MATERIAL SAFETY DATA SHEET
SILVER BRAZING ALLOYS

PRODUCT NAME: SILVER BRAZING ALLOYS
MANUFACTURER: SRA Soldering Products
25 Walpole Park S.
Walpole, MA 02081

T: 508-668-6044  F: 508-668-1622
EMERGENCY PHONE #: 1-800-424-9300 (CHEMTREC)

H.M.I.S. Information: HEALTH = 1  FLAMMABILITY = 0  REACTIVITY = 0

SECTION I - PRODUCT & USE

Common Name: Braze Alloys
CAS Number: See Below
Formula: See Attachment
Use: Joining metal components by brazing

Chemical Family: Mixture
Chemical Name: Mixture (See Attachment)
TSCA Compliant: Yes

SECTION II - COMPOSITION INFORMATION

<table>
<thead>
<tr>
<th>Hazardous Components</th>
<th>CAS NO.</th>
<th>OSHA PEL</th>
<th>ACGIH TLV</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>SILVER (Metal)</td>
<td>7440-22-4</td>
<td>0.01</td>
<td>0.1</td>
<td>NA</td>
</tr>
<tr>
<td>SILVER (soluble)</td>
<td>7440-22-4</td>
<td>0.01</td>
<td>0.01</td>
<td>NA</td>
</tr>
<tr>
<td>COPPER (dust)</td>
<td>7440-50-8</td>
<td>1.0</td>
<td>1.0</td>
<td>NA</td>
</tr>
<tr>
<td>ZINC (oxide)</td>
<td>1314-13-2</td>
<td>5.0</td>
<td>5.0 (fume)</td>
<td>NA</td>
</tr>
<tr>
<td>TIN (oxide)</td>
<td>7440-31-5</td>
<td>2.0</td>
<td>2.0</td>
<td>NA</td>
</tr>
<tr>
<td>NICKEL</td>
<td>7440-02-0</td>
<td>1.0</td>
<td>1.0</td>
<td>NA</td>
</tr>
<tr>
<td>MANGANANESE (fume asm)</td>
<td>7439-96-5</td>
<td>10</td>
<td>1.0</td>
<td>NA</td>
</tr>
</tbody>
</table>

SARA SECTIONS 313 SUPPLIER NOTIFICATION: Individual filler metals covered by this MSDS may contain the following toxic chemicals subject to the reporting requirements of Section 3134 of the Emergency Planning and Community Right-To-Know Act of 1986 and 40CFR 372. Copper, Manganese, Nickel, Silver and Zinc. Refer to Section 1 of this MSDS for the filler metal name and the percent by weight and Section 2 for the CAS number for each chemical.
| SILVER BRAZE 7 | 7 | 93 |
| SILVER BRAZE 9 | 9 | 53 | 38 |
| SILVER BRAZE 20 | 20 | 45 | 35 |
| SILVER BRAZE 25 | 25 | 52.5 | 22.5 |
| SILVER BRAZE 25SN2 | 25 | 40 | 33 | 2 |
| SILVER BRAZE 30 | BAg-20 | 30 | 38 | 32 |
| SILVER BRAZE 35 | 35 | 32 | 33 |
| SILVER BRAZE 38 | BAg-34 | 38 | 32 | 28 | 2 |
| SILVER BRAZE 40L | 40 | 30 | 30 |
| SILVER BRAZE 40 | 40 | 36 | 24 |
| SILVER BRAZE 40SN2 | BAg-28 | 40 | 30 | 28 | 2 |
| SILVER BRAZE 40NI2 | BAg-4 | 40 | 30 | 28 | 2 |
| SILVER BRAZE 40NI5 | 40 | 30 | 25 | 5 |
| SILVER BRAZE 45T | 45 | 27 | 25 | 3 |
| SILVER BRAZE 45 | BAg-5 | 45 | 30 | 25 |
| SILVER BRAZE 49NI4 | BAg-22 | 49 | 16 | 23 | 4.5 | 7.5 MN |
| SILVER BRAZE 50 | BAg-6 | 50 | 34 | 16 |
| SILVER BRAZE 50NI2 | BAg-24 | 50 | 20 | 28 | 2 |
| SILVER BRAZE 54 | BAg-13 | 4772 | 54 | 40 | 5 | 1 |
| SILVER BRAZE 56NI2 | BAg-13a | 4765 | 56 | 42 | 2 |
| SILVER BRAZE 56 | BAg-7 | 4763 | 56 | 22 | 17 | 5 |
| SILVER BRAZE 58 | 57.5 | 32.5 | 7 | 3 MN |
| SILVER BRAZE 60 | 60 | 25 | 15 |
| SILVER BRAZE 60SN10 | BAg-18 | 4773 | 60 | 30 | 10 |
| SILVER BRAZE 63 | BAg-21 | 4774C | 63 | 28.5 | 2.5 | 6 |
| SILVER BRAZE 65 | Bag-9 | 65 | 20 | 15 |
| SILVER BRAZE 65NI2 | 65 | 28 | 2 | 5 MN |
| SILVER BRAZE 72 | BAg-8 | 72 | 28 |
| SILVER BRAZE 75 | 75 | 22 | 3 |
| SILVER BRAZE 85 | BAg-23 | 4766 | 85 | 15 MN |
| TRIMETAL 40NI2 | BAg-4 | 40 | 30 | 28 | 2 |
| TRIMETAL 40NI5 | 40 | 30 | 25 | 5 |
| TRIMETAL 50NI2 | BAg-24 | 50 | 20 | 28 | 2 |

One way to determine the composition and quantity of fumes and gasses to which workers are exposed is to take an air sample in the workers breathing zone, See ANSI/AWS F1.1 available from the American Welding Society, 550 NW Laguna Rd., Miami FL, 33126.

**SECTION III - HAZARD IDENTIFICATION**

**Emergency Overview:**
These products are supplied in a paste-like form or paint in small containers and syringes and present minimal hazards to human health and the environment in the form and quantity in which they are supplied. However, during brazing and soldering operations the hazards outlined below should be taken into account

**Short-term effects:**
- May cause chemical and mechanical irritation to eyes.
- Prolonged or repeated skin contact of pastes may cause chemical irritation and reactions such as dry skin and dermatitis.
- Ingestion of these products may cause nausea, vomiting, and gastrointestinal irritation.
- Inhalation of dust or fumes generated from these products during brazing operations can cause respiratory irritation.
Chronic health effects:
Prolonged exposure to metal fumes during brazing operations can cause lung damage.

Copper: Copper dust and fumes may be irritating to the respiratory tract. Inhalation of the fume can result in symptoms of "Metal Fume Fever" (e.g., chills, fever and sweating). Ingestion of copper metal may cause gastrointestinal upset.

Manganese: Aerosol is irritating to the respiratory tract. Long term or repeated exposure could result in increased susceptibility to bronchitis, pneumonitis and neurologic, neuropsychiatric disorders (manganism).
Nickel: Ingestion of soluble nickel salts causes nausea, vomiting and diarrhea. Nickel is a known sensitizer and may produce allergic reactions.
- Nickel is classified by the European Commission as a Category 3 carcinogen: limited evidence of carcinogenic effect.
- Nickel is classified by the International Agency for Research on Cancer (IARC) as a Group 2B carcinogen: Probably carcinogenic to humans.
- Nickel is classified by the National Toxicology Program as reasonably anticipated to be a human carcinogen.

Silver: Inhalation of fumes and dust may cause kidney injury. Prolonged and exposures may cause localized blue-gray discoloration of the eyes, skin or mucous membranes.

Tin: Prolonged or repeated inhalation of dust or fume may cause a lung condition called stannosis, which is reported not to be disabling. High concentrations of tin may damage the liver and kidneys. High exposure can affect the central nervous system.

The State of California requires the following information for products containing Nickel:

WARNING: This product contains a chemical known to the State of California that may cause cancer.

SECTION IV - FIRST AID MEASURES

EMERGENCY AND FIRST AID PROCEDURES

Inhalation 
Remove from dust or fume exposure. If breathing has stopped, perform artificial respiration. Summon medical aid immediately.

Eyes 
Flush eyes with plenty of water. If irritation develops, call a physician.

Skin 
Flush with plenty of water. If irritation persists, call a physician.

Ingestion 
Procedures normally not needed. If large quantities are ingested, seek medical advice

Primary Routes of Entry into Body 
Fume inhalation

Copper and Zinc fume may cause fume fever. Short term symptoms may include a metallic taste in the mouth, dryness or irritation of the throat, followed by coughing, shortness of breath, nausea, fever, body ache, and chills.

Long-term exposure to brazing fume, gasses, or dust may contribute to pulmonary irritation or pneumoconiosis. Nickel should be considered a possible carcinogen per OSHA 29 CFR 1910.1200. Certain nickel compounds have been implicated based on experience in some nickel
refining operations. The specific compounds, however, have not been determined and direct association between nickel in welding fume and cancer has not been demonstrated.

Medical Conditions
Aggravated by Exposure
Individuals with impaired pulmonary functions or illness may have symptoms exacerbated by fume irritants.

Chemical Listed as Carcinogen
NA

OSHA Permissible Exposure Limit (PEL)
NA

ACGIH Threshold Limit Value (TLV)
NA

Other Health Considerations
Brazing alloys are frequently used with a fluoride type flux. If applicable, flux fume should be considered in evaluation of hazards.

SECTION V - FIRE AND EXPLOSION HAZARD DATA

Flash Point
NA

Flammable Limits
Lower: NA
Upper: NA

Extinguishing Media
None Needed

Auto Ignition Temperature
NA

Special Fire Fighting Procedures
NA

Unusual Fire and Explosion Hazards
Open flame and sparks can ignite combustibles

SECTION VI - ACCIDENTAL RELEASE MEASURES

Steps to be Taken in Case Material is Spilled
Solid Metal Wire / Strip does not spill or leak

SECTION VII - STABILITY AND REACTIVITY

Stability: Generally considered stable. (Conditions to Avoid): None expected.

Incompatibility
NA

Hazardous
Brazing fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the
Decomposition Products

metal being brazed, the process, procedures, and filler metals used. Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being brazed (such as paint, plating, or galvanizing), the number of operators and the volume of the work area, the quality and amount of ventilation, the position of the operator's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities). When the filler metal is consumed, the fume and gas decomposition products generated are different in percent and form from the solid wire or rod ingredients listed in Section 1. Fume and gas decomposition products, and not the ingredients in the rod or wire are important. The concentration of a given fume or gas component may decrease or increase by many times the original concentration in the rod or wire. Also, new compounds not in the rod or wire may form. Decomposition products of normal operation include those originating from the volatilization reaction, or oxidation of the wire or rod plus those from the base metal and coating, etc., as noted above.

Hazardous Polymerization: Will not occur. (Conditions to Avoid): NA

SECTION VIII - EXPOSURE CONTROL MEASURES

Ventilation

Use enough ventilation, local exhaust at the flame to keep the fumes and gases below TLV's 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.

Local Exhaust

Yes

Protective Gloves

NA

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.

Eye Protection

NA

Mechanical (General)

NA

Respiratory Protection (Type):

NA

Wear head and body protection, which helps to prevent injury from heat radiation, sparks, and flame. See ANSI Z49.1. At a minimum this includes gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection, as well as dark substantial clothing.

SECTION IX - HANDLING AND STORAGE
Handling & Storage Precautions

Store in a cool, dry location away from incompatible materials.

Work/Hygienic Practices

Wash thoroughly after handling. Avoid contact with and dusts, mists or fumes resulting from the use of this product. Do not eat, drink, or smoke in work area. Use only with adequate ventilation.

Other Precautions

NA

NOTE: Consult the most recent OSHA CADMIUM Standard (1910.1027) and its attachments, appendices, etc., for full requirements, some of which are not covered in this Material Safety Data Sheet.

SECTION X - PHYSICAL AND CHEMICAL CHARACTERISTICS

Boiling Point

ND

Vapor Pressure (mm Hg)

NA

Vapor Density (Air = 1)

NA

Melting Point

ND

Reactivity in Water

None

Specific Gravity (Water = 1)

NA

Percent Volatile by Volume

NA

Evaporation Rate (Butyl Acetate = 1)

NA

Solubility in Water

Insoluble

Appearance and Odor

Metallic wire, rod or strip; odorless

SECTION XI - TOXICOLOGICAL INFORMATION

In addition to Section 2 and Section 3, toxicological information is available through the U.S. National Institute for Occupational Safety and Health (NIOSH) and the Registry of Toxic Effects of Chemical Substances (RTECS) – website: http://www.cdc.gov/niosh/ipcsneng/nengrtec.html. Applicable product components and their respective RTECS numbers are as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>RTECS Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper</td>
<td>GL5325000</td>
</tr>
<tr>
<td>Manganese</td>
<td>OO9275000</td>
</tr>
<tr>
<td>Nickel</td>
<td>QR5950000</td>
</tr>
<tr>
<td>Silver</td>
<td>VW3500000</td>
</tr>
<tr>
<td>Tin</td>
<td>XP7320000</td>
</tr>
</tbody>
</table>

SECTION XII - ECOLOGICAL INFORMATION
When used in their intended manner, these products should not be released to the environment and adverse effects on ecosystems are not anticipated under normal and recommended conditions of handling, use, storage and disposal. None of the constituents in these products are classified as environmentally persistent, bio-accumulative toxic chemicals. Copper is a marine pollutant.

**SECTION XIII - DISPOSAL CONSIDERATIONS**

Manage & dispose of waste in accordance with EPA or applicable international regulations. Regulations may vary so check Federal, National, State and Local regulations. Whenever possible, try to recycle & reclaim metals. Process, use or contamination may change the characteristics of the waste, and consequently, how the waste is managed.

**SECTION XIV - TRANSPORTATION INFORMATION**

- **D.O.T. Proper Shipping Name**: Non-hazardous
- **Identification Number**: NA
- **Type of D.O.T. Label Required Information**: NA
- **Hazard Class**: NA
- **Packing Group**: NA

**SECTION XV - REGULATORY INFORMATION**

Nickel is classified as hazardous to human health, Category 3 carcinogen, in the European Union under Directive 67/548/EEC, and required to be supplied with the following labeling:

**Nickel:**

- Xn: Harmful
- R40: Limited evidence of carcinogenic effect
- R43: May cause sensitization by skin contact
- S22: Do not breathe dust
- S36: Wear suitable protective clothing
- S53: Avoid exposure – obtain special instructions before use

**SECTION XVI - OTHER INFORMATION**

- **Date Created**: 12/16/13
- **Last Updated**: 7/7/14
Individuals requiring further information and Engineering Specification Documents may wish to contact the Engineering Society for Advanced Mobility, Land Sea Air and Space, The Society of Automotive Engineers http://www.sae.org/ (SAE AMS) or The American Welding Society (AWS) http://aws.org/

NOTE:

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