Energy Equivalents

	J	kg	m^{-1}	Hz
1 J	$(1\ \mathrm{J}) =$ 1 J	$(1\ \mathrm{J})/c^2 =$ $1.112\,650\,056\ldots \times 10^{-17}$ kg	$(1\ \mathrm{J})/hc =$ $5.034\,117\,20(86) \times 10^{24}\ \mathrm{m}^{-1}$	$(1\ \mathrm{J})/h =$ $1.509\,190\,37(26) \times 10^{33}$ Hz
1 kg	$(1\ \mathrm{kg})c^2 =$ $8.987\,551\,787\ldots \times 10^{16}$ J	$(1\ \mathrm{kg}) =$ 1 kg	$(1\ \mathrm{kg})c/h =$ $4.524\,438\,91(77) \times 10^{41}\ \mathrm{m}^{-1}$	$(1\ \mathrm{kg})c^2/h =$ $1.356\,392\,66(23) \times 10^{50}$ Hz
1 m^{-1}	$(1\ \mathrm{m}^{-1})hc =$ $1.986\,445\,61(34) \times 10^{-25}$ J	$(1\ \mathrm{m}^{-1})h/c =$ $2.210\,218\,81(38) \times 10^{-42}$ kg	$(1\ \mathrm{m}^{-1}) =$ 1 m^{-1}	$(1\ \mathrm{m}^{-1})c =$ 299 792 458 Hz
1 Hz	$(1\ \mathrm{Hz})h =$ $6.626\,0693(11) \times 10^{-34}$ J	$(1\ \mathrm{Hz})h/c^2 =$ $7.372\,4964(13) \times 10^{-51}$ kg	$(1\ \mathrm{Hz})/c =$ $3.335\,640\,951\ldots \times 10^{-9}\ \mathrm{m}^{-1}$	$(1\ \mathrm{Hz}) =$ 1 Hz
1 K	$(1\ \mathrm{K})k =$ $1.380\,6505(24) \times 10^{-23}$ J	$(1\ \mathrm{K})k/c^2 =$ $1.536\,1808(27) \times 10^{-40}$ kg	$(1\ \mathrm{K})k/hc =$ $69.503\,56(12)\ \mathrm{m}^{-1}$	$(1\ \mathrm{K})k/h =$ $2.083\,6644(36) \times 10^{10}$ Hz
1 eV	$(1\ \mathrm{eV}) =$ $1.602\,176\,53(14) \times 10^{-19}$ J	$(1\ \mathrm{eV})/c^2 =$ $1.782\,661\,81(15) \times 10^{-36}$ kg	$(1\ \mathrm{eV})/hc =$ $8.065\,544\,45(69) \times 10^{5}\ \mathrm{m}^{-1}$	$(1\ \mathrm{eV})/h =$ $2.417\,989\,40(21) \times 10^{14}$ Hz
1 u	$(1\ \mathrm{u})c^2 =$ $1.492\,417\,90(26) \times 10^{-10}$ J	$(1\ \mathrm{u}) =$ $1.660\,538\,86(28) \times 10^{-27}$ kg	$(1\ \mathrm{u})c/h =$ $7.513\,006\,608(50) \times 10^{14}\ \mathrm{m}^{-1}$	$(1\ \mathrm{u})c^2/h =$ $2.252\,342\,718(15) \times 10^{23}$ Hz
1 E_h	$(1\ E_\mathrm{h}) =$ $4.359\,744\,17(75) \times 10^{-18}$ J	$(1\ E_\mathrm{h})/c^2 =$ $4.850\,869\,60(83) \times 10^{-35}$ kg	$(1\ E_\mathrm{h})/hc =$ $2.194\,746\,313\,705(15) \times 10^{7}\ \mathrm{m}^{-1}$	$(1\ E_\mathrm{h})/h =$ $6.579\,683\,920\,721(44) \times 10^{15}$ Hz

Derived from the relations $E = mc^2 = hc/\lambda = h\nu = kT$, and based on the 2002 CODATA adjustment of the values of the constants;
1 eV $= (e/\mathrm{C})$ J, 1 u $= m_\mathrm{u} = \frac{1}{12}m(^{12}\mathrm{C}) = 10^{-3}$ kg $\mathrm{mol}^{-1}/N_\mathrm{A}$, and $E_\mathrm{h} = 2R_\infty hc = \alpha^2 m_\mathrm{e} c^2$ is the Hartree energy (hartree).

Source: Peter J. Mohr and Barry N. Taylor, CODATA Recommended Values of the Fundamental Physical Constants: 2002, *Reviews of Modern Physics*, Vol. 77, No.1, 2005.

Energy Equivalents

	K	eV	u	E_h
1 J	(1 J)/k = $7.242\,963(13) \times 10^{22}$ K	(1 J) = $6.241\,509\,47(53) \times 10^{18}$ eV	(1 J)/c^2 = $6.700\,5361(11) \times 10^{9}$ u	(1 J) = $2.293\,712\,57(39) \times 10^{17}$ $E_{\rm h}$
1 kg	(1 kg)c^2/k = $6.509\,650(11) \times 10^{39}$ K	(1 kg)c^2 = $5.609\,588\,96(48) \times 10^{35}$ eV	(1 kg) = $6.022\,1415(10) \times 10^{26}$ u	(1 kg)c^2 = $2.061\,486\,05(35) \times 10^{34}$ $E_{\rm h}$
1 $\rm m^{-1}$	(1 $\rm m^{-1}$)hc/k = $1.438\,7752(25) \times 10^{-2}$ K	(1 $\rm m^{-1}$)hc = $1.239\,841\,91(11) \times 10^{-6}$ eV	(1 $\rm m^{-1}$)h/c = $1.331\,025\,0506(89) \times 10^{-15}$ u	(1 $\rm m^{-1}$)hc = $4.556\,335\,252\,760(30) \times 10^{-8}$ $E_{\rm h}$
1 Hz	(1 Hz)h/k = $4.799\,2374(84) \times 10^{-11}$ K	(1 Hz)h = $4.135\,667\,43(35) \times 10^{-15}$ eV	(1 Hz)h/c^2 = $4.439\,821\,667(30) \times 10^{-24}$ u	(1 Hz)h = $1.519\,829\,846\,006(10) \times 10^{-16}$ $E_{\rm h}$
1 K	(1 K) = 1 K	(1 K)k = $8.617\,343(15) \times 10^{-5}$ eV	(1 K)k/c^2 = $9.251\,098(16) \times 10^{-14}$ u	(1 K)k = $3.166\,8153(55) \times 10^{-6}$ $E_{\rm h}$
1 eV	(1 eV)/k = $1.160\,4505(20) \times 10^{4}$ K	(1 eV) = 1 eV	(1 eV)/c^2 = $1.073\,544\,171(92) \times 10^{-9}$ u	(1 eV) = $3.674\,932\,45(31) \times 10^{-2}$ $E_{\rm h}$
1 u	(1 u)c^2/k = $1.080\,9527(19) \times 10^{13}$ K	(1 u)c^2 = $931.494\,043(80) \times 10^{6}$ eV	(1 u) = 1 u	(1 u)c^2 = $3.423\,177\,686(23) \times 10^{7}$ $E_{\rm h}$
1 $E_{\rm h}$	(1 $E_{\rm h}$)/k = $3.157\,7465(55) \times 10^{5}$ K	(1 $E_{\rm h}$) = $27.211\,3845(23)$ eV	(1 $E_{\rm h}$)/c^2 = $2.921\,262\,323(19) \times 10^{-8}$ u	(1 $E_{\rm h}$) = 1 $E_{\rm h}$

Derived from the relations $E = mc^2 = hc/\lambda = h\nu = kT$, and based on the 2002 CODATA adjustment of the values of the constants; 1 eV = $(e/{\rm C})$ J, 1 u = $m_{\rm u} = \frac{1}{12}m(^{12}{\rm C}) = 10^{-3}$ kg mol$^{-1}/N_{\rm A}$, and $E_{\rm h} = 2R_\infty hc = \alpha^2 m_{\rm e}c^2$ is the Hartree energy (hartree).

Source: Peter J. Mohr and Barry N. Taylor, CODATA Recommended Values of the Fundamental Physical Constants:2002, *Reviews of Modern Physics*, Vol. 77, No.1, 2005.