



Sub Zero fg2 Material Safety Data Sheet

1 Company Identification

Advanced Fuel Solutions
P.O. Box 291
Lynnfield, MA 01940

Product information 1-978-664-5923
In Case of Emergency
Call Chemtrec 1-800-424-9300

2 Composition / Ingredient Information

<u>Material</u>	<u>CAS Number</u>	<u>%</u>
Proprietary polymers.....		10-30
*Vinyl Acetate Monomer	108-05-4	<0.2
*Xylene.....	1330-20-7	<2
*(Ethylbenzene).....	100-41-4	(<0.3)
Heavy Aromatic Naphtha	64742-94-5	<3
*Ethylene Glycol N-Butyl Ether	111-76-2	<5
Light Ends of Polyethylbenzene Residue	178535-25-6	70-90
*(Naphthalene)	91-20-3	(<4)
*(Triethylbenzene)	102-25-0	(10-20)
*(Toluene)	108-88-3	(~0.1)
*(Cumene).....	98-82-8	(~0.1)

*Disclosure as a toxic chemical is required under Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR part 372.

3 Hazardous Identification

Potential Health Effects

Eye contact with the product ingredients may cause eye irritation with discomfort, tearing, or blurring of vision. Direct exposure may cause skin irritation (redness, swelling). A single prolonged exposure may result in the material being absorbed through the skin in harmful amounts.

In general, overexposure to high atmospheric concentrations of alkyl-substituted aromatics may produce central nervous system depression, headache, dizziness, incoordination, nausea and loss of appetite. Aspiration (liquid enters the lung), may cause lung damage due to chemical pneumonia, a condition caused by petroleum-like solvents.

Minute amounts of petroleum hydrocarbons aspirated into the lungs during ingestion or vomiting may cause mild to severe pulmonary injury and possible death.

Individuals with preexisting diseases of the kidneys or liver may have increased susceptibility to the toxicity of excessive exposures.

Inhalation of fumes or vapors from heated product may cause skin, eye and respiratory tract irritation.

Xylene can penetrate the skin in amounts capable of causing systemic toxicity. Eye contact may cause eye irritation with discomfort, tearing or blurring of vision. Inhalation of Ethylbenzene may cause irritation of the upper respiratory passages with coughing and discomfort.

Inhalation or ingestion of Xylene or Ethylbenzene may cause nonspecific discomfort, such as nausea, headache, or weakness; or temporary nervous system depression with anesthetic effects such as dizziness, headache, confusion, incoordination, and loss of consciousness.

Inhalation or ingestion of Ethylbenzene may cause abnormal liver or kidney function. Aspiration of Ethylbenzene into the lungs during ingestion or vomiting may lead to chemical pneumonitis.

Ingestion of Xylene or Ethylbenzene may cause gastrointestinal tract irritation. Higher exposure to Xylene may lead to cardiac stress; anemia and other blood changes; respiratory effects; possible liver and kidney damage; or fatality from gross overexposure.

Inhalation or ingestion of Heavy Aromatic Naphtha may cause central nervous system depression with anesthetic effects, such as dizziness, headache, confusion, incoordination and loss of consciousness. Higher exposures may result in fatality from gross overexposure. Ingestion may cause gastrointestinal irritation. Aspiration hazard! Small amounts aspirated into the lungs during ingestion or vomiting may cause lung injury, possibly leading to death. Symptoms of aspiration into the lungs include coughing, gasping, choking, shortness of breath, bluish discolored skin, rapid breathing and heart rate. Chemical pneumonitis from aspiration may result in fever. Pulmonary edema or bleeding, drowsiness, confusion, coma and seizures may occur in more serious cases. Symptoms may develop immediately or as late as 24 hours after the exposure, depending on how much chemical entered the lungs.

Prolonged or repeated exposure to Ethylene Glycol N-Butyl Ether may cause skin irritation which may be slow to heal. A single prolonged exposure may result in the material being absorbed in harmful amounts. Excessive exposure may cause hemolysis, thereby impairing the blood's ability to transport oxygen. Repeated minor exposure may result in absorption of harmful amounts. May cause moderate eye irritation which may be slow to heal. May cause moderate corneal injury. Effects may be slow to heal. Vapors of Ethylene Glycol N-Butyl Ether may irritate eyes. A single prolonged excessive inhalation exposure may cause adverse effects. Excessive exposure may cause irritation to upper respiratory tract. Observations in animals include blood and kidney effects. Single dose oral toxicity of Ethylene Glycol N-Butyl Ether is considered to be moderate. Small amounts swallowed incidental to normal handling operations are not likely to cause injury; swallowing amounts larger than that may cause injury. One case of Massive Ingestion (i.e. attempted suicide) reported blood (hemolysis) and kidney effects.

Carcinogenicity Information

Ethylbenzene, Naphthalene and Vinyl Acetate Monomer have been classified by the International Agency for Research on Cancer (IARC) as possibly carcinogenic to humans (Group 2B). This IARC classification was based upon limited evidence of carcinogenicity to animals and inadequate evidence of carcinogenicity to humans.

4 First Aid Measures

Inhalation

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Skin Contact

Flush skin with water after contact. Wash contaminated clothing before reuse.

Eye Contact

In case of contact immediately, flush eyes with plenty of water for at least 15 minutes. Call a physician.

Ingestion

If swallowed, do not induce vomiting. Allow victim to rinse his mouth and then to drink 2-4 cupfuls of water. Never give anything by mouth to an unconscious person. Call a physician.

Notes to Physicians

Activated charcoal mixture may be administered. To prepare activated charcoal mixture, suspend 50 grams activated charcoal in 400-ml water and mix thoroughly. Administer 5 ml/kg or 350 ml for an average adult.

Because of the danger of aspiration, emesis or gastric lavage should not be employed unless the risk is justified by the presence of additional toxic substances. Activated charcoal may induce vomiting, but may be given after emesis or lavage to absorb toxic additives. Steroid therapy in mild to moderate cases does not improve outcome. Bacterial pneumonia often occurs after exposure, but prophylactic antibiotics are not indicated and should be reserved for documented bacterial pneumonia.

5 Fire Fighting Measures

Flammable Properties

Flash Point..... 166°F (74.4°C)

Method..... PMCC

Extinguishing Media

Water Spray, Foam, Dry Chemical, CO₂.

Fire Fighting Instructions

Wear self-contained breathing apparatus. Wear full protective equipment.

6 Accidental Release Measures

Note: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) SECTIONS before proceeding with clean up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean up. Soak up with sawdust, sand, oil dry or other absorbent material. Remove source of heat, sparks, flame, impact, friction, or electricity. Dike spill. Prevent material from entering sewers, waterways, or low areas.

Spill Clean-Up

Soak up with sawdust, sand, oil dry or other absorbent material.

Accidental Release Measures

Spills are very slippery and should be cleaned up promptly.

7 Handling and Storage

Handling (Personnel)

Avoid breathing vapors or mist. Avoid contact with eyes, skin, or clothing. Wash thoroughly after handling.

Handling (Physical Aspects)

Keep away from heat, sparks and flames.

Storage

Store in a well-ventilated place. Keep container tightly closed. Store in accordance with National Fire Protection Association recommendations.

8 Exposure Controls

Engineering Controls

Use only with adequate ventilation. Keep container tightly closed.

Personal Protective Equipment

Eye/Face Protection

Wear coverall chemical splash goggles or safety glasses.

Respirators

Where there is potential for airborne exposures in excess of applicable limits, wear NIOSH/MSHA approved respiratory protection.

Protective Clothing

Where there is potential for skin contact have available and wear as appropriate Impervious gloves, apron, pants, hood and jacket.

Exposure Limits

Toluene:

PEL(OSHA)	200 ppm, 8 hr. TWA
.....	300 ppm, Ceiling
.....	500 ppm, 10 min. max.
TLV (ACGIH)	50 ppm, 188 mg/m ³ , 8 hr. TWA, Skin A4; BEI

Heavy Aromatic Naphtha:

PEL(OSHA)	None established
TLV (ACGIH)	None established

Naphthalene:

PEL (OSHA).....10 ppm, 50 mg/m³, 8 hr. TWA
TLV (ACGIH).....10 ppm, 52 mg/m³, 8 hr TWA, Skin; A4
STEL 15 ppm, 79 mg/m³, A4

Ethylene Glycol N-Butyl Ether:

PEL(OSHA)25 ppm, skin
TLV (ACGIH)20 ppm, 8 hr TWA, A3

Xylene:

PEL(OSHA)100 ppm, 435 mg/m³, 8 hr TWA
TLV (ACGIH)100 ppm, 434 mg/m³, 8 hr TWA
STEL 150 ppm, 651 mg/m³, A4; BEI

Ethylbenzene:

PEL(OSHA)100 ppm, 435 mg/m³, 8 hr, TWA
TLV (ACGIH)100 ppm, 434 mg/m³, 8 hr, TWA, A3, BEI
STEL 125 ppm, 543 mg/m³

Vinyl Acetate Monomer:

PEL(OSHA)None established
TLV (ACGIH)10 ppm, 35 mg/m³, 8 hr, TWA, A3
STEL 15 ppm, 53 mg/m³, A3

Cumene:

PEL(OSHA)50 ppm, 245 mg/m³, 8 hr TWA skin
TLV (ACGIH)50 ppm, 246 mg/m³, 8 hr TWA skin

9 Physical and Chemical Properties

Physical Data

Appearance..... Amber
Form..... Liquid
Odor..... Aromatic
Specific Gravity 0.904 @ 60/60°F (15.6/15.6°C)
Density 7.52 lbs./gal. @ 60°F (15.6°C)
Solubility in water <5 wt%

10 Stability and Reactivity

Chemical Stability

Stable at normal temperatures and storage conditions.

Incompatibility

Incompatible with strong oxidizers and fluorine.

Decomposition

Decomposes with heat. Decomposition products include oxides of carbon.

Polymerization

Will not occur.

11 Toxicological Information

Animal Data

Heavy Aromatic Naphtha:

Inhalation 6 hour LC50.....	>11.67 mg/L in rats
Skin Absorption LD50	>3,160 mg/kg in rabbits
Oral LD50.....	>5,000 mg/kg in rats

Naphthalene:

Inhalation 15 minute LC50:	>0.34 mg/L in rats
Skin Absorption LD50:	10,000 mg/kg in rabbits
Oral LD50:.....	1,780 mg/kg in rats

Xylene (mixed isomers):

Inhalation 4 hour LC50.....	6,700 ppm in rats
Skin absorption LD50.....	4,320 mg/kg in rabbits
Oral ALD	4,500 mg/kg in rats

Ethylbenzene:

Inhalation 4 hour LC50.....	>4,000 ppm in rats
Skin absorption LD50.....	~15,000 mg/kg in mice
Oral LD50.....	>3,500 mg/kg in rats

Vinyl Acetate Monomer:

Inhalation 4 hour LC50.....	4,000 ppm in rats
Skin Absorption LD50	2,335 mg/kg in rabbits
Oral LD50.....	2,920 mg/kg in rats

Toluene:

Inhalation 6 hr. LC50:.....	4,618 ppm in rats
Inhalation 24 hr. LC50:.....	400 ppm in mice
Skin Absorption LD50:	~12,000 mg/kg in rabbits
Oral LD50:.....	636 mg/kg in rats

Ethylene Glycol N-Butyl Ether:

Inhalation LC50.....	700 ppm in rats, 7 hours
Skin Absorption LD50	220 mg/kg in rabbits
Oral LD50.....	470 mg/kg in rats

Dermal absorption of Xylene in animals causes narcosis. Toxic effects described in animals by inhalation include upper respiratory irritation; central nervous system effects; behavioral effects; decreased weight gain; hearing loss; and effects on the blood, liver, kidneys, heart, spleen, lungs and bone marrow. By ingestion, xylene caused central nervous system effects; decreased body weight and liver effects. Tests of xylene in animals demonstrate no carcinogenic activity. Xylene does not produce heritable genetic damage in animals or genetic damage in bacterial or mammalian cell cultures. Although abnormal sperm were observed after an interperitoneal injection in rats, xylene did not produce reproductive effects. Developmental toxicity was observed in animals exposed to xylene but only at concentrations that were maternally toxic.

Vinyl Acetate is a slight skin and a severe eye irritant, but is untested for animal sensitization. No effects from repeated exposure to Vinyl Acetate by inhalation were observed at 100 ppm in rats. Exposure to higher concentrations of Vinyl Acetate by inhalation caused eye irritation and lacrimation, reduced weight gain, and irritation of the respiratory tract with breathing difficulty. The effects observed in rats and mice exposed by inhalation to 200 and 600 ppm for two years include reduced body weight. Repeated

exposures by administration of Vinyl Acetate in the drinking water caused decreased weight gain, and low liver weights. Reduced body weight occurred in rats administered 5000 ppm in their drinking water for two years. Vinyl acetate is weakly carcinogenic in rats, but not in mice. The compound does not have an adverse effect on the development of rats and its effect on reproduction is not considered significant. The genotoxicity of vinyl acetate is equivocal. Genetic damage was produced in some types of cell cultures and in animals, but was negative in other studies. No tests for heritable genetic damage were available.

Heavy Aromatic Naphtha is a severe skin irritant, and is an eye irritant, but is not a skin sensitizer in animals. Repeated inhalation exposures caused reduced growth rate, respiratory tract irritation, congestion in liver and spleen, changes in blood tests and equilibrium disturbances. No animal test reports are available to define carcinogenic, mutagenic, developmental or reproductive hazards.

12 Ecological Information

Xylene:

96 hour LC50 fathead minnow: 27-42 mg/L

Heavy Aromatic Naphtha:

96 hour LC50, fathead minnows: 4.2 – 20.8 mg/L

Toluene:

96 hour LC50, fathead minnows: 26-31 mg/L

13 Disposal Considerations

Waste Disposal

Treatment, storage, transportation, and disposal must be in accordance with applicable Federal, State/Provincial and Local regulations.

14 Shipping Information

DOT

Proper Shipping Name..... Combustible Liquid, n.o.s. (Triethylbenzene, Naphthalene)
Hazard Class Combustible Liquid
I.D. No. (UN/NA) NA 1993
Packing Group III
Special Information Flash Point: 74.4°C
Not regulated in containers <119 gallons
Marine Pollutant Triethylbenzene
DOT Label(s) Combustible Liquid

IMO

Proper Shipping Name..... Environmentally Hazardous Substance, Liquid, n.o.s.
(Triethylbenzene)
Hazard Class 9
I.D. No. (UN) 3082
Packing Group III
Special Information Flash Point: 74.4°C
Marine Pollutant Triethylbenzene
IMO Label Miscellaneous Dangerous Goods

Reportable Quantity

Xylene 100 lbs.
Naphthalene..... 100 lbs.
Ethylbenzene 1000 lbs.

Shipping Containers

Steel Drums UN1A1/Y/100

15 US Federal Regulations

TSCA Inventory Status..... Reported / Included

Title III Hazard Classifications Sections 311, 312

Acute Yes
Chronic Yes
Fire Yes
Reactivity No
Pressure No

16 Other Information

NPCA-HMIS Rating

Health..... 2* (Chronic Health Effects)
Flammability..... 2
Reactivity 0

Personal Protection rating to be supplied by user depending on use conditions.

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

Responsibility for MSDS:

**AFS MSDS Coordinator
Advanced Fuel Solutions
P.O. Box 291
Lynnfield MA 01940
978-664-5923**