

TECHNICAL DATA

Copper Conductor Data

AWG	Sectional Area	Stranding	AWG	Sectional Area	Stranding	AWG	Sectional Area	Stranding	
	mm ²	No./mm		mm ²	No./mm		mm ²	No./mm	
40	0.005	1/0.079	18	0.823	1/1.024	8	8.367	1/3.264	
38	0.008	1/0.102			7/0.404			7/1.230	
36	0.012	1/0.127			16/0.254			19/0.749	
34	0.020	1/0.160			34/0.180			37/0.536	
32	0.032	1/0.203			41/0.160			133/0.284	
30	0.050	1/0.254	16	1.31	1/1.290	6	13.300	1/4.115	
28	0.080	7/0.102			7/0.488			7/1.560	
		1/0.320			26/0.254			19/0.945	
26	0.128	7/0.127	14	2.08	65/0.160	4	21.150	37/0.676	
		1/0.404			1/1.630			266/0.254	
24	0.205	7/0.160			7/0.615			1/5.189	
		1/0.511			19/0.373			7/1.960	
22	0.325	7/0.203			41/0.254			19/1.190	
		11/0.160	105/0.160	37/0.853					
20	0.519	1/0.643	12	3.31	1/2.050	2	33.62	133/0.455	
					7/0.254			7/0.775	420/0.254
					7/0.160			19/0.470	1/6.543
20	0.519	7/0.254	10	5.261	65/0.254	1	42.41	7/2.470	
					17/0.160			168/0.160	19/1.500
					1/0.813			1/2.588	37/1.080
					7/0.320			7/0.978	1/7.348
20	0.519	21/0.180	10	5.261	19/0.594	1	42.41	19/1.690	
		26/0.160			87/0.424			37/1.210	
					105/0.254			61/0.940	
					259/0.160				

Insulation Materials properties Chart

Properties	PVC	PE	PP
1. Abrasion Resistance	Good	Good	Fair
2. Heat Resistance	Good	Good	Good
3. Weatherability	Good	Excellent	Excellent
4. Flame Retardancy	Excellent	Poor	Poor
5. Watwe Resistance	Good	Excellent	Excellent
6. Acid Resistance	Good	Good	Excellent
7. Alkali Resistance	Good	Good	Excellent
8. Aliphatic Hydro. Resis.	Good	Poor	Fair
9. Aromatic Hydro resis.	Poor	Poor	Fair

Properties	ASTM Method	PVC	PE	PP
1. Specification Gravity	D-792-66	1.16-1.70	0.9-1.26	0.890-0.905
2. Tensile Strength (psi)	D-638-77	1500-4500	1500-2200	2900-4500
3. Elongation (%)	D-412-75	40-400	180-600	700
4. Volume Resistivity (ohm - cm)	D-257-78	10 ⁴ - 10 ¹⁶	>10 ¹⁵	1.5X10 ¹⁵ , 2.8X10 ¹⁵
5. Dleectric Strength (volts/mil)	D-149-75	250-500	230-1420	450-850
6. Dleectric Constant (@ 60 Hz)	D-150-78	3.2-9.0	2.28-2.50	2.50-2.75
7. Dleectric Constant (@ 1KHz)	D-150-78	3.0-8.0	2.27-2.50	2.50-2.65
8. Power Factor (Dissipation) (@ 60Hz)	D-150-78	.007-0.15	0.003-0.044	0.0054-0.0070
9. Power Factor (Dissipation @ 1 KHz)	D-150-78	.009-0.16	.00048 , .00049	.0036-0050

Note : All values shown are nominal

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Current Carrying Capacity

Current Carrying Capacity is defined as the amperage a conductor can carry. Before melting either the conductor or the insulation. Heat, caused by an electrical current flowing through a conductor, will determine the amount of current a wire will handle. Theoretically, the amount of current that can be passed through a single bare copper wire can be increased until heat generated reaches the melting temperature of the copper, There are many factors which will limit the amount of current that can be passed through a wire. These major determining factors are

Conductor Size :

The larger the circular mil area, the greater current capacity.

Insulation :

The amount of heat generated should never exceed the maximum temperature rating of the insulation.

Ambient Temperature :

The higher the ambient temperature, the less heat required to reach the maximum temperature rating of the insulation.

Conductor Number :

Heat dissipation is lessened as the number of individually insulated conductors, bundled together, is increased.

Insulation Conductors :

Restricting the heat dissipation by installing the conductors in conduit, duet, trays or raceways lessens the current carrying capacity. This restriction can be alleviated somewhat by using proper ventilation methods, forced air cooling, etc.

The chart shows the current required to raise the temperatures of single insulated conductor in free air (30°C ambient) to the limits of various insulation types. The following table gives a derating factor to be used when the conductors are bundled. These charts should only be used as a guide when attempting to establish current ratings on conductor and cable.

Derating Factors for Bundled Conductors

Bundle #	Derating Factor (X Amps)
2-5	0.8
6-15	0.7
16-30	0.5

Amperes

Insulation Materials	LDPE	PP	PVC
	Neoprene PU HDPE	HDPE	XLPVC NYLON
Copper Temp.	80°C	90°C	105°C
30 AWG	2	3	3
28 AWG	3	4	4
26 AWG	4	5	5
24 AWG	6	7	7
22 AWG	8	9	10
20 AWG	10	12	13
18 AWG	15	17	18
16 AWG	19	22	24
14 AWG	27	30	33
12 AWG	36	40	45
10 AWG	47	55	58
8 AWG	65	70	75
6 AWG	95	100	105
4 AWG	125	135	145
2 AWG	170	180	200

Single Conductor in Free Air 30°C Ambient Temp



JUMBO WIRE & CABLE CO., LTD.

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Ampacity Ratings (For Equipment wires)

Definition :

Ampacity or Current Carrying Capacity is determined by the Cross Sectional Area and composition of the conductor, the ambient temperature and the maximum allowable increase in temperature of the insulation.

Ambient Temperature :

The Figures below are based an ambient Temperature of 30°C and the maximum operating temperature of the insulation system.

Bundling :

Ampacity Ratings must be reduced when two or more wires are bundled together (See Chart below)

AWG	80°C	90°C	105°C
30	2	3	3
28	3	4	4
26	4	5	5
24	6	7	7
22	8	9	10
20	10	12	13
18	15	17	18
16	19	22	24
14	27	30	33
12	36	40	45
10	47	55	58
8	65	70	75
6	95	100	105
4	125	135	145
2	170	180	200

De-Rating Factors :

No. of wires	Factor
2 to 5	x 0.8
6 to 15	x 0.7
16 to 30	x 0.5