

ALUMINUM WIRE RISK: The Aluminum Electrical Wiring Risks & Hazards Explained



Aluminum wiring, used in some homes from the mid 1960's to the early 1970's, is a potential fire hazard. How safe is aluminum wiring?

According to the U.S. Consumer Product Safety Commission, fires and even deaths have been reported to have been caused by this hazard. Problems due to aluminum wiring expansion, or much more likely micro-fretting and arcing at the connectors, can cause overheating at connections between the wire and devices (switches and outlets) or at splices. The connections can become hot enough to start a fire without ever tripping a circuit breaker!

The photos shown above are not the most dramatic catastrophes linked to fires caused by aluminum wiring. But these are conditions that are found in many homes with aluminum wiring, confirming that this is a real, common, and widespread hazard.

CPSC research shows that "homes wired with aluminum wire manufactured before 1972 are 55 times more likely to have one or more connections reach "Fire Hazard Conditions" than are homes wired with copper. "Post 1972" aluminum wire is also a concern. Introduction of the aluminum wire "alloys" in 1972 time frame did not solve most of the connection failure problems.

Aluminum wiring is still permitted and used for certain applications, including residential service entrance wiring and single-purpose higher amperage circuits such as 240V air conditioning or electric range circuits. The fire risk from single purpose circuits is much less than for branch circuits.

But it's not necessarily because of a "new alloy" as some folks assert. It's because there are enormously fewer connections (four or six rather than 30 or 40 per circuit) and thus

Brought to you as current (as of today) information only, you should consult with an electrician licensed by the State of Texas as to proper and current repairs of Aluminum wiring.



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statistically a smaller chance of a connection failure. These connections do still burn up, as indicated by field reports.

Types of Repairs and Some that are no longer allowed:

The AMP TYCO COPALUM Connector for Aluminum Wiring Pigtailing Repairs



AMP TYCO COPALUM Copper-to-Aluminum Pigtailing Use the special AMP (now TYCO) COPALUM high pressure crimp connector and special tool to connect short copper wires to *every aluminum wire end* in the building, reconnecting the copper to the various devices (outlets, switches, lights) and splices.

The AlumiConn Aluminum Wiring Connector for Pigtailing and Repairs



AlumiConn™ aluminum to copper lug connectors [*New in 2006, U.L. Listed, 2007 completed independent testing*] available from King Innovation. Results of independent testing indicate that this product "... **is predicted to have a high probability of failure-free long-term safe performance, PROVIDED THAT THE SETSCREWS ARE CAREFULLY TIGHTENED TO THE MANUFACTURER'S RECOMMENDATION**".

[AlumiConn™](#) is a website with information on obtaining the AlumiConn aluminum wiring connector.

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Obsolete Aluminum Wiring Repair Method - No Longer Recommended



Scotchlok 3M Special Method [- superseded by new alternate repair as of June 2007 -]: this ""Scotchlok 3M Special Method was previously recommended as independent tests showed that it performed acceptably.

While this repair method has been superseded by new alternate repair as of June 2007, we have kept this description available to aid home buyers, electricians and home inspectors who may discover or need to be able to recognize this aluminum wire repair method if it was previously used in the building.

Other Aluminum Wiring Repair Methods that Are Not Recommended



Other methods - not recommended: Warnings regarding other "repair" methods which are not recommended are discussed at [OTHER REPAIR PRODUCTS](#), such as the **Ideal 65 purple "Twister"** connector shown in the photo at left (12 connectors cost \$49. to \$79.), **receptacles and outlets marked "COALR"** (even if these worked, which has not been demonstrated, what about all of the other electrical connections and splices in the building?) and others.



Electrical Receptacles and switches marked "COALR" or CU/AL are also not recommended for aluminum wiring repairs: The photograph shows a back-wired electrical receptacle with an aluminum-wired branch circuit. In this photograph case the electrical receptacle was marked as "AL-CU" but was further marked as Backwire CU-ONLY by its manufacturer. [Photograph courtesy of Roger

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Hankey. Contributions of photos of CU-AL and COALR receptacles are sought by the author.].

Electrical Receptacles and switches marked COALR, CO/ALR, AL-CU or CU-AL have not been recommended by the US CPSC for aluminum wiring repairs. However COALR or CO/ALR - marked devices are not and should not be treated identically with electrical devices marked CU-AL or AL-CU.

Prior to the introduction of the "CO/ALR" wiring devices in about 1973, UL did not have any standard or standard tests for wiring device terminals for aluminum wire. The markings prior to that time regarding type of wire were optional for the manufacturer to apply as they wished. UL considered all wiring devices with screw terminals as suitable for aluminum wire, even if the devices also had push-in backwired terminals.

The photograph shows a back-wired electrical receptacle with an aluminum-wired branch circuit. In these photos the electrical receptacle was marked as *AL-CU* but was further marked as *Backwire CU-ONLY* by its manufacturer.

As we report in more detail below, devices marked AL-CU performed poorly when tested with aluminum wire, and backwiring these receptacles increases the risk of an electrical failure. ["Electrical receptacle" as used in our articles is a synonym for "electrical outlet" or what some people call a "wall plug" or "wall socket".

"Electrical devices" includes receptacles, switches, and possibly other electrical components which are connected to the electrical wiring in a building.

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