AWG Wire Size Chart

Solid round copper at 20 °C · NEC 2023 Article 310.16 ampacity (75 °C THWN/XHHW in raceway)

Calcflux

Safety Notice. Wire sizing affects electrical safety. This chart gives NEC 2023 Article 310.16 base ampacity for 75 °C copper in raceway. It does not account for ambient temperature correction (310.15(B)), conductor bundling derating (310.15(C)), continuous-load factors (210.19(A)(1)), or local code amendments. Incorrect wire sizing can cause overheating and fire. Always have a licensed electrician verify wire sizing and code compliance before any installation. Reference only — not engineering advice.

Picking a gauge is usually a voltage-drop problem, not an ampacity problem. Start with ampacity to find the floor, then compute loop voltage drop over the full round-trip distance. The NEC Informational Note to 210.19 recommends ≤3% on the feeder and ≤5% combined feeder + branch. Step up one gauge whenever the drop exceeds 3%.

AWG	DIAMETER (MM)	DIAMETER (IN)	AREA (MM^2)	Ω / 1000 FT	NEC 75 °C CU AMPS
4/0	11.684	0.4600	107.2	0.04901	230
3/0	10.405	0.4096	85.03	0.06180	200
2/0	9.266	0.3648	67.43	0.07793	175
1/0	8.251	0.3249	53.49	0.09827	150
1	7.348	0.2893	42.41	0.1239	130
2	6.544	0.2576	33.63	0.1563	115
3	5.827	0.2294	26.67	0.1970	100
4	5.189	0.2043	21.15	0.2485	85
6	4.115	0.1620	13.30	0.3951	65
8	3.264	0.1285	8.366	0.6282	50
10	2.588	0.1019	5.261	0.9989	35 (30 A bkr)
12	2.053	0.0808	3.309	1.588	25 (20 A bkr)
14	1.628	0.0641	2.081	2.525	20 (15 A bkr)
16	1.291	0.0508	1.309	4.016	outside 310.16
18	1.024	0.0403	0.8231	6.385	outside 310.16
20	0.8118	0.0320	0.5176	10.15	–
22	0.6438	0.0253	0.3255	16.14	–
24	0.5106	0.0201	0.2047	25.67	–
26	0.4049	0.0159	0.1288	40.81	–
28	0.3211	0.0126	0.08098	64.90	–
30	0.2546	0.01002	0.05093	103.2	–
32	0.2019	0.00795	0.03203	164.1	–
36	0.1270	0.00500	0.01267	414.8	–
40	0.0799	0.00314	0.00501	1049	–

AWG FORMULA (1857 BROWN & SHARPE)

All AWG diameters derive from one equation with a ratio of 92 spread across 39 gauges (4/0 to 36).

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d(n) = 0.127 mm × 92^((36 − n) / 39)
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VOLTAGE DROP FORMULA

For single-phase, loop distance is 2× the one-way run.

$$V_{drop} = 2 \times L \times I \times R_{per\_ft}$$

Drop % = V_{drop} / V_{source}. Keep feeder ≤3%.

AWG TO IEC 60228 (MM^2)

- 14 AWG → 2.5 mm^2
- 12 AWG → 4 mm^2
- 10 AWG → 6 mm^2
- 8 AWG → 10 mm^2
- 6 AWG → 16 mm^2
- 4 AWG → 25 mm^2
- 2 AWG → 35 mm^2
- 1/0 AWG → 50 mm^2
- 4/0 AWG → 95–120 mm^2

COPPER VS ALUMINUM

Aluminum ampacity is roughly 78% of copper at the same gauge. Rule of thumb: up two AWG sizes when switching copper → aluminum.