



MATERIAL SAFETY DATA SHEET

CADWELD[®] PLUS Welding Material

Inclusive of material types : F20, F80, F33, XF19 MSDS: 233 PLUS
Applicable prefixes : SB, PB, CA
Revision : C
Issue Date : April 15, 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[®] PLUS Exothermic Welding Material

Identification of the Company

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2 Composition / Data on Components

Description

The CADWELD PLUS integrated welding material package is a tamper proof, moisture resistant package consisting of a steel cup containing CADWELD weld metal alloys and a bimetallic electronic ignition source. The package is sealed with an aluminized Mylar[®] cover and a tamper proof polyvinylchloride band. It is intended for use in conjunction with the CADWELD PLUS system including all standard CADWELD graphite molds with integrated baffle covers and the CADWELD[®] MULTI system. CADWELD PLUS units are ignited using a simple battery powered control unit supplied separately. Mylar is a registered trademark of E. I. du Pont de Nemours and Company.

Components

The following table lists components and ingredients that are either contained within the CADWELD PLUS unit or make up the embodiment of the unit.

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

* Type F20 and XF19 only

** Type F33 only

Package Component	CAS Number	EINECS Number	EU Risk Phrases
Steel	7439-89-6	231-096-4	Not Applicable
Flexible Graphite	7782-42-5	231-955-3	Not Applicable
Hot Melt Adhesive	8002-74-2	232-315-6	Not Applicable
Aluminized Mylar			Not Applicable
Rubber Based Adhesive			Not Applicable
Copper Tape	7440-50-8	231-159-6	Not Applicable
Nomex®	25765-47-3	N/A	Not Applicable
Polyvinylchloride Band	9002-86-2	N/A	Not Applicable

Nomex is a registered trademark of E. I. du Pont de Nemours and Company.

3 Hazard Identification

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 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. Volatile, combustible decomposition products may be produced from plastic packaging.

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 PLUS. Reaction byproducts were tested for total dust, respirable dust, metals, acids, fluorides, various elements, and volatile organic compounds (VOC's). 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.

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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 ft³ 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

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 PLUS 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® PLUS 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 PLUS integrated packages 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 PLUS 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, the CADWELD PLUS unit and CADWELD 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.

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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 <60 Copper <60 Aluminum	Dust 1.0 Fume 0.1 Total Dust 15.0 Respirable Fraction 5.0	Dust 1.0 Fume 0.2 Dust 10.0 Fume 5.0	Not > 15%	No
Aluminum-Vanadium Alloy** <60 Vanadium <60 Aluminum	V ₂ O ₅ Dust 0.5 Fume 0.1 Total Dust 15.0 Respirable Fraction 5.0	V ₂ O ₅ 0.05 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 (H₂O=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

STABILITY: Stable

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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 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 exothermic mixture contained within the CADWELD PLUS unit and the unit itself is not classified as a flammable solid. These findings indicate that no special package label and no special restrictions apply for transport or shipping of this material by motor vehicle, rail car, sea or air.

MARINE POLLUTANT: Not Applicable

UN / ID NUMBER: Not Applicable

PACKAGING GROUP: Not Applicable

PROPER SHIPPING NAME: CADWELD PLUS Exothermic Welding Material

CADWELD® PLUS 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.