1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: 600 Bronze Brazing Flux

Other means of identification
SDS number: 200000007216

Recommended use and restriction on use
Recommended use: Metal Brazing
Restrictions on use: Not known. Read this SDS before using this product.

Manufacturer/Importer/Supplier/Distributor Information
Company Name: The Harris Products Group
Address: 4501 Quality Place
Mason, OH 45040-1971
USA
Telephone: +1 (513) 754-2000
Contact Person: Safety Data Sheet Questions: custservmason@jwharris.com

Emergency telephone number:
USA/Canada/Mexico +1 (888) 609-1762
Americas/Europe +1 (216) 383-8962
Asia Pacific +1 (216) 383-8966
Middle East/Africa +1 (216) 383-8969

3E Company Access Code: 333988

2. HAZARDS IDENTIFICATION


Hazard Classification
Health Hazards
Toxic to reproduction Category 1B

Label Elements
Hazard Symbol:

Signal Word: Danger
Hazard Statement: May damage fertility or the unborn child.
Precautionary Statements:
Prevention: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required.

Response: IF exposed or concerned: Get medical advice/attention.

Storage: Store locked up.

Disposal: Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Other hazards which do not result in GHS classification:
- Heat rays (infrared radiation) from flame or hot metal can injure eyes.
- Overexposure to brazing fumes and gases can be hazardous. Read and understand the manufacturer’s instructions, Safety Data Sheets and the precautionary labels before using this product.

Substance(s) formed under the conditions of use:
Fumes produced from use of this product may contain the following constituent(s) and/or their complex metallic oxides as well as solid particles or other constituents from the solder, brazing consumable, flux material or base metal, or base metal coating not listed below. Hydrogen fluoride, a possible decomposition product, 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.

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>CAS-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon dioxide</td>
<td>124-38-9</td>
</tr>
<tr>
<td>Carbon monoxide</td>
<td>630-08-0</td>
</tr>
<tr>
<td>Nitrogen dioxide</td>
<td>10102-44-0</td>
</tr>
<tr>
<td>Ozone</td>
<td>10028-15-6</td>
</tr>
</tbody>
</table>

3. COMPOSITION / INFORMATION ON INGREDIENTS

Reportable Hazardous Ingredients Mixtures

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>CAS number</th>
<th>Content in percent (%)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium tetraborate, anhydrous</td>
<td>1330-43-4</td>
<td>50 - &lt;100%</td>
</tr>
<tr>
<td>Boric acid</td>
<td>10043-35-3</td>
<td>50 - &lt;100%</td>
</tr>
</tbody>
</table>

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

Composition Comments: The term “Hazardous Ingredients” should be interpreted as a term defined in Hazard Communication standards and does not necessarily imply the existence of a welding hazard. The product may contain additional non-hazardous ingredients or may form additional compounds under the condition of use. Refer to Sections 2 and 8 for more information.

4. FIRST AID MEASURES
Ingestion: Avoid hand, clothing, food, and drink contact with fluxes, metal fume or powder which can cause ingestion of particulate during hand to mouth activities such as drinking, eating, smoking, etc. If ingested, do not induce vomiting. Contact a poison control center. Unless the poison control center advises otherwise, wash out mouth thoroughly with water. If symptoms develop, seek medical attention at once.

Inhalation: Move to fresh air if breathing is difficult. If breathing has stopped, perform artificial respiration and obtain medical assistance at once.

Skin Contact: Remove contaminated clothing and wash the skin thoroughly with soap and water. For reddened or blistered skin, or thermal burns, obtain medical assistance at once.

Eye Contact: Do not rub eye. Any material that contacts the eye should be washed out immediately with water. If easy to do, remove contact lenses. Continue to rinse for at least 15 minutes. Get medical attention promptly if symptoms occur after washing.

Most important symptoms/effects, acute and delayed
Symptoms: Short-term (acute) overexposure to fumes and gases from welding and allied processes may result in discomfort such as metal fume fever, dizziness, nausea, or dryness or irritation of nose, throat, or eyes. May aggravate pre-existing respiratory problems (e.g. asthma, emphysema). Long-term (chronic) overexposure to fumes and gases from welding and allied processes can lead to siderosis (iron deposits in lung), central nervous system effects, bronchitis and other pulmonary effects. Refer to Section 11 for more information.

Hazards: The hazards associated with welding and its allied processes such as soldering and brazing are complex and may include physical and health hazards such as but not limited to electric shock, physical strains, radiation burns (eye flash), thermal burns due to hot metal or spatter and potential health effects of overexposure to fumes, gases or dusts potentially generated during the use of this product. Refer to Section 11 for more information.

Indication of immediate medical attention and special treatment needed
Treatment: Treat symptomatically.

5. FIRE-FIGHTING MEASURES

General Fire Hazards: As shipped, this product is nonflammable. However, welding arc and sparks as well as open flames and hot surfaces associated with brazing and soldering can ignite combustible and flammable materials. Read and understand American National Standard Z49.1, "Safety in Welding, Cutting and Allied Processes" and National Fire Protection Association NFPA 51B, "Standard for Fire Prevention during Welding, Cutting and Other Hot Work" before using this product.

Suitable (and unsuitable) extinguishing media
Suitable extinguishing media: Use fire-extinguishing media appropriate for surrounding materials.

Unsuitable extinguishing media: Do not use water jet as an extinguisher, as this will spread the fire.

Specific hazards arising from the chemical: During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters

Special fire fighting procedures: Use standard firefighting procedures and consider the hazards of other involved materials.

Special protective equipment for fire-fighters: Selection of respiratory protection for fire fighting; follow the general fire precautions indicated in the workplace. Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: If airborne dust and/or fume is present, use adequate engineering controls and, if needed, personal protection to prevent overexposure. Refer to recommendations in Section 8.

Methods and material for containment and cleaning up: Absorb with sand or other inert absorbent. Stop the flow of material, if this is without risk. Clean up spills immediately, observing precautions in the personal protective equipment in Section 8. Avoid generating dust. Prevent product from entering any drains, sewers or water sources. Refer to Section 13 for proper disposal.

Environmental Precautions: Avoid release to the environment. Prevent further leakage or spillage if safe to do so. Do not contaminate water sources or sewer. Environmental manager must be informed of all major spillages.

7. HANDLING AND STORAGE

Precautions for safe handling: Prevent abrading consumable materials or creating dust. Provide appropriate exhaust ventilation at places where fume or dust is formed. Wear appropriate personal protective equipment. Observe good industrial hygiene practices.


Conditions for safe storage, including any incompatibilities: Store locked up.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Control Parameters

Occupational Exposure Limits: US

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Type</th>
<th>Exposure Limit Values</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium tetraborate, anhydrous - Inhalable fraction.</td>
<td>STEL</td>
<td>6 mg/m3</td>
<td>US. ACGIH Threshold Limit Values (02 2012)</td>
</tr>
<tr>
<td>Sodium tetraborate, anhydrous</td>
<td>TWA</td>
<td>2 mg/m3</td>
<td>US. ACGIH Threshold Limit Values (02 2012)</td>
</tr>
<tr>
<td>Boric acid - Inhalable fraction.</td>
<td>REL</td>
<td>1 mg/m3</td>
<td>US. NIOSH: Pocket Guide to Chemical Hazards (2005)</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>2 mg/m3</td>
<td>US. ACGIH Threshold Limit Values (02 2012)</td>
</tr>
</tbody>
</table>
### Occupational Exposure Limits: Canada

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Type</th>
<th>Exposure Limit Values</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium tetraborate, anhydrous</td>
<td>TWA</td>
<td>1 mg/m³</td>
<td>Canada. Alberta OELs (Occupational Health &amp; Safety Code, Schedule 1, Table 2) (07 2009)</td>
</tr>
<tr>
<td></td>
<td>STEL</td>
<td>3 ppm</td>
<td>Canada. Alberta OELs (Occupational Health &amp; Safety Code, Schedule 1, Table 2) (07 2009)</td>
</tr>
<tr>
<td>Sodium tetraborate, anhydrous - Inhalable</td>
<td>STEL</td>
<td>6 mg/m³</td>
<td>Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended) (07 2007)</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>2 mg/m³</td>
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</tr>
<tr>
<td>Sodium tetraborate, anhydrous - Inhalable fraction.</td>
<td>STEL</td>
<td>6 mg/m³</td>
<td>Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act) (03 2012)</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>2 mg/m³</td>
<td>Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act) (03 2012)</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>2 mg/m³</td>
<td>Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents) (11 2010)</td>
</tr>
<tr>
<td></td>
<td>STEL</td>
<td>6 mg/m³</td>
<td>Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents) (11 2010)</td>
</tr>
<tr>
<td></td>
<td>8 HR ACL</td>
<td>2 mg/m³</td>
<td>Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21) (05 2009)</td>
</tr>
<tr>
<td></td>
<td>15 MIN ACL</td>
<td>6 mg/m³</td>
<td>Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21) (05 2009)</td>
</tr>
<tr>
<td>Sodium tetraborate, anhydrous</td>
<td>TWA</td>
<td>1 mg/m³</td>
<td>Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment) (09 2017)</td>
</tr>
<tr>
<td>Boric acid - Inhalable</td>
<td>STEL</td>
<td>6 mg/m³</td>
<td>Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended) (07 2007)</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>2 mg/m³</td>
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<td>Boric acid - Inhalable fraction.</td>
<td>STEL</td>
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<td></td>
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<td></td>
<td>STEL</td>
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<tr>
<td></td>
<td>8 HR ACL</td>
<td>2 mg/m³</td>
<td>Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21) (05 2009)</td>
</tr>
<tr>
<td></td>
<td>15 MIN ACL</td>
<td>6 mg/m³</td>
<td>Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21) (05 2009)</td>
</tr>
</tbody>
</table>
### Occupational Exposure Limits: Mexico

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Type</th>
<th>Exposure Limit Values</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium tetraborate, anhydrous - Inhalable fraction.</td>
<td>VLE-PPT</td>
<td>2 mg/m³</td>
<td>Mexico. OELs. (NOM-010-STPS-2014 Chemical Pollutants at the Workplace; Assessment and Control) (04 2014)</td>
</tr>
<tr>
<td></td>
<td>VLE-CT</td>
<td>6 mg/m³</td>
<td>Mexico. OELs. (NOM-010-STPS-2014 Chemical Pollutants at the Workplace; Assessment and Control) (04 2014)</td>
</tr>
<tr>
<td>Boric acid - Inhalable fraction.</td>
<td>VLE-PPT</td>
<td>2 mg/m³</td>
<td>Mexico. OELs. (NOM-010-STPS-2014 Chemical Pollutants at the Workplace; Assessment and Control) (04 2014)</td>
</tr>
<tr>
<td></td>
<td>VLE-CT</td>
<td>6 mg/m³</td>
<td>Mexico. OELs. (NOM-010-STPS-2014 Chemical Pollutants at the Workplace; Assessment and Control) (04 2014)</td>
</tr>
</tbody>
</table>

### Additional exposure limits under the conditions of use: US

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Type</th>
<th>Exposure Limit Values</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon dioxide</td>
<td>TWA</td>
<td>5,000 ppm</td>
<td>US. ACGIH Threshold Limit Values (12 2010)</td>
</tr>
<tr>
<td></td>
<td>STEL</td>
<td>30,000 ppm</td>
<td>US. ACGIH Threshold Limit Values (12 2010)</td>
</tr>
<tr>
<td></td>
<td>PEL</td>
<td>5,000 ppm 9,000 mg/m³</td>
<td>US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)</td>
</tr>
<tr>
<td></td>
<td>STEL</td>
<td>30,000 ppm 54,000 mg/m³</td>
<td>US. NIOSH: Pocket Guide to Chemical Hazards (2005)</td>
</tr>
<tr>
<td></td>
<td>REL</td>
<td>5,000 ppm 9,000 mg/m³</td>
<td>US. NIOSH: Pocket Guide to Chemical Hazards (2005)</td>
</tr>
<tr>
<td>Carbon monoxide</td>
<td>TWA</td>
<td>25 ppm</td>
<td>US. ACGIH Threshold Limit Values (12 2010)</td>
</tr>
<tr>
<td></td>
<td>PEL</td>
<td>50 ppm 55 mg/m³</td>
<td>US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)</td>
</tr>
<tr>
<td></td>
<td>REL</td>
<td>35 ppm 40 mg/m³</td>
<td>US. NIOSH: Pocket Guide to Chemical Hazards (2005)</td>
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<tr>
<td></td>
<td>Ceil_Time</td>
<td>200 ppm 229 mg/m³</td>
<td>US. NIOSH: Pocket Guide to Chemical Hazards (2005)</td>
</tr>
<tr>
<td>Nitrogen dioxide</td>
<td>TWA</td>
<td>0.2 ppm</td>
<td>US. ACGIH Threshold Limit Values (02 2012)</td>
</tr>
<tr>
<td></td>
<td>Ceiling</td>
<td>5 ppm 9 mg/m³</td>
<td>US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)</td>
</tr>
<tr>
<td></td>
<td>STEL</td>
<td>1 ppm 1.8 mg/m³</td>
<td>US. NIOSH: Pocket Guide to Chemical Hazards (2005)</td>
</tr>
<tr>
<td>Ozone</td>
<td>PEL</td>
<td>0.1 ppm 0.2 mg/m³</td>
<td>US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)</td>
</tr>
<tr>
<td></td>
<td>Ceil_Time</td>
<td>0.1 ppm 0.2 mg/m³</td>
<td>US. NIOSH: Pocket Guide to Chemical Hazards (2005)</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>0.05 ppm</td>
<td>US. ACGIH Threshold Limit Values (03 2014)</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>0.20 ppm</td>
<td>US. ACGIH Threshold Limit Values (03 2014)</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>0.10 ppm</td>
<td>US. ACGIH Threshold Limit Values (03 2014)</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>0.08 ppm</td>
<td>US. ACGIH Threshold Limit Values (03 2014)</td>
</tr>
</tbody>
</table>

### Additional exposure limits under the conditions of use: Canada

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Type</th>
<th>Exposure Limit Values</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon dioxide</td>
<td>STEL</td>
<td>30,000 ppm 54,000 mg/m³</td>
<td>Canada. Alberta OELs (Occupational Health &amp; Safety Code, Schedule 1, Table 2) (07 2009)</td>
</tr>
<tr>
<td>Substance</td>
<td>TWA</td>
<td>STEL</td>
<td>Canada. Alberta OELs (Occupational Health &amp; Safety Code, Schedule 1, Table 2) (07 2009)</td>
</tr>
<tr>
<td>-------------------</td>
<td>-----</td>
<td>------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Carbon monoxide</td>
<td>TWA</td>
<td>STEL</td>
<td>Canada. Alberta OELs (Occupational Health &amp; Safety Code, Schedule 1, Table 2) (07 2009)</td>
</tr>
<tr>
<td>Nitrogen dioxide</td>
<td>TWA</td>
<td>STEL</td>
<td>Canada. Alberta OELs (Occupational Health &amp; Safety Code, Schedule 1, Table 2) (07 2009)</td>
</tr>
<tr>
<td>Exposure Limit</td>
<td>Concentration</td>
<td>Notes</td>
<td></td>
</tr>
<tr>
<td>---------------</td>
<td>---------------</td>
<td>-------</td>
<td></td>
</tr>
<tr>
<td>TWA</td>
<td>3 ppm</td>
<td>5.6 mg/m³</td>
<td>Canada. Alberta OELs (Occupational Health &amp; Safety Code, Schedule 1, Table 2) (07 2009)</td>
</tr>
<tr>
<td>TWA</td>
<td>0.2 ppm</td>
<td></td>
<td>Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act) (03 2012)</td>
</tr>
<tr>
<td>STEL</td>
<td>5 ppm</td>
<td></td>
<td>Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents) (11 2010)</td>
</tr>
<tr>
<td>TWA</td>
<td>3 ppm</td>
<td></td>
<td>Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents) (11 2010)</td>
</tr>
<tr>
<td>8 HR ACL</td>
<td>3 ppm</td>
<td></td>
<td>Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21) (05 2009)</td>
</tr>
<tr>
<td>15 MIN ACL</td>
<td>5 ppm</td>
<td></td>
<td>Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21) (05 2009)</td>
</tr>
<tr>
<td>TWA</td>
<td>3 ppm</td>
<td>5.6 mg/m³</td>
<td>Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment) (09 2017)</td>
</tr>
<tr>
<td>STEL</td>
<td>0.3 ppm</td>
<td>0.6 mg/m³</td>
<td>Canada. Alberta OELs (Occupational Health &amp; Safety Code, Schedule 1, Table 2) (07 2009)</td>
</tr>
<tr>
<td>TWA</td>
<td>0.1 ppm</td>
<td>0.2 mg/m³</td>
<td>Canada. Alberta OELs (Occupational Health &amp; Safety Code, Schedule 1, Table 2) (07 2009)</td>
</tr>
<tr>
<td>TWA</td>
<td>0.05 ppm</td>
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<td>Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended) (07 2007)</td>
</tr>
<tr>
<td>TWA</td>
<td>0.1 ppm</td>
<td></td>
<td>Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended) (07 2007)</td>
</tr>
<tr>
<td>TWA</td>
<td>0.08 ppm</td>
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</tr>
<tr>
<td>TWA</td>
<td>0.2 ppm</td>
<td></td>
<td>Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended) (07 2007)</td>
</tr>
<tr>
<td>TWA</td>
<td>0.1 ppm</td>
<td>0.2 mg/m³</td>
<td>Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents) (07 2010)</td>
</tr>
<tr>
<td>STEL</td>
<td>0.3 ppm</td>
<td>0.6 mg/m³</td>
<td>Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents) (07 2010)</td>
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<tr>
<td>15 MIN ACL</td>
<td>0.15 ppm</td>
<td></td>
<td>Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21) (05 2009)</td>
</tr>
<tr>
<td>8 HR ACL</td>
<td>0.05 ppm</td>
<td></td>
<td>Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21) (05 2009)</td>
</tr>
<tr>
<td>CEILING</td>
<td>0.1 ppm</td>
<td>0.2 mg/m³</td>
<td>Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment) (12 2008)</td>
</tr>
<tr>
<td>TWA</td>
<td>0.20 ppm</td>
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<td>Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act) (03 2014)</td>
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<tr>
<td>TWA</td>
<td>0.05 ppm</td>
<td></td>
<td>Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act) (03 2014)</td>
</tr>
</tbody>
</table>
Appropriate Engineering Controls

Ventilation: Use enough ventilation and local exhaust at the arc, flame or heat source to keep the fumes and gases from the worker's breathing zone and the general area. Train the operator to keep their head out of the fumes. Keep exposure as low as possible.

Individual protection measures, such as personal protective equipment

General information:

Exposure Guidelines: To reduce the potential for overexposure, use controls such as adequate ventilation and personal protective equipment (PPE). Overexposure refers to exceeding applicable local limits, the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs) or the Occupational Safety and Health Administration’s (OSHA) Permissible Exposure Limits (PELs). Workplace exposure levels should be established by competent industrial hygiene assessments. Unless exposure levels are confirmed to be below the applicable local limit, TLV or PEL, whichever is lower, respirator use is required. Absent these controls, overexposure to one or more compound constituents, including those in the fume or airborne particles, may occur resulting in potential health hazards. According to the ACGIH, TLVs and Biological Exposure Indices (BEIs) "represent conditions under which ACGIH believes that nearly all workers may be repeatedly exposed without adverse health effects." The ACGIH further states that the TLV-TWA should be used as a guide in the control of health hazards and should not be used to indicate a fine line between safe and dangerous exposures. See Section 10 for information on constituents which have some potential to present health hazards. Welding consumables and materials being joined may contain chromium as an unintended trace element. Materials that contain chromium may produce some amount of hexavalent chromium (CrVI) and other chromium compounds as a byproduct in the fume. In 2018, the American Conference of Governmental Industrial Hygienists (ACGIH) lowered the Threshold Limit Value (TLV) for hexavalent chromium from 50 micrograms per cubic meter of air (50 µg/m³) to 0.2 µg/m³. At these new limits, CrVI exposures at or above the TLV may be possible in cases where adequate ventilation is not provided. CrVI compounds are on the IARC and NTP lists as posing a lung cancer and sinus cancer risk. Workplace conditions are unique and welding fume exposures levels vary. Workplace
exposure assessments must be conducted by a qualified professional, such as an industrial hygienist, to determine if exposures are below applicable limits and to make recommendations when necessary for preventing overexposures.

**Maximum Dust Exposure Guideline™ (MDEG)™** for this product (based on content of Sodium tetraborate, anhydrous Boric acid) is 4.0 mg/m³. This exposure guideline is calculated using the most conservative value of the ACGIH TLV or OSHA PEL for the stated substance. Handle to minimize generation of airborne dust. Use adequate ventilation and dust collection. Use respiratory protection, if required, to keep exposure below limits. If your local applicable exposure limits are lower than the ACGIH TLV or OSHA PEL for any of the substances listed in Section 3 of this SDS, you must take that into consideration before utilizing or applying this guideline.

**Eye/face protection:** Wear helmet, face shield or eye protection with filter lens shade number 2 for torch soldering and 3-4 for torch brazing, and follow the recommendations as specified in ANSI Z49.1, Section 4, based on your process details. Shield others by providing appropriate screens and eye protection.

**Skin Protection**

**Hand Protection:** Wear protective gloves. Suitable gloves can be recommended by the glove supplier.

**Other:**

**Protective Clothing:** Wear hand, head, and body protection which help to prevent injury from radiation, open flames, hot surfaces, sparks and electrical shock. See Z49.1. At a minimum, this includes welder's gloves and a protective face shield when welding, and may include arm protectors, aprons, hats, shoulder protection, as well as dark substantial clothing when welding, brazing and soldering. Wear dry gloves free of holes or split seams. Train the operator not to permit electrically live parts or electrodes from contacting the skin . . . or clothing or gloves if they are wet. Insulate yourself from the work piece and ground using dry plywood, rubber mats or other dry insulation.

**Respiratory Protection:** Keep your head out of fumes. Use enough ventilation and local exhaust to keep fumes and gases from your breathing zone and the general area. An approved respirator should be used unless exposure assessments are below applicable exposure limits.

**Hygiene measures:** Do not eat, drink or smoke when using the product. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Determine the composition and quantity of fumes and gases to which workers are exposed by taking an air sample from inside the welder's helmet if worn or in the worker's breathing zone. Improve ventilation if exposures are not below limits. See ANSI/AWS F1.1, F1.2, F1.3 and F1.5, available from the American Welding Society, www.aws.org. Do not handle until all safety precautions have been read and understood. Obtain special instructions before use.

### 9. PHYSICAL AND CHEMICAL PROPERTIES

| Appearance: | Brazing flux. |
| Physical state: | Solid |
| Form: | Powder. |
10. STABILITY AND REACTIVITY

Reactivity: The product is non-reactive under normal conditions of use, storage and transport.

Chemical Stability: Material is stable under normal conditions.

Possibility of hazardous reactions: None under normal conditions.

Conditions to avoid: Avoid heat or contamination.


Hazardous Decomposition Products: Fumes and gases from welding and its allied processes such as brazing and soldering cannot be classified simply. The composition and quantity of both are dependent upon the metal to which the joining or hot work is applied, the process, procedure - and where applicable - the electrode or consumable 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 welded or worked (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.)

In cases where an electrode or other applied material is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section 3. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the materials shown in Section 3, plus those from the base metal and coating, etc., as noted above. Reasonably expected fume constituents produced during arc welding and brazing include the oxides of iron, manganese and other metals present in the welding consumable or base metal. Hexavalent chromium compounds may be in the welding or brazing fume of consumables or base metals which contain chromium. Gaseous and particulate fluoride may be in the fume of consumables or flux materials which contain fluoride. Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc associated with welding.

11. TOXICOLOGICAL INFORMATION

General information: The International Agency for Research on Cancer (IARC) has determined welding fumes and ultraviolet radiation from welding are carcinogenic to humans (Group 1). According to IARC, welding fumes cause cancer of the lung and positive associations have been observed with cancer of the kidney. Also according to IARC, ultraviolet radiation from welding causes ocular melanoma. IARC identifies gouging, brazing, carbon arc or plasma arc cutting, and soldering as processes closely related to welding. Read and understand the manufacturer’s instructions, Safety Data Sheets and the precautionary labels before using this product.

Information on likely routes of exposure

Inhalation: Inhalation is the primary route of exposure. In high concentrations, dust, vapors, fumes or mists may irritate nose, throat and mucus membranes.

Skin Contact: Moderately irritating to skin with prolonged exposure.

Eye contact: HEAT RAYS (INFRARED RADIATION) from flame or hot metal can injure eyes.

Ingestion: Avoid ingestion - wear gloves and other appropriate personal protection - wash hands thoroughly following use or handling.

Symptoms related to the physical, chemical and toxicological characteristics

Inhalation: Short-term (acute) overexposure to fumes and gases from brazing and soldering may result in discomfort such as metal fume fever, dizziness, nausea, or dryness or irritation of nose, throat, or eyes. May aggravate pre-existing respiratory problems (e.g. asthma, emphysema). Long-term (chronic) overexposure to fumes and gases from brazing and soldering can lead to siderosis (iron deposits in lung), central nervous system effects, bronchitis and other pulmonary effects. Products which contain lead or cadmium have additional specific health hazards - refer to Sections 2, 8 and 11 of this SDS.

Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

Oral
Product:

Specified substance(s):
- Sodium tetraborate, anhydrous
- Boric acid

LD 50 (Rat): 2,660 mg/kg

Dermal Product:
Not classified for acute toxicity based on available data.

Inhalation Product:
Not classified for acute toxicity based on available data.

Repeated dose toxicity Product:
No data available.

Skin Corrosion/Irritation Product:
Not classified

Serious Eye Damage/Eye Irritation Product:
Not classified

Respiratory or Skin Sensitization Product:
Respiratory Sensitization: Not classified
Skin Sensitization: Not classified

Carcinogenicity Product:
Not classified

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:
No carcinogenic components identified

US. National Toxicology Program (NTP) Report on Carcinogens:
No carcinogenic components identified

No carcinogenic components identified

Germ Cell Mutagenicity

In vitro Product:
Not classified

In vivo Product:
Not classified

Reproductive toxicity Product:
May damage fertility or the unborn child.

Specific Target Organ Toxicity - Single Exposure Product:
Not classified

Specific Target Organ Toxicity - Repeated Exposure Product:
Not classified

Aspiration Hazard Product:
Not applicable

Symptoms related to the physical, chemical and toxicological characteristics under the condition of use

Additional toxicological information under the conditions of use:
Acute toxicity
Inhalation
Specified substance(s):
- Carbon dioxide
  LC Lo (Human, 5 min): 90000 ppm
- Carbon monoxide
  LC 50 (Rat, 4 h): 1300 ppm
- Nitrogen dioxide
  LC 50 (Rat, 4 h): 88 ppm
- Ozone
  LC Lo (Human, 30 min): 50 ppm

Other effects:
Specified substance(s):
- Carbon dioxide
  Asphyxia
- Carbon monoxide
  Carboxyhemoglobinemia
- Nitrogen dioxide
  Lower respiratory tract irritation

12. ECOLOGICAL INFORMATION

Ecotoxicity
Acute hazards to the aquatic environment:
Fish
  Product: Not classified
  Specified substance(s):
  - Sodium tetraborate, anhydrous
    LC 50 (Western mosquitofish (Gambusia affinis), 6 d): 54.7 mg/l
  - Boric acid
    LC 50 (Pimephales promelas, 96 h): 79.7 mg/l

Aquatic Invertebrates
  Product: Not classified
  Specified substance(s):
  - Boric acid
    LC 50 (Hyalella azteca, 96 h): 64 mg/l

Chronic hazards to the aquatic environment:
Fish
  Product: Not classified

Aquatic Invertebrates
  Product: Not classified

Toxicity to Aquatic Plants
  Product: No data available.

Persistence and Degradability
Biodegradation
  Product: No data available.

Bioaccumulative potential
Bioconcentration Factor (BCF)
  Product: No data available.

Mobility in soil:
  No data available.

13. DISPOSAL CONSIDERATIONS

General information:
The generation of waste should be avoided or minimized whenever possible. When practical, recycle in an environmentally acceptable, regulatory compliant manner. Dispose of non-recyclable products in accordance with all applicable Federal, State, Provincial, and Local...
requirements.

**Disposal instructions:** Discharge, treatment, or disposal may be subject to national, state, or local laws.

**Contaminated Packaging:** Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

### 14. TRANSPORT INFORMATION

**DOT**
- **UN Number:**
- **UN Proper Shipping Name:** NOT DG REGULATED
- **Transport Hazard Class(es):**
  - Class: NR
  - Label(s): –
  - Packing Group: –
  - Marine Pollutant: No

**IMDG**
- **UN Number:**
- **UN Proper Shipping Name:** NOT DG REGULATED
- **Transport Hazard Class(es):**
  - Class: NR
  - Label(s): –
  - EmS No.: –
  - Packing Group: –
  - Marine Pollutant: No

**IATA**
- **UN Number:**
- **Proper Shipping Name:** NOT DG REGULATED
- **Transport Hazard Class(es):**
  - Class: NR
  - Label(s): –
  - Packing Group: –
  - Marine Pollutant: No
  - Cargo aircraft only: Allowed.

**TDG**
- **UN Number:**
- **UN Proper Shipping Name:** NOT DG REGULATED
- **Transport Hazard Class(es):**
  - Class: NR
  - Label(s): –
  - Packing Group: –
  - Marine Pollutant: No

### 15. REGULATORY INFORMATION

**US Federal Regulations**
- **TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)**
  None present or none present in regulated quantities.

  None present or none present in regulated quantities.
CERCLA Hazardous Substance List (40 CFR 302.4):
None present or none present in regulated quantities.

Superfund Amendments and Reauthorization Act of 1986 (SARA)
Hazard categories
Delayed (Chronic) Health Hazard
Reproductive toxicity

SARA 302 Extremely Hazardous Substance
None present or none present in regulated quantities.

SARA 304 Emergency Release Notification
None present or none present in regulated quantities.

SARA 311/312 Hazardous Chemical

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Threshold Planning Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium tetraborate, anhydrous</td>
<td>10000 lbs</td>
</tr>
<tr>
<td>Boric acid</td>
<td>10000 lbs</td>
</tr>
</tbody>
</table>

SARA 313 (TRI Reporting)
None present or none present in regulated quantities.

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3)
None present or none present in regulated quantities.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):
None present or none present in regulated quantities.

US State Regulations
US. California Proposition 65
No ingredient regulated by CA Prop 65 present.

WARNING: This product contains or produces a chemical known to the State of California to cause cancer and birth defects (or other reproductive harm). (California Health & Safety Code Section 25249.5 et seq.)

WARNING: Cancer and Reproductive Harm – www.P65Warnings.ca.gov

US. New Jersey Worker and Community Right-to-Know Act

<table>
<thead>
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<tbody>
<tr>
<td>Sodium tetraborate, anhydrous</td>
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<td>Boric acid</td>
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</table>

US. Massachusetts RTK - Substance List

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<th>Chemical Identity</th>
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</thead>
<tbody>
<tr>
<td>Sodium tetraborate, anhydrous</td>
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</table>

US. Pennsylvania RTK - Hazardous Substances

<table>
<thead>
<tr>
<th>Chemical Identity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium tetraborate, anhydrous</td>
</tr>
</tbody>
</table>

US. Rhode Island RTK
No ingredient regulated by RI Right-to-Know Law present.

Canada Federal Regulations
List of Toxic Substances (CEPA, Schedule 1)
Not Regulated

Export Control List (CEPA 1999, Schedule 3)
Not Regulated
National Pollutant Release Inventory (NPRI)
Canada. National Pollutant Release Inventory (NPRI) Substances, Part 5, VOCs with Additional Reporting Requirements
NPRI PT5: Not Regulated

Canada. National Pollutant Release Inventory (NPRI) (Schedule 1, Parts 1-4)
NPRI: Not Regulated

Greenhouse Gases
Not Regulated

Controlled Drugs and Substances Act
CA CDSI: Not Regulated
CA CDSII: Not Regulated
CA CDSIII: Not Regulated
CA CDSIV: Not Regulated
CA CDSV: Not Regulated
CA CDSVII: Not Regulated
CA CDSVIII: Not Regulated

Precursor Control Regulations
Not Regulated

Mexico. Substances subject to reporting for the pollutant release and transfer registry (PRTR): Not applicable

Inventory Status:
Australia AICS: On or in compliance with the inventory
Canada DSL Inventory List: On or in compliance with the inventory
EINECS, ELINCS or NLP: On or in compliance with the inventory
Japan (ENCS) List: On or in compliance with the inventory
China Inv. Existing Chemical Substances: On or in compliance with the inventory
Korea Existing Chemicals Inv. (KECI): On or in compliance with the inventory
Canada NDSL Inventory: One or more components are not listed or are exempt from listing.
Philippines PICCS: On or in compliance with the inventory
US TSCA Inventory: On or in compliance with the inventory
New Zealand Inventory of Chemicals: On or in compliance with the inventory
Japan ISHL Listing: On or in compliance with the inventory
Japan Pharmacopoeia Listing: One or more components are not listed or are exempt from listing.
Mexico INSQ: On or in compliance with the inventory
Ontario Inventory: On or in compliance with the inventory
Taiwan Chemical Substance Inventory: On or in compliance with the inventory

16. OTHER INFORMATION

Definitions:

The Maximum Dust Exposure Guideline™ (MDEG)™ is provided to assist with the management of workplace exposures where granular solid welding products or other materials are being utilized. It is derived from relevant compositional data and estimates the lowest level of total airborne dust exposure, for a given product, at which some specific constituent might potentially exceed its individual exposure limit. The specific exposure limits referenced are the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV®) and the U. S. OSHA Permissible Exposure Limit (PEL), which ever value is the lowest. If local applicable limits for any of the substances listed in Section 3 of this SDS are lower than the TLV or PEL this must be taken into consideration before
utilizing or applying this guideline. The MDEG™ is never greater than 10 mg/m³ as this is the airborne exposure guideline for total particulate (total dust). The MDEG™ is intended to serve as a general guideline to assist in the management of workplace exposure and does not replace the regular measurement and analysis of worker exposure to individual airborne dust constituents in accordance with recommended industrial hygiene practice.

**Combustible Dust Hazard Rating:**

This material will not burn and has the Lincoln Electric Combustible Dust Hazard Rating: 0-CS. For additional information contact the Lincoln Electric EHS Department (216) 383-2669.

**Combustible Dust Hazard Rating Information:**

Lincoln Electric’s Combustible Dust Rating System is as follows:

3: Fine solid powders or dusts which can ignite with contact with air, or have a Kst value ≥300, and/or would have an ignition flame front faster than the speed of sound.

2: Fine solid powders or dusts which can ignite with contact with air, have an MIE <3 mJ, or have a Kst value >200 & ≤299, and/or would have an ignition flame front faster than the speed of sound.

1.3: Fine solid powders or dusts which have an MIE >3 mJ <500mJ, and a Kst ≥25<200 mJ.

1.2: Fine solid powders or dusts which have an MIE >3 mJ <500mJ, and a Kst <25, or MIE >500mJ and Kst ≥25 but <200 mJ.

1.1: Fine solid powders or dusts which have an MIE >10 J and a positive Kst value <25.

0-CS: Materials that will not burn.

**Revision Date:**

10/08/2018

**Further Information:**

Additional information is available by request.

**Disclaimer:**

The Lincoln Electric Company urges each end user and recipient of this SDS to study it carefully. See also www.lincolnelectric.com/safety. If necessary, consult an industrial hygienist or other expert to understand this information and safeguard the environment and protect workers from potential hazards associated with the handling or use of this product. This information is believed to be accurate as of the revision date shown above. However, no warranty, expressed or implied, is given. Because the conditions or methods of use are beyond Lincoln Electric’s control, we assume no liability resulting from the use of this product. Regulatory requirements are subject to change and may differ between various locations. Compliance with all applicable Federal, State, Provincial, and local laws and regulations remain the responsibility of the user.

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