuels, such as unseasoned wood, can be more than 40% different in their gross and net heat content rates. See "Heat Content" and "British Thermal Unit (Btu)" in the Glossary for more information.

In general, the annual thermal conversion factors presented in Tables A2 through A6 are computed from final annual data or from the best available data and labeled "preliminary." Often, the current year's factors are labeled "estimate," and are set equal to the previous year's values until data become available to calculate the factors. The source of each factor is described in the section entitled "Thermal Conversion Factor Source Documentation," which follows Table A6 in this appendix.

**Table A1. Approximate Heat Content of Petroleum and Other Liquids**  
(Million Btu per Barrel, Except as Noted)

| Commodity                                     | Heat Content       | Commodity                                 | Heat Content                           |
|---|--------------------|---|--|
| Asphalt and Road Oil                          | 6.636              | Motor Gasoline Blending Components (MGBC) |  |
| Aviation Gasoline (Finished)                  | 5.048              | Through 2006                              | 5.253                                  |
| Aviation Gasoline Blending Components         | 5.048              | Beginning in 2007                         | 5.222                                  |
| Biodiesel                                     | 5.359              | Oxygenates (excluding Fuel Ethanol)       | 4.247                                  |
| Crude Oil—see Table A2                        |                    | Petrochemical Feedstocks                  |  |
| Distillate Fuel Oil—see Table A3 for averages |                    | Naphtha Less Than 401°F                   | 5.248                                  |
| 15 ppm sulfur and under                       | 5.770              | Other Oils Equal to or Greater Than 401°F | 5.825                                  |
| Greater than 15 ppm to 500 ppm sulfur         | 5.817              | Petroleum Coke—see Table A3 for averages  |  |
| Greater than 500 ppm sulfur                   | 5.825              | Total, through 2003                       | 6.024                                  |
| Fuel Ethanol—see Table A3                     |                    | Catalyst, beginning in 2004               | <sup>a</sup> 6.287                     |
| Hydrocarbon Gas Liquids                       |                    | Marketable, beginning in 2004             | 5.719                                  |
| Ethane/Ethylene                               | 3.082              | Plant Condensate                          | 5.418                                  |
| Propane/Propylene                             | 3.836              | Renewable Fuels Except Fuel Ethanol       | <sup>b</sup> 5.359; <sup>b</sup> 5.494 |
| Normal Butane/Butylene                        | 4.326              | Residual Fuel Oil                         | 6.287                                  |
| Isobutane/Isobutylene                         | 3.974              | Special Naphthas                          | 5.248                                  |
| Natural Gasoline (Pentanes Plus)              | 4.620              | Still Gas                                 | <sup>c</sup> 6.287; <sup>c</sup> 6.000 |
| Hydrogen                                      | <sup>a</sup> 6.287 | Unfinished Oils                           | 5.825                                  |
| Jet Fuel, Kerosene Type                       | 5.670              | Unfractionated Stream                     | 5.418                                  |
| Jet Fuel, Naphtha Type                        | 5.355              | Waxes                                     | 5.537                                  |
| Kerosene                                      | 5.670              | Miscellaneous Products                    | 5.796                                  |
| Lubricants                                    | 6.065              | Other Hydrocarbons                        | 5.825                                  |
| Motor Gasoline (Finished)—see Tables A2/A3    |                    |   |  |

<sup>a</sup> Per residual fuel oil equivalent barrel (6.287 million Btu per barrel).

<sup>b</sup> The biodiesel heat content factor, 5.359 million Btu per barrel, is used for "Biomass-Based Diesel Fuel" and "Other Renewable Fuels"; however, a factor of 5.494 million Btu per barrel is used for "Other Renewable Diesel Fuel."

<sup>c</sup> Through 2015, the still gas heat content factor is 6.000 million Btu per fuel oil equivalent barrel; beginning in 2016, the factor is 6.287 million Btu per residual fuel oil equivalent barrel.

Note: The values in this table are for gross heat contents. See "Heat Content" in Glossary.

Web Page: <http://www.eia.gov/totalenergy/data/monthly/#appendices>.

Sources: See "Thermal Conversion Factor Source Documentation," which follows Table A6.