

# Practical tips May 14, 2020 Connecting Aluminum and Copper Conductors

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Homepage Building Technology Electrical Installers

## Practical Tip: Connecting Aluminum and Copper Conductors

Copper (Cu) or aluminum (Al): it's not a matter of having faith in electrical cables – in most, it comes down to questioning price. Both have their advantages and disadvantages. But when they meet, things get dicey. However, electricians don't always need a specialty Al/Cu connector for building installations. With WAGO Alu-Plus Contact Paste, they can connect aluminum and copper conductors using WAGO's connectors – quickly, easily and reliably.

## The Problem: Fire Hazard

Connecting aluminum and copper conductors is like a boxing match: in one corner is the resilient and inexpensive lightweight aluminum (Al). In the other corner, the superconductive and more expensive standard copper (Cu). If a conductive liquid (such as water condensation) is added to the fight, an electrochemical reaction occurs: the copper decomposes the aluminum, increasing contact resistance and temperature. This mixture could result in a fire.

## Relatively Rare in Building Installations

Connecting aluminum and copper conductors: This is a challenge that electricians in building installations rarely face. And this is confirmed by Volker Kuhlmann, ELECTRICAL INTERCONNECTIONS technical customer consultant at WAGO. Nevertheless, “Especially in older buildings within the states of what used to be East Germany, you can still find installation cables with aluminum conductors.” When renovating or extending these electrical installations, electricians face the problem of having to connect or distribute from the old aluminum conductors to copper conductors. “These connections and distributions can occur in junction boxes and existing building distribution boards,” Kuhlmann notes.

## Junction Box and Building Distribution Board Connections

With WAGO Alu-Plus Contact Paste (20 ml syringe), solid aluminum conductors up to 4 mm<sup>2</sup> can also be connected with WAGO's 2273 Series PUSH WIRE® Junction Box Connectors and 222 Series Splicing Connectors up to 4 mm<sup>2</sup> per the standards. However, the 221 Series is not approved for this. But the 224 Series Lighting Connectors can also be used

with this paste. “In building distribution boards, all CAGE CLAMP®-equipped rail-mount terminal blocks up to 4 mm<sup>2</sup> can reliably connect aluminum and copper conductors with the Alu-Plus contact paste. These terminal blocks include the 279 to 281 and 780 to 781 Series.”

By the way, both 2273 Series PUSH WIRE® Junction Box Connectors and 222 Series Splicing Connectors can also be used in a building distribution board via a mounting carrier for DIN-35 rails (2273-500 or 222-500).

## Using the “Alu-Plus” Contact Paste

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- With the contact paste, solid aluminum conductors up to 4 mm<sup>2</sup> can be reliably contacted via WAGO's spring pressure connections.
- With CAGE CLAMP® (e.g., 222 Series), clean the aluminum conductor with a blade and immediately connect it to the clamping point filled with the paste.
- With PUSH WIRE® (e.g., 2273 Series), it is recommended to clean the aluminum conductor beforehand and then connect it immediately to the terminal point filled with the paste.

## Seize the Benefits

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If you want to connect aluminum and copper conductors using WAGO's connectors, Alu-Plus Contact Paste offers the following advantages:

### Alu-Plus Contact Paste Advantages

- Destroys oxide film during clamping
- Prevents fresh oxidation at the clamping point.
- Blocks electrolytic corrosion between aluminum and copper conductors (in the same terminal block).
- Provides long-term protection against corrosion.

## Connecting Aluminum and Copper Conductors – Adjusting Nominal Currents

But if you want to connect aluminum and copper conductors, you must remember that copper (Cu) conducts better than aluminum (Al)! Therefore, the nominal currents must be adapted to the lower conductivity of the aluminum conductors: 2.5 mm<sup>2</sup> = 16 A, 4 mm<sup>2</sup> = 22 A.

## Product Recommendations

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## News

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## Your WAGO Contact

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