Material Safety Data Sheet

Emergency phone: Alpha Chemtrec #5591
US & Canada: 800 424-9300
Mexico: 01 800 022 1400, (55) 5559 1588
Brasil: 55 11 4353 2700

Flammability: 1
Health: 1
Instability: 0
Special: None

1. Product and company identification

<table>
<thead>
<tr>
<th>Product name</th>
<th>Solder Wire Cored 96.5Sn/3.0Ag/0.5Cu (SAC305) Alloy, Energized Plus Flux</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product code</td>
<td>M771NRG+</td>
</tr>
<tr>
<td>Material uses</td>
<td>Specialty assembly materials for the electronics industries</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>Alpha Alpha Metals MEXICO SA DE CV Cookson Electronics Brasil Ltda</td>
</tr>
<tr>
<td></td>
<td>109 Corporate Blvd. Avenida Nafta No. 800, Av.: José Odorizzi, No. 650</td>
</tr>
<tr>
<td></td>
<td>South Plainfield, NJ 07080 Parque Industrial Stiva Aeropuerto São Bernardo do Campo</td>
</tr>
<tr>
<td>Toll Free:</td>
<td>(800) 367-5460 Apodaca, Nuevo León, C.P. 66600 São Paulo, CEP098100 000</td>
</tr>
<tr>
<td>Main Phone:</td>
<td>(908) 791-3000 Mexico Brasil</td>
</tr>
<tr>
<td>Fax:</td>
<td>(908) 791-3090 <a href="http://www.alpha.alent.com">www.alpha.alent.com</a></td>
</tr>
<tr>
<td>Preparred by</td>
<td>T. Valverde (203)-799-4940</td>
</tr>
<tr>
<td>Validation date</td>
<td>4/8/2014.</td>
</tr>
<tr>
<td>Supersedes Date</td>
<td>6/5/2013.</td>
</tr>
</tbody>
</table>

2. Hazards identification

Physical state: Solid.
Odor: None.
OSHA/HCS status: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Emergency overview: WARNING!
Harmful if swallowed. Irritating to eyes, respiratory system and skin. May cause sensitization by skin contact. Do not ingest. Do not get on skin or clothing. Avoid contact with eyes. Contains material that may cause target organ damage, based on animal data. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

Routes of entry: Dermal contact. Eye contact. Inhalation. Ingestion.

Potential acute health effects:
Inhalation: Irritating to respiratory system.
Ingestion: Harmful if swallowed. Can cause target organ damage. Ingestion may cause gastrointestinal irritation and diarrhea.

Continued on next page
2. Hazards identification

Skin : Irritating to skin. May cause sensitization by skin contact. Skin inflammation is characterized by itching, scaling, reddening or, occasionally, blistering. Prolonged or repeated contact may cause dermatitis. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels. In the event of any complaints or symptoms, avoid further exposure. Persons with a history of skin sensitization problems should not be employed in any process in which this product is used.

Eyes : Irritating to eyes. Adverse symptoms may include the following: redness, itching, swelling, pain

Potential chronic health effects

Chronic effects : Contains material that can cause target organ damage. Adverse symptoms may include the following:
- **tin**: Prolonged or repeated exposure may cause benign pneumoconiosis (Stannosis).
- **silver**: Inhalation: metal fume fever, chills or shivering, muscle weakness, metallic taste. Ingestion: convulsions, shock. Contact with this product may result in a condition from silver compounds known as Argyria (a bluish-gray discoloration of the skin, eyes and mucous membranes).
- **Rosin/Resin**: May cause allergic skin reactions with repeated exposure. Prolonged inhalation of fumes may cause respiratory sensitization.

Target organs : Contains material which may cause damage to the following organs: kidneys, lungs, upper respiratory tract, skin, eyes, nose/sinuses, testes.

Carcinogenicity : Not classified or listed by IARC, NTP, OSHA, EU and ACGIH.

Mutagenicity : Not classified.

Teratogenicity : Not classified.

Developmental effects : Not classified.

Fertility effects : Not classified.

California Prop. 65 : **WARNING**: This product contains less than 1% of a chemical known to the State of California to cause birth defects or other reproductive harm.

Medical conditions aggravated by over-exposure : Pre-existing skin and digestive disorders and disorders involving any other target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product. Persons with a history of skin sensitization problems should not be employed in any process in which this product is used.

3. Composition/information on ingredients

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS number</th>
<th>% by weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>tin</td>
<td>7440-31-5</td>
<td>80-100</td>
</tr>
<tr>
<td>silver</td>
<td>7440-22-4</td>
<td>1-5</td>
</tr>
<tr>
<td>Rosin/Resin</td>
<td>-</td>
<td>1-5</td>
</tr>
</tbody>
</table>

Any ingredient not listed in Section 3 is non-regulated or present in the product in concentrations below legal disclosure limits.

4. First aid measures

Eye contact : Check for and remove any contact lenses. Get medical attention if irritation occurs. Immediately flush eyes with running water for at least 30 minutes, keeping eyelids open.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Continue to rinse for at least 15 minutes. Get medical attention. May cause sensitization by skin contact. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels. Wash contaminated clothing before reuse. Clean shoes thoroughly before reuse. In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.

Continued on next page
4. First aid measures

Inhalation: Get medical attention immediately. Move exposed person to fresh air. If it is suspected that mists are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Ingestion: Get medical attention immediately. Wash out mouth with water. Remove dentures if any. Move exposed person to fresh air. Keep person warm and at rest. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel.

Protection of first-aiders: No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wear suitable protective clothing, gloves and eye/face protection. If it is suspected that mists are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

5. Fire-fighting measures

Flammability of the product: No specific fire or explosion hazard.

Extinguishing media: Use an extinguishing agent suitable for the surrounding fire.

Special exposure hazards: None known.

Hazardous combustion products: metal oxide/oxides

Special protective equipment for fire-fighters: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. Accidental release measures

Personal precautions: No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).

Environmental precautions: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Large spill: Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Small spill: Move containers from spill area. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.

Continued on next page
7. Handling and storage

Handling: Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not get in eyes or on skin or clothing. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage: Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

8. Exposure controls/personal protection

<table>
<thead>
<tr>
<th>Product name</th>
<th>Exposure limits</th>
</tr>
</thead>
</table>
| tin          | OSHA PEL (United States, 9/2005).  
TWA: 2 mg/m³ 8 hour(s).  
ACGIH TLV (United States, 3/2012).  
TWA: 2 mg/m³ 8 hour(s). |
| silver       | NIOSH REL (United States, 6/2009). Notes: as Ag  
TWA: 0.01 mg/m³, (as Ag) 10 hour(s). Form: METAL DUST AND SOLUBLE  
OSHA PEL (United States, 6/2010). Notes: as Ag  
TWA: 0.01 mg/m³, (as Ag) 8 hour(s).  
OSHA PEL 1989 (United States, 3/1989). Notes: as Ag  
TWA: 0.01 mg/m³, (as Ag) 8 hour(s).  
ACGIH TLV (United States, 3/2012). Notes: Substances for which the TLV is higher than the OSHA Permissible Exposure Limit (PEL) and/or the NIOSH Recommended Exposure Limit (REL). See CFR 58(124) :36338-33351, June 30, 1993, for revised OSHA PEL.  
TWA: 0.1 mg/m³ 8 hour(s). Form: Metallic form |

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures: If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures: Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. Processes should be designed to minimize airborne and skin exposure to hazardous substances.

Hygiene measures: Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location. Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Take off immediately all contaminated clothing. Contaminated work clothing should not be allowed out of the workplace.

Personal protection

Continued on next page
8. Exposure controls/personal protection

**Respiratory**
- Use a properly fitted, air-purifying or air-fed respirator complying with NIOSH if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. Risk assessments should be completed by a Certified Industrial Hygienist.

**Hands**
- Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. The user must check that the final choice of type of glove selected for handling this product is the most appropriate and takes into account the particular conditions of use, as included in the user's risk assessment. Risk assessments should be completed by a Certified Industrial Hygienist.

**Eyes**
- Avoid contact with eyes. Safety eyewear should be used when there is a likelihood of exposure.

**Skin**
- Avoid contact with skin and clothing. Wear suitable protective clothing. Body garments used should be based upon the task being performed (e.g., lab coat, chemical resistant protective suit, sleevelets, synthetic apron, gauntlets) to avoid exposed skin surfaces. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

**Environmental exposure controls**
- Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9. Physical and chemical properties

**Physical state**
- Solid.

**Flash point**
- Not available.

**Auto-ignition temperature**
- Not available.

**Flammable limits**
- Not available.

**Color**
- Gray.

**Odor**
- None.

**pH**
- Not available.

**Boiling/condensation point**
- Not available.

**Melting/freezing point**
- Not available.

**Vapor pressure**
- Not available.

**Vapor density**
- Not available.

**Odor threshold**
- Not available.

**Evaporation rate**
- Not available.

**VOC**
- 1.8 g/l

**Solubility**
- Insoluble in the following materials: cold water and hot water.

10. Stability and reactivity

**Stability**
- The product is stable.

**Conditions to avoid**
- No specific data.

**Incompatibility with various substances**
- Reactive with oxidizing agents, reducing agents, acids, alkalis.
- Chlorine, peroxides

**Hazardous decomposition products**
- Under normal conditions of storage and use, hazardous decomposition products should not be produced.

**Other Hazardous decomposition products**
- Metal oxides, toxic fumes

**Hazardous polymerization**
- Under normal conditions of storage and use, hazardous polymerization will not occur.

Continued on next page
11. Toxicological information

Acute toxicity

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Dose</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>silver</td>
<td>LD Oral</td>
<td>Guinea pig</td>
<td>&gt;5 g/kg</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>LD Oral</td>
<td>Mouse</td>
<td>&gt;10 g/kg</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>LD50 Oral</td>
<td>Mouse</td>
<td>100 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>LD50 Oral</td>
<td>Mouse</td>
<td>2.2 g/kg</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>3 g/kg</td>
<td>-</td>
</tr>
<tr>
<td>Rosin/Resin</td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

Carcinogenicity Classification

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>ACGIH</th>
<th>IARC</th>
<th>EPA</th>
<th>NIOSH</th>
<th>NTP</th>
<th>OSHA</th>
</tr>
</thead>
<tbody>
<tr>
<td>silver</td>
<td>-</td>
<td>-</td>
<td>D</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Alpha has not conducted specific studies on the toxicity of this product.

12. Ecological information

CURRENTLY UNDER TECHNICAL REVIEW

13. Disposal considerations

Waste disposal: The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14. Transport information

<table>
<thead>
<tr>
<th>Regulatory information</th>
<th>UN number</th>
<th>Proper shipping name</th>
<th>Classes</th>
<th>PG*</th>
<th>Label</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOT Classification</td>
<td>Not regulated</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

PG*: Packing group

15. Regulatory information

United States

HCS Classification: Irritating material
Sensitizing material
Target organ effects

U.S. Federal regulations

TSCA 5(a)2 proposed significant new use rules: No products were found.
TSCA 5(a)2 final significant new use rules: No products were found.
TSCA 12(b) one-time export: No products were found.
TSCA 12(b) annual export notification: No products were found.

United States inventory (TSCA 8b): All components are listed or exempted.

Continued on next page
15. Regulatory information

**SARA 313**

<table>
<thead>
<tr>
<th>Form R - Reporting requirements</th>
<th>Product name</th>
<th>CAS number</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>silver</td>
<td>silver</td>
<td>7440-22-4</td>
<td>1-5</td>
</tr>
</tbody>
</table>

**SARA 302/304/311/312 extremely hazardous substances**: No products were found.

**California Prop. 65**

**WARNING**: This product contains less than 1% of a chemical known to the State of California to cause birth defects or other reproductive harm.

**Canada**

- **WHMIS (Canada)**: Class D-2A: Material causing other toxic effects (Very toxic).
- **Canada inventory**: All components are listed or exempted.

**International lists**

- **China inventory (IECSC)**: All components are listed or exempted.
- **Europe inventory**: All components are listed or exempted.
- **Australia inventory (AICS)**: All components are listed or exempted.
- **Japan inventory (ENCS)**: All components are listed or exempted.
- **Korea inventory (KECI)**: All components are listed or exempted.
- **Philippines inventory (PICCS)**: All components are listed or exempted.

16. Other information

**Definition of Terms**

- **ACGIH**: American Conference of Governmental Industrial Hygienists
- **Ceiling**: Maximum exposure limit defined by OSHA
- **CAS**: Chemical Abstract Service
- **IARC**: International Agency for Research on Cancer
- **NIOSH**: National Institute for Occupational Safety and Health
- **NTP**: National Toxicology Program
- **OSHA**: Occupational Safety and Health Administration
- **PEL**: Permissible Exposure Limit
- **REL**: Recommended Exposure Limit
- **RTK**: Right to Know
- **SARA**: Superfund Amendments and Reauthorization Act
- **STEL**: Short Term Exposure Limit
- **TLV**: ACGIH Threshold Limit Value
- **TLV-C**: ACGIH Threshold Limit Value, Ceiling
- **TRADE SECRET**: Claimed as allowed under 29CFR§1910.1200
- **TSCA**: Toxic Substances Control Act
- **PPE**: Personal Protection Equipment
- **CEPA**: Canadian Environmental Protection Act
- **DSL**: Domestic Substance List
- **NDSL**: Non-Domestic Substance List
- **NSN**: New Substance Notification Rules

**Disclaimer**

The information contained herein is based on data considered accurate. However, no warranty is expressed of implied regarding the accuracy of these data or the results to be obtained from the use thereof. Additionally, Cookson Electronics assumes no responsibility for injury to the vendee or third persons proximately caused by the material even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in his use of the material.
16. Other information