Energy and Heat Unit Converter (kJ, kcal, Btu, kWh)

Convert energy and heat between joules, kilojoules, megajoules, gigajoules, kilocalories, British thermal units, kilowatt-hours and ton-hours of refrigeration.

Method: NIST SP 811 (2008); Appendix B conversion factors

Input parameters

Unit system: SI

Parameter	Value	Unit
Energy (choose its unit)	859.85	kcal

Calculated results

Parameter	Value	Unit
joule	3,600,000	J
kilojoule	3,600.0	kJ
megajoule	3.6000	MJ
gigajoule	0.003600	GJ
kilocalorie (IT)	859.85	kcal
British thermal unit (IT)	3,412.1	Btu
kilowatt-hour	1.0000	kWh
megawatt-hour	0.001000	MWh
ton-hour of refrigeration	0.28435	TR·h

Notes for this case

- Kilocalorie and Btu are the International Table values (1 kcal = 4.1868 kJ exactly; 1 Btu = 1.05505585262 kJ).

Formula and method

$$1\ \text{kcal} = 4.1868\ \text{kJ}, \quad 1\ \text{Btu} = 1.055\,055\,85\ \text{kJ}, \quad 1\ \text{kWh} = 3.6\ \text{MJ}$$

Variables

E	Energy (choose its unit)	J

Method and standards

Exact or defined factors from NIST SP 811: International Table calorie and Btu.

Assumptions and limits

- International Table calorie and Btu; thermochemical units differ slightly.

References

- NIST SP 811 (2008)
- Appendix B conversion factors

Report details

Report reference	FCC-3Q8S-0BYD (the same inputs always give the same reference)
Generated	17 November 2026, 19:54 UTC
Calculator	Energy and Heat Unit Converter (kJ, kcal, Btu, kWh)
Method last reviewed	12 November 2026
Software release	FireCAD Calc, release of 17 November 2026
Release checks	3 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/general/unit-conversions/energy-unit-converter

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.