FURSE EARTHING & LIGHTNING PROTECTION

Furseweld™ powder - Main
Safety Data Sheet (SDS)

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1. CHEMICAL PRODUCT & COMPANY IDENTIFICATION:

1.1. Product identifier

Product name: Furseweld™ Alumina-Thermic Welding Powder
Pure substance/mixture: Copper Based Welding Powder with Aluminium

1.2. Relevant identified uses of the substance or mixture and uses advised against

Recommended use: Exothermic Welding Material
Uses advised against:

1.3. Details of the supplier of the safety data sheet

Company name: ABB Furse (ABB Ltd.), Wilford Road, Nottingham NG2 1EB United Kingdom
Contact: Mr. Surinder Kareer, Tel: +44 (0)115 964 3875

2. HAZARDS IDENTIFICATION:

2.1. Classification of the substance or mixture

2.1.1. Label elements (pictograms)

![Irritant](image1.png) ![Environmental Hazard](image2.png)

Signal word: Warning

2.1.2. Hazard statements

H302 Harmful if swallowed
H411 Toxic to aquatic life
H320 Causes eye irritation
H335 May cause respiratory irritation

2.1.3. Precautionary statements

P261 Do not breathe dust/fume/vapours/gas.
P264 Wash skin thoroughly after handling.
P270  Do not eat, drink or smoke when using this product.
P271  Use only outdoors or in a well-ventilated area.
P273  Avoid release to the environment.
P280  Wear protective gloves/clothing.
P301 + P312  If swallowed, call a poison centre/doctor/qualified party if feeling unwell.
P391  Collect Spillage.

2.1.4. Other hazards

Improper use of the weld metal product or inadequate preparation of the conductors, moulds or surroundings can result in aggressive reactions. 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. The molten product can cause serious burns. Weld metal, conductors, moulds and joints remain hot for prolonged periods, after reaction occurs. Always use safety equipment. Inhalation of powder or fumes may cause metal fume fever.

Exposure to reaction by-products: See section 8

3. COMPOSITION/INFORMATION ON INGREDIENTS:

3.1. Mixtures

Reportable hazardous substances only

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS No.</th>
<th>EC-No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper Oxide/Cuprous Oxide</td>
<td>1317-39-1</td>
<td>215-270-7</td>
<td>&lt; 80%</td>
</tr>
<tr>
<td>Dicopper Oxide/Cupric Oxide</td>
<td>1317-38-0</td>
<td>215-269-1</td>
<td>&lt; 80%</td>
</tr>
<tr>
<td>Aluminium Copper Alloy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 60 Aluminium</td>
<td>7429-90-5</td>
<td>231-072-3</td>
<td>&lt; 15%</td>
</tr>
<tr>
<td>&lt; 60 Copper</td>
<td>7440-50-8</td>
<td>231-15-6</td>
<td></td>
</tr>
<tr>
<td>Copper</td>
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<td>231-159-6</td>
<td>&lt; 10%</td>
</tr>
<tr>
<td>Calcium Silicon</td>
<td>12013-56-8</td>
<td>234-588-7</td>
<td>&lt; 5%</td>
</tr>
</tbody>
</table>

Other: The full text for all hazard statements is displayed in Section 15.

4. FIRST AID MEASURES:

4.1. Description of first aid measures

Molten product will cause skin burns and if in contact with eyes while in a molten state may cause serious damage.
5. FIRE FIGHTING MEASURES:

5.1. Specific hazards

Hazard: Furseweld™ Alumina-Thermic Welding Powder is not classified as a flammable solid, as per the UN Test N.1. The materials are not shock sensitive or prone to spontaneous ignition.

If ignition temperatures exceed 454°C/850°F for the starting weld metal and 954°C/1750°F for the main weld metal, the material may be accidentally ignited. In this case, large amounts of water should hinder and then control the spread of fire. The ignition of large amounts of weld metal could possibly result in varying volumes of smoke.

5.2. Extinguishing media

Extinguishing media: Extinguish with dry sand and/or flood with large amounts of water.

Extinguishing media not suitable: Hand water buckets or hand storage pumps. Molten metal contact with water can cause small pockets of superheated steam.

Use fire-extinguishing media appropriate for surrounding materials.

5.3. Advice for firefighters

Protective equipment: Full face self-contained breathing apparatus is recommended.

Procedures: The application of water should be done from a distance, as well as in copious amounts. Do not use buckets of water or hand held extinguishers. Water should be administered in a direct and heavy stream after the exothermic reaction has been completed.
6. ACCIDENTAL RELEASE MEASURES:

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions: Avoid inhalation of dust. Do not breathe fumes. Avoid contact with skin and eyes. Follow precautions for safe handling described in this safety data sheet, including the use of protective equipment.

6.2. Environmental precautions

Environmental precautions: Precaution should be taken to prevent hot material and reaction by-products from contact with combustible materials in surrounding areas. Avoid spreading dust or contaminated materials. Avoid discharge to the aquatic environment. Contact local authorities in case of spillage to drain/aquatic environment.

6.3. Methods and material for containment and cleaning up

Spill clean-up methods: Remove sources of ignition. All spilled or leaked materials should be swept up by soft natural fibre brushes. Use non-sparking or plastic scoops to pick up the material.

If spillage is slightly wettened, dust clouds will be prevented in the cleaning-up process.

Dispose of materials in compliance with local laws and regulations.

6.4. Reference to other sections

Other: For personal protection, see Section 8.

For waste disposal, see Section 13.

7. HANDLING AND STORAGE:

7.1. Precautions for safe handling

Safe handling advice: All persons handling the product should be trained by qualified parties. All handling instructions should be read and understood before attempting to use the exothermic welding system.

Avoid inhalation of dust/fumes. Avoid contact with skin and eyes. Use correct PPE. Use of improper or damaged equipment can lead to exposure to molten metal and reaction by-products.

Products only to be used in well ventilated areas. Ensure the product has been stored in cool, dry place before use.

Technical measures: Do not smoke in area of handling. Do not handle in areas with open flame fires. Ensure proper training has been given to handlers, by qualified parties.
7.2. Conditions for safe storage, including any incompatibilities

Safe storage advice: Furseweld™ Alumina-Thermic Welding Powder 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. Product should be stored the right side up at all times, packaging should remain sealed until time of use, to limit exposure to moisture.

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

If proper storage is maintained, Furseweld™ Materials do not exhibit any storage or shelf life. It is however recommended that products be used within two years, to avoid moisture build-up and particle separation.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION:

Occupational exposure limit values:

<table>
<thead>
<tr>
<th>CAS No.</th>
<th>Chemical name</th>
<th>As</th>
<th>OSHA (USA)</th>
<th>ACGIH TLV</th>
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<tbody>
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<td></td>
<td></td>
<td></td>
<td>OHS (RSA)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Dust</td>
<td>Respiration</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(Mg/m³)</td>
<td>Fraction</td>
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<td>8-Hour TWA</td>
<td>(Mg/m³)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>8-Hour TWA</td>
<td>8-Hour TWA</td>
</tr>
<tr>
<td>7429-90-5</td>
<td>Aluminium, metal</td>
<td>Al</td>
<td>15.0</td>
<td>5.0</td>
</tr>
<tr>
<td>7440-50-8</td>
<td>Copper</td>
<td>Cu</td>
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<td>0.1</td>
</tr>
<tr>
<td>1317-39-1</td>
<td>Copper Oxide</td>
<td>CuO</td>
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<td>5.0</td>
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<td>1317-38-0</td>
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<td>Cu2O</td>
<td>15.0</td>
<td>5.0</td>
</tr>
<tr>
<td>--------</td>
<td>Calcium Silicon</td>
<td>CaSi</td>
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<tr>
<td>--------</td>
<td>Fluorides</td>
<td>F</td>
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<td>2.5</td>
</tr>
</tbody>
</table>

Notes: A4 = Not Classifiable as a Human Carcinogen.

8.1. Exposure controls

General measures: Use in well ventilated areas. Observe Occupational Exposure Limits and minimise the risk of inhalation of dust and fumes.

Personal protection: Personal protection equipment should be chosen according to the relevant standards. Equipment must be suitable for welding purposes.
Respiratory equipment: If area is not very well ventilated, wear suitable respiratory equipment for dusts and metal fumes.

Hand protection: Heat insulated protective gloves. Recommended for handling hot equipment. Do not touch mould or joint when hot.

Eye protection: Wear goggles and shield face from reaction.

Skin protection: Use protective clothing, which buttons at neck and wrists.

Hygiene measures: Wash hands after handling. Change contaminated clothing. Minimise contact with substance. Practice safe working habits.

9. PHYSICAL AND CHEMICAL PROPERTIES:

9.1. Information on basic physical and chemical properties

Appearance: Granular
Colour: Grey – black
Odour: Odourless
pH: Not available
Melting point / freezing point: 1095°C/2000°F
Boiling point: Not available
Evaporation point: Not relevant
Vapour pressure: Not relevant
Vapour density: Not relevant
Solubility: Insoluble in water
Partition coefficient: Not available
Auto-ignition temperature: > 955°C/1750°F
Decomposition temperature: Not available
Specific gravity: ± 6.0

10. STABILITY AND REACTIVITY:

10.1. Chemical stability

Stability: Stable under prescribed storage conditions.

10.2. Possibility of hazardous reactions

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

Conditions / materials to avoid: Temperatures above ignition point 955°C (1750°F).

10.4. Incompatible materials

Incompatible materials: Typical of problems associated with molten metals.

10.5. Hazardous decomposition products

Hazardous decomposition products: None under normal conditions. Polymerization will not occur.

11. TOXICOLOGICAL INFORMATION:

11.1. Information on toxicological effects

Inhalation: Dust may irritate throat and respiratory system and cause coughing. Heating above the melting point releases metallic oxides, which may cause metal fume fever by inhalation.

Skin contact: Prolonged exposure may cause allergic dermatitis.

Eye contact: Particles and/or fumes in the eyes may cause irritation.

Ingestion: Ingestion may cause nausea, headache, dizziness and intoxication. Dicopper Oxide: LD50 > 470 mg/kg.

Specific effects: Frequent inhalation of dust over a long period increases the risk of developing lung diseases. Copper oxide 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. This product contains no ingredient listed on the NTP, OSHA or IARC carcinogen lists.

12. ECOLOGICAL INFORMATION:

12.1. Toxicity

Ecotoxicity: Product should not be disposed of in sewers or water systems.

12.2. Persistence and degradability

Degradability: The product solely consists of inorganic compounds, which are not biodegradable. Insufficient data on biodegradability and mobility of composition.

12.3. Bioaccumulative potential

Bioaccumulative potential: No data available on bioaccumulation.
12.4. Mobility in soil

Mobility: The product is not volatile but may be spread by dust-raising handling. The product is reported to be immobile in sand, unless high levels of acidity are present. Limited information available.

12.5. Other adverse effects

Other adverse effects: None known.

13. DISPOSAL CONSIDERATIONS:

13.1. Waste treatment methods

Dispose of waste and residues in accordance with local laws and regulations.

14. TRANSPORT INFORMATION:

Independent laboratory testing has been performed on Furseweld™ Alumina-Thermic Welding Powder to determine if the product should be classified as a flammable solid (Division 4.1).

The Furseweld™ Welding Powder sample passed the preliminary screening test and is therefore NOT classified as a flammable solid (Division 4.1). The testing was performed per UN Test N.1, “Test method for readily combustible solids.” The material did not ignite or propagate combustion.

Due to the limited quantities of hazardous material per package, all Exoweld™ powders are shipped in non-bulk packagings under provisions outlined in 49 CFR 171.4 “Marine Pollutants” and the exception 49 CFR 171.4(c)(2)

UN Number: UN3077 UN
 Proper Shipping Name: Environmentally Hazardous Substance, solid n.o.s.
 Transport Hazard Class: Class 9
 Packing Group Number: Group III
 Environmental Hazards: Severe Marine Pollutant

15. REGULATORY INFORMATION:

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Foreign regulations:

Safety Health and Environmental Regulations/Legislation Specific for the substance or mixtures. EC Regulation (EC) No. 1907/2006 (REACH)

American Conference of Governmental Industrial Hygienists, Threshold Limit Value Tables.

Occupational Safety and Health Standards, Part 1910, Air Contaminates, Respiratory Protection and Hazard Communication.

16. OTHER INFORMATION:

16.1. Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

16.2. Revision history

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<th>Rev.</th>
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<th>Chapt. (C)</th>
<th>Description</th>
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<td>A</td>
<td>All</td>
<td></td>
<td>First issue in ABB format.</td>
<td>04/2020 GBNTG R&amp;D APM.</td>
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<tr>
<td>B</td>
<td>2</td>
<td>14</td>
<td>Added signal word. Added reference to UN3077</td>
<td>05/2020 GBNTG R&amp;D APM.</td>
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