AWG Wire Size Chart

American Wire Gauge 4/0 to 40: diameter, area in mm² and kcmil, copper resistance and nearest metric size

For: Electricians, electronics engineers, installers, makers and students

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KEY RELATIONSHIP	FORMULA	REVERSE	WORKED EXAMPLE
AWG 36 = 0.005 in and AWG 4/0 = 0.46 in; 39 steps between them (ASTM B258)	d = 0.005 in × 92^((36 − n) ÷ 39)	n = 36 − 39 × $\log_{92}$(d ÷ 0.005 in)	AWG 12: 0.0808 in = 2.053 mm, 3.31 mm²

Solid round copper at 20 °C, 1/58 Ω·mm²/m (IEC 60028). Every 6 gauges halves the diameter; every 3 gauges halves the area.

AWG sizes, dimensions and copper resistance

Nearest metric size is the closest IEC 60228 cross-section by area. It is not a substitute for sizing a cable to your wiring code.

AWG	Diameter (in)	Diameter (mm)	Area (mm²)	Area (kcmil)	Ω per km	Ω per 1000 ft	Nearest mm²
4/0 (0000)	0.4600	11.684	107.2	211.6	0.1608	0.04901	120
3/0 (000)	0.4096	10.405	85.03	167.8	0.2028	0.0618	95
2/0 (00)	0.3648	9.266	67.43	133.1	0.2557	0.07793	70
1/0 (0)	0.3249	8.251	53.48	105.5	0.3224	0.09827	50
1	0.2893	7.348	42.41	83.69	0.4066	0.1239	50
2	0.2576	6.544	33.63	66.37	0.5127	0.1563	35
3	0.2294	5.827	26.67	52.63	0.6465	0.197	25
4	0.2043	5.189	21.15	41.74	0.8152	0.2485	25
5	0.1819	4.621	16.77	33.1	1.028	0.3133	16
6	0.1620	4.115	13.3	26.25	1.296	0.3951	16
7	0.1443	3.665	10.55	20.82	1.634	0.4982	10
8	0.1285	3.264	8.366	16.51	2.061	0.6282	10
9	0.1144	2.906	6.634	13.09	2.599	0.7921	6
10	0.1019	2.588	5.261	10.38	3.277	0.9989	6
11	0.0907	2.305	4.172	8.234	4.132	1.26	4
12	0.0808	2.053	3.309	6.53	5.211	1.588	4
13	0.0720	1.828	2.624	5.178	6.571	2.003	2.5
14	0.0641	1.628	2.081	4.107	8.286	2.525	2.5
15	0.0571	1.450	1.65	3.257	10.45	3.184	1.5
16	0.0508	1.291	1.309	2.583	13.17	4.016	1.5
17	0.0453	1.150	1.038	2.048	16.61	5.064	1
18	0.0403	1.024	0.823	1.624	20.95	6.385	0.75
19	0.0359	0.912	0.6527	1.288	26.42	8.051	0.75
20	0.0320	0.812	0.5176	1.022	33.31	10.15	0.5
21	0.0285	0.723	0.4105	0.8101	42	12.8	0.5
22	0.0253	0.644	0.3255	0.6424	52.96	16.14	—
23	0.0226	0.573	0.2582	0.5095	66.79	20.36	—
24	0.0201	0.511	0.2047	0.404	84.22	25.67	—
25	0.0179	0.455	0.1624	0.3204	106.2	32.37	—
26	0.0159	0.405	0.1288	0.2541	133.9	40.81	—
27	0.0142	0.361	0.1021	0.2015	168.9	51.47	—
28	0.0126	0.321	0.08098	0.1598	212.9	64.9	—
29	0.0113	0.286	0.06422	0.1267	268.5	81.84	—
30	0.0100	0.255	0.05093	0.1005	338.6	103.2	—

AWG	Diameter (in)	Diameter (mm)	Area (mm²)	Area (kcmil)	Ω per km	Ω per 1000 ft	Nearest mm²
31	0.0089	0.227	0.04039	0.0797	426.9	130.1	—
32	0.0080	0.202	0.03203	0.06321	538.3	164.1	—
33	0.0071	0.180	0.0254	0.05013	678.8	206.9	—
34	0.0063	0.160	0.02014	0.03975	856	260.9	—
35	0.0056	0.143	0.01597	0.03152	1,079	329	—
36	0.0050	0.127	0.01267	0.025	1,361	414.8	—
37	0.0045	0.113	0.01005	0.01983	1,716	523.1	—
38	0.0040	0.101	0.007967	0.01572	2,164	659.6	—
39	0.0035	0.090	0.006318	0.01247	2,729	831.8	—
40	0.0031	0.080	0.00501	0.009888	3,441	1,049	—

Metric cable sizes (IEC 60228) to AWG

Area (mm²)	Solid diameter (mm)	Area (kcmil)	Nearest AWG	Ω per km (copper)
0.5	0.80	0.9868	20	34.48
0.75	0.98	1.48	18	22.99
1	1.13	1.974	17	17.24
1.5	1.38	2.96	15	11.49
2.5	1.78	4.934	13	6.897
4	2.26	7.894	11	4.31
6	2.76	11.84	9	2.874
10	3.57	19.74	7	1.724
16	4.51	31.58	5	1.078
25	5.64	49.34	3	0.6897
35	6.68	69.07	2	0.4926
50	7.98	98.68	1/0 (0)	0.3448
70	9.44	138.1	2/0 (00)	0.2463
95	11.00	187.5	3/0 (000)	0.1815
120	12.36	236.8	4/0 (0000)	0.1437
150	13.82	296	4/0 (0000)	0.1149
185	15.35	365.1	4/0 (0000)	0.0932
240	17.48	473.6	4/0 (0000)	0.07184
300	19.54	592.1	4/0 (0000)	0.05747
400	22.57	789.4	4/0 (0000)	0.0431
500	25.23	986.8	4/0 (0000)	0.03448
630	28.32	1,243	4/0 (0000)	0.02737

Using this chart

Point	What to know
Stranded wire	A stranded conductor of the same gauge has about the same copper area but a slightly larger overall diameter.
Resistance and temperature	Copper resistance rises about 0.393% per °C above 20 °C; at 75 °C it is about 22% higher than shown.
Current rating	Ampacity depends on insulation, installation method, bundling and ambient temperature. Use NEC Table 310.16, BS 7671 or IEC 60364-5-52.
kcmil and MCM	1 kcmil = 1,000 circular mils = 0.5067 mm². Sizes above 4/0 are named in kcmil (250, 300, 350 …).
Voltage drop	Two-wire drop = 2 × length × current × Ω per unit length. Many codes recommend no more than 3% to 5%.

Sources and method

- **ASTM B258** — Standard nominal diameters and cross-sectional areas of AWG sizes of solid round wires
- **IEC 60028** — International standard of resistance for copper: 1/58 Ω·mm²/m at 20 °C (100% IACS)
- **IEC 60228** — Conductors of insulated cables: nominal cross-sectional areas

Diameters and areas are calculated from the AWG definition; resistance uses the IEC 60028 copper resistivity; the nearest metric size is the IEC 60228 cross-section closest in area. Interactive version, corrections and more charts: **allunitconversions.com/awg-wire-size-chart**