MATERIAL SAFETY DATA SHEET

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1. PRODUCT IDENTIFICATION

PRODUCT NAME: EXT-1006

2. HAZARD IDENTIFICATION

ROUTES OF ENTRY:

INHALATION?	*YES*
SKIN CONTACT?	*YES*
EYE CONTACT?	*YES*
INGESTION?	*YES*

MAY BE FATAL IF SWALLOWED. Human deaths have been reported following intentional ingestion of BDO. The lethal dose of BDO in humans (in its pure form) is estimated to be 5.4 – 20 grams (approx 0.2 – 0.7 fluid ounces. May cause temporary nervous system depression with anesthetic effects such as dizziness, headache, drowsiness, nausea, confusion, incoordination, and loss of consciousness. Gross overexposure of BDO by ingestion may cause damage to the kidneys, central nervous system (CNS), &/or respiratory system. Other side effects may be gastric disturbances.

CARCINOGENICITY:

No component of this product at levels greater than 0.1% is identified as a carcinogen by the NTP, IARC, or OSHA.

NTP (National Toxicology Program)?	No
IARC (International Agency for Research on Cancer)?	No
OSHA REGULATED?	No

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE:

Individuals with preexisting diseases of the central nervous system, or possibly the kidneys, may be at increased risk from exposure to this chemical.

HEALTH HAZARDS:

NOTES:

Repeated or prolonged exposure to BDO can produce nervous system damage. There is experimental evidence that BDO may cause toxicity to the developing fetus at maternally toxic doses.

INHALATION:

No significant health hazards identified. At normal ambient temperatures this product will be unlikely to present an inhalation hazard because of its low volatility.

SKIN:

Contact may cause slight irritation. May be absorbed through the skin to cause effects similar to ingestion. Prolonged or repeated skin contact may cause skin irritation with discomfort or rash.

EYE:

Slightly irritating to the eyes, with discomfort, tearing, or blurring of vision.

INGESTION:

3. COMPOSITION/INFORMATION ON INGREDIENTS

			EXPOSURE LIMITS	
INGREDIENT NAME	*CAS NUMBER*	*%*	*OSHA PEL*	*ACGIH TLV*
1,4-Butanediol	110-63-4	<=100	Not established	Not established

4. COMPOSITION/INFORMATION ON INGREDIENTS

INHALATION:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

SKIN:

Immediately wash exposed skin with soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly before reuse. Thoroughly clean shoes before reuse. Get medical attention if symptoms appear.

EYE:

Immediately flush eyes with large amounts of water, preferably, lukewarm water for at least 15 minutes, holding eyelids open all the time to ensure that the eyes are being irrigated. Get medical attention if irritation occurs.

INGESTION:

Get medical attention immediately. DO NOT INDUCE VOMITING unless directed to do so by medical personnel. Rinse mouth with water. Dilute stomach by giving 1 to 2 cups of water or activated charcoal slurry (To prepare activated charcoal slurry, suspend 50 grams activated charcoal in 400 ml of water and mix thoroughly. Give 5 ml/kg of body weight, or 350 ml for an average adult.)

DO NOT GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. If vomiting occurs spontaneously, keep head below hips to prevent breathing vomit into lungs. Treatment should in general be symptomatic and directed to relieving any effects.

NOTES TO PHYSICIAN:

There is no specific antidote. Treatment should be directed at control of symptoms and the clinical condition. Pure 1,4-Butanediol is a pharmacologic analogue of gamma-butyrolactone and is metabolized to gamma-hydroxybutyrate.

Lower oral doses of pure 1,4-Butanediol (less than 2 milliliters) may result in diaphoresis, confusion, agitation, ataxia, and a shallow level of consciousness.

Moderate doses of pure 1,4-Butanediol (2-5 milliliters) may result in loss of consciousness, lethargy, amnesia, agitation, combativeness, ataxia, and urinary incontinence.

Higher doses of pure 1,4-Butanediol (greater than 5 milliliters) may result in dysarthria, loss of consciousness, dizziness, vomiting, urinary and/or fecal incontinence, amnesia, respiratory depression and death.

The lethal dose of pure 1,4-Butanediol in humans is estimated to be 5.4-20 milliliters or 0.2 – 0.7 fluid ounces. Chronic abuse may cause physical dependency with severe withdrawal symptoms, including auditory, visual and tactile hallucinations, paranoid delusions, agitation and tremor when use is discontinued.

5. FIRE FIGHTING MEASURES

FLASH POINT (Method Used): 311º F (155º C) (Open Cup)

FLAMMABLE LIMITS:

LEL (Lower Explosion Limit)= Not Available.
UEL (Upper Explosion Limit)= Not Available.

EXTINGUISHING MEDIA:

Foam, water spray, dry chemical, carbon dioxide (CO_2).

For SMALL FIRE – use DRY chemical powder. For LARGE FIRE – use water spray, fog or foam. (Alcohol resistant foam). Do not use water jet or straight streams of water as this may spread fire. NOTE: Direct application of water or foam may cause frothing. Use water spray to cool containers exposed to fire.

SPECIAL FIRE FIGHTING PROCEDURES:

Prevent human exposure to fire, fumes, smoke, and products of combustion. Evacuate non-essential personnel. Firefighters should wear NIOSH approved positive pressure self-contained breathing apparatus with full-face mask and impervious protective clothing. Do not spray pool fires with direct water stream (see above).

UNUSUAL FIRE & EXPLOSION HAZARDS:

May be combustible at high temperature. Products of combustion are carbon oxides (carbon monoxide (CO) & carbon dioxide (CO_2)) and Tetrahydrofuran. When heated in the presence of sulfuric acid (H2SO4), forms highly flammable tetrahydrofuran. This material is not explosive as defined by established regulatory criteria. Hot organic chemical vapors may spontaneously ignite or explode when mixed with air, even at temperatures below their published autoignition temperature. Vapors are heavier than air and may collect in low areas.

6. ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

- Stop the leak / spill.
- Review Section -Fire & Explosion Hazard Data before proceeding with clean up.
- Use appropriate personal protective equipment. (See Section –Exposure Controls/Personal protection).
- Contain / dike spilled material.
- Ensure runoff does not reach a waterway.
- Minimize contact of spilled material with soils to prevent runoff to surface waterways.

- Soak up liquid with noncombustible inert absorbent and transfer to dry, clean, covered, sealed liquid-proof containers. (Soil may be used in the absence of other suitable materials.)

- Sweep, shovel, or vacuum up and place into dry, clean, covered, sealed liquid-proof containers for recovery or disposal.
- Flush spill area with water.
- Comply with Federal, State, and local regulations on reporting releases.

7. HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING & STORING:

Do not ingest. Avoid contact with eyes, skin, and clothing. Use only with adequate ventilation. Avoid breathing vapor or mist. Wash thoroughly after handling.

Keep container tightly closed. Keep container in a cool, dry, well-ventilated area. Store and use away from heat, sparks, open flame, or any other ignition source. Do not store with powerful inorganic oxidants, such as nitric acid or hydrogen peroxide. Limit steam pressure for heating tank cars, tank trucks, and storage tans to 40 psig to avoid possibility of overheating.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

VENTILATION:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective occupational exposure limits.

RESPIRATORY PROTECTION:

Use only with adequate ventilation. Do not breathe vapor or mist. If ventilation is inadequate, use respirator that will protect against organic vapor and dust/mist. If respirator is used, a Respiratory protection program must be in compliance with OSHA requirements in 29 CFR 1910.134.

SKIN PROTECTION:

Do not get on skin or clothing. Wear clothing and footwear that cannot be penetrated by chemicals or oils (impervious apron, boots). Wear gloves that cannot be penetrated by chemicals or oil (PVC or Neoprene gloves). If there is potential for contact with hot/molten material, wear heat resistant impervious clothing and footwear.

EYE PROTECTION:

Avoid contact with eyes. Wear chemical splash goggles or face shield. Do not wear contact lenses when working with chemicals.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:

Safety showers and eyewash stations should be available.

WORK/HYGIENIC PRACTICES:

Wash hands, forearms, and face thoroughly after handling compounds and before eating, smoking, using lavatory, and at the end of the day. Educate and train employees in safe use of product. Follow all label instructions.

9. PHYSICAL / CHEMICAL CHARACTERISTICS

APPEARANCE (physical form, color, texture, etc.)	clear liquid.
ODOR:	Low odor.
MELTING POINT:	68° F (20° C) for BDO.
FREEZE POINT:	68° F (20° C) for BDO
BOILING POINT:	442º F (228º C) @ 760 mm Hg for BDO
VAPOR PRESSURE (mm Hg):	<1 mm Hg at 68º F (20º C) for BDO
VAPOR DENSITY (Air = 1)	3.2 for BDO
SPECIFIC GRAVITY (H_2O = 1):	1.0171 for BDO
EVAPORATION RATE (Butyl Acetate = 1):	Less than 1 for BDO
SOLUBILITY IN WATER:	BDO is easily soluble in cold water.

10. STABILITY AND REACTIVITY

STABILITY:

Stable under normal conditions. Unstable with heat. Flammable tetrahydrofuran (THF) begins to form at about 302º F (150º C).

CONDITIONS TO AVOID (if unstable):

Heat, heated surfaces, static electricity, electric arcs, sparks & flames.

INCOMPATIBILITY (MATERIALS TO AVOID):

Reactive with oxidizing agents or bleaching agents such as chlorine, oxygen, permanganates, perchlorates, percarbonates, peroxides, chromates, hypochlorites, nitric acid, sulfuric acid, and hydrogen peroxide.

HAZARDOUS DECOMPOSITION OR BYPRODUCTS:

Products of combustion are carbon oxides (carbon monoxide (CO) & carbon dioxide (CO_2)) and Tetrahydrofuran.

HAZARDOUS POLYMERIZATION:

Will not occur.

CONDITIONS TO AVOID (if polymerization may occur):

Not applicable.

OTHER:

Avoid inhalation of vapors and spray mist. Avoid all possible sources of ignition (spark or flame).

11. TOXICOLOGICAL INFORMATION

Summary 1,4-Butanediol

1,4-Butanediol is NOT intended for human consumption and is not approved by the U.S. Food and Drug Administration for such uses. Acute lethal toxicity of 1,4-Butanediol (BDO) is low via all routes of exposure. Major toxic signs by oral administration are CNS depression and respiratory failure. In animals and humans, BDO is rapidly absorbed and metabolized to gamma-hydroxybutryrate (GHB) which is thought to produce the neurotoxic effects of BDO. Because there have been a number of human poisonings from accidental or intentional ingestion, BDO is regarded as a hazardous chemical. BDO can competitively inhibit the enzyme that metabolizes alcohol, hence combined exposures may increase the toxic effects of alcohol and delay and prolong the toxicity of BDO. BDO is a slight irritant to the skin, eyes, and respiratory tract but not a skin sensitize. Repeated exposures of rodents to high dos resulted in sedation, body weight decreases, alterations in blood and clinical chemistry parameters and minimal microscopic structural changes in organs/ tissues. BDO is not teratogenic or selectively toxic to the embryo or fetus. A reduction in fetal body weight was observed in rats and mice following high oral doses but this effect was considered secondary to maternal toxicity. BDO is not genotoxic in in vitro assays.

1,4-Butanediol 110-63-4
Acute Toxicity- Lethal Doses
LC50(inhl) Rat <15,000 MG/M3 4 hours (aerosol)

LD50(oral) Rat 1830 MG/KG BWT

LD50(skin) Rat >5000 MG/KG BWT

12. ECOLOGICAL INFORMATION

Summary 1,4-Butanediol

Ecotoxicity

This material in not classified as harmful or toxic to fish. This material in not classified as harmful or toxic to invertebrates. This material is not classified as harmful or toxic to algae or higher aquatic plants.

Environmental Fate and Pathway

This material is expected to be readily biodegradable. Estimated half-life from a model river and model lake is 18,600 and 202,900 days respectively. Undergoes slow aquatic oxidation to succinic acid and carbon dioxide. Not expected to undergo hydrolysis. Undergoes photooxidation with OH radicals in air with a half-life of 24 hours. Expected to have high mobility in soils. Not expected to volatilize from surface waters. Not likely to absorb to suspended solids and sediment in water. Volatilization from dry soil surfaces is expected. This material is not expected to bioaccumulate.

Acute Toxicity to fish:
LC50 / 96 hours Japanese medaka > 100mg/l
Acute Toxicity to aquatic invertebrates:
EC50 / 48 hours daphnia >1000mg/l
Toxicity to aquatic plants:
EC50 / 72 hours green algae. >1000mg/l
Toxicity to microorganisms:
No Data Available
Chronic toxicity to fish:
Not Data Available
Chronic toxicity to aquatic invertebrates:
EC50 / 21 day daphnids. >85mg/l

13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD:

Avoid contact of spilled material and runoff with soil, sewers, and surface waterways. Preferred method of disposal is incineration. Dispose of material in accordance with all Federal, State and local regulations. Local regulations may be more stringent than Federal or State.

EMPTY CONTAINER PRECAUTIONS:

Empty containers may contain harmful, flammable/combustible or explosive residue or vapors. Do not cut, grind, drill, weld, reuse, or dispose of containers unless adequate precautions are taken against these hazards. Labels should not be removed from containers until they have been cleaned. Do not incinerate closed containers.

14. TRANSPORTATION INFROMATION

DOT CLASSIFICATION: Non-regulated

IMDG (SEA TRANSPORT): Non-regulated

*ICA/LATA (AIR TRANSPORT):*Non-regulated

15. REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION STATUS:

This product is considered hazardous as defined under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200.

***RCRA STATUS**:*

To the best of our knowledge, if discarded in its purchased form, this product would not be considered a hazardous waste either by listing or by characteristic. However, under RCRA, it is the responsibility of the user of products to determine, at the time of disposal, whether a product meets any of the criteria for a hazardous waste. This is because product uses, transformations, mixtures, processes, etc., may render the resulting material hazardous, under the criteria of ignitability, corrosivity, reactivity, and toxicity (40 CFR 261.20-24).

US INVENTORY (TSCA):

The ingredients of this product are listed on the TSCA inventory or are not required to be listed on the TSCA inventory.

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA), TITLE III:

Sections 301-303 – Emergency Planning - Extremely Hazardous Substances:
None.

Section 304 – Emergency Release Notification – Reportable Substances:
None.

Section 311/312 – Community Right-to-Know Reporting Requirements - Emergency Hazard Categories:
1,4-Butanediol: Immediate health hazard.

Section 313 – Toxic Chemical Notification & Release Inventory Reporting – Listed Substances:
None.

16. OTHER INFORAMATION

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

HMIS RATINGS:

HEALTH	*1*	***FLAMMABLILITY***	*1*	***REACTIVITY***	*0*

(0=Minimal; 1=Slight; 2=Moderate; 3=Serious; 4=Severe)

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