KW Weld metal powder

For Grounding & Lightning Protection Systems

Kumwell weld metal powder KW type is exothermic welding connection process for grounding and lightning protection system must maintain a low contact resistance often under adverse conditions for the expected lifetime. Connections in grounding and lightning protection system network are subjected to serve corrosion, high mechanical stress due to electromagnetic force, and rapid thermal heating due to high current magnitude during fault conditions.

Applications

Suitable for typical installation in grounding and lightning protection's connections their fore copper to copper, copper to steel, steel to steel, copper to stainless steel, and stainless steel to stainless steel.

Standards

- UL 467 - Standard for Grounding & Bonding Equipment.
- IEEE 837 - Standard for Qualifying Permanent Connections used in Substation Grounding.
- IEC 62561-1 - Lightning Protection Systems Component (LPSC) for connection components.

Criteria of Test Kumwell Exothermic welding conections have been successfully tested in accordance with;

• IEEE Std. 837 Standard for Qualifying Permanent Connection (For type test product)

1. Mechanical pullout test
2. Electromagnetic force
3. Sequential test group has 3 main procedures to test each if it passes the set standard of each procedure;
   a. Current Temperature Cycling b. Freeze Thaw Cycling c. Corrosion Sequence Run: Salt Spray Test, Acid Test

• UL 467 Standard for Grounding & Bonding Equipment/UL Inspection Witness

1. Weld metal powder quality: Percentage of material, Particle size, Density of each compostion, Starting powder and ignition
2. Reaction: Steady burn, No pop, No drastic color change, No porosity in the resulting copper, Consistency of color
3. Shot Time Current Test
4. Mechanical Sequence from UL 486

• American Railway Engineering and Maintenance-of-way Association (AREMA)

Test methods for tensile testing of metallic material evaluate the consistency chemistry and overall quality of KW, KB and KR Welding material resulting to the average of 43,000 psi tensile strength.

• IEC 62561-1 Lightning Protection Systems Component (LPSC) for connection component

1. Environmental Test: Salt Spray Test, Humid Sulphurous atmosphere test.
2. Electrical Test: Lightning Impulse Current Test, Contact Resistance Measurement
3. Static Mechanical Test: Tensile Test

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High Lightning Impulse Current Generator 10/350 µs & 8/20 µs

High Lightning Impulse Current Combine Generator 8/20 µs

TEMPERATURE (HUMIDITY) Test Chamber

SULFUR DIOXIDE Test Chamber

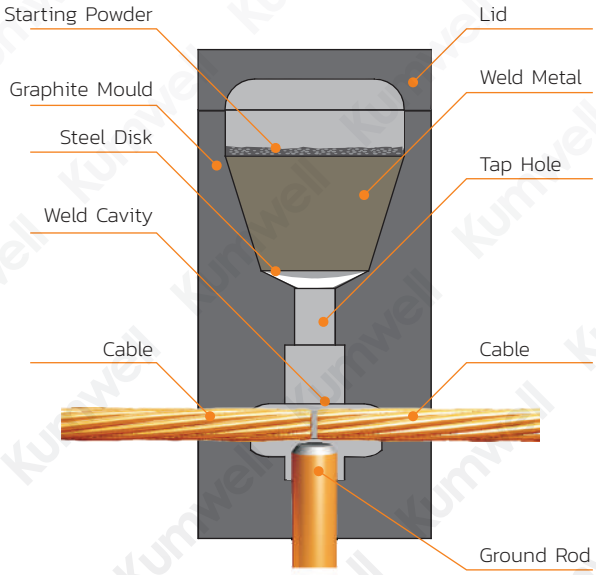
SALT SPRAY Test Chamber

Quality Assurance

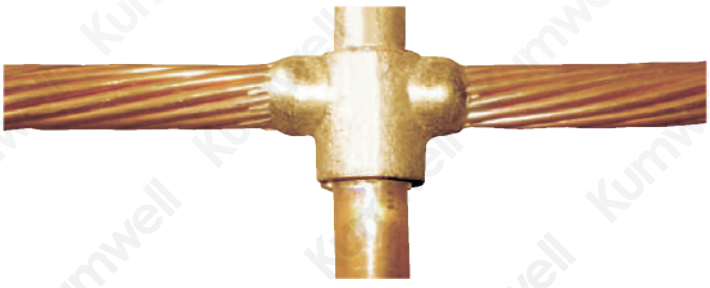
Kumwell also is internationally recognized for high standard of its graphite mould and the exothermic welding powder from successfully passed the control test in accordance with the UL467 Standard for Grounding and Bonding Equipment/UL Inspection Witness.

Process

Kumwell Exothermic Welding process is a molecular chemical reaction between copper oxide and aluminum, generating a tremendous superheat with molten metals reaching approximately temperatures of 2,537 °C (4,598 °F). The process can be completed itself automatically without external source of power or heat.



$3Cu_2O+2Al \longrightarrow 6Cu+Al_2O_3$



Completed Connection

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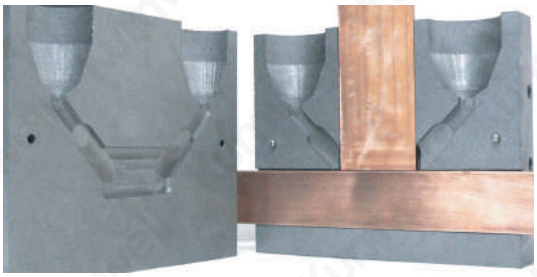
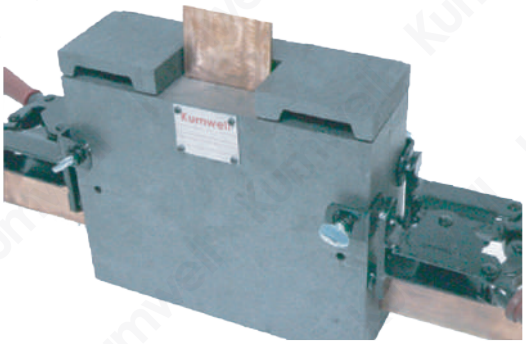
Graphite Mould

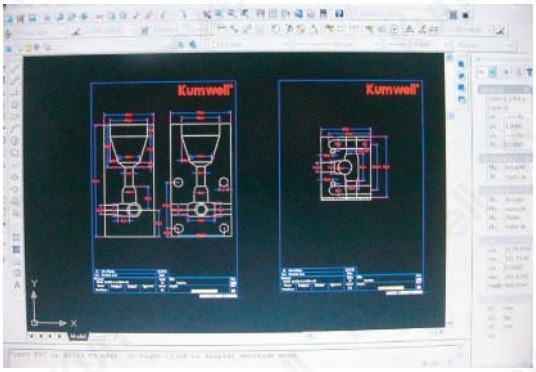
Kumwell's exothermic welding mould made from high quality graphite material. From expert engineering to accurate manufacturing process followed the UL International Standards result in earnest design for cavity and flow path, accurate tolerance, professional design and long service life. Moreover, Kumwell can customize mould made to order.

- Earnest design: cavity, flow path
- High quality raw material
- Accurate tolerance
- Duration: at least 50 times in normal usage





BB11-WC-508508: 50x8 mm² Copper bar to 50x8 mm² Copper bar



Graphite Mould designs by computer programs.

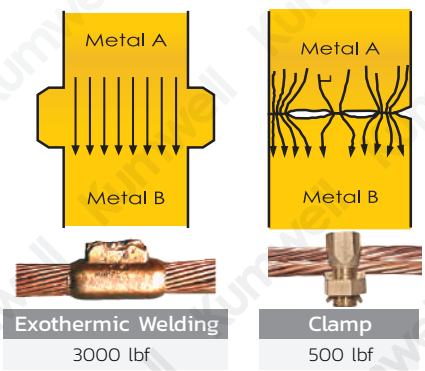
Safety starting and weld metal powder

- Nontoxic and heavy metal
- Non self-ignite
- Ignition temperature at least 400°C
- Smooth reaction
- Steady burn without pop and fire out
- No slag and porosity
- Consistency of color
- High conductivity

Technical Comparison

Exothermic welding withstands about 5 times higher than clamp's connection in mechanical force.

Unlike compression and bolt clamp, exothermic welded joint become homogeneous metal.



Exothermic Welding
3000 lbf

Clamp
500 lbf

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Packaging

Kumwell weld metal powder is contained a moisture-resistant plastic cartridge, packed in a paper box. Integral weld metal package is identified as to the weld metal powder's amount, type of metal powder to be connected, Lot No., the number of tubes to manufacturing date (MFD).

Code	KW15	KW25	KW32	KW45	KW65	KW90	KW115	KW150	KW200	KW250
Tubes/box	40	20	20	20	20	20	10	10	10	10

Storage

It should be stored at ambient temperature and kept away from moisture.