SECTION 1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier

| Trade name | All-State Duzall Flux |

1.2 Relevant identified uses of the substance or mixture and uses advised against

| Use | General Purpose Soft Soldering Flux |

1.3 Details of the supplier of the safety data sheet

| Supplier | ESAB Welding & Cutting Products |
| Street address | 801 Wilson Ave., Hanover, PA 17331 |
| Telephone | 1-717-637-8911 |
| Fax | 1-717-630-3458 |
| Email | us.technical.fillermetals@esab.com |
| Web site | www.esabna.com |

1.4 Emergency telephone number

| Emergency phone number | 1-800-424-9300 (Chemtrec) |
| Available outside office hours | Yes |

SECTION 2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

**Classification according to Regulation (EC) No 1272/2008, Annex VI**

| Classification | Hazardous to the aquatic environment — Acute hazard category 1 |
|                | Hazardous to the aquatic environment — Chronic hazard category 1 |
|                | Skin corrosion, hazard category 1B |
|                | Specific Target Organ Toxicity — Single exposure, hazard category 3 - respiratory tract irritation |
|                | Acute toxicity, oral, hazard category 4 |

| Hazard statements | H290, H302, H314, H315, H319, H335, H410 |

2.2 Label elements

SAFETY DATA SHEET
All-State Duzall Flux

Pictogram

Signal word
Danger

Hazard statements
H290 May be corrosive to metals.
H302 Harmful if swallowed.
H314 Causes severe skin burns and eye damage.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.
H410 Very toxic to aquatic life with long lasting effects.

Precaution statements
P234 Keep only in original container.
P260 Do not breathe dust/fumes/gas/mist/vapors/spray.
P264 Wash thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P273 Avoid release to the environment.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician/
P301 + P330 + P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing.
Rinse skin with water/shower.
P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position 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.
P332 + P313 If skin irritation occurs: Get medical advice/attention.
P337 + P313 If eye irritation persists: Get medical advice/attention.
P362 Take off contaminated clothing and wash before reuse.
P363 Wash contaminated clothing before reuse.
P391 Collect spillage.
P402 Store in a dry place.
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.
P501 Dispose of contents/container to in accordance with local/regional/national/international regulation

More information
Appearance: White to Pale Yellow
Physical State: Liquid
Odor: Slightly acidic

2.3 Other hazards
None
SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS No. EC No.</th>
<th>Concentration</th>
<th>Classification</th>
<th>R-phrase H-phrase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinc chloride</td>
<td>7646-85-7 231-592-0</td>
<td>50 - 70%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ammonium chloride</td>
<td>12125-02-9 235-186-4</td>
<td>5 - 20%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Hydrochloric acid</td>
<td>7647-01-0 231-595-7</td>
<td>5 - 15%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Glycerin</td>
<td>56-81-5 200-289-5</td>
<td>&lt;5%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Methanol</td>
<td>67-56-1 200-659-6</td>
<td>&lt;5%</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

SECTION 4. FIRST AID MEASURES

4.1 Description of first aid measures

Consult a physician. Show this safety data sheet to the doctor in attendance. Move patient out of dangerous area.

**Inhalation**
Remove to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

**Skin contact**
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. If rash or burns develops, consult a physician. Material is corrosive. Wash contaminated clothing before reuse and discard shoes.

**Eye contact**
In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician. Blindness can result.

**Ingestion**
If swallowed, DO NOT induce vomiting. Immediately give large quantities of water to drink. Call a physician or Poison Control Center immediately. Never give anything by mouth to an unconscious person.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labeling (see Section 2.2) and/or in Section 11.

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5. FIRE-FIGHTING MEASURES
5.1 Extinguishing media

**Suitable extinguishing media**
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Hydrogen chloride gas, zinc/zinc oxides. Dense smoke may be generated.

5.3 Advice for firefighters

**Special protective equipment for fire-fighters**
Wear self contained breathing apparatus for fire fighting if necessary.

*Other*
No data available

### SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear respiratory protection. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. For personal protection see Section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and material for containment and cleaning up

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable and closed containers for disposal.

6.4 Reference to other sections

For disposal see Section 13.

### SECTION 7. HANDLING AND STORAGE

7.1 Precautions for safe handling

**Preventive handling precautions**
Wash thoroughly after handling to remove residue. Do not breathe fumes. Professionally wash contaminated clothing.

7.2 Conditions for safe storage, including any incompatibilities

Store flux at ambient conditions. Keep extremely dry. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)

Apart from the uses mentioned in Section 1.2, no other specific uses are stipulated.
SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

**Exposure limits**

ACGIH TLV, mg/m³

- Zinc chloride, fume 1, 2 (STEL)
- Ammonium chloride 10, 20 (STEL)
- Hydrochloric acid 2.98 (Ceiling)
- Glycerin Withdrawn
- Methanol 262, 328 (STEL)

USA, OSHA PEL, mg/m³

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>CAS no.</th>
<th>EC No.</th>
<th>Exposure limit mg/m³-ppm</th>
<th>Short-term exposure limit mg/m³-ppm</th>
<th>Ceiling exposure limit mg/m³-ppm</th>
<th>Remark</th>
<th>Source</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonium chloride, fume</td>
<td>12125-02-9</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Exposure limit: None</td>
<td>-</td>
<td>2016</td>
</tr>
<tr>
<td>Glycerin, mist</td>
<td>56-81-5</td>
<td>-</td>
<td>5</td>
<td>-</td>
<td>-</td>
<td>Respirable fraction</td>
<td>-</td>
<td>2016</td>
</tr>
<tr>
<td>Glycerin, mist</td>
<td>56-81-5</td>
<td>-</td>
<td>15</td>
<td>-</td>
<td>-</td>
<td>Total dust</td>
<td>-</td>
<td>2016</td>
</tr>
<tr>
<td>Hydrochloric acid</td>
<td>7647-01-0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>7</td>
<td>5</td>
<td>-</td>
<td>2016</td>
</tr>
<tr>
<td>Methanol</td>
<td>67-56-1</td>
<td>-</td>
<td>260 200</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2016</td>
</tr>
<tr>
<td>Zinc chloride, fume</td>
<td>7646-5-7</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2016</td>
</tr>
</tbody>
</table>

8.2 Exposure controls

**Technical precaution measures**

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

**Eye / face protection**

Safety glasses with side-shields conforming to EN 166. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166 (EU).

**Safety gloves**

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove’s outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.
SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance, colour</td>
<td>Pale yellow</td>
</tr>
<tr>
<td>Appearance, physical state</td>
<td>Liquid</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Flash point</td>
<td>160° - 165° F</td>
</tr>
<tr>
<td>Initial boiling point and boiling range</td>
<td>~215°F @ 760 mm Hg</td>
</tr>
<tr>
<td>Melting point / freezing point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Odour</td>
<td>Slightly acidic</td>
</tr>
<tr>
<td>Odour threshold</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Oxidising properties</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Partition coefficient: n-octanol / water</td>
<td>Not applicable</td>
</tr>
<tr>
<td>pH value</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Relative density</td>
<td>1.59 H2O = 1 @ 72° F</td>
</tr>
</tbody>
</table>
SECTION 10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents.

10.6 Hazardous decomposition products
Other decomposition products: No data available
In the event of fire, see Section 5.

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute toxicity</td>
<td>No data available</td>
</tr>
<tr>
<td>Skin corrosion / irritation</td>
<td>No data available</td>
</tr>
<tr>
<td>Serious eye damage / irritation</td>
<td>No data available</td>
</tr>
</tbody>
</table>
### Corrosive effects
- Hydrochloric acid: Corrosive to eyes (rabbit)

### Respiratory or skin sensitisation
- No data available

### Germ cell mutagenicity
- No data available

### Carcinogenicity
- No data available

### Reproductive toxicity
- No data available

### STOT-single exposure
- No data available

### STOT-repeated exposure
- No data available

### Aspiration hazard
- No data available

<table>
<thead>
<tr>
<th>LD50 Oral</th>
<th>Zinc chloride 350 mg/kg/Rat</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ammonium chloride 1650 mg/kg/Rat</td>
</tr>
<tr>
<td></td>
<td>Glycerin 12,600 mg/kg/Rat</td>
</tr>
<tr>
<td></td>
<td>Methanol 143 mg/kg/Human</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LD50 Dermal</th>
<th>Glycerin &gt;10,000 mg/kg/Rabbit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Methanol 17,100 mg/kg/Rabbit</td>
</tr>
</tbody>
</table>

| LC50 Inhalation    | Methanol 128.2 mg/kg/Rat     |

### Routes of exposure
- Primary Route of Exposure: No data available

### Toxicity in case of inhalation
- No data available

### Toxicity in case of skin contact
- No data available

### Toxicity in case of eye contact
- No data available

### Toxicity in case of ingestion
- No data available

### Other

Methanol may be fatal or cause blindness if swallowed. Effects due to ingestion may include: headache, dizziness, drowsiness, metabolic acidosis, coma, seizures. Symptoms may be delayed. Damage of the: liver, kidney. Stomach - Irregularities - Based on Human Evidence

Zinc chloride and its aqueous solutions are corrosive to the eyes and skin. They cause conjunctivitis and corneal burns in the eye and produce chemical burns, particularly on areas where the skin is broken. Ingestion produces a corrosive action to the mouth, throat, and digestive tract which can include symptoms of stomach pain, nausea, vomiting, bloody diarrhea, swelling of the throat, blood in the urine, and shock. Inhalation irritates the nose and throat (onset may be delayed by several hours), and pneumonia. Fatalities have occurred by inhalation and ingestion.
Hydrochloric acid is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin. Inhalation symptoms include cough, wheezing, laryngitis, shortness of breath, spasm, inflammation and edema of the larynx and bronchi, pneomontis, and pulmonary edema.

Glycerin: Prolonged or repeated exposure may cause nausea, headache, and vomiting. Kidney - Irregularities - Based on Human Evidence

| Long term effect | Effects of Chronic Exposure: No data available |

**SECTION 12. ECOLOGICAL INFORMATION**

**12.1 Toxicity**

Glycerin: No data available

**Aquatic**

<table>
<thead>
<tr>
<th>Substance</th>
<th>LOEC (mg/l - 96 h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinc chloride</td>
<td>0.2 mg/l - 48 h</td>
</tr>
<tr>
<td>Ammonium chloride</td>
<td>161 mg/l - 48 h</td>
</tr>
<tr>
<td>Methanol</td>
<td>&gt; 10,000.00 mg/l - 48 h</td>
</tr>
</tbody>
</table>

**Acute fish toxicity**

<table>
<thead>
<tr>
<th>Substance</th>
<th>LOEC (mg/l - 96 h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrochloric acid</td>
<td>282 mg/l - 96 h</td>
</tr>
<tr>
<td>Zinc chloride</td>
<td>0.4 - 2.2 mg/l - 96.0 h</td>
</tr>
<tr>
<td>Ammonium chloride</td>
<td>209.00 mg/l - 96 h</td>
</tr>
<tr>
<td>Ammonium chloride</td>
<td>3.98 mg/l - 96 h</td>
</tr>
<tr>
<td>Ammonium chloride</td>
<td>57 mg/l - 96 h</td>
</tr>
<tr>
<td>Methanol: Mortality</td>
<td>15,400.0 mg/l - 96 h</td>
</tr>
<tr>
<td>Methanol: NOEC</td>
<td>7,900 mg/l - 200 h</td>
</tr>
</tbody>
</table>

**Acute algae toxicity**

<table>
<thead>
<tr>
<th>Substance</th>
<th>LOEC (mg/l - 96 h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinc chloride</td>
<td>12.5 mg/l - 96 h</td>
</tr>
<tr>
<td>Methanol: Growth inhibition</td>
<td>22,000.0 mg/l</td>
</tr>
</tbody>
</table>

**12.2 Persistence and degradability**

Methanol: Biodegradability: Aerobic - Exposure time 5 d - Result: 72% - rapidly biodegradable

Methanol: Biochemical oxygen demand (BOD) = 600 - 1,120 mg/g

Methanol: Chemical oxygen demand (COD) = 1,420 mg/g

Methanol: Theoretical oxygen demand (ThOD) = 1,500 mg/g

**12.3 Bioaccumulative potential**
Zinc chloride: Pimephales promelas (fathead minnow) - 63 d
Zinc chloride: Bioconcentration factor (BCF): 21,000

Methanol: Cyprinus carpio (Carp) - 72 d at 20°C - 5 mg/l
Methanol: Bioconcentration factor (BCF): 1

12.4 Mobility in soil

| Mobility | No data available |

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

Avoid release to the environment. An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Very toxic to aquatic life with long lasting effects.

Methanol: At 19°C 83 - 91% - 72 h
Remarks: Hydrolyses on contact with water. Hydrolyses readily.

SECTION 13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

<table>
<thead>
<tr>
<th>Disposal considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product: Hazardous waste</td>
</tr>
<tr>
<td>USA RCRA: This product or product residue is considered hazardous waste if discarded, RCRA ID characteristic toxic Hazardous Waste D002.</td>
</tr>
<tr>
<td>Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.</td>
</tr>
<tr>
<td>Contaminated packaging: Dispose of as unused product.</td>
</tr>
</tbody>
</table>

SECTION 14. TRANSPORT INFORMATION

14.1 UN number

1760

14.2 UN proper shipping name

<table>
<thead>
<tr>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrosive Liquid, N.O.S. (Zinc Chloride, Hydrochloric Acid)</td>
</tr>
</tbody>
</table>

14.3 Transport hazard class(es)

<table>
<thead>
<tr>
<th>IMDG Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 - Corrosive material 49 CFR 173.136</td>
</tr>
</tbody>
</table>
IMDG Marine Pollutant

Yes. Unless your shipments qualify for an exemption, you must mark the products with the marine pollutant mark and add the words "Marine Pollutant" to the product's basic description on your bill of lading.

14.4 Packing group

PG II

14.5 Environmental hazards

Marine pollutant

14.6 Special precautions for user

ERG Guide No. 154

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

SECTION 15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
SECTION 16. OTHER INFORMATION

Other regulations, limitations and legal regulations

International Inventories:
USA: United States EPA Toxic Substance Control Act: All constituents of this product are on the TSCA inventory list or are excluded from listing.
Canada: Canadian Environmental Protection Act (CEPA): All constituents of this product are on the Domestic Substance List (DSL).
WHMIS classification: Class D; Division 2, Subdivision B - Class E
Europe: All raw materials used in this product are listed on EINECS Inventory.

Federal Regulations:
CERCLA/SARA Title III Reportable Quantities (RQs) and/or Threshold Planning Quantities (TPQs):
Ammonium chloride: 5000 RQ (lb)
Hydrochloric acid: 5000 RQ (lb)
Methanol: 5000 RQ (lb)
Zinc chloride: 1000 RQ (lb)
Spills or releases resulting in the loss of any ingredient at or above its RQ require immediate notification to the National Response Center and to your Local Emergency Planning Committee.

Section 311 Hazard Class - As shipped: Immediate In Use: Immediate delayed

EPCRA/SARA Title III Toxic Chemicals:
Hydrochloric acid: 1.0% de minimis concentration
Methanol: 1.0% de minimis concentration
Zinc chloride: 1.0% de minimis concentration

California Proposition 65: This product contains or produces a chemical known to the state of California to cause cancer and birth defects (or other reproductive harm). (California Health & Safety Code § 25249.5 et seq.)

15.2 Chemical safety assessment
No data available

Other

Read and understand the manufacturer's instructions, your employer's safety practices and the health and safety instructions on the label. Observe any federal and local regulations. Take precautions when soldering and protect yourself and others.

WARNING: Soldering fumes and gases are hazardous to your health and may damage lungs and other organs. Use adequate ventilation.

ELECTRIC SHOCK can kill.
ARC RAYS and SPARKS can injure eyes and burn skin.
Wear correct hand, head, eye and body protection.

SECTION 16. OTHER INFORMATION

Changes to previous revision
This Safety Data Sheet has been revised due to modifications to Sections 1-16.

References to key literature and data sources
USA: Contact ESAB at www.esabna.com or 1-800 ESAB-123 if you have any questions about this SDS.
ESAB requests the users of this product to study this Safety Data Sheet (SDS) and become aware of product hazards and safety information. To promote safe use of this product a user should:
- notify its employees, agents and contractors of the information on this SDS and any product hazards/safety information.
- request such customers to notify employees and customers for the same product hazards and safety information.

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