



HSM Wire International, Inc

Ph: 330-244-8501 Fax: 330-244-8561

www.hsmwire.com

Properties for Aluminum and Copper Conductors

Copper and Aluminum Conductors

Physical and Electrical Properties

Physical Properties	Copper	Aluminum	Electrical Properties	Copper	Aluminum
Density, 20°C (68°F)			IACS Volume Conductivity, Min % 20°C (68°F)	100	61.8
Pounds/Inch ³	0.3212	0.09765			
Grams/Centimeter ³	8.89	2.703			
Thermal Capacity, 20°C (68°F)			Volume Resistivity, Max 20°C (68°F)		
BTU/Pound/°F	0.0921	0.214	Ohm-Circular Mil/Foot	10.371	16.782
Thermal Conductivity, 20°C (68°F)			Ohm-Millimeter ² /Meter	0.017241	0.027899
BTU/Foot ² /Sec/°F/In	1.15	0.66			
Gram-calories/mm ² /Sec/°C/cm	0.93	0.53	Weight Resistivity, Max 20°C (68°F)		
Thermal Coefficient of Expansion, Linear			Ohm-Pound/Mile ²	875.20	430.59
Change in Unit Length at 0 °C/°C	16.8 x 10 ⁻⁶	23.8 x 10 ⁻⁶	Ohm-Gram/Meter ²	0.15328	0.07541
Melting Point					
°C	1083	660	Thermal Coefficient of Resistance, 20°C (68°F)		
°F	1980	1220	Change in Unit Resistance at 20 °C/°C	0.00393	0.00408
Tensile Characteristics, Annealed, 20°C (68°F)					
Ultimate Strength					
Pounds/Inch ²	36000-40000	9000-14000			
Kilograms Force/mm ²	25.3 - 28.1	6.3 - 9.8			
Yield Strength, 0.2% Off-Set					
Pounds/Inch ²	9000-12000	4000-7000			
Kilograms Force/mm ²	6.3 - 8.4	2.8 - 4.9			

This information was derived from Superior Essex.

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R2.06.08.2013



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Allowable Ampacities of Insulated Conductors

Copper				Aluminum			
AWG	Allowable Ampacities*			Allowable Ampacities*			AWG
	60 °C	75 °C	90 °C	60 °C	75 °C	90 °C	
		TYPES THWN, RHW, USE	TYPES THWN-2, USE-2, XHHW-2, XHHW, RHW-2, RHH		TYPES THWN, RHW, USE	TYPES THWN-2, USE-2, XHHW-2, XHHW, RHW-2, RHH	
8	40	50	55	30	40	45	8
6	55	65	75	40	50	60	6
4	70	85	95	55	65	75	4
2	95	115	130	75	90	100	2
1	110	130	150	85	100	115	1
1/0	125	150	170	100	120	135	1/0
2/0	145	175	195	115	135	150	2/0
3/0	165	200	225	130	155	175	3/0
4/0	195	230	260	150	180	205	4/0
250	215	255	290	170	205	230	250
300	240	285	320	190	230	255	300
350	260	310	350	210	250	280	350
400	280	335	380	225	270	305	400
500	320	380	430	260	310	350	500

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600	355	420	475	285	340	385	600
700	385	460	520	310	375	420	700
750	400	475	535	320	385	435	750
1000	455	545	615	375	445	500	1000

* Allowable Ampacities: 30°C (86°F) Ambient Temperature

Based on 2005 NEC, Table 310.16

For different ambient temperatures than the one shown above, consult the NEC tables.

Temperature Limitations: The temperature rating associated with the ampacity of a conductor shall be selected and coordinated so as not to exceed the lowest temperature rating of any connected termination, conductor, or device.

Conductors with temperature ratings higher than specified for terminations shall be permitted to be used for ampacity adjustment, correction, or both.

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