



“Marine Grade” Low Voltage Lighting Cable

Marine grade cables use tin-coated copper conductors and are promoted as having higher corrosion resistance than the conventional Low Voltage Lighting cables using copper conductors. Here are our opinions regarding the use of tin coated copper cables for Low Voltage Lighting applications:

- Tin coated copper is tarnish resistant, but not corrosion resistant. Copper is more corrosion resistant than tin. And even if tin-coated copper were more corrosion resistant, once the cable is cut, the bare copper is exposed on the ends of the wire strands which become concentrated points of corrosion.
- Tin coated copper is corrosion resistant when installed above ground, as when soldered onto printed circuit boards. It is not as corrosion resistant as bare copper when installed below ground. Galvanized pipe and fittings are a good analogy to this issue. Galvanized fittings corrode rapidly when buried and they last a long time when installed above ground. When installing backflow prevention devices, contractors have to wrap the galvanized pipe with corrosion prevention tape up to the point where the pipe exits the ground level to prevent corrosion. It is not necessary to wrap the pipe above ground. Copper pipe is usually not wrapped.
- Tin-coated copper and soldering do not solve the problem of improper splices. The real solution is to make a proper waterproof splice in the first place. Use [DBY](#), [DBR](#), [DBY-6](#), [DBR-6](#), and [DB14-4](#) connectors for best results. Gel filled wire nuts that are Underwriters Laboratories^{®1} (UL[®]) listed as “Pressure Type Connectors”, which is the category for twist-on connectors, split bolts, butt connectors, etc., are not recommended for underground installations.
- The resistance (and voltage drop) of tin coated 12 AWG/2c Low Voltage Lighting Cable is about 7.7% higher than that of bare copper. See Underwriters Laboratories[®] Standard UL 1581, Table 30.10.
- Tin coating makes the cable stiffer and more difficult to work-with.
- The manufacturing cost of tin-coated copper is higher than that of bare copper.

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REFERENCE STANDARD FOR WIRE - UL 1581

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Table 30.10
Maximum direct-current resistance of ASTM 30 AWG (Class K) stranded conductors

Size of conductor	Uncoated copper				Coated copper (each strand coated with tin or a tin/lead alloy)			
	20°C		25°C		20°C		25°C	
	Ohms per 1000 feet	Ohms per km	Ohms per 1000 feet	Ohms per km	Ohms per 1000 feet	Ohms per km	Ohms per 1000 feet	Ohms per km
12	1.650	5.430	1.680	5.530	1.770	5.820	1.810	5.940
10	1.040	3.410	1.060	3.480	1.110	3.660	1.140	3.730
8	0.666	2.180	0.679	2.230	0.715	2.350	0.729	2.400