Section: Appendix A

Small and Large Energy Units and Energy per Unit Weight Conversions

Energy Units

FROM:	TO: MJ	J	k W h	Btu_{IT}	cal_{IT}
megajoule (MJ)	1	1×10^{6}	0.278	947.8	238845
joule (J)[a]	1×10^{-6}	1	0.278×10^{-6}	9.478×10^{-4}	0.239
Kilowatt hours (k W h)	3.6	3.6×10^{6}	1	3412	859845
Btu_{IT}	1.055×10^{-3}	1055.055	2.93×10^{-4}	1	251.996
$calorie_{IT}$ (cal_{IT})		4.186	1.163×10^{-6}	3.97×10^{-3}	1

Energy per Unit Weight

FROM:	TO: $J\ kg^{-1}$	kJ kg-1	$cal_{IT}\ g^{-1}$	$Btu_{IT}\ lb^{-1}$
joule per kilogram ($J\ kg^{-1}$)	1	0.001	2.39×10^{-4}	4.299×10^{-4}
kilojoules per kilogram($kJ\ kg^{-1}$)	1000	1	0.2388	0.4299
calorieth per gram ($cal_{IT}\ g^{-1}$)	4186.8	4.1868	1	1.8
BtuIT per pound ($Btu_{IT}\ lb^{-1}$)	2326	2.326	0.5555	1

Large Energy Unit Conversions

FROM:	TO: Terajoules	Giga-calories	Million tonnes of oil equivalent	Million Btu	Gigawatt-hours
	multiply by:				
Terajoules	1	238.8	2.388×10^{-5}	947.8	0.2778
Gigacalories	4.1868×10^{-3}	1	10^{-7}	3.968	1.163×10^{-3}
Million tonnes of oil equivalent	4.1868×10^{4}	107	1	3.968×10^{7}	11,630
Million Btu	1.0551×10^{-3}	0.252	2.52×10^{-8}	1	2.931×10^{-4}
Gigawatthours	3.6	860	8.6×10^{-5}	3412	1

Sources:

www.gordonengland.co.uk/conversion/power.html and www.convert-me.com/en/convert/power and www.unitconversion.org/unit_converter/fuel-efficiency-mass were used to make or check conversions

Davis, S.C., S.W. Diegel and R.G. Boundy. 2008. *Transportation Energy Data Book: Edition 27,* Appendix B.7. ORNL-6981, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Note:

The subscript "IT" stands for International Table values, which are only slightly different from thermal values normally subscripted "th". The "IT" values are most commonly used in current tables and generally are not subscripted, but conversion calculators ususally include both.

[a] One Joule is the exact equivalent of one Newton meter (Nm) and one Watt second.