### SECTION 1 - PRODUCT IDENTIFICATION

**Manufacturer:** J.W. HARRIS CO., INC. & HARRIS WELCO DIVISION/J.W. HARRIS CO.

**Address:** 1051 York Rd.; Kings Mountain, NC 28086

**Emergency Telephone No.:** CHEMTREC: 1-800-424-9300

**Information Telephone No.:** 704-739-6421

**Date Prepared:** November 16, 1998

### SECTION 2 - COMPOSITION AND INFORMATION ON INGREDIENTS

**STAY-SILV WHITE BRAZING FLUX; DYNAFLOW FLUX**

<table>
<thead>
<tr>
<th>Chemical</th>
<th>CAS #</th>
<th>% w/w</th>
<th>ACGIH TLV mg/m³</th>
<th>OSHA-TWA mg/m³</th>
<th>NIOSH REL mg/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boric Acid (exposure limits are for Particulates Not Otherwise Classified)</td>
<td>10043-35-3</td>
<td>30-70</td>
<td>10 (Particulates)</td>
<td>5 (Respirable Fraction)</td>
<td>15 (Total Dust)</td>
</tr>
<tr>
<td>Potassium Fluorides (exposure limits are for Fluorides, as Fluorides)</td>
<td>Proprietary</td>
<td>10-50</td>
<td>2,5,44 (Respirable Fractions) as a Human Carcinogen</td>
<td>2,5</td>
<td>TWA = 2,5</td>
</tr>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>Balance</td>
<td>NE</td>
<td>NE</td>
<td>NE</td>
</tr>
</tbody>
</table>

**STAY-SILV BLACK BRAZING FLUX**

<table>
<thead>
<tr>
<th>Chemical</th>
<th>CAS #</th>
<th>% w/w</th>
<th>ACGIH TLV mg/m³</th>
<th>OSHA-TWA mg/m³</th>
<th>NIOSH REL mg/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boric Acid (exposure limits are for Particulates Not Otherwise Classified)</td>
<td>10043-35-3</td>
<td>1-10</td>
<td>10 (Particulates)</td>
<td>5 (Respirable Fraction)</td>
<td>15 (Total Dust)</td>
</tr>
<tr>
<td>Potassium Fluorides (exposure limits are for Fluorides, as Fluorides)</td>
<td>Proprietary</td>
<td>10-40</td>
<td>2,5</td>
<td>2,5</td>
<td>TWA = 2,5</td>
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<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>Balance</td>
<td>NE</td>
<td>NE</td>
<td>NE</td>
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</tbody>
</table>

**STAY-SILV #99 POWDER BRAZING FLUX**

<table>
<thead>
<tr>
<th>Chemical</th>
<th>CAS #</th>
<th>% w/w</th>
<th>ACGIH TLV mg/m³</th>
<th>OSHA-TWA mg/m³</th>
<th>NIOSH REL mg/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potassium Borates (exposure limits are for Particulates Not Otherwise Classified)</td>
<td>Proprietary</td>
<td>50-70</td>
<td>10 (Particulates)</td>
<td>5 (Respirable Fraction)</td>
<td>15 (Total Dust)</td>
</tr>
<tr>
<td>Boron (exposure limits are for Boron)</td>
<td>7440-42-4</td>
<td>1-10</td>
<td>10</td>
<td>15 (Total Dust)</td>
<td>2,5 (Respirable Fraction)</td>
</tr>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>Balance</td>
<td>NE</td>
<td>NE</td>
<td>NE</td>
</tr>
</tbody>
</table>

**STAY-SILV WHITE POWDER BRAZING FLUX**

<table>
<thead>
<tr>
<th>Chemical</th>
<th>CAS #</th>
<th>% w/w</th>
<th>ACGIH TLV mg/m³</th>
<th>OSHA-TWA mg/m³</th>
<th>NIOSH REL mg/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potassium Borates (exposure limits are for Particulates Not Otherwise Classified)</td>
<td>Proprietary</td>
<td>30-50</td>
<td>10 (Particulates)</td>
<td>5 (Respirable Fraction)</td>
<td>15 (Total Dust)</td>
</tr>
<tr>
<td>Boron (exposure limits are for Boron)</td>
<td>7440-42-4</td>
<td>1-3</td>
<td>10 (Particulates)</td>
<td>5 (Respirable Fraction)</td>
<td>15 (Total Dust)</td>
</tr>
<tr>
<td>Copper Fusing Agents</td>
<td>Proprietary</td>
<td>Balance</td>
<td>NE</td>
<td>NE</td>
<td>NE</td>
</tr>
</tbody>
</table>

**WARNING: PRODUCT COMPONENTS PRESENT HEALTH AND SAFETY HAZARDS. READ AND UNDERSTAND THIS LITERATURE AND MATERIAL SAFETY DATA SHEET. ALSO FOLLOW YOUR EMPLOYER'S SAFETY PRACTICES. MATERIAL SAFETY DATA SHEETS ARE AVAILABLE FROM J.W. HARRIS CO., INC. & HARRIS WELCO DIVISION/J.W. HARRIS CO.**

**STAY-SILV BRAZING FLUXES**

**IMPORTANT!**

This is a condensed version of a Material Safety Data Sheet (MSDS). Read the full MSDS before using this product.

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CONTINUED FROM PAGE 1

CARCINOGENICITY STATUS: Chemicals in these fluxes are listed, as follows.

POTASSIUM FLUORIDES (as Fluoride): ACGLH-A4, Not Classifiable as to Human Carcinogenicity.

The other components of these fluxes are not found on the following lists: FEDERAL OSHA ZLIST, NTP, IARC, and CAL/OSHA, and therefore are not considered to be, nor suspected to be, cancer-causing agents by these agencies.

SECTION 4 - FIRST-AID MEASURES

SKIN: Begin decontamination with running water. Minimum flushing is for 15 minutes. Special Measures 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.

EYES: Flush eyes under gently running water. Minimum flushing is for 15 minutes.

INGESTION: Contact Physician or Poison Control Center for Most Current Information. If professional advice is not available, do not induce vomiting. Liquid should be ingested. Liquid may increase the amount of calcium in the body. Liquid should be ingested. Liquid may increase the amount of calcium in the body.

VAPOR PRESSURE: Not applicable, pH: Not applicable.

APPEARANCE AND COLOR: STAY-SILV WHITE BRAZING FLUX/DYNALOW FLUX - white, odorless paste; STAY-SILV BLACK BRAZING FLUX - smooth, black, odorless paste; STAY-SILV POWDER BRAZING FLUX - fine, white, odorless powder.

SECTION 5 - FIRE-FIGHTING MEASURES

FLASH POINT: Not applicable.

AUTOIGNITION TEMPERATURE: Not determined.

FLAMMABLE LIMITS: Not applicable.

FIRE EXTINGUISHING MATERIALS:
- Water Stream: YES (for cooling)
- Carbon Dioxide: YES
- Extinguishment by Mechanical Impact: Not applicable

EXPLOSION SENSITIVITY TO MECHANICAL IMPACT: Not applicable.

EXPLOSION SENSITIVITY TO STATIC DISCHARGE: Not sensitive.

FIRE HAZARDS: During a fire, irritant and toxic gases (e.g., hydrogen fluoride, potassium oxides, fluoride, and boron compounds) may be generated.

FIRE-FIGHTING PROCEDURES: Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Clear the affected area, protect people, and respond with trained personnel. Proper personal protective equipment must be worn. Place all spills in a suitable container and seal. Dispose of in accordance with applicable U.S. Federal, State, or local procedures and appropriate Canadian standards. Refer to Material Safety Data Sheet for detailed response information. Specific information for component products is below.

Special Measures 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 silicate-based absorbents.

SECTION 7. HANDLING AND STORAGE

All employees who handle these materials should be trained to handle them safely. Empty containers may contain residual product; therefore, empty containers should be handled with care. Store these fluxes in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Store away from incompatible chemicals (see Section 10). Stability and Reactivity. Materials should be stored in secondary containers, as appropriate. Storage and use areas should be covered with impervious material. Inspect all incoming containers before storage to ensure they are properly labeled and not damaged.

Special Instructions For Stay-Silv White Brazing Flux/Dynaflow Flux And Stay-Silv Black Brazing Flux: Do not store in, or permit material to be stored in, silicate-based material.

SECTION 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 9 (Composition and Information on Ingredients). Ensure eyewash/shower stations are available.

RESPIRATORY PROTECTION: If respiratory protection is needed, use only protection authorized in the U.S. Federal OSHA Standard (29 CFR 1910.134). Use appropriate U.S. State regulations, or the appropriate standards of Canada and its Provinces.

EYE PROTECTION: Safety glasses or goggles. Face shields may be needed if operations generate particulates.

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, chemically-resistant boots).

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

VAPOR DENSITY: Not applicable.

EVAPORATION RATE: Not applicable.

SPECIFIC GRAVITY (water = 1): 1.5-1.7.

FREEZING POINT: Not applicable.

SOLUBILITY IN WATER: Moderately soluble

BOILING POINT: Not applicable

VAPOR PRESSURE: Not applicable, pH: Not applicable.

APPEARANCE AND COLOR: STAY-SILV WHITE BRAZING FLUX/DYNALOW FLUX - white, odorless paste; STAY-SILV BLACK BRAZING FLUX - smooth, black, odorless paste; STAY-SILV POWDER BRAZING FLUX - fine, white, odorless powder.

SECTION 10. STABILITY AND REACTIVITY

STABILITY: Stable.

DECOMPOSITION PRODUCTS: Hydrogen fluoride, fluorine, and boron and potassium compounds.

MATERIALS OF WHICH PRODUCTS ARE INCOMPATIBLE: Strong oxidizers, strong acids, reactive inorganics. 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 POLYMORPHISMS: Will not occur.

SECTION 11. OTHER USEFUL INFORMATION

RECOMMENDATIONS TO PHYSICIANS: For Stay-Silv White 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 water or milk. For all other Components: Treat symptoms.

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. Refer to Material Safety Data Sheet for more specific information on waste disposal.

ADDITIONAL U.S. AND CANADIAN REGULATIONS: Various other U.S. Federal and State Standards (or those of Canada and its Provinces) may be pertinent to the safe use, storage, and disposal, and regulatory reporting requirements. Refer to the Material Safety Data Sheet for more specific Information.

TRANSPORTATION REGULATIONS:

Not regulated under current U.S. DOT regulations.
**STAY SILV® FLUX**

**IMPORTANT!** READ THIS MATERIAL SAFETY DATA SHEET BEFORE USING PRODUCT

---

**SECTION 1 - MATERIAL IDENTIFICATION**

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>J. W. HARRIS CO., INC.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>10930 Deerfield Rd., Cincinnati, OH 45242</td>
</tr>
<tr>
<td>Emergency Telephone No.</td>
<td>800-424-9300</td>
</tr>
<tr>
<td>Telephone No. for Info.</td>
<td>513-891-2000</td>
</tr>
<tr>
<td>Date Prepared</td>
<td>7/96 (SUPERSEDES 12/85)</td>
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**SECTION 2 - HAZARDOUS INGREDIENTS**

<table>
<thead>
<tr>
<th>INGREDIENT</th>
<th>CAS NUMBER</th>
<th>PEL MG/M3</th>
<th>TLV MG/M3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potassium Tetraborate</td>
<td>1332-77-0</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>Potassium Pentaborate</td>
<td>11128-29-3</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>Boric Acid as H3BO3</td>
<td>10043-35-3</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>Potassium Bifluoride (F)</td>
<td>7789-29-9</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
</tbody>
</table>

*C. W. A. is a copper wetting agent for Stay-Silv Powdeled Flux only.

Important: This section covers the materials from which the product is manufactured. Additional information about the fumes and gases produced during brazing with normal use of this product are covered in Section 6.

---

**SARA 313 SUPPLIER NOTIFICATION:** Individual fluxes covered by this MSDS may contain toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and of 40CFR 372. Refer to Section 2 for the CAS Number for each chemical ingredient.

---

**SECTION 3 - PHYSICAL AND CHEMICAL DATA**

These products are shipped as nonhazardous, nonflammable, nonexplosive, and nonreactive solid materials.

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Gravity</td>
<td>White 1.54</td>
</tr>
<tr>
<td>Boiling Point</td>
<td>760 mm Hg</td>
</tr>
<tr>
<td>Melting Point</td>
<td>N/A</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>N/A</td>
</tr>
<tr>
<td>Appearance and odor</td>
<td>Stay-Silv White Flux, GB 88 Flux, Auto Dispense Flux, and Dynaflow Flux are smooth white pastes with no odor. Stay-Silv Black Flux is a smooth block paste with no odor. Stay-Silv #99 Flux is a fine white powder with no odor. Stay-Silv Powdered Flux is a white powder with no appreciable odor.</td>
</tr>
</tbody>
</table>

---

**SECTION 4 - FIRE AND EXPLOSION DATA**


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**SECTION 5 - HEALTH HAZARD DATA**

EXPOSURE: Section 2 covers ingredients and exposure limits on brazing fluxes. See Section 6 for additional information. Actual exposure limits should be determined by monitoring the fume in the operator’s breathing zone.

PRIMARY ROUTE OF EXPOSURE: Inhalation of fume. Skin or eye contact is also possible.

POSSIBLE EFFECTS OF EXPOSURE: Fumes are irritating to skin, eyes, and the respiratory tract.

EMERGENCY FIRST AID: Remove from fume exposure. If breathing has stopped, perform artificial respiration. If swallowed, induce vomiting. Never give anything by mouth to an unconscious person. For skin contact, wash with water. For eye contact, immediately flush eyes for 15 minutes with plenty of water. Get medical aid immediately.

---

**NFPA HAZARD SIGNAL**

<table>
<thead>
<tr>
<th>Health</th>
<th>Stability</th>
<th>Flammability</th>
<th>Special</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

One recommended way to determine the composition and quantity of fumes and gases to which workers are exposed is to take an air sample in the workers’ breathing zone. See ANSIIAWSFl.1 available from the American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33126.

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**MATERIAL SAFETY DATA SHEET**

*STAY-SILV® WHITE BRAZING FLUX, STAY-SILV BLACK BRAZING FLUX, GB 88 FLUX, AUTO DISPENSE FLUX, STAY-SILV #99 SILVER BRAZING FLUX, POWDER, STAY-SILV POWDERED BRAZING FLUX, DYNAFLOW® FLUX*

---

**WARNING CONTAINS FLUORIDES.** Protect yourself and others. Read and understand this label.

FUMES AND GASES CAN BE DANGEROUS TO YOUR HEALTH. BURNS EYES AND SKIN ON CONTACT. CAN BE FATAL IF SWALLOWED.

Before use, read and understand the manufacturer’s instructions, Material Safety Data Sheet, (MSDS), and your employer’s safety practices.

Keep your head out of the fumes.

Use enough ventilation, exhaust at the work, or both, to keep fumes and gases from your breathing zone and the general area.

For maximum safety, be certified for and wear a respirator at all times when welding or brazing.

Avoid contact of flux with eyes and skin.

Do not take internally.

Keep out of reach of children.


The Material Safety Data Sheet for this product follows. The MSDS contains detailed safety and health information about possible hazards associated with use of this product. Additional MSDS are available from your employer or by contacting the J.W. Harris Co., Inc., Cincinnati, Ohio 45242.

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For maximum safety, be certified for and wear a respirator at all times when welding or brazing.

Avoid contact of flux with eyes and skin.

Do not take internally.

Keep out of reach of children.

CONTINUED FROM PAGE 1

OTHER HEALTH CONSIDERATIONS: Fluxes are used with brazing filler metals. When melted, these filler metals may produce fumes which are hazardous. Filler metals may contain cadmium. Fume generated during brazing with cadmium alloys may be toxic. Consult the material safety data sheets that pertain to these products.

CARCINOGENICITY NTP? NO IARC MONOGRAPHS? NO OSHA REGULATED? NO

SECTION 6 - REACTIVITY DATA HAZARDOUS DECOMPOSITION PRODUCTS

Brazing fumes cannot be classified simply. The composition and quantity are dependent upon the metal being brazed, the process, procedures and the filler metal used. Other conditions which also influence the composition and quantity of the fumes to which workers may be exposed include: coatings on the metal being soldered (such as paint, plating, or galvanizing), the amount of ventilation and the position of the operator's head with respect to the fume. The fume decomposition products generated may be different in percent and form from the ingredients listed in Section 2.

SECTION 7 - SPILL OR LEAK PROCEDURES

SPILL OR LEAK PROCEDURES: Large spills should be neutralized with a slaked lime-soda ash slurry. Follow Federal, State, and Local regulations for disposal.

SECTION 8 AND 9 - SPECIAL PROTECTION INFORMATION AND PRECAUTIONS

Read and understand the manufacturer's instructions and the precautionary label on the product. See American National Standard Z49.1, Safety in Welding, Cutting and Allied Processes, published by the American Welding Society, 550 N.W. LaJeune Rd., Miami, FL 33126 and U.S. Department of Transportation (DOT) Hazardous Materials Regulations (HMR), 49CFR1910, U.S. Government Printing Office, Washington, D.C. 20402 for more details on many of the following. VENTILATION-Use enough ventilation to keep the fumes below TLVs in the worker's breathing zone and the general area. Train the employee to keep his head out of the fumes. See ANSI/ASC Z49.1 Section 5. RESPIRATORY PROTECTION-Use respirable fume respirator or air supplied respirator when brazing in confined space or where local exhaust or ventilation does not keep exposure below TLV. EYE PROTECTION-Wear safety glasses, goggles or use face shield with filter lens of appropriate shade number (see ANSI/ASC Z49.1-Section 4.2). Provide protection screens and flash goggles, if necessary, to shield others. PROTECTIVE CLOTHING-Wear head and body protection which help to prevent injury from radiation, sparks, and flame. See ANSI Z49.1. At a minimum this includes gloves and a protective face shield or goggles, and may include arm protectors, aprons, hats, shoulder protection, as well as dark substantial clothing.

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D.O.T INFORMATION: Nonregulated substance

OUR PRODUCTS HAVE NO OZONE DEPLETING SUBSTANCES, (ODS).