Material Safety Data for: Brake Fluid

1. PRODUCT IDENTIFICATION

Name: brake fluid
Synonyms: -
Product Uses: hydraulic fluid

2. INGREDIENTS

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS #</th>
<th>%</th>
<th>TWAEV / TLV ppm</th>
<th>LD50 (mg/kg) ORAL</th>
<th>LD50 (mg/kg) SKIN</th>
<th>LC50 ppm INHALATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diethylene Glycol Monobutyl Ether</td>
<td>112-34-5</td>
<td>15-35%</td>
<td>not listed</td>
<td>2000</td>
<td>2700</td>
<td>not known</td>
</tr>
<tr>
<td>Triethylene Glycol Monobutyl Ether</td>
<td>143-22-6</td>
<td>15-25%</td>
<td>not listed</td>
<td>5300</td>
<td>3540</td>
<td>not known</td>
</tr>
<tr>
<td>Tripropylene Glycol</td>
<td>24800-44-0</td>
<td>15-20%</td>
<td>not listed</td>
<td>3000</td>
<td>not known</td>
<td>not known</td>
</tr>
<tr>
<td>Diethylene Glycol</td>
<td>111-46-6</td>
<td>5-10%</td>
<td>not listed</td>
<td>&lt;2000</td>
<td>&gt;20,000</td>
<td>not known</td>
</tr>
<tr>
<td>Polypropylene Glycol</td>
<td>25322-69-3</td>
<td>5-10%</td>
<td>not listed</td>
<td>2300</td>
<td>11,890</td>
<td>not known</td>
</tr>
<tr>
<td>Diethylene Glycol Monoethyl Ether</td>
<td>111-90-0</td>
<td>5-10%</td>
<td>not listed</td>
<td>25</td>
<td>3000</td>
<td>8500</td>
</tr>
<tr>
<td>Triethylene Glycol Monoethyl Ether</td>
<td>112-50-5</td>
<td>5-10%</td>
<td>not listed</td>
<td>3070</td>
<td>8000</td>
<td>not known</td>
</tr>
<tr>
<td>Diethylene Glycol Monopropyl Ether</td>
<td>6881-94-3</td>
<td>5-10%</td>
<td>not listed</td>
<td>not known</td>
<td>not known</td>
<td>not known</td>
</tr>
<tr>
<td>Polypropylene Glycol Monopropyl Ether</td>
<td>29011-16-3</td>
<td>5-10%</td>
<td>not listed</td>
<td>not known</td>
<td>not known</td>
<td>not known</td>
</tr>
</tbody>
</table>

3. (a) HAZARDS SUMMARY

Canada, Quick Guide: ingestion may damage the liver & kidneys and even cause death

Canada – WHMIS

Key:
B 2 – Flash Point <38°C, B 3 – Flash Point >38°C & <93°C
D 1 – Immediately Toxic, D 2 – Chronic Toxicity
C – Oxidising Substance, E – Corrosive

U.S.A. – HMIS

Health – 2, Fire – 1, Reactivity – 0
Key:
0 = minimal, 1 = slight, 2 = moderate, 3 = serious, 4 = severe

3. (b) HAZARDS – TOXICITY

Effects, Acute Exposure
Skin Contact: little to no effect
Skin Absorption: slight; no toxic effects likely by this route
Eye Contact: may be slightly irritating
Inhalation: vapour may irritate; low vapour pressure greatly reduces likelihood of inhalation
Ingestion: little or no effect likely to accidental ingestion of small amounts

Effects, Chronic Exposure
General: prolonged absorption (or large single dose) may damage liver & kidneys
Sensitising: not a sensitisier in humans or animals
Carcinogen/Tumorigen: not considered a tumorigen in humans; one component is a mouse tumorigen
Reproductive Effect: one component fetotoxic in rodents and reduces fertility no known effect in humans
Mutagen: may be a rodent mutagen; no known effect on humans
Synergistic With: not known
LD50 (oral): 2070mg/kg
LD50 (skin): 6350mg/kg
LC50 (inhalation): not known – no data available

Please ensure that this MSDS is given to, and explained to people using this product.
4. FIRST AID

SKIN: Wash with soap and plenty of water. Remove contaminated clothing and do not reuse until thoroughly cleaned or laundered.

EYES: Wash eyes with plenty of water, holding eyelids open. Seek medical assistance promptly if there is irritation.

INHALATION: Remove from contaminated area promptly. CAUTION: Rescuer must not endanger himself! If breathing stops, administer artificial respiration and seek medical aid promptly.

INGESTION: Give plenty of water to dilute product. Do not induce vomiting (NOTE below). Keep victim quiet. If vomiting occurs, lower victim’s head below hips to prevent inhalation of vomited material. Seek medical help promptly.

Inadvertent inhalation of vomited material may seriously damage the lungs. The danger of this is greater than the risk of poisoning through absorption of this relatively low-toxicity substance. The stomach should only be emptied under medical supervision, and after the installation of an airway to protect the lungs.

5. PHYSICAL PROPERTIES

Odour & Appearance clear, amber, hygroscopic liquid with mild ether odour
Odour Threshold not known
Vapour Pressure below 0.14mmHg / 0.019kPa (20°C / 68°F)
Evaporation Rate (Butyl Acetate = 1) below 0.001 – not considered volatile
Vapour Density (air = 1) above 3
Boiling Range approx 230-300°C / 446-572°F
Freezing Point not known – probably well below -50°C / -45°F
Specific Gravity 1.023-1.035 (20/20°C)
Water Solubility complete
Also soluble in most oxygenated organic solvents and some hydrocarbons
Viscosity not known
pH 6.5-7.5 – (none of the components liberate hydrogen ions when dissolved)

6. FLAMMABILITY & FIRE FIGHTING

Flash Point 130°C / 270°F (closed cup)
Autoignition Temperature not known – probably above 250°C / 482°F
Flammable Limits not known
Combustion Products carbon monoxide, nitrogen oxides, smoke, part oxidised hydrocarbon fragments
Firefighting Precautions foam, dry chemical, water fog, water spray; firefighters must wear SCBA
Static Charge Accumulation cannot accumulate a static charge on agitation or pumping

7. STABILITY / REACTIVITY

Dangerously Reactive With strong oxidising agents
Also Reactive With none known
Stability stable; will not polymerize
Decomposes in Presence of not known
Decomposition Products none apart from Hazardous Combustion Products
Sensitive to Mechanical Impact no
8. PROTECTIVE EQUIPMENT / EXPOSURE CONTROL

TWAEV / TLV 25ppm / 137mg/m³ (diethylene glycol monoethyl ether – no other components listed)
STEL not listed
Ventilation mechanical ventilation may be required to maintain airborne titre below TWAEV; depending on handling procedures
Hands not required – nitrile gloves may be worn – consult supplier to confirm suitability
Eyes safety glasses with side shields – always protect the eyes
Clothing no special protective clothing required

9. HANDLING & STORAGE

Store in a cool, dry environment, away from sources of ignition, heat and oxidising agents.
Components of this product may react with oxygen in the air to form explosive or flammable peroxides. This product is hygroscopic and absorbs moisture from air. Ensure that containers are full and tightly sealed. If prolonged storage of a part container is anticipated, flush headspace with dry nitrogen gas prior to sealing. Empty containers may contain a flammable / explosive vapour. Always ensure that containers, whether empty or full, or part full, are tightly sealed unless in use.
Never cut, drill, weld or grind on or near this container. Avoid contact with skin and wash work clothes frequently. An eye bath and safety shower must be available near the workplace.

10. SPILL PROCEDURES

Leak Precaution dyke to control spillage and prevent environmental contamination
Handling Spill ventilate contaminated area; recover free liquid with suitable pumps; absorb residue on an inert sorbent, shovel, & store in closed containers for recycling or disposal

11. DISPOSAL

Waste Disposal do not flush to sewer, recycle solvent if possible, if local regulations permit, may be put in sanitary landfill, may be incinerated in approved facility
Containers Drums should be reused. Recondition and pressure test by a licensed reconditioner prior to re-use.
Pails must be vented and thoroughly dried prior to crushing and recycling.
IBCs (intermediate bulk containers): polyethylene bottle must be pressure tested & recertified at 30 months. Replace at 60 months (5yrs). Steel containers must be inspected, pressure tested & recertified every 5 years.
Never cut, drill, weld or grind on or near this container, even if empty

12. ENVIRONMENTAL INFORMATION

Bioaccumulation the substances in this product are not bioaccumulators
Biodegradation these substances degrade readily and rapidly in the presence or absence of oxygen
Abiotic Degradation this product reacts with atmospheric hydroxyl radicals; its estimated half-life in air is unknown
Mobility in soil, water this product is water soluble and will move readily in soil and water
Environmental Impact none of the substances in this product are particularly toxic to the environment

Please ensure that this MSDS is given to, and explained to people using this product.
13. **TRANSPORT REGULATIONS**

| Canada TDG | PIN | UN-not regulated for transport |
| Shipping Name | not regulated for transport |
| Class | not regulated for transport |
| Packing Group | not regulated for transport |
| U.S.A. 49 CFR | PIN | UN- not regulated for transport |
| Shipping Name | not regulated for transport |
| Class | not regulated for transport |
| Packing Group | not regulated for transport |

Marine Pollutant: not a marine pollutant

14. **EMERGENCY INFORMATION**

| Canada | Call CANUTEC (collect) | (613) 996-6666 |
| U.S.A. | Call CHEMTREC | (800) 424-9300 |

15. **REGULATIONS**

All of the substances in this product are listed on the Canadian DSL and the U.S.A. TSCA

16. **PREPARATION INFORMATION**

*Prepared for Megaloid Laboratories by Peter Bursztyn, (705) 734-1577*

Data from RTECS, Haz. Substance Data Base, Cheminfo, manufacturer data, and other source, as available

Preparation Date: **October 2003**  Revision Date: **July 2006**

*Please ensure that this MSDS is given to, and explained to people using this product.*