Section 1 Identification

Product identifiers
Product name: Freeman Optical Soluble Wax

Relevant identified uses of the substance or mixture and uses advised against
Identified uses: Investment casting wax

Details of the supplier of the safety data sheet
Freeman Manufacturing and Supply Company
1101 Moore Road, Avon, OH 44011
Phone (440) 934-1902
FAX (440) 934-7200

24 Hour emergency telephone number: CHEMTREC (800) 424-9300

Section 2 Hazards Identification

Hazard classification
This substance is not hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29CFR 1910.1200.

Section 3 Composition/Information on Ingredients

Mixture

<table>
<thead>
<tr>
<th>Ingredient Name</th>
<th>CAS Number</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polyethylene glycol</td>
<td>25322-68-3</td>
<td>70-100%</td>
</tr>
<tr>
<td>1-Vinyl-2-pyrrolidine, -vinyl acetate polymer</td>
<td>25086-89-9</td>
<td>0-20%</td>
</tr>
<tr>
<td>Polyethylene glycol compound</td>
<td>42617-82-3</td>
<td>0-10%</td>
</tr>
</tbody>
</table>

Section 4 First Aid Measures

Description of first aid measures
General advice: No hazards which require special first aid measures.
If inhaled: Move person into fresh air. If not breathing, give artificial respiration.
In case of skin contact: Wash off with soap and plenty of water.
In case of eye contact: Flush eyes with water for several minutes. Remove contact lenses after the initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist.
If swallowed: Never give anything by mouth to an unconscious person. Rinse mouth with water. If symptoms persist, consult a physician.

Most important symptoms and effects, both acute and delayed
No symptoms known or expected.

Indication of any immediate medical attention and special treatment needed
Notes to physician: Absorption may be promoted by damaged skin. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.
### Section 5 Fire-Fighting Measures

**Suitable extinguishing media**
- Use water fog or fine spray, alcohol-resistant foam, dry chemical or carbon dioxide.

**Unsuitable extinguishing media**
- Do not use direct water stream, may spread fire.

**Special hazards arising from the mixture**
- Product is a waxy solid and is not expected to form dust. Organic dusts at sufficient concentration may form explosive mixtures in air.
- During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Carbon dioxide, Carbon monoxide.

**Advice for fire-fighters**
- Wear self-contained breathing apparatus for firefighting if necessary.

### Section 6 Accidental Release Measures

**Personal precautions, protective equipment and emergency procedures**
- Avoid dust formation. Avoid breathing dust, vapors, mist or gas.
- Use appropriate safety equipment. For additional information, refer to Section 8.

**Environmental precautions**
- Prevent from entering soil, ditches, sewers, waterways and/or groundwater.

**Methods and materials for containment and cleaning up**
- Contain spilled material if possible. Collect in suitable and properly labeled containers.
- See Section 13 for additional information.

### Section 7 Handling and Storage

**Precautions for safe handling**
- Use normal precautions when handling hot molten liquid solutions. Do not breathe fumes or vapor from heated material. Do not allow hot material to contact skin. Avoid creating dust. Provide appropriate exhaust ventilation if dust is formed.

**Conditions for safe storage, including any incompatibilities**
- Store at ambient temperatures in closed containers. This material can catch fire if overheated. Do not heat this material above the flash point. Keep away from flame and open electrical coils. No chemical incompatibilities.

### Section 8 Exposure Controls/Personal Protection

**Control parameters**
- Ingredients with occupational exposure limits to be monitored.

**Exposure controls**
- **Appropriate engineering controls**
  - Local ventilation is recommended – mechanical ventilation may be used.

**Personal protective equipment**
- **Eye/face protection**
  - Use a full-face shield and safety glasses if handling heated material. With product at ambient temperatures, use safety glasses equipped with side shields.
Hand protection
Use gloves chemically resistant to this material when prolonged or frequent repeated contact could occur. If hands are cut or scratched, use gloves chemically resistant to this material even for brief exposures. Examples of preferred glove barrier materials include: neoprene, polyvinyl chloride (PVC) or butyl rubber gloves. When handling product at elevated temperatures, use heat-resistant gloves.

Skin and body protection
Prevent skin contact when handling heated material. Use insulated, heat resistant clothing such as apron or slicker suit.

Respiratory protection
The need for respiratory protection is not anticipated under normal use conditions and with adequate ventilation. If elevated airborne concentrations above applicable workplace exposure levels are anticipated, a NIOSH-approved organic vapor respirator equipped with a dust/mist prefILTER should be used.

Safety Stations
Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work area.

General Hygienic Practices
Avoid breathing dust, vapor or mist. Avoid contamination of food, beverages, or smoking materials. Wash thoroughly after handling, and before eating, drinking or smoking. Remove contaminated clothing promptly and clean thoroughly before reuse.

Section 9 Physical and Chemical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Translucent waxy solid</td>
</tr>
<tr>
<td>Color</td>
<td>White to light yellow</td>
</tr>
<tr>
<td>Odor</td>
<td>Odorless</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>No test data available</td>
</tr>
<tr>
<td>pH</td>
<td>4.0-8.0</td>
</tr>
<tr>
<td>Melting Point</td>
<td>&gt;144°F (&gt;62°C)</td>
</tr>
<tr>
<td>Initial boiling point/boiling range</td>
<td>No test data available</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>No test data available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Not ignitable</td>
</tr>
<tr>
<td>Upper/lower flammability</td>
<td>No test data available</td>
</tr>
<tr>
<td>Flash Point (closed cup)</td>
<td>Approximately 475°F (246°C)</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>No test data available</td>
</tr>
<tr>
<td>Vapor density</td>
<td>No test data available</td>
</tr>
<tr>
<td>Relative density (g/cc)</td>
<td>1.4 ±0.1</td>
</tr>
<tr>
<td>Water solubility</td>
<td>72% at 68°F (20°C) Estimated</td>
</tr>
<tr>
<td>Coefficient: n-octanol/ water</td>
<td>No test data available</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>No test data available</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No test data available</td>
</tr>
<tr>
<td>Viscosity</td>
<td>Solid at room temperature</td>
</tr>
</tbody>
</table>
Section 10 Stability and Reactivity

Reactivity
No dangerous reactions known under conditions of normal use.

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
No dangerous reactions known under conditions of normal use. Stable.

Conditions to avoid
Exposure to elevated temperatures can cause product to decompose. Generation of gas during decomposition can cause pressure in closed system.

Incompatible materials
Avoid contact with: Strong acids. Strong bases. Strong oxidizers.

Hazardous decomposition products
Decomposition products depend upon temperature, air supply and the presence of other materials. Decomposition products can include and are not limited to: Aldehydes. Alcohols. Ethers. Carbon dioxide. Carboxylic acids. Polymer fragments.

Section 11 Toxicological Information

Acute toxicity

<table>
<thead>
<tr>
<th>Ingredient Name</th>
<th>Acute oral toxicity</th>
<th>Acute dermal toxicity</th>
<th>Acute inhalation toxicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polyethylene glycol (25322-68-3)</td>
<td>LD50, Rat, &gt;10,000 mg/kg Estimated</td>
<td>LD50, Rabbit, &gt;20,000 mg/kg</td>
<td>LC50, Rat, 6 Hour, Aerosol, &gt;2.5 mg/l No death occurred at this concentration</td>
</tr>
<tr>
<td>1-Vinyl-2-pyrrolidine, -vinyl acetate polymer (25086-89-9)</td>
<td>LD50, Rat, &gt;5,000 mg/kg Remarks: Based on similar product</td>
<td>Not available</td>
<td>Not available</td>
</tr>
<tr>
<td>Polyethylene glycol compound (42617-82-3)</td>
<td>LD50,Rat, &gt;15,000 mg/kg</td>
<td>Not available</td>
<td>Not available</td>
</tr>
</tbody>
</table>

Skin corrosion and/or irritation
Prolonged exposure not likely to cause significant skin irritation. May cause more severe response if skin is abraded (scratched or cut).

Serious eye damage or irritation
May cause slight temporary eye irritation. Corneal damage is unlikely.

Respiratory and skin sensitization
Not available

Germ cell mutagenicity
Not available

Aspiration hazard
No data available
### Section 11 Toxicological Information continued

**Carcinogenicity**

<table>
<thead>
<tr>
<th>Source</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IARC</td>
<td>No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.</td>
</tr>
<tr>
<td>NTP</td>
<td>No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.</td>
</tr>
<tr>
<td>OSHA</td>
<td>No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.</td>
</tr>
</tbody>
</table>

**Reproductive toxicity**

No data available

**Specific target organ toxicity - single exposure**

No data available

**Specific target organ toxicity - repeated exposure**

Recent findings of kidney failure and death in burn patients, as well as some studies using animal burn models, suggest that polyethylene glycol may have been a factor.

### Section 12 Ecological Information

#### Ecotoxicity

<table>
<thead>
<tr>
<th>Ingredient Name</th>
<th>Toxicity to fish</th>
<th>Toxicity to daphnia and other aquatic invertebrates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polyethylene glycol (25322-68-3)</td>
<td>Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/LL50 &gt;100 mg/l in the most sensitive species tested).</td>
<td>Not available</td>
</tr>
<tr>
<td>1-Vinyl-2-pyrrolidinone, vinyl acetate polymer (25086-89-9)</td>
<td>Not available</td>
<td>EC 50 (Water flea (Daphnia magna)): &gt;1,000 mg/l Exposure time: 48 hours</td>
</tr>
<tr>
<td>Polyethylene glycol compound (42617-82-3)</td>
<td>LC50 (Danio rerio (zebra fish)): &gt;100 mg/l Exposure time: 96 hours</td>
<td>Not available</td>
</tr>
</tbody>
</table>

#### Persistence and degradability

<table>
<thead>
<tr>
<th>Ingredient Name</th>
<th>Biodegradability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polyethylene glycol (25322-68-3)</td>
<td>No data available</td>
</tr>
<tr>
<td>1-Vinyl-2-pyrrolidinone, vinyl acetate polymer (25086-89-9)</td>
<td>Concentration: 100 mg/l Remarks: Not readily biodegradable</td>
</tr>
</tbody>
</table>

**Bioaccumulative potential**

No bioconcentration is expected because of the water solubility.

**Mobility in soil**

No data available
### Section 13 Disposal Considerations

**Disposal methods**

Dispose of in accordance with all applicable federal, provincial/state, and local regulations.

### Section 14 Transport Information

**DOT, TDG, IMDG, IATA:** Not regulated

### Section 15 Regulatory Information

**SARA Title III (EPCRA) Sections 311 and 312**

This product is not a hazardous chemical under 29CFR 1910.1200.

**SARA Title III (EPCRA) Section 313**

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.

**Pennsylvania Worker and Community Right-To-Know Act**

1-Vinyl-2-pyrrolidine, -vinyl acetate polymer 25086-89-9 0-20%

**California Proposition 65**

This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute.

**TSCA Inventory Status**

All components of this product are in compliance with the inventory listing requirements of the U.S. Toxic Substance Control Act (TSCA) Chemical Substance Inventory.

**Canadian DSL**

All components of this product are on the Canadian DSL

### Section 16 Other Information

**Disclaimer**

The following supersedes Buyer’s documents. SELLER MAKES NO REPRESENTATION OR WARRANTY, EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. No statements herein are to be construed as inducements to infringe any relevant patent. Under no circumstances shall Seller be liable for incidental, consequential or indirect damages for alleged negligence, breach of warranty, strict of liability arising in connection with the product(s). Buyer’s sole remedy and Seller's sole liability for any claims shall be Buyer’s purchase price. Data and results are based on controlled lab work and must be confirmed by Buyer by testing for its intended conditions of use. The product(s) has not been tested for, and is therefore not recommended for, uses for which prolonged contact with mucous membranes, abraded skin, or blood is intended; or for uses for which implantation within the human body is intended.

Revision Date: May 22, 2017

Replacing Version: May 1, 2015

Date of Preparation: May 22, 2017