1. Product and Company Identification

1.1 Product identifiers

Product Name: Silvasod™ Silver Brazing Alloys (multiple products - see section 3)
Producer: FJ Feddersen, Inc.
Product Number: Not available
CAS-No.: Not available - mixture

1.2 Identified uses of the product and uses advised against

Identified Uses: Silver brazing alloys, metal brazing

1.3 Details of the chemical supplier

Company: FJ Feddersen, Inc.
Address: 7501 Corporate Park Drive
          Loudon, TN 37774
          USA
TelephoneNumber: +1 (865) 408-1545

1.4 Emergency phone number

Emergency phone number: +1 (800) 424-9300 (CHEMTREC Emergency Telephone, 24 hrs-a-day / 7 days-a-week)

2. Hazards Identification

2.1 Classification of the substance or mixture according to GHS

GHS Class:
- Acute toxicity, oral (Category 4), H302
- Sensitization, skin (Category 1), H317
- Specific target organ toxicity, single exposure (Category 3), Lungs, H335
- Carcinogenicity (Category 2), H351
- Specific target organ toxicity, repeated exposure (Category 1), Lungs, H372

2.2 GHS Label elements, including precautionary statements

GHS Pictograms

Signal word: Danger

Hazard statements:
- H302 - Harmful if swallowed
- H317 - May cause an allergic skin reaction
- H335 - May cause respiratory irritation
- H351 - Suspected of causing cancer
- H372 - Causes damage to organs (lungs) through prolonged or repeated exposure if inhaled

Precautionary statements:
- P202 - Do not handle until all safety precautions have been read and understood.
- P260 - Do not breathe dust/fume/gas/mist/vapours/spray.
- P261 - Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
- P264 - Wash skin thoroughly after handling.
- P270 - Do not eat, drink, or smoke when using this product.
- P271 - Use only outdoors or in a well-ventilated area.
- P272 - Contaminated clothing should not be allowed out of the workplace.
- P280 - Wear protective gloves/protective clothing/eye protection/face protection.
- P301 + P312 - IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell.
- P302 + P352 - IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.
P308 + P313 - IF exposed or concerned: Get medical advice/attention.
P330 - Rinse mouth.
P333 + P313 - If skin irritation or rash occurs: Get medical advice/attention.
P361 + P362 - Remove/Take off immediately all contaminated clothing and wash before reuse.
P405 + P403 + P233 - Store locked up and in a well-ventilated place. Keep container tightly closed.
P501 - Dispose of contents/container to an approved waste disposal plant.

2.3 **Hazards not otherwise classified (HNOC) or not covered by GHS**
Potential route of overexposure to this product may include eye and skin contact, and inhalation of excessive amounts of dust or heat-released vapors. Ingestion is not expected to be a significant route of exposure for this product under normal use conditions.
Product is a solid material having minimal odor. Vapors and other heat-released air emissions may be irritating to the eyes, skin, and respiratory system. Contact with molten material may cause serious thermal burns.

### 3. Composition/Information on Ingredients

#### 3.1 Product mixture

**Synonyms**
Silver brazing alloys, metal alloys

**Formula**
Mixture

**Molecular wt**
Mixture

**CAS-No.**
Mixture

**EC-No.**
Mixture

**NOMINAL COMPOSITION**

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Bag-No.</th>
<th>Ag</th>
<th>Cu</th>
<th>Zn</th>
<th>Ni</th>
<th>Sn</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silvasod™25</td>
<td>25</td>
<td>25</td>
<td>43</td>
<td>30</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silvasod™30</td>
<td>BAg-20</td>
<td>30</td>
<td>38</td>
<td>32</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silvasod™35</td>
<td>Bag-35</td>
<td>35</td>
<td>32</td>
<td>33</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silvasod™38T</td>
<td>BAg-34</td>
<td>38</td>
<td>32</td>
<td>28</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silvasod™40</td>
<td>40</td>
<td>40</td>
<td>30.5</td>
<td>29.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silvasod™40 Ni2</td>
<td>BAg-4</td>
<td>40</td>
<td>30</td>
<td>28</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silvasod™40 Ni5</td>
<td>40</td>
<td>40</td>
<td>30</td>
<td>25</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silvasod™40T</td>
<td>BAg-28</td>
<td>40</td>
<td>30</td>
<td>28</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silvasod™45</td>
<td>BAg-5</td>
<td>45</td>
<td>30</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silvasod™45T</td>
<td>BAg-36</td>
<td>45</td>
<td>27</td>
<td>25</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silvasod™50</td>
<td>50</td>
<td>50</td>
<td>34</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silvasod™50N</td>
<td>BAg-24</td>
<td>50</td>
<td>20</td>
<td>28</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silvasod™54</td>
<td>54</td>
<td>54</td>
<td>40</td>
<td>5</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silvasod™56</td>
<td>BAg-7</td>
<td>56</td>
<td>22</td>
<td>17</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silvasod™58</td>
<td>57.5</td>
<td>32.5</td>
<td>7</td>
<td>3 Mn</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silvasod™60</td>
<td>60</td>
<td>60</td>
<td>25</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silvasod™60T</td>
<td>60</td>
<td>60</td>
<td>30</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silvasod™72</td>
<td>BAg-8</td>
<td>72</td>
<td>28</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks**
Ag: Silver; Cu: Copper; Zn: Zinc; Ni: Nickel; Sn: Tin; Mn: Manganese
Silver - CAS-No. 7440-22-4
Copper - CAS-No. 7440-50-8
Zinc - CAS-No. 7440-66-6
Nickel - CAS-No. 7440-02-0
Tin - CAS-No. 7440-31-5
Manganese - CAS-No. 7439-96-5
There are no additional hazardous ingredients greater than or equal to 1.0 wt% concentration or carcinogenic ingredients greater than or equal to 0.1 wt% concentration.

The information presented herein is supplied as a guide to those who handle or use this product. Safe work practices must be employed when working with any materials. It is important that the end user makes a determination regarding the adequacy of the safety procedures employed during the use of this product. Fumes generated during brazing operations may be irritating to the skin and eyes.

4. First Aid Measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

Skin contact
Keep away from open cuts and irritated skin. If skin has contact with molten material, place affected area under cold running water. Seek medical attention for removal of material from the affected area. Consult a physician if symptoms occur.

Eye contact
If dust or vapors contacts the eyes rinse thoroughly with plenty of water for at least 15 minutes and consult a physician. If molten material contacts eyes, rinse with water and seek medical attention immediately.

Inhalation
If dust or vapors are inhaled, move person to fresh air. Consult a physician if difficulties in breathing or other symptoms occur.

Ingestion
Not an expected route of exposure. Rinse mouth with water and consult a physician if gastrointestinal or other symptoms occur.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms and effects
The most important known symptoms and effects are described in the labelling (see section 2.2) and in section 11.

4.3 Indication of any immediate medical attention and special treatment needed

Other first aid
No data available

5. Fire Fighting Measures

5.1 Suitable (and unsuitable) extinguishing media

Suitable extinguishing media
Use alcohol-resistant foam, dry chemical or carbon dioxide. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

5.2 Special hazards arising from the substance or mixture

Special hazards
Thermal decomposition can lead to release of irritating gases and vapors. Keep product and empty container away from heat and sources of ignition. Decomposition products may include the following materials: metal oxides.

5.3 Advice for firefighters

Protective equipment
Wear self-contained breathing apparatus for firefighting if necessary.

6. Accidental Release Measures

6.1 Personal precautions, protective equipment, and emergency procedures

Personal precautions
Avoid contact with irritated skin and prevent dust from contacting eyes. Avoid breathing vapors, mist or dust. Ensure adequate ventilation in areas where dust can accumulate. Remove all sources of ignition. Molten rods can cause serious skin burns and eye damage. Do not eat or drink while handling these products. Dust can accumulate in low areas when dealing with large quantities. For personal protection see section 8.

Follow the requirements of the Federal Occupational Safety and Health Welding and Cutting Standard (29 CFR 1910 Subpart Q) and the safety standards of the American National Standards Institute for welding and cutting (ANSI Z49.1).

6.2 Environmental precautions

Environmental precautions
Prevent excessive dust runoff into sewers and drains. Recover as much of the material as possible. Prevent further leakage and safe to do so.

6.3 Methods and materials for containment and cleaning up

Methods for cleanup
Move containers from spill area. Prevent entry into sewers, water courses, basements or confined areas. Contain and collect spillage with a shovel or mechanical means and place in container for disposal according to local regulations (see Section 13). Prevent accumulation of vapours/ dust during clean up. Keep in suitable, closed containers for disposal. Contain spillage.
6.4 References to other sections

Other references

For disposal see section 13.

7. Handling and Storage

7.1 General hygiene considerations

General hygiene

Avoid contact of dust with eyes. Avoid inhalation of vapor or dust. Use local exhaust or general dilution ventilation to control exposure and dust within applicable limits. For precautions see section 2.2. Wash hands after use. Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to dust overexposures.

7.2 Precautions for safe handling

Safe handling precautions

Keep container tightly closed in a dry and well-ventilated place. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

7.3 Conditions for safe storage, including any incompatibilities

Other storage conditions

Store product in a dry environment, away from strong bases and oxidizers. Storage in an atmosphere that is wet, moist, or highly humid may lead to corrosion of these products. Store away from incompatible materials (see Section 10, Stability and Reactivity). Apart from the uses mentioned in section 1.2 no other specific uses are stipulated.

8. Exposure Controls/Personal Protection

8.1 Control and exposure limits recommended by the chemical manufacturer

Use respirator or air supplied respirator when brazing or soldering in a confined space, or where local exhaust or ventilation is not sufficient to keep exposure values within safe limits. Use special care when brazing and soldering painted or coated steels since hazardous substances from the coating may be emitted. Wear hand, head, eyes, ear and body protection like welders gloves, helmet or face shield with filter lens, safety boots, apron, arm and shoulder protection. Keep protective clothing clean and dry.

Use industrial hygiene monitoring equipment to ensure that exposure does not exceed applicable national exposure limits. The following limits can be used as guidance.

<table>
<thead>
<tr>
<th>Chemical</th>
<th>CAS-No.</th>
<th>ACGIH TLV, mg/m³</th>
<th>OSHA PEL, mg/m³</th>
<th>IDLH, mg/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper</td>
<td>7440-50-8</td>
<td>0.2 (fume) 1 (dust, mist)</td>
<td>0.1 (fume) 1 (dust, mist)</td>
<td>100</td>
</tr>
<tr>
<td>Manganese</td>
<td>7439-96-5</td>
<td>0.2</td>
<td>1 (vacated) 5 - STEL (ceiling) 3 - STEL (vacated)</td>
<td>500</td>
</tr>
<tr>
<td>Nickel</td>
<td>7440-02-0</td>
<td>0.2</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Silver</td>
<td>7440-22-4</td>
<td>0.01</td>
<td>0.01</td>
<td>10</td>
</tr>
<tr>
<td>Tin</td>
<td>7440-31-5</td>
<td>2</td>
<td>2</td>
<td>100</td>
</tr>
<tr>
<td>Zinc</td>
<td>7440-66-6</td>
<td>5 (fume) 10 (dust) 10 - STEL (fume)</td>
<td>5 (fume) 5 (dust) 15 (respirable dust) 5 (respirable dust, vacated)</td>
<td></td>
</tr>
</tbody>
</table>

8.2 Appropriate engineering controls

Engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of day. Use adequate ventilation where dust forms to keep concentration under exposure control limits. Keep away from high temperatures and sources of ignition.

8.3 Individual protection measures, such as personal protective equipment

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multipurpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).
Eye/face protection
Safety glasses with side-shields conforming to EN166 are recommended. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166 (EU).

Hand protection
If handling with gloves, gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body protection
Wear impervious clothing. The type of protective equipment must be selected according to the concentration and amount of the substance at the specific workplace.

9. Physical and Chemical Properties

9.1 Information on basic physical and chemical properties

- Appearance: Metal alloy rods and strips, various colors
- Odor: No data available
- Odor threshold: No data available
- pH: No data available
- Melting/freezing point: >600°C (>1,112°F)
- Boiling point: No data available
- Flash point: No data available
- Evaporation rate: No data available (solid)
- Flammability (solid, gas): No data available
- Upper/lower flammability or explosive limits: Upper (UEL): No data available, Lower (LEL): No data available
- Vapor pressure: Approximately zero (solid)
- Vapor density: No data available (solid)
- Relative density: 8 - 11 (estimated)
- Water solubility: Insoluble
- Partition coefficient: No data available
- Auto-ignition temp: No data available
- Decomposition temp: No data available
- Viscosity: No data available

10. Stability and Reactivity

10.1 Reactivity
Reactivity: No data available

10.2 Chemical stability
Chemical stability: Stable under ordinary conditions of use and storage.

10.3 Possibility of hazardous reactions
Hazardous reactions: No data available

10.4 Conditions to avoid
Conditions to avoid: Contact with incompatible chemicals and exposure to extremely high temperatures.

10.5 Incompatible materials
Incompatible materials: Strong acids, strong oxidizers, acetylene, halogenated hydrocarbons, halogens, ammonium nitrate, sulfur, potassium, alkali carbonates, alkali hydroxides, glass, other silica-based compounds.

10.6 Hazardous decomposition products
Hazardous products: None under normal processing. In the event of fire, see section 5.

11. Toxicological Information

11.1 Information on toxicological effects
Acute toxicity
- Acute oral toxicity: Copper - Rat LD50 - 300 mg/kg, Manganese - Rat LD50 - 9,000 mg/kg
Nickel - Rat LD50 - >5,000 mg/kg
Silver - Rat LD50 - >5,000 mg/kg
Zinc - Rat LD50 - >5,000 mg/kg

Acute intravenous toxicity No data available
Acute dermal toxicity No data available
Acute inhalation toxicity No data available

Skin corrosion/irritation
Vapors or dust may cause irritation to skin

Serious eye damage/eye irritation
Vapors or dust may cause irritation to eyes

Respiratory or skin sensitization
May be sensitizing to respiratory system
May be sensitizing to skin

Germ cell mutagenicity
No data available

Carcinogenicity
No data available

Suspected cancer agent
No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen.

Reproductive toxicity
No data available

Aspiration hazard
No data available

12. Ecological Information

12.1 Ecotoxicity (aquatic and terrestrial)

Ecotoxicity
Manganese - Toxicity to daphnia and other aquatic invertebrates EC50 - Daphnia magna (Water flea) - 40 mg/l - 48 h
Nickel - Toxicity to fish LC50 - Cyprinus carpio (Carp) - 1.3 mg/l - 96 h; Toxicity to daphnia and other aquatic invertebrates - EC50 - Daphnia magna (Water flea) - 1 mg/l - 48 h

12.2 Persistence and degradability

Degradability No data available

12.3 Bioaccumulation potential

Bioaccumulation No data available

12.4 Mobility in soil

Mobility in soil No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment Not available as chemical safety assessment not required/not conducted.
13. Disposal Considerations

13.1 Waste treatment methods

Waste treatment disposal

For consumer use, dispose of in trash can. Waste disposal must be in accordance with appropriate Federal, State, and local regulations.

14. Transport Information

DOT

Not dangerous goods.

IMDG

Not dangerous goods.

IATA

Not dangerous goods.

15. Regulatory Information

15.1 Safety, health, and environmental regulations specific to the product or mixture

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Acute health hazard, chronic health hazard.

TSCA

All components of this product are on the TSCA inventory or are exempt from TSCA inventory requirements.

16. Other Information

HMIS Rating

Health hazard - 2
Flammability - 0
Physical Hazard - 0

NFPA Rating

Health hazard - 2
Fire Hazard - 0
Reactivity Hazard - 0

Revision Date

8 February 2017

The information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof. FJ Feddersen, Inc. assumes no responsibility for injury to the vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, FJ Feddersen, Inc. assumes no responsibility for injury to vendee or third persons proximately caused by use of the material even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in his use of the material.

Abbreviations and acronyms

IMDG - International Maritime Code for Dangerous Goods
IATA - International Air Transport Association
GHS - Globally Harmonized System of Classification and Labelling of Chemicals
PBT - Persistent, bioaccumulative and toxic assessment
vPvB - Very persistent and very bioaccumulative assessment
ACGIH - American Conference of Governmental Industrial Hygienists
NIOSH - National Institute for Occupational Safety and Health
TLV - Threshold Limit Values
CAS - Chemical Abstracts Service (division of the American Chemical Society)
NFPA - National Fire Protection Association
HMIS - Hazardous Materials Identification System
CFR - Code of Federal Regulations
SARA - Superfund Amendments and Reauthorization Act
DOT - US Department of Transportation
EC50 - Half maximal effective concentration
LD50 - Median lethal dose
LC50 - Median lethal concentration
SDS - Safety Data Sheet
PEL - Permissible Exposure Limit
TSCA - Toxic Substances Control Act