SECTION I: PRODUCT AND COMPANY INFORMATION

Product Name: Kapp LIQUID Golden Flux for Aluminum Soldering 350°F TO 550°F
Product Number: 551
Company Identification: Kapp Alloy and Wire, 1 Klein Street / PO Box 1188, Oil City, PA 16301 USA
Contact: Telephone: 1-800-327-6533 or 814-676-0613, Fax: 814-676-5565, Email: info@kappalloy.com

SECTION II: HAZARD INFORMATION

Classification of the mixture according to Regulation (EC) No. 1272/2008 and OSHA 29 CFR 1910

GHS05 Corrosion Eye Damage
H290 – May be corrosive to metals
H314 - Causes serious skin burns & eye damage
H318 – Causes serious eye damage

GHS07 Skin Irritation
H301 – Toxic if swallowed.
H302 – Harmful if swallowed.
H315 - Causes skin irritation.
H317 – May cause an allergic skin reaction

GHS08 Health Hazard
H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled.

GHS09 Aquatic Toxicity
H400 – Very toxic to aquatic life
H401 – Very toxic to aquatic life with long lasting effects.

Label Elements according to Regulation (EC) No. 1272/2008 and OSHA 29 CFR 1910

Hazard Pictograms:

GHS05  GHS07  GHS08  GHS09

Signal Word: DANGER

Hazard-determining components of labeling:
Aminoethylethanolamine, Zinc Oxide, Ammonium Fluoborate, Diethanolamine, Triethanolamine, Stannous Fluoborate, Zinc Fluoborate, Fluoroboric Acid

Hazard Statements:
H290 May be corrosive to metals
H301 Toxic if swallowed.
H302 Harmful if swallowed.
H314 Causes serious skin burns & eye damage
H315 Causes skin irritation.
H317 May cause an allergic skin reaction
H318 Causes serious eye damage.
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H400 Very toxic to aquatic life
H401 Very toxic to aquatic life with long lasting effects.

Precautionary Statements:
P220 - Wear protective gloves, clothing, eye, face, and respiratory protection.
P234 - Keep only in original container.
P260 - Do not breathe dust, mist, or fumes.
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.
SECTION III: COMPOSITION / INGREDIENTS

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS No.</th>
<th>EINECS No.</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aminoethanolamine</td>
<td>111-41-1</td>
<td>203-867-5</td>
<td>25-35</td>
</tr>
<tr>
<td>Zinc Oxide</td>
<td>1314-13-2</td>
<td>215-222-5</td>
<td>0-10</td>
</tr>
<tr>
<td>Stannous Fluoroborate</td>
<td>13814-97-6</td>
<td>237-487-6</td>
<td>0-5</td>
</tr>
<tr>
<td>Diethanolamine</td>
<td>111-42-2</td>
<td>203-868-0</td>
<td>0-10</td>
</tr>
<tr>
<td>Ammonium Fluoroborate</td>
<td>13826-83-0</td>
<td>237-531-4</td>
<td>10-20</td>
</tr>
<tr>
<td>Triethanolamine</td>
<td>102-71-6</td>
<td>203-049-8</td>
<td>20-30</td>
</tr>
<tr>
<td>Zinc Fluoroborate</td>
<td>13826-88-5</td>
<td>237-534-0</td>
<td>0-1</td>
</tr>
<tr>
<td>Fluoroboric Acid</td>
<td>16872-11-0</td>
<td>240-898-3</td>
<td>0-10</td>
</tr>
</tbody>
</table>

SECTION IV: FIRST AID MEASURES

Ingestion: Call a physical or Poison Control Center IMMEDIATELY; Advise of chemical composition. (Section III) and Potential Health Effects, (section VIII). Corrosive to mucous membranes. May contain corrosive hydrofluoric acid solution.

Skin: Promptly flush with water to remove any residue. If a rash or burn develops, consult a physician. Product is corrosive. Hydrofluoric acid possible.

Inhalation: Terminate exposure and remove to fresh air. If fumes are inhaled, call physician immediately; over-inhalation may be harmful.

Eyes: Flush with water for at least 20 minutes to remove any residue. Get medical help NOW. Blindness can result. Hydrofluoric acid possible.

SECTION V: FIRE FIGHTING MEASURES

Flash point (°F): > 275.

Flammability Limits: (in air, % by volume)
- LEL: 1.6 estimated
- UEL: 10.0 estimated

Extinguisher Media: Water spray, alcohol-resistant foam, dry chemical, or carbon dioxide.

Special Hazards: Toxic ammonia, boron oxides, or fluoride fumes. Oxides of nitrogen. Hydrofluoric acid solution may be formed within water runoff.

Special Fire Fighting Procedures Wear self-contained breathing apparatus. Fire fighters must wear fire resistant personnel protective equipment & chemical resistant over suit.

Unusual Fire and Explosion Hazards Avoid splashing this material and solutions of it onto personnel. Hydrofluoric acid solution may be formed within water runoff.
SAFETY DATA SHEET  

SDS Name: Kapp LIQUID Golden Flux for Aluminum Soldering 350°F TO 550°F  
SDS Number: 551  

SECTION VI: ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures:
- Wear respiratory protection. Avoid dust formation. Avoid breathing vapors, mist or gas.
- Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
- For personal protection see section 8.

Environmental precautions:  Do not let product enter drains.

Methods and materials for containment and cleaning up: In case of accidental release or spill, immediately notify the appropriate authorities if required by Federal, State/Provincial and local laws and regulations. Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal. Keep in properly labeled containers. Prevent product from entering drains. Clean spill area thoroughly. Local authorities should be advised if significant spillages cannot be contained.

SECTION VII: HANDLING AND STORAGE

Precautions to be taken in handling and storage:
- Store flux at temperatures 35°F to 100°F in original container, keep tightly closed and away from food.
- Wash hands thoroughly after handling to remove any residue.
- No eating or smoking in work area.
- Avoid contact with skin and eyes.
- Do not breathe fumes. Professionally wash contaminated clothing before re-use.
- Existing lung disorders will have increased toxic susceptibility.

SECTION VIII: EXPOSURE CONTROLS / PERSONAL PROTECTION

Skin Protection: Wear protective gloves of Nitrile Rubber or Natural Rubber to protect hands and wrists. 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.

Respiratory Protection: If the work station is not properly ventilated to exhaust all fumes and dusts, use NIOSH-approved fullface respirator with multipurpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Eye Protection: Chemical tight safety goggles or face shield and safety glasses. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Ventilation: Maintain air flow away from user to remove all fumes and vapors, so that the PEL is never exceeded. Adhere to Environmental regulations for exhausts. Conform to applicable regulatory statutes.

Other: Full protective equipment normally used in soldering (applicable) operations so as to prevent any contact. Review operations to avoid contact with hazardous gas, liquids or solids.

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS No.</th>
<th>EINECS No.</th>
<th>SARA III</th>
<th>OSHA PEL</th>
<th>ACGIH TLV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aminoethanolamine</td>
<td>111-41-1</td>
<td>203-867-5</td>
<td>---</td>
<td>N/E</td>
<td>Hazard: Corrosive</td>
</tr>
<tr>
<td>Zinc Oxide</td>
<td>1314-13-2</td>
<td>215-222-5</td>
<td>&lt;10%</td>
<td>5.0 mg/m³</td>
<td>2.0 mg/m³</td>
</tr>
<tr>
<td>Stannous Fluoroborate</td>
<td>13814-97-6</td>
<td>237-487-6</td>
<td>---</td>
<td>2.5 mg/m³as F*</td>
<td>2.5 mg/m³as F* 2.0 mg/m³as Sn</td>
</tr>
<tr>
<td>Diethanolamine</td>
<td>111-42-2</td>
<td>203-868-0</td>
<td>---</td>
<td>---</td>
<td>5.0 mg/m³</td>
</tr>
<tr>
<td>Diethanolamine</td>
<td>111-42-2</td>
<td>203-868-0</td>
<td>---</td>
<td>---</td>
<td>1.0 mg/m³ SKIN</td>
</tr>
<tr>
<td>Ammonium Fluoroborate</td>
<td>13826-83-0</td>
<td>237-531-4</td>
<td>&lt;20%</td>
<td>2.5 mg/m³as F*</td>
<td>2.5 mg/m³as F*</td>
</tr>
<tr>
<td>Triethanolamine</td>
<td>102-71-6</td>
<td>203-049-8</td>
<td>---</td>
<td>---</td>
<td>5.0 mg/m³</td>
</tr>
<tr>
<td>Zinc Fluoroborate</td>
<td>13826-88-5</td>
<td>237-534-0</td>
<td>---</td>
<td>2.5 mg/m³as F*</td>
<td>2.5 mg/m³as F*</td>
</tr>
<tr>
<td>Fluoroboric Acid</td>
<td>16872-11-0</td>
<td>240-898-3</td>
<td>---</td>
<td>2.5 mg/m³as F*</td>
<td>2.5 mg/m³as F*</td>
</tr>
</tbody>
</table>

*Ammonium Fluoroborate:
- The PEL for fluoride as F is 2.5 mg/m³. Chronic fluoride absorption can result in osseous fluorosis, increased radiographic density of the bones and mottling of the teeth. Read OSHA 29 CFR 1910.1000, July 1, 1980, standard for fluorides.
- The PEL for boron oxide is: 10 mg/m³, B₂O₃ as a fume. This compound when used as intended will generate fumes of boron oxide. Contact your industrial hygiene department.

SECTION IX: PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Viscous Liquid
Odor: Ammoniac
Color: Yellow
Specific Gravity: 1.3
Flash Point (@ 760 mmHg): >275°F
Solubility in Water (100 = complete): 100
Active Temperature Range: Active between 350 – 550 °F
Percent volatiles by volume: 8.6
pH: 10-11
Use: General purpose low temperature aluminum soldering flux

SECTION X: STABILITY AND REACTIVITY

Stability: Stable
Conditions to avoid: Excessive heat; decomposes forming corrosive, skin penetrating, toxic gases
Incompatibility (materials to avoid): Strong acids, bases cyanides, sulfides, strong oxidants.
Hazardous Combustion / Decomposition: Toxic hydrofluoric acid, ammonia, and boron trifluoride.

SECTION XI: TOXICOLOGY INFORMATION

<table>
<thead>
<tr>
<th>Component</th>
<th>LC50/Inhalation/1h/Rat</th>
<th>LD50/Rabbit</th>
<th>LD50/Oral/Rat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triethanolamine</td>
<td>No Data</td>
<td>No Data</td>
<td>5530 mg/kg</td>
</tr>
<tr>
<td>Diethanolamine</td>
<td>No Data</td>
<td>2000 mg/kg</td>
<td>4000 mg/kg</td>
</tr>
<tr>
<td>Aminoethylethanolamine</td>
<td>No data</td>
<td>2200 mg/kg</td>
<td>3000 mg/kg</td>
</tr>
</tbody>
</table>

Reproductive toxicity
No data available

Chronic Toxicity and Carcinogenicity
Based on information for component(s): Triethanolamine. Findings from a chronic skin painting study by NTP include liver tumors in mice. Mechanistic studies indicate that tumor formation is of questionable relevance to humans. Findings from a chronic diethanolamine skin painting study by NTP include liver and kidney tumors in mice; no tumors were observed in rats. Mechanistic studies indicate that tumor formation is of questionable relevance to humans. A number of factors may have influenced the results and are being considered in their interpretation.

Carcinogenicity:
Triethanolamine - IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (2,2',2''- Nitrioltriethanol)
Diethanolamine- IARC Possibly carcinogenic to humans.; 2B ACGIH Confirmed animal carcinogen with unknown relevance to humans.; Group A3

Developmental Toxicity
For the major component(s): Has been toxic to the fetus in laboratory animals at doses toxic to the mother. However, the relevance of this to humans is unknown. Dose levels producing these effects were many times higher than any dose levels expected from exposure due to use.

Reproductive Toxicity
For the minor component(s): In animals, effects have been reported on the following organs: Male reproductive organs. Repeated excessive exposures to high amounts may cause effects on testes and fertility in males.
Genetic Toxicology
Based on information for component(s): In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin, spasm, inflammation and edema of the larynx, spasms, inflammation and edema of the bronchi, pneumonia, pulmonary edema, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea.

Swallowing: Can cause damage to digestive system. Corrosive to mucous membranes. May cause salivation, nausea, vomiting, diarrhea, and abdominal pain. Fluoride ions can reduce serum calcium levels, possibly causing fatal hypocalcaemia. Systemic toxicity and shock.

Skin Absorption / Contact: None currently known. Fumes may penetrate / absorb into skin.
Inhalation: **Highly irritating to respiratory system**. Coughing & sneezing. Existing lung disorders will be aggravated. Inhalation may yield: chills, labored breathing, fevers, and unproductive cough. The fluoride ion may cause hypocalcaemia – calcium deficiency in the blood. Inflammation and necrosis of mucous membranes.

Eye Contact: Strong irritation to eyes, tearing, burn of eye surface, corrosive to eyes. May cause blindness.

<table>
<thead>
<tr>
<th>Rating</th>
<th>Health</th>
<th>Flammability</th>
<th>Reactivity</th>
<th>Special</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFPA</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>HMIS</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**SECTION XII: ECOLOGY INFORMATION**

12.1 Toxicity
Toxicity to fish LC50 - Danio rerio (zebra fish) - 2,600 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates - EC50 - Daphnia magna (Water flea) - > 100 mg/l
Remarks: Information given is based on data on the components and the ecotoxicology of similar products.
Toxicity to algae NOEC - Pseudokirchnerriella subcapitata (green algae) - > 100 mg/l – 72 hr.
Remarks: Information given is based on data on the components and the eco-toxicology of similar products.

12.2 Persistence and degradability
Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.
Indirect Photo degradation with OH Radicals
Rate Constant Atmospheric Half-life Method
1.20E-10 cm3/s 1.1 h Estimated OECD Biodegradation Tests: Biodegradation
Exposure Time Method > 97 % 28 d OECD 301F Test

12.3 Bio-accumulative potential
No data available

12.4 Mobility in soil
Potential for mobility in soil is very high (Koc between 0 and 50). Given its very low Henry's constant, volatilization from natural bodies of water or moist soil is not expected to be an important fate process.
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

No data available

SECTION XIII: DISPOSAL CONSIDERATION

Waste Disposal Method

- Must not be disposed of together with household garbage. Do not allow product to reach sewage system.
- Disposal must be made according to official regulations. Dispose of according to federal, state, local, international, and OSHA regulations. 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.
- Dispose of contaminated packaging as unused product.

SECTION XIV: TRANSPORT INFORMATION

US Department of Transportation – GROUND ONLY

Proper shipping name: Corrosive Liquid, N.O.S.(Aminoethyl ethanolamine, Ammonium Flu borate)

Hazard Class: 8
ID & Packing Group Number: UN 1760, PG II
ERG Guide Number: 154
Marine Pollutant: No
Reportable Quantity: None

International Air Transportation (ICAO/IATA):

Proper shipping name: Corrosive Liquid NOS (aminoethyl ethanolamine, Ammonium Fluoroborate

UN No.: 1760
Packaging Groups: II
Hazard Class: 8
Hazard labels: Corrosive
IATA PKG Inst# 855, Cargo Aircraft Only
ERG Guide Number: 154

International Maritime Organization (IMO/IMDG):

Proper Shipping name: Corrosive Liquid NOS (aminoethyl ethanolamine, ammonium fluoroborate)

UN No.: 1760
Packaging Groups: II
Hazard Class: 8
Hazard labels: Corrosive
IMDG – Marine Pollutant: No

SECTION XV: REGULATORY INFORMATION

SARA Title III 313 Reportable Substances

This product contains the following chemicals which are subject to the reporting requirements of the Act and of Title 40 of the Code of Federal Regulations, Part 372

<table>
<thead>
<tr>
<th>Chemical</th>
<th>CAS No.</th>
<th>% by Weight</th>
<th>Section 311/312 Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinc Compounds</td>
<td>N982</td>
<td>11</td>
<td>Acute Health Hazard</td>
</tr>
<tr>
<td>N,N-Diethanolamine</td>
<td>111-42-2</td>
<td>5</td>
<td>Acute Health Hazard</td>
</tr>
</tbody>
</table>
CERCLA Section 103
This product contains the following substances which are subject to CERCLA Section 103 reporting requirements and which are listed on 40 CFR 302.4: Diethanolamine 111-42-2

Toxic Substance Control Act (TSCA)
If listed below, non-proprietary substances are subject to export notification Section 12 (b) of TSCA: None listed

State Regulations (RTK)
Pennsylvania and New Jersey Right to Know Components:

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluoroboric Acid</td>
<td>16872-11-0</td>
</tr>
<tr>
<td>Ammonium Fluoroborate</td>
<td>13826-83-0</td>
</tr>
<tr>
<td>Diethanolamine</td>
<td>111-42-2</td>
</tr>
<tr>
<td>Triethanolamine</td>
<td>102-71-6</td>
</tr>
<tr>
<td>Zinc Oxide</td>
<td>1314-13-2</td>
</tr>
<tr>
<td>Aminoethyamino)ethanol</td>
<td>111-41-1</td>
</tr>
</tbody>
</table>

California Proposition 65
This product contains a chemical known in the State of California to cause cancer: Diethanolamine, CAS 111-42-2

RoHS, REACH, and REACH-SVHC Compliance:
This Product is RoHS and REACH Compliant. This product is free of REACH-SVHC substances.

Hazardous Communications Program: Hazardous warnings and training requirements as mandated for corrosive material.

SECTION XVI: OTHER INFORMATION

This information must be included in all SDS that are copied and distributed for this material.

GOOD HOUSEKEEPING PROCEDURES SHOULD BE MAINTAINED.
PERSONNEL SHOULD WASH THOROUGHLY BEFORE SMOKING OR EATING
FOOD AND DRINK SHOULD NOT BE CONSUMED, TOBACCO PRODUCTS USED, OR COSMETICS
APPLIED IN AREAS WHERE EXPOSURES EXIST.


The information and recommendations contained within this publication have been compiled from sources believed to be reliable and to represent the best information available to Kapp Alloy and Wire, Inc. at the time of issue. It is our policy to include an SDS with initial orders for each product. This submission is to become a matter of record and need not accompany subsequent shipments for the same product to the same customer. The information contained on this sheet is intended solely for employee health and safety education and not for contract specification purposes. No warranty, guarantee, or representation is made by Kapp Alloy and Wire, Inc., nor does Kapp Alloy and Wire, Inc. assume any responsibility in connection there within; nor can it be assumed that all acceptable safety measures or other safety measures may not be required under particular or exceptional conditions or circumstances. Should you need additional information, contact us.