1: PRODUCT AND COMPANY IDENTIFICATION

Trade name: 2224-25 Soldering Flux

Article number: C6-00-2224-25

Application of the substance / the preparation:
Soldering flux
Soldering flux

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

ITW Specialty Materials (Suzhou) Co., Ltd.
Heng Qiao Road
Wujiang Economic Development Zone
Suzhou, Jiangsu 215200 China
Tel +86 512 8266808

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

GHS02 Flame

Flam. Liq. 2 H225 Highly flammable liquid and vapor.

GHS05 Corrosion

Eye Dam. 1 H318 Causes serious eye damage.

GHS07

Acute Tox. 4 H302 Harmful if swallowed.
Acute Tox. 4 H312 Harmful in contact with skin.
Acute Tox. 4 H332 Harmful if inhaled.
STOT SE 3 H335-H336 May cause respiratory irritation. May cause drowsiness or dizziness.

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

(Contd. on page 2)
Hazard pictograms

GHS02  GHS05  GHS07

Signal word Danger

Hazard-determining components of labeling:
Isopropanol

Hazard statements
Highly flammable liquid and vapor.
Harmful if swallowed, in contact with skin or if inhaled.
Causes serious eye damage.
May cause respiratory irritation. May cause drowsiness or dizziness.

Precautionary statements
Keep away from heat/sparks/open flames/hot surfaces. No smoking.
Wear protective gloves / eye protection.
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
IF INHALED: Remove person to fresh air and keep comfortable for breathing.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Store in a well-ventilated place. Keep container tightly closed.
Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard description:

WHMIS Symbols

Classification system:
NFPA ratings (scale 0 - 4)

Health = 1
Fire = 3
Reactivity = 0

HMIS-ratings (scale 0 - 4)

Health = 1
Fire = 3
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.
Trade name: 2224-25 Soldering Flux

(Contd. of page 2)

<table>
<thead>
<tr>
<th>CAS No.</th>
<th>Description</th>
<th>% Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS: 67-63-0</td>
<td>Isopropanol</td>
<td>70-85%</td>
</tr>
<tr>
<td>EINECS: 200-661-7</td>
<td>Flam. Liq. 2; H225</td>
<td></td>
</tr>
<tr>
<td>CAS: 79-14-1</td>
<td>Glycolic Acid</td>
<td>3.0-5.0%</td>
</tr>
<tr>
<td>EINECS: 201-180-5</td>
<td>Skin Corr. 1B, H314; Eye Dam. 1, H318; Acute Tox. 4, H302</td>
<td></td>
</tr>
<tr>
<td>CAS: 50-01-1</td>
<td>guanidinium chloride</td>
<td>3.0-5.0%</td>
</tr>
<tr>
<td>EINECS: 200-002-3</td>
<td>Acute Tox. 4, H302; Skin Irrit. 2, H315; Eye Irrit. 2A, H319</td>
<td></td>
</tr>
<tr>
<td>CAS: 56-81-5</td>
<td>glycerol</td>
<td>3.0-5.0%</td>
</tr>
<tr>
<td>EINECS: 200-289-5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAS: 7732-18-5</td>
<td>Water</td>
<td>5-10%</td>
</tr>
<tr>
<td>EINECS: 231-791-2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4: FIRST AID MEASURES

4.1 Description of first aid measures
- **General information:** 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. If symptoms persist, 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.
- **For safety reasons unsuitable extinguishing agents:** Water with full jet

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:** Wear self-contained respiratory protective device.

6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
- Wear protective equipment. Keep unprotected persons away.
- Ensure adequate ventilation
- Keep away from ignition sources

6.2 Environmental precautions:
- Do not allow product to reach sewage system or any water course.
- Do not allow to enter sewers/ surface or ground water.

6.3 Methods and material for containment and cleaning up:
- Ensure adequate ventilation.
- Do not flush with water or aqueous cleansing agents
- Absorb with clay, dry sand, or other inert material. Do not use combustible materials such as sawdust. Place in a chemical waste container.

6.4 Reference to other sections
- See Section 7 for information on safe handling.
- See Section 8 for information on personal protection equipment.

(Contd. on page 4)
7: HANDLING AND STORAGE

7.1 Precautions for safe handling
Store in cool, dry place in tightly closed receptacles.
Ensure good ventilation/exhaustion at the workplace.
Prevent formation of aerosols.
Information about protection against explosions and fires:
Keep ignition sources away - Do not smoke.
Protect against electrostatic charges.

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: Store away from oxidizing agents.
Further information about storage conditions:
Keep receptacle tightly sealed.
Store in cool, dry conditions in well sealed receptacles.
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>Component Code</th>
<th>PEL</th>
<th>Long-term value: 980 mg/m³, 400 ppm</th>
</tr>
</thead>
<tbody>
<tr>
<td>67-63-0 Isopropanol</td>
<td>REL</td>
<td>Short-term value: 1225 mg/m³, 500 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Long-term value: 980 mg/m³, 400 ppm</td>
</tr>
<tr>
<td></td>
<td>TLV</td>
<td>Short-term value: 984 mg/m³, 400 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Long-term value: 492 mg/m³, 200 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BEI</td>
</tr>
</tbody>
</table>

56-81-5 glycerol

<table>
<thead>
<tr>
<th>Component Code</th>
<th>PEL</th>
<th>Long-term value: 15* 5** mg/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>mist; *total dust **respirable fraction</td>
</tr>
<tr>
<td>TLV</td>
<td>TLV withdrawn-insufficient data human occup. exp.</td>
<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:
When ventilation is not sufficient to remove fumes from the breathing zone, a safety approved respirator or self-contained breathing apparatus should be worn.

(Contd. on page 5)
**Trade name: 2224-25 Soldering Flux**

(Contd. of page 4)

**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

Face Shield with Safety Glasses when refilling.

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**9: PHYSICAL AND CHEMICAL PROPERTIES**

9.1 Information on basic physical and chemical properties

**General Information**

**Appearance:**
- **Form:** Liquid
- **Color:** Light yellow
- **Odor:** Mild

**pH-value at 20 °C (68 °F):** 2.5

**Change in condition**
- **Melting point/Melting range:** Undetermined.
- **Boiling point/Boiling range:** 82 °C (180 °F)

**Flash point:** 18 °C (64 °F)

**Ignition temperature:** 399 °C (750 °F)

**Auto igniting:** Product is not selfigniting.

**Danger of explosion:** Product is not explosive. However, formation of explosive air/vapor mixtures are possible.

**Explosion limits:**
- **Lower:** 2.0 Vol %
- **Upper:** 12.0 Vol %

**Vapor pressure at 20 °C (68 °F):** 43 hPa (32 mm Hg)

**Density:** 1.40 g/cm³

**Solubility in / Miscibility with**
- **Water at 20 °C (68 °F):** 100 %

**Solvent content:**
- **Organic solvents:** 73.4 %
- **Water:** 6.1 %

(Contd. on page 6)
Trade name: 2224-25 Soldering Flux

Solids content: 20.4 %

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: Strong acids, strong oxidizers.
10.6 Hazardous decomposition products: No dangerous decomposition products known.

11: TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects
Acute toxicity:
Harmful if swallowed, in contact with skin or if inhaled.

LD/LC50 values that are relevant for classification:

<table>
<thead>
<tr>
<th>67-63-0 Isopropanol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral LD50</td>
</tr>
<tr>
<td>Dermal LD50</td>
</tr>
<tr>
<td>Inhalative LC50/4 h</td>
</tr>
</tbody>
</table>

Primary irritant effect:
on the skin: Possible local irritation by contact with flux or fumes.
on the eye:
Smoke during soldering can cause eye irritation.
Causes serious eye damage.
through inhalation:
Vapors during use may irritate mucous membranes and respiratory system. High concentrations can cause headache, dizziness, and nausea.
through ingestion: May cause gastrointestinal irritation.
Sensitization: Based on available data, the classification criteria are not met.

Additional toxicological information:

Carcinogenic categories
IARC (International Agency for Research on Cancer)
67-63-0 Isopropanol

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.

Additional ecological information:

General notes:
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
12.5 Results of PBT and vPvB assessment
PBT: Not applicable.

(Contd. on page 7)
SAFETY DATA SHEET (SDS)
According to 1907/2006/EC, Article 31
Trade name: 2224-25 Soldering Flux

vPvB: Not applicable.

13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods
Recommendation: Disposal must be made according to official regulations. 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.

14: TRANSPORT INFORMATION

14.1 UN-Number
DOT, IMDG, IATA  UN1219
ADR  UN1219
Not regulated

14.2 UN proper shipping name
DOT  Isopropanol
ADR  1219 Isopropanol
IMDG, IATA  Not regulated
ISOPROPANOL (ISOPROPYL ALCOHOL)

14.3 Transport hazard class(es)
DOT

Class  3 Flammable liquids
Label  Not regulated.

ADR, IMDG, IATA

Class  3 Flammable liquids
Label  3

14.4 Packing group
DOT, IMDG, IATA  II

14.5 Marine pollutant:  No

14.6 Special precautions for user  Not applicable.

Danger code (Kemler):  33

EMS Number:  F-E,S-D

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code  Not applicable.

(Contd. of page 6)

(Contd. on page 8)
15: REGULATORY INFORMATION

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

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

SARA (Superfund Amendments and Reauthorization Act)

Section 355 (extremely hazardous substances):
None of the ingredient is listed.

Section 313 (Specific toxic chemical listings):
None of the ingredients is listed.

TSCA (Toxic Substances Control Act): Kester certifies that all components listed below for the subject finished product are on the TSCA Inventory of Chemical Substances and are not subject to any chemical specific regulation under TSCA Section 12(b) export notification requirements delineated at 40 CFR part 707, subpart D.

All ingredients are listed or exempt from listing.

California Proposition 65

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)
None of the ingredients is listed.

NIOSH-Ca (National Institute for Occupational Safety and Health)
None of the ingredients is listed.

CANADA:
Not classified.

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.

Labelling according to Regulation (EC) No 1272/2008
The product is classified and labeled according to the CLP regulation.
SAFETY DATA SHEET (SDS)
According to 1907/2006/EC, Article 31

Trade name: 2224-25 Soldering Flux

Hazard pictograms

GHS02  GHS05  GHS07

Signal word Danger

Hazard-determining components of labeling:
Isopropanol

Hazard statements
Highly flammable liquid and vapor.
Harmful if swallowed, in contact with skin or if inhaled.
Causes serious eye damage.
May cause respiratory irritation. May cause drowsiness or dizziness.

Precautionary statements
Keep away from heat/sparks/open flames/hot surfaces. No smoking.
Wear protective gloves / eye protection.
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
IF INHALED: Remove person to fresh air and keep comfortable for breathing.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Store in a well-ventilated place. Keep container tightly closed.
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 11/24/2015 / 2

Abbreviations and acronyms:
RID: Reglement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
IATA-DGR: Dangerous Goods Regulations by the "International Air Transport Association" (IATA)
ICAO: International Civil Aviation Organisation
ICAO-TI: Technical Instructions by the "International Civil Aviation Organisation" (ICAO)
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
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)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
Flam. Liq. 2: Flammable liquids, Hazard Category 2
Acute Tox. 4: Acute toxicity, Hazard Category 4
Skin Corr. 1B: Skin corrosion/irritation, Hazard Category 1B
Skin Irrit. 2: Skin corrosion/irritation, Hazard Category 2
Eye Dam. 1: Serious eye damage/eye irritation, Hazard Category 1

(Contd. on page 10)
Trade name: 2224-25 Soldering Flux

Eye Irrit. 2A: Serious eye damage/eye irritation, Hazard Category 2A
STOT SE 3: Specific target organ toxicity - Single exposure, Hazard Category 3
* Data compared to the previous version altered.