Magnetic Unit Converter: Tesla, Gauss, A/m and Oersted

Converts flux density between tesla and gauss and field strength between A/m and oersted, and relates B and H through the relative permeability.

Method: SI and CGS magnetic units

Input parameters

Unit system: SI

Parameter	Value	Unit
Magnetic flux density	50.000	mT
Magnetic field strength	12.566	Oe
Relative permeability of the medium	1.0000	

Calculated results

Parameter	Value	Unit
Flux density in gauss	500.00	G
Flux density in tesla	0.050000	T
Field strength in oersted	12.566	Oe
Field strength in kA/m	1.0000	kA/m
H corresponding to B in the medium	39,789	A/m
B corresponding to H in the medium	1.2566	mT

Notes for this case

• 1 T = 10^4 G; 1 Oe = 1000/(4π) A/m ≈ 79.58 A/m. In vacuum (and air) B = $\mu_0 H$, so 1 G corresponds to 1 Oe; in a linear material B = $\mu_0 \mu_r H$. Ferromagnetic materials are non-linear and saturate, so a single μ_r is only valid at one operating point. The Earth's field is about 0.25–0.65 G (25–65 µT).

Formula and method

$$1\ \mathrm{T} = 10^4\ \mathrm{G}, \quad 1\ \mathrm{Oe} = \frac{1000}{4\pi}\ \mathrm{A/m}, \quad B = \mu_0 \mu_r H$$

Variables

B	Magnetic flux density	T
H	Magnetic field strength	A/m
μ_r	Relative permeability of the medium	-
H_B	H corresponding to B in the medium	A/m
B_H	B corresponding to H in the medium	T

Method and standards

Magnetic units.

Assumptions and limits

- Linear isotropic medium for the B–H relation.

References

SI and CGS magnetic units

Report details

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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/magnetic-unit-converter

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.