Hazard Alert: Diesel Exhaust Fluid

Location: Widely found throughout BC’s forest industry

Date of Incident: N/A

Details, Recommended Preventative Actions: Diesel Exhaust Fluid (DEF) is a product that has become more and more common in the forest industry. It is designed to help reduce levels of oxides of nitrogen that are emitted from diesel engines. These emissions are harmful to human health and to the environment as well.

DEF is injected into exhaust systems where it vaporizes and decomposes to form ammonia and carbon dioxide. The ammonia and exhaust gas pass through the catalyst and converts the mixture to nitrogen and water.

Diesel Exhaust Fluid is considered an eye and skin irritant and is not flammable. If your skin comes into contact with DEF, wash immediately with soap and water. For other health effects, please the attached Material Safety Data Sheet (MSDS) for TerraCair DEF.

DEF has a freezing point of minus 12 degrees Celsius and should be stored at normal room temperature in a closed container away from incompatible materials. The low freezing point indicates that in extreme cold temperatures, the DEF will freeze. Equipment or vehicles that use Diesel Exhaust Fluid normally will have heaters in the reservoir, allowing them to work in cold environments.

Diesel Exhaust Fluid should be used in well-ventilated environments. Proper PPE should also be worn when handling DEF. Safety glasses with side shields and impervious gloves are manufacturer’s recommendations.

For more information: Refer to the MSDS for Diesel Exhaust Fluid, found starting on the next page.
1. Product and Company Identification

Product Name  TerraCair® Ultrapure Diesel Exhaust Fluid
CAS # Mixture
Product use Diesel Exhaust NOx Reducing Agent
Manufacturer Terra Industries Inc.
600 Fourth Street
Sioux City, Iowa 51101 US
Phone: 800-265-6643
CHEMTREC 800-424-9300
CANUTEC 613-996-6666

2. Hazards Identification

Emergency Overview CAUTION
EYE AND SKIN IRRITANT.

Potential short term health effects

Routes of exposure Eye, Skin contact, Inhalation, Ingestion.
Eyes May cause irritation.
Skin May cause irritation.
Inhalation May be harmful by inhalation. May cause respiratory tract irritation.
Ingestion May cause stomach distress, nausea or vomiting.

Target organs Eyes. Skin. Respiratory system.

Signs and symptoms Symptoms may include redness, edema, drying, defatting and cracking of the skin.
Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.

3. Composition / Information on Ingredients

<table>
<thead>
<tr>
<th>Ingredient(s)</th>
<th>CAS #</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>67.5</td>
</tr>
<tr>
<td>Urea</td>
<td>57-13-6</td>
<td>32.5</td>
</tr>
</tbody>
</table>

4. First Aid Measures

First aid procedures

Eye contact Flush with cool water. Remove contact lenses, if applicable, and continue flushing. Obtain medical attention if irritation persists.

Skin contact Flush with cool water. Wash with soap and water. Obtain medical attention if irritation persists.

Inhalation If symptoms develop, move victim to fresh air. If symptoms persist, obtain medical attention. If breathing has stopped, trained personnel should administer CPR immediately.
### 5. Fire Fighting Measures

<table>
<thead>
<tr>
<th>Property</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Flammable properties</strong></td>
<td>Not flammable by WHMIS/OSHA criteria.</td>
</tr>
<tr>
<td><strong>Extinguishing media</strong></td>
<td></td>
</tr>
<tr>
<td>Suitable extinguishing media</td>
<td>Treat for surrounding material.</td>
</tr>
<tr>
<td>Unsuitable extinguishing media</td>
<td>Not available</td>
</tr>
<tr>
<td><strong>Protection of firefighters</strong></td>
<td>Not available</td>
</tr>
<tr>
<td>Specific hazards arising from the chemical</td>
<td>Not available</td>
</tr>
<tr>
<td>Protective equipment for firefighters</td>
<td>Firefighters should wear full protective clothing including self contained breathing apparatus.</td>
</tr>
<tr>
<td><strong>Hazardous combustion products</strong></td>
<td>May include and are not limited to: Oxides of carbon. Oxides of nitrogen. Ammonia.</td>
</tr>
<tr>
<td><strong>Explosion data</strong></td>
<td></td>
</tr>
<tr>
<td>Sensitivity to mechanical impact</td>
<td>Not available</td>
</tr>
<tr>
<td>Sensitivity to static discharge</td>
<td>Not available</td>
</tr>
</tbody>
</table>

### 6. Accidental Release Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Personal precautions</strong></td>
<td>Keep unnecessary personnel away. Wear appropriate protective clothing.</td>
</tr>
<tr>
<td><strong>Methods for containment</strong></td>
<td>Stop leak if you can do so without risk. Prevent entry into waterways, sewers, basements or confined areas.</td>
</tr>
<tr>
<td><strong>Methods for cleaning up</strong></td>
<td>Before attempting clean up, refer to hazard data given above. Small spills may be absorbed with non-reactive absorbent and placed in suitable, covered, labeled containers. Prevent large spills from entering sewers or waterways. Contact emergency services and supplier for advice. Never return spills in original containers for re-use.</td>
</tr>
</tbody>
</table>

### 7. Handling and Storage

<table>
<thead>
<tr>
<th>Measure</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Handling</strong></td>
<td>Use good industrial hygiene practices in handling this material.</td>
</tr>
<tr>
<td><strong>Storage</strong></td>
<td>Keep out of reach of children. Store in a closed container away from incompatible materials.</td>
</tr>
</tbody>
</table>
8. Exposure Controls / Personal Protection

<table>
<thead>
<tr>
<th>Ingredient(s)</th>
<th>Exposure Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urea</td>
<td>ACGIH-TLV</td>
</tr>
<tr>
<td></td>
<td>Not established</td>
</tr>
<tr>
<td></td>
<td>OSHA-PEL</td>
</tr>
<tr>
<td></td>
<td>Not established</td>
</tr>
</tbody>
</table>

**Engineering controls**
Ensure adequate ventilation, especially in confined areas. Use only under good ventilation conditions or with respiratory protection.

**Personal protective equipment**

- **Eye / face protection**: Wear safety glasses with side shields.
- **Hand protection**: Impervious gloves. Nitrile, Viton, Butyl.
- **Skin and body protection**: As required by employer code.
- **Respiratory protection**: Where exposure guideline levels may be exceeded, use an approved NIOSH respirator.
- **General hygiene considerations**: Avoid breathing vapors. Handle in accordance with good industrial hygiene and safety practice. When using do not eat or drink. Wash hands before breaks and immediately after handling the product.

9. Physical & Chemical Properties

- **Appearance**: Clear.
- **Color**: Colorless
- **Form**: Liquid
- **Odor**: Slight ammonia
- **Physical state**: Liquid
- **pH**: 9.8 - 10.0
- **Freezing point**: -12°C
- **Boiling point**: 104°C
- **Density**: 9.1 lbs. / USG - 4.13 kg / 3.785L
- **Specific gravity**: 1.087-1.093 @ 20°C
- **Solubility (H2O)**: 100%

10. Chemical Stability & Reactivity Information

- **Chemical stability**: Stable under recommended storage conditions.
- **Conditions to avoid**: Do not mix with any other chemical or product.
- **Hazardous decomposition products**: May include and are not limited to: Oxides of carbon. Oxides of nitrogen. Ammonia.
- **Possibility of hazardous reactions**: Hazardous polymerization does not occur.
11. Toxicological Information

Component analysis - LC50

<table>
<thead>
<tr>
<th>Ingredient(s)</th>
<th>LC50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urea</td>
<td>Not available</td>
</tr>
</tbody>
</table>

Component analysis - Oral LD50

<table>
<thead>
<tr>
<th>Ingredient(s)</th>
<th>LD50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urea</td>
<td>11,500 - 13,000 mg/kg mouse; 14,300 - 15,000 mg/kg rat; 510 mg/kg cattle.</td>
</tr>
</tbody>
</table>

Effects of acute exposure

- **Eye**: May cause irritation.
- **Skin**: May cause irritation.
- **Inhalation**: Not available
- **Ingestion**: May cause stomach distress, nausea or vomiting.

**Sensitization**: Non-hazardous by WHMIS/OSHA criteria.
**Chronic effects**: Non-hazardous by WHMIS/OSHA criteria.
**Carcinogenicity**: Non-hazardous by WHMIS/OSHA criteria.
**Mutagenicity**: Non-hazardous by WHMIS/OSHA criteria.
**Reproductive effects**: Non-hazardous by WHMIS/OSHA criteria.
**Teratogenicity**: Non-hazardous by WHMIS/OSHA criteria.

12. Ecolological Information

**Ecotoxicity**: Components of this product have been identified as having potential environmental concerns.

**Ecotoxicity - Freshwater Fish Species Data**

- **Urea**: 57-13-6 96 Hr LC50 Barillius barna: >9100 mg/L

**Ecotoxicity - Microtox Data**

- **Urea**: 57-13-6 24HrEC50 Daphnia magna straus: >10000mg/L

**Environmental effects**: Not available
**Aquatic toxicity**: Not available
**Persistence / degradability**: Not available
**Bioaccumulation / accumulation**: Not available
**Partition coefficient**: Not available
**Mobility in environmental media**: Not available
**Chemical fate information**: Not available
**Other adverse effects**: Not available
### 13. Disposal Considerations

<table>
<thead>
<tr>
<th>Waste codes</th>
<th>Not available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disposal instructions</td>
<td>Review federal, provincial, and local government requirements prior to disposal.</td>
</tr>
<tr>
<td>Waste from residues / unused products</td>
<td>Not available</td>
</tr>
<tr>
<td>Contaminated packaging</td>
<td>Not available</td>
</tr>
</tbody>
</table>

### 14. Transport Information

**U.S. Department of Transportation (DOT)**
- Not regulated as dangerous goods.

**Transportation of Dangerous Goods (TDG - Canada)**
- Not regulated as dangerous goods.

### 15. Regulatory Information

**Canadian federal regulations**
- This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

**US Federal regulations**
- The product is a “Hazardous Chemical” as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200. All components are on the U.S. EPA TSCA Inventory List.

**Occupational Safety and Health Administration (OSHA)**
- 29 CFR 1910.1200 hazardous chemical: Yes

**Superfund Amendments and Reauthorization Act of 1986 (SARA)**
- **Hazard categories**
  - Immediate Hazard - Yes
  - Delayed Hazard - No
  - Fire Hazard - No
  - Pressure Hazard - No
  - Reactivity Hazard - No
- **Section 302 extremely hazardous substance**: No
- **Section 311 hazardous chemical**: Yes

**Clean Air Act (CAA)**
- Not available

**Clean Water Act (CWA)**
- Not available

**Safe Drinking Water Act (SDWA)**
- Not available

**Drug Enforcement Agency (DEA)**
- Not available

**Food and Drug Administration (FDA)**
- Not available

**WHMIS status**
- Controlled

**WHMIS classification**
- Class D - Division 2B

**WHMIS labeling**
State regulations

This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

Inventory name

<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>

A “Yes” indicates that all components of this product comply with the inventory requirements administered by the governing country(s).

16. Other Information

Disclaimer

Information contained herein was obtained from sources considered technically accurate and reliable. While every effort has been made to ensure full disclosure of product hazards, in some cases data is not available and is so stated. Since conditions of actual product use are beyond control of the supplier, it is assumed that users of this material have been fully trained according to the requirements of all applicable legislation and regulatory instruments. No warranty, expressed or implied, is made and supplier will not be liable for any losses, injuries or consequential damages which may result from the use of or reliance on any information contained in this document.

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