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# MATERIAL SAFETY DATA SHEET

MSDS Code 73-103

Complies With 29CFR 1910

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## SECTION I

Manufacturer's Name <b>HANDY &amp; HARMAN</b>		Emergency Telephone No. (212) 207-2632	
Address (Number, Street, City, State & Zip Code) 850 Third Avenue, New York, NY 10022		Telephone No. (212) 752-3400	
Chemical Name and Synonyms White Flux; Silver Brazing Flux - Low Temp.		Trade Name and Specifications AMS 3410G; O-F-499d, Type B; Handy Flux; AWS Class FB3A	
Chemical Family Potassium Salts of Fluorine and Boron		Formula K-F-B in H <sub>2</sub> O	

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## SECTION II HAZARDOUS INGREDIENTS AND DECOMPOSITION PRODUCTS\*

Flux Ingredients***	CAS#	%	Exposure** Limits	Possible Brazing Hazardous Decomposition Products	CAS#	Observed Emission Max. mg/g	Exposure** Limits
Potassium Fluoride Borate Hydroxide, Solids K <sub>2</sub> B <sub>3</sub> O <sub>3</sub> (OH) <sub>4</sub>	12228-71-6	50-70	2.5 <sup>1</sup> ACGIH 2.5 <sup>1</sup> OSHA	Boron Trifluoride, Gas BF <sub>3</sub> (Trifluoro Borane)	7637-07-2	-	C1 2 ACGIH C1 2 OSHA
Potassium Hydroxide, Soln. KOH	1310-58-3	.05-.9	C2 <sup>1</sup> ACGIH None OSHA	Hydrogen Fluoride, Gas HF (Hydrofluoric Acid)	7664-39-3	-	C3 2 ACGIH 3 2 OSHA
Potassium Fluoride, Soln. KF(asF)	7789-23-3	5-20	2.5 <sup>1</sup> ACGIH 2.5 <sup>1</sup> OSHA 2.5 <sup>1</sup> NIOSH	Potassium Fluoride, Fume KF (asF)	7789-23-3	7.	2.5 <sup>1</sup> ACGIH 2.5 <sup>1</sup> OSHA 2.5 <sup>1</sup> NIOSH
Water H <sub>2</sub> O	7732-18-5	20-35	None ACGIH None OSHA	Boron Oxide, Fume B <sub>2</sub> O <sub>3</sub>	1303-86-2	3.5	10.1 ACGIH 15.1 OSHA
<b>Flux Mixture (Total)</b>		<b>100</b>	<b>3.8<sup>1</sup> ACGIH</b> <b>None OSHA</b>				

\*Thought should also be given to the filler metal and the base metals being joined and to possible base metal coating which could emit fumes on heating, depending on their particular chemistry. Hazardous products of combustion, e.g. NO<sub>2</sub>, O<sub>3</sub> & CO may also be produced by the heating source.

\*\*American Conference of Governmental Industrial Hygienists-Threshold Limit Value-Time weighted Average per 8 hour workday or Short Term Exposure Limit.  
Occupational Safety and Health Administration-Permissible-Exposure Limit, 8 hour.  
National Institute for Occupational Safety and Health-REL, 10 hour day TWA or STEL.  
<sup>1</sup>Approximate milligrams of substance per cubic meter of air or <sup>2</sup>parts per million.  
C Denotes "Ceiling Limit" - not to be exceeded at any time.  
See ANSI/AWS Fl.1, Fl.4, Fl.5 & NIOSH Criteria Documents for Air Sampling & Testing Methods.

\*\*\*None of the ingredients of this product are classified as toxic by EPA in 40 CFR 372.65 and are not subject to reporting requirements of SARA Title III section 313 and 40 CFR 372.45

## SECTION III PHYSICAL DATA

Boiling Point	Slightly above 212°F	Specific Gravity (H <sub>2</sub> O = 1)	1.67 (approx)
Solubility in Water	Soluble	Melting Temperature (approx)	1050°F
Appearance and Odor	White paste, No odor	pH (paste)	8.0-8.5
		pH (fused)	5.5 (approx)

## SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash Point (method used) - Not applicable | Flammable Limits - Not Applicable | Lel, Uel - N.A.

Extinguishing Media - Water

Special Fire Fighting Procedures - None Known

Unusual Fire and Explosion Hazards - None Known, Not Flammable to Explosive

NFPA Hazard Rating: Health 2, Flammability 0, Reactivity 1

CERCLA Hazard Rating: Health 2, Flammability 0, Reactivity 0

SARA Hazard Category: Acute Health Hazard-Yes; Chronic Health Hazard-No; Fire Hazard-No; Sudden Release of Pressure Hazard-No; Reactive Hazard-No

*Stamp:* FACILITIES MANAGEMENT, APR 26 1990, CITY SCHOOL DISTRICT

MAJOR EXPOSURE HAZARD - INHALATION OF FLUORIDE GASES

CUMULATIVE LIMITS: Welding (Brazing) Fumes - Total Particulate (C<sub>1</sub> + C<sub>2</sub> + ... C<sub>N</sub>) ≤ 5 mg/m<sup>3</sup> (C=Concentration, T=TLV). C<sub>1</sub>/T<sub>1</sub> + C<sub>2</sub>/T<sub>2</sub> + ... C<sub>N</sub>/T<sub>N</sub> ≤ 1) (See Section IX - Other Precautions)

EFFECTS OF OVEREXPOSURE: Fluorides are poisonous if swallowed - (TXDS-ori-rat LD50: 245 mg/kg Lethal oral dose infants 2-3 grams, adults 2-5 grams, KOH is both toxic (TXDS-ori-rat LD50: 365 mg/kg) and an irritant. Prolonged contact may cause dermatitis. Overexposure to BF<sub>3</sub> gas on heating is toxic (TXDS-ihl-rat LCLo: 750ppm 5.5h). HF gas on heating is toxic. (TXDS-ihl-hmm LCLo; 50ppm, 30m.) (TXDS-ihl-rat LC50 1276 ppm, 1h dry). B<sub>2</sub>O<sub>3</sub> is an irritant (IRDS-skn-rbt;lgm). None of the ingredients or by product have been determined to be carcinogenic, teratogenic or mutagenic as reported by ACGIH, EPA, NTP, IARC, OSHA and NIOSH.

EMERGENCY & FIRST AID PROCEDURE: Remove victim from contaminated area. Administer oxygen. Call a doctor. Give artificial respiration if breathing has stopped. If swallowed, induce vomiting. Never give anything by mouth to an unconscious person; Wash exposed skin or eyes with large quantities of water. See attached Chemical Fact Sheets.

SECTION VI REACTIVITY DATA

STABILITY: Stable at room temperature. Decomposes at brazing temperature. (See Section II;

Conditions to avoid; Overheating (See Section IX)

INCOMPATIBILITY: None Known

HAZARDOUS POLYMERIZATION: Will not occur

Conditions to avoid; None known

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Avoid contact with skin or eyes. Dilute and wash spillage with water. Avoid high temperature. Wear rubber gloves during spill clean-up. CERCLA RQ (40CFR, 302): none listed. RCRA Hazardous Waste No. (40 CFR, 261) = None.

WASTE DISPOSAL METHOD: All effluent ingredients are inorganic. Biodegradability N/A. Local regulations may require the removal of fluorides and suspended trace metals before discharge of final effluent. Chemical precipitation by addition of lime or other Calcium compounds, followed by Magnesium Hydroxide or Aluminum Sulfate; then removal of the precipitate by settling and/or filtration has proven simple and effective. The resulting precipitate containing Calcium Fluoride and Metal Carbonates, Sulfates or Hydroxides should be tested to determine if it is a hazardous waste, or, not. Dispose of only, through a licensed disposal firm, at a secure chemical landfill location. EPA 40 CFR, Part 141-recommended max. contamination level for primary drinking water is 4 mg/L Fluorine

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: None for brazing in properly ventilated area. In confined space use an airline respirator or hose mask, NIOSH. U. S. Bureau of Mines approved hose Type C or self-contained air respirator.

VENTILATION: LOCAL EXHAUST: Air flow to produce velocity of 100 lineal ft./min in brazing zone.

(for fumes & gases)

MECHANICAL: 2,000 cu. ft./min/brazer (see footnote)

NATURAL (MIN): 10,000 cu.ft./brazer - 16ft. ceiling - No obstructions

PROTECTIVE GLOVES: Leather welding gloves for brazing. Rubber gloves or protective hand cream for flux application.

EYE PROTECTION: Plastic frame safety spectacles with side shields-filter lenses shade #3 or #4.

OTHER PROTECTIVE EQUIPMENT: Normal clothing for torch brazing. (Avoid flammable fabrics).

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING, STORING AND USE: Avoid heating above recommended brazing temperature range. (1050-1600°F) as excessive fumes may result. Use sufficient Flux or Atmosphere to protect the filler metal and minimize oxidation and vaporization during brazing.

OTHER PRECAUTIONS: This flux is often used with brazing filler metals containing Cd. Cd Oxide fume (TLV=.05 mg/m<sup>3</sup>) is a greater hazard than fluoride fume from Flux. Zn Oxide fume may also be emitted from the filler metal during brazing. TLV=5. mg/m<sup>3</sup>). Products of combustion from torch or furnace may produce toxic NO<sub>2</sub>, O<sub>3</sub> & CO gases.

REFERENCE: Refer to "OSHA Standard 20 CFR 1910 from the U. S. Government Printing Office, Washington, D.C. 20402 and ANSI Standard Z49.1-Safety in Welding & Cutting," published by the American Welding Society, P.O. Box 351040, Miami, FL 33135.

SHIPPING REGULATIONS: Handy Flux is labeled "Keep Away From Food," Hazard Class 6.1 per 49 CFR, DOT and IATA; UN No. 1812, Potassium Fluoride Soln. CAS# 7789-23-3.

SODIUM FLUORIDE \*\*

The information in this sheet applies to workplace exposure resulting from processing, manufacturing, storing or handling and is not designed for the population at large. Any generalization beyond occupational exposures should not be made. The best industrial hygiene practice is to maintain concentrations of all chemicals at levels as low as is practical.

Chemical Names: CAS 7681-49-4.

Trade Names: Floridine, Florocid, T-Fluoride, Flure-Drops, Flursol, Karidium, Loride, Pergantene and others.

Uses: Insecticides for roaches and ants; in other pesticide formulae; in electroplating and glass manufacturing.

PHYSICAL INFORMATION

Appearance: Colorless crystals or white powder.

Behavior in Water: Very soluble.

HEALTH HAZARD INFORMATION

OSHA Standard: Average 8 hour exposure -- 2.5 mg/m<sup>3</sup> (total inorganic fluorides).

NIOSH Recommended Limit: Average 10 hour day/40 hour week exposure -- 2.5 mg/m<sup>3</sup> (total inorganic fluorides).

ACGIH Recommended Limit: Average 8 hour exposure -- 2.5 mg/m<sup>3</sup> (total inorganic fluorides).

Short Term Exposure:

Inhalation: May cause difficult breathing, burning of the mouth, throat and nose, which can result in bleeding. These may be felt at 7.5 mg/m<sup>3</sup>. Nausea, vomiting, profuse sweating and excess thirst may occur at higher levels.

Skin: May cause rash, itching and burning of skin. Solutions of 1% strength may cause sores if not removed promptly.

Eyes: May cause severe irritation.

Ingestion: Most reported instances of fluoride toxicity are due to accidental ingestion and it is difficult to associate symptoms with dose. 5 to 40 mg may cause nausea, diarrhea, and vomiting. More severe symptoms of burning and painful abdomen, sores in mouth, throat and digestive tract, tremors, convulsions and shock will occur around a dose of 1 gm. Death may result by ingestion of 2 to 5 grams.

Long Term Exposure:

Fluoride may increase bone density, stimulate new bone growth or cause calcium deposits in ligaments. This may become a problem at levels of 20 to 50 mg/m<sup>3</sup> or higher. Mottling of tooth enamel may also occur.

\*Prepared by the Bureau of Toxic Substance Assessment, New York State Department of Health. For an explanation of the terms and abbreviations used, see "Toxic Substances: How Toxic is Toxic" available from the New York State Department of Health.

\*\*POTASSIUM FLUORIDE SHOULD EXHIBIT SIMILAR EXPOSURE CHARACTERISTICS

EMERGENCY AND FIRST AID INSTRUCTIONS

Inhalation: Move victim to fresh air. Give artificial respiration, if necessary. If the nose is bleeding put absorbent material (like cotton) into the nasal openings. Do not pack the nostrils. Change the material often. Seek medical attention.

Skin: Remove soiled clothing. Wash skin with soap and water for at least 5 minutes, followed by a boric acid solution. Seek medical attention, if necessary.

Eyes: Wash eyes with slow, steady stream of water for at least 15 minutes, followed by a boric acid solution. Seek medical attention immediately.

Ingestion: Seek immediate medical attention. Give magnesium hydroxide gel, if conscious.

Note to Physician: Urinary fluoride excretion levels have been useful in evaluating industrial exposures to fluoride dusts.

FIRE AND EXPLOSION INFORMATION

General: Not flammable or explosive.

REACTIVITY

Materials to Avoid: Avoid acids. Reacts to form hydrogen fluoride, which is a highly corrosive and poisonous gas.

Conditions to Avoid: Avoid high temperatures. Compound will break down.

PROTECTIVE MEASURES

Storage and Handling: Store in a cool, dry area that is well ventilated. Protect from damage. Avoid acids.

Engineering Controls: Use only with an effective and properly maintained exhaust ventilation or with a fully enclosed process. Sinks, showers and eye wash stations should be readily available.

Protective Clothing (Should not be substituted for proper handling and engineering controls): If direct contact is possible, wear protective clothing, gloves and goggles.

Protective Equipment: For exposure up to 12.5 mg/m<sup>3</sup> use a dust mask. For up to 25 mg/m<sup>3</sup> use a supplied-air or self-contained breathing device. For up to 125 mg/m<sup>3</sup> use a supplied-air respirator with a facepiece, helmet or hood. For up to 250 mg/m<sup>3</sup> use a supplied-air device in pressure demand or other positive pressure or continuous flow mode. To escape a contaminated area use a gas mask with an organic vapor canister or a self-contained breathing device.

Miscellaneous: Remove any clothing that you think may have become chemically soiled and wash before reuse.

PROCEDURES FOR SPILLS AND LEAKS

Get all workers out of the spill area. Enter only with protective clothing and devices. Treat with soda ash or slaked lime. Neutralize with weak hydrochloric acid. Use an industrial vacuum cleaner to remove the spill. Clean up with soap and water is allowed only if exposure and contamination are not increased to above the recommended levels. For final disposal contact your regional office of the New York State Department of Environmental Conservation.

For more information: Contact the Industrial Hygienist or Safety Officer at your worksite or the New York State Department of Health, Bureau of Toxic Substance Assessment, Empire State Plaza, Tower Building, Albany, New York 12237.

SODIUM HYDROXIDE\*\*

The information in this sheet applies to workplace exposure resulting from processing, manufacturing, storing or handling and is not designed for the population at large. Any generalization beyond occupational exposures should not be made. The best industrial hygiene practice is to maintain concentrations of all chemicals at levels as low as is practical.

Chemical Names: Caustic soda, sodium hydrate, white caustic; CAS 1310-73-2.

Trade Names: Ascarite, Collo-grillrein, Collo tapetta and others.

Uses: Used to neutralize acids; in the manufacture of rayon, cellophane, soap and others.

PHYSICAL INFORMATION

Appearance: A white solid in the form of flakes, pellets, cakes, chips or sticks.  
Also available as a clear, colorless water solution.

Odor: None.

Behavior in Water: Very soluble in water.

HEALTH HAZARD INFORMATION

OSHA Standard: Average 8 hour exposure -- 2 mg/m<sup>3</sup>.

NIOSH Recommended Limit: Average 8 hour exposure -- 2 mg/m<sup>3</sup>.

ACGIH Recommended Limit: Average 8 hour exposure -- 2 mg/m<sup>3</sup>.

Short Term Exposure:

Inhalation: Can cause severe irritation of the nose and throat and inflammation of the lungs.

Skin: Can cause deep burns and severe irritation.

Eyes: Can cause severe irritation, corneal burns and blindness.

Ingestion: Can cause burning of the mouth and throat, nausea, vomiting, abdominal pains and diarrhea (occasionally with blood). Can also cause swelling of the larynx and subsequent suffocation, holes in the stomach and intestines, heart failure, coma. Death has resulted from swallowing less than 1/3 ounce of the solid.

Long Term Exposure:

Skin irritation may develop from repeated exposure to the solid or low concentrations of the liquid. Irritation to the lungs, nose, throat and mouth may occur if exposed to low levels for long periods of time.

\*Prepared by the Bureau of Toxic Substance Assessment, New York State Dept. of Health. For an explanation of the terms and abbreviations used, see "Toxic Substances: How Toxic is Toxic" available from the New York State Department of Health.

\*\*POTASSIUM HYDROXIDE SHOULD EXHIBIT SIMILAR EXPOSURE CHARACTERISTICS

EMERGENCY AND FIRST AID INSTRUCTIONS

Inhalation: Get victim to fresh air. Give artificial respiration, if necessary. Seek medical attention.

Skin: Wash contaminated area with running water until the "soapy" feeling disappears. Seek medical attention, if necessary.

Eyes: Wash eyes with running water for at least 15 minutes. Seek immediate medical attention.

Ingestion: Do not induce vomiting. Give large amounts of water or milk. Seek immediate medical attention. Note: Never force an unconscious person to drink.

Note to Physician: Dilute with water, milk or weak acid. Gastric lavage and emetics are contraindicated. As soon as pain and shock are controlled, presence or absence of esophageal injury should be determined.

FIRE AND EXPLOSION INFORMATION

General: Not flammable or explosive.

REACTIVITY

General: Extremely corrosive.

Materials to Avoid: Separate from acids, metals, explosives, organic peroxides and easily ignitable materials; contact may release heat and poisonous gases.

Conditions to Avoid: When the solid comes in contact with moisture or water, it can generate enough heat to ignite combustible materials.

PROTECTIVE MEASURES

Storage and Handling: Store in a dry place. Protect container from water or moisture and against physical damage.

Engineering Controls: Use in an area that is dry or has a dehumidifier. Eye wash stations and showers should be readily available.

Protective Clothing (Should not be substituted for proper handling and engineering controls): If contact is likely wear rubber gloves, apron, boots and safety glasses.

Protective Equipment: For levels up to  $100 \text{ mg/m}^3$  use a high-efficiency particulate respirator with a full facepiece, a supplied-air respirator with a full facepiece, helmet or hood, or a self-contained breathing apparatus with a full facepiece. For up to  $200 \text{ mg/m}^3$  use a powered air-purifying respirator with a high-efficiency filter and full facepiece or a Type C supplied-air respirator with a full facepiece operated in pressure-demand or other positive pressure mode. For escape from a contaminated area use a dust and mist respirator or a self-contained breathing apparatus with a full facepiece.

PROCEDURES FOR SPILLS OR LEAKS

Wear protective clothing. For the solid, sweep into large vessel containing a large amount of water. Neutralize with weak hydrochloric acid. For solution, neutralize with weak hydrochloric acid. Pick-up with mop or water vacuum. For final disposal contact your regional office of the New York State Department of Environmental Conservation.

For more information:

Contact the Industrial Hygienist or Safety Officer at your worksite or the New York State Department of Health, Bureau of Toxic Substance Assessment, Empire State Plaza, Tower Building, Albany, New York 12237.