

Aluminum House Wiring

This housing addition was put in with aluminum wiring. It has caused a number of fires, some of which destroyed local homes. We still have one vacant lot from such a fire. Please see the article below. It does a nice job of explaining the problems and solutions. Personally I have done some pig-tailing and replaced most of my receptacles and plugs with CO/ALR. I do not replaced any wiring. Any new wire I have added has been copper. I have lived here for 14 years and have seen one house burn down and one catching fire from the wiring. I heard of another person who called the fire department when they saw smoke coming from one of their receptacles. Yep, it was aluminum wiring again.

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The following was taken from

<http://www.sizes.com/tools/wireCon.htm>

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Wire nuts and aluminum wire

In the *1970's* a number of new homes in the United States were wired with aluminum wire, which is cheaper than copper. Aluminum is an excellent conductor (utility transmission lines are aluminum). However, it is also very active chemically, and a freshly exposed aluminum surface will be covered with aluminum oxide, an insulator, in a matter of seconds. Aluminum also expands and contracts as it heats and cools more than copper does. These characteristics make it difficult to make good electrical connections. In some cases, as the connection ages its resistance increases, and so its temperature rises, which ultimately can lead to a fire. A number of home fires in the *1970s*, some with fatalities, were traced to these connections.

In response manufacturers changed the nature of aluminum wire and improved devices connected to it, such as circuit breakers, switches, outlets and so on. These second-generation devices are marked "CO/ALR." Note the "R".

The owner of a home wired with aluminum in the *70's* has a number of options. Obviously, one is to rewire the house with copper wire, an expensive step and one that can be destructive. (14 AWG aluminum wire, however, should always be replaced with copper.)

Alternatively, all the switches, outlets, etc. may be replaced with CO/ ALR types. Replacing every connection in a house is more difficult to do than it sounds, and some authorities believe that even then complete protection will not have been achieved (see below).

Another solution is to attach a short length of insulated copper wire between the aluminum wire and the existing switch, outlet, etc. This practice is called "pigtailing." The aluminum-to-copper connection must be made with the special COPALUM system now made by TYCO, though retaining the former brand name, AMP. The COPALUM system may only be used by licensed electricians specially trained and certified by TYCO. Other crimping systems sold to the public and even electricians are not comparable and cannot make a safe connection.

In the *mid-1990's*, a new type of wire nut was introduced that was specifically designed for aluminum-to-aluminum and aluminum-to-copper connections. These nuts are purple. (If the packaging says the connectors it contains are approved for aluminum or copper-clad aluminum wires but they are not purple, the nuts were made before *January 2, 1987* and should not be used.) The use of this connector for "pigtailing" is controversial.

The Consumer Product Safety Commission stated¹ in *2003* that "The COPALUM crimp connector, which has been available for more than 20 years, is the only system recognized by CPSC that provides a complete and permanent repair and reduces the fire hazard in aluminum wire circuits. ... CPSC believes that 'twist-on' connectors, receptacles and switches and other devices that connect directly to aluminum wires, are an inadequate solution."

1. CPSC Release #03-120 (May 1, 2003)

www.cpsc.gov/CCCPSC/PUB/PREREL/prhtml03/03120.html

The Consumer Product Safety Commission booklet on this topic can be accessed at www.cpsc.gov/cpsc/pub/pubs/516.pdf

UL 486B, Standard for Wire Connectors for Use with Aluminum Conductors.

UL 486C, Standard for Splicing Wire Connectors.