

The Truth About Aluminum Wiring

First, a little history about aluminum wiring: During the mid 60's and into the mid 70's and throughout the Vietnam War era, copper was at an all time high price level, which made it cost prohibitive for use in residential wiring. (Actually, it was nowhere near as expensive as it is today.) Copper mining and processing was not what it is today, production could not keep up with demand, and the copper was being bought up at a rapid pace to provide jacketing for ballistics in the military and for other military purposes. People in the home building industry were looking for an alternative product that could be used safely for residential wiring and it was determined that aluminum would suffice, if it was installed correctly. Underwriters Laboratories had previously approved aluminum for interior wiring purposes as early as 1945. Of course there were some issues that needed to be considered by the industry if we were going to use aluminum for circuits in homes. It was much softer than copper wiring, it couldn't withstand as much stress when it was being pulled, it was subject to breaking if it was nicked and bent at radical angles, and it had to be at least one wire gauge larger than copper for each current rating. But, despite all of the downfalls of aluminum, it was much cheaper to use at the time and it would have been an acceptable product for the purpose if it were installed correctly. Not much emphasis was put on aluminum wiring's creep rating (rate of expansion and contraction) and very little information was disseminated to the end user's about the proper installation of aluminum wiring. Builders and electrical contractors were just happy to have a cheaper product to use that would enable them to continue building. During that time there was widespread use of 12 AWG and 10 AWG type NM-C sheathed aluminum cable in the interior wiring of homes. Local building inspection departments and code enforcement agencies were very scarce during this era and probably had even less information than the electrical contractors did about the installation of aluminum wire.

As much as you may have heard about the problems with aluminum wiring in homes, aluminum has never really been the problem. In fact, it is still being used today on larger circuits that don't require as many terminations to various devices. Many electrical contractors still use aluminum for feeders to panels and large appliances such as electric furnaces, and engineers still specify aluminum wiring on large feeders and branch circuits in buildings. These circuits are commonly terminated in disconnects and electrical panels with lugs that are rated and suitable for aluminum wiring. However, it is not commonly used on the smaller branch circuits any more because of the problem is the termination of aluminum. It has to be terminated with lugs, crimp sleeves, screw terminals, and other devices that are made of materials that are compatible with aluminum and it must be treated with an oxide inhibitor that is intended for aluminum wiring. Ah ha! There we find the problem. Most of the homes that were built during that era were not wired appropriately. That is because the receptacles, switches, and other devices that were installed on the wiring were not of the correct type and

oxide inhibitor wasn't in widespread use. Had the devices been Co/Alr type devices (switches and receptacles that are rated for both copper and aluminum) there would not have been nearly the backlash and problems that we have all heard about. The devices that were installed in most of the homes with aluminum wiring were rated only for copper and are not compatible with aluminum due to the composition of the screws and terminals. In short, the metal on the screw terminals caused oxidation, heating, expansion, and contraction, which made the terminals become loose on the receptacles and switches. That is primarily because aluminum expands and contracts at a different rate than copper, and the switches and receptacles were designed for copper's rate of expansion and contraction.

Unfortunately, there are a number of sub divisions in our area that consist almost entirely of homes that were wired with aluminum wiring. Virtually none of them have the correct type of Co/Alr devices in them, even today! Ever since Geraldo Rivera's 60-Minutes sensational exposure of "**aluminum wiring fires**" in the early 80's, the insurance companies have been gunning for those of us that have homes that are wired with aluminum wiring. Now that the wiring and the devices have been in the homes for approximately 35 to 45 years, the insurance companies have really gotten serious about aluminum wiring. Some of them won't insure your home with aluminum wiring, and others will insure your home if you take the proper steps to make it safe but they still want to elevate your annual premium to make it worth their risk to insure your home.

You may ask, are there any solutions for aluminum wiring? Yes, there are a few solutions to consider but they may no longer go down well with your home insurance carrier due to the age of the aluminum and the receptacles and switches to which it is installed. In the past, we had basically three options to correct the issue with the aluminum wiring. We could employ a method called "Pig tailing" which involved adding a short piece of copper wiring on to the aluminum wiring with an approved, but very expensive, special wire nut that contains an oxide inhibitor and terminate the short piece of copper on to the receptacle or switch. This "pig tailing" can also be done with an approved crimp sleeve, but our experience has led us away from that method for a number of reasons. Another solution was to remove all of the switches and receptacles in the residence and replace them with Co/Alr receptacles and switches which was equally expensive to do. The remaining solution is the one that most insurance companies are pushing for at this time, and that is to completely rewire the home. This option is by far the most expensive and intrusive resolution. Many of the homes that were built during the same era when aluminum was being used are ranch style homes that have low pitched roofs and horizontal fire bracing in the walls. This is a very difficult combination when trying to rewire an existing home with finished walls. It is very hard to determine how long it would take to rewire a home under the circumstances and it is equally as hard to find someone willing to give a firm quotation on the rewiring of the home. There are so many variables to consider when doing a rewire of this type and that is what makes it so hard to

price. Pricing a job of this type is more an educated guess than it is real science. It is risky for the contractor and it is almost certain to end up costing the homeowner in drywall repairs and patching because some areas are just too inaccessible from the attic.

Well, there you have it. This is the truth about aluminum wiring as we know it. As you can see, the aluminum was never really the culprit but rather the faulty installation, incompatible materials, and lack of maintenance. The one thing that I hope we have revealed in this information is that aluminum wiring, although approved for the purpose, was more than likely not installed in your home correctly in the first place, and at the very least it must be inspected and maintained by a professional periodically. One thing that I would like to add; It is foolish to live in any home without proper functional smoke alarms, but it is downright criminal to live in a home with aluminum wiring and no adequate smoke alarms. Adequate means, smoke alarms that are combination AC and battery back up that are located throughout the residence in strategic locations which will alert everyone in the house in the event of a fire.

We hope that this information has helped you in some way. There are many nice older homes in our area that are wired completely in aluminum wiring. If you are considering purchasing one of these homes please call your insurance company and see what they have to say about it before you make your purchase. And please call your friends at Gulf Coast Electric if you have any questions or you can visit our web site at www.gcedestin.com.