Material Safety Data Sheet

Part I: What is the material and what do I need to know in an emergency?

1. Product Identification

Trade Names (as labeled): Stay-silv white brazing flux; Dynaflow flux; Stay-silv black brazing flux; Stay-silv #99 powder brazing flux; Stay-silv white powder brazing flux

Synonyms: Stay-Silv Brazing Fluxes
Chemical Name/Class: Mixture of Potassium Borate and Fluoride Compounds.

Product Use: Metal-Working Operations
Document Number: 0134

Supplier/Manufacturer's Name: J.W. Harris Co., Inc. & Harris Welco Division/J.W. Harris Co.

Address: 1051 York Rd.
Kings Mountain, NC 28086

Emergency Phone: CHEMTREC: 1-800-424-9300
Business Phone: 704-739-6421

Date of Preparation: September 15, 1998

2. Composition and Information On Ingredients

Chemical Name	CAS#	%w/w	Exposure Limits In Air				
			ACGIH	OSHA			
			TLV	STEL	PEL	STEL	IDHL	Other
			Mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3
Stay-Silv White Brazing Flux; Dynaflow Flux								
Boric Acid (exposure limits are for Particulates Not Otherwise Classified)	10043-36-3	30-70%	10 (Inhalable Particulates) 3 (Respirable Particulates)	NE	15 (Total Dust) 5 (Respirable Fraction)	NE	NE	NE
Potassium Fluorides (exposure limits are for fluorides, as fluorine)	Proprietary	10-50%	2.5, A4 Not Classifiable as a Human Carcinogen) MAK: 2.5	NE	2.5 DFG	NE	NE	NIOSH REL:2.5
Water	7732-18-5	Balance	NE	NE	NE	NE	NE	NE

NE=Not Established C=Ceiling Limit See Section 16 for Definitions of Terms Used
NOTE: All WHMIS required information is included. It is located in appropriate sections based on the ANSI Z400.1-1993 format.

Stay-Silv Black Brazing Flux								
Potassium Borates (exposure limits are for Particulates Not Otherwise Classified)	50-75%	10(Inhalable Particulates) 3 (Respirable Particulates)	NE	15 (Total Dust) 5 (Respirable Fraction)	NE	NE	NE	

2. COMPOSITION AND INFORMATION ON INGREDIENTS (CONTINUED)

Chemical Name	CAS#	%w/w	Exposure Limits In Air

			ACGIH TLV Mg/m3	OSHA STEL mg/m3	PEL mg/m3	STEL mg/m3	IDHL mg/m3	Other mg/m3	
Stay-Silv Black Brazing Flux (Continued)									
Potassium Fluorides (exposure limits are for fluorides, as fluorine)		10-40%	2.5, A4 (not classifiable as a Human Carcinogen)	NE	2.5	NE	NE	NIOSH REL:2.5 DFG MAK:2.5	
Boric Acid (exposure limits are for Particulates Not Otherwise Classified)	10043-35-3	1-10%	10 (Inhalable (Particulates) 3 (Respirable Particulates)	NE	15 (Total Dust) 5 (Respirable Fraction)	NE	NE	NE	
Boron (exposure limits are for boron oxide)	7440-42-8	1-10%	10	NE	15 (Total dust) 10 (vacated 1989 PEL)	NE	2000	NIOSH REL:10 DFG MAK:15	
Water	7732-18-5	Balance	NE	NE	NE	NE	NE	NE	
Stay-Silv #99 Powder Brazing Flux									
Potassium Borates (exposure limits are for Particulates Not Otherwise Classified)		30-90%	10 (Inhalable (Particulates) 3 (Respirable Particulates)	NE	15(total dust) 5 (Respirable Fraction)	NE	NE	NE	
Boric Acid (exposure limits are for Particulates Not Otherwise Classified)	10043-35-3	Balance	10(Inhalable (Particulates) 3(Respirable (Particulates)	NE	15 (total dust) 5(Respirable Fraction)	NE	NE	NE	
Stay-Silv White Powder Brazing Flux									
Potassium Borates (exposure limits are for Particulates Otherwise Classified)		30-80%	10(Inhalable (Particulates) 3(Respirable Particulates)	NE	15(total dust) 5(Respirable Fraction)	NE	NE	NE	
Boric Acid (exposure limits are for Particulates Not Otherwise Classified)	10043-35-3	1-3%	10(Inhalable (Particulates) 3 (Respirable Particulates)	NE	15(total dust) 5(Respirable Fraction)	NE	NE	NE	
Copper Welting Agent		Balance	NE	NE	NE	NE	NE	NE	

NE=Not Established C=Ceiling Limit See Section 16 for Definitions of Terms Used.
NOTE: All WHMIS required information is included. It is located in appropriate sections based on the ANSI Z400. 1-1993 format.

3. Hazard Identification

EMERGENCY OVERVIEW: These fluxes have the following characteristics: STAY-SILV WHITE BRAZING FLUX/DYNAFLOW FLUX – white, odorless paste; STAY-SILV BLACK BRAZING FLUX – smooth, black odorless paste; STAY-SILV #99 POWDER BRAZING FLUX – fine, white powder with no odor; STAY-SILV WHITE POWDER BRAZING FLUX-fine, white, odorless powder. These fluxes and their decomposition products can moderately to severely irritate the skin, eyes, and any other contaminated tissue. These fluxes are neither flammable nor reactive under normal circumstances. If involved in a fire, the components of these products can decompose to release toxic gases. Emergency responders must wear the proper personal protective equipment suitable for the situation to which they are responding.

3. Hazard Identification (Continued)

SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE: The most significant routes of over-exposure for these fluxes are by contact with skin, eye contact, or inhalation. The symptoms of overexposure to these fluxes, via route of entry, are as follows:

Health (Blue) 2 Flammability (Red) 0 Reactivity (Yellow) 0 Protective Equipment X

Inhalation: If particulates of these fluxes are inhaled, they can moderately to severely irritate the nose, throat, and respiratory system. Symptoms of inhalation over-exposure may include coughing, sneezing, and difficulty breathing.

Contact With Skin or Eyes: Depending on the duration and concentration of over-exposure, skin contact with these fluxes can moderately to severely irritate the skin. Repeated or prolonged skin over-exposure to these fluxes may result in dermatitis (red, dry, itchy skin). Depending on the duration and concentration of over-exposure, eye contact with these fluxes can irritate the eyes. Eye over-exposure can cause tearing, redness, and tissue damage.

Skin Absorption: Hydrogen fluoride, a possible decomposition product of Stay-Silv White Brazing Flux/Dynaflow Flux and Stay-Silv Black Brazing Flux, is extremely corrosive and a poison by all routes of entry. Hydrogen fluoride can penetrate the skin and produce burns which may not be immediately painful or visible; the burns impact the lower layers of skin and bone tissue. Hydrogen fluoride exposures involving 20 percent of the body or more can be fatal through systemic fluoride poisoning.

Ingestion: Ingestion is not anticipated to be a likely route of occupational exposure for these fluxes. If these products are swallowed (especially in large amounts), it may irritate the mouth, throat, and other tissues of the digestive system. Initial symptoms may include thirst, stomach cramps, nausea, vomiting, and diarrhea. Later symptoms may include muscular weakness, convulsions, lethargy, irregular heartbeat, low blood pressure, diminished calcium, magnesium, and potassium in the blood, metabolic acidosis, albumin in the urine, kidney failure, cardiovascular collapse, respiratory arrest, and coma. Chronic ingestion over-exposure may cause mottling of tooth enamel and hardening or abnormal density of the bones. Chronic-overexposure of Boric Acid (a component of these fluxes) by ingestion can result in “borism” (dry skin, skin lesions, and gastrointestinal disturbances). Severe ingestion over-exposure may be fatal.

Injection: Though not anticipated to be a likely route of occupational exposure for these fluxes, injection (via punctures or lacerations by a contaminated object) may cause local reddening, tissue swelling, and discomfort in addition to the wound.

Health Effects or Risks from Over-Exposure: An Explanation in Lay Terms; Symptoms associated with over-exposure to these fluxes are as follows:

Acute: Symptoms of inhalation over-exposure may include coughing, sneezing, and difficulty breathing. Depending on the duration and concentration of over-exposure, skin contact with these fluxes can severely irritate the skin. Depending on the duration and concentration of over-exposure, eye contact with these fluxes can irritate the eyes. Severe ingestion over-exposure may be fatal.

Chronic: Repeated or prolonged skin over-exposure to these fluxes may result in dermatitis (red, dry, itchy skin). Chronic over-exposure to hydrogen fluoride (a possible decomposition product of Stay-Silv White Brazing Flux/Dynaflow Flux and Stay-Silv Black Brazing Flux) can cause fluorosis (weakening and degeneration of bone structure and possible heart, nerve, and intestinal problems). Chronic ingestion over-exposure may to these fluoride-containing fluxes cause mottling of tooth enamel and hardening or abnormal density of the bones. Refer to Section 11 (Toxicological information) for additional information regarding these fluxes and their components.

Target Organs: Skin, eyes, respiratory system.

Part II: What should I do if a hazardous situation occurs?

4. First-Aid Measures

Skin Exposure: If these fluxes or their decomposition products irritate the skin, begin decontamination with running water. Minimum flushing is for 15 minutes. Do not interrupt flushing. For Stay-Silv White Brazing Flux/Dynaflow Flux and Stay-Silv Black Brazing Flux: If necessary, apply calcium gluconate gel (2.5% concentration) after flushing is complete.

See Section 11 (Toxicological Information, Recommendations to Physicians) for more information on the use of calcium gluconate gel. Remove exposed or contaminated clothing, taking care not to contaminate eyes. Victim must seek medical attention if any adverse reaction occurs.

Eye Exposure: If these fluxes enter the eyes, open victim's eyes while under gently running water. Use sufficient force to open eyelids. Have victim "roll" eyes. Minimum flushing is for 15 minutes. Do not interrupt flushing. Victim must seek immediate medical attention.

Inhalation: If particulates of these fluxes are inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Victim must seek medical attention if any adverse reaction occurs.

Ingestion: If these fluxes are swallowed, CALL PHYSICIAN OR POSION CONTROL CENTER FOR MOST CURRENT INFORMATION. If professional advice is not available, do not induce vomiting. Victim should drink milk, egg whites, or large quantities of water. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions or unable to swallow.

Victims of chemical exposure must be taken for medical attention. Rescuers should be taken for medical attention if necessary. Take copy of label and MSDS to health professional with victim. Medical professionals should refer to See Section 11 (Toxicological Information, Recommendations to Physicians) for more information.

5. Fire-Fighting Measures

Flash Point: Not flammable.
Autoignition Temperature: Not applicable
Flammable Limits (in air by volume, %): Lower (LEL): Not Applicable.
Upper (UEL): Not Applicable.
Fire Extinguishing Materials: These fluxes are not flammable. Use extinguishing media appropriate for surrounding fire.

Water Spray: YES (for cooling) Carbon Dioxide: YES
Halon: YES Foam: YES
Dry Chemical: YES Other: Any "ABC" Class.

Unusual Fire and Explosion Hazards: This product can moderately to severely irritate contaminated skin, and presents a potential contact hazard to firefighters. During a fire, irritating and toxic gases (e.g., hydrogen fluoride, potassium oxides, fluorine, and boron compounds) may be generated.

Explosion Sensitivity to Mechanical Impact: Not sensitive.
Explosion Sensitivity to Static Discharge: Not sensitive.

Special Fire-Fighting Procedures: Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Move containers from fire area if it can be done without risk to personnel. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas.

6. Accidental Release Measures

Spill and Leak Response: Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a spill, clear the affected area, protect people, and respond with trained personnel.

In the event of an incidental release of these fluxes, personnel should wear gloves, safety glasses (or goggles), and face shield during clean up. In the event of a non-incidental release, minimum Personal Protective Equipment should be Level B: triple-gloves (rubber gloves and nitrile gloves over latex gloves), chemical resistant suit and boots, hard-hat, and Self-Contained Breathing Apparatus. Wipe-up or sweep-up spilled material carefully, avoiding the generation of airborne dust. Decontaminate the area thoroughly. Place all spill residue in a suitable container and seal. Dispose of in accordance with applicable U.S. Federal, State, or local procedures and appropriate Canadian standards (see Section 13, Disposal Considerations).

For Stay-Silv White Brazing Flux/Dynaflow Flux and Stay-Silv Black Brazing Flux: DUE TO THE PRESENCE OF FLUORIDE COMPONENTS, DO NOT STORE RESIDUE IN GLASS. ALSO, AVOID THE USE OF CLAY OR OTHER ILICATE-BASED ABSORBENTS.

Part III: How can I prevent hazardous situations form occuring?

7. Handling and Storage

Work Practices and Hygiene Practices: As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Do not eat, drink, smoke, or apply cosmetics while handling this product. Avoid breathing particulates generated by this product. Remove contaminated clothing immediately.

Storage and Handling Practices: All employees who handle this material should be trained to handle it safely. Empty containers may contain residual material; therefore, empty containers should be handled with care.

Store these fluxes in a cool, dry location, away from direct sunlight, sources of intense heat. Store away from incompatible chemicals (see Section10, Stability and Reactivity). Material should be stored in secondary containers or in a dlked area, as appropriate. Storage and use areas should be covered with impervious materials. Keep container tightly closed when not in use. Inspect all incoming containers before storage to ensure they are properly labeled and not damaged. For Stay-Silv White Brazing Flux/Dynaflow Flux and Stay-Silv Black Brazing Flux: Do not store in glass, or permit material to be stored in silicate-based material.

Protective Practices During Maintenance of Contaminated Equipment: Follow practices indicated in Section 6 (Accidental Release Measures). Make certain that application equipment is locked and tagged out safely. Collect all reinstaes and dispose of according to applicable U.S. Federal, State, or local procedures and appropriate Canadian standards.

8. Exposure Controls – Personal Protection

Ventilation and Engineering Controls: Use with adequate ventilation to ensure exposure levels are maintained below the limits provided in Section 2 (Composition and Information on Ingredients). Exhaust directly to the outside, taking necessary precautions for environmental protection. Prudent practice is to ensure eyewash/safety shower stations are available near areas where these fluxes are used.

Respiratory Protection: Maintain airborne contaminant concentrations below guidelines listed in Section 2 (Composition and Information on Ingredients) if applicable. If respiratory protection is needed, use only protection authorized in 29 CFR 1910.134 or applicable State regulations. Use supplied air respiration protection if oxygen levels are below 19.5% or are unknown. The following respiratory protection guidelines are provided for Fluorides (e.g., Potassium Fluorides, components of these fluxes):

8. Exposure Controls – Personal Protection (continued)

Concentration	Respiratory Protection
Up to 12.5 mg/m3	Dust and mist respirator.
Up to 25 mg/m3	Dust and mist respirator except single-use and quarter-mask respirator*or Supplied Air Respirator (SAR)*.
Up to 62.5 mg/m3	SAR operated in a continuous-flow mode* or powered air-purifying respirator with dust and mist filter(s)*++.
Up to 125 mg/m3	Full-facepiece respirator with high-efficiency particulate filter(s) ++, full-facepiece Self-Contained Breathing Apparatus, of full-facepiece SAR.
Up to 250 mg/m3	Positive pressure, full-facepiece SAR.

EMERGENCY OR PLANNED ENTRY INTO UNKNOWN CONCENTRATION OR IDLH CONDITIONS: Positive pressure, full-facepiece SCBA or positive pressure, full-facepiece SAR with an auxiliary positive pressure SCBA.

Excape: Full-facepiece respirator with high-efficiency particulate filter(s)++or escape type SCBA.
*Note: Substance reported to cause eye irritation or damage; may require eye protection.
++Note: May need acid gas sorbent.

Eye Protection: Safety glasses or goggles.
Hand Protection: Wear natural rubber, neoprene, or nitrile rubber gloves for routine Industrial use.
Body Protection: None needed for normal circumstances of use. Use body protection appropriate for task (i.e., apron, coveralls, chemical resistant boots).

9. Physical and Chemical Properties

Relative Vapor Density (air = 1): Not applicable Evaporation Rate (nBuAc=1): Not applicable.
Specific Gravity (water = 1): 1.5-1.7 Freezing/Melting Point: Not applicable.
Solubility in Water: Moderately soluble. Boiling Point: Not applicable.
Vapor Pressure, mm Hg @ 24°C: Not established. PH: Not applicable.
Odor Threshold: Not applicable.
Coefficient of oil/water distribution (partition coefficient): Not established.
Appearance and Color: Stay-Silv White Brazing Flux/Dynaflow Flux – white, odorless paste; Stay-Silv Black Brazing Flux – smooth, black, odorless paste; Stay-Silv #99 Powder Brazing Flux – fine, white powder with no odor; Stay-Silv White Powder Brazing Flux – fine, white, odorless powder.
How To Detect These Substances (warning properties): The appearance may act as a distinguishing characteristic of these fluxes.

10. Stability and Reactivity

Stability: Stable

Decomposition Products: Hydrogen fluoride, fluorine, and boron and potassium compounds.

Materials With Which Substance Is Incompatible: Strong oxidizers, strong acids, reactive interhalogens. For Stay-Silv White Brazing Flux/Dynaflow Flux and Stay-Silv Black Brazing Flux: Due to the presence of fluoride components, avoid contact with silicate-based materials.

Hazardous Polymerization: Will not occur.

Conditions To Avoid: Extreme temperatures, moisture, incompatible materials.

Part IV: Is there any other useful information about this material?

11. Toxicological Information

Toxicity Data: Presented below are human toxicological data available for the components of these fluxes present in concentration greater than 1%. Other data for animals are available for the components of these products, but are not presented in this Material Safety Data Sheet.

Boric Acid:
Skin Irritancy (human) = 15 mg/3 days/intermittent, mild
LD (oral, human) = 37 mg/kg/boron as boric acid
TDLo (skin, infant) = 210 mg/kg/boron as boric acid
TDLo (oral, child) = 500 mg/kg; gastrointestinal effects
LDLo (oral, man)= 429 mg/kg; cardiovascular, systemic effects
LDLo (oral, woman) = 200 mg/kg
TDLo (oral, infant) = 800 mg/kg/4 weeks/intermittent
LDLo (oral, infant) = 934 mg/kg

Boric Acid (continued):
LDLo (skin, infant) = 1200 mg/kg
LDLo (skin, child) = 4000 mg/kg/4 days
LDLo (skin, man) = 2430 mg/kg
LDLo (skin, child) = 1500 mg/kg
LDLo(subcutaneous, infant) = 1100mg/kg
LDLo (unreported, man) = 170 mg/kg; Gastrointestinal effects
LDLo (unreported, man) = 147 mg/kg

Suspected Cancer Agent: The components of these fluxes are not found on the following lists: FEDERAL OSHA Z LIST, NTP, IARC, AND CAL/OSHA, and therefore are not considered to be, nor suspected to be, cancer causing agents by these agencies.

Irritancy of Product: These fluxes can moderately to severely irritate contaminated tissue.

Sensitization To The Product: No component of these fluxes is known to be a sensitizer with prolonged or repeated use.

Reproductive Toxicity Information: Listed below is information concerning the effects of these fluxes on the human reproductive system.

Mutagenicity: These fluxes are not reported to produce mutagenic effects in humans. Animal mutation data are available for Boric Acid (a component of these fluxes); these data were obtained during clinical studies on specific animal tissues exposed to high doses of this compound.

Embryotoxicity: These fluxes are not reported to produce embryotoxic effects in humans.

Teratogenicity: These fluxes are not reported to cause teratogenic effects in humans.

Reproductive Toxicity: These fluxes are not reported to cause reproductive effects in humans. Clinical studies on test animals exposed to relatively high doses of Boric Acid (a component of these fluxes) indicate adverse reproductive effects.

A mutagen is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generational lines. An embryotoxin is a chemical which causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A teratogen is a chemical which causes damage to a developing fetus, but the damage does not propagate across generaational lines. A reproductive toxin is any substance which interferes in any way with the reproductive process.

Biological Exposure Indices: Currently there are Biological Exposure Indices (BEIs) associated with Potassium Fluorides (a component of these fluxes), as a fluoride.

Chemical Determinant	Sampling Time	BEI
Fluorides		
Fluorides in urine	Prior to shift	3 mg/g creatinlne
	End of shift	10 mg/g creatinine

11. Toxicological Information (continued)

Medical Conditions Aggravated By Exposure: Dermatitis, other skin disorders, and respiratory conditions may be aggravated by over-exposure to these fluxes.

Recommendations to Physicians: Treat symptoms and eliminate over-expousre. For Stay-Silv Whie Brazing Flux/Dynaflow Flux and Stay-Silv Black Brazing Flux: In the event of over-exposure to these fluxes, all personnel providing treatment must be gloved. If there are indications that a victim is suffering from the effects of fluoride over-exposure, the treatment recommendations for contamination are as follows:

Skin Contact: After 15 minute water flush (if flush has not yet been done), apply calcium gluconate gel (2.5% concentration) until pain has subsided, but not longer than 30 minutes. If pain lasts longer than 15 minutes, proceed with calcium gluconate injections.

Eye Contact: After 15 minutes water flush (if flush has not been done), flush eyes with 1% calcium gluconate gel in normal, sterile saline.

Inhalation: Provide 100% oxygen, followed by inhalation of a mist containing 2.5% calcium gluconate in saline solution. Watch for pulmonary edema.

Ingestion: Gastric lavage with lime water or milk.

12. Ecological Information

All work practices must be aimed at eliminating environmental contamination.

Environmental Stability: The components of these fluxes will slowly decompose under normal environmental conditions into a variety of inorganic compounds.

Effect of Material On Plants or Animals: These fluxes can be harmful to plant and animal life. Specific data on test animals are available, but are not presented in this Material Safety Data Sheet.

Effect of Chemical on Aquatic Life: Large releases of these fluxes may be harmful or fatal to exposed aquatic life.

The following Aquatic Toxicity Data Are Available.

Boric Acid:
LC50 (trout eggs) = 100 ppm/soft
LC50 (trout eggs) = 79 ppm/hard
LC50 (catfish eggs) = 155 ppm/soft
LC50 (catfish eggs) = 22 ppm/hard

Boric Acid (continued)
LC50 (goldfish eggs) = 46 ppm/soft
LC50 (goldfish eggs) = 75 ppm/hard
LC50 (Daphnia magna) = 133 mg/L/48 hours

13. Disposal Considerations

Preparing Wastes For Disposal: Waste disposal must be in accordance with appropriate U.S. Federal, State, and local regulations or with regulations of Canada and its Provinces. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority.

14. Transportation Information

THIS MATERIAL IS NOT HAZARDOUS (PER 49 CFR 172.101) BY THE U.S. DEPARTMENT OF TRANSPORTATION.

Proper Shipping Name: Not applicable
Hazard Class Number and Description: Not applicable
Un-identification Number: Not applicable
Packing Group: Not applicable
DOT Label(s) Required: Not applicable

North American Emergency Response Guidebook Number (1996): Not applicable.

Marine Pollutant: The components of these fluxes are not designated by the Department of Transportation to be Marine Pollutants (49 CFR 172.101, Appendix B).

Transport Canada Transportation of Dangerous Goods Regulations: This material is considered as dangerous goods. Refer to above information for Canadian shipments.

15. Regulatory Information
Additional U.S. Regulations:

U.S. SARA Reporting Requirements: The components of these fluxes are not subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act.

U.S. SARA Threshold Planning Quantity: Not applicable.

U.S. Cercla Reportable Quantity (RQ): Not applicable.

U.S. TSCA Inventory Status: The components of these fluxes are listed on the TSCA Inventory.

U.S. State Regulartory Information: Components of these fluxes are covered under specific State regulations , as denoted below:

Alaska: Designated Toxic and Hazardous Substances: No
California: Permissible Exposure Limits for Chemical Contaminants: No
Florida: Substance List: No
Illinois: Toxic Substance List: No
Kansas: Section 302/313 List: No
Massachusetts: Substance List: No
Michigan: Critical Materials Register: No
Minnesota: List of Hazardous Substances: No
Missouri: Employer Information/Toxic Substance List: Potassium Fluorides
New Jersey: Right to Know Hazardous Substance List: Potassium Fluorides
North Dakota: List of Hazardous Chemicals, Reportable Quantities: No
Pennsylvania: Hazardous Substance List: No
Rhode Island: Hazardous Substance List: No
Texas: Hazardous Substance List: No
West Virginia: Hazardous Substance List: No
Wisconsin: Toxic and Hazardous Substances: No

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSTION 65):
No component of these fluxes is on the California Proposition 65 lists.

ANSI LABELING (Z129.1): **WARNING!** MAY BE HARMFUL OR FATAL IF SWALLOWED. IRRITATING INHALED. CAUSES SKIN AND EYE IRRITATION. MAY CONTIAN FLUORIDES. PROTECT YOURSELF AND OTHERS. KEEP AWAY FROM GLASS AND SILICATES. FUMES AND GASES CAN BE HAZARDOUS TO HEALTH AND CAN BURN EYES AND SKIN ON CONTACT. Keep out of reach of children. Do not taste or swallow. Do not get on skin or in eyes. Avoid breathing fumes or particulates. Keep head away from fumes. Use enough ventilation, exhaust or arc, or both, to keep fumes and gases from breathing zone and general area. Keep container closed when not in use. Avoid contact with glass and silicate compounds. Wash thoroughly after handling. Wear gloves, goggles, face-shields, suitable body protection, and NIOSH/MSHA-approved respiratory protection, as appropriate. For maximum safety, be certified for and wear a respirator at all times when brazing. See American National Standard Z49.1, Safety in Welding, Cutting, and Allied Processes,

published by the American Welding Society, 500 NW LeJeune Rd., Miami, FL 33126. Also see OSHA Safety and Health Standards, 29 CFR 1910, available from the US Government Printing Office, Washington DC, 20402. FIRST-AID: in case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. If inhaled, remove to fresh air. If ingested, do not induce vomiting. Get medical attention. IN CASE OF FIRE: Use water fog, dry chemical, CO2, or "alcohol" foam. IN CASE OF SPILL: Wipe-up or sweep-up spilled powder carefully. Place residue in suitable container and seal. Avoid contact with silicate-based material. Consult Material Safety Data Sheet for additional information.

ADDITIONAL CANADIAN REGULATIONS:
CANADIAN DSL/NDSL INVENTORY STATUS: The components of these fluxes are listed on the NDSL/DSL Inventory.
OTHER CANADIAN REGULATIONS: Not applicable.
CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS: The components of these fluxes are not on the CEPA Priorities Substances Lists, as follows: Potassium Fluoride (as in organic fluoride) Priority List 1, Toxic Material.
CANADIAN WHMIS SYMBOLS: D2B Materials Causing Other Toxic Effects.

16. OTHER INFORMATION

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619/565/0302

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This Material Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard (29 CFR 1910.1200). Other government regulations must be reviewed for applicability to these fluxes. The information contained herein relates only to the specific product. If the product is combined with other materials, all component properties must be considered. To the best of the J.W. Harris Company, Inc's knowledge, the information and recommendations contained in this publication are reliable and accurate as the date of issue. However, accuracy, suitability, or completeness are not guaranteed, and no warranty, guarantee, or representation, expressed or implied, is made by J.W. Harris Co., Inc. as to the absolute correctness or sufficiency of any representation contained in this and other publication: J.W. Harris Co., Inc. assumes no responsibility in connection therewith; nor can it be assumed that all acceptable safety measures may not be required under particular or exceptional conditions or circumstances. Data may be changed from time to time. Be sure to consult the latest edition.

DEFINITIONS OF TERMS
A large number of abbreviations and acronyms appear on a MSDS. Some of these which are commonly used include the following:
CAS #: This is the Chemical Abstract Service Number which uniquely identifies each constituent. It is used as a unique identifier for the chemical.

EXPOSURE LIMITS IN AIR:
ACGIH – American Conference of Governmental Industrial Hygienists. A professional association which establishes exposure limits. TLV – Threshold Limit Value – an airborne concentration of a substance which represents conditions under which it is generally believed that nearly all workers may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour Time Weighted Average (TWA), the 15-minute Short Term Exposure Limit, and the instantaneous Celling Level (C). Skin absorption effects must also be considered. OSHA – U.S. Occupational Safety and Health Administration. PEL- Permissible Exposure Limit – This exposure value means exactly the same as a TLV, except that it is enforceable by OSHA. The OSHA Permissible Exposure Limits are based in the 1989 PELs and the June,

1993 Air Contaminants Rule (Federal Register: 58: 35338-35351 and 58: 40191). Both the current PELs and the vacated PELs are indicated. The phrase, "Vacated 1989 PEL" is placed next to the PEL which was vacated by Court Order. IDLH – Immediately Dangerous to Life and Health – This level represents a concentration from which one can escape within 30-minutes without suffering escape-preventing or permanent injury. The DFG – MAK is the Republic of Germany's Maximum Exposure Level similar to the U.S. PEL. NIOSH is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. Occupational Safety and Health Administration (OSHA). NIOSH issues exposure guidelines called Recommended Exposure Levels (RELs). When no exposure guidelines are established. NE is made for reference.

Hazard Ratings:
Hazardous Materials Identification System: This rating system was developed by the National Paint and Coating Association and has been adoped by industry to identify the degree of chemical hazards. Health Hazard: 0 (minimal acute or chronic exposure hazard); 1 (slight acute or chronic exposure hazard); 2 (moderate acute or significant chronic exposure hazard); 3 (severe acute exposure hazard: onetime overexposure can result in permanent injury and may be fatal); 4 (extreme acute exposure hazard; onetime overexposure can be fatal). Flammability Hazard: 0 (minimal hazard); 1 (materials that require substantial pre-heating before burning): 2 (combustible liquid or solids; liquids with a flash point of 38-93°C (100-200°F); 3 (Class IB and IC flammable liquids with flash points below 38°C (100°F); 4 (Class IA flammable liquids with flash points below 23°C (73°F) and boiling points below 38°C (100°F); Reactivity Hazard: 0 (normally stable); 1 (material that can become unstable at elevated temperature or which can react slightly with water); 2 (materials that are unstable but do not detonate or which can react violently with water); 3 (materials that can detonate when initiated or which can react explosively with water); 4 (materials that can detonate at normal temperatures or pressures). PPE Rating X: Special attention should be given to PPE selection.

National Fire Protection Association: Health Hazard: 0 (material that on exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials); 1 (materials that on exposure under fire conditions could cause irritation or minor residual injury); 2 (materials that on intense or continued exposure under fire conditions could cause temporary incapacitation or possible residual injury); 3 (materials that can on short exposure could cause serious temporary or residual injury); 4 (materials that under very short exposure causes death or major residual injury). Flammability Hazard and Reactivity Hazard: Refer to definitions for "Hazardous Materials Identification System.

Flammability Limits in Air:
Much of the information related to fire and explosion is derived from the National Fire Protection Association (NFPA). Flash Point – Minimum temperature at which a liquid gives off sufficient vapors to form an ignitable mixture with air. Auto ignition Temperature: The minimum temperature required to initiate combustion in air with no other source of ignition. LEL – the lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. UEL – the highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.

Toxicological Information:
Human and Animal Toxicology: Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. Definitions of some terms used in this section are: LD50 – Lethal Dose (solids & liquids) which kills 50% of the exposed animals; LC50 – Lethal Concentration (gases) which kills 50% of the exposed animals; ppm concentration expressed in parts of material per million parts of air or water: mg/m3 concentration expressed in weight of substance per volume of air; mg/kg quantity of material, by weight, administered to a test subject based on their body weight in kg. Other measures of toxicity include TDL0, the lowest dose to cause a symptom and LCL0 the lowest concentration to cause a symptom: TD0, LDL0, and LD0, or TC, TC0, LCL0, and LC0 the lowest dose (or concentratio) to cause lethal or toxic effects. Cancer Information: The souces are IARC – the International Agency for Research on Cancer; NTP – the National Toxicology Program. RTECS – the Registry of Toxic Effects of Chemical Substances, OSHA and CAL OSHA. IARC and NTP rate chemicals on a scale of decreasing potential to cause human cancer with rankings from 1 to 4. Subrankings (2A, 2B, etc.) are also used. Other Information: BEI – ACGIH Biological Exposure indices, represent the levels of

determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV. Ecological Information: EC is the effect concentration in water. BCF = Bioconcentration Factor, which is used to determine if a substance will concentrate in life forms which consume contaminated plant or animal matter. TL = median threshold limit; Coeffieint of Oil/Water Distribution is represented by log K and is used to assess a substance's behavior in the environment.

Regulatory Information:
This section explains the impact of various laws and regulations on the material. U.S. EPA is the U.S. Environmental Protection Agency. DOT is the U.S. Department of Transportation. SARA is the Superfund Amendments and Reauthorization Act. TSCA is the U.S. Toxic Substance Control Act. CERCLA (or Superfund) refers to the Comprehensive Environmental Response. Compensation and Liability Act. Labeling is per the American National Standards Institute (ANSI Z129.1). Canada: CEPA is the Canadian Environmental Protection Act. WHMIS is the Canadian Workplace Hazardous Materials Information System. TC us Transport Canada. DSL/NDSL are the Canadian Domestic/Non-Domestic Substances Lists.