Current Carrying Capacity of Copper Conductors (Ampacity Rating)

Current carrying capacity is the maximum number of amperes (amps) that can flow through an insulated conductor before the insulation breaks down. Heat caused by an electrical current flowing through a conductor, will determine the amount of current a wire can handle. While there are many factors that will limit the amount of current that can be passed through a wire, there are five major parameters to consider...

1) **Conductor Size** – the larger the circular mil area, or AWG size, the greater the current capacity.
2) **Dielectric (insulation)** – The amount of heat generated should never exceed the maximum temperature rating of the insulating material.
3) **Ambient Temperature** – The higher the ambient temperature, the less heat required to reach the maximum temperature rating of the insulation.
4) **Number of Conductors** – Heat dissipation is lessened as the number of individually insulated conductors bundled together, is increased.
5) **Installation Conditions** – Restricting the heat dissipation by installing the conductors in conduit, duct, trays or raceways lessens the current carrying capacity. This restriction can be alleviated somewhat by using proper ventilation methods, forced air-cooling, etc.

The information that follows should only be used as a general guideline to determine possible performance levels considering AWG size & dielectric/copper temperature along with a de-rating factor based on bundling of conductors and/or components.

Amperes per Conductor in free air @ 30°C ambient temperature:

AWG Size	Dielectric/Copper Temperature				
	@ 80°C	@ 90°C	@ 105°C	@ 125°C	@ 200°C
30	2	3	3	3	4
28	3	4	4	5	6
26	4	5	5	6	7
24	6	7	7	8	10
22	8	9	10	11	13
20	10	12	13	14	17
18	15	17	18	20	24
16	19	22	24	26	32
14	27	30	33	40	45
12	36	40	45	50	55
10	47	55	58	70	75

De-rating Factors for Bundled Conductors:

# Of Bundled Conductors	De-rate / Reduction Factor (x Amps)
2 – 5	0.8
6 – 15	0.7
16 – 30	0.5

Example: 8 conductors of 26 AWG at 90°C = 5 x 0.7 = 3.5 amperes max, each conductor.
Note: For Flat Ribbon configurations with greater than 30 conductors, use 0.5 de-rate factor.