AWG to mm² Wire Size Converter

Diameter and cross-section in mm² of an American Wire Gauge (AWG) size by the defining formula, with the resistance per km for copper or another metal.

Method: ASTM B258 (AWG diameters: 0.005 in × 92^((36 − n)/39)); IEC 60028 (resistivity of annealed copper)

Input parameters

Unit system: SI

Parameter	Value	Unit
AWG number (0 = 1/0, −1 = 2/0, −2 = 3/0, −3 = 4/0)	10.000	
Resistivity of the conductor at 20 °C Default: annealed copper (IACS). Aluminium is about 0.0283 Ω·mm²/m.	0.017241	Ω·mm²/m

Calculated results

Parameter	Value	Unit
Diameter	2.5882	mm
Cross-section	5.2612	mm²
Resistance per unit length at 20 °C	3.2771	Ω/km

Notes for this case

- Solid round wire. Stranded conductors of the same AWG have the same metal area but a larger overall diameter.

Formula and method

$$d\,[\text{in}] = 0.005 \times 92^{(36-n)/39}, \quad A = \frac{\pi d^2}{4}, \quad r = \frac{\rho}{A}$$

Variables

n	AWG number (0 = 1/0, −1 = 2/0, −2 = 3/0, −3 = 4/0)	-
ρ	Resistivity of the conductor at 20 °C	Ω·m
d	Diameter	m
A	Cross-section	m²
r	Resistance per unit length at 20 °C	Ω/m

Method and standards

The AWG series is a geometric progression between 36 AWG and 4/0.

Assumptions and limits

- Solid wire dimensions; whole-number gauges only.

References

- ASTM B258 (AWG diameters: 0.005 in × 92^((36 − n)/39))
- IEC 60028 (resistivity of annealed copper)

Report details

Report reference	FCC-PAXP-748T (the same inputs always give the same reference)
Generated	17 November 2026, 19:48 UTC
Calculator	AWG to mm² Wire Size Converter
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/electrical/cables/awg-to-mm2

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.