

AMPACITY

The ampacity of a conductor represents its current carrying capacity. Generally, as the conductor size increases its resistance decreases resulting in a greater ability to handle current. A by-product of increasing current is increasing heat. Unless the heat is dissipated, enough current can be applied to a conductor to actually melt the metallic conductive material carrying the current. Most certainly, however, the plastic insulating material will decompose at a much lower temperature. To that end current carrying capacity limits have been established by regulatory agencies such as UL and NEC.

A variety of factors were examined in determining the current carrying capacity of an electrical conductor. Among them are conductor size; DC resistance; dielectric softening point; ambient temperature; number of conductors bundled; etc. There are a number of uncontrolled factors that were not examined but must be considered in various application installations, such as air flow; voltage drop; human contact; etc. Probably the most overlooked factor in many applications is the temperature rating of adjacent materials within the installation. For example, some electrical wires will carry a temperature rating of 250°C (482°F). Many electrical connectors and plastic housings are only rated for 60°C (140°F). Consequently, given even a moderate current load the wire will remain intact but surrounding components will melt.

For just this reason the following table is strictly intended to be used as a general guide. Individual applications, whether they be communications, control, power, etc. need to be examined and all appropriate safety factors considered. This table approximates the current carrying capacity of a single 19-strand copper conductor in free air at 30°C (86°F) ambient temperature. Additionally, derating factors for cabled conductors must also be taken into account.

Insulated Wire Temperature Rating

AWG	Diameter	60°C	80°C	90°C	105°C	125°C	150°C	200°C	250°C
30	.0124"	1.3	2.0	2.5	3.0	3.5	4.3	4.8	5.9
28	.0146"	2.0	3.0	3.5	4.0	4.5	5.5	6.3	8.0
26	.0188"	3.0	4.0	4.5	5.0	6.0	7.0	9.0	11
24	.0235"	4.5	5.5	6.5	7.0	8.5	10	12	14
22	.0296"	6.0	7.5	9.0	10	11	13	16	20
20	.0376"	8.0	10	12	13	14	18	22	27
18	.0403"	11	14	16	18	19	25	30	36
16	.0531"	16	19	22	24	26	34	38	45
14	.0667"	22	27	30	33	37	45	50	57
12	.0856"	30	36	40	45	50	60	65	75
10	.1080"	40	47	55	58	65	80	90	100
8	.1610"	60	65	75	80	90	105	125	145
6	.2020"	80	95	105	110	125	145	165	205
4	.2550"	105	125	140	155	170	190	220	270
2	.3310"	135	160	180	200	220	240	280	350
1	.3670"	165	195	220	245	270	290	340	430
1/0	.4160"	195	230	260	290	320	340	400	510
2/0	.4690"	225	260	300	330	370	390	465	590

Derating Factors for Cabled Conductors	
# Cond.	Derate @
2-5	80%
6-15	70%
16-30	50%