NOVA Chemicals®

Material Safety Data Sheet

Material Name: **AROMATIC CONCENTRATE GRADE 1 (Pygas)** **MSDS ID: NOVA-0004**

Section 1 - Product and Company Identification

Synonyms: Joffre Pygas: AC1; Pyrolysis Gasoline; High Benzene Naphthas; C5s/C5+
Chemical Name: Hydrocarbons, ethylene-manuf.-by-product distn. residues
Chemical Family: Aromatic hydrocarbons
Material Use: Feedstock for petrochemical manufacturing
Chemical Formula: Not available, complex mixture

NOVA Chemicals
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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)

Section 2 - Hazards Identification

HMIS Ratings: Health: 2* **Fire:** 4 **Physical Hazard:** 0 **Personal Protection:** chemical goggles, gloves, respirator, coveralls

*Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe * = Chronic hazard*

NFPA Ratings: Health: 2 **Fire:** 4 **Reactivity:** 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

Emergency Overview

DANGER! TOXIC! HIGHLY FLAMMABLE! CANCER HAZARD! Product is a pale yellow liquid with a pungent odour. Vapour is heavier than air and may spread long distances. Distant ignition and flashback are possible. Flammable liquid and vapour can accumulate static charge. Liquid can float on water and may travel to distant locations and/or spread fire. This product is harmful by inhalation, skin contact and if it is swallowed. This product is irritating to the eyes and skin. Ingestion or excessive inhalation of this material may result in central nervous system effects including headache, sleepiness, dizziness, nausea, loss of coordination, as well as possible blood disorders, damage to blood systems, possibly cancer (leukemia) and in extreme conditions coma and possibly death.

Potential Health Effects: Eye

Contact with liquid and vapours from 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. Prolonged contact with this product may cause allergic skin sensitization reactions.

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, nausea, loss of coordination, and in extreme conditions coma and possibly death. Ingestion may also cause kidney and liver damage and blood disorders. 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 may result in heartbeat irregularities and central nervous system effects including headache, sleepiness, dizziness, nausea, loss of coordination, and in extreme conditions coma and possibly death. Excessive inhalation of this material may also cause damage to blood systems, and over time may cause kidney and liver damage, blood disorders and possibly cancer (leukemia). Based on animal testing, a component of this product (xylene) is considered to be a developmental toxicant in Canada (birth defects). Small amounts of this product, if aspirated into the lungs, may cause mild to severe pulmonary injury.

Section 3 - Composition/Information on Ingredients

CAS #	Component	Percent by Wt.
68921-67-5	Hydrocarbons, ethylene-manuf.-by-product distn. residues	100
	The above listed CAS number and product is comprised of the following components:	
71-43-2	Benzene	30-50
77-73-6	Dicyclopentadiene	10-20
108-88-3	Toluene	3-5
108-88-3	Toluene	5-8
542-92-7	Cyclopentadiene	1-5
542-92-7	Cyclopentadiene	5-8
Not Available	Mixed C5 raffinates *	2-5
Not Available	Mixed C5 raffinates *	5-7
100-42-5	Styrene	1-5
100-42-5	Styrene	5-6
504-60-9	1,3-Pentadiene	2-5
78-79-5	Isoprene	0.1-1
78-79-5	Isoprene	1-4
106-99-0	1,3-Butadiene	0.1-1
106-99-0	1,3-Butadiene	1-2
100-41-4	Ethylbenzene	0.5-1
1330-20-7	Xylenes	0.1-1

Additional Information

Product is considered to be a complex mixture containing C5-C10 compounds, which are primarily aromatic, but include some olefins and paraffins. Product may contain up to 10 ppm of hydrogen sulphide (CAS # 7783-06-4).
* C5 raffinates include mixed pentenes, pentanes, cyclopentenes and cyclopentanes.
The actual components and weight % concentrations vary based on operating conditions.

This product is hazardous under 29 CFR 1910.1200 (Hazard Communication).
This material is a controlled product under Canadian WHMIS regulations.
This material is regulated as hazardous material / dangerous goods for transportation.

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 attention 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 auto-ignition information.

General Fire Hazards

Fire and explosion hazards are serious when this product is exposed to heat or flame. Vapours are heavier than air and may travel along the ground to some distant source of ignition and flash back. Material will float and can be reignited on surface of water. Consider need for immediate emergency isolation and evacuation for at least 300 metres (984 feet). If tank is involved in a fire, ISOLATE for 800 metres (1/2 mile) in all directions.

Explosion Hazards

Vapours may form an explosive mixture with air. Keep containers away from source of heat or fire. Containers may explode when involved in a fire. Evacuate personnel to a distance of at least 0.8 to 1.6 kilometres (1/2 to 1 mile) if a fire or rail car, tank car, or major vessel rupture is possible. This product may be a static accumulator which can form an ignitable vapour-air mixture in a storage tank.

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 spray or fog. Use water to cool fire-exposed containers and to protect personnel. Water spray may be an ineffective extinguishing medium. Monitor water run-off for flammability, and prevent from entering waterways, drains, ditches and sewers or other confined or underground spaces.

Fire Fighting Equipment/Instructions

Reference 2008 Emergency Response Guidebook, Guide No. 128 for additional details and instructions. 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 discolouration 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, ditches, 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 buildup of flammable concentrations in air.

Small Spills

Eliminate ignition sources. Spill or leak area should be isolated immediately for 25 to 50 metres (82 to 164 feet) in all directions. Keep upwind and out of low areas. Stop discharge if safe to do so. Contain discharge by booming on water or diking on ground. Spills on water will volatilize rapidly, making containment or recovery difficult. Remove liquid material with non-sparking approved pumps, skimmers or vacuum equipment. Absorb/adsorb residual materials and clean up with non-sparking tools. Prevent entry into sewers, drains, ditches, underground or confined spaces, water intakes and waterways. Shovel material with non-sparking tools into appropriate container for disposal.

Large Spills

Consider downwind evacuation for 300 metres (984 feet). Eliminate ignition sources. Keep upwind and out of low areas. Stop discharge if safe to do so. Contain liquids by booming on water or by diking 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, non-sparking pumps, skimmers or vacuum equipment. An inert foam cover material may assist in short term vapour suppression. Absorb with DRY earth, sand or other non-combustible material and clean up with non-sparking tools. Soil remediation may be required.

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 cleanup. 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. 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. Bonding and grounding may be insufficient to eliminate the hazard from static-accumulating flammable liquids. 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". Take special precautions when cold cutting or breaking into lines, or when cleaning and disposing of empty containers. Do not breathe gas, fumes, vapour 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. 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, 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. portable fire extinguishers (dry chemical, foam or carbon dioxide)) and flammable gas detectors. Keep absorbents for leaks and spills readily available. Inspect vents during winter conditions for vapour ice buildup. 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 in close proximity 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.

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 TWA; 2.5 ppm STEL Skin - Danger of cutaneous absorption

Dicyclopentadiene (77-73-6)

ACGIH:	5 ppm TWA; 27 mg/m3 TWA
OSHA (Vacated)*:	5 ppm TWA; 30 mg/m3 TWA
NIOSH:	5 ppm TWA; 30 mg/m3 TWA
Alberta:	5 ppm TWA; 27 mg/m3 TWA
Ontario:	5 ppm TWA

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 TWA

Cyclopentadiene (542-92-7)

ACGIH:	75 ppm TWA; 203 mg/m3 TWA
OSHA (Vacated)*:	75 ppm TWA; 200 mg/m3 TWA
OSHA (Final):	75 ppm TWA; 200 mg/m3 TWA
NIOSH:	75 ppm TWA; 200 mg/m3 TWA 750 ppm IDLH
Alberta:	75 ppm TWA; 203 mg/m3 TWA
Ontario:	75 ppm TWA

Styrene (100-42-5)

ACGIH:	20 ppm TWA; 85 mg/m3 TWA; 40 ppm STEL; 170 mg/m3 STEL; BEI
OSHA (Vacated)*:	50 ppm TWA; 215 mg/m3 TWA; 100 ppm STEL; 425 mg/m3 STEL
OSHA (Final):	100 ppm TWA; 200 ppm Ceiling
NIOSH:	50 ppm TWA; 215 mg/m3 TWA; 100 ppm STEL; 425 mg/m3 STEL 700 ppm IDLH
Alberta:	20 ppm TWA; 85 mg/m3 TWA; 40 ppm STEL; 170 mg/m3 STEL
Ontario:	35 ppm TWA; 100 ppm STEL

Isoprene (78-79-5)

While no peer-reviewed workplace exposure limit has been established for isoprene, based on the current literature, adoption of an internal Isoprene 8-hr TWA exposure limit of 10 ppm or 28 mg/m3 is recommended.

1,3-Butadiene (106-99-0)

ACGIH:	2 ppm TWA; 4.4 mg/m3 TWA
OSHA (Vacated)*:	0.5 ppm Action Level; 1 ppm TWA; 5 ppm STEL (15 min. See 29 CFR 1910.1051)
OSHA (Final):	1 ppm TWA; 5 ppm STEL (see 29 CFR 1910.1051)
NIOSH:	2000 ppm IDLH (10% LEL)
Alberta:	2 ppm TWA; 4.4 mg/m3 TWA
Ontario:	2 ppm TWA

Ethylbenzene (100-41-4)

ACGIH:	20 ppm TWA; 87 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 (10% LEL)
Alberta:	100 ppm TWA; 434 mg/m3 TWA; 125 ppm STEL; 543 mg/m3 STEL
Ontario:	100 ppm TWA; 125 ppm STEL

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
NIOSH:	100 ppm TWA; 435 mg/m3 TWA; 150 ppm STEL; 655 mg/m3 STEL 900 ppm IDLH (related to m-xylene or o-xylene or p-xylene)
Alberta:	100 ppm TWA; 434 mg/m3 TWA; 150 ppm STEL; 651 mg/m3 STEL
Ontario:	100 ppm TWA; 150 ppm STEL (as o-, m and p isomers)

Hydrogen sulphide (7783-06-4)

ACGIH:	1 ppm TWA; 1.4 mg/m3 TWA; 5 ppm STEL; 7 mg/m3 STEL
OSHA (Vacated)*:	10 ppm TWA; 14 mg/m3 TWA; 15 ppm STEL; 21 mg/m3 STEL
OSHA (Final):	20 ppm Ceiling
NIOSH:	10 ppm Ceiling (10 min); 15 mg/m3 Ceiling (10 min) 100 ppm IDLH
Alberta:	10 ppm TWA; 14 mg/m3 TWA; 15 ppm Ceiling; 21 mg/m3 Ceiling
Ontario:	10 ppm TWA; 15 ppm STEL

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 vapours.

Personal Protective Equipment: Skin/Hands/Feet

Use chemically resistant 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. If splashing or contact with liquid material is possible, consider the need for an impervious overcoat. Fire resistant (i.e., Nomex) or natural fibre clothing (i.e., cotton or wool) is recommended. Synthetic clothing can generate static electricity and is not recommended where a flammable vapour release may occur. Static Dissipative (SD) rated footwear is recommended.

Personal Protective Equipment: Respiratory

If engineering controls and ventilation are not sufficient to prevent buildup of aerosols or vapours, appropriate NIOSH 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.

Section 9 - Physical & Chemical Properties

Physical State and Appearance:	Liquid	**Colour:**	Pale yellow
Odour:	Pungent	**Odour Threshold:**	Detectable at 0.011 ppm (dicyclopentadiene) 0.001-0.013 ppm H2S (detection); loss of ability to smell H2S begins at 50 ppm; sense of smell is deadened above 100 ppm H2S
pH:	Not applicable	**Vapour Pressure:**	0.3 atm at 20°C (68°F) 0.92 atm at 54°C (129°F)
Vapour Density at 0°C (Air=1):	2.8 (benzene), all components > 1	**Boiling Point:**	Range: 14°C to 205°C (57.2°F to 401°F)
Freezing Point:	Range: -38°C to -25°C (-36.4°F to -13°F)	**Solubility (H2O):**	slightly soluble (0.18 g/100ml) (benzene)
Specific Gravity (Water=1):	Range: 0.83 to 0.86 at 15°C (60°F)	**Evaporation Rate (n-Butyl Acetate=1):**	Not available
Percent Volatile:	Estimated > 95%	**Octanol/H2O Coeff.:**	Not available
Auto Ignition:	Range: 400°C to 500°C (752°F to 932°F)	**Flash Point:**	Below -30°C (below -22°F)
Flash Point Method:	Estimated; below test limit	**Upper Flammable Limit (UFL):**	7.8% (v/v) (benzene)
Lower Flammable Limit (LFL):	1.2 % (v/v) (benzene)	**Flammability Classification:**	Highly Flammable

Section 10 - Stability & Reactivity Information

Chemical Stability

This product is a stable material.

Chemical Stability: Conditions to Avoid

Keep away from heat, sparks, or open flame.

Incompatibility

Reactive with oxidizing agents, acids and halogens. May attack and degrade some types of plastics, rubbers and coatings. Vapours may form explosive mixture with air.

Possibility of Hazardous Reactions or Hazardous Polymerization

Hazardous polymerization not likely to occur.

Corrosivity

Hydrogen sulphide and other sulphur compounds may be corrosive.

Hazardous Decomposition

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

Special Remarks

Some minor components of product may react at elevated temperatures and pressures, causing hydrocarbon deposits.

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. Pygas, hydrocarbons, ethylene-manufacture-by-product distillation residues has been tested under the HPV test plan for ACC HPV Group 5 mixtures (High Benzene Naphthas). Mixture is irritating to eyes, skins and respiratory system. Liquid contact can cause dermatitis and possible chemical blistering. Considered to be acutely toxic by inhalation, skin absorption and ingestion. Major components are toxic to the central nervous system and may cause dizziness, headache, loss of coordination, convulsions and unconsciousness. Mixture is an aspiration hazard resulting in CNS depression, possible chemical pneumonitis and death due to respiratory failure. The following additional information has been found for its components:

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.

Dicyclopentadiene (DCPD) - Contact can irritate the eyes and skin. Inhalation can irritate the nose, throat, and lungs, causing coughing, wheezing, and/or shortness of breath. DCPD is toxic to the central nervous system (CNS) and exposure may cause CNS depression, causing headache, dizziness, nausea, vomiting, loss of coordination and unconsciousness.

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.

1,3-Cyclopentadiene - Can irritate the eyes and mucous membranes. Can irritate the skin causing a rash or burning feeling on contact. Inhalation may cause central nervous system (CNS) depression, causing headache, dizziness, nausea, loss of coordination, unconsciousness, and in extreme conditions coma and possibly death. CNS depression with terminal seizures has been noted in animal tests; however, seizures have not been reported in exposed humans.

Styrene - Contact can irritate the eyes and skin. Vapours irritate the eyes and respiratory system and at high concentrations may result in central nervous system (CNS) depression, causing headache, dizziness, nausea, loss of coordination, and unconsciousness.

Isoprene/1,3-pentadiene - Contact can irritate the skin and eyes. Inhalation can irritate the mucous membranes causing coughing and wheezing. Inhalation of high concentrations may result in central nervous system (CNS) depression, causing headache, nausea, vomiting, dizziness, loss of coordination and unconsciousness.

1,3-Butadiene - May cause irritation of the eyes, nose and throat. Contact can irritate the skin and may cause frostbite. Inhalation irritates the respiratory tract causing coughing and wheezing. Inhalation may cause drowsiness, lightheadedness, unconsciousness, and at very high exposures death.

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. Ingestion and subsequent aspiration into the lungs may cause chemical pneumonitis.

Xylenes, mixed - Vapours 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.

Hydrogen sulphide - Irritating to eyes, nose and throat at 10 to 50 ppm.

B: Acute Toxicity - LD50/LC50

Benzene (71-43-2)
Inhalation LC50 Rat: 13,050-14,380 ppm/4H; Oral LD50 Rat: 1800 mg/kg

Dicyclopentadiene (77-73-6)
Inhalation LC50 Rat: 500 ppm/4H; Oral LD50 Rat: 346.5 mg/kg; Dermal LD50 Rat: >2000 mg/kg;
Dermal LD50 Rabbit: 4380 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; Dermal LD50 Rat 12,124 mg/kg

Cyclopentadiene (542-92-7)
Oral LD50 Rat 113 mg/kg; Dermal LD50 Rabbit 430 mg/kg

Styrene (100-42-5)
Inhalation LC50 Rat: 24 mg/m3/4H; Inhalation LC50 Mouse: 2160 mg/m3/2H; Oral LD50 Rat: 1000 mg/kg

1,3-Pentadiene (504-60-9)
Inhalation LC50 Rat >17.8 mg/L/ 4H; Inhalation LC50 Rat 97,200 mg/m3/4H
Isoprene (78-79-5)
Inhalation LC50 Rat: 180 mg/m3/4H; Oral LD50 Rat: 2043 mg/kg; Dermal LD50 Rat >1 mL/kg
1,3-Butadiene (106-99-0)
Inhalation LC50 Rat: 485 mg/L/4H; Oral LD50 Rat: 5480 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
Xylenes (1330-20-7)
Inhalation LC50 Rat: 5000 ppm/4Hh; Inhalation LC50 Rat: 47,635 mg/L/4H; Oral LD50 Rat: 4300 mg/kg;
Dermal LD50 Rabbit: >1700 mg/kg
Hydrogen sulphide (7783-06-4)
Inhalation LC50 Mouse: 634-673 ppm/1H; 335 ppm/4H; Inhalation LC50 Rat: 587 ppm/2H; 415-501 ppm/4H; 335ppm/6H

C: Chronic Toxicity - General Product Information

Similar hydrocarbon mixtures were tested under the EPA's High Production Volume (HPV) Chemical Challenge program. Pygas, hydrocarbons, ethylene-manufacture-by-product distillation residues has been tested under the HPV test plan for ACC HPV Group 5 mixtures (High Benzene Naphthas). Mixture is considered chronically toxic by inhalation and skin contact. Major target organs are central nervous system, respiratory and cardiac systems, liver, kidney, and blood forming systems. Several major components are known or suspect human carcinogens. Some components are known to have reproductive effects and fetotoxicity. The following additional information has been found for its components:

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 haematopoietic 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.

Dicyclopentadiene (DCPD) - Prolonged and repeated exposure may damage the liver and the adrenal glands. Signs of intoxication in animals include excessive salivation, anorexia, and loss of coordination. At higher doses, effects include convulsions, gastrointestinal disturbance, and haemorrhage of the lungs and intestines. Testing indicates that DCPD is not a skin sensitizer.

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. Chronic neurotoxic effects on the central nervous system may progress to an irreversible state. Intentional misuse 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".

1,3-Cyclopentadiene - Prolonged and repeated contact may cause a skin sensitization (allergy) to develop. If an allergy develops, very low future exposure can cause itching and a skin rash. Chronic exposure may cause headache, abdominal pain, jaundice, and anemia. Cyclopentadiene has been shown to cause mild liver and kidney injury in repeat exposure animal tests.

Styrene - Chronic exposure at high concentration may result in CNS depression and may have an effect on hearing. It also may result in neurological defects known as “styrene sickness”. Prolonged skin contact may produce irritation and defatting dermatitis. Styrene has been classified by IARC as Group 2B (possibly carcinogenic to humans) based on “limited evidence” in humans, “limited evidence” in animals, and “other relevant data”. The National Toxicology Program (NTP) classified styrene as “reasonably anticipated to be a human carcinogen”. Styrene has been shown to be mutagenic in several *in vitro* assays.

Isoprene/1,3-pentadiene - Prolonged and repeated exposure can irritate the lungs and may cause bronchitis to develop with cough, phlegm, and/or shortness of breath. Repeated exposure to high concentrations may affect the blood cells. Isoprene has been classified by IARC as Group 2B (possibly carcinogenic to humans).

1,3-Butadiene - Prolonged and repeated exposure may cause irritation effects and haematological changes. Elevated incidence of lymphomas, leukemias, and other neoplastic diseases of the blood system are found in studies of Butadiene (BD) monomer production workers. The Environmental Protection Agency (EPA) and the International Agency for Research on Cancer (IARC) have classified 1,3-butadiene as a known human carcinogen. There is limited evidence that 1,3-Butadiene is a teratogen in animals and may cause damage to the testes and ovaries.

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).

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. 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.

Hydrogen sulphide - few known chronic effects in humans. Chronic inhalation in animal studies has shown nasal lesions, reduced body weight, and mild brain dysfunction. Testing for reproductive effects is inconclusive.

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.

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 to be a Human Carcinogen
IARC: Monograph 100F [in prep], Supplement 7 [1987], Monograph 29 [1982] (Group 1 (carcinogenic to humans))

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))

Styrene (100-42-5)

ACGIH: A4 - Not Classifiable as a Human Carcinogen
NTP: Reasonably Anticipated To Be A Human Carcinogen
IARC: Monograph 82 [2002], Monograph 60 [1994] (Group 2B (possibly carcinogenic to humans))

Isoprene (78-79-5)

NTP: Reasonably Anticipated To Be A Human Carcinogen
IARC: Monograph 71 [1999], Monograph 60 [1994] (Group 2B (possibly carcinogenic to humans))

1,3-Butadiene (106-99-0)

ACGIH: A2 - Suspected Human Carcinogen
OSHA: 0.5 ppm Action Level; 1 ppm TWA; 5 ppm STEL (15 min. See 29 CFR 1910.1051)
EPA: Classification: 1,3-butadiene is characterized as carcinogenic to humans by inhalation.
NTP: Known to be a Human Carcinogen
IARC: Monograph 100F [in prep]; Monograph 97 [2008], Monograph 71 [1999], Supplement 7 [1987] (Group 1 (carcinogenic to humans))

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))

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))

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. Pygas, hydrocarbons, ethylene-manufacture-by-product distillation residues has been tested under the HPV test plan for ACC HPV Group 5 mixtures (High Benzene Naphthas). Product is slightly soluble in water, and evaporates rapidly. Major components are highly volatile and will partition rapidly to air. Product is likely to have moderate toxicity in freshwater fish and invertebrates, based on toxic disruption of biological membrane function. Product has likely low absorption into soil and sediment.

B: Component Analysis - Ecotoxicity - Aquatic/Terrestrial Toxicity

Benzene (71-43-2)

Test and Species	Results and Conditions
96 Hr LC50 Pimephales promelas	10.7-14.7 mg/L [flow-through]
96 Hr LC50 Oncorhynchus mykiss	5.3 mg/L [flow-through]
96 Hr LC50 Lepomis macrochirus	22.49 mg/L [static]
96 Hr LC50 Poecilia reticulata	28.6 mg/L [static]
96 Hr LC50 Pimephales promelas	22,330-41,160 µg/L [static]
96 Hr LC50 Lepomis macrochirus	70,000-142,000 µg/L [static]
72 Hr EC50 Pseudokirchneriella subcapitata	29 mg/L
48 Hr EC50 Daphnia magna	8.76-15.6 mg/L [static]
48 Hr EC50 Daphnia magna	10 mg/L

Dicyclopentadiene (77-73-6)

Test and Species	Results and Conditions
96 Hr LC50 Lepomis macrochirus	11.5-17.6 mg/L [static]
96 Hr LC50 Lepomis macrochirus	23 mg/L
96 Hr LC50 Oncorhynchus mykiss	13-19.5 mg/L [static]
96 Hr LC50 Pimephales promelas	10-14.2 mg/L [static]
96 Hr EC50 Pseudokirchneriella subcapitata	>100 mg/L
48 Hr EC50 Daphnia magna	11 mg/L

Toluene (108-88-3)

Test and Species	Results and Conditions
96 Hr LC50 Pimephales promelas	15.22-19.05 mg/L [flow-through] (1 day old)
96 Hr LC50 Pimephales promelas	12.6 mg/L [static]
96 Hr LC50 Oncorhynchus mykiss	5.89-7.81 mg/L [flow-through]
96 Hr LC50 Oncorhynchus mykiss	14.1-17.16 mg/L [static]
96 Hr LC50 Oncorhynchus mykiss	5.8 mg/L [semi-static]
96 Hr LC50 Lepomis macrochirus	11.0-15.0 mg/L [static]
96 Hr LC50 Oryzias latipes	54 mg/L [static]
96 Hr LC50 Poecilia reticulata	28.2 mg/L [semi-static]
96 Hr LC50 Poecilia reticulata	50.87-70.34 mg/L [static]
96 Hr EC50 Pseudokirchneriella subcapitata	>433 mg/L
72 Hr EC50 Pseudokirchneriella subcapitata	12.5 mg/L [static]
48 Hr EC50 Daphnia magna	5.46-9.83 mg/L [static]
48 Hr EC50 Daphnia magna	11.5 mg/L

Styrene (100-42-5)

Test and Species	Results and Conditions
96 Hr LC50 Pimephales promelas	3.24-4.99 mg/L [flow-through]
96 Hr LC50 Lepomis macrochirus	19.03-33.53 mg/L [static]
96 Hr LC50 Pimephales promelas	6.75-14.5 mg/L [static]
96 Hr LC50 Poecilia reticulata	58.75-95.32 mg/L [static]
72 Hr EC50 Pseudokirchneriella subcapitata	1.4 mg/L
96 Hr EC50 Pseudokirchneriella subcapitata	0.72 mg/L
72 Hr EC50 Pseudokirchneriella subcapitata	0.46-4.3 mg/L [static]
96 Hr EC50 Pseudokirchneriella subcapitata	0.15-3.2 mg/L [static]
48 Hr EC50 Daphnia magna	3.3-7.4 mg/L

1,3-Pentadiene (504-60-9)

Test and Species	Results and Conditions
96 Hr LC50 Pimephales promelas	19 mg/L
96 Hr EC50 Chaetogammarus marinus	18-35 mg/L

Isoprene (78-79-5)

Test and Species	Results and Conditions
96 Hr LC50 Lepomis macrochirus	32.5-50.15 mg/L [static]
96 Hr LC50 Pimephales promelas	58.75-95.32 mg/L [static]
96 Hr LC50 Poecilia reticulata	188.77-305.14 mg/L [static]
96 Hr EC50 Scenedesmus quadricauda	>1000 mg/L
48 Hr EC50 Daphnia magna	140 mg/L

1,3-Butadiene (106-99-0)

Test and Species	Results and Conditions
96 Hr EC50 Daphnia magna	24.8 mg/L

Ethylbenzene (100-41-4)

Test and Species	Results and Conditions
72 Hr EC50 Pseudokirchneriella subcapitata	4.6 mg/L
96 Hr EC50 Pseudokirchneriella subcapitata	>438 mg/L
72 Hr EC50 Pseudokirchneriella subcapitata	2.6-11.3 mg/L [static]
96 Hr EC50 Pseudokirchneriella subcapitata	1.7-7.6 mg/L [static]
48 Hr EC50 Daphnia magna	1.8-2.4 mg/L

Xylenes (1330-20-7)

Test and Species	Results and Conditions
96 Hr LC50 Pimephales promelas	13.4 mg/L [flow-through]
96 Hr LC50 Oncorhynchus mykiss	2.661-4.093 mg/L [static]
96 Hr LC50 Oncorhynchus mykiss	13.5-17.3 mg/L
96 Hr LC50 Lepomis macrochirus	13.1-16.5 mg/L [flow-through]
96 Hr LC50 Lepomis macrochirus	19 mg/L
96 Hr LC50 Lepomis macrochirus	7.711-9.591 mg/L [static]
96 Hr LC50 Pimephales promelas	23.53-29.97 mg/L [static]
96 Hr LC50 Cyprinus carpio	780 mg/L [semi-static]
96 Hr LC50 Cyprinus carpio	>780 mg/L
96 Hr LC50 Poecilia reticulata	30.26-40.75 mg/L [static]
48 Hr EC50 water flea	3.82 mg/L
48 Hr LC50 Gammarus lacustris	0.6 mg/L

Hydrogen sulphide (7783-06-4)

Test and Species	Results and Conditions
96 Hr LC50 Lepomis macrochirus	0.0448 mg/L [flow-through]
96 Hr LC50 Pimephales promelas	0.016 mg/L [flow-through]
96 Hr EC50 Gammarus pseudolimnaeus	0.022 mg/L

Environmental Fate/Mobility

When released to soil or water, product will rapidly begin to volatilize. Components have slight water solubility. Calculation of atmospheric half-lives of constituent chemicals has identified a half-life of 0.9 to 65.8 hours as result of indirect hydrolysis by hydroxyl radical attack.

Persistence/Degradability

Atmospheric oxidation constitutes a significant route of degradation. Products are likely to biodegrade significantly.

Bioaccumulation/Accumulation

Product is not expected to persist in the environment or bioaccumulate.

Section 13 - Disposal Considerations

U.S./Canadian Waste Information

A: General Product Information

If discarded, this product meets the definition of a US RCRA ignitable waste: D001. 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 its properties or hazards. 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 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 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

Benzene (71-43-2)
RCRA: waste number U019 (Ignitable waste, Toxic waste); 0.5 mg/L regulatory level

Toluene (108-88-3)
RCRA: waste number U220

1,3-Pentadiene (504-60-9)
RCRA: waste number U186 (Ignitable waste)

Xylenes (1330-20-7)
RCRA: waste number U239 (Ignitable waste, Toxic waste)

Hydrogen sulphide (7783-06-4)
RCRA: waste number U135

Section 14 - Transportation Information

US DOT Information

Shipping Name: Flammable liquids, n.o.s. (Benzene, Dicyclopentadiene)
UN#: UN1993 **Hazard Class:** 3 **Packing Group:** I
Required Label(s): FLAMMABLE LIQUID
Additional Info.: The Reportable Quantity for xylene, isoprene is 100 lbs (45.4 kg) each. The Reportable quantity for ethylbenzene, styrene & toluene is 1000 lbs (454 kg) each. The Reportable quantity for benzene & 1,3-butadiene is 10 lbs (4.54 kg) each.
2008 Emergency Response Guidebook, Guide No. 128

Canadian TDG Information

Shipping Name: FLAMMABLE LIQUIDS, N.O.S. (Benzene, Dicyclopentadiene)
UN#: UN1993 **Hazard Class:** 3 **Packing Group:** I
Required Label(s): FLAMMABLE LIQUID
Additional Info.: 2008 Emergency Response Guidebook, Guide No. 128

International Air Transport Association (IATA) and International Civil Aviation Organization (ICAO) Information

Shipping Name: FLAMMABLE LIQUIDS, N.O.S. (Benzene, Dicyclopentadiene)
UN#: UN1993 **Hazard Class:** 3 **Packing Group:** I
Required Label(s): FLAMMABLE LIQUID

International Maritime Dangerous Goods (IMDG) Code

Shipping Name: Flammable liquid, n.o.s. (Benzene, Dicyclopentadiene)
UN#: UN1993 **Hazard Class:** 3 **Packing Group:** I
Required Label(s): FLAMMABLE LIQUID
EmS Code: F-E, S-E
Marine Pollutant: No

Section 15 - Regulatory Information

A: International Regulations

Component Analysis - International Inventory Status

Component	CAS #	US - TSCA	CANADA - DSL	EU - EINECS
Hydrocarbons, ethylene-manuf.-by-product distn. residues	68921-67-5	Yes	Yes	Yes
Benzene	71-43-2	Yes	Yes	Yes
Dicyclopentadiene	77-73-6	Yes	Yes	Yes
Toluene	108-88-3	Yes	Yes	Yes
Cyclopentadiene	542-92-7	Yes	Yes	Yes
Styrene	100-42-5	Yes	Yes	Yes
1,3-Pentadiene	504-60-9	Yes	Yes	Yes
Isoprene	78-79-5	Yes	Yes	Yes
1,3-Butadiene	106-99-0	Yes	Yes	Yes
Ethylbenzene	100-41-4	Yes	Yes	Yes
Xylenes	1330-20-7	Yes	Yes	Yes
Hydrogen sulphide	7783-06-4	Yes	Yes	Yes

B: USA Federal & State Regulations

Ongoing occupational hygiene, medical surveillance programs, 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 hazardous under 29 CFR 1910.1200 (Hazard Communication). HCS Classes:
HCS CLASS: Highly Toxic
HCS CLASS: MAY CAUSE CANCER
HCS CLASS: Flammable liquid IA having a flashpoint lower than 22.8°C (73°F) and a boiling point lower than 37.8°C (100°F).
HCS CLASS: Irritating substance.
HCS CLASS: Sensitizing 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).

Benzene (71-43-2)
SARA 313: 0.1 % de minimis concentration
CERCLA: 10 lb final RQ

Dicyclopentadiene (77-73-6)
SARA 313: 1.0 % de minimis concentration

Toluene (108-88-3)
SARA 313: 1.0 % de minimis concentration
CERCLA: 1000 lb final RQ; 454 kg final RQ

Styrene (100-42-5)
SARA 313: 0.1 % de minimis concentration
CERCLA: 1000 lb final RQ; 454 kg final RQ

1,3-Pentadiene (504-60-9)
CERCLA: 100 lb final RQ; 45.4 kg final RQ

Isoprene (78-79-5)
SARA 313: 0.1 % de minimis concentration
CERCLA: 100 lb final RQ; 45.4 kg final RQ

1,3-Butadiene (106-99-0)
SARA 313: 0.1 % de minimis concentration
CERCLA: 10 lb final RQ; 4.54 kg final RQ

Ethylbenzene (100-41-4)
SARA 313: 0.1 % 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

Hydrogen sulphide (7783-06-4)
SARA 302: 500 lb TPQ
CERCLA: 100 lb final RQ; 45.4 kg final RQ

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
Benzene	71-43-2	Yes	Yes
Dicyclopentadiene	77-73-6	Yes	Yes
Toluene	108-88-3	Yes	Yes
Cyclopentadiene	542-92-7	Yes	Yes
Styrene	100-42-5	Yes	Yes
1,3-Pentadiene	504-60-9	Yes	Yes
Isoprene	78-79-5	Yes	Yes
1,3-Butadiene	106-99-0	Yes	Yes
Ethylbenzene	100-41-4	Yes	Yes
Xylenes	1330-20-7	Yes	Yes
Hydrogen sulphide	7783-06-4	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
Benzene	71-43-2	0.1 %
Dicyclopentadiene	77-73-6	1 %
Toluene	108-88-3	1 %
Cyclopentadiene	542-92-7	1 %
Styrene	100-42-5	0.1 %
Isoprene	78-79-5	1 %
1,3-Butadiene	106-99-0	0.1 %
Ethylbenzene	100-41-4	0.1 %
Hydrogen sulphide	7783-06-4	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 D1A: Very Toxic (Dicyclopentadiene)
WHMIS CLASS D2A: Carcinogen (Benzene, Styrene, Isoprene, 1,3-Butadiene, Ethylbenzene) Animal embryotoxin (Xylene), Mutagen (Benzene, 1,3-Butadiene)
WHMIS CLASS D2B: Toxic

Other Regulations

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

Section 16 - Other Information

Label Information

DANGER! TOXIC! HIGHLY FLAMMABLE! CANCER HAZARD! Product is a pale yellow liquid with a pungent odour. Vapour is heavier than air and may spread long distances. Distant ignition and flashback are possible. Flammable liquid and vapour can accumulate static charge. Liquid can float on water and may travel to distant locations and/or spread fire. This product is harmful by inhalation, skin contact and if it is swallowed. This product is irritating to the eyes and skin. Ingestion or excessive inhalation of this material may result in central nervous system effects including headache, sleepiness, dizziness, nausea, loss of coordination, as well as possible blood disorders, damage to blood systems, possibly cancer (leukemia) and in extreme conditions coma and possibly death.
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 attention 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.
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 metres (984 feet). Eliminate ignition sources. Keep upwind and out of low areas. Stop discharge if safe to do so. Contain liquids by booming on water or by diking 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, non-sparking pumps, skimmers or vacuum equipment. An inert foam cover material may assist in short term vapour suppression. Absorb with DRY earth, sand or other non-combustible material and clean up with non-sparking tools. Soil remediation may be required.

References

Available on request.

Special Considerations

Bonding and grounding may be insufficient to eliminate the hazard from static-accumulating flammable liquids. 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; ADR = Transport of Dangerous Goods by Road; ADR/RID = European Agreement of Dangerous Goods by Road/Rail; BOD = Biochemical Oxygen Demand; CAS = Chemical Abstracts Service; CEPA = Canadian Environmental Protection Act; CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act; CFR = Code of Federal Regulations; CPR = Controlled Products Regulations; DFG = Deutsche Forschungsgemeinschaft; DOT = Department of Transportation; DSL = Domestic Substances List; EC50 = Effective Concentration 50%; EEC = European Economic Community; EINECS = European Inventory of Existing Commercial Chemical Substances; ELINCS = European List of Notified Chemical Substances; EPA = Environmental Protection Agency; EU = European Union; FDA = Food and Drug Administration; GHS = Globally Harmonized System for the Classification and Labelling of Chemicals; HCS = Hazard Communication Standard; HMIS = Hazardous Materials Identification System; IARC = International Agency for Research on Cancer; IATA = International Air Transport Association; ICAO = International Civil Aviation Organization; IDL = Ingredient Disclosure List; IDLH = Immediately Dangerous to Life or Health; IMDG = International Maritime Dangerous Goods; IMO = International Maritime Organization; ISHL = Industrial Safety and Health Law; Kow = Octanol/water partition coefficient; LC50 = Lethal Concentration 50%; LD50 = Lethal Dose 50%; LEL = Lower Explosive Limit; LFL = Lower Flammable Limit; LLV = Level Limit Ceiling Limit (Sweden dust); MAK = Maximum Concentration Value in the Workplace; MITI = Ministry of International Trade and Industry; MSDS = Material Safety Data Sheet; NAB = Threshold Values (Indonesia); NCEC = National Chemical Emergency Centre; NDSL = Non-Domestic Substances List; NFPA = National Fire Protection Association; NIOSH = National Institute for Occupational Safety and Health; NJTSR = New Jersey Trade Secret Registry; NTP = National Toxicology Program; OEL = Occupational Exposure Limit; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit; PNOC = Particulates Not Otherwise Classified; PPE = Personal Protective Equipment; PRTR = Designated Chemical Substance Law (Japan); PSD = Short Term Exposure Limit (Indonesia); RCRA = Resource Conservation and Recovery Act; REACH = Registration, Evaluation, Authorisation and Restriction of Chemical Substances; REL = Recommended Exposure Limit; RID = Transport of Dangerous Goods by Rail; SARA = Superfund Amendments and Reauthorization Act; SCBA = Self Contained Breathing Apparatus; SDS = Safety Data Sheet; SEPA = State Environmental Protection Administration; STEL = Short Term Exposure Limit; TDG = Transportation of Dangerous Goods; TLV = Threshold Limit Value; TSCA = Toxic Substances Control Act; TWA = Time Weighted Average; UEL = Upper Explosive Limit; UFL = Upper Flammable Limit; VLA-ED = Valor límite Ambiental de Exposición Diaria (Environmental Exposure Daily Limit Value); VME = valeur limite d'exposition (Occupational Exposure Limits); WHMIS = Workplace Hazardous Materials Information Systems

MSDS Prepared by: NOVA Chemicals

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

Other Information

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