

Wire Gauge and Current Limits

Metric Wire Gauges (see table below)

Metric Gauge: In the Metric Gauge scale, the gauge is 10 times the diameter in millimetres, so a 50 gauge metric wire would be 5 mm in diameter. Note that in AWG the diameter goes up as the gauge goes down, but for metric gauges it is the opposite. Probably because of this confusion, most of the time metric sized wire is specified in millimetres rather than metric gauges.

Load Carrying Capacities (see table below)

The following chart is a guideline of ampacity or copper wire current carrying capacity following the *Handbook of Electronic Tables and Formulas* for American Wire Gauge. As you might guess, the rated ampacities are just a rule of thumb. In careful engineering the voltage drop, insulation temperature limit, thickness, thermal conductivity, and air convection and temperature should all be taken into account. The Maximum Amps for Power Transmission uses the 700 circular mils per amp rule, which is very conservative. The Maximum Amps for Chassis Wiring is also a conservative rating, but is meant for wiring in air, and not in a bundle. For short lengths of wire, such as is used in battery packs you should trade off the resistance and load with size, weight, and flexibility.

AWG gauge	Conductor Diameter Inches	Conductor Diameter mm	Ohms per 1000 ft.	Ohms per km	Maximum amps for chassis wiring	Maximum amps for power transmission
0000	0.46	11.684	0.049	0.16072	380	302
000	0.4096	10.40384	0.0618	0.202704	328	239
00	0.3648	9.26592	0.0779	0.255512	283	190
0	0.3249	8.25246	0.0983	0.322424	245	150
1	0.2893	7.34822	0.1239	0.406392	211	119
2	0.2576	6.54304	0.1563	0.512664	181	94
3	0.2294	5.82676	0.197	0.64616	158	75
4	0.2043	5.18922	0.2485	0.81508	135	60
5	0.1819	4.62026	0.3133	1.027624	118	47
6	0.162	4.1148	0.3951	1.295928	101	37
7	0.1443	3.66522	0.4982	1.634096	89	30

8	0.1285	3.2639	0.6282	2.060496	73	24
9	0.1144	2.90576	0.7921	2.598088	64	19
10	0.1019	2.58826	0.9989	3.276392	55	15
11	0.0907	2.30378	1.26	4.1328	47	12
12	0.0808	2.05232	1.588	5.20864	41	9.3
13	0.072	1.8288	2.003	6.56984	35	7.4
14	0.0641	1.62814	2.525	8.282	32	5.9
15	0.0571	1.45034	3.184	10.44352	28	4.7
16	0.0508	1.29032	4.016	13.17248	22	3.7
17	0.0453	1.15062	5.064	16.60992	19	2.9
18	0.0403	1.02362	6.385	20.9428	16	2.3
19	0.0359	0.91186	8.051	26.40728	14	1.8
20	0.032	0.8128	10.15	33.292	11	1.5
21	0.0285	0.7239	12.8	41.984	9	1.2
22	0.0254	0.64516	16.14	52.9392	7	0.92
23	0.0226	0.57404	20.36	66.7808	4.7	0.729
24	0.0201	0.51054	25.67	84.1976	3.5	0.577
25	0.0179	0.45466	32.37	106.1736	2.7	0.457
26	0.0159	0.40386	40.81	133.8568	2.2	0.361
27	0.0142	0.36068	51.47	168.8216	1.7	0.288
28	0.0126	0.32004	64.9	212.872	1.4	0.226
29	0.0113	0.28702	81.83	268.4024	1.2	0.182
30	0.01	0.254	103.2	338.496	0.86	0.142
31	0.0089	0.22606	130.1	426.728	0.7	0.113
32	0.008	0.2032	164.1	538.248	0.53	0.091
Metric 2.0	0.00787	0.200	169.39	555.61	0.51	0.088
33	0.0071	0.18034	206.9	678.632	0.43	0.072
Metric 1.8	0.00709	0.180	207.5	680.55	0.43	0.072
34	0.0063	0.16002	260.9	855.752	0.33	0.056
Metric 1.6	0.0063	0.16002	260.9	855.752	0.33	0.056
35	0.0056	0.14224	329	1079.12	0.27	0.044
Metric 1.4	.00551	.140	339	1114	0.26	0.043
36	0.005	0.127	414.8	1360	0.21	0.035
Metric 1.25	.00492	0.125	428.2	1404	0.20	0.034

37	0.0045	0.1143	523.1	1715	0.17	0.0289
Metric 1.12	.00441	0.112	533.8	1750	0.163	0.0277
38	0.004	0.1016	659.6	2163	0.13	0.0228
Metric 1	.00394	0.1000	670.2	2198	0.126	0.0225
39	0.0035	0.0889	831.8	2728	0.11	0.0175
40	0.0031	0.07874	1049	3440	0.09	0.0137