SPECIFICATIONS
Cadweld® EXOTHERMIC
WELDING SYSTEM

GROUNDING AND CATHODIC CONNECTIONS

1. <u>GENERAL</u>

This specification covers the Cadweld exothermic welding system for use in making electrical connections. The Cadweld system supplied under this specification shall include weld metal, molds, tools and accessories as required.

2. <u>STANDARDS</u>

The Cadweld exothermic welding system furnished under this specification shall meet the applicable requirements of ANSI IEEE Standard 80 "IEEE Guide for Safety in AC Substation Grounding" and IEEE Standard 837 IEEE "Standard for Qualifying Permanent Connections Used in Substation Grounding". Independent test data showing conformance to IEEE Std. 80 and IEEE Std. 837 shall be readily available.

The exothermic welding system supplied under this specification must be approved by an OSHA Nationally Recognized Test Laboratory such as Underwriters Laboratories to ANSI UL 467 "Grounding and Bonding Equipment".

3. <u>APPLICATION</u>

The Cadweld exothermic welding system is used for making electrical connections of copper to copper, copper to steel, or copper to cast iron for grounding and cathodic applications.

  a. Cadweld connections shall be suitable for exposure to the elements of direct burial in earth or concrete without degradation over the lifetime of the grounding system.

  b. EXOLON connections are metallurgically similar to Cadweld connections but are designed primarily for indoor or confined spaces. EXOLON shall use weld metal with no starting material. EXOLON molds shall use a dual element filter system that removes 97% of the smoke.

4. <u>MATERIAL</u>

Cadweld Molds shall be made from:

  a. Graphite material capable of withstanding high temperatures that are capable of providing an average life of not less than fifty separate exothermic welds.

  b. Cordierite, refractory ceramic or other material suitable for a single connection.

Starting material (where used) shall consist of aluminum, copper, and iron oxides. It shall not contain phosphorous, magnesium or any caustic, toxic or explosive substances.

Low voltage battery starting (where used), shall use an electric ignition system that does not use starting material.

Weld metal used for grounding connections shall contain copper oxide, aluminum and no less than 3% tin as the wetting agent. Weld metal used for cathodic connections shall not contain tin, but shall contain vanadium.

5. QUALITY CONTROL

Weld metal shall be controlled at the factory and subjected to routing and rigid quality control inspection procedures. The batch control lot number shall be packaged with the product for shipment from the factory.

   a. Manufacturers shall be ISO9001:2000 certified.

   b. Manufacturers shall have been engaged in the design and manufacturing of exothermic connection systems for at least seventy-five (75) years.

6. MARKING

Graphite molds shall bear permanent marking indicating the name of the manufacturer, the mold part number, the type and size of welding mixture compatible with the welding process and the size of the cable or bus connection. Labels on the package shall identify ceramic molds. Instructions detailing general safety information, connection preparation and welding procedures shall be provided with each mold.

Weld metal packages shall be identified as to the part number (size) and type of metals to be connected, such as copper to copper or copper to steel, cast iron, etc.; or shall be marked for their intended use – such as cathodic connections.

7. PACKAGING AND SHIPPING

Containers for weld metal shall be moisture resistant and shall be packaged to prevent damage or spillage during shipping.

Weld metal and starting material (if used) shall be pre-measured and packaged to prevent spillage during shipping.

8. TRAINING

Use of the exothermic connection system shall require minimal training. Factory trained personnel shall respond to field calls quickly and provide training for construction crews on the proper techniques for making Cadweld® connections.