MATERIAL SAFETY DATA SHEET

Protective Clothing	NFPA Rating (USA)	EC Classification	WHMIS (Canada)	Transportation
	 (estimated)	 **Toxic**  **Corrosive**  **Dangerous for the environment**	 **D1B**  **Corrosive**	**May be shipped as a Consumer Commodity** (See Section 14)

Section 1: Product and Company Information

Product Name: Aluminium Flux Powder

Product Codes: Aluminium Flux Powder

Product Use: Soldering flux for Aluminium at low temperature.

Manufacturer: CuP Alloys (Metal Joining) Ltd
154 Mandalay Rd, Pleasley, Mansfield,
Nottinghamshire. NG19 7TJ

Phone Number: +44 1623 707955

24-hour Emergency: **+44 1623 707955**

Section 2: Composition and Ingredient Information

Hazardous/Dangerous Ingredients:

Chemical Name	CAS No.	Wt.%	EINECS / ELINCS	Symbol	Risk Phrases
Monoethanolamine	141-43-5	30 - 60	205-483-3	Xn; C	R20/21/22 - 34
Ammonium hydrogendifluoride	1341-49-7	5 - 10	215-676-4	T; C	R25 - 34
Tin (II) Chloride dihydrate	10025-69-1 (7772-99-8 anhydrous)	10 - 15	231-868-0	None*	None
Zinc Chloride	7646-85-7	5 - 10	231-592-0	Xn; C, N	R22 - 34 -50/53

* This chemical substance is not classified in the Annex I of Directive 67/548/EEC.

Note: See Section 8 of this MSDS for exposure limit data for these ingredients.
See Section 16 for the full text of the R-phrases above.

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Section 3: Hazards Identification

Preparation Hazards and Classification:

Toxic if swallowed. Harmful by inhalation and in contact with skin. Causes burns. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

USA: This material is considered hazardous by the OHSA hazard Communication Standard (29 CFR 1910.1200).

Canada: This is a controlled product under WHMIS.

European Communities (EC): This preparation is classified as dangerous according to Directive 1999/45/EC and its amendments. Classifications: Toxic, Corrosive, Dangerous for the environment.

Appearance, Color and Odor: Honey colored viscous liquid, ammonia-like odor.

Primary Route(s) of Exposure: Inhalation, Eye contact, Skin contact, Ingestion. Exposure may be from contact to product as packaged and from fumes/gases generated during soldering.

Potential Health Effects:

ACUTE (short term): see Section 8 for exposure controls

Inhalation: Inhalation of fumes/gases generated when soldering with the flux can be moderately to severely irritating to the nose, throat and respiratory system. Symptoms of over-exposure include chills, fever, unproductive cough and difficulty breathing.

Ingestion: Toxic by ingestion. May cause nausea, vomiting and diarrhea. Ingestion may result in damage to the tissues of the gastrointestinal system and systemic fluoride toxicity, which may be fatal.

Skin: Severely irritating or corrosive to the skin. Causes burns with direct contact.

Thermal decomposition of this product may result in the release of hydrogen fluoride. This substance may be absorbed through the skin, causing burns. Extreme over-exposure to hydrogen fluoride can cause systemic fluoride toxicity, which may be fatal.

Eye: Product is irritating to the eyes. Causes eye burns with direct eye contact.

CHRONIC (long term): see Section 11 for additional toxicological data

Prolonged or repeated over-exposure by skin contact may cause dermatitis.

Long-term over-exposure to fluorides can cause a deposit of fluorides in the bones and teeth, a condition called Fluorosis. This may cause pain, disability and mottling of the teeth. Fluorides can irritate the lungs and may cause bronchitis to develop with cough, phlegm and/or shortness of breath.

Long-term over-exposure to inorganic tin compounds can cause a benign dust-induced lung condition, called Stannosis. Usually this condition does not interfere with normal lung function. Workers with lung disease or limited respiratory capacity should have limited exposure to products containing inorganic tin compounds.

Medical Conditions Aggravated by Exposure: May aggravate an existing dermatitis.

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Section 4: First Aid Measures

Inhalation: To ensure your own safety before attempting rescue (e.g. Wear appropriate protective equipment, use the buddy system). Get immediate medical attention. Remove source of contamination or move victim to fresh air. If breathing is stopped, trained personnel should begin artificial respiration (AR) or, if the heart has stopped, immediately start cardiopulmonary resuscitation (CPR) or automated external defibrillation (AED). Quickly transport victim to an emergency care facility.

Eye Contact: Get immediate medical attention. Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for at least 20-30 minutes, while holding the eyelids open. If a contact lens is present, DO NOT delay irrigation or attempt to remove the lens. Neutral saline solution may be used as soon as it is available. Do not interrupt flushing. If necessary, continue flushing during transport to emergency care facility. Take care not to rinse contaminated water into the unaffected eye or onto the face. Quickly transport victim to an emergency care facility.

Skin Contact: As quickly as possible, remove contaminated clothing, shoes and leather goods (e.g. watchbands, belts). Immediately flush with lukewarm, gently flowing water for at least 30 minutes. Do not interrupt flushing. If necessary, and it can be done safely, continue flushing during transport to medical care facility.

Ingestion: Get immediate medical attention. Never give anything by mouth if victim is rapidly losing consciousness or is unconscious or convulsing. Have victim rinse mouth thoroughly with water. Do not induce vomiting. If vomiting occurs naturally, have victim lean forward to reduce the risk of aspiration. Quickly transport victim to an emergency care facility.

Notes to Physician: Fluorides can reduce serum calcium resulting in potentially fatal hypocalcemia; if there are indications that a victim is suffering from the effects of fluoride over-exposure, then give soluble calcium or magnesium.

Section 5: Fire Fighting Measures

Extinguishing Media: Use water spray to cool fire-exposed flux. Use carbon dioxide, foam and dry chemical for extinguishing fires involving this flux.

Unusual Fire and Explosion Hazards: Flash point is expected to be > 93°C (200°F).

Sensitivity to mechanical impact: Not sensitive
Sensitivity to static discharge: Not sensitive

Fire Fighting Instructions: Self-contained breathing apparatus and full protective clothing should be worn. This material is corrosive to skin and presents a potential contact hazard to firefighters.

Hazardous Combustion Products: During a fire, irritating and toxic gases may be generated. Hazardous combustion products include carbon monoxide and ammonia. Hydrogen fluoride can penetrate the skin causing skin burns and systemic toxic effects.

Section 6: Accidental Release Measures

Personal Precautions: Wear all protective equipment as described in Section 8. Prevent all inhalation exposures, skin and possible eye contact. Keep unauthorized personnel away. Ventilate the area.

Environmental Precautions: Do not allow product to reach sewage systems or ground water.

Methods for Containment: Stop the spill if it is safe to do so. Contain the spill using absorbent clay, sand, sawdust, or other inert absorbent material.

Methods for Clean-up: Clean up spills immediately. Scoop up contaminated absorbent material and place into suitable, labeled plastic waste container.

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Section 7: Handling and Storage

Handling

All employees who handle this material should be trained to handle it safety. Avoid breathing fumes/gases of this material. Prevent all skin and eye contact. Do not ingest. Keep away from children. Use this material with adequate ventilation. Keep container closed when not in use. Wash thoroughly after handling this product. Do not eat, drink, smoke while handling this product. Remove contaminated clothing immediately.

Storage:

Store in a cool, dry area. Keep containers tightly closed when not in use. Store away from incompatible materials (see Section 10).

Section 8: Exposure Controls and Personal Protection

Exposure Limits

Ingredient	ACGIH TLV (8-hr. TWA) (mg/m^3)	U.S. OSHA PEL (8-hr. TWA) (mg/m^3)	Ontario (Canada) TWAEV (mg/m^3)	UK OEL (8-hr. TWA) (mg/m^3)
Monoethanolamine	2 ppm STEL: 6 ppm	6 (3 ppm)	7.5 (3 ppm) STEL: 15 (6 ppm)	7.5 (3 ppm) STEL: 15 (6 ppm)
Ammonium hydrogendifluoride	Not established	Not established	Not established	Not established
Stannous Chloride	Not established	Not established	Not established	Not established
Zinc Chloride fume	1 STEL: 2	1	1 STEV: 2	Not established
Ammonium Fluoride	Not established	Not established	Not established	Not established
Fluorides, as F	2.5	2.5	2.5	2.5
Tin, as Sn (inorganic compounds)	2	2 (except oxides)	2 (except stannane)	2 STEL: 4 (except stannane)
Other exposure limits: NIOSH IDLH (Immediately Dangerous to Life or Health) for Monoethanolamine: 30 ppm				

STEV = Short Term Exposure Value
STEL = Short Term Exposure Limit

MATERIAL SAFETY DATA SHEET

Section 8: Exposure Controls and Personal Protection, continued

Exposure Controls

Engineering Controls: Provide adequate ventilation/local exhaust to keep exposure levels below the exposure limits listed above.

Personal Protection:

Respiratory Protection: When concentrations in air exceed the occupational exposure guidelines, always wear respiratory protection. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

NIOSH Recommendations for Monoethanolamine concentrations in air:
Up to 30 ppm: Chemical cartridge respirator; or gas mask with canister; or powered air-purifying respirator with cartridges to protect against Monoethanolamine; or SAR (Supplied Air Respirator); or full-facepiece Self-contained Breathing Apparatus (SCBA); or full-facepiece SAR.

Emergency of planned entry into unknown concentrations or Immediately IDLH conditions: Positive pressure, full-facepiece SCBA; or positive pressure, full-facepiece SAR with an auxiliary positive pressure SCBA.

Where the potential exists for exposure over the 2.5 mg/m^3 as fluoride, use a MSHA/NIOSH approved supplied-air respiratory with a full facepiece operated in a pressure-demand or other positive pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.

A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 or Canadian Standards Association (CSA) Standard Z94.4-02 must be followed whenever workplace conditions warrant a respirator's use.

Skin Protection: Wear impervious protective gloves made of rubber. Wear clean body-covering clothing to prevent skin contact. Wear an impervious apron as needed to prevent skin contact.

Eye Protection: Wear chemical splash goggles and a full faceshield.

Other Protective Equipment: Provide eyewash and safety shower stations in workplaces where this flux is handled.

Hygiene Measures: Avoid breathing fumes and gases of this material. Prevent all skin and eye contact. Do not ingest. Use this material with adequate ventilation. Keep container closed when not in use. Wash thoroughly after handling this product. Do not eat, drink, smoke while handling this product. Remove contaminated clothing immediately.

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Section 9: Physical and Chemical Properties

Physical State:	Liquid	**Vapor Pressure: (mm Hg @ 25°C)**	Not applicable
Appearance:	Honey colored viscous liquid	**Vapor Density: (Air = 1)**	Not available
pH:	8	**Solubility in Water:**	Soluble
Relative Density: (water = 1)	1.33	**Water / Oil distribution coefficient:**	>1
Boiling Point:	>93.3°C (>200°F)	**Odor Type:**	Ammonia-like odor
Freezing Point:	Not available	**Odor Threshold:**	Not available
Viscosity:	Not available	**Evaporation Rate: (n-Butyl Acetate = 1)**	Not available
Oxidizing Properties:	Not available	**Auto Ignition Temperature (°C):**	Not available
Flash Point and Method:	>93.3°C (>200°F), Not determined	**Flammability Limits (%):**	Not available
VOC %:	0% (w/w%); 0% (v/v%)	**VOC:**	0 lbs per gallon (US)

Section 10: Stability and Reactivity

Stability: Stable

Conditions to Avoid: Avoid incompatible materials.

Incompatible Materials: Incompatible with strong oxidizing agents, sodium nitrite and nitrosating agents.

Hazardous Decomposition Products: Thermal decomposition of this product may result in the release of hydrogen fluoride. This substance may be absorbed through the skin, causing burns. Extreme over-exposure to hydrogen fluoride can be fatal through systemic fluoride poisoning.
Other products of combustion may include ammonia and carbon monoxide.

Possibility of Hazardous Reactions: Hazardous polymerization will not occur.

Other Reactivity Concerns: Not available

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Section 11: Toxicological Information

Acute Toxicity Data

Ingredient	LD_{50} Oral (mg/kg)	LD_{50} Dermal (mg/kg)	LC_{50} Inhalation (4 hrs.)
Monoethanolamine	1 720 (rat)	1 000 (rabbit)	1 210 mg/m^3
Ammonium hydrogendifluoride	Not available	Not available	1 276 ppm/1hr (rat) 432 ppm/3hr (mouse)
Stannous Chloride	604 (mouse)	Not available	Not available
Zinc Chloride	200 (guinea pig) 350 (rat)	Not available	Not available

Chronic Toxicity Data

Carcinogenicity: The table below indicates whether each agency has listed any ingredient as a carcinogen.

Ingredient	ACGIH	IARC	NTP
Monoethanolamine	Not listed	Not listed	Not listed
Ammonium hydrogendifluoride	Not listed	Not listed	Not listed
Stannous Chloride	Not listed	Not listed	Not listed
Zinc Chloride	Not listed	Not listed	Not listed
Fluorides, as F	A4	Group 3	Not listed

ACGIH: (American Conference of Governmental Industrial Hygienists)
A4 – Not Classifiable as a Human Carcinogen.
IARC: (International Agency for Research on Cancer)
Group 3 – Not classifiable as to carcinogenicity in humans.
NTP: (National Toxicology Program)

Irritation: Severely irritating or corrosive when in contact with skin and eyes. Over-exposure to fumes can be severely irritating to the nose and throat.

Sensitization: Not available

Neurological Effects: Extreme over-exposure by ingestion or by inhalation of hydrogen fluoride may cause adverse neurological effects.

Teratogenicity: Not available

Reproductive Toxicity: Not available

Mutagenicity (Genetic Effects): Not available

Toxicologically Synergistic Materials: Not available

Target Organ Effects: Exposure to fluorides can affect the skin, bones, nervous system and teeth.

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Section 12: Ecological Information

Ecotoxicity: Not available.
Do not allow the material to be released into the environment. Zinc chloride is very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
If flux is released into the aquatic environment, it is expected to have toxic effects on aquatic plants, fish and invertebrates.

Mobility: Not available

Persistence and degradability: Not available

Bioaccumulative potential: Not available

Other adverse effects: Not available

Section 13: Disposal Considerations

Waste Disposal Method: Do NOT dump into any sewers, on the ground or into any body of water. Store material for disposal as indicated in Section 7 Handling and Storage.

USA: Dispose of in accordance with local, state and federal laws and regulations.

Canada: Dispose of in accordance with local, provincial and federal laws and regulations.

EC: Waste must be disposed of in accordance with relevant EC Directives and national, regional and local environmental control regulations. For disposal within the EC, the appropriate code according to the European Waste Catalogue (EWC) should be used.

Section 14: Transport Information:

U.S. Hazardous Materials Regulation (DOT 49CFR): When packaged in quantities less than 30 kg, this material can be shipped as a “Consumer Commodity ORM-D” Exemption. Shipment from US going to Canada may transport as per 49 CFR (TDG Section 9.1)

Canadian Transportation of Dangerous Goods (TDG): When packaged in quantities less than 30 kg this material can be shipped as a “Consumer Commodity” as per part 1.17 of the TDG Regulations. Shipment from Canada to the US may transport as per TDG Regulations (49 CFR Part 171.12a)

ADR/RID: When packaged in quantities less than 6 kg this material can be shipped in Limited Quantities as per 3.4.5 or the ADR.
Label outer package with: UN1760

IMDG: UN1760, CORROSIVE LIQUID N.O.S., (Monoethanolamine, Ammonium hydrogendifluoride), 8, PGIII, LTD QTY, EmS F-A, S-B

Marine Pollutants: Not applicable

ICAO/IATA : ID8000, Consumer Commodity, 9

May be carried under the provisions for dangerous goods in limited quantities.

MATERIAL SAFETY DATA SHEET

Section 15: Regulatory Information

NFPA Hazard Rating (estimated):

Category	NFPA
Acute Health	3
Flammability	1
Instability	0

USA

TSCA Status: All ingredients in the product are listed on the TSCA inventory.

SARA Title III:

Sec. 302/304: None
Sec: 311/312: Acute, Chronic
Sec. 313: None
CERCLA RQ Ammonium Bifluoride; Ammonium Fluoride

California Prop. 65 : This product does not contain chemicals known to the State of California to cause cancer or reproductive toxicity.

BXA : Ammonium hydrogendifluoride (CAS 1341-49-7) appears on the Bureau of Export Administration list of Precursors for Toxic Chemical Agents, classified under Export Control Classification Number 1C350. This product may not be exported without appropriate licensing.

Canada

This product has been classified in accordance with the hazard criteria of the *Controlled Products Regulations* and the MSDS contains all the information required by the *Controlled Products Regulations*.

WHMIS Classification: D1B: Material causing immediate and serious toxic effects.
E: Corrosive

NSNR Status (New Substance Notification Regulations): All substances in the product are listed, as required, on Canada's Domestic Substances List (DSL).

NPRI Substances (National Pollutant Release Inventory): The potential thermal decomposition product, Hydrogen fluoride, is a NPRI reportable substance. None of the ingredients, as listed in Section 2 are NPRI reportable substances.

CEPA Priorities Substances List : Ammonia hydrogendifluoride is listed on Priority list 1, Toxic material (as inorganic fluoride).

MATERIAL SAFETY DATA SHEET

Section 15: Regulatory Information, continued

EC Classification for the Substance/Preparation:

Symbol:

Toxic

Corrosive

Dangerous for the environment.

Risk Phrases:

R25: Toxic if swallowed.
R20/21: Harmful by inhalation and in contact with skin.
R34: Causes burns.
R51/53: Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases:

1/2: Keep locked up and out of the reach of children.
26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
36/37/39: Wear suitable protective clothing, gloves and eye/face protection.
45: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
60: This material and its container must be disposed of as hazardous waste
61: Avoid release to the environment. Refer to special instructions/safety data sheet.

Section 16: Other Information

Full Text of R-phrases appearing in Section 2:

R20/21/22: Harmful by inhalation, in contact with skin and if swallowed.
R22: Harmful if swallowed.
R25: Toxic if swallowed.
R34: Causes burns.
R50/53: Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Preparation Information:

Revision Date: June 16, 2009

Revision Summary:

Prepared by:

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Disclaimer:

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