1 PRODUCT AND COMPANY IDENTIFICATION

Trade name: 817 Soldering Flux
Relevant identified uses of the substance or mixture and uses advised against
No further relevant information available.

1.3 Details of the supplier of the safety data sheet
Manufacturer/Supplier:
Kester Inc.
800 West Thomdale Avenue
Itasca, IL 60143 USA
Tel (630) 616-4000
Tel International  00 1 630 616-4000

ITW Specialty Materials (Suzhou) Co., Ltd.
Heng Qiao Road
Wujiang Economic Development Zone
Suzhou, Jiangsu 215200 China
Tel +86 512 82060808

Kester GmbH
Ganghofer Strasse 45
D-82216 Gerolzhofen Germany
Tel +49 (0) 8142 4785 0

Information department: Product Compliance: EHS_Kester@kester.com
1.4 Emergency telephone number:
CHEMTREC 24-Hour Emergency Response  Telephone Number : (800) 424-9300
CHEMTREC 24-Hour Emergency Response (Outside US & Canada)  Telephone Number : (703) 527-3887

2 HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture
Classification according to Regulation (EC) No 1272/2008

GHS05 Corrosion
Skin Corr. 1B  H314  Causes severe skin burns and eye damage.
Eye Dam. 1    H318  Causes serious eye damage.

GHS07
Acute Tox. 4   H302  Harmful if swallowed.

Aquatic Acute 3 H402  Harmful to aquatic life.

2.2 Label elements
Labelling according to Regulation (EC) No 1272/2008
The product is classified and labeled according to the CLP regulation.
Hazard pictograms

GHS05  GHS07
### Signal word
Danger

### Hazard-determining components of labeling:
- Zinc chloride
- Hydrochloric Acid
- Ammonium chloride

### Hazard statements
- H302 Harmful if swallowed.
- H314 Causes severe skin burns and eye damage.
- H402 Harmful to aquatic life.

### Precautionary statements
- P280 Wear protective gloves/protective clothing/eye protection/face protection.
- P273 Avoid release to the environment.
- P264 Wash thoroughly after handling.
- P270 Do not eat, drink or smoke when using this product.
- P301 P330 P331 IF SWALLOWED: 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.
- P405 Store locked up.
- P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

### Classification system:
- NFPA ratings (scale 0 - 4)
  - Health: 3
  - Fire: 0
  - Reactivity: 0

- HMIS-ratings (scale 0 - 4)
  - Health: 3
  - Fire: 0
  - Reactivity: 0

### 2.3 Other hazards
- Results of PBT and vPvB assessment
  - PBT: Not applicable.
  - vPvB: Not applicable.

### 3 COMPOSITION OF MIXTURE

**Description:** Mixture of the substances listed below with nonhazardous additions.

<table>
<thead>
<tr>
<th>CAS No.</th>
<th>Description</th>
<th>% Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS: 7646-85-7 EINECS: 231-592-0</td>
<td>Zinc chloride</td>
<td>Skin Corr. 1B, H314; Eye Dam. 1, H318</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Acute Tox. 4, H302</td>
</tr>
<tr>
<td>CAS: 7647-01-0 EINECS: 231-595-7</td>
<td>Hydrochloric Acid</td>
<td>Skin Corr. 1B, H314; Eye Dam. 1, H318</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Acute Tox. 4, H302; STOT SE 3, H335</td>
</tr>
<tr>
<td>CAS: 12125-02-9 EINECS: 235-186-4</td>
<td>Ammonium chloride</td>
<td>Acute Tox. 4, H302; Eye Irrit. 2A, H319</td>
</tr>
</tbody>
</table>
4 FIRST AID MEASURES

4.1 Description of first aid measures
General information:
Immediately remove any clothing soiled by the product.
Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.
Follow general first aid procedures.
After inhalation: Supply fresh air; consult doctor in case of complaints.
After skin contact: Immediately wash with water and soap and rinse thoroughly.
After eye contact: Rinse opened eye for several minutes under running water. Then consult a doctor.
After swallowing: Seek immediate medical advice.
4.2 Most important symptoms and effects, both acute and delayed No further relevant information available.
4.3 Indication of any immediate medical attention and special treatment needed
No further relevant information available.

5 FIREFIGHTING MEASURES

5.1 Extinguishing media
Suitable extinguishing agents:
CO2, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
5.2 Special hazards arising from the substance or mixture In case of fire, the following can be released:
5.3 Advice for firefighters
Protective equipment: No special measures required.

6 ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation
6.2 Environmental precautions: Do not allow to enter sewers/surface or ground water.
6.3 Methods and material for containment and cleaning up:
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.
6.4 Reference to other sections
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.
Protective Action Criteria for Chemicals

| PAC-1: | CAS: 7646-85-7 | zinc chloride | 2 mg/m³ |
|        | CAS: 7647-01-0 | Hydrochloric Acid | 1.8 ppm |
|        | CAS: 12125-02-9 | ammonium chloride | 20 mg/m³ |

| PAC-2: | CAS: 7646-85-7 | zinc chloride | 800 mg/m³ |
|        | CAS: 7647-01-0 | Hydrochloric Acid | 22 ppm |
|        | CAS: 12125-02-9 | ammonium chloride | 54 mg/m³ |

| PAC-3: | CAS: 7646-85-7 | zinc chloride | 4,800 mg/m³ |
|        | CAS: 7647-01-0 | Hydrochloric Acid | 100 ppm |
Trade name: 817 Soldering Flux

| CAS: 12125-02-9 ammonium chloride | 330 mg/m³ |

7 HANDLING AND STORAGE

7.1 Precautions for safe handling: Prevent formation of aerosols.

Information about protection against explosions and fires: No special measures required.

7.2 Conditions for safe storage, including any incompatibilities

Storage:
Requirements to be met by storerooms and receptacles: Store in a cool location.

Information about storage in one common storage facility: Not required.

Further information about storage conditions: Keep receptacle tightly sealed.

7.3 Specific end use(s) No further relevant information available.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Additional information about design of technical systems: No further data; see item 7.

8.1 Control parameters

Components with limit values that require monitoring at the workplace:

<table>
<thead>
<tr>
<th>CAS: 7646-85-7 zinc chloride</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEL</td>
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<tr>
<td></td>
</tr>
<tr>
<td>REL</td>
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<tr>
<td>TLV</td>
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<table>
<thead>
<tr>
<th>CAS: 7647-01-0 Hydrochloric Acid</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEL</td>
</tr>
<tr>
<td>REL</td>
</tr>
<tr>
<td>TLV</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CAS: 12125-02-9 ammonium chloride</th>
</tr>
</thead>
<tbody>
<tr>
<td>REL</td>
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<tr>
<td></td>
</tr>
<tr>
<td>TLV</td>
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<td></td>
</tr>
</tbody>
</table>

Additional information:
PEL = Permissible Exposure Limit (OSHA)
TLV = Threshold Limit Value (ACGIH)
OSHA = Occupational Safety and Health Administration
ACGIH = American Conference of Governmental Industrial Hygienists

8.2 Exposure controls

Personal protective equipment:
General protective and hygienic measures:
The usual precautionary measures for handling chemicals should be followed.
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Avoid contact with the eyes and skin.
Breathing equipment:
Not necessary if room is well-ventilated.
Use suitable respiratory protective device in case of insufficient ventilation.

Protection of hands:
Protective gloves

Material of gloves:
Nitrile rubber, NBR
Natural rubber, NR

Penetration time of glove material:
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

Eye protection:
Safety glasses

9 PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

General Information

Appearance:
Form: Liquid
Color: Pale
Odor: Mild

pH-value at 20 °C (68 °F): < 1.4

Change in condition
Melting point/Melting range: Undetermined.
Boiling point/Boiling range: 113 °C (235 °F)

Flash point: Not applicable.
Auto igniting: Product is not selfigniting.

Danger of explosion: Product does not present an explosion hazard.

Vapor pressure at 20 °C (68 °F): 23 hPa (17 mm Hg)
Density at 20 °C (68 °F): 1.42 g/cm³ (11.85 lbs/gal)

Solubility in / Miscibility with
Water: Fully miscible.

Solvent content:
Organic solvents: 0.0 %
Water: 51.7 %
Solids content: 43.4 %

(Contd. on page 6)
10 STABILITY AND REACTIVITY

10.1 Reactivity: No further relevant information available.
10.2 Chemical stability
   Thermal decomposition / conditions to be avoided: No decomposition if used according to specifications.
10.3 Possibility of hazardous reactions: No dangerous reactions known.
10.4 Conditions to avoid: No further relevant information available.
10.5 Incompatible materials: No further relevant information available.
10.6 Hazardous decomposition products: No dangerous decomposition products known.

11 TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects
   Acute toxicity: Harmful if swallowed.

   LD/LC50 values that are relevant for classification:
   CAS: 7646-85-7 zinc chloride
   Oral LD50 350 mg/kg (rat)

   Primary irritant effect:
   on the skin: Causes severe skin burns and eye damage.
   on the eye: Causes serious eye damage.
   Sensitization: Based on available data, the classification criteria are not met.

   Additional toxicological information:
   Carcinogenic categories
   IARC (International Agency for Research on Cancer)
   CAS: 7647-01-0 Hydrochloric Acid
   NTP (National Toxicology Program)
   None of the ingredients is listed.
   OSHA-Ca (Occupational Safety & Health Administration)
   None of the ingredients is listed.

12 ECOLOGICAL INFORMATION

12.1 Toxicity
   Aquatic toxicity: No further relevant information available.
   Ecotoxicological effects:
   Remark: Very toxic for fish
   Additional ecological information:
   General notes:
   Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
   Must not reach bodies of water or drainage ditch undiluted or unneutralized.
   Danger to drinking water if even extremely small quantities leak into the ground.
   Also poisonous for fish and plankton in water bodies.
   Very toxic for aquatic organisms
   Rinse off of bigger amounts into drains or the aquatic environment may lead to decreased pH-values. A low pH-value harms aquatic organisms. In the dilution of the use-level the pH-value is considerably increased, so that after the use of the product the aqueous waste, emptied into drains, is only low water-dangerous.
13 DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods
Recommendation:
Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

Uncleaned packagings:
Recommendation: Disposal must be made according to official regulations.
Recommended cleansing agent: Water, if necessary with cleansing agents.

14 TRANSPORT INFORMATION

14.1 UN-Number
DOT, ADR, IMDG, IATA UN3264

14.2 UN proper shipping name
DOT Corrosive liquid, acidic, inorganic, n.o.s. (Hydrochloric acid, Zinc chloride)
ADR 3264 Corrosive liquid, acidic, inorganic, n.o.s. (Hydrochloric acid, Zinc chloride)
IMDG, IATA CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (HYDROCHLORIC ACID, ZINC CHLORIDE)

14.3 Transport hazard class(es)

DOT Class 8 Corrosive substances
Label 8

ADR, IMDG, IATA

Class 8 Corrosive substances
Label 8

14.4 Packing group
DOT, IMDG, IATA III

14.6 Special precautions for user
Not applicable.
Danger code (Kemler): 80
EMS Number: F-A,S-B
Segregation groups Acids
Stowage Category A
Stowage Code SW2 Clear of living quarters.

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code
Not applicable.
Trade name: 817 Soldering Flux

Transport/Additional information:

<table>
<thead>
<tr>
<th>DOT</th>
<th>Quantity limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>On passenger aircraft/rail: 5 L</td>
</tr>
<tr>
<td></td>
<td>On cargo aircraft only: 60 L</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ADR</th>
<th>Exected quantities (EQ)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Code: E1</td>
</tr>
<tr>
<td></td>
<td>Maximum net quantity per inner packaging: 30 ml</td>
</tr>
<tr>
<td></td>
<td>Maximum net quantity per outer packaging: 1000 ml</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IMDG</th>
<th>Limited quantities (LQ)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5L</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UN &quot;Model Regulation&quot;:</th>
<th>Maximum net quantity per inner packaging: 30 ml</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>UN 3264 CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (HYDROCHLORIC ACID, ZINC CHLORIDE), 8, III</td>
</tr>
</tbody>
</table>

15 REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

All ingredients are listed on the following Government Inventories:

- China: Inventory of Existing Chemical Substances in China (IECSC)
- Korea: Korea Existing Chemicals List (ECL)
- Europe: European Inventory of Existing Commercial Chemical Substances (EINECS)
- Japan: Inventory of Existing and New Chemical Substances (ENCS)
- Philippines: Philippine Inventory of Chemicals and Chemical Substances (PICCS)
- USA: TSCA (Toxic Substances Control Act) TSCA Inventory of Chemical Substances

USA The following information relates to product regulation specific to the USA.

SARA (Superfund Amendments and Reauthorization Act)

**Section 355 (extremely hazardous substances):**

- CAS: 7647-01-0 Hydrochloric Acid

**Section 313 (Specific toxic chemical listings):**

- CAS: 7646-85-7 zinc chloride
- CAS: 7647-01-0 Hydrochloric Acid

Chemicals known to cause cancer:

None of the ingredients is listed.

Chemicals known to cause reproductive toxicity:

None of the ingredients is listed.

Carcinogenic categories

**EPA (Environmental Protection Agency):**

- CAS: 7646-85-7 zinc chloride

**NIOSH-Ca (National Institute for Occupational Safety and Health):**

None of the ingredients is listed.

CANADA:

Workplace Hazardous Materials Identification (WHMIS):

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulation (CPR) and the Safety Data Sheet (SDS) contains all of the information required by the CPR.
Trade name: 817 Soldering Flux

Labelling according to Regulation (EC) No 1272/2008
The product is classified and labeled according to the CLP regulation.

Hazard pictograms

![Pictograms](image)

GHS05  GHS07

Signal word Danger

Hazard-determining components of labeling:
zinc chloride
Hydrochloric Acid
ammonium chloride

Hazard statements
H302 Harmful if swallowed.
H314 Causes severe skin burns and eye damage.
H402 Harmful to aquatic life.

Precautionary statements
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P273 Avoid release to the environment.
P264 Wash thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P301+P330+P331 IF SWALLOWED: 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.
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

15.2 Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 OTHER INFORMATION

The information contained herein is based on data considered accurate and is offered solely for information, consideration and investigation. Kester extends no warranties, makes no representations and assumes no responsibility as to the accuracy, completeness or suitability of this data for any purchaser’s use. The data on this Material Safety Data Sheet relates only to this product and does not relate to use with any other material or in any process. All chemical products should be used only by, or under the direction of, technically qualified personnel who are aware of the hazards involved and the necessity for reasonable care in handling. Hazard communication regulations require that employees must be trained on how to use a Material Safety Data Sheet as a source for hazard information.

Department issuing Safety Data Sheet (SDS): Product Compliance / EHS Department

Contact: EHS_Kester@kester.com

Date of preparation / last revision 05/10/2017 / 10

Abbreviations and acronyms:
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
GHS: Globally Harmonised System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
LC50: Lethal concentration, 50 percent
**Trade name: 817 Soldering Flux**

LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
NIOSH: National Institute for Occupational Safety
OSHA: Occupational Safety & Health
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
REL: Recommended Exposure Limit
Acute Tox. 4: Acute toxicity – Category 4
Skin Corr. 1B: Skin corrosion/irritation – Category 1B
Eye Dam. 1: Serious eye damage/eye irritation – Category 1
Eye Irrit. 2A: Serious eye damage/eye irritation – Category 2A
STOT SE 3: Specific target organ toxicity (single exposure) – Category 3
Aquatic Acute 3: Hazardous to the aquatic environment - acute aquatic hazard – Category 3

* Data compared to the previous version altered.