SECTION 1: Identification

1.1. Identification

Product form : Mixture
Trade name : HANDY FLO 876
Product code : A00001157

1.2. Recommended use and restrictions on use

Recommended use : Binders for metal brazing

1.3. Supplier

Lucas-Milhaupt, Inc.
5656 South Pennsylvania Ave.
Cudahy, WI 53110 - USA
T (414)-769-6000
LM_SDSinfo@lucasmilhaupt.com - www.Lucasmilhaupt.com

1.4. Emergency telephone number

Emergency number : CHEMTREC within the USA and Canada: 1-800-424-9300
CHEMTREC outside the USA and Canada +1 701-741-5970

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS US classification
Acute toxicity (oral), Category 4 H302 - Harmful if swallowed.
Skin corrosion/irritation, Category 1B H314 - Causes severe skin burns and eye damage.
Serious eye damage/eye irritation, Category 1 H318 - Causes serious eye damage.

Full text of H statements : see section 16

2.2. GHS Label elements, including precautionary statements

GHS US labelling
Hazard pictograms (GHS US) :

Signal word (GHS US) : Danger
Hazard statements (GHS US) :
H302 - Harmful if swallowed.
H314 - Causes severe skin burns and eye damage.
H318 - Causes serious eye damage.

Precautionary statements (GHS US) :
P260 - Do not breathe dust/fume/gas/mist/vapours/spray.
P264 - Wash hands, forearms and face thoroughly after handling.
P270 - Do not eat, drink or smoke when using this product.
P280 - Wear protective gloves/protective clothing/eye protection/face protection.
P301+P312 - If swallowed: Call a poison center/doctor if you feel unwell
P301+P330+P331 - If swallowed: Call a poison center/doctor if you feel unwell: rinse mouth. Do NOT induce vomiting
P303+P361+P353 - If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 - Immediately call a poison center/doctor
P321 - Specific treatment (see supplemental first aid instruction on this label)
P330 - Rinse mouth.
P363 - Wash contaminated clothing before reuse.
P405 - Store locked up.
P501 - Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation
2.3. Other hazards which do not result in classification
No additional information available

2.4. Unknown acute toxicity (GHS US)
Not applicable

SECTION 3: Composition/information on ingredients

3.1. Substances
Not applicable

3.2. Mixtures

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinc chloride</td>
<td>(CAS-No.) 7646-85-7</td>
<td>51.3 - 54</td>
</tr>
<tr>
<td>Ammonium chloride</td>
<td>(CAS-No.) 12125-02-9</td>
<td>6</td>
</tr>
</tbody>
</table>

Full text of hazard classes and H-statements : see section 16

SECTION 4: First-aid measures

4.1. Description of first aid measures
First-aid measures general : Call a physician immediately.
First-aid measures after inhalation : Remove person to fresh air and keep comfortable for breathing. Call a poison center or a doctor if you feel unwell.
First-aid measures after skin contact : Rinse skin with water/shower. Take off immediately all contaminated clothing. Call a physician immediately.
First-aid measures after eye contact : Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician immediately.
First-aid measures after ingestion : Rinse mouth. Do not induce vomiting. Call a physician immediately.

4.2. Most important symptoms and effects (acute and delayed)
Symptoms/effects after inhalation : May cause respiratory irritation.
Symptoms/effects after skin contact : Irritation. Burns.
Symptoms/effects after eye contact : Eye irritation. Serious damage to eyes.
Symptoms/effects after ingestion : Burns.

4.3. Immediate medical attention and special treatment, if necessary
Treat symptomatically.

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media
Suitable extinguishing media : Dry powder. Water spray. Foam.
Unsuitable extinguishing media : Water.

5.2. Specific hazards arising from the chemical
Fire hazard : May form combustible dust concentrations in air.
Reactivity : The product is non-reactive under normal conditions of use, storage and transport.

5.3. Special protective equipment and precautions for fire-fighters
Protection during firefighting : Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel
Emergency procedures : Ventilate spillage area. Avoid contact with skin and eyes. Do not breathe dust/fume/gas/mist/vapours/spray.

6.1.2. For emergency responders
Protective equipment : Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".

6.2. Environmental precautions
Avoid release to the environment.
6.3. Methods and material for containment and cleaning up

For containment: Collect spillage.
Methods for cleaning up: Mechanically recover the product.
Other information: Dispose of materials or solid residues at an authorized site.

6.4. Reference to other sections

For further information refer to section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling: Avoid contact with skin and eyes. Wear personal protective equipment. Do not breathe dust/fume/gas/mist/vapours/spray. Use only outdoors or in a well-ventilated area. Avoid dust formation.
Hygiene measures: Wash contaminated clothing before reuse. Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions: Store in a well-ventilated place. Keep cool. Store locked up. Keep container tightly closed.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

<table>
<thead>
<tr>
<th>Ammonium chloride (12125-02-9)</th>
<th>ACGIH</th>
<th>ACGIH TWA (mg/m³)</th>
<th>10 mg/m³ (fume)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH</td>
<td>ACGIH</td>
<td>ACGIH STEL (mg/m³)</td>
<td>20 mg/m³ (fume)</td>
</tr>
<tr>
<td>NIOSH</td>
<td>NIOSH</td>
<td>NIOSH REL (TWA) (mg/m³)</td>
<td>10 mg/m³ (fume)</td>
</tr>
<tr>
<td>NIOSH</td>
<td>NIOSH</td>
<td>NIOSH REL (STEL) (mg/m³)</td>
<td>20 mg/m³ (fume)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Zinc chloride (7646-85-7)</th>
<th>ACGIH</th>
<th>ACGIH TWA (mg/m³)</th>
<th>1 mg/m³ (fume)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH</td>
<td>ACGIH</td>
<td>ACGIH STEL (mg/m³)</td>
<td>2 mg/m³ (fume)</td>
</tr>
<tr>
<td>OSHA</td>
<td>OSHA</td>
<td>OSHA PEL (TWA) (mg/m³)</td>
<td>1 mg/m³ (fume)</td>
</tr>
<tr>
<td>IDLH</td>
<td>IDLH</td>
<td>US IDLH (mg/m³)</td>
<td>50 mg/m³ (fume)</td>
</tr>
<tr>
<td>NIOSH</td>
<td>NIOSH</td>
<td>NIOSH REL (TWA) (mg/m³)</td>
<td>1 mg/m³ (fume)</td>
</tr>
<tr>
<td>NIOSH</td>
<td>NIOSH</td>
<td>NIOSH REL (STEL) (mg/m³)</td>
<td>2 mg/m³ (fume)</td>
</tr>
</tbody>
</table>

8.2. Appropriate engineering controls

Appropriate engineering controls: Ensure good ventilation of the work station.
Environmental exposure controls: Avoid release to the environment.

8.3. Individual protection measures/Personal protective equipment

Hand protection:
Protective gloves

Eye protection:
Safety glasses

Skin and body protection:
Wear suitable protective clothing

Respiratory protection:
In case of insufficient ventilation, wear suitable respiratory equipment

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state: Solid
HANDY FLO 876
Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour</td>
<td>No data available</td>
</tr>
<tr>
<td>Odour</td>
<td>No data available</td>
</tr>
<tr>
<td>Odour threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>pH</td>
<td>No data available</td>
</tr>
<tr>
<td>Melting point</td>
<td>No data available</td>
</tr>
<tr>
<td>Freezing point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Boiling point</td>
<td>No data available</td>
</tr>
<tr>
<td>Flash point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Relative evaporation rate (butylacetate=1)</td>
<td>No data available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Non flammable</td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative vapour density at 20 °C</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative density</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Solubility</td>
<td>No data available</td>
</tr>
<tr>
<td>Log Pow</td>
<td>No data available</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, kinematic</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>No data available</td>
</tr>
<tr>
<td>Explosive limits</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>No data available</td>
</tr>
<tr>
<td>Oxidising properties</td>
<td>No data available</td>
</tr>
</tbody>
</table>

9.2. Other information
No additional information available

SECTION 10: Stability and reactivity

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

10.2. Chemical stability
Stable under normal conditions.

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

10.4. Conditions to avoid
None under recommended storage and handling conditions (see section 7). Avoid dust formation. Heat. No flames, no sparks. Eliminate all sources of ignition.

10.5. Incompatible materials
Oxidizing agent.

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

SECTION 11: Toxicological information

11.1. Information on toxicological effects
Acute toxicity (oral) : Oral: Harmful if swallowed.
Acute toxicity (dermal) : Not classified
Acute toxicity (inhalation) : Not classified

ATE US (oral) 500 mg/kg bodyweight

Ammonium chloride (12125-02-9)

LD50 oral rat 1650 mg/kg
ATE US (oral) 1650 mg/kg bodyweight

Zinc chloride (7646-85-7)

LD50 oral rat 1100 mg/kg
LC50 inhalation rat (mg/l) <= 1975 mg/m³ (Exposure time: 10 min)
HANDY FLO 876
Safety Data Sheet
according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

<table>
<thead>
<tr>
<th>Zinc chloride (7646-85-7)</th>
<th>1100 mg/kg bodyweight</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATE US (oral)</td>
<td></td>
</tr>
<tr>
<td>Skin corrosion/irritation</td>
<td>Causes severe skin burns and eye damage.</td>
</tr>
<tr>
<td>Serious eye damage/irritation</td>
<td>Causes serious eye damage.</td>
</tr>
<tr>
<td>Respiratory or skin sensitisation</td>
<td>Not classified</td>
</tr>
<tr>
<td>Germ cell mutagenicity</td>
<td>Not classified</td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>Not classified</td>
</tr>
<tr>
<td>Reproductive toxicity</td>
<td>Not classified</td>
</tr>
<tr>
<td>STOT-single exposure</td>
<td>Not classified</td>
</tr>
<tr>
<td>STOT-repeated exposure</td>
<td>Not classified</td>
</tr>
<tr>
<td>Aspiration hazard</td>
<td>Not classified</td>
</tr>
<tr>
<td>Viscosity, kinematic</td>
<td>No data available</td>
</tr>
<tr>
<td>Symptoms/effects after inhalation</td>
<td>May cause respiratory irritation.</td>
</tr>
<tr>
<td>Symptoms/effects after skin contact</td>
<td>Irritation. Burns.</td>
</tr>
<tr>
<td>Symptoms/effects after eye contact</td>
<td>Eye irritation. Serious damage to eyes.</td>
</tr>
<tr>
<td>Symptoms/effects after ingestion</td>
<td>Burns.</td>
</tr>
</tbody>
</table>

SECTION 12: Ecological information

12.1. Toxicity
Ecology - general : The product is not considered harmful to aquatic organisms nor to cause long-term adverse effects in the environment. Very toxic to aquatic life with long lasting effects.

<table>
<thead>
<tr>
<th>Ammonium chloride (12125-02-9)</th>
<th>209 mg/l (Exposure time: 96 h - Species: Cyprinus carpio [static])</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC50 fish 1</td>
<td></td>
</tr>
</tbody>
</table>

12.2. Persistence and degradability
No additional information available

12.3. Bioaccumulative potential

<table>
<thead>
<tr>
<th>Zinc chloride (7646-85-7)</th>
<th>16000</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCF fish 1</td>
<td></td>
</tr>
</tbody>
</table>

12.4. Mobility in soil
No additional information available

12.5. Other adverse effects
No additional information available

SECTION 13: Disposal considerations

13.1. Disposal methods
Waste treatment methods : Dispose of contents/container in accordance with licensed collector’s sorting instructions.

SECTION 14: Transport information

Department of Transportation (DOT)
In accordance with DOT

Transport document description : UN1840 Zinc chloride, solution, 8, III
UN-No.(DOT) : UN1840
Proper Shipping Name (DOT) : Zinc chloride, solution
Class (DOT) : 8 - Class 8 - Corrosive material 49 CFR 173.136
Packing group (DOT) : III - Minor Danger
**Hazard labels (DOT)**: 8 - Corrosive

**Marine pollutant**: Yes (IMDG only)

**DOT Packaging Non Bulk (49 CFR 173.xxx)**: 203
**DOT Packaging Bulk (49 CFR 173.xxx)**: 241
**DOT Special Provisions (49 CFR 172.102)**: IB3 - Authorized IBCs: Metal (31A, 31B and 31N); Rigid plastics (31H1 and 31H2); Composite (31H21 and 31HA2, 31HB2, 31HN2, 31HD2 and 31HH2). Additional Requirement: Only liquids with a vapor pressure less than or equal to 110 kPa at 50 °C (1.1 bar at 122 °F), or 130 kPa at 55 °C (1.3 bar at 131 °F) are authorized, except for UN2672 (also see Special Provision IP8 in Table 2 for UN2672).
**T4**: 2.65 178.274(d)(2) Normal............. 178.275(d)(3)
**TP1**: The maximum degree of filling must not exceed the degree of filling determined by the following: Degree of filling = 97 / (1 + a (tr - tf)) Where: tr is the maximum mean bulk temperature during transport, and tf is the temperature in degrees celsius of the liquid during filling.
**DOT Packaging Exceptions (49 CFR 173.xxx)**: 154
**DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27)**: 5 L
**DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75)**: 60 L
**DOT Vessel Stowage Location**: A - The material may be stowed “on deck” or “under deck” on a cargo vessel and on a passenger vessel.
**Emergency Response Guide (ERG) Number**: 154
**Other information**: No supplementary information available.

**Transportation of Dangerous Goods**

Not applicable

**Transport by sea**

**Transport document description (IMDG)**: UN 1840 ZINC CHLORIDE SOLUTION, 8, III, MARINE POLLUTANT
**UN-No. (IMDG)**: 1840
**Proper Shipping Name (IMDG)**: ZINC CHLORIDE SOLUTION
**Class (IMDG)**: 8 - Corrosive substances
**Packing group (IMDG)**: III - substances presenting low danger
**Marine pollutant**: Yes (IMDG only)

**Air transport**

**Transport document description (IATA)**: UN 1840 Zinc chloride solution, 8, III
**UN-No. (IATA)**: 1840
**Proper Shipping Name (IATA)**: Zinc chloride solution
**Class (IATA)**: 8 - Corrosives
**Packing group (IATA)**: III - Minor Danger
**SECTION 15: Regulatory information**

**15.1. US Federal regulations**

<table>
<thead>
<tr>
<th>Component</th>
<th>State or local regulations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonium chloride (12125-02-9)</td>
<td>Listed on the United States TSCA (Toxic Substances Control Act) inventory</td>
</tr>
<tr>
<td>Zinc chloride (7646-85-7)</td>
<td>Listed on the United States TSCA (Toxic Substances Control Act) inventory</td>
</tr>
</tbody>
</table>

**CERCLA RQ**

- **5000 lb**
- **1000 lb**

**15.2. International regulations**

<table>
<thead>
<tr>
<th>Component</th>
<th>State or local regulations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonium chloride (12125-02-9)</td>
<td>Listed on the TCSI (Taiwan Chemical Substance Inventory)</td>
</tr>
<tr>
<td>Zinc chloride (7646-85-7)</td>
<td>Listed on the TCSI (Taiwan Chemical Substance Inventory)</td>
</tr>
</tbody>
</table>

**15.3. US State regulations**

<table>
<thead>
<tr>
<th>Component</th>
<th>State or local regulations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonium chloride(12125-02-9)</td>
<td>U.S. - Massachusetts - Right To Know List</td>
</tr>
<tr>
<td></td>
<td>U.S. - New Jersey - Right to Know Hazardous Substance List</td>
</tr>
<tr>
<td></td>
<td>U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List</td>
</tr>
<tr>
<td>Zinc chloride(7646-85-7)</td>
<td>U.S. - Massachusetts - Right To Know List</td>
</tr>
<tr>
<td></td>
<td>U.S. - New Jersey - Right to Know Hazardous Substance List</td>
</tr>
<tr>
<td></td>
<td>U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List</td>
</tr>
</tbody>
</table>

**SECTION 16: Other information**

According to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Full text of H-statements:

| H302 | Harmful if swallowed. |
| H314 | Causes severe skin burns and eye damage. |
| H318 | Causes serious eye damage. |

SDS US (GHS HazCom 2012)

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Lucas-Milhaupt, Inc.