SAFETY DATA SHEET
PETROFLO* 21Y23

1. Product and Company Identification

Material name: PETROFLO 21Y23
Version #: 2.0
Revision date: Sep-19-2014
Supersedes date: Sep-07-2011
Chemical description: Neutralising amine
CAS #: Mixture
Product application: Neutralizer

Company/undertaking identification
GE Betz, Inc.
4636 Somerton Road
Trevose, PA  19053
T 215 355 3300, F 215 953 5524

Emergency telephone
(800) 877 1940

2. Hazards Identification

Emergency overview
Severe irritant to the skin. Absorbed by skin. Corrosive to the eyes. Vapors, gases, mists and/or aerosols cause irritation to the upper respiratory tract. Prolonged exposure may cause dizziness and headache.

Potential health effects

Eyes
Corrosive to eyes

Skin
Primary route of exposure Severe irritant to the skin. Absorbed by skin

Inhalation
Primary route of exposure Vapors, gases, mists or aerosols may cause irritation to the upper respiratory tract. Prolonged exposure may cause dizziness and headache.

Ingestion
May cause severe gastrointestinal irritation with possible nausea, vomiting, headache, dizziness, unconsciousness and injury to kidneys and liver.

Target organs
Prolonged or repeated exposures may cause toxicity to the liver and kidney.

Signs and symptoms
Inhalation may cause lightheadedness, slurred speech, nausea and vomiting (pulmonary oedema may result).
Skin contact may cause severe irritation or burns.

3. Composition / Information on Ingredients

Components | CAS # | Percent
--- | --- | ---
AMINO ETHER | TSRN 125438 - 5183P |

4. First Aid Measures

First aid procedures

Eye contact
URGENT! Immediately flush eyes with plenty of low-pressure water for at least 20 minutes while removing contact lenses. Hold eyelids apart. Get immediate medical attention.

Skin contact
Wash thoroughly with soap and water. Remove contaminated clothing. Thoroughly wash clothing before reuse. Immediately contact a physician.
Inhalation
Remove to fresh air. If breathing is difficult, give oxygen. If breathing stops, provide artificial respiration. Seek medical attention.

Ingestion
Do not feed anything by mouth to an unconscious or convulsive victim. Do NOT induce vomiting! Seek medical attention. Dilute contents of stomach using 2-8 fluid ounces (60-240ml) of milk or water.

5. Fire Fighting Measures

Extinguishing media
Suitable extinguishing media Carbon dioxide, dry chemicals, foam, water spray (fog).

Unsuitable extinguishing media
None.

Protection of firefighters
Specific hazards arising from the chemical
Oxides of carbon and nitrogen evolved in fire.

Protective equipment and precautions for firefighters
Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.

Fire fighting equipment/instructions
Use standard firefighting procedures and consider the hazards of other involved materials.

General fire hazards
Non flammable liquid

6. Accidental Release Measures

Personal precautions
Wear appropriate protective equipment and clothing during clean-up. Avoid contact with spilled material. See Section 8 of the MSDS for Personal Protective Equipment.

Environmental precautions
Avoid discharge into drains, water courses or onto the ground. Water contaminated with this product may be sent to a sanitary sewer treatment facility, or a permitted waste treatment facility, in accordance with any local agreements.

Other information
Ventilate area, use specified protective equipment. Contain and absorb on absorbent material (e.g. sand). Place in waste disposal container.

7. Handling and Storage

Handling
Alkaline. corrosive to the eyes Do not mix with acidic material.

Storage
Store containers closed when not in use.
Store in cool, well ventilated area.
Store away from oxidizers.

8. Exposure Controls / Personal Protection

Occupational exposure limits

<table>
<thead>
<tr>
<th>Components</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMINO ETHER (CAS TSRN 125438 - 5183P)</td>
<td>TWA</td>
<td>20 ppm</td>
</tr>
</tbody>
</table>

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

<table>
<thead>
<tr>
<th>Components</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMINO ETHER (CAS TSRN 125438 - 5183P)</td>
<td>PEL</td>
<td>70 mg/m3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 ppm</td>
</tr>
</tbody>
</table>

Biological limit values
No biological exposure limits noted for the ingredient(s).

Exposure guidelines

US. ACGIH Threshold Limit Values

AMINO ETHER (CAS TSRN 125438 - 5183P) Can be absorbed through the skin.

US. California Code of Regulations, Title 8, Section 5155. Airborne Contaminants

MORPHOLINE; TETRAHYDRO-4H-1, 4-OXAZINE (CAS TSRN 125438 - 5183P) Can be absorbed through the skin.

US. Minnesota Hazardous Substances List (Minn. Rules 5206.0400).

AMINO ETHER (CAS TSRN 125438 - 5183P) Skin designation applies.

US. NIOSH: Pocket Guide to Chemical Hazards

AMINO ETHER (CAS TSRN 125438 - 5183P) Can be absorbed through the skin.

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

AMINO ETHER (CAS TSRN 125438 - 5183P) Can be absorbed through the skin.
AMINO ETHER (CAS TSRN 125438 - 5183P)

Can be absorbed through the skin.

**Engineering controls**
Adequate ventilation to maintain air contaminants below exposure limits.
Arrange for eye wash possibility.

**Personal protective equipment**

**Eye / face protection**
Splash proof chemical goggles.
Face shield.

**Skin protection**
Chemical resistant apron.

**Respiratory protection**
If air-purifying respirator use is appropriate, use organic vapor cartridges and any of the following particulate respirators: N95, N99, N100, R95, R99, R100, P95, P99 or P100. In case of insufficient ventilation, use a breathing mask with filter type: A2-P2

**General hygiene considerations**
Wash hands after handling.

### 9. Physical & Chemical Properties

**Appearance**

**Physical state**
Liquid

**Color**
Colorless to yellow

**Odor**
Amine

**Odor threshold**
Not available.

**pH (concentrated product)**
12.1

**Vapor pressure**
15 mm Hg

**Vapor pressure temp.**
70 °F (21 °C)

**Vapor density**
> 1 (Air = 1)

**Boiling point**
220 °F (104 °C)

**Melting point/Freezing point**
-6 °F (-21 °C)

**Solubility (water)**
100 %

**Specific gravity (70°F, 21°C)**
1.03

**Flash point**
> 200 °F (> 93 °C) SETA(CC)

**Flammability limits in air, upper, % by volume**
Not available.

**Flammability limits in air, lower, % by volume**
Not available.

**Auto-ignition temperature**
Not available.

**Evaporation rate**
< 1 (Ether = 1)

**Viscosity**
4 cps

**Viscosity temperature**
70 °F (21 °C)

**Percent volatile**
38 (Estimated)

**Pour point**
0 °F (-18 °C)

### 10. Chemical Stability & Reactivity Information

**Chemical stability**
Material is stable under normal conditions.

**Conditions to avoid**
Contact with water reactive compounds may cause fire or explosion.

**Incompatible materials**
Avoid contact with strong oxidizers.

**Hazardous decomposition products**
Elemental oxides
11. Toxicological Information

**Toxicological data**

<table>
<thead>
<tr>
<th>Product</th>
<th>Species</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>PETROFLO 21Y23 (CAS Mixture)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Acute</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dermal</td>
<td>Rabbit</td>
<td>1333 mg/kg, (Calculated according to GHS additivity formula (Category 4))</td>
</tr>
<tr>
<td>Inhalation</td>
<td>Rat</td>
<td>21.2 mg/l/4h, (Calculated according to GHS additivity formula)</td>
</tr>
<tr>
<td>Oral</td>
<td>Rat</td>
<td>2763 mg/kg, (Calculated according to GHS additivity formula)</td>
</tr>
</tbody>
</table>

**Components**

<table>
<thead>
<tr>
<th>Species</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMINO ETHER (CAS TSRN 125438 - 5183P)</td>
<td></td>
</tr>
<tr>
<td><strong>Acute</strong></td>
<td></td>
</tr>
<tr>
<td>Dermal</td>
<td>Rabbit</td>
</tr>
<tr>
<td>Inhalation</td>
<td>Rat</td>
</tr>
<tr>
<td>Oral</td>
<td>Rat</td>
</tr>
</tbody>
</table>

**Acute effects**

Harmful in contact with skin.

**Chronic effects**

Long term exposure may cause adverse effects to health.

**Carcinogenicity**

- **ACGIH Carcinogens**
  - AMINO ETHER (CAS TSRN 125438 - 5183P) A4 Not classifiable as a human carcinogen.
- **IARC Monographs. Overall Evaluation of Carcinogenicity**
  - AMINO ETHER (CAS TSRN 125438 - 5183P) 3 Not classifiable as to carcinogenicity to humans.
  - Not listed.

**Skin corrosion/irritation**

Causes severe skin burns and eye damage.

12. Ecological Information

**Ecotoxicity**

<table>
<thead>
<tr>
<th>Product</th>
<th>Species</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>PETROFLO 21Y23 (CAS Mixture)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crustacea</td>
<td>Daphnia magna</td>
<td>100 mg/L, Static Screen, 48 hour</td>
</tr>
<tr>
<td>Other</td>
<td>Rainbow Trout</td>
<td>500 mg/L, Static Screen, 48 hour</td>
</tr>
</tbody>
</table>

**Partition coefficient**

AMINO ETHER -0.9

**Partition coefficient**

<table>
<thead>
<tr>
<th>Product</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMINO ETHER</td>
<td>0.9</td>
</tr>
</tbody>
</table>

**Persistence and degradability**

- COD (mgO2/g) 695 (calculated data)
- BOD 5 (mgO2/g) 0 (calculated data)
- BOD 28 (mgO2/g) 345 (calculated data)
- Closed Bottle Test (% Degradation in 28 days) 54 (calculated data)
- Zahn-Wellens Test (% Degradation in 28 days) 90 (calculated data)
13. Disposal Considerations

**Waste codes**
Industrial Liquid Waste

**Disposal instructions**
Dispose of contents/container in accordance with local/regional/national/international regulations.

**Waste from residues / unused products**
Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner.

**Contaminated packaging**
Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport Information

**DOT**

<table>
<thead>
<tr>
<th>UN number</th>
<th>UN2735</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN proper shipping name</td>
<td>AMINES LIQUID CORROSIVE, N.O.S. (MORPHOLINE SOLUTION)</td>
</tr>
<tr>
<td>Transport hazard class(es)</td>
<td></td>
</tr>
<tr>
<td>Class</td>
<td>8</td>
</tr>
<tr>
<td>Subsidiary risk</td>
<td>-</td>
</tr>
<tr>
<td>Packing group</td>
<td>II</td>
</tr>
<tr>
<td>Special precautions for user</td>
<td>Not available.</td>
</tr>
<tr>
<td>ERG number</td>
<td>153</td>
</tr>
</tbody>
</table>

**IATA**

<table>
<thead>
<tr>
<th>UN number</th>
<th>UN2735</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN proper shipping name</td>
<td>AMINES LIQUID, CORROSIVE, N.O.S. (MORPHOLINE SOLUTION)</td>
</tr>
<tr>
<td>Transport hazard class(es)</td>
<td></td>
</tr>
<tr>
<td>Class</td>
<td>8</td>
</tr>
<tr>
<td>Subsidiary risk</td>
<td>-</td>
</tr>
<tr>
<td>Packing group</td>
<td>II</td>
</tr>
<tr>
<td>Environmental hazards</td>
<td>No.</td>
</tr>
<tr>
<td>ERG Code</td>
<td>153</td>
</tr>
<tr>
<td>Special precautions for user</td>
<td>Not available.</td>
</tr>
</tbody>
</table>

**IMDG**

<table>
<thead>
<tr>
<th>UN number</th>
<th>UN2735</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN proper shipping name</td>
<td>AMINES LIQUID, CORROSIVE, N.O.S. (MORPHOLINE SOLUTION)</td>
</tr>
<tr>
<td>Transport hazard class(es)</td>
<td></td>
</tr>
<tr>
<td>Class</td>
<td>8</td>
</tr>
<tr>
<td>Subsidiary risk</td>
<td>-</td>
</tr>
<tr>
<td>Packing group</td>
<td>II</td>
</tr>
<tr>
<td>Environmental hazards</td>
<td>No.</td>
</tr>
<tr>
<td>Marine pollutant</td>
<td>Not available.</td>
</tr>
<tr>
<td>EmS</td>
<td>Not available.</td>
</tr>
<tr>
<td>Special precautions for user</td>
<td>Not available.</td>
</tr>
</tbody>
</table>

**TDG**

<table>
<thead>
<tr>
<th>UN number</th>
<th>UN2735</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN proper shipping name</td>
<td>AMINES LIQUID, CORROSIVE, N.O.S. (MORPHOLINE SOLUTION)</td>
</tr>
<tr>
<td>Hazard class</td>
<td>8</td>
</tr>
<tr>
<td>Packing group</td>
<td>II</td>
</tr>
<tr>
<td>ERG code</td>
<td>153</td>
</tr>
</tbody>
</table>
15. Regulatory Information

US federal regulations

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: Listed substance
None listed.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)
Not regulated.

CERCLA (Superfund) reportable quantity, lbs
AMINO ETHER: 100 lbs

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
- Immediate Hazard - Yes
- Delayed Hazard - Yes
- Fire Hazard - No
- Pressure Hazard - No
- Reactivity Hazard - No

SARA 302 Extremely hazardous substance

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS number</th>
<th>Reportable quantity</th>
<th>Threshold planning quantity, lower value</th>
<th>Threshold planning quantity, upper value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,2-Diaminoethane (Ethylene diamine)</td>
<td>107-15-3</td>
<td>5000</td>
<td>10000 lbs</td>
<td></td>
</tr>
</tbody>
</table>

SARA 311/312 Hazardous chemical

<table>
<thead>
<tr>
<th>Country(s) or region</th>
<th>Inventory name</th>
<th>On inventory yes/no*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>Domestic Substances List (DSL)</td>
<td>Yes</td>
</tr>
<tr>
<td>Canada</td>
<td>Non-Domestic Substances List (NDSL)</td>
<td>No</td>
</tr>
<tr>
<td>United States &amp; Puerto Rico</td>
<td>Toxic Substances Control Act (TSCA) Inventory</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*"Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

State regulations

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance
No ingredient listed.

US - California Proposition 65 - CRT: Listed date/Developmental toxin

US - California Proposition 65 - CRT: Listed date/Female reproductive toxin
No ingredient listed.

US - California Proposition 65 - CRT: Listed date/Male reproductive toxin

US - Massachusetts RTK - Substance List
AMINO ETHER (CAS TSRN 125438 - 5183P)

US - New Jersey RTK - Substances: Listed substance
AMINO ETHER (CAS TSRN 125438 - 5183P) Listed.

US - Pennsylvania RTK - Hazardous Substances
AMINO ETHER (CAS TSRN 125438 - 5183P) Listed.

US - Rhode Island RTK
Not regulated.
16. Other Information

List of abbreviations
Not available.

HMIS® ratings
Health: 3
Flammability: 1
Physical hazard: 0
Personal protection: D

NFPA ratings
Health: 3
Flammability: 1
Instability: 0
Special hazards: ALK

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

This data sheet contains changes from the previous version in section(s):
Product and Company Identification: Commercial Names
Composition / Information on Ingredients: Disclosure Overrides
Toxicological Information: Toxicological Data
Transport Information: Material Transportation Information
GHS: Classification

Prepared by
This MSDS has been prepared by GE Water & Process Technologies Regulatory Department (1-215-355-3300).

* Trademark of General Electric Company. May be registered in one or more countries.