NOVA Chemicals®

Material Safety Data Sheet

Material Name: PETROCARB® Fuel Oil

MSDS ID: NOVA-0015

Section 1 - Product and Company Identification

Synonyms: Corunna Pyrolysis Fuel Oil; PFO-Corunna
Chemical Name: Fuel Oil, Pyrolysis
Chemical Family: Hydrocarbons
Material Use: Petrochemicals Feedstock, fuels
Chemical Formula: Not available; complex mixture

NOVA 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)

General Comments

This product has been assigned a CAS # of 69013-21-4.

Section 2 - Hazards Identification

HMIS Ratings: Health: 2* **Fire:** 2 **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:** 2 **Reactivity:** 0

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

Emergency Overview

WARNING! TOXIC. POSSIBLE CANCER HAZARD. This product is a heavy, dark brown to black liquid with a strong distinctive odour and is insoluble in water. This product is flammable when heated to high temperatures and burns readily under fire conditions or when heated to high temperatures. This product is harmful by inhalation, if it is swallowed, or if it is absorbed through the skin on prolonged contact. This product is irritating to the eyes, nose and skin, and respiratory system. Excessive inhalation or ingestion of the heated product may result in nausea, vomiting, central nervous system effects including headache, sleepiness, dizziness, nausea, loss of coordination, kidney and liver damage and blood disorders. Aspiration of this product into the lungs can cause severe injury. Prolonged contact with this product may cause allergic skin reaction and possibly skin cancer. Prevent entry into sewers, drains, ditches and waterways.

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. Prolonged contact with this product may cause allergic skin sensitization reactions and possibly skin cancer.

Potential Health Effects: Ingestion

This product is harmful if swallowed. Ingestion of this product may result in nausea, vomiting, abdominal pain and central nervous system effects including headache, sleepiness, dizziness, nausea, and loss of coordination. Ingestion may also cause kidney and liver damage, blood disorders, and in extreme conditions coma and possibly death.

Potential Health Effects: Inhalation

This product may be harmful by inhalation. Excessive inhalation of the heated product may result in central nervous system effects including headache, sleepiness, dizziness, nausea, and loss of coordination. Prolonged and excessive inhalation of the heated material may also cause kidney and liver damage, blood disorders and in extreme conditions coma and possibly death. Small amounts of this product, if aspirated into the lungs, may cause severe pulmonary injury.

Section 3 - Composition / Information on Ingredients

CAS #	Component	Percent by Wt.
69013-21-4	Fuel oil, pyrolysis	100
	The above listed product is comprised of the following components:	
Not Available	Asphaltenes	20-30
Not Available	Polycyclic aromatic hydrocarbons	15-25
Not Available	Diaromatics	10-20
Not Available	Mixed C4-C22 alkanes and paraffins	5-10
91-20-3	Naphthalene	<0.1-1
91-20-3	Naphthalene	1-5
Not Available	Total sulphur	0.4-1
Not Available	Total sulphur	1-1.5

Additional Information

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 product is regulated as a 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 autoignition information.

General Fire Hazards

This product burns readily under fire conditions or when heated to high temperatures. Empty containers when heated may pose a fire risk. Heated vapours 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 metres (984 feet). If tank is involved in a fire, ISOLATE for 800 metres (1/2 mile) in all directions.

Explosion Hazards

Heated vapours may form explosive mixture with air. Keep containers away from source of heat or fire. Containers may explode when involved in a fire.

Hazardous Combustion Products

Upon combustion conditions, this product emits carbon monoxide, carbon dioxide, low molecular weight hydrocarbons, acidic gases, nitrogen oxides, and sulphur oxides.

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, and may actually spread flames. Prevent runoff from entering sewers, drains, ditches, underground or confined spaces and waterways.

Fire Fighting Equipment/Instructions

Reference 2008 Emergency Response Guidebook, Guide # 171 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. Keep upwind and out of low areas. Stop or reduce discharge if safe to do so. Absorb spill with inert material. Absorb/adsorb residual materials and clean up with non-sparking tools. Prevent entry into 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 or reduce discharge if safe to do so. Contain discharge by booming on water or diking on ground. A vapour suppressing foam may be used to reduce vapours. Remove pooled liquid material with approved, non-sparking pumps, skimmers or vacuum equipment. Absorb with DRY earth, sand or other non-combustible material. Land areas may require soil remediation. Prevent entry into water intakes and waterways.

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 combustible 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. Take special precautions when cold cutting or breaking into lines, or when cleaning and disposing of empty containers. Parts and equipment should be steam cleaned prior to maintenance procedures. 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. Oil-contaminated clothing must be removed and cleaned prior to reuse. After handling, always wash hands thoroughly with soap and water.

Recommended maximum temperature for storage and loading is below the flash point.

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 combustible 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. Water spray is ineffective for extinguishing fires. Prevent soil contamination. Keep absorbents for leaks and spills readily available. Equip storage tank vents with a flame arrestor. Inspect vents during winter conditions for vapour ice buildup. Storage tanks should be above ground and diked to hold entire contents.

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 the workstation location.

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.

Asphaltenes / Polycyclic aromatic hydrocarbons (CAS # Not Available)

ACGIH:	0.2 mg/m3 TWA (as benzene soluble aerosol) (related to Coal tar pitch volatiles)
OSHA (Vacated)*:	0.2 mg/m3 TWA (benzene soluble fraction) (related to Coal tar pitch volatiles)
OSHA (Final):	0.2 mg/m3 TWA (benzene soluble fraction) (related to Coal tar pitch volatiles)
NIOSH:	0.1 mg/m3 TWA (cyclohexane-extractable fraction) (related to Coal tar pitch volatiles) 80 mg/m3 IDLH (related to Coal tar pitch volatiles)
Alberta:	0.2 mg/m3 TWA (as benzene solubles) (related to Coal tar pitch volatiles (PPAH, Particulate polycyclic aromatic hydrocarbons))
Ontario:	0.2 mg/m3 TWA (as total benzene-soluble compounds) (related to Coal tar pitch volatiles)

Naphthalene (91-20-3)

ACGIH:	10 ppm TWA; 52 mg/m3 TWA; 15 ppm STEL; 79 mg/m3 STEL Skin - potential significant contribution to overall exposure by the cutaneous route
OSHA (Vacated)*:	10 ppm TWA; 50 mg/m3 TWA; 15 ppm STEL; 75 mg/m3 STEL
OSHA Final:	10 ppm TWA; 50 mg/m3 TWA
NIOSH:	10 ppm TWA; 50 mg/m3 TWA; 15 ppm STEL; 75 mg/m3 STEL 250 ppm IDLH
Alberta:	10 ppm TWA; 52 mg/m3 TWA; 15 ppm STEL; 79 mg/m3 STEL Substance may be readily absorbed through intact skin
Ontario:	10 ppm TWA; 15 ppm STEL

Total Sulphur (CAS # Not Available)

Alberta:	10 mg/m3 TWA (related to Sulphur)

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 heated vapours or mists.

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 flammable vapour releases 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, oily	**Colour:**	Dark brown to black
Odour:	Strong, tar-like, with naphthalene (mothball)	**Odour Threshold:**	Not available
pH:	Not applicable	**Vapour Pressure:**	Varies; estimate 1-5 mm Hg at 38°C (100.4°F)
Vapour Density @ 0ºC (Air=1):	>1 estimated	**Boiling Point:**	Range: 204°C to 700°C (399.2°F to 1292°F)
Freezing Point:	Varies, typically -21°C (-5.8°F)	**Solubility (H2O):**	Insoluble
Specific Gravity (Water=1):	Range: 1.06 to 1.10 at 15°C (59°F)	**Evaporation Rate (n-Butyl Acetate=1):**	Slow
Viscosity:	Range: 120 to 1700 cSt at 50°C (122°F)	**Percent Volatile:**	<5% (naphthalene)
Octanol/H2O Coeff.:	Not available	**Auto Ignition:**	Not available
Flash Point:	Range: 90°C to 115°C Varies; typically 90°C (194°F) or higher	**Flash Point Method:**	Pensky-Marten, closed cup
Upper Flammable Limit (UFL):	5.9% (v/v (naphthalene))	**Lower Flammable Limit (LFL):**	0.9 % (v/v (naphthalene))
Flammability Classification:	Combustible when heated		

Section 10 - Stability & Reactivity Information

Chemical Stability

This product is stable under normal use conditions for shock, vibration, pressure, or temperature. Material may need to be heated prior to loading and transportation due to its inherent high viscosity.

Chemical Stability: Conditions to Avoid

Fire and explosion hazards are serious when this product is exposed to heat or flame. Keep away from heat, sparks, or open flame.

Incompatibility

May react with strong acids or oxidizing agents. Heated vapours or mists may form explosive mixture with air.

Possibility of Hazardous Reactions or Hazardous Polymerization

Hazardous polymerization not likely to occur.

Corrosivity

Not corrosive to the common metals.

Hazardous Decomposition

Upon decomposition, this product emits carbon monoxide, carbon dioxide, low molecular weight hydrocarbons, acidic gases, nitrogen oxides, and sulphur oxides.

Section 11 - Toxicological Information

A: Acute Toxicity – General Product Information

Similar products were tested under the EPA's High Production Volume (HPV) Chemical Challenge Program. Pyrolysis Fuel Oil was included in the HPV test plan for ACC's Olefins Panel Test Group #10 Fuel Oils category. Product is irritating to the eyes, skin, and respiratory tract. Main route of exposure is by inhalation with little absorption through the skin. It is toxic to the central nervous system and may cause dizziness, headaches, loss of coordination, and unconsciousness. Material is toxic through ingestion, with possible effects including kidney and liver damage and blood disorders. Aspiration into the lungs may cause chemical pneumonitis. The following additional information has been found for its components:

Naphthalene - Can irritate the skin, eyes, nose, and throat. Contact may cause corneal damage. Ingestion can cause nausea, vomiting, diarrhoea, liver damage, kidney damage, and haemolytic anaemia, which may lead to methemoglobinemia.

B: Acute Toxicity - LD50/LC50

Fuel oil, pyrolysis (69013-21-4)

Oral LD50 Mouse: 22 g/kg (related to Oil mist, mineral)

Inhalation LC50 Rat: >5050 mg/m3/4H; Oral LD50 Rat: >5 g/kg; Dermal LD50 Rat: >2 g/kg (related to Polymers (petroleum), viscous)

Naphthalene (91-20-3)

Inhalation LC50 Rat: >340 mg/m3/1H; Oral LD50 Rat: 490 mg/kg; Dermal LD50 Rat: >2500 mg/kg; Dermal LD50 Rabbit: >20 g/kg

C: Chronic Toxicity – General Product Information

Similar products were tested under the EPA's High Production Volume (HPV) Chemical Challenge Program. Pyrolysis Fuel Oil was included in the HPV test plan for ACC's Olefins Panel Test Group #10 Fuel Oils category. Administration caused reduced body weight, increased liver weight, and reduced haematology values in dermal, oral and inhalation exposures. Liver enlargement and abnormalities were observed after repeated dose dermal exposure. Similar test streams have shown evidence of DNA damage and excision repair and mutagenicity. Test streams have shown genotoxic potential. Similar test streams have been shown to be carcinogenic by dermal exposure. Based on available data, the Fuel Oils Category streams are unlikely to induce teratogenetic, reproductive or developmental toxicity. The following additional information has been found for its components:

Naphthalene - Prolonged and repeated exposure can cause cataracts and allergic skin reactions. If allergy develops, very low repeated exposure can cause itching and a skin rash. Chronic exposure may result in jaundice, optical neuritis, aplastic anaemia, liver damage, kidney damage, and haemolytic anaemia, which may lead to methemoglobinemia. Naphthalene has been shown to cause nasal and lung cancer in animal tests and has been classified by IARC as Group 2B (possibly carcinogenic to humans). NTP has listed naphthalene as "Reasonably Anticipated to be a Carcinogen". Naphthalene was not mutagenic in the Ames Salmonella microsome assay.

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.

Asphaltenes / Polycyclic aromatic hydrocarbons (CAS # Not Available)

ACGIH: A1 - Confirmed Human Carcinogen (as benzene soluble aerosol) (related to Coal tar pitch volatiles)
NTP: Known Carcinogen (related to Coal tar pitches)
Reasonably Anticipated To Be A Carcinogen (related to Polycyclic aromatic hydrocarbons (PAH))
IARC: Supplement 7 [1987], Monograph 35 [1985] (related to Coal tar pitches) (Group 1 (carcinogenic to humans))

Naphthalene (91-20-3)

ACGIH: A4 - Not Classifiable as a Human Carcinogen
EPA: Classification: possible human carcinogen
NTP: Reasonably Anticipated To Be A Human Carcinogen
IARC: Monograph 82 [2002] (Group 2B (possibly carcinogenic to humans))

Section 12 - Ecological Information

Ecotoxicity

A: General Product Information

Similar products were tested under the EPA's High Production Volume (HPV) Chemical Challenge Program. Pyrolysis Fuel Oil was included in the HPV test plan for ACC's Olefins Panel Test Group #10 Fuel Oils category. Product is largely insoluble in water, has minimal volatility into air except when heated and becomes a persistent solid residue on land. Extensive ecosystem studies have been conducted on various grades of crude oils, following water and land spills and recovery. This product would likely have effects similar to the heaviest crude oils. Product is sticky, will solidify and will adhere to soil, sediment and plants, birds and water mammals.

B: Component Analysis - Ecotoxicity - Aquatic/Terrestrial Toxicity

Fuel oil, pyrolysis (69013-21-4)

96 Hr LC50 Oncorhynchus mykiss	1.0 to 4.0 mg/L
96 Hr EC50 Pseudokirchneriella subcapitata	0.9 to 1.6 mg/L
48 Hr EC50 Daphnia magna	1.2 to 2.7 mg/L

Naphthalene (91-20-3)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	6.14 mg/L [flow-through]	
96 Hr LC50 Oncorhynchus mykiss	1.60 mg/L [flow-through]	juvenile
96 Hr LC50 Pimephales promelas	6.08 mg/L [flow-through]	
96 Hr LC50 Pimephales promelas	1.99 mg/L [static]	
96 Hr EC50 Skeletonema costatum	0.4 mg/L	
48 Hr EC50 water flea	2.16 mg/L	

Environmental Fate/Mobility

Results of distribution modeling show that constituents of streams in the Fuel Oils Category will partition largely between the air, water, and soil compartments, with a negligible amount partitioning to sediment. Volatilization to the air can contribute to the loss of some constituents from aqueous and terrestrial habitats. It is not anticipated to bioconcentrate.

Persistence/Degradability

Streams in this category are subject to biodegradative processes. Two category streams, Heavy Pyrolysis Fuel Oil and Pyrolysis C10+ Fuel Oil, and one analog stream, 1,1'-biphenyl, exhibited a range 7 to 57% biodegradation under standard testing procedures after 28 days. The remaining streams that were not tested are expected to demonstrate a similar range of biodegradability.

Bioaccumulation/Accumulation

This product will accumulate on the surface of plants, waterfowls and mammals, resulting in serious injury and possible death. Contains some polycyclic aromatic compounds which are known to persist and bioaccumulate.

Section 13 - Disposal Considerations

U.S./Canadian Waste Number & Descriptions

A: General Product Information

This product may be a hazardous waste according to U.S. and Canadian regulations. The use, mixing or processing of this material 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

Naphthalene (91-20-3)

RCRA: waste number U165

Section 14 - Transportation Information

US DOT Information

Shipping Name: Environmentally hazardous substances, liquid, n.o.s. (Naphthalene)
UN #: UN3082 **Hazard Class:** 9 **Packing Group:** III
Required Label(s): Class 9
Additional Information: Note: The Reportable Quantity for naphthalene is 100 lbs (45.4 kg).
2008 Emergency Response Guidebook, Guide # 171
Note: Product will be regulated as flammable for transportation if the loading temperature exceeds the flash point of the shipment.

Canadian TDG Information

Shipping Name: Environmentally hazardous substances, liquid, n.o.s. (Naphthalene)
UN #: UN3082 **Hazard Class:** 9 **Packing Group:** III
Required Label(s): Class 9
Additional Information: Note: The Reportable Quantity for naphthalene is 100 lbs (45.4 kg).
2008 Emergency Response Guidebook, Guide # 171
Note: Product will be regulated as flammable for transportation if the loading temperature exceeds the flash point of the shipment.

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

Shipping Name: Environmentally hazardous substances, liquid, n.o.s. (Naphthalene)
UN #:UN3082 **Hazard Class:** 9 **Packing Group**: III
Required Label(s): Class 9
Note: Product will be regulated as flammable for transportation if the loading temperature exceeds the flash point of the shipment.

International Maritime Dangerous Goods (IMDG) Code

Shipping Name: Environmentally hazardous substances, liquid, n.o.s. (Naphthalene)
UN/NA #:UN3082 **Hazard Class:** 9 **Packing Group**: III
Required Label(s): Class 9
Additional Info.: EmS No.: F-A, S-F
Marine Pollutant: No
Note: Product will be regulated as flammable for transportation if the loading temperature exceeds the flash point of the shipment.

Section 15 - Regulatory Information

A: International Regulations

Component Analysis – International Inventory Status

Component	CAS #	U.S. TSCA	CANADA - DSL	EU - EINECS
Fuel oil, pyrolysis	69013-21-4	Yes	Yes	Yes
Naphthalene	91-20-3	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: Combustible liquid if flashpoint is between 37.8°C (100°F) and 93.3°C (200°F).
HCS CLASS: MAY CAUSE CANCER
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).

Polycyclic aromatic hydrocarbons (CAS # Not Available)

SARA 313: 0.1 % Supplier notification limit (except for benzo(a)phenanthrene, dibenzo(a,e)fluoranthrene, benzo(j,k)fluorene, and 3-methylcholanthrene which are subject to the 1.0% de minimis level, Chemical Category N590) (related to Polycyclic aromatic compounds (PACs))

Naphthalene (91-20-3)

SARA 313: 0.1 % de minimis concentration
CERCLA: 100 lb final RQ; 45.4 kg final RQ

US CAA Section 112 Hazardous Air Pollutants (HAPs) List

Naphthalene (CAS # 91-20-3)

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
Asphaltenes / Polycyclic aromatic hydrocarbons ([1]related to Coal tar pitch) ([2]related to Particulate polycyclic aromatic hydrocarbons)	Not available	Yes[1]	Yes[2]
Naphthalene	91-20-3	Yes	Yes
Total Sulfur ([1]related to Sulfur)	Not available	Yes[1]	Yes[1]

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.

C: Canadian Regulations - Federal and Provincial

Canadian Environmental Protection Act (CEPA): All components of this material are on the Domestic Substances List (DSL) or are exempt and are acceptable for use under the provisions of CEPA.

WHMIS Ingredient Disclosure List (IDL)

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

Component	CAS #	Minimum Concentration
Naphthalene	91-20-3	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 B3: Combustible liquid if the flashpoint is between 37.8°C (100°F) and 93.3°C (200°F).
WHMIS CLASS D1B: Toxic (Naphthalene)
WHMIS CLASS D2A: Carcinogen (Asphaltenes, Polycyclic Aromatic Hydrocarbons, Naphthalene)
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

WARNING! TOXIC. POSSIBLE CANCER HAZARD. This product is heavy, dark brown to black liquid with a strong distinctive odour and is insoluble in water. This product is flammable when heated to high temperatures and burns readily under fire conditions or when heated to high temperatures. This product is harmful by inhalation, if it is swallowed, or if it is absorbed through the skin on prolonged contact. This product is irritating to the eyes, nose and skin, and respiratory system. Excessive inhalation or ingestion of the heated product may result in nausea, vomiting, central nervous system effects including headache, sleepiness, dizziness, nausea, loss of coordination, kidney and liver damage and blood disorders. Aspiration of this product into the lungs can cause severe injury. Prolonged contact with this product may cause allergic skin reaction and possibly skin cancer. Prevent entry into sewers, drains, ditches and waterways.

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.

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.

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 or reduce discharge if safe to do so. Contain discharge by booming on water or diking on ground. A vapour suppressing foam may be used to reduce vapours. Remove pooled liquid material with approved, non-sparking pumps, skimmers or vacuum equipment. Absorb with DRY earth, sand or other non-combustible material. Land areas may require soil remediation. Prevent entry into water intakes and waterways.

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; 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

Notice to Reader:

ALTHOUGH THE INFORMATION CONTAINED IN THIS DOCUMENT IS PRESENTED IN GOOD FAITH, BASED ON AVAILABLE INFORMATION BELIEVED TO BE RELIABLE AT THE TIME OF PREPARATION OF THIS DOCUMENT, **NOVA CHEMICALS MAKES NO WARRANTIES OR REPRESENTATIONS WITH RESPECT TO THE INFORMATION OR THE PRODUCT/MATERIALS DESCRIBED HEREIN, AND EXPRESSLY DISCLAIMS ALL IMPLIED WARRANTIES AND CONDITIONS (INCLUDING ALL WARRANTIES AND CONDITIONS OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE). NO FREEDOM FROM INFRINGEMENT OF ANY PATENT OWNED BY NOVA CHEMICALS OR OTHERS IS TO BE INFERRED. THIS INFORMATION IS SUBJECT TO CHANGE WITHOUT NOTICE. PLEASE CONTACT NOVA CHEMICALS FOR THE MOST CURRENT VERSION OF THIS MSDS. NOVA CHEMICALS DOES NOT ASSUME RESPONSIBILITY FOR MSDS OBTAINED FROM THIRD PARTY SOURCES.**

UNLESS SPECIFICALLY AGREED OTHERWISE, NOVA CHEMICALS DOES NOT TAKE RESPONSIBILITY FOR USE, TRANSPORTATION, STORAGE, HANDLING OR DISPOSAL OF THE PRODUCTS DESCRIBED HEREIN.

This is the end of MSDS # NOVA-0015.