

## **ALUMINUM HOUSE WIRING: IDENTIFYING AND DEFUSING A HAZARD**

If your home is between 30 and 40 years old there is a possibility that it is wired with aluminum wiring. This type of wiring became popular because of its reduced cost during a time when the supply of copper was low. It was not until the early to mid 70's that the problems of using aluminum wiring began to show up.

The basic problem is not actually with the aluminum wiring itself, but with the connections and terminations at outlets, switches, and fixtures. Aluminum does not conduct as efficiently as copper. It expands more when heated and contracts more when cooled. This action eventually loosens the terminal connections at switches, outlets, and fixtures. The loose connections cause more resistance which produces more heat. That compounds the problem. As the terminals loosen, the risk of an arc increases which can cause a fire. Also, as the resistance increases so does the temperature of the wire which also may cause a fire.

The second problem with aluminum is that it begins to oxidize the instant it comes in contact with the atmosphere. This process is accelerated by electrolysis when two dissimilar metals are in contact with each other (the wire is aluminum and the terminal is brass or copper). The corrosion causes resistance, which increases the wire temperature. This causes the wire to expand more, etc. So you can see how all of these problems interrelate to increase the risk of fire with aluminum wiring unless the proper safeguards are practiced, and approved terminals and methods are used.

How do you determine if your home is wired with aluminum wiring? Turn off the power to a specific circuit. Remove the switch or outlet cover plate and examine the exposed wire. Or you can shut off the main power source and remove the cover of your breaker or fuse panel. This will expose the wiring going to the various circuits in your home.

Aluminum is a silver colored wire as opposed to the copper color of copper wire. There is also a copper clad aluminum wire. This is an aluminum wire encased in a copper jacket. For our discussion we will suggest that copper clad aluminum wire be treated the same as aluminum.

Now that you have determined that you do in fact have aluminum wiring in your house how do you safeguard the hazards.

Basically there are three options to choose from:

- 1) Rewire the house with copper wire.
- 2) Replace outlets and switches with a device approved for use with aluminum.
- 3) Splice copper wire pigtails to the aluminum wire.

**1) REWIRE** - This option is much more difficult and expensive than the other two options. Most experts agree that this is usually unnecessary.

**2) REPLACE OUTLETS & SWITCHES** - As we have stated the problem is not generally with the aluminum wire, but the connections and terminals. In the early 70's the problems began to show up because the switches and outlets were originally designed for use with copper wire. Since then, Underwriters Laboratories have approved devices which effectively eliminate the connection problem. These devices should be plainly marked with the following markings: AL-CU which stand for aluminum - copper; and CO/ALR which stand for copper / aluminum revised. The latter is the most generally accepted marking since September 1971.

**3) PIGTAILS** - This option is to splice an insulated copper wire pigtail to the aluminum wire for the connection to the outlet, switch, or fixture. To avoid the corrosion where the copper and aluminum wire meet, the wire nut or connector should be packed with an anti-oxidation paste. This paste is readily available at electrical supply houses under a variety of names.

Incidentally, with either the pigtail or the replacement of outlet method, the connections at light fixtures and direct wired appliance will need to be packed with the anti-oxide paste as well.

There does not seem to be a clear preference as to which method is best. It depends on the individual preference of the electrician. The pigtail method is generally less expensive, so appears to be used more often. The cost of either the replacement of outlets and switches, or pigtails will be about \$1000 for most homes.

The determination of the type of wiring in a home should be part of an inspection

performed by a reputable inspection company. The inspector should be able to determine if any repairs or corrections have been made to alleviate the hazards of aluminum wiring.

While aluminum wiring is something to be concerned about, the experts generally agree that it can be made as safe as copper if the wires are properly installed with appropriate switches and outlets. However, if you ever have any concerns you should contact a licensed electrician immediately.