



## MATERIAL SAFETY DATA SHEET

### CADWELD<sup>®</sup> Electrical Welding Material

Inclusive of material types : F20, F80, F33, XF19, F76 MSDS: 233  
Applicable prefixes : CA, SB, PB, XL, XF, ACB, ACC  
Revision : Q  
Issue Date : March 1, 2007  
In accordance with : guidelines 91/155/EEG – NEN ISO 11014-1, 29 CFR 1910.1200, 29 CFR 1926.59, Controlled Products Regulations

#### 1 Identification of the Product and Company

##### Identification of the Product

CADWELD<sup>®</sup> Electrical Welding Material

##### Identification of the Company

ERICO International Corporation  
34600 Solon Road  
Solon, Ohio 44139  
(440) 248-0100

ERICO B.V.  
Jules Verneweg 75  
5015 BG Tilburg  
The Netherlands  
31(0)13-5835100

##### Telephone

24-hour response line: Chem Tel 1-800-255-3924  
National Toxicity Information Centre 31 (0)30-2748888 (Attending Physician Only)

#### 2 Composition / Data on Components

##### Description

CADWELD Electrical Welding Materials are exothermic mixtures that react to produce molten metal and a ceramic phase by-product. The reaction temperatures can exceed 4000°F (2200°C) producing molten metal in excess of 2500°F (1370°C). These products are intended for use with CADWELD accessories only in making permanent connections.

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| <b>CADWELD® Electrical Welding Material</b> |
|---|

**Components**

| Chemical Component  | Chemical Symbol         | CAS Number             | EINECS Number          | EU Risk Phrases               |
|---|-------------------------|------------------------|------------------------|-------------------------------|
| Copper Oxide  | Cu <sub>2</sub> O / CuO | 1317-39-1              | 215-270-7              | Not Applicable                |
| Calcium/Silicon   | CaSi <sub>2</sub>       | 12775-68-7             | NA                     | Not Applicable                |
| Calcium Fluoride  | CaF <sub>2</sub>        | 7789-75-5              | 232-188-7              | Not Applicable                |
| Tin*  | Sn                      | 7440-31-5              | 242-159-0              | Not Applicable                |
| Aluminum - Copper Alloy<br><60 Copper<br><60 Aluminum       | Cu<br>Al                | 7440-50-8<br>7429-90-5 | 231-159-6<br>231-072-3 | Not Applicable<br>R 10 – R 15 |
| Aluminum - Vanadium Alloy**<br><60 Vanadium<br><60 Aluminum | V<br>Al                 | 7440-62-2<br>7429-90-5 | 231-171-1<br>231-072-3 | Not Applicable<br>R 10 – R 15 |

\* Type F20 and XF19 only

\*\* Type F33 only

|                                |
|--------------------------------|
| <b>3 Hazard Identification</b> |
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**Hazard Description**

Improper use of the product or inadequate preparation of the conductors, molds or surroundings can result in aggressive reactions. Instruction prints should be followed at all times. If information is missing contact ERICO or visit our web site at [www.erico.com](http://www.erico.com) to obtain proper procedures.

Self-propagating high temperature reaction will occur if heated above ignition temperature. Generates molten metal in excess of 2500°F (1370°C), slag, and dense, dusty smoke.

**Immediate Hazards**

Burns from contact with reaction, reaction products, or from hot equipment are possible.

**Exposure To Reaction By-Products**

A detailed fume analysis was conducted on CADWELD Electrical Welding Materials. Reactions byproducts were tested for total dust, respirable dust, metals, acids, fluorides, and various elements identified in typical welding fume analysis. All sampling and analysis followed methodologies dictated by the National Institute of Occupational Safety and Health (NIOSH) and by the Occupational Safety and Health Administration (OSHA). A certified Industrial Hygienist did the sample collection and independent labs conducted all analytical work.

Data collected was evaluated and compared to limits set by the American Conference of Governmental Industrial Hygienists (ACGIH) and OSHA. As a worse case scenario, calculations were completed based on a sealed 800 ft<sup>3</sup> room with no ventilation. These calculations would indicate that the copper fume PEL would be the limiting factor. Under normal outdoor use or in ventilated areas threshold limits are beyond any expected exposure limits.

**Classification System**

Not Applicable

**CADWELD<sup>®</sup> Electrical Welding Material****4 First Aid Measures****General Information**

The product produces materials at elevated temperatures. Proper protection should be utilized to avoid contact with hot materials. Standard treatment for burns in the event of contact with molten metal, slag or hot equipment

**Inhalation**

For excessive inhalation of dust, fume, remove from exposure, provide fresh air, and consult a physician.

**Skin contact**

Standard treatment for burns in the event of contact with molten metal, slag or hot equipment.

**Eye contact**

Exposure to powdered metals should be treated by flushing eyes with large amounts of water from the nasal area outward. Consult a physician if irritation persists.

Eye contact with molten metal or reaction by products requires immediate medical attention.

**5 Fire Fighting Measures****Suitable Extinguishing Agents**

Dry sand and/or flooding with large amounts of water. Water application should be at a reasonable distance. Use of hand water buckets or hand storage pumps is not recommended. Molten metal contact with water can cause small pockets of superheated steam.

Suitable extinguishing agents should be used to protect surrounding areas.

**Additional Information**

CADWELD Electrical Welding Materials are exothermic mixtures, which react to produce hot molten metals with temperatures in excess of 2500°F (1370°C) and small amounts of metal fume and smoke. Ignition temperatures are in excess of 1750°F (950°C). The material is not sensitive to vibrations, shock, or impact and is not subject to any form of spontaneous ignition.

In the event that the packaging materials are ignited, the immediate and direct application of large quantities of water will effectively eliminate the spread of fire to the surrounding areas. The ignition of the packaging materials may, in rare cases, lead to ignition. Direct application of a continuous heavy stream of water is recommended.

Ignition of extremely large quantities of exothermic materials may result in large volumes of dense smoke.

**CADWELD® Electrical Welding Material****6 Accidental Release Measures****Person-Related Safety Precautions**

RESPIRATORY PROTECTION: Normal use precludes use of special protection as material is generally used out of doors, in small quantities and is of short duration.

VENTILATION: Local Exhaust - May be necessary if used in confined space. Special - Use of NIOSH approved respirator for dusts and metal fumes in lieu of local exhaust.

PROTECTIVE GLOVES: Recommended for handling hot equipment.

EYE PROTECTION: Safety glasses recommended and caution to user to avoid direct eye contact with "flash" of light from reaction.

**Measures for Environmental Protection**

Precautions should be taken to prevent hot material and reaction byproducts from contact with combustible materials in surrounding areas.

**Measures for Cleaning/Collecting**

All unused, spilled materials may be swept up for disposal, in accordance with local regulations and guidelines.

**7 Handling and Storage****Handling**

CADWELD Exothermic Welding Materials are designed for use in CADWELD equipment only. Use of improper or damaged equipment can lead to exposure to molten metal and reaction byproducts, resulting in personal injury.

All product instructions should be followed to help ensure proper welding and safety. For additional information, see American National Standard, Safety In Welding And Cutting, Z49.1.

**Storage**

CADWELD Electrical Welding Material should be stored in a clean, dry and secure location. Storage should include provisions to minimize rough handling, excessive vibration and physical abuse. All outer packages must be stored in accordance with label markings.

If proper storage is maintained, CADWELD Electrical Welding Materials do not exhibit any storage or shelf life.

If evidence is present of damaged or contaminated products, these units should not be used.

## CADWELD<sup>®</sup> Electrical Welding Material

### 8 Exposure Control / Personal Protection

| Chemical Component  | OSHA PEL   | ACGIH TLV  | Weight Percent | TSCA Inv. |
|---|--|--|----------------|-----------|
| Copper Oxide  | Dust 1.0 Fume 0.2  | Dust 1.0 Fume 0.2  | Not > 80%      | Yes       |
| Calcium/Silicon   | Ca 5.0 as CaO Si 5.0   | Ca 2 as CaO Si 10.0                                      | Not > 5%       | Yes       |
| Calcium Fluoride  | 2.5 as Fluoride  | 2.5 as Fluoride  | Not > 5%       | Yes       |
| Tin*  | 2.0  | 2.0  | Not > 10%      | Yes       |
| Aluminum-Copper Alloy<br><60 Copper<br><60 Aluminum       | Dust 1.0 Fume 0.1<br>Total Dust 15.0 Respirable Fraction 5.0                               | Dust 1.0 Fume 0.2<br>Dust 10.0 Fume 5.0                  | Not > 15%      | No        |
| Aluminum-Vanadium Alloy**<br><60 Vanadium<br><60 Aluminum | V <sub>2</sub> O <sub>5</sub> Dust 0.5 Fume 0.1<br>Total Dust 15.0 Respirable Fraction 5.0 | V <sub>2</sub> O <sub>5</sub> 0.05<br>Dust 10.0 Fume 5.0 | Not > 5%       | No        |

\* Type F20 and XF19 only

\*\* Type F33 only

### 9 Physical and Chemical Properties (CADWELD Exothermic Material)

**Form:** Granular  
**Color:** Grey-black  
**Odor:** Odorless

BOILING POINT: N/A

VAPOR PRESSURE: N/A

VAPOR DENSITY: N/A

SOLUBILITY IN WATER: Insoluble, 0

SPECIFIC GRAVITY (H<sub>2</sub>O=1): 5.5

MELTING POINT: @ 2000°F (1093°C)

EVAPORATION RATE (BUTYL ACETATE=1): N/A, V.O.C.=0

FLASH POINT (METHOD USED): Self ignites above 1750°F (Indirect Heating) (954°C).

FLAMMABLE LIMITS: LEL - N/A UEL - N/A

### 10 Stability and Reactivity

#### Thermal Decomposition / Conditions to be Avoided

Temperatures above ignition point. Indirect heating to temperatures above 1750°F (950°C).

#### Dangerous Reactions

Aggressive reactions are possible if excess moisture is present in the mold or on the conductors to be welded. Care should be taken to ensure proper preparation in accordance with instruction prints.

#### Dangerous Decomposition Products

None

**CADWELD® Electrical Welding Material**

STABILITY: Stable

CONDITIONS TO AVOID: Temperatures above ignition (flash point).

INCOMPATIBILITY (MATERIALS TO AVOID): Typical of problems associated with molten metals.

HAZARDOUS DECOMPOSITION OR BYPRODUCTS: None

HAZARDOUS POLYMERIZATION: Will not occur.

**11 Toxicological Information**

The primary route of entry is inhalation or ingestion.

Burns from contact with reaction, reaction byproducts, or from hot equipment are possible. Dust and fumes are an irritant to eyes and upper respiratory tract. Inhalation of high concentrations of freshly formed oxide fumes and dusts in the respirable particle size range can cause influenza-like illness termed metal fume fever. Copper oxide dust may by repeated or prolonged inhalation occasionally cause ulceration and perforation of the nasal septum. Long term exposure to copper containing dusts may cause allergic dermatitis.

**12 Ecological Information**

CADWELD Electrical Welding Material contains fluorides, copper and copper compounds.

**13 Disposal Considerations**

Disposal must be done in accordance with applicable local, state or federal laws. If data is unavailable, contact ERICO for appropriate disposal recommendations.

**14 Transport Information****General Information**

The product material has been tested by independent facilities in accordance with D.O.T. / U.N. CFR 49 and I.A.T.A. Dangerous Goods Regulations to determine the applicable ratings of this material. Based on the results of this testing, the CADWELD Electrical Welding Material is not classified as a flammable solid.

A secondary CADWELD Starting Material is included in the as supplied package in all cases, other than XL identified material. An MSDS specific to this material is provided separately. This material has been classified through independent laboratory testing as a 4.1 flammable solid. Due to the minimal quantity present per package, this material and the CADWELD Electrical Welding Material package is shipped under provisions outlined under D.O.T. / U.N. 49 CFR 171.1 "General Regulations for the Transportation of Hazardous Material" and 173.4 "Exceptions for Small Quantities". All materials are packaged and marked at the factory in full compliance with these regulations.

MARINE POLLUTANT: Not Applicable

UN / ID NUMBER: Not Applicable

PACKAGING GROUP: Not Applicable

PROPER SHIPPING NAME: CADWELD Electrical Welding Material

**CADWELD® Electrical Welding Material****15 Regulations****US FEDERAL REGULATIONS**

This product contains compounds which are subject to reporting requirements of Section 313 of Title III of SARA and 40 CFR 372.

Components of the material are also included on the TSCA inventory list and are identified in section 8 above.

**INTERNATIONAL REGULATIONS:****Canadian Workplace Hazardous Materials Information System**

Utilizing information presented in "WHMIS CORE MATERIAL, A RESOURCE MANUAL FOR THE APPLICATION AND IMPLEMENTATION OF WHMIS" Worker's Compensation Board of British Columbia, Richmond, BC CADWELD and CADWELD PLUS materials would be considered Division 2 Class D Sub Division B.

**16 Other Information**

The information supplied in this document is provided with the best of our knowledge and in good faith. If the information required does not appear on this MSDS, please contact ERICO at the numbers identified in Section 1 for assistance.