Calorific Value Unit Converter (kcal/kg, kJ/kg, Btu/lb)

Convert the calorific value of a fuel, or any specific energy, between kJ/kg, MJ/kg, kcal/kg, Btu/lb and kWh per tonne, with exact factors.

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

Input parameters

Unit system: SI

Parameter	Value	Unit
Calorific value (choose its unit)	4,000.0	kcal/kg

Calculated results

Parameter	Value	Unit
joule per kilogram	1.6747e+07	J/kg
kilojoule per kilogram	16,747	kJ/kg
megajoule per kilogram	16.747	MJ/kg
kilocalorie per kilogram	4,000.0	kcal/kg
Btu per pound	7,200.0	Btu/lb
kilowatt-hour per tonne	4,652.0	kWh/t

Notes for this case

- 1 kcal/kg = 4.1868 kJ/kg and 1 Btu/lb = 2.326 kJ/kg exactly. Gross and net values are different quantities: converting units does not turn one into the other.

Formula and method

$$1\ \text{kcal/kg} = 4.1868\ \text{kJ/kg}, \quad 1\ \text{Btu/lb} = 2.326\ \text{kJ/kg}$$

Variables

CV	Calorific value (choose its unit)	J/kg

Method and standards

Exact factors from the International Table calorie and Btu definitions.

Assumptions and limits

- Units only; basis (as received, dry) and gross/net unchanged.

References

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

Report details

Report reference	FCC-KPH3-KW0A (the same inputs always give the same reference)
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Method last reviewed	12 November 2026
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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/calorific-value-unit-converter

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.