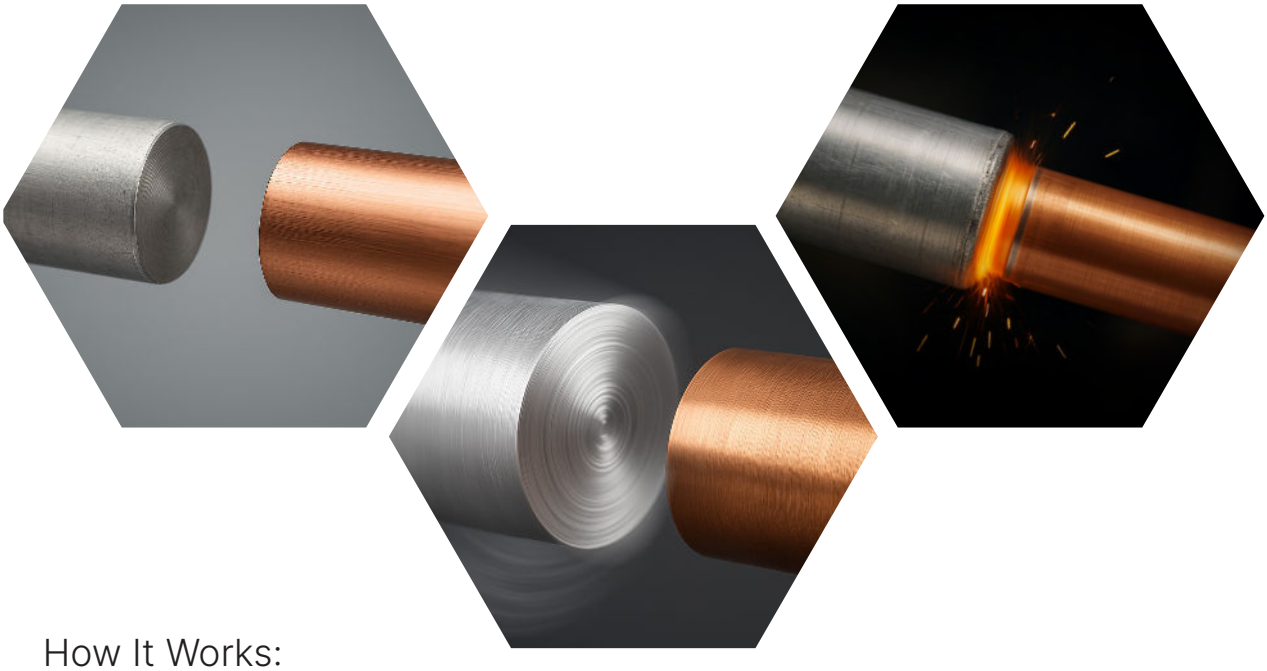
Friction-Welded Bi-Metallic Lugs

Technical Overview

AKK/AKS/AKP

ELPRESS

Why Friction-Welded Bi-Metallic Lugs (AKK) Are Critical For Long-Term Safety



How It Works:

Elpress creates bimetal connections using a process called **friction welding** – a method used to fuse aluminum and copper without compromising structural integrity. Unlike conventional welding, which relies on melting the base materials, friction welding uses high rotational speed and axial pressure to generate heat at the interface.

Friction welding creates an extremely strong, oxygen-free connection without reaching the full melting point of the base materials – instead, the materials are plastically deformed under high temperature and pressure. This results in a seamless metallurgical connection between the copper and aluminum parts, free from voids or oxidation – and highly resistant to galvanic corrosion.

The process guarantees mechanical strength and electrical conductivity that far exceed traditional screw connections or mechanical connections, making Elpress bimetal connections the perfect choice for high-performance applications in power distribution, renewable energy and industrial environments.

Reliable Engineering – Quality Assurance

Elpress bimetallic connectors undergo a rigorously controlled quality process to ensure long-term durability, electrical performance, and mechanical strength. The quality assurance program includes both preventive methods and final inspection, ensuring each product meets the high standards associated with the Elpress brand.

One of the most critical checks is the **bend test**, where 100% of all produced connectors are individually tested. In this procedure, each connector is subjected to a controlled five-degree bend at the joint area, verifying the structural integrity of the bond between the aluminum and copper materials. Any flaw in the joint becomes immediately visible and the component is rejected.

In addition to the bend test, every terminal undergoes visual inspection and dimensional control to confirm compliance with required tolerances and surface quality.

The quality program relies on standardized processes and methods, including risk analysis, root cause analysis (8D), and clearly defined corrective and preventive actions. By proactively identifying potential issues and ensuring process stability, Elpress minimizes variation and achieves high repeatability in manufacturing.

The result is a dependable connector – built to last and engineered to meet the demands of critical electrical installations worldwide.

A punched E indicates and gives reassurance to the customer that the product has undergone Elpress quality control checks.

Why Choose Elpress AKK?

- Proven in the field for over 40 years with a field failure rate of less than 0.1% over millions of units.
- Smooth transition zone between metals eliminates hotspots.
- Bend tested for quality assurance
- Used in renewable energy, utilities, and industrial sectors.

Al-to-Cu Connections: Code-Compliant — But Are They Optimal?

In many markets, including those governed by the NEC (National Electrical Code), it is technically allowed to terminate aluminum conductors onto copper busbars — if using dual-rated, tin-plated aluminum lugs.

Mixing aluminum and copper conductors in terminals not specifically rated for both materials is strictly prohibited by the NEC. Doing so introduces severe risks of corrosion, thermal damage, and potential system failure.

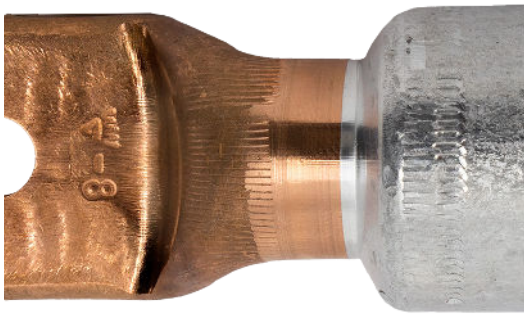
But even with tinned AL lugs, thermal cycling, mechanical stress, and surface oxidation remain concerns — particularly in demanding environments like solar installations or utility infrastructure. Over time, these factors can cause micro-movement, increased contact resistance, and even dangerous overheating.

While NEC-compliant, these solutions may not offer the long-term reliability needed in critical applications.

Technical Benefits of Friction-Welded AKKs

Solution With AKK Bi-Metallic Lugs

- ✓ Permanent, vibration-resistant friction-welded joint
- ✓ Stable performance under temperature cycling
- ✓ Gas-tight interface stops ingress of moisture or air
- ✓ Continuous, uninterrupted electrical path between Cu and Al



Technical Documents And Tests

TEST BIMETALLIC CONNECTORS

TECHNICAL INFORMATION AKS

CORROSION

CERTIFICATE

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