Dear Reader,

The higher the price for copper rises, the more people in the electrical component business look for a possible substitute for this increasingly expensive raw material.

When it comes to cables, people are turning to aluminum conductors with larger cross-sections.

In this edition of Elektro Tipp we will deal with the professional connection of aluminum cables. It requires special installation expertise and of course the right cable junction boxes with terminals for aluminum and copper conductors.

Hensel has offered a complete range of products for this very purpose for years and they have proven very reliable and can also help produce reliable connections with aluminum cables when the instructions are followed.

We believe that we have once again proven our skill in the connection of cables and conductors and have helped electricians to solve often urgent problems with our range of products and services.

We look forward to working with you in the future.

Felix G. Hensel
Managing partner of Gustav Hensel GmbH & Co. KG

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**Professional Connection of Aluminum Conductors:**

**Special expertise is needed!**

To save money, more and more people are thinking about using aluminum cables instead of copper. It is especially true of wires with larger cross sections.

Most devices and terminals are designed **only for** connecting **copper cables**. Therefore special requirements need to be adhered to with aluminum conductors.

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**How can aluminum cables be properly connected?**
Requirements for Connections with Aluminum Conductors:

In contrast to copper, aluminum has a few material characteristics that electricians need to pay close attention to (see electrochemical voltage sequences/galvanised element).

I. Chemical basis:
The special conducting characteristics of aluminum can be seen in the fact that the surface of an aluminum conductor is immediately covered in a non-conducting oxide layer upon exposure to oxygen. This characteristic leads to an increase in the temporary resistance between the aluminum conductors and the terminal body. This can lead to terminal overheating and in the worst case fire.

II. Appropriate preparation and handling of aluminum conductors:

1. The non-insulated conductor ends need to have the oxide layer carefully scraped clean using a knife for example. In doing so no files, sand paper or brushes may be used as small iron particles can remain on the conductor which can lead to the disintegration of the base materials (aluminum in this case) due to the electrochemical voltage sequence.

2. Immediately after removing the oxide layer, the conductor end needs to be rubbed with an acid and alkali free grease such as technical vaseline and then immediately connected to the terminal. This in turn prevents oxygen from forming a non-conducting oxide layer.

3. Due to the flow tendency in aluminum, the terminal clamps need to be tightened before start up and after the first 200 operating hours (note the appropriate torque).

4. The steps listed above need to be repeated if the wire is removed and re-connected. I.e. the conductor has to be scraped again, greased and immediately connected, because it will be connected at a different position.

III. Selection of appropriate terminals for the connection of aluminum conductors:
The suitability of terminal for connections with aluminum conductors needs to be evaluated and confirmed by the terminal manufacturer.

1. These terminals will thus meet the requirements for an aligned electrochemical voltage sequence. A disintegration of the base material (aluminum) will be prevented.

2. The terminal will have an appropriate form and surface, to penetrate the grease layer or a very thin oxide layer on the aluminum wire upon connection.

Despite these special conditions, aluminum conductors can be connected if the terminal used is appropriate and the following conditions are taken into consideration when connecting.
Professional Connection of Aluminium Cables in Hensel Cable Junction Boxes:

**Situation 1:**
Connection of two aluminum cables

Select appropriate cable junction boxes with terminals for aluminum conductors in accordance with the cable cross sections. The box size selected should offer enough space for wiring.

**Situation 2:**
Connection of aluminum and copper cables

Select appropriate cable junction box with terminal for the largest cable cross section. The cable cross sections for aluminum cables are larger than for copper cables with the same operating current.

Cable junction boxes for aluminum conductors from Hensel can connect the various cable cross sections and conductor types from aluminum and copper in a single terminal.

The general installation directions apply:
1. Select appropriate cable entries for large cable cross-sections.
2. Note IP degree of protection for the box.
3. Note bending radius for the cable.
4. Note professional handling of aluminum conductors (see previous page).

**Summary:**
For connecting copper and aluminum cables use cable junction boxes from Hensel with the appropriate terminals for connection!
Hensel Junction Boxes with Terminals for the Safe Connection of Aluminum and Copper Conductors:

**Product information**

DK Cable Junction Boxes With Terminals for Aluminum and Copper Conductors from 1.5 to 240 mm² Rated Connecting Capacity

**Delivery in India via Hensel authorized distributor network spanning 130 cities and industrial centers.**

**Delivery in South East Asia via Hensel authorized distributor network in all ASEAN countries.**

**DK cable junction boxes with terminals for aluminum and copper conductors.**

- ESM cable entry (IP 55) included
- Degree of protection: IP 65 with cable glands
- Material: Thermoplastic
- Colour: grey, RAL 7035
- Degree of protection: IP 65 with cable glands
- Material: Thermoplastic
- Colour: grey, RAL 7032
- Rated insulation voltage: AC/DC 690 V
- Order cable glands, flanges and other accessories separately as required

**More detailed information on this theme Proceed to download at www.hensel.in!**

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**Order cable glands, flanges and other accessories separately as required**

**Delivery only via electrical wholesalers!**

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