1 Identification

Trade name: 2331ZX Soldering Flux and Flux Pen
Relevant identified uses of the substance or mixture and uses advised against
No further relevant information available.

Details of the supplier of the safety data sheet
Manufacturer/Supplier:
Kester Inc.
800 West Thormdale 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 Gernlinden Germany
Tel +49 (0) 8142 4785 0

Information department: Product Compliance: EHS_Kester@kester.com
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 Hazard(s) identification

Classification of the substance or mixture

Flame

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

Health hazard

Carc. 2  H351  Suspected of causing cancer.
STOT RE 2  H373  May cause damage to organs through prolonged or repeated exposure.

Corrosion

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

STOT SE 3  H336  May cause drowsiness or dizziness.
Trade name: 2331ZX Soldering Flux and Flux Pen

Label elements
GHS label elements The product is classified and labeled according to the Globally Harmonized System (GHS).
Hazard pictograms

GHS02  GHS05  GHS07  GHS08

Signal word Danger

Hazard-determining components of labeling:
diethanolamine
Isopropanol
Glycolic Acid

Hazard statements
H225 Highly flammable liquid and vapor.
H314 Causes severe skin burns and eye damage.
H351 Suspected of causing cancer.
H336 May cause drowsiness or dizziness.
H373 May cause damage to organs through prolonged or repeated exposure.

Precautionary statements
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P240 Ground/bond container and receiving equipment.
P243 Take precautionary measures against static discharge.
P260 Do not breathe dust/fume/gas/mist/vapors/spray.
P264 Wash thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
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.
P314 Get medical advice/attention if you feel unwell.
P370+P378 In case of fire: Use dry chemical or foam fire extinguisher.
P403+P233 Store in a well-ventilated place. Keep container tightly closed.
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 = 1
Fire = 3
Reactivity = 0

HMIS-ratings (scale 0 - 4)

Health = *1
Fire = 3
Reactivity = 0

Other hazards
Results of PBT and vPvB assessment
PBT: Not applicable.
Trade name: 2331ZX Soldering Flux and Flux Pen

vPvB: Not applicable.

3 Composition/information on ingredients

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: 67-63-0 Isopropanol</td>
<td>Flam. Liq. 2, H225, Eye Irrit. 2A, H319; STOT SE 3, H336</td>
<td>55-70%</td>
</tr>
<tr>
<td>CAS: 58-81-5 Glycerol</td>
<td></td>
<td>10-25%</td>
</tr>
<tr>
<td>CAS: 111-42-2 Diethanolamine</td>
<td>Carc. 2, H351; STOT RE 2, H373, Skin Corr. 1B, H314; Eye Dam. 1, H318, Acute Tox. 4, H302</td>
<td>5-10%</td>
</tr>
<tr>
<td>Trade Secret Organic Salt</td>
<td>Acute Tox. 4, H302</td>
<td>5-10%</td>
</tr>
<tr>
<td>Trade Secret Organic Acid</td>
<td>Skin Irrit. 2, H315; Eye Irrit. 2A, H319; STOT SE 3, H335</td>
<td>3-5%</td>
</tr>
<tr>
<td>CAS: 79-14-1 Glycolic Acid</td>
<td>Skin Corr. 1B, H314; Eye Dam. 1, H318, Acute Tox. 4, H302</td>
<td>1-3%</td>
</tr>
</tbody>
</table>

4 First-aid measures

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.
Information for doctor:
Most important symptoms and effects, both acute and delayed: No further relevant information available.
Indication of any immediate medical attention and special treatment needed: No further relevant information available.

5 Fire-fighting measures

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

6 Accidental release measures

Personal precautions, protective equipment and emergency procedures
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation
Environmental precautions: No special measures required.
Methods and material for containment and cleaning up: Ensure adequate ventilation.
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.
Trade name: 2331ZX Soldering Flux and Flux Pen

Protective Action Criteria for Chemicals

(PAC-1:

<table>
<thead>
<tr>
<th>CAS</th>
<th>Chemical</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>67-63-0</td>
<td>Isopropanol</td>
<td>400 ppm</td>
</tr>
<tr>
<td>56-81-5</td>
<td>Glycerol</td>
<td>45 mg/m³</td>
</tr>
<tr>
<td>111-42-2</td>
<td>Diethanolamine</td>
<td>3 mg/m³</td>
</tr>
<tr>
<td>79-14-1</td>
<td>Glycolic Acid</td>
<td>25 mg/m³</td>
</tr>
</tbody>
</table>

(PAC-2:

<table>
<thead>
<tr>
<th>CAS</th>
<th>Chemical</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>67-63-0</td>
<td>Isopropanol</td>
<td>2000 ppm</td>
</tr>
<tr>
<td>56-81-5</td>
<td>Glycerol</td>
<td>180 mg/m³</td>
</tr>
<tr>
<td>111-42-2</td>
<td>Diethanolamine</td>
<td>28 mg/m³</td>
</tr>
<tr>
<td>79-14-1</td>
<td>Glycolic Acid</td>
<td>280 mg/m³</td>
</tr>
</tbody>
</table>

(PAC-3:

<table>
<thead>
<tr>
<th>CAS</th>
<th>Chemical</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>67-63-0</td>
<td>Isopropanol</td>
<td>12000 ppm</td>
</tr>
<tr>
<td>56-81-5</td>
<td>Glycerol</td>
<td>1100 mg/m³</td>
</tr>
<tr>
<td>111-42-2</td>
<td>Diethanolamine</td>
<td>130 mg/m³</td>
</tr>
<tr>
<td>79-14-1</td>
<td>Glycolic Acid</td>
<td>390 mg/m³</td>
</tr>
</tbody>
</table>

7 Handling and storage

Handling:
Precautions for safe handling: Prevent formation of aerosols.
Information about protection against explosions and fires:
Keep ignition sources away - Do not smoke.
Protect against electrostatic charges.

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.
Store in cool, dry conditions in well-sealed receptacles.
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.

Control parameters
Components with limit values that require monitoring at the workplace:
The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit.
At this time, the other constituents have no known exposure limits.

CAS: 67-63-0 Isopropanol

<table>
<thead>
<tr>
<th>Limit</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEL</td>
<td>980 mg/m³, 400 ppm</td>
</tr>
<tr>
<td>REL</td>
<td>1225 mg/m³, 500 ppm</td>
</tr>
<tr>
<td></td>
<td>980 mg/m³, 400 ppm</td>
</tr>
</tbody>
</table>
### Trade name: 2331ZX Soldering Flux and Flux Pen

| TLV | Short-term value: 984 mg/m³, 400 ppm  
|     | Long-term value: 492 mg/m³, 200 ppm  
|     | BEI |
| CAS: 56-81-5 glycerol |
| PEL | Long-term value: 15* 5** mg/m³  
|     | mist; *total dust **respirable fraction  
| TLV | TLV withdrawn-insufficient data human occup. exp.  
| CAS: 111-42-2 diethanolamine |
| REL | Long-term value: 15 mg/m³, 3 ppm  
| TLV | Long-term value: 1* mg/m³, 0.2* ppm  
|     | Skin; *inhaled fraction and vapor |

**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

#### 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

**Information on basic physical and chemical properties**

**General Information**

**Appearance:**
- **Form:** Liquid
- **Color:** Amber colored
Trade name: 2331ZX Soldering Flux and Flux Pen

(Contd. of page 5)

Odor: Alcohol-like
pH-value at 20°C (68 °F): 6.5
Change in condition
Melting point/Melting range: Undetermined.
Flash point: < 23°C (< 73.4 °F)
Ignition temperature: 370°C (698 °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: 2Vol %
Upper: 12Vol %

Vapor pressure at 20°C (68 °F): 43hPa (32.3 mm Hg)
Density at 20°C (68 °F): 0.9g/cm³ (7.51 lbs/gal)
Solubility in / Miscibility with
Water: Fully miscible.
Solvent content:
Organic solvents: 80.6%
Water: 2.8%
Solids content: 11.6%

10 Stability and reactivity

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

11 Toxicological information

Information on toxicological effects
Acute toxicity:
LD/LC50 values that are relevant for classification:

<table>
<thead>
<tr>
<th>CAS: 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>

<table>
<thead>
<tr>
<th>CAS: 56-81-5 glycerol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral LD50</td>
</tr>
</tbody>
</table>

(Contd. on page 7)
Trade name: 2331ZX Soldering Flux and Flux Pen

**CAS: 111-42-2 diethanolamine**

<table>
<thead>
<tr>
<th>Route</th>
<th>LD50</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral</td>
<td>1,600 mg/kg (rat)</td>
<td></td>
</tr>
<tr>
<td>Dermal</td>
<td>12,200 mg/kg (rabbit)</td>
<td></td>
</tr>
</tbody>
</table>

**Primary irritant effect:**
on the skin: No irritant effect.
on the eye: Irritating effect.

**Sensitization:** Sensitization possible through inhalation.

**Additional toxicological information:**
The product shows the following dangers according to internally approved calculation methods for preparations:
Irritant

**Carcinogenic categories**

<table>
<thead>
<tr>
<th>Agency</th>
<th>CAS Number</th>
<th>Substance</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>IARC (International Agency for Research on Cancer)</td>
<td>67-63-0</td>
<td>Isopropanol</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>111-42-2</td>
<td>Diethanolamine</td>
<td>2B</td>
</tr>
<tr>
<td>NTP (National Toxicology Program)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**OSHA-Ca (Occupational Safety & Health Administration)**
None of the ingredients is listed.

**12 Ecological information**

**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.

**Results of PBT and vPvB assessment**
PBT: Not applicable.
vPvB: Not applicable.

**13 Disposal considerations**

**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**

**UN-Number**
UN1219

**DOT, ADR, IMDG, IATA**

**DOT - Proper shipping name**
Isopropanol solution

**ADR - 1219 Isopropanol solution**

**IMDG, IATA - ISOPROPANOL (ISOPROPYL ALCOHOL) solution**

(Contd. on page 8)
### Transport hazard class(es)

**DOT**

<table>
<thead>
<tr>
<th>Class</th>
<th>Label</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td>3 Flammable liquids</td>
</tr>
</tbody>
</table>

**ADR, IMDG, IATA**

<table>
<thead>
<tr>
<th>Class</th>
<th>Label</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td>3 Flammable liquids</td>
</tr>
</tbody>
</table>

### Transport/Additional information:

**DOT**

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

**ADR**

<table>
<thead>
<tr>
<th>Excepted quantities (EQ)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code: E2</td>
</tr>
<tr>
<td>Maximum net quantity per inner packaging: 30 ml</td>
</tr>
<tr>
<td>Maximum net quantity per outer packaging: 500 ml</td>
</tr>
</tbody>
</table>

**IMDG**

<table>
<thead>
<tr>
<th>Limited quantities (LQ)</th>
<th>Excepted quantities (EQ)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1L</td>
<td>Maximum net quantity per inner packaging: 30 ml</td>
</tr>
<tr>
<td></td>
<td>Maximum net quantity per outer packaging: 500 ml</td>
</tr>
<tr>
<td>UN &quot;Model Regulation&quot;:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>UN 1219 ISOPROPANOL SOLUTION, 3, II</td>
</tr>
</tbody>
</table>

### 15 Regulatory information

**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)
  - European: 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
Trade name: 2331ZX Soldering Flux and Flux Pen

(Contd. of page 8)

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):
<table>
<thead>
<tr>
<th>CAS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>67-63-0</td>
<td>Isopropanol</td>
</tr>
<tr>
<td>111-42-2</td>
<td>diethanolamine</td>
</tr>
</tbody>
</table>

California Proposition 65
Chemicals known to cause cancer:
diethanolamine

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:
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.

GHS label elements The product is classified and labeled according to the Globally Harmonized System (GHS).

Hazard pictograms

 ![GHS02](image) ![GHS05](image) ![GHS07](image) ![GHS08](image)

Signal word Danger

Hazard-determining components of labeling:
diethanolamine
Isopropanol
Glycolic Acid

Hazard statements
H225 Highly flammable liquid and vapor.
H314 Causes severe skin burns and eye damage.
H351 Suspected of causing cancer.
H336 May cause drowsiness or dizziness.
H373 May cause damage to organs through prolonged or repeated exposure.

Precautionary statements
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P240 Ground/bond container and receiving equipment.
P243 Take precautionary measures against static discharge.
P260 Do not breathe dust/fume/gas/mist/vapors/spray.
P264 Wash thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

(Contd. on page 10)
**Trade name:** 2331ZX Soldering Flux and Flux Pen

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>P303+P361+P353</td>
<td>IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.</td>
</tr>
<tr>
<td>P304+P340</td>
<td>IF INHALED: Remove person to fresh air and keep comfortable for breathing.</td>
</tr>
<tr>
<td>P305+P351+P338</td>
<td>IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.</td>
</tr>
<tr>
<td>P314</td>
<td>Get medical advice/attention if you feel unwell.</td>
</tr>
<tr>
<td>P370+P378</td>
<td>In case of fire: Use for extinction: CO2, powder or water spray.</td>
</tr>
<tr>
<td>P403+P233</td>
<td>Store in a well-ventilated place. Keep container tightly closed.</td>
</tr>
<tr>
<td>P405</td>
<td>Store locked up.</td>
</tr>
<tr>
<td>P501</td>
<td>Dispose of contents/container in accordance with local/regional/national/international regulations.</td>
</tr>
</tbody>
</table>

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

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**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

**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
- 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
- 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
- Flm. Liq. 2: Flammable liquids – Category 2
- Acute Tox. 4: Acute toxicity – Category 4
- Skin Corr. 1B: Skin corrosion/irritation – Category 1B
- Skin Irrit. 2: Skin corrosion/irritation – Category 2
- Eye Dam. 1: Serious eye damage/eye irritation – Category 1
- Eye Irrit. 2A: Serious eye damage/eye irritation – Category 2A
- Carc. 2: Carcinogenicity – Category 2
- STOT SE 3: Specific target organ toxicity (single exposure) – Category 3
- STOT RE 2: Specific target organ toxicity (repeated exposure) – Category 2

* Data compared to the previous version altered.