

Material Safety Data Sheet

Material Name: **Toluene/Xylene Mixture**

MSDS ID: NOVA-0008

Section 1 - Product and Company Identification

Synonyms: TOLUENE/XYLENE, T/X, C₆-C₈ Aromatics, TX Mix**Chemical Name:** Extracts (petroleum), heavy naphtha solvent**Chemical Family:** Aromatic Hydrocarbons**Material Use:** Gasoline blends, industrial feedstock**Chemical Formula:** MixtureNOVA Chemicals
P.O. Box 2518, Station M
Calgary, Alberta, Canada T2P 5C6**Product Information #:** 1-412-490-4063**MSDS Information Email:**
msdsemail@novachem.com**EMERGENCY Telephone Numbers:****North America (Canada and US):**

1-800-561-6682, 1-403-314-8767 (NOVA Chemicals) (24 hours)

1-800-424-9300 (CHEMTREC-USA) (24 hours)

1-613-996-6666 (Canutec-Canada) (24 hours)

Mexico and South America: +44 208 762 8322 (NCEC) (24 hours)**General Comments**

This product has been assigned a CAS # of 64741-98-6.

Section 2 - Hazards Identification

HMIS Ratings: Health: 2* **Fire:** 3 **Physical Hazard:** 0 **Personal Protection:** chemical goggles, gloves, respirator*Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe * = Chronic hazard***NFPA Ratings: Health:** 2 **Fire:** 3 **Reactivity:** 0*Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe***Emergency Overview**

DANGER! FLAMMABLE. TOXIC. Product is a colorless liquid with a solvent odor. Vapor is heavier than air and may spread long distances. Distant ignition and flashback are possible. Flammable liquids and vapors are susceptible to ignition by accumulated static charges on surfaces. Liquid can float on water and may travel to distant locations and/or spread fire. This product is harmful by inhalation and if it is swallowed. This product is irritating to the eyes and skin. Ingestion of this product may result in central nervous system effects including headache, sleepiness, dizziness, slurred speech and blurred vision. Excessive inhalation of this material causes headache, dizziness, nausea, incoordination and in extreme conditions coma and possibly death. Contains components that may cause cancer.

Potential Health Effects: Eyes

This product is irritating to the eyes.

Potential Health Effects: Skin

Prolonged and/or repeated skin contact with this product may cause irritation/dermatitis, and possible chemical blistering. Product contains component(s) that may be absorbed through the skin.

Potential Health Effects: Ingestion

This product is harmful if swallowed. Ingestion of this product may result in central nervous system effects including headache, sleepiness, dizziness, slurred speech and blurred vision. Ingestion may cause liver and kidney damage. Small amounts of this product, if aspirated into the lungs, may cause mild to severe pulmonary injury.

Potential Health Effects: Inhalation

This product may be harmful by inhalation. Excessive inhalation of this material causes headache, dizziness, nausea, incoordination and in extreme conditions coma and possibly death. Components of this product are considered carcinogenic. Based on animal testing, a component of this product (xylene) is considered to be a developmental toxicant in Canada (birth defects).

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Section 3 - Composition / Information on Ingredients

CAS #	Component	Percent by Wt.
64741-98-6	Extracts, petroleum, heavy naphtha solvent	100
The above listed CAS# and product is composed of the following components:		
108-88-3	Toluene	55-65
1330-20-7	Xylenes	17-23
100-41-4	Ethylbenzene	16-21
71-43-2	Benzene	<0.01-0.1
71-43-2	Benzene	0.1-1

Additional Information

The actual components and weight % concentrations vary based on operating conditions.

This product is considered to be hazardous under 29 CFR 1910.1200 (Hazard Communication).

This material is a controlled product under Canadian WHMIS regulations.

This product is regulated as a hazardous material / dangerous goods for transportation (See Section 14).

This product is controlled under the Canadian and U.S. Drug Precursor Control Regulations (Class B-Toluene).

See Section 8 for applicable exposure limits. See Section 11 for applicable toxicity data.

Section 4 - First Aid Measures

First Aid: Eyes

Remove contact lenses, if it can be done safely. Immediately flush eyes with water for at least 15 minutes, while holding eyelids open. Seek medical if symptoms develop or persist.

First Aid: Skin

Remove contaminated clothing and shoes. Wash immediately with soap and water. Seek medical attention if symptoms develop or persist. Completely decontaminate clothing, shoes and other protective equipment before reuse or discard.

First Aid: Inhalation

Move affected individual to non-contaminated air. Loosen tight clothing such as a collar, tie, belt or waistband to facilitate breathing. Seek immediate medical attention if the individual is not breathing, is unconscious or if any other symptoms persist. WARNING: Contact through mouth-to-mouth resuscitation may pose a secondary risk to the rescuer. Avoid mouth-to-mouth contact by using a mouth shield or guard to perform artificial respiration.

First Aid: Ingestion

DO NOT INDUCE VOMITING. Loosen tight clothing such as a collar, tie, belt or waistband. Seek immediate medical attention.

First Aid: Notes to Physician

For more detailed medical emergency support information call 1-800-561-6682 or 1-403-314-8767 (24 hours, NOVA Chemicals Emergency Response). Ensure thorough eye and skin decontamination. Treat unconsciousness, nausea, hypotension, seizures and cardiac arrhythmias in the conventional manner. Aspiration of this product during induced emesis can result in lung injury. If evacuation of stomach contents is considered necessary, use the method least likely to cause aspiration, such as gastric lavage after protecting the airway. Observe hospitalized patients for delayed chemical pneumonia, acute tubular necrosis, encephalopathy and dysrhythmias. Monitor for urinary phenol within 72 hours of acute exposure.

Section 5 - Fire Fighting Measures

See Section 9: Physical Properties for flammability limits, flash point and autoignition information.

General Fire Hazards

Fire and explosion hazards are serious when this product is exposed to heat or flame. Vapors are heavier than air and may travel along the ground to some distant source of ignition and flash back. Consider initial downwind evacuation for at least 300 meters (984 feet). If tank is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions.

Explosion Hazards

Vapors may form explosive mixture with air. Keep containers away from source of heat or fire.

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Hazardous Combustion Products

Upon combustion, this product emits carbon monoxide, carbon dioxide, and/or low molecular weight hydrocarbons.

Extinguishing Media

Dry chemical, foam, carbon dioxide, and water fog. Use water to cool fire-exposed containers and to protect personnel. Water may be an ineffective extinguishing medium, and may actually spread flames. Contain all liquid runoff to prevent entry into sewers, drains, or waterways.

Fire Fighting Equipment/Instructions

Reference 2008 Emergency Response Guidebook, Guide # 130. Position upwind. Keep unnecessary personnel away. Move containers from fire area if you can do so without risk. Fight fire from maximum distance or use unmanned holders or monitor nozzles. Immediately withdraw in case of fire and container venting or heat discoloration of a container. Fire fighters should wear full-face, self-contained breathing apparatus and thermal protective clothing. Avoid inhaling any smoke and combustion materials. Remove and clean or destroy any contaminated clothing. Cool containers with flooding quantities of water until well after the fire is out. Control runoff waters to prevent entry into sewers, drains, underground or confined spaces and waterways.

Section 6 - Accidental Release Measures

Evacuation Procedures

Isolate area. Keep unnecessary personnel away. Alert stand-by emergency and fire fighting personnel. Monitor surrounding area for build-up of flammable air concentrations.

Small Spills

Eliminate ignition sources. Spill or leak area should be isolated. Keep upwind and out of low areas. Stop or reduce discharge if safe to do so. Contain discharge by booming on water or diking on ground. Absorb/adsorb residual materials and clean up with non-sparking tools. Prevent entry into water intakes and waterways.

Large Spills

Consider downwind evacuation for 300 meters (984 feet). Eliminate ignition sources. Keep upwind and out of low areas. Stop discharge if safe to do so. Contain liquids on land to prevent entry into sewers, drains or waterways. Spills on water will volatilize rapidly, making containment or recovery difficult. Recover any pooled liquid material with approved pumps, skimmers or vacuum equipment. Absorb with DRY earth, sand or other non-combustible material. May require soil remediation.

Special Procedures

Contact local police/emergency services and appropriate emergency telephone numbers provided in Section 1. Ensure that statutory and regulatory reporting requirements in the applicable jurisdiction are met. Wear appropriate protective equipment and clothing during clean-up. Individuals without appropriate protective equipment should be excluded from area of spill until cleanup has been completed.

See Section 8 for recommended Personal Protective Equipment and see Section 13 for waste disposal considerations.

Section 7 - Handling and Storage

Handling Procedures

Keep locked up or secured. Handle in fully grounded, properly designed and approved equipment systems that are suitable for flammable liquids. Use with adequate ventilation. Do not ingest or inhale. Collect and flare vents. Keep away from heat and ignition sources. No smoking or open flames permitted in storage, use or handling areas. Dissipate static electricity during transfer by grounding and bonding containers and equipment. Take special precautions when cold cutting or breaking into lines, or when cleaning and disposing of empty containers. Do not breathe gas, fumes, vapor or spray. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately. Avoid contact with skin and eyes. Keep away from incompatible materials such as oxidizing agents and acids. After handling, always wash hands thoroughly with soap and water.

Storage Procedures

Storage area should be clearly identified, well-illuminated, clear of obstruction and accessible only to trained and authorized personnel. Adequate security must be provided so that unauthorized personnel do not have access to product/material. Store in grounded, properly designed and approved vessels and away from incompatible materials. Store and use away from heat, sparks, open flame, or any other ignition source. Store according to applicable regulations for flammable materials for storage tanks, containers, piping, buildings, rooms, cabinets,

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allowable quantities and minimum storage distances. Use non-sparking ventilation systems, approved explosion-proof equipment, and intrinsically safe electrical systems. Have appropriate extinguishing capability in storage area (e.g. sprinkler system, portable fire extinguishers (dry chemical, foam or carbon dioxide)), and flammable gas detectors. Keep absorbents for leaks and spills readily available. Equip storage tank vents with a flame arrester. Inspect vents during winter conditions for vapor ice build-up. Storage tanks should be above ground and diked to hold entire contents. A refrigerated room is generally recommended for warehouse storage of materials with a flash point lower than 37.8°C (100°F).

See Section 8: Exposure Controls/Personal Protection for appropriate Personal Protective Equipment. See Section 10 for information on Incompatibilities.

Section 8 - Exposure Controls / Personal Protection

Exposure Guidelines

A: General Product Information

Refer to published exposure limits - use effective control measures and PPE to maintain worker exposure to concentrations that are below these limits. Ensure that eyewash stations and safety showers are proximal to work locations.

B: Component Exposure Limits

ACGIH, OSHA, NIOSH, EPA, Alberta, and Ontario exposure limit lists have been checked for major components listed with CAS registry numbers. Other exposure limits may apply, check with proper authorities.

*Note: The Vacated OSHA Permissible Exposure Limits (PELs) are those provided in the 1989 update to OSHA's Air Contaminants Standard 29 CFR 1910.1000. These limits were vacated by the U.S. Court of Appeals, Eleventh Circuit but may be enforceable in some states.

Toluene (108-88-3)

ACGIH: 20 ppm TWA; 75 mg/m³ TWA; BEI
OSHA (Vacated)*: 100 ppm TWA; 375 mg/m³ TWA; 150 ppm STEL; 560 mg/m³ STEL
OSHA (Final): 200 ppm TWA; 300 ppm Ceiling
NIOSH: 100 ppm TWA; 375 mg/m³ TWA; 150 ppm STEL; 560 mg/m³ STEL
500 ppm IDLH
Alberta: 50 ppm TWA; 188 mg/m³ TWA
Substance may be readily absorbed through intact skin
Ontario: 20 ppm TWAEV (also known as methylbenzene)

Xylenes (1330-20-7)

ACGIH: 100 ppm TWA; 434 mg/m³ TWA; 150 ppm STEL; 651 mg/m³ STEL; BEI
OSHA (Vacated)*: 100 ppm TWA; 435 mg/m³ TWA; 150 ppm STEL; 655 mg/m³ STEL
OSHA (Final): 100 ppm TWA; 435 mg/m³ TWA
Alberta: 100 ppm TWA; 434 mg/m³ TWA; 150 ppm STEL; 651 mg/m³ STEL (as dimethylbenzene (xylene, o, m & p isomers))
Ontario: 100 ppm TWAEV; 435 mg/m³ TWAEV; 150 ppm STEV; 650 mg/m³ STEV (as dimethylbenzene (sum of o-, m-, and p-isomers))

Ethylbenzene (100-41-4)

ACGIH: 100 ppm TWA; 434 mg/m³ TWA; 125 ppm STEL; 543 mg/m³ STEL; BEI
OSHA (Vacated)*: 100 ppm TWA; 435 mg/m³ TWA; 125 ppm STEL; 545 mg/m³ STEL
OSHA (Final): 100 ppm TWA; 435 mg/m³ TWA
NIOSH: 100 ppm TWA; 435 mg/m³ TWA; 125 ppm STEL; 545 mg/m³ STEL
800 ppm IDLH
Alberta: 100 ppm TWA; 434 mg/m³ TWA; 125 ppm STEL; 543 mg/m³ STEL
Ontario: 100 ppm TWAEV; 435 mg/m³ TWAEV; 125 ppm STEV; 540 mg/m³ STEV

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Benzene (71-43-2)

ACGIH: 0.5 ppm TWA; 1.6 mg/m³ TWA; 2.5 ppm STEL; 8 mg/m³ STEL; BEI

Skin - potential significant contribution to overall exposure by the cutaneous route

OSHA (Vacated)*: 0.5 ppm Action Level; 1 ppm TWA; 5 ppm STEL (Cancer hazard, Flammable - see 29 CFR 1910.1028)

OSHA (Final): 1 ppm TWA; 10 ppm TWA (applies to industry segments exempt from the benzene standard at 29 CFR 1910.1028)

5 ppm STEL (see 29 CFR 1910.1028)

25 ppm Ceiling (applies to industry segments exempt from the 1 ppm TWA and 5 ppm STEL of the benzene standard)

NIOSH: 0.1 ppm TWA; 0.32 mg/m³ TWA; 1 ppm STEL; 3.2 mg/m³ STEL
500 ppm IDLH

Alberta: 0.5 ppm TWA; 1.6 mg/m³ TWA; 2.5 ppm STEL; 8 mg/m³ STEL

Substance may be readily absorbed through intact skin

Ontario: 0.5 ppm TWAEV (applies to workplaces to which the designated substance regulation does not apply); 0.5 ppm TWAEV (designated substance regulation)

2.5 ppm STEV (applies to workplaces to which the designated substance regulation does not apply); 2.5 ppm STEV (designated substances regulation)

ENGINEERING CONTROLS

Engineering methods to reduce hazardous exposure are preferred controls. Methods include mechanical ventilation (dilution and local exhaust) process or personal enclosure, remote and automated operation, control of process conditions, leak detection and repair systems, and other process modifications. Ensure all exhaust ventilation systems are discharged to outdoors, away from air intakes and ignition sources. Supply sufficient replacement air to make up for air removed by exhaust systems. Administrative (procedure) controls and use of personal protective equipment may also be required.

PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment: Eyes/Face

Wear safety glasses; chemical goggles are recommended if splashing is possible, or to prevent eye irritation from vapors.

Personal Protective Equipment: Skin/Hands/Feet

Use impervious gloves when handling product. Wear chemical-resistant safety footwear with good traction to prevent slipping. Work clothing that sufficiently prevents skin contact should be worn, such as coveralls and/or long sleeves and pants. Fire resistant (i.e., Nomex) or natural fiber clothing (i.e., cotton or wool) is recommended. Synthetic clothing can generate static electricity and is not recommended where flammable vapors release may occur.

Personal Protective Equipment: Respiratory

If engineering controls and ventilation are not sufficient to prevent buildup of aerosols or vapors, appropriate NIOSH/MSHA approved air-purifying respirators or self-contained breathing apparatus (SCBA) appropriate for exposure potential should be used. Air supplied breathing apparatus must be used when oxygen concentrations are low or if airborne concentrations exceed the limits of the air-purifying respirators.

Personal Protective Equipment: General

Personal protective equipment (PPE) should not be considered a long-term solution to exposure control. Employer programs to properly select, fit, maintain, and train employees to use equipment must accompany PPE. Consult a competent industrial hygiene resource, the PPE manufacturer's recommendation, and/or applicable regulations to determine hazard potential and ensure adequate protection.

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Section 9 - Physical & Chemical Properties

Physical State and Appearance:	Liquid	Color:	Clear, colorless
Odor:	Aromatic	Odor Threshold:	2-5 ppm
pH:	Not applicable	Vapor Pressure:	4.8 kPa at 37.8°C (36 mm Hg at 100°F)
Vapor Density @ 0°C (Air=1):	3-4	Boiling Point:	Range: 110°C - 140°C (230° F-284°F)
Melting Point:	-80°C (-112°F)	Solubility (H2O):	Insoluble
Specific Gravity (Water=1):	0.87 at 15°C (59°F)	Dispersion Properties:	Not dispersed in hot or cold water
Evaporation Rate (n-Butyl Acetate=1):	Medium at 20°C (68°F)	Percent Volatile:	100%
Octanol/H2O Coeff.:	log Kow = 3.12-3.20	Auto Ignition:	Range: 450°C - 500°C (842°F - 932°F)
Softening Point:	Not applicable	Flash Point:	4°C (39.2°F)
Flash Point Method:	Closed cup	Upper Flammable Limit (UFL):	7% (based on toluene content)
Lower Flammable Limit (LFL):	1% (based on toluene content)	Flammability Classification:	Flammable

Section 10 - Stability & Reactivity Information

Chemical Stability

This product is stable under normal use conditions for shock, vibration, pressure, or temperature.

Chemical Stability: Conditions to Avoid

Keep away from heat, sparks, or open flame.

Incompatibility

This product may react with strong acids or oxidizing agents.

Hazardous Polymerization

Not likely to occur.

Corrosivity

Material is not considered corrosive (copper strip corrosion test).

Hazardous Decomposition

Upon decomposition, this product emits carbon monoxide, carbon dioxide and/or low molecular weight hydrocarbons.

Section 11 - Toxicological Information

A: Acute Toxicity - General Product Information

Similar hydrocarbon mixtures were tested under the EPA's High Production Volume (HPV) Chemical Challenge program. Toluene/Xylene Mixture has been tested under the HPV test plan for the Olefins Panel of the American Chemistry Council Low Benzene Naphthas Category. This product is not acutely toxic by the oral, dermal or inhalation routes of exposure. Liquid aspirated into the lungs causes pulmonary injury. This product is non-irritating to the eye and is a moderate skin irritant.

The following additional information has been found for its components:

Toluene - Contact can irritate the skin and eyes. Toluene can be absorbed through intact skin. Inhalation can irritate the nose and throat, causing coughing and wheezing. Inhalation of high concentrations may result in central nervous system (CNS) depression, causing trouble concentrating, headache, dizziness, nausea, loss of coordination, unconsciousness, and in extreme conditions coma and possibly death. Ingestion and subsequent aspiration into the lungs may cause chemical pneumonitis.

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Xylenes, mixed - Vapors can irritate the eyes. Contact with unprotected skin or eyes produces erythema and slight necrosis. Xylene can be absorbed through intact skin. Inhalation can irritate the nose and throat causing cough and difficulty breathing. Inhalation of high concentrations may result in central nervous system (CNS) depression, causing headache, dizziness, nausea, vomiting, loss of coordination, confusion, unconsciousness, and in extreme conditions coma and possibly death. Ingestion and subsequent aspiration into the lungs may cause chemical pneumonitis.

Ethylbenzene - Causes severe eye, nose, and throat irritation. It is also a skin irritant that may be absorbed through the skin in harmful amounts. Inhalation may result in central nervous system depression, causing headache, dizziness, nausea, loss of coordination, unconsciousness, and at high concentrations, difficulty breathing and possibly death. Ethylbenzene is narcotic at high concentrations and can be fatal. Ingestion and subsequent aspiration into the lungs may cause chemical pneumonitis.

Benzene - May cause corneal injury to the eye. It is also a skin irritant that may be absorbed through the skin in harmful amounts. Inhalation of benzene can irritate the respiratory tract and may result in central nervous system (CNS) depression and possible death due to respiratory failure. Ingestion and subsequent aspiration into the lungs may cause chemical pneumonitis.

B: Acute Toxicity - LD50/LC50

Extracts, petroleum, heavy naphtha solvent (64741-98-6)

Inhalation LC50 Rat: >5.2 mg/L/4H; Oral LD50 Rat: >5000 mg/kg; Dermal LD50 Rabbit: >2000 mg/kg

Toluene (108-88-3)

Inhalation LC50 Rat: 12.5 mg/L/4H; Inhalation LC50 Rat: >26,700 ppm/1H; Oral LD50 Rat: 636 mg/kg; Dermal LD50 Rabbit: 8390 mg/kg

Xylenes (1330-20-7)

Inhalation LC50 Rat: 5000 ppm/4H; Oral LD50 Rat: 4300 mg/kg; Dermal LD50 Rabbit: >1700 mg/kg

Ethylbenzene (100-41-4)

Inhalation LC50 Rat: 17.2 mg/L/4H; Oral LD50 Rat: 3500 mg/kg; Dermal LD50 Rabbit: 15,354 mg/kg

Benzene (71-43-2)

Inhalation LC50 Rat: 13,050 ppm/4H; Oral LD50 Rat: 690 mg/kg; Dermal LD50 Rabbit: >8260 mg/kg

C: Chronic Toxicity - General Product Information

Similar hydrocarbon mixtures were tested under the EPA's High Production Volume (HPV) Chemicals Challenge program. Toluene/Xylene Mixture has been tested under the HPV test plan for the Olefins Panel of the American Chemistry Council Low Benzene Naphthas Category. Inhalation studies of high aromatic naphtha streams showed minimal toxicity. No neurobehavioral or neuropathological effects were observed when measured. Naphthas with relatively high aromatic content induced skin irritation and systemic effects primarily related to skin damage and accompanying stress. Mild anemia was also observed. Naphtha streams high in aromatic content (60-90%) are mutagenic in vitro test with metabolic activation. In vivo, naphtha streams containing relatively high aromatic and low benzene content do not induce cytogenetic damage.

The following additional information has been found for its components:

Toluene - Prolonged and repeated contact may cause defatting dermatitis with drying and cracking, itching, and a skin rash. Repeated toluene exposure has been associated with central nervous system effects, loss of appetite, enlargement of the liver, kidney effects, blood effects, as well as cardiac effects. The chronic neurotoxic effects on the central nervous system may progress to an irreversible state. Intentional misuse of toluene has resulted in reproductive effects including physical and developmental abnormalities, such as low birth weight and microencephaly, and has been referred to as "Fetal Toluene Syndrome".

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Xylenes, mixed - Prolonged and repeated skin contact can cause defatting dermatitis with drying and cracking. Chronic inhalation has been associated with central nervous system effects, loss of appetite, nausea, ringing in the ears, irritability, thirst, anemia, mucosal bleeding, enlarged liver, and hyperplasia, but not destruction of the bone marrow. Xylene can damage the liver and kidneys. In chronic occupational exposure, Xylene (usually mixed with other solvents) has produced irreversible damage to the central nervous system and may be ototoxic (damages hearing or increases sensitivity to noise), probably from a neurotoxic mechanism. Xylene is classified as a developmental toxicant in Canada.

Ethylbenzene - Prolonged and repeated exposure may be harmful to the central nervous system (CNS), upper respiratory tract, and/or may cause liver disorders. It may also cause drying, scaling, and blistering of the skin. Ethylbenzene has been classified by IARC as Group 2B (possibly carcinogenic to humans) based on the National Toxicology Program's two year study of very high exposure levels on rats and mice (NTP, 1999). Rats and mice were exposed to concentrations of 0, 75, 250, or 750 ppm of ethylbenzene for 6 hours per day, 5 days per week for 104 and 103 weeks, respectively. There were statistically significant increases in incidence of kidney tumors in male and female rats, lung tumors in male mice, and liver tumors in female mice exposed to 750 ppm of ethylbenzene. The relevance of these data to human exposure is presently being evaluated.

Benzene - Prolonged and/or repeated exposure can cause drying and scaling of the skin. Long-term exposure has been associated with certain types of leukemia in humans. IARC and OSHA consider benzene to be a human carcinogen. EPA has classified benzene as a Group A, known human carcinogen. Chronic exposure to benzene has been reported to cause bone marrow abnormalities and adverse blood effects including anemia. Progressive deterioration of hematopoietic function expressed as a decrease in absolute lymphocyte count is the most sensitive indicator of benzene exposure. Benzene may cause fetotoxicity and teratogenicity. Chromosomal aberrations have been noted in animal tests.

D: Chronic Toxicity - Carcinogenic Effects

ACGIH, EPA, IARC, OSHA, and NTP carcinogen lists have been checked for selected similar materials or those components with CAS registry numbers.

Toluene (108-88-3)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

EPA: Classification: under the Guidelines for Carcinogen Risk Assessment (U.S. EPA, 2005), there is inadequate information to assess the carcinogenic potential of toluene.

IARC: Monograph 71 [1999], Monograph 47 [1989] (Group 3 (not classifiable))

Xylenes (1330-20-7)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

EPA: Classification: not classified as a carcinogen.

IARC: Monograph 71 [1999], Monograph 47 [1989] (Group 3 (not classifiable))

Ethylbenzene (100-41-4)

ACGIH: A3 - Confirmed animal carcinogen with unknown relevance to humans

EPA: Classification: not classifiable as to human carcinogenicity.

IARC: Monograph 77 [2000] (Group 2B (possibly carcinogenic to humans))

Benzene (71-43-2)

ACGIH: A1 - Confirmed Human Carcinogen

OSHA: 0.5 ppm Action Level; 1 ppm TWA; 5 ppm STEL (Cancer hazard, Flammable - see 29 CFR 1910.1028)

EPA: Classification: known human carcinogen for all routes of exposure.

NTP: Known Carcinogen

IARC: Supplement 7 [1987], Monograph 29 [1982] (Group 1 (carcinogenic to humans))

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Section 12 - Ecological Information

Ecotoxicity

A: General Product Information

Similar hydrocarbon mixtures were tested under the EPA's High Production Volume (HPV) Chemical Challenge program. Toluene/Xylene Mixture has been tested under the HPV test plan for the Olefins Panel of the American Chemistry Council Low Benzene Naphthas Category. Product is largely insoluble in water, and evaporates rapidly. Product has likely low to moderate absorption into soil and sediment. Components are considered acutely hazardous to aquatic and terrestrial life.

B: Component Analysis - Ecotoxicity - Aquatic/Terrestrial Toxicity

Extracts, petroleum, heavy naphtha solvent (64741-98-6)

96 Hr LC50 Pimephales promelas: 45 mg/L [flow-through]; 96 Hr LC50 Lepomis macrochirus: 1740 mg/L [static]
96 Hr LC50 Den-dronereides heteropoda: 4720 mg/L

Toluene (108-88-3)

96 Hr LC50 Pimephales promelas: 25 mg/L [flow-through] (1 day old); 96 Hr LC50 Oncorhynchus mykiss: 24.0 mg/L [static];
96 Hr LC50 Lepomis macrochirus: 24.0 mg/L [static]; 96 Hr LC50 Lepomis macrochirus: 13 mg/L [static]
96 Hr EC50 Selenastrum capricornutum: >433 mg/L
48 Hr EC50 water flea: 11.3 mg/L; 48 Hr EC50 water flea: 310 mg/L; 48 Hr EC50 Daphnia magna: 11.3 mg/L
30 min EC50 Photobacterium phosphoreum: 19.7 mg/L

Xylenes (1330-20-7)

96 Hr LC50 Pimephales promelas: 13.4 mg/L [flow-through]; 96 Hr LC50 Oncorhynchus mykiss: 8.05 mg/L [flow-through]; 96 Hr LC50 Lepomis macrochirus: 16.1 mg/L [flow-through]; 96 Hr LC50 Pimephales promelas: 26.7 mg/L [static]
48 Hr EC50 water flea: 3.82 mg/L; 48 Hr LC50 Gammarus lacustris: 0.6 mg/L
24 hr EC50 Photobacterium phosphoreum: 0.0084 mg/L

Ethylbenzene (100-41-4)

Freshwater

fish 96-h LC50: 4.7 mg/L (predicted); fish (guppy) 96-h LC50: 9.9 mg/l (measured); fish (rainbow trout) 96-h LC50: 4.2 mg/l (measured); fish (fathead minnow) 96-h LC50: 12.1 mg/l (measured); daphnid 48-h LC-50: 5.5 mg/l (predicted); daphnid 48-h LC-50: 3.2 mg/l (modeling); daphnid 48-h LC-50: >1.81 mg/L (measured); green algal 96-h EC-50 (Biomass as cell/ml) = 3.7 mg/L (predicted); green algal 96-h EC-50 (growth rate): 3.7 mg/l fish Chronic value (ChV): 0.750 mg/L (predicted); fish (fathead minnow) ChV > 0.440 mg/L (measured) daphnid 21-d ChV - 0.500 mg/l (predicted); daphnid 7-day ChV - 1.3 mg/L (measured); algal ChV -0.790 mg/L (predicted); algal ChV -3.4 mg/L (measured)

Saltwater

fish 96-h LC50: 2.0 mg/L (predicted); fish (atlantic silverside) 96-h LC50: 5.4 mg/L (measured) mysid 96-h LC50: 0.540 mg/L (predicted); mysid 96-h LC-50: 2.6 mg/L (measured); bay shrimp 96-h LC50: 0.490 mg/l (measured); crab LC-50: 13.0 mg/L (measured); green algal 96-h EC-50 (growth rate): 7.7 mg/l (measured); fish ChV - 0.200 mg/L acute to chronic ratio is 10
mysid ChV - 0.050 mg/L (predicted, acute to chronic ratio is 10); bay shrimp ChV - 0.050 mg/L (predicted; acute to chronic ratio is 10); algal ChV - 4.5 mg/L (measured).

Benzene (71-43-2)

96 Hr LC50 Pimephales promelas: 12.6 mg/L [flow-through]; 96 Hr LC50 Oncorhynchus mykiss: 5.3 mg/L [flow-through]; 96 Hr LC50 Lepomis macrochirus: 22 mg/L [static]; 96 Hr LC50 Poecilia reticulata: 28.6 mg/L [static]
72 Hr EC50 Selenastrum capricornutum: 29 mg/L
48 Hr EC50 water flea: 356 mg/L [Static]; 48 Hr EC50 Daphnia magna: 10 mg/L

Environmental Fate/Mobility

Calculation of atmospheric half-lives of representative constituent chemicals identified a range of 2.3-31.8 hours as a result of indirect hydrolysis by hydroxyl radical attack. When released to soil or water, product will rapidly begin to volatilize. Components have low to moderate water solubility. Toluene has low to moderate volatility. It is relatively insoluble in water. Toluene is absorbed into soils and will migrate through soil pores. Remediation of soils may be required. Some of the xylene will be scavenged by rain. From the surface of water, half of the amount of xylene will be volatilized within 2 to 5.5 days. Benzene migrates in soils and in ground waters. Its airborne levels can be reduced by rain or water spray.

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Persistence/Degradability

Components (C5-C12 carbons) found in low benzene naphtha products biodegraded from 63-100% after 14 or 28 days; the results for complex products range from 21-96% after 28 days. These data suggest relatively high biodegradability and hence are not expected to persist in the environment. Toluene is biodegradable under aerobic and more slowly under anaerobic conditions. Depending on water table and soil conditions, toluene may migrate to significant depths. When released into the air, xylene may degrade by reaction with photochemically produced hydroxyl radicals. The photoreaction products are formic acid and acetic acid that, after absorption in the hydrosphere are further degraded to CO₂ and H₂O. Benzene in air will photo-degrade with a calculated half-life of 13.4 days. This is accelerated in polluted atmospheres containing nitrogen or sulfur oxides. By-products include phenol, nitrophenols, nitrobenzene, formic acid and peroxyacetyl nitrate. Benzene will biodegrade in soils and ground waters (half-life 16-28 days) under aerobic conditions. Limited degradation under anaerobic conditions. Sewage treatment plants have been shown to remove 44-100%.

Bioaccumulation/Accumulation

Toluene is not expected to bioaccumulate. In humans, metabolites are rapidly excreted in the urine. Some absorption to sediment may occur for xylene. Low to moderate absorption to soil would be expected based on the Kow. Little bioconcentration is expected in fish such as eel and clams. The concentration in rainbow trout and carp was found at the level of 50 and 120 ppb respectively.

Section 13 - Disposal Considerations

U.S./Canadian Waste Number & Descriptions

A: General Product Information

This product is known to be a hazardous waste according to US and Canadian regulations. The use, mixing or processing of this product may alter this product. Contact federal, provincial/state and local authorities in order to generate or ship a waste material associated with this product to ensure materials are handled appropriately and meet all criteria for disposal of hazardous waste. **DO NOT ATTEMPT TO DISPOSE OF BY UNCONTROLLED IGNITION.** Since emptied containers retain product/material residue, follow safe handling/label warnings even after container is emptied.

See Section 7: Handling and Storage and Section 8: Exposure Controls/Personal Protection for additional handling information that may be applicable for safe handling and the protection of employees.

Waste generator is advised to carefully consider hazardous properties and control measures needed for other materials that may be found in the waste.

B: Component Waste Numbers

Toluene (108-88-3)

RCRA: waste number U220

Xylenes (1330-20-7)

RCRA: waste number U239 (Ignitable waste, Toxic waste)

Benzene (71-43-2)

RCRA: waste number U019 (Ignitable waste, Toxic waste); 0.5 mg/L regulatory level

Section 14 - Transportation Information

US DOT Information

Shipping Name: Flammable liquids, n.o.s. (Toluene, Ethylbenzene, Xylenes)

UN/NA #: UN1993 **Hazard Class:** 3 **Packing Group:** II

Required Label(s): FLAMMABLE LIQUID

Additional Info.: NOTE: The Reportable Quantity for benzene is 10 lbs. (4.54 kg). The Reportable Quantity for xylene is 100 lbs. (45.4 kg). The Reportable quantity for ethylbenzene & toluene is 1000 lbs. (454kg) each. 2008 Emergency Response Guidebook, Guide #130.

Canadian TDG Information

Shipping Name: FLAMMABLE LIQUIDS, N.O.S. (Toluene, Ethylbenzene, Xylenes)

UN #: UN1993 **Hazard Class:** 3 **Packing Group:** II

Required Label(s): FLAMMABLE LIQUID

Additional Info.: 2008 Emergency Response Guidebook, Guide #130.

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International Air Transport Association (IATA) and ICAO Information

Shipping Name: Flammable liquids, n.o.s. (Toluene, Ethylbenzene, Xylenes)
UN #: UN1993 **Hazard Class:** 3 **Packing Group:** II
Required Label(s): FLAMMABLE LIQUID

International Maritime Dangerous Goods (IMDG) Code

Shipping Name: Flammable liquids, n.o.s. (Toluene, Ethylbenzene, Xylenes)
UN #: UN1993 **Hazard Class:** 3 **Packing Group:** II
Required Label(s): FLAMMABLE LIQUID
Additional Info.: EmS No.: F-E, S-E

Section 15 - Regulatory Information

A: International Regulations

Component Analysis - International Inventory Status

Component	CAS #	US - TSCA	CANADA - DSL	EU - EINECS
Extracts, petroleum, heavy naphtha solvent	64741-98-6	Yes	Yes	Yes
Toluene	108-88-3	Yes	Yes	Yes
Xylenes	1330-20-7	Yes	Yes	Yes
Ethylbenzene	100-41-4	Yes	Yes	Yes
Benzene	71-43-2	Yes	Yes	Yes

B: USA Federal & State Regulations

Ongoing occupational hygiene, medical surveillance programs, or site emission or spill reporting may be required by Federal or State regulations. Check for applicable regulations.

USA OSHA Hazard Communication Class

This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication). HCS Classes:

HCS CLASS: Highly Toxic

HCS CLASS: DANGEROUS MAY CAUSE CANCER

HCS CLASS: Flammable liquid having a flash point lower than 37.8°C (100°F).

HCS CLASS: Irritating substance.

HCS CLASS: Target organ effects.

USA Right-to-Know - Federal

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

Toluene (108-88-3)

SARA 313: 1.0 % de minimis concentration
CERCLA: 1000 lb final RQ; 454 kg final RQ

Xylenes (1330-20-7)

SARA 313: 1.0 % de minimis concentration
CERCLA: 100 lb final RQ; 45.4 kg final RQ

Ethylbenzene (100-41-4)

SARA 313: 0.1 % de minimis concentration
CERCLA: 1000 lb final RQ; 454 kg final RQ

Benzene (71-43-2)

SARA 313: 0.1 % de minimis concentration
CERCLA: 10 lb final RQ (receives an adjustable RQ of 10 lbs based on potential carcinogenicity in August 14, 1989 final rule); 4.54 kg final RQ (receives an adjustable RQ of 10 lbs based on potential carcinogenicity in August 14, 1989 final rule)

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Material Name: **Toluene/Xylene Mixture**

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USA Right-to-Know - State

The following components appear on one or more of the following state hazardous substances lists. Some components (including those present only in trace quantities, and therefore not listed in this document) may be included on the Right-To-Know lists of other U.S. states. The reader is therefore cautioned to contact his or her NOVA Chemicals' representative or NOVA Chemicals' Product Integrity group for further U.S. State Right-To-Know information.

Component	CAS	NJ	PA
Toluene	108-88-3	Yes	Yes
Xylenes	1330-20-7	Yes	Yes
Ethylbenzene	100-41-4	Yes	Yes
Benzene	71-43-2	Yes	Yes

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):

WARNING! This product contains a chemical known to the state of California to cause cancer.

WARNING! This product contains a chemical known to the state of California to cause reproductive/developmental effects.

C: Canadian Regulations - Federal and Provincial

WHMIS Ingredient Disclosure List (IDL)

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List (IDL):

Component	CAS #	Minimum Concentration
Toluene	108-88-3	1 %
Ethylbenzene	100-41-4	0.1 %
Benzene	71-43-2	0.1 %

WHMIS Classification

Workplace Hazardous Materials Information System (WHMIS): This product has been classified in accordance with the hazard criteria of the CPR (Controlled Products Regulations) and the MSDS contains all the information required by the CPR.

WHMIS CLASS B2: Flammable liquid with a flash point lower than 37.8°C (100°F).

WHMIS CLASS D2A: Carcinogen (Ethylbenzene, Benzene), Animal embryotoxic (Xylene)

WHMIS CLASS D2B: Skin irritation

Other Regulations

Ongoing occupational hygiene, medical surveillance programs, or site emission or spill reporting may be required by Federal or Provincial regulations. Check for applicable regulations.

Section 16 - Other Information

Label Information

DANGER! FLAMMABLE. TOXIC. Product is a colorless liquid with a solvent odor. Vapor is heavier than air and may spread long distances. Distant ignition and flashback are possible. Flammable liquid and vapor can accumulate static charge to cause ignition. Liquid can float on water and may travel to distant locations and/or spread fire. This product is harmful by inhalation and if it is swallowed. This product is irritating to the eyes and skin. Ingestion of this product may result in central nervous system effects including headache, sleepiness, dizziness, slurred speech and blurred vision. Excessive inhalation of this material causes central nervous system effects of headache, dizziness, nausea, incoordination and in extreme conditions coma and possibly death. Contains components that may cause cancer.

FIRST AID:

SKIN: Remove contaminated clothing and shoes. Wash immediately with soap and water. Seek medical attention if symptoms develop or persist. Completely decontaminate clothing, shoes and other protective equipment before reuse or discard.

EYES: Remove contact lenses, if it can be done safely. Immediately flush eyes with water for at least 15 minutes, while holding eyelids open. Seek medical if symptoms develop or persist.

INHALATION: Move affected individual to non-contaminated air. Loosen tight clothing such as a collar, tie, belt or waistband to facilitate breathing. Seek immediate medical attention if the individual is not breathing, is unconscious or if any other symptoms persist. WARNING: Contact through mouth-to-mouth resuscitation may pose a secondary risk to the rescuer. Avoid mouth-to-mouth contact by using a mouth shield or guard to perform artificial respiration.

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INGESTION: DO NOT INDUCE VOMITING. Loosen tight clothing such as a collar, tie, belt or waistband. Seek immediate medical attention.

IN CASE OF A LARGE SPILL: Consider downwind evacuation for 300 meters (984 feet). Eliminate ignition sources. Keep upwind and out of low areas. Stop discharge if safe to do so. Contain liquids on land to prevent entry into sewers, drains or waterways. Spills on water will volatilize rapidly, making containment or recovery difficult. Recover any pooled liquid material with approved pumps, skimmers or vacuum equipment. Absorb with DRY earth, sand or other non-combustible material.

References

Available on request.

Special Considerations

For additional information on equipment bonding and grounding, refer to the American Petroleum Institute (API) Recommended Practice 2003, "Protection Against Ignitions Arising out of Static, Lightning, and Stray Currents" or National Fire Protection Association (NFPA) 77, "Recommended Practice on Static Electricity".

Key/Legend

ACGIH = American Conference of Governmental Industrial Hygienists; BLEVE = Boiling Liquid Expanding Vapor Explosion; BOD = Biochemical Oxygen Demand; CAS = Chemical Abstracts Service; CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act; CPR = Controlled Products Regulations; DOT = Department of Transportation; DSL = Domestic Substances List; EINECS = European Inventory of Existing Commercial Substances; EPA = Environmental Protection Agency; EU = European Union; FDA = Food and Drug Administration; IARC = International Agency for Research on Cancer; IDL = Ingredient Disclosure List; Kow = Octanol/water partition coefficient; LEL = Lower Explosive Limit; NIOSH = National Institute for Occupational Safety and Health; NJTSR = New Jersey Trade Secret Registry; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; RCRA = Resource Conservation and Recovery Act; SARA = Superfund Amendments and Reauthorization Act; TDG = Transportation of Dangerous Goods; TSCA = Toxic Substances Control Act.

MSDS Prepared by: NOVA Chemicals

MSDS Information Phone Number: 1-412-490-4063

Other Information

Notice to Reader:

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This is the end of MSDS # NOVA-0008.