



FAQ How can I connect to, or adapt, aluminum wire?

Background With the sharply increased cost of copper, more aluminum wire is used. This results in more requirements for aluminum-to-copper adapters and aluminum connectors.

General Practices

On **aluminum wire** an aluminum connector must be used. Do not use copper/bronze connectors (even if tin-plated) on aluminum wire, especially for power applications, unless specifically approved. This is primarily due to the different thermal expansion characteristics of aluminum vs. copper, as well as possible electrolytic corrosion due to dis-similar metals. For grounding applications, see below.

“Dual-rated” means “suitable for use on copper and/or aluminum wire”. [One way to remember this rule is that “AL” dual-rated connectors may be used on “all” wire materials, i.e. alum or copper wire, whereas copper/bronze connectors can be used only on copper wire.]

On **copper wire**, either copper/bronze connectors or aluminum (dual-rated) connectors may be used. [However, hi-strand/flex copper wire requires features not generally available in aluminum lugs.]

Use of oxide-inhibitor is recommended with all aluminum connections, to avoid oxidation of the aluminum surface, and to protect the joint from moisture hence electrolytic corrosion.

Adapters for Aluminum Wire - Reasons to adapt an aluminum wire for an existing lug include:

- Larger MCM aluminum wire is used to match the amperage rating of copper
- Even larger aluminum wire might be used to avoid voltage drop on a long circuit length

To adapt an aluminum wire to a copper/bronze or aluminum lug:

- PT Pin-Terminal compression adapters were developed when aluminum wire came onto the market. The PT type was designed with aluminum barrel, so they are dual-rated for either aluminum or copper wire. They provide a copper wire pin of Class B stranded for insertion into either a copper/bronze or dual-rated lug. The size reduction from barrel to pin reflects the reduced ampacity of aluminum wire (larger wire) vs. copper (smaller pin). Also, the PTO configuration provides an offset pin to help fit multiple aluminum wires into closely spaced wire ports.
- Field-adapt by splicing a short copper jumper wire in-line with the aluminum wire:
 - One-piece compression AC-R aluminum reducers
 - Compression ACK-R kits (similar in configuration to copper CRK kits) consist of an aluminum barrel-splice (to accept the larger aluminum wire) and CRA Copper Reducing Adapter insert(s) in one end, with oxide-inhibitor, to fit a smaller copper wire.Mechanical set-screw type -- ABS, insulated PBS

Lugs/Splices for Aluminum Wire - Greaves **dual-rated** splices, lugs, and multi-wire connectors can be used on aluminum and/or copper wires. These include:

- Aluminum compression lugs and splices: ASC-T, AL, AL-N, ASL-N, AC-R, ACK-R
- Aluminum mechanical lugs and splices: A-, AA-, AAA-, AAAA-, AQ-, ABS, GP, BTL (not DB)
- Insulated splices and multi-cable connectors: PBS, USA, USAD
- Insulation Piercing Connectors: IPC

Grounding When aluminum conductor is used for grounding:

- Aluminum pipe clamps #GAC1, GAC2, GAC4 for 1", 2", 4" pipe sizes, respectively
- Tin-plated bronze clamps (to avoid electrolytic corrosion). Tin-plated bronze is suitable for most grounding applications where there will be little or no temperature nor amperage, hence no thermal cycling.

FAQALAdapt

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