

# 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 byproduct 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	60C	80C	90C	105C	125C	150C	200C	250C
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%