

Section 1: PRODUCT AND COMPANY IDENTIFICATION

Product Name: FRACSOL®
Synonyms: Not available.
Product Use: Hydrocarbon Fracturing Fluid.
Manufacturer/Supplier: Enerchem International Inc.
 Suite 3900, Bow Valley Square 2
 205-5th Ave SW
 Calgary, Alberta
 T2P 2V7
Phone Number: 1-800-380-4580
Emergency Phone: (613) 996-6666 (CANUTEC)
Date of Preparation: December 1, 2011

Section 2: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

DANGER

FLAMMABLE LIQUID AND VAPOR. IRRITATING TO EYES AND SKIN. HARMFUL OR FATAL IF SWALLOWED. CAN ENTER LUNGS AND CAUSE DAMAGE. CANCER HAZARD – CAN CAUSE CANCER.

Colour: Colourless to slight yellow.
Physical State: Liquid.
Odour: Petroleum.

WHMIS	Personal Protection Equipment	TDG (Ground)
		

Potential Health Effects: See Section 11 for more information.

Likely Routes of Exposure: Eye contact. Skin contact. Inhalation. Ingestion. Skin absorption.

Eye: Irritating to eyes. Signs/symptoms may include redness, swelling, pain, tearing, and blurred or hazy vision.

Skin: Irritating to skin. Signs/symptoms may include localized redness, swelling, and itching.

Ingestion: Harmful or fatal: may cause lung damage if swallowed. Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis. May cause gastrointestinal irritation. Signs/symptoms may include abdominal pain, stomach upset, nausea, vomiting and diarrhea.

Inhalation: May cause respiratory tract irritation. Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain. May cause headache, dizziness, confusion, loss of appetite and loss of consciousness. Inhalation of Toluene may result in peculiar skin sensations (e. g. pins and needles) or numbness.

Chronic Effects: See Section 11 for more information.

Medical Conditions Aggravated By Exposure: Not available.

Target Organs: Skin. Eyes. Gastrointestinal tract. Respiratory system. Bone marrow. Nervous system.

Potential Environmental Effects: See Section 12 for more information.

This material is considered hazardous by the OSHA Hazard Communication Standard, (29 CFR 1910.1200).

Section 3: COMPOSITION / INFORMATION ON INGREDIENTS

Component	CAS No.	Wt. %
Distillates (petroleum), straight-run middle	64741-44-2	15 - 45
Nonane	111-84-2	10 - 30
Decane	124-18-5	10 - 30
Octane	111-65-9	7 - 13
Heptane	142-82-5	3 - 7
Benzene, dimethyl-	1330-20-7	1 - 5
Cyclohexane, methyl-	108-87-2	1 - 5
Hexane	110-54-3	1 - 5
Benzene, 1,2,4-trimethyl-	95-63-6	1 - 5
Benzene, methyl-	108-88-3	0.5 - 1.5
Benzene, ethyl-	100-41-4	0.1 - 1
Benzene	71-43-2	< 0.1

Section 4: FIRST AID MEASURES

- Eye Contact:** Flush eyes with plenty of water for at least 15 minutes. If signs/symptoms persist, get medical attention.
- Skin Contact:** Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. If signs/symptoms develop, get medical attention.
- Ingestion:** Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.
- Inhalation:** Remove person to fresh air. If breathing has stopped apply artificial respiration. If signs/symptoms develop, get medical attention.
- General Advice:** In case of accident or if you feel unwell, seek medical advice immediately (show the label or MSDS where possible).
- Note to Physicians:** Symptoms may not appear immediately.

Section 5: FIRE FIGHTING MEASURES

Flammability: Flammable liquid by WHMIS criteria. Flammable liquid by OSHA criteria. Released vapours may form flammable/explosive mixtures at or above the flash point. Vapours may travel considerable distances to ignition sources and cause a flash fire. Cool containing vessels with water jet in order to prevent pressure build-up, auto-ignition or explosion.

Means of Extinction

Suitable Extinguishing Media: Dry chemical, foam, water fog, carbon dioxide.

Unsuitable Extinguishing Media: Not available.

Products of Combustion:	Oxides of carbon. Aldehydes.
Protection of Firefighters:	Keep upwind of fire. Wear full fire fighting turn-out gear (full Bunker gear) and respiratory protection (SCBA).
Explosion Data	
Sensitivity to Mechanical Impact:	This material is not sensitive to mechanical impact.
Sensitivity to Static Discharge:	This material is sensitive to static discharge at temperatures above the flash point.

Section 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions:	Evacuate all unnecessary personnel. Stay upwind. Eliminate all ignition sources. Use personal protection recommended in Section 8. Isolate the hazard area and deny entry to unnecessary and unprotected personnel.
Environmental Precautions:	Keep out of drains, sewers, ditches, and waterways.
Methods for Containment:	Stop leak if without risk. Contain spill and absorb with inert absorbent. Large pools may be covered with foam to prevent vapour evolution. Do not flush to sewer or allow to enter waterways.
Methods for Clean-Up:	Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Use clean non-sparking tools to collect absorbed material. Large spills should be removed with explosion proof vacuum equipment.
Other Information:	Dispose of in accordance with all federal, provincial and local regulations. Comply with federal, provincial, and local requirements for spill and/or release notification.

Section 7: HANDLING AND STORAGE

Handling:

Do not swallow. Do not get in eyes, or on skin. All equipment used when handling the product must be grounded. Handle and open container with care. When using do not eat or drink. Wash hands before eating, drinking, or smoking. See Section 8 for information on Personal Protective Equipment.

Storage:

Store in cool, dry, well-ventilated area away from incompatible materials, heat, and sources of ignition. All storage containers and pumping equipment should be grounded. Keep out of the reach of children.

Section 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines Component

Distillates (petroleum), straight-run middle

(64741-44-2) **ACGIH:** 100 ppm (TWA) (1980); For Stoddard solvent

(64741-44-2) **OSHA:** 500 ppm (TWA), 2900 mg/m³ (TWA); For Stoddard solvent.

Nonane

(111-84-2) **ACGIH:** 200 ppm (TWA); (1992)

(111-84-2) **OSHA:** 200 ppm (TWA) [Vacated]

Decane

(124-18-5) **ACGIH:** No TLV established.

(124-18-5) **OSHA:** No PEL established.

Octane

(111-65-9) **ACGIH:** 300 ppm (TWA); (1979)

(111-65-9) **OSHA:** 500 ppm (TWA), 2350 mg/m³ (TWA);
300 ppm (TWA); 375 ppm (STEL) [Vacated]

Heptane

(142-82-5) **ACGIH:** 400 ppm (TWA); 500 ppm (STEL); (1979)

(142-82-5) **OSHA:** 500 ppm (TWA), 2000 mg/m³ (TWA);
400 ppm (TWA); 500 ppm (STEL) [Vacated]

Benzene, dimethyl-

(1330-20-7) **ACGIH:** 100 ppm (TWA); 150 ppm (STEL); A4; BEI (1992)

(1330-20-7) **OSHA:** 100 ppm (TWA), 435 mg/m³ (TWA);
150 ppm (STEL) [Vacated]

Cyclohexane, methyl-

(108-87-2) **ACGIH:** 400 ppm (TWA); (1962)

(108-87-2) **OSHA:** 500 ppm (TWA), 2000 mg/m³ (TWA);
400 ppm (TWA) [Vacated]

Hexane

(110-54-3) **ACGIH:** 50 ppm (TWA); Skin, BEI (1996)

(110-54-3) **OSHA:** 500 ppm (TWA), 1800 mg/m³ (TWA); Skin.
50 ppm (TWA) [Vacated]

Benzene, 1,2,4-trimethyl-

(95-63-6) **ACGIH:** 25 ppm (TWA); (1970)

(95-63-6) **OSHA:** 25 ppm (TWA) [Vacated]

Benzene, methyl-

(108-88-3) **ACGIH:** 20 ppm (TWA); A4; BEI (2006)

(108-88-3) **OSHA:** 200 ppm (TWA); 300 ppm (C); 500 ppm (Peak) (Maximum duration: 10
minutes.)
100 ppm (TWA); 150 ppm (STEL) [Vacated]

Benzene, ethyl-

(100-41-4) **ACGIH:** 20 ppm (TWA); A3; BEI (2010)

(100-41-4) **OSHA:** 100 ppm (TWA), 435 mg/m³ (TWA);
125 ppm (STEL) [Vacated]

Benzene

(71-43-2) **ACGIH:** 0.5 ppm (TWA); 2.5 ppm (STEL); Skin; A1; BEI (1996)

(71-43-2) **OSHA:** 1 ppm (TWA); 5 ppm (STEL);

PEL: Permissible Exposure Limit

TLV: Threshold Limit Value

TWA: Time-Weighted Average

STEL: Short-Term Exposure Limit

C: Ceiling

Engineering Controls:

Use ventilation adequate to keep exposures (airborne levels of dust, fume, vapour, gas, etc.) below recommended exposure

limits. Use explosion-proof ventilation equipment.

Personal Protective Equipment

- Eye/Face Protection:** Wear safety glasses. Ensure that eyewash stations are close to the workstation location.
- Hand Protection:** Wear impervious gloves. Consult manufacturer specifications for further information.
- Skin and Body Protection:** Wear suitable protective clothing. Flame resistant clothing such as Nomex® is recommended in areas where material is stored or handled.
- Respiratory Protection:** If engineering controls and ventilation are not sufficient to control exposure to below the allowable limits then an appropriate NIOSH/MSHA approved air-purifying respirator or self-contained breathing apparatus (SCBA) should be used. Supplied air breathing apparatus must be used when oxygen concentrations are low or if airborne concentrations exceed the limits of the air-purifying respirators.
- General Hygiene Considerations:** Handle according to established industrial hygiene and safety practices.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

- Appearance:** Colourless to slight yellow liquid.
- Colour:** Colourless to slight yellow.
- Odour:** Petroleum.
- Odour Threshold:** Not available.
- Physical State:** Liquid.
- pH:** Not available.
- Viscosity:** < 2 cSt @ 20 °C
- Melting Point:** -35 to -30 °C
- Boiling Point:** 68.9 to 441 °C
- Flash Point:** 15 °C (PMCC)
- Evaporation Rate:** < 1.0 (n-BuAc = 1)
- Lower Flammability Limit:** Not available.
- Upper Flammability Limit:** Not available.
- Vapor Pressure:** 2 to 4 kPa (Reid)
- Vapor Density:** > 1.0 (Air = 1)
- Specific Gravity:** 0.780 to 0.840 (Water = 1) at 15°C
- Density:** 780 to 840 kg/m³ at 15°C
- Solubility in Water:** Not available.
- Coefficient of Water/Oil Distribution:** Not available.

Auto-ignition Temperature: Not available.

Percent Volatile, wt. %: Not available.

VOC content, wt. %: Not available.

Section 10: STABILITY AND REACTIVITY

Stability: Stable under normal storage conditions.

Conditions of Reactivity: Contact with incompatible materials. Sources of ignition. Exposure to heat.

Incompatible Materials: Strong oxidizers.

Hazardous Decomposition Products: Not available.

Possibility of Hazardous Reactions: None known.

Section 11: TOXICOLOGICAL INFORMATION

EFFECTS OF ACUTE EXPOSURE

Component Toxicity

Component	CAS No.	LD ₅₀ oral	LD ₅₀ dermal	LC ₅₀
Distillates (petroleum), straight-run middle	64741-44-2	>5000 mg/kg, (rat)	>2000 mg/kg, (rabbit)	1700 mg/m ³ , (rat), 4H
Nonane	111-84-2	Not available.	Not available.	3200 ppm, (rat), 4H
Decane	124-18-5	Not available.	Not available.	>1369 ppm, (rat), 8H
Octane	111-65-9	Not available.	Not available.	118000 mg/m ³ , (rat), 4H
Heptane	142-82-5	Not available.	Not available.	103000 mg/m ³ , (rat), 4H
Benzene, dimethyl-	1330-20-7	>1700 mg/kg, (rat)	4300 mg/kg, (rabbit)	5000 ppm, (rat), 4H
Cyclohexane, methyl-	108-87-2	>3200 mg/kg, (rat)	>86700 mg/kg, (rabbit)	15227 ppm, (rabbit), 1H
Hexane	110-54-3	25000 mg/kg, (rat)	Not available.	48000 ppm, (rat), 4H
Benzene, 1,2,4-trimethyl-	95-63-6	5000 mg/kg, (rat)	Not available.	18000 mg/m ³ , (rat), 4H
Benzene, methyl-	108-88-3	600 mg/kg, (rat)	14.1 mL/kg, (rabbit)	49000 mg/m ³ , (rat), 4H
Benzene, ethyl-	100-41-4	3500 mg/kg, (rat)	17800 µl/kg, (rabbit)	Not available.
Benzene	71-43-2	930 mg/kg, (rat)	>9400 µl/kg, (rabbit)	10000 ppm, (rat), 7H

Eye: Irritating to eyes. Signs/symptoms may include redness, swelling, pain, tearing, and blurred or hazy vision.

Skin: Irritating to skin. Signs/symptoms may include localized redness, swelling, and itching.

Ingestion: Harmful or fatal: may cause lung damage if swallowed. Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis. May cause gastrointestinal irritation. Signs/symptoms may include abdominal pain, stomach upset, nausea, vomiting and diarrhea.

Inhalation: May cause respiratory tract irritation. Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain. May cause headache,

dizziness, confusion, loss of appetite and loss of consciousness. Inhalation of Toluene may result in peculiar skin sensations (e. g. pins and needles) or numbness.

Skin Sensitization: Not hazardous by OSHA/WHMIS criteria.

Respiratory Sensitization: Not hazardous by OSHA/WHMIS criteria.

EFFECTS OF CHRONIC EXPOSURE

Target Organs: Skin. Eyes. Gastrointestinal tract. Respiratory system. Blood. Bone marrow. Liver. Kidneys. Nervous system.

Chronic Effects: Hazardous by OSHA/WHMIS criteria. May cause chronic effects. Prolonged or repeated contact may dry skin and cause irritation. Prolonged or repeated skin contact with Nonane may cause liver and kidney damage and cause blood effects. Xylene and Toluene can damage bone marrow thus causing anemia, and can also damage the liver and kidneys, as well as the central and peripheral nervous systems. Chronic inhalation of n-Hexane may cause peripheral nerve disorders and central nervous system effects. 1,2,4-Trimethylbenzene may cause CNS changes, asthmatic bronchitis, and changes in the blood such as anemia or thrombocytopenia (i.e. low thrombocyte count that may affect the blood's ability to clot). Ethylbenzene may cause changes in the blood such as Leukopenia or Lymphocytosis (i.e. damaging effects on the body's white blood cells).

Carcinogenicity: Hazardous by OSHA/WHMIS criteria. May cause cancer. Chronic exposure to benzene has been associated with an increased incidence of leukemia and multiple myeloma (tumour composed of cells of the type normally found in the bone marrow).

Component Carcinogenicity

Component	ACGIH	IARC	NTP	OSHA	Prop 65
Distillates (petroleum), straight-run middle	Not listed.	Not listed.	Not listed.	Not listed.	Not listed.
Nonane	Not listed.	Not listed.	Not listed.	Not listed.	Not listed.
Decane	Not listed.	Not listed.	Not listed.	Not listed.	Not listed.
Octane	Not listed.	Not listed.	Not listed.	Not listed.	Not listed.
Heptane	Not listed.	Not listed.	Not listed.	Not listed.	Not listed.
Benzene, dimethyl-	A4	Group 3	Not listed.	Not listed.	Not listed.
Cyclohexane, methyl-	Not listed.	Not listed.	Not listed.	Not listed.	Not listed.
Hexane	Not listed.	Not listed.	Not listed.	Not listed.	Not listed.
Benzene, 1,2,4-trimethyl-	Not listed.	Not listed.	Not listed.	Not listed.	Not listed.
Benzene, methyl-	A4	Group 3	Not listed.	Not listed.	Not listed.
Benzene, ethyl-	A3	Group 2B	Not listed.	OSHA Carcinogen.	Listed.
Benzene	A1	Group 1	List 1	OSHA Carcinogen.	Listed.

Mutagenicity: Not hazardous by OSHA/WHMIS criteria.

Reproductive Effects: Not hazardous by OSHA/WHMIS criteria.

Developmental Effects

Teratogenicity: Not hazardous by OSHA/WHMIS criteria.

Embryotoxicity: Hazardous by OSHA/WHMIS criteria. Possible risk of harm to the unborn child. Exposure to Xylene has produced fetotoxic effects in animal studies. Exposure to Toluene may affect the developing fetus.

Toxicologically Synergistic Materials: Not available.

Section 12: ECOLOGICAL INFORMATION

Ecotoxicity: Not available.
Persistence / Degradability: Not available.
Bioaccumulation / Accumulation: Not available.
Mobility in Environment: Not available.

Section 13: DISPOSAL CONSIDERATIONS

Disposal Instructions: Disposal should be in accordance with applicable regional, national and local laws and regulations. Local regulations may be more stringent than regional or national requirements.

Section 14: TRANSPORTATION INFORMATION

CFR

Proper Shipping Name: UN 1268, PETROLEUM DISTILLATES, N.O.S., 3, PG II
Class: 3
UN Number: 1268
Packing Group: II
Label Code:



TDG

Proper Shipping Name: UN 1268, PETROLEUM DISTILLATES, N.O.S., 3, PG II
Class: 3
UN Number: 1268
Packing Group: II
Label Code:



Section 15: REGULATORY INFORMATION

Chemical Inventories

US (TSCA)

The components of this product are in compliance with the chemical notification requirements of TSCA.

Canada (DSL)

The components of this product are in compliance with the chemical notification requirements of the NSN Regulations under CEPA, 1999.

Federal Regulations

Canada

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.

WHMIS Classification: Class B2 - Flammable Liquids.
Class D2A - Carcinogenicity.
Class D2A - Embryotoxicity.
Class D2A - Chronic toxic effects.
Class D2B - Skin irritant.
Class D2B - Eye irritant.

Hazard Symbols:



United States

This MSDS has been prepared to meet the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200.

SARA Title III Component

Section 302 (EHS) TPQ (lbs.)	Section 304 EHS RQ (lbs.)	CERCLA RQ (lbs.)	Section 313	RCRA CODE	CAA 112(r) TQ (lbs.)	
Distillates (petroleum), straight-run middle	Not listed.	Not listed.	Not listed.	Not listed.	Not listed.	
Nonane	Not listed.	Not listed.	Not listed.	Not listed.	Not listed.	
Decane	Not listed.	Not listed.	Not listed.	Not listed.	Not listed.	
Octane	Not listed.	Not listed.	Not listed.	Not listed.	Not listed.	
Heptane	Not listed.	Not listed.	Not listed.	Not listed.	Not listed.	
Benzene, dimethyl-	Not listed.	Not listed.	100	313	U239	Not listed.
Cyclohexane, methyl-	Not listed.	Not listed.	Not listed.	Not listed.	Not listed.	Not listed.
Hexane	Not listed.	Not listed.	5000	313 & X	Not listed.	Not listed.
Benzene, 1,2,4-trimethyl-	Not listed.	Not listed.	Not listed.	313	Not listed.	Not listed.
Benzene, methyl-	Not listed.	Not listed.	1000	313	U220	Not listed.
Benzene, ethyl-	Not listed.	Not listed.	1000	313	Not listed.	Not listed.
Benzene	Not listed.	Not listed.	10	313	U019	Not listed.

State Regulations

Massachusetts

US Massachusetts Commonwealth's Right-to-Know Law (Appendix A to 105 Code of Massachusetts Regulations Section 670.000)

Component

Component	CAS No.	RTK List
Distillates (petroleum), straight-run middle	64741-44-2	Not listed.
Nonane	111-84-2	Listed.
Decane	124-18-5	Not listed.
Octane	111-65-9	Listed.
Heptane	142-82-5	Listed.
Benzene, dimethyl-	1330-20-7	Listed.
Cyclohexane, methyl-	108-87-2	Listed.

MATERIAL SAFETY DATA SHEET

FRACSOL®

Date of Preparation: December 1, 2011

Hexane	110-54-3	Listed.
Benzene, 1,2,4-trimethyl-	95-63-6	Listed.
Benzene, methyl-	108-88-3	Listed.
Benzene, ethyl-	100-41-4	Listed.
Benzene	71-43-2	E

Note: E = Extraordinarily Hazardous Substance

New Jersey

US New Jersey Worker and Community Right-to-Know Act (New Jersey Statute Annotated Section 34:5A-5)

Component	CAS No.	RTK List
Distillates (petroleum), straight-run middle	64741-44-2	Not listed.
Nonane	111-84-2	SHHS
Decane	124-18-5	Listed.
Octane	111-65-9	SHHS
Heptane	142-82-5	SHHS
Benzene, dimethyl-	1330-20-7	SHHS
Cyclohexane, methyl-	108-87-2	SHHS
Hexane	110-54-3	SHHS
Benzene, 1,2,4-trimethyl-	95-63-6	Listed.
Benzene, methyl-	108-88-3	SHHS
Benzene, ethyl-	100-41-4	SHHS
Benzene	71-43-2	SHHS

Note: SHHS = Special Health Hazard Substance

Pennsylvania

US Pennsylvania Worker and Community Right-to-Know Law (34 Pa. Code Chap. 301-323)

Component	CAS No.	RTK List
Distillates (petroleum), straight-run middle	64741-44-2	Not listed.
Nonane	111-84-2	Listed.
Decane	124-18-5	Listed.
Octane	111-65-9	Listed.
Heptane	142-82-5	Listed.
Benzene, dimethyl-	1330-20-7	E
Cyclohexane, methyl-	108-87-2	Listed.
Hexane	110-54-3	Listed.
Benzene, 1,2,4-trimethyl-	95-63-6	E
Benzene, methyl-	108-88-3	E
Benzene, ethyl-	100-41-4	E
Benzene	71-43-2	ES

Note: E = Environmental Hazard; S = Special Hazardous Substance

California

California Prop 65: WARNING: This product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

Component	Type of Toxicity
Benzene, methyl-	female & developmental
Benzene, ethyl-	cancer
Benzene	developmental, male & cancer

Section 16: OTHER INFORMATION

Disclaimer:

The information contained in this document applies to this specific material as supplied. It may not be valid for this material if it is used in combination with any other materials. It is the user's responsibility to satisfy oneself as to the suitability and completeness of this information for his own particular use.

Expiry Date: November 30, 2014

Version: 1.0

MSDS Prepared by: Deerfoot Consulting Inc.

Phone: (403) 720-3700