1 Identification

Trade name: 2166-BN Soldering Flux

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 Thorndale 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

Corrosion

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

Acute Tox. 4 H302 Harmful if swallowed.
Flam. Liq. 4 H227 Combustible liquid.

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

Hazard pictograms

GHS05 GHS07

Signal word Danger

(Contd. on page 2)
Trade name: 2166-BN Soldering Flux

Hazard-determining components of labeling:
Glycolic Acid
ethanolamine
2-butoxyethanol

Hazard statements
H227 Combustible liquid.
H302 Harmful if swallowed.
H314 Causes severe skin burns and eye damage.

Precautionary statements
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.
P403+P235 Store in a well-ventilated place. Keep cool.
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 = 1
Reactivity = 0

HMIS-ratings (scale 0 - 4)

Health = 3
Fire = 1
Reactivity = 0

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

3 Composition/information on ingredients

<table>
<thead>
<tr>
<th>Description</th>
<th>CAS No.</th>
<th>% Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glycolic Acid</td>
<td>CAS: 79-14-1</td>
<td>10-25%</td>
</tr>
<tr>
<td>Organic Acids</td>
<td>Trade Secret</td>
<td>10-25%</td>
</tr>
</tbody>
</table>

(Safety Data Sheet: acc. to OSHA HCS 29 CFR 1910.1200)
Trade name: 2166-BN Soldering Flux

(Contd. of page 2)

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS Number</th>
<th>% in Formulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ethanolamine</td>
<td>141-43-5</td>
<td>5-10%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Acute Tox. 3, H311</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Skin Corr. 1B, H314; Eye Dam. 1, H318</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Acute Tox. 4, H332</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flam. Liq. 4, H227</td>
</tr>
<tr>
<td>2-butoxyethanol</td>
<td>111-76-2</td>
<td>1-3%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Acute Tox. 4, H302; Acute Tox. 4, H312; Acute Tox. 4, H332; Skin Irrit. 2, H315; Eye Irrit. 2A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flam. Liq. 4, H227</td>
</tr>
</tbody>
</table>

4 First-aid measures

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.
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: Do not allow to enter sewers/ surface or ground water.
Methods and material for containment and cleaning up:
Dispose contaminated material as waste according to item 13.
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.
Protective Action Criteria for Chemicals

PAC-1:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS Number</th>
<th>PAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glycolic Acid</td>
<td>79-14-1</td>
<td>25 mg/m³</td>
</tr>
</tbody>
</table>

(Contd. on page 4)
## Trade name: 2166-BN Soldering Flux

| CAS: 141-43-5 | ethanolamine | 6 ppm |
| CAS: 111-76-2 | 2-butoxyethanol | 60 ppm |
| CAS: 67-63-0 | Isopropanol | 400 ppm |

### PAC-2:

| CAS: 79-14-1 | Glycolic Acid | 280 mg/m³ |
| CAS: 141-43-5 | ethanolamine | 170 ppm |
| CAS: 111-76-2 | 2-butoxyethanol | 120 ppm |
| CAS: 67-63-0 | Isopropanol | 2000 ppm |

### PAC-3:

| CAS: 79-14-1 | Glycolic Acid | 390 mg/m³ |
| CAS: 141-43-5 | ethanolamine | 1,000 ppm |
| CAS: 111-76-2 | 2-butoxyethanol | 700 ppm |
| CAS: 67-63-0 | Isopropanol | 12000 ppm |

## 7 Handling and storage

**Handling:**
- **Precautions for safe handling**: Prevent formation of aerosols.
- **Information about protection against explosions and fires**: No special measures required.

**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.
  - **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: 141-43-5 ethanolamine

| PEL | Long-term value: 6 mg/m³, 3 ppm |
| REL | Short-term value: 15 mg/m³, 6 ppm |
|     | Long-term value: 8 mg/m³, 3 ppm |
| TLV | Short-term value: 15 mg/m³, 6 ppm |
|     | Long-term value: 7.5 mg/m³, 3 ppm |

### CAS: 111-76-2 2-butoxyethanol

| PEL | Long-term value: 240 mg/m³, 50 ppm |
| Skin |
| REL | Long-term value: 24 mg/m³, 5 ppm |
| Skin |
| TLV | Long-term value: 97 mg/m³, 20 ppm |
| BEI |
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: Light orange color
Odor: Mild
pH-value: Not determined.

Change in condition
Melting point/Melting range: Undetermined.
Boiling point/Boiling range: 100°C (212 °F)
Flash point: 93°C (199.4 °F)
Ignition temperature: 385°C (725 °F)
Auto igniting: Product is not selfigniting.
Trade name: 2166-BN Soldering Flux

(Contd. of page 5)

Danger of explosion: Not determined.

Vapor pressure at 20°C (68 °F): 23hPa (17.3 mm Hg)

Density at 20°C (68 °F): 1.14g/cm³ (9.51 lbs/gal)

Solubility in / Miscibility with

Water: Fully miscible.

Solvent content:
Organic solvents: 9.6%
Water: 59.1%
Solids content: 31.3%

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: 79-14-1 Glycolic Acid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral LD50 1,950 mg/kg (rat)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CAS: 141-43-5 Ethanolamine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral LD50 2,050 mg/kg (rat)</td>
</tr>
</tbody>
</table>

Dermal LD50 1,000 mg/kg (rabbit)

Inhalative LC50/4 h 11 mg/l (ATE)

Primary irritant effect:

on the skin: Caustic effect on skin and mucous membranes.
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:

Harmful
Corrosive
Irritant

Swallowing will lead to a strong caustic effect on mouth and throat and to the danger of perforation of esophagus and stomach.

Carcinogenic categories

IARC (International Agency for Research on Cancer)

CAS: 111-76-2 2-butoxyethanol

(Contd. on page 7)
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.
Must not reach bodies of water or drainage ditch undiluted or unneutralized.

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
DOT, ADR, IMDG, IATA
UN proper shipping name
DOT
ADR
IMDG, IATA
Corrosive liquids, n.o.s. (Glycolic Acid, Ethanolamine)
1760 Corrosive liquids, n.o.s. (Glycolic Acid, Ethanolamine)
CORROSIVE LIQUID, N.O.S. (Glycolic Acid, ETHANOLAMINE)
Transport hazard class(es)
DOT
Class 8 Corrosive substances
Label 8
### ADR, IMDG, IATA

<table>
<thead>
<tr>
<th>Class</th>
<th>8 Corrosive substances</th>
</tr>
</thead>
<tbody>
<tr>
<td>Label</td>
<td>8</td>
</tr>
<tr>
<td>Packing group</td>
<td></td>
</tr>
<tr>
<td>DOT, IMDG, IATA</td>
<td>III</td>
</tr>
<tr>
<td>Special precautions for user</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Danger code (Kepler)</td>
<td>80</td>
</tr>
<tr>
<td>EMS Number</td>
<td>F-A,S-B</td>
</tr>
<tr>
<td>Segregation groups</td>
<td>Acids, alkalis</td>
</tr>
<tr>
<td>Stowage Category</td>
<td>A</td>
</tr>
<tr>
<td>Stowage Code</td>
<td>SW2 Clear of living quarters.</td>
</tr>
</tbody>
</table>

#### Transport/Additional information:

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

#### ADR

<table>
<thead>
<tr>
<th>Exception quantities (EQ)</th>
<th>Code: E1</th>
</tr>
</thead>
<tbody>
<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>

#### IMDG

<table>
<thead>
<tr>
<th>Limited quantities (LQ)</th>
<th>5L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exception quantities (EQ)</td>
<td>Maximum net quantity per inner packaging: 30 ml</td>
</tr>
<tr>
<td>UN &quot;Model Regulation&quot;:</td>
<td>UN 1760 CORROSIVE LIQUIDS, N.O.S. (GLYCOLIC ACID, ETHANOLAMINE), 8, III</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)
- 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)

<table>
<thead>
<tr>
<th>Section 355 (extremely hazardous substances):</th>
</tr>
</thead>
<tbody>
<tr>
<td>None of the ingredient is listed.</td>
</tr>
</tbody>
</table>

(Contd. on page 9)
## Trade name: 2166-BN Soldering Flux

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

| CAS: 111-76-2 | 2-butoxyethanol |

### California Proposition 65

#### Chemicals known to cause cancer:

- 1,4-dioxane

#### Chemicals known to cause reproductive toxicity:

None of the ingredients is listed.

### Carcinogenic categories

**EPA (Environmental Protection Agency)**

| CAS: 111-76-2 | 2-butoxyethanol | NL |

**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**

- GHS05
- GHS07

### Signal word

DANGER

### Hazard-determining components of labeling:

- Glycolic Acid
- ethanolamine
- 2-butoxyethanol

### Hazard statements

- H227 Combustible liquid.
- H302 Harmful if swallowed.
- H314 Causes severe skin burns and eye damage.

### Precautionary statements

- **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.
- **P403+P235** Store in a well-ventilated place. Keep cool.
- **P405** Store locked up.
- **P501** Dispose of contents/container in accordance with local/regional/national/international regulations.

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

Flam. Liq. 4: Flammable liquids – Category 4

Acute Tox. 4: Acute toxicity – Category 4

Acute Tox. 3: Acute toxicity – Category 3

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

STOT SE 3: Specific target organ toxicity (single exposure) – Category 3

* Data compared to the previous version altered.