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# Specific Heat of some Metals

## Specific heat of commonly used metals like aluminum, iron, mercury and many more - imperial and SI units

The specific heat of **metals and metalloids (semimetals)** are given in the table below.

- Specific heat online unit converter

See also tabulated values for gases , food and foodstuff , common liquids and fluids , common solids and other common substances as well as values of *molar specific heat* for common organic substances and inorganic substances.

| Metal | Specific Heat - $c_p$ - (kJ/(kg K)) (Btu/lb °F) (cal/gram C°) |
|---|---|
| Aluminum | 0.91 |
| Antimony | 0.21 |
| Barium | 0.20 |
| Beryllium | 1.83 |
| Bismuth | 0.13 |
| Cadmium | 0.23 |
| Calsium | 0.63 |
| Carbon Steel | 0.49 |
| Cast Iron | 0.46 |
| Cesium | 0.24 |
| Chromium | 0.46 |
| Cobalt | 0.42 |
| Copper | 0.39 |
| Gallium | 0.37 |
| Germanium | 0.32 |
| Gold | 0.13 |
| Hafnium | 0.14 |
| Indium | 0.24 |
| Iridium | 0.13 |
| Iron | 0.45 |
| Lanthanum | 0.195 |
| Lead | 0.13 |
| Lithium | 3.57 |
| Lutetium | 0.15 |
| Magnesium | 1.05 |

| Metal | Specific Heat - $c_p$ - (kJ/(kg K)) (Btu/lb °F) (cal/gram C°) |
|---|---|
| Manganese | 0.48 |
| Mercury | 0.14 |
| Molybdenum | 0.25 |
| Nickel | 0.44 |
| Niobium (Columbium) | 0.27 |
| Osmium | 0.13 |
| Palladium | 0.24 |
| Platinum | 0.13 |
| Plutonium | 0.13 |
| Potassium | 0.75 |
| Rhenium | 0.14 |
| Rhodium | 0.24 |
| Rubidium | 0.36 |
| Ruthenium | 0.24 |
| Scandium | 0.57 |
| Selenium | 0.32 |
| Silicon | 0.71 |
| Silver | 0.23 |
| Sodium | 1.21 |
| Strontium | 0.30 |
| Tantalum | 0.14 |
| Thallium | 0.13 |
| Thorium | 0.13 |
| Tin | 0.21 |
| Titanium | 0.54 |
| Tungsten | 0.13 |
| Uranium | 0.12 |
| Vanadium | 0.39 |
| Yttrium | 0.30 |
| Zinc | 0.39 |
| Zirconium | 0.27 |
| Wrought Iron | 0.50 |

Metalloids - also known as semimetals - are elements containing properties similar and midway between metals and nonmetals.

- *1 J/(kg K) = 2.389x10$^{-4}$ kcal/(kg $^{o}$C) = 2.389x10$^{-4}$ Btu/(lb$_m$ $^{o}$F)*
- *1 kJ/(kg K) = 0.2389 kcal/(kg $^{o}$C) = 0.2389 Btu/(lb$_m$ $^{o}$F) = 10$^{3}$ J/(kg $^{o}$C) = 1 J/(g $^{o}$C)*
- *1 Btu/(lb$_m$ $^{o}$F) = 4186.8 J/ (kg K) = 1 kcal/(kg $^{o}$C)*
- *1 kcal/(kg $^{o}$C) = 4186.8 J/ (kg K) = 1 Btu/(lb$_m$ $^{o}$F)*

For conversion of units, use the Specific heat online unit converter.

See also tabulated values for Gases , Food and foodstuff , Common liquids and fluids , Common solids and other Common substances as well as values of *molar specific heat* for common organic substances and inorganic substances.

### Heating Energy

The energy required to heat a product can be calculated as

$$q = c_p\, m\, dt \qquad (1)$$

*where*

*q = heat required (kJ)*

*$c_p$ = specific heat (kJ/kg K, kJ/kg C°)*

*dt = temperature difference (K, C°)*

### Example - Heating Carbon Steel

*2 kg* of carbon steel is heated from *20 °C* to *100 °C*. The specific heat of carbon steel is *0.49 kJ/kgC°* and the heat required can be calculated as

$$q = (0.49\ kJ/kg\ ^oC)\ (2\ kg)\ ((100\ ^oC) - (20\ ^oC))$$

$$= \underline{78.4}\ (kJ)$$

## Related Topics

- **Material Properties** - Material properties for gases, fluids and solids - densities, specific heats, viscosities and more
- **Thermodynamics** - Effects of work, heat and energy on systems

## Related Documents

- **Aluminum - Radiation Heat Emissivity** - Radiation heat emissivity of unoxidized, oxidized and polished aluminum
- **Aluminum Alloys - Mechanical Properties** - Mechanical properties of aluminum alloys - tensile strength, yield strength and more
- **Electrode Potential and Galvanic Corrosion** - Introduction to electro chemical series and corrosion of metals
- **Heat Capacity** - The heat capacity of a substance is the amount of heat required to change its temperature by one degree, and has units of energy per degree
- **Heat, Work and Energy** - Heat, work and energy tutorial - essentials as specific heat
- **Lead - Melting Points of Binary Eutectic Alloys** - Pb - Lead (Plumbum) - binary eutectic alloys and melting points
- **Magnesium - Melting Points of Binary Eutectic Alloys** - Mg - Magnesium - binary eutectic alloys and melting points
- **Melting and Boiling Temperatures, Densities and Solubility for Inorganic Compounds in Water** - Physical constants for more than 280 common inorganic compounds. Density is given for the actual state at 25°C and for liquid phase at melting point temperature.
- **Metals - Boiling Temperatures** - Metals and their boiling temperatures

- **Metals - Latent Heat of Fusion** - Metals and their latent heat of fusion
- **Metals and Alloys - Densities** - Density of some common metals, metallic elements and alloys - aluminum, bronze, copper, iron and more ..
- **Metals and Alloys - Melting Temperatures** - Melting temperatures of common metals and alloys
- **Metals and Corrosion Resistance** - Common metals and their corrosion resistance to aggressive fluids like acids, bases and more
- **Metals Machinability** - Machinability of metals
- **Mixing Fluids** - Final mass and temperature when mixing fluids
- **Poisson's Ratio for Metals** - Some metals and their Poisson's Ratio
- **Polymers - Specific Heats** - Specific heat of polymers like epoxy, PET, polycarbonate and more
- **Solids and Metals - Specific Gravities** - Specific gravity for some common solids and metals like aluminum, asbestos, brass, calcium and many others
- **Specific Heat - Online Unit Converter** - Online specific heat converter with the most commonly used units
- **Specific Heat of Solids** - Common solids - like brick, cement, glass and many more - and their specific heats - in Imperial and SI units
- **Specific Heat of some common Substances** - Specific heat of some products like wet mud, granite, sandy clay, quartz sand and more
- **Standard enthalpy of formation, Gibbs energy of formation, entropy and molar heat capacity of organic substances** - The standard enthalpy of formation, Gibbs energy of formation, entropy and molar heat capacity are tabulated for more than hundred organic substances.
- **Standard state and enthalpy of formation, Gibbs free energy of formation, entropy and heat capacity** - Definition and explanation of the terms standard state and standard enthalpy of formation, with listing of values for standard enthalpy and Gibbs free energy of formation, as well as standard entropy and molar heat capacity, of 370 inorganic compounds
- **Thermal Conductivity of Metals, Metallic Elements and Alloys** - Thermal conductivity of common metals, metallic elements aand Alloys

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- en: specific heat metals capacity

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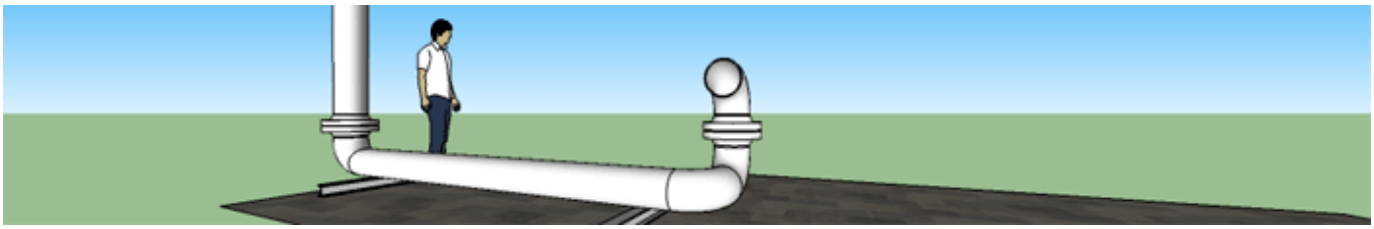

Add standard and customized parametric components - like flange beams, lumbers, piping, stairs and more - to your Sketchup model with the Engineering ToolBox - SketchUp Extension - enabled for use with the amazing, fun and free SketchUp Make and SketchUp Pro .Add the Engineering ToolBox extension to your SketchUp from the SketchUp Pro Sketchup Extension Warehouse!

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- editor.engineeringtoolbox@gmail.com

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