

## Aluminum 110 volt wiring

Widely used in the 1970's for residential construction aluminum branch distribution wiring circuits have been cited as the cause for many house fires. If your house has been identified as having aluminum 110 volt wiring there's no need to panic right away. If installed properly aluminum wiring is reasonably as safe as copper.

The key is if the wiring is installed properly.

There are a couple of reasons that aluminum wiring for 110 volt circuits cause some concern:

First thing to know is that electrical distribution service in home or structure is designed to manage heat. With that in mind, the aluminum material is prone to corrosion if it is in contact with various metals and or materials. Corrosion on electrical conductors can cause resistance and thus heat and could lead to more dangerous conditions. As the wires heat up this may cause the insulated casing of the wire, fixtures, receptacles or switches to become hot or possibly cause a fire.

Also, aluminum expands and contracts at a greater ratio than copper. This expansion and contraction over time can loosen connections between the wire and switches, receptacles and even terminals connecting overcurrent protection devices such as fuses or circuit breakers. If the connection becomes loose enough an arc may occur and over heating or fire could occur due to this condition.

Since people usually encounter aluminum wiring when they move into a house built during the 70's, we will cover basic points of safe aluminum wiring. We suggest that, if you're considering purchasing a home with aluminum wiring, or have discovered it later, that you hire a licensed electrician or inspector to check over the wiring for the following things:

- 1) Fixtures (eg: outlets and switches) directly attached to aluminum wiring should be rated for it. The device will be stamped with "Al/Cu" or "CO/ALR". The latter supersedes the former, but both are safe. These fixtures are somewhat more expensive than the ordinary ones.
- 2) Wires should be properly connected (at least 3/4 way around the screw in a clockwise direction). Connections should be tight. While repeated tightening of the screws can make the problem worse, during the inspection it would pay off to snug up each connection.  
  
Note that aluminum wiring is still often used for the main service entrance cable. It should be inspected.
- 3) "Push-in" type terminals are an extreme hazard with aluminum wire. Any connections using push-in type terminals should be refitted with the proper screw connections immediately.
- 4) There should be no signs of overheating: darkened connections, melted insulation, or "baked" fixtures. Any such damage should be repaired.
- 5) Connections between aluminum and copper wire need to be handled specially. Current Canadian codes require that the connectors used must be specially marked for connecting aluminum to copper. The NEC requires that the wire be connected together using special crimp devices, with an anti-oxidant grease. The tools and materials for the latter are quite expensive - not practical to do it yourself unless you can rent the tool.

[Note that regulations are changing rapidly in this area. Suggest that you discuss any work with an inspector if you're going to do more than one or two connections.]

- 6) Any non-rated receptacle can be connected to aluminum wiring by means of a short copper "pigtail". See (5) above.
- 7) Shows reasonable workmanship: neat wiring, properly stripped (not nicked) wire etc.

If, when considering purchasing a home, an inspection of the wiring shows no problems or only one or two, we believe that you can consider the wiring safe. If there are signs of problems in many places, we suggest you look elsewhere. If the wrong receptacles are used, you can replace them with the proper type, or use pigtails - having this professionally done can range from approximately \$3 to \$10 per receptacle/switch.

Inspectors identify potential safety concerns with numerous components in a home. Inspectors are trained to identify potential safety concerns and defects.

A licensed electrician can evaluate the electrical distribution system in your home and perform proper corrections for the condition. It's much better to err on the side of caution.

These professionals know the potential problems with this type of wiring and will correct them if any unsafe conditions exist.