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Electrical Safety Authority
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Aluminum Wiring in Residential Installations – Rule 12-118

Since January of 2003 the Electrical Safety Authority has received an increasing number of questions about the safety of aluminum wiring. In particular, purchasers or owners of homes built from the mid 1960's until the late 1970's with aluminum wiring are finding that many insurers will not provide or renew insurance coverage on such properties unless the wiring is inspected and repaired or replaced as necessary and this work is inspected by ESA and a copy of the certificate of inspection is provided to the insurer. In some cases the insurer may require replacement of the aluminum wiring with copper wiring. Check with your insurance company for their requirements.

Some homes may have a mixture of aluminum and copper wiring.

Reported problems with aluminum wiring have been related to the overheating and failure of aluminum wiring terminations. This is due to aluminums tendency to oxidize and its incompatibility with devices designed for use with copper wiring. Warm cover plates or discolouration of switches or receptacles, flickering lights, or the smell of hot plastic insulation may evidence these problems.

Each home will be different and must be assessed on its own. It is highly recommended the homeowner hire a qualified electrical contractor who is knowledgeable in the special techniques required for working with and repairing aluminum wiring. The contractor should do an assessment, make the necessary repairs, and have the work inspected by ESA. The homeowner should obtain a copy of the Certificate of Inspection for their records and for their insurance company (if requested).

As mentioned above, where problems exist with aluminum wiring they are usually found at termination points. This necessitates the opening of all outlets (receptacles, switches, fixtures, appliance connections, and in the panelboard) and visually inspecting terminations for signs of failure and overheating without removing or disturbing the devices or wiring. There should be no signs of overheating such as darkened or discoloured connections, melted insulation, etc.

All terminations of aluminum conductors shall be to devices marked as per Table 1, this includes the bare bond conductor as well. Rule 12-118(3) provides two exceptions to this requirement. The first exception is for devices or fixtures with wire leads, in which case the joint between the wire lead and the aluminum conductor shall be made with a wire connector approved for copper to aluminum connections and marked as per Table 1. The second exception is the outlet box bonding screw, which does not require approval for connection of the aluminum bonding conductor.

Devices with "push-in" terminations shall not be used with aluminum conductors.

An alternative to using copper/aluminum approved devices is to connect a copper wire "pigtail" between the aluminum conductor and the device connection screw of a device approved for copper only connections. Pigtailing also applies to the bond conductor, which is often overlooked. The wire connector used for the pigtail joint shall be marked as per Table 1.

Myths

- Aluminum wiring was recalled because it is known to be a fire hazard.

- Aluminum wiring is no longer used for interior wiring systems.

Fact

- The Ontario Electrical Safety Code permits the installation of aluminum wiring.
- Adequate precautions shall be given to the terminations and splicing of aluminum conductors;
- Aluminum wiring itself is safe if proper connections and terminations are made, without damaging the wire and devices approved for use with aluminum wire are employed.
- Aluminum wiring is widely used today for larger commercial and industrial feeders. Electrical distribution companies use it widely throughout their distribution systems including the supply service cable to most residences; in fact it may still be used today for interior wiring systems in residential homes as well as other structures.

Aluminum wiring installed in accordance with the Ontario Electrical Safety Code and the manufacturer's instructions, is safe.

Shall be:

Electrical Device	Required Marking
Receptacle (rated 20 amps or less)	"CO/ALR" or "AL–CU"
Receptacle (rated greater than 20 amps)	"AL–CU" Or "CU–AL"
Switch (rated 20 amps or less)	"CO/ALR"
Wire Connectors [intended for use with combinations of either an aluminum conductor(s), a copper conductor(s), or both]	"AL–CU" Or "CU–AL"
Luminaire (Lighting fixture or lampholder)	No required marking on fixture, however approved wire nuts are required.
Electric Heater	No required marking on heater, however approved wire nuts are required.

Table 1 – Required markings for devices used with aluminum wiring