

Conductor Size

Calculating conductor size is very important to the electrical and mechanical properties of a bus bar. Electrical current-carrying requirements determine the minimum cross-sectional area of the conductors. Mechanical considerations include rigidity, mounting holes, connections and other subsystem elements. The table below can be used to approximately calculate the conductor size at a given steady state current with a resulting self-heating temperature rise. This table is generally used for currents above 300 amps. For currents below 300 amps, please refer to the design guide formula. You can find ampacity charts and comparative graphs at the Copper Development Association's website, copper.org.

Dimensions, In.	30°C Rise		50°C Rise		65°C Rise	
	Skin Effect Ratio at 70° C	60-Hz Ampacity, * Amp	Skin Effect Ratio at 90° C	60-Hz Ampacity, *Amp	Skin Effect Ratio at 105° C	60-Hz Ampacity, *Amp
1/16 x 1/2	1.00	103	1.00	136	1.00	157
1/16 x 3/4	1.00	145	1.00	193	1.00	225
1/16 x 1	1.00	187	1.00	250	1.00	285
1/16 x 1 1/2	1.00	270	1.00	355	1.00	410
1/16 x 2	1.01	345	1.01	460	1.01	530
1/8 x 1/2	1.00	153	1.00	205	1.00	235
1/8 x 3/4	1.00	215	1.00	285	1.00	325
1/8 x 1	1.01	270	1.01	360	1.01	415
1/8 x 1 1/2	1.01	385	1.01	510	1.01	590
1/8 x 2	1.02	495	1.02	660	1.02	760
1/8 x 2 1/2	1.02	600	1.02	800	1.02	920
1/8 x 3	1.03	710	1.03	940	1.03	1,1
1/8 x 3 1/2	1.04	810	1.03	1,1	1.03	1,25
1/8 x 4	1.04	910	1.04	1,2	1.04	1,4
3/16 x 1/2	1.00	195	1.00	260	1.00	300
3/16 x 3/4	1.01	270	1.01	360	1.01	415
3/16 x 1	1.01	340	1.01	455	1.01	520
3/16 x 1 1/2	1.02	480	1.02	630	1.02	730
3/16 x 2	1.03	610	1.03	810	1.03	940
3/16 x 2 1/2	1.04	740	1.04	980	1.03	1,15
3/16 x 3	1.05	870	1.05	1,15	1.04	1,35
3/16 x 3 1/2	1.07	990	1.06	1,3	1.06	1,5
3/16 x 4	1.09	1,1	1.08	1,45	1.07	1,7
1/4 x 1/2	1.01	240	1.01	315	1.01	360
1/4 x 3/4	1.01	320	1.01	425	1.01	490
1/4 x 1	1.02	400	1.02	530	1.02	620
1/4 x 1 1/2	1.03	560	1.03	740	1.03	860
1/4 x 2	1.04	710	1.04	940	1.04	1,1
1/4 x 2 1/2	1.06	850	1.06	1,15	1.06	1,3
1/4 x 3	1.08	990	1.08	1,3	1.07	1,55
1/4 x 3 1/2	1.10	1,15	1.09	1,5	1.09	1,75
1/4 x 4	1.12	1,25	1.11	1,7	1.10	1,95
1/4 x 5	1.16	1,5	1.15	2	1.14	2,35
1/4 x 6	1.18	1,75	1.17	2,35	1.17	2,7
1/4 x 8	1.23	2,25	1.22	3	1.21	3,45
1/4 x 10	1.27	2,7	1.26	3,6	1.25	4,2
1/4 x 12	1.31	3,15	1.3	4,2	1.28	4,9

Dimensions, In.	30°C Rise		50°C Rise		65°C Rise	
	Skin Effect Ratio at 70° C	60-Hz Ampacity, * Amp	Skin Effect Ratio at 90° C	60-Hz Ampacity, *Amp	Skin Effect Ratio at 105° C	60-Hz Ampacity, *Amp
3/8 x 3/4	1.02	415	1.02	550	1.02	630
3/8 x 1	1.03	510	1.03	680	1.03	790
3/8 x 1 1/2	1.05	710	1.04	940	1.04	1,1
3/8 x 2	1.08	880	1.08	1,15	1.07	1,35
3/8 x 2 1/2	1.12	1,05	1.10	1,4	1.09	1,6
3/8 x 3	1.15	1,2	1.14	1,6	1.13	1,85
3/8 x 3 1/2	1.18	1,35	1.16	1,8	1.15	2,1
3/8 x 4	1.20	1,5	1.19	2	1.18	2,35
3/8 x 5	1.24	1,8	1.23	2,4	1.22	2,8
3/8 x 6	1.27	2,1	1.26	2,8	1.24	3,25
3/8 x 8	1.33	2,65	1.31	3,55	1.30	4,1
3/8 x 10	1.38	3,2	1.36	4,3	1.35	4,9
3/8 x 12	1.42	3,7	1.4	5	1.38	5,8
1/2 x 1	1.04	620	1.04	820	1.04	940
1/2 x 1 1/2	1.08	830	1.08	1,1	1.07	1,25
1/2 x 2	1.12	1	1.11	1,35	1.10	1,55
1/2 x 2 1/2	1.16	1,2	1.15	1,6	1.14	1,85
1/2 x 3	1.20	1,4	1.19	1,85	1.18	2,15
1/2 x 3 1/2	1.24	1,55	1.22	2,1	1.21	2,4
1/2 x 4	1.26	1,7	1.25	2,3	1.24	2,65
1/2 x 5	1.32	2,05	1.30	2,75	1.29	3,15
1/2 x 6	1.36	2,4	1.34	3,15	1.33	3,65
1/2 x 8	1.42	3	1.40	4	1.39	4,6
1/2 x 10	1.47	3,6	1.45	4,8	1.44	5,5
1/2 x 12	1.52	4,2	1.51	5,6	1.5	6,4
3/4 x 4	1.42	2,05	1.40	2,75	1.38	3,15
3/4 x 5	1.48	2,4	1.46	3,25	1.44	3,75
3/4 x 6	1.52	2,8	1.50	3,75	1.48	4,3
3/4 x 8	1.60	3,5	1.58	4,7	1.56	5,4
3/4 x 10	1.67	4,2	1.64	5,6	1.62	6,5
3/4 x 12	1.72	4,9	1.69	6,5	1.67	7,5

* Applicable to typical in-service conditions (indoors, 40°C ambient temperature), horizontal run on edge, and free from external magnetic influences.

Table courtesy of copper.org