SAFETY DATA SHEET

Classified in accordance with 29 CFR 1910.1200

1. Identification

Product identifier: AROMATIC CONCENTRATE GRADE 1 (Pygas)

Other means of identification

Common name(s), synonym(s): Joffre Pygas: AC1; Pyrolysis Gasoline; High Benzene Naphthas; C5s/C5+

SDS number: NOVA-0004

Recommended use and restriction on use

Recommended use: Feedstock for petrochemical manufacturing.

Restrictions on use: All uses other than the identified.

Manufacturer/Importer/Supplier/Distributor Information

Importer

Company Name:	NOVA Chemicals, Inc.
Address:	1555 Coraopolis Heights Road Moon Township, PA, USA 15108
Telephone:	Product Information: 1-412-490-4063
SDS Information Email:	msdsemail@novachem.com

Emergency telephone number:

1-800-561-6682, 1-403-314-8767 (NOVA Chemicals) (24 hours)
1-800-424-9300 (CHEMTREC) (24 hours)

2. Hazard(s) identification

Hazard Classification

Physical Hazards	
Flammable liquids	Category 1
Health Hazards	
Acute toxicity (Oral)	Category 4
Acute toxicity (Inhalation - vapor)	Category 4
Skin Corrosion/Irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Germ Cell Mutagenicity	Category 1B
Carcinogenicity	Category 1A
Reproductive toxicity	Category 2
Specific Target Organ Toxicity - Single Exposure	Category 3
Specific Target Organ Toxicity - Repeated Exposure	Category 1
Specific Target Organ Toxicity - Repeated Exposure	Category 2
Aspiration Hazard	Category 1
Environmental Hazards	
Acute hazards to the aquatic environment	Category 1

Chronic hazards to the aquatic environment	Category 1

Label Elements

Hazard Symbol:

Signal Word: Danger

Hazard Statement:

Extremely flammable liquid and vapor.
Harmful if swallowed or if inhaled.
Causes skin irritation.
Causes serious eye irritation.
May cause genetic defects.
May cause cancer.
Suspected of damaging fertility or the unborn child.
May cause respiratory irritation.
Causes damage to organs through prolonged or repeated exposure.
(Blood)
(Auditory system)
May cause damage to organs through prolonged or repeated exposure.
(Central nervous system)
May be fatal if swallowed and enters airways.
Very toxic to aquatic life with long lasting effects.

Precautionary Statements:

Prevention:

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Keep container tightly closed. Ground and bond container and receiving equipment. Use explosion-proof electrical, ventilating and lighting equipment. Use non-sparking tools. Take action to prevent static discharges. Do not breathe vapors. Wash face, hands and any exposed skin thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Wear protective gloves/ protective clothing/ eye protection/ face protection. Avoid release to the environment.

Response:

IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. Immediately call a POISON CENTER. IF ON SKIN (or hair): Take off immediately all contaminated clothing and wash it before reuse. Rinse skin with water [or shower]. If skin irritation occurs: Get medical advice. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER if you feel unwell. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention. IF exposed or concerned: Get medical attention. In case of fire: Use dry chemical, foam, carbon dioxide (CO2), water spray or fog to extinguish. Collect spillage.

Storage:

Store in a well-ventilated place. Keep container tightly closed. Keep cool. Store locked up.

Disposal: Dispose of contents and container in accordance with local regulations.

Other hazards which do not result in GHS classification: Static accumulating flammable liquid can become electrostatically charged even in bonded and grounded equipment. Sparks may ignite liquid and vapor. May cause flash fire or explosion.

3. Composition/information on ingredients

Mixtures

Chemical Identity	Common name and synonyms	CAS number	Content in percent (%)*
Benzene	Benzol	71-43-2	37.2 - 48.1%
4,7-Methano-1H-indene, 3a,4,7,7a-tetrahydro-	Dicyclopentadiene, DCPD	77-73-6	9.66 - 15.9%
1,3-Cyclopentadiene	Cyclopentadiene	542-92-7	2.61 - 7.19%
Toluene	Methylbenzene	108-88-3	4.3 - 6.6%
Benzene, ethenyl-	Styrene	100-42-5	2.01 - 4.39%
1,3-Pentadiene	Piperylene	504-60-9	2.44 - 4.16%
1-Pentene	Pent-1-ene	109-67-1	1.06 - 2.95%
Cyclopentene	1-Cyclopentene	142-29-0	1.44 - 2.296%
1,3-Butadiene, 2-methyl-	Isoprene	78-79-5	0.76 - 1.66%
Benzene, dimethyl-	Xylene (mixed isomers)	1330-20-7	0.26 - 1.54%
1H-Indene	Indene, Benzocyclopentadiene	95-13-6	0.28 - 1%
Pentane, 2-methyl-	Isohexane	107-83-5	0.01 - 0.81%
1,3-Butadiene	Vinylethylene	106-99-0	0.3 - 0.8%
Benzene, ethyl-	Ethylbenzene, Phenylethane	100-41-4	0.28 - 0.7%
Naphthalene	Naphthalene	91-20-3	0.015 - 0.186%
Pentane, 3-methyl-	3-Methylpentane	96-14-0	0.01 - 0.16%
1-Octene	Octylene	111-66-0	0.01 - 0.1%
n-Undecane	Undecane	1120-21-4	0.01 - 0.012%

* All concentrations are percent by weight.

Additional Information: This product has been assigned a CAS # of 68921-67-5 - Hydrocarbons, ethylene-manuf.-by-product distn. residues. It is comprised of the above listed components. Hydrogen sulfide (CAS # 7783-06-4) may also be present up to 30 ppm. This product is considered hazardous by the OSHA Hazard Communication Standard, (29 CFR 1910.1200).

4. First-aid measures

Inhalation: IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER if you feel unwell.

Ingestion: IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. Immediately call a POISON CENTER.

Skin Contact: IF ON SKIN (or hair): Take off immediately all contaminated clothing and wash it before reuse. Rinse skin with water [or shower]. If skin irritation occurs: Get medical advice.

Eye contact: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention.

Most important symptoms/effects, acute and delayed

Symptoms:	Eye irritation. Skin irritation. Respiratory irritation. Vomiting, nausea, abdominal pain and central nervous system effects including headache.

Indication of immediate medical attention and special treatment needed

Treatment:	Ensure thorough eye and skin decontamination. Treat unconsciousness, nausea, hypotension, seizures and cardiac dysrhythmias 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. Urine collection (within 12 hours of exposure) for S-Phenylmercapturic Acid (SPMA) analysis can be used to assess the extent of benzene absorption.

5. Fire-fighting measures

General Fire Hazards:	Extremely flammable liquid and vapour. Vapors are heavier than air and may travel to a source of ignition and flash back. Closed containers may rupture violently when heated. Material will float and can be re-ignited on surface of water. If tank, rail car or tank truck is involved in fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions. Vapors may form explosive mixture with air. Keep containers away from source of heat or fire. This product may be a static accumulator which can form an ignitable vapor-air mixture in a storage tank.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media:	Use dry chemical, foam, carbon dioxide (CO2), water spray or fog to extinguish. Use water to cool fire-exposed containers and to protect personnel.
Unsuitable extinguishing media:	Do not use straight/direct streams as this may actually spread flames.
Specific hazards arising from the chemical:	Upon combustion, this product emits carbon monoxide, carbon dioxide, low molecular weight hydrocarbons.

Special protective equipment and precautions for fire-fighters

Special fire-fighting procedures:	Keep upwind. Keep unauthorized personnel away. Move containers from fire area if you can do so without risk. Fight fire from maximum distance or use unmanned holders or monitor nozzles. Immediately withdraw in case of fire and container venting or heat discoloration of a container. Avoid inhaling any smoke and combustion materials. Remove and isolate contaminated clothing and shoes. Cool containers with flooding quantities of water until well after the fire is out. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Reference Emergency Response Guidebook No. 128 for additional details and instructions.
Special protective equipment for fire-fighters:	Wear positive pressure self-contained breathing apparatus (SCBA).

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures:

Wear appropriate personal protective equipment. Isolate area. Keep unauthorized personnel away. Alert stand-by emergency and fire-fighting personnel. Monitor surrounding area for buildup of flammable concentrations in air.

Methods and material for containment and cleaning up:

Do not touch or walk through spilled material. In case of leakage, eliminate all ignition sources. As an immediate precautionary measure, isolate spill or leak area for at least 50 meters (164 feet) in all directions. All equipment used when handling the product must be grounded. Keep upwind. Keep out of low areas. Stop leak if safe to do so. Contain discharge by booming on water or diking on ground. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply.

Small Spills: Remove liquid material with non-sparking approved pumps, skimmers or vacuum equipment. Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal. Use non-sparking tools.

Large Spills: Consider downwind evacuation for 300 meters (1000 feet). Spills on water will volatilize rapidly, making containment or recovery difficult. A vapor-suppressing foam may be used to reduce vapors. Remove pooled liquid material with approved, non-sparking pumps, skimmers or vacuum equipment. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Soil remediation may be required.

7. Handling and storage

Precautions for safe handling:

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Keep container tightly closed. Ground and bond container and receiving equipment. Use explosion-proof electrical, ventilating and lighting equipment. Use non-sparking tools. Take action to prevent static discharges. These alone may be insufficient to remove static electricity. 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". For additional information on storing and handling flammable liquids, refer to the National Fire Protection Association (NFPA) 30, "Flammable and Combustible Liquids Code". 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 vapor. Avoid contact with skin and eyes. Keep away from incompatible materials such as oxidizing agents and acids. Wash face, hands and any exposed skin thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Wear protective gloves/ protective clothing/ eye protection/ face protection. In case of inadequate ventilation, use respiratory protection. Avoid release to the environment.

Conditions for safe storage, including any incompatibilities:

Storage area should be clearly identified, well-illuminated and clear of obstruction. Store in a well-ventilated place. Keep container tightly closed. Keep cool. Store locked up. Only allow access to authorized persons. Store and handle in properly designed pressure vessels and equipment. Store and use away from heat, sparks, open flame, or any other ignition source. Use non-sparking ventilation systems, approved explosion-proof

equipment, and intrinsically safe electrical systems. Have appropriate extinguishing capability in storage area (e.g. sprinkler system, portable fire extinguishers) and flammable gas detectors. Keep absorbents for leaks and spills readily available. Inspect vents during winter conditions for vapor ice buildup. Storage tanks should be above ground and diked to hold entire contents. Store away from incompatible materials. Store according to applicable regulations and standards for flammable materials.

8. Exposure controls/personal protection

Control Parameters

Occupational Exposure Limits

1,3-Butadiene, 2-methyl-: The American Industrial Hygiene Association (AIHA) has developed an 8-hour TWA Workplace Environmental Exposure Level (WEEL) for isoprene of 2 ppm; adoption of this WEEL is recommended.

Components	Type	Exposure Limit Values		Source
Benzene	REL	0.1 ppm		US. NIOSH: Pocket Guide to Chemical Hazards, as amended
	STEL	1 ppm		US. NIOSH: Pocket Guide to Chemical Hazards, as amended
	IDLH	500 ppm		US. NIOSH. Immediately Dangerous to Life or Health (IDLH) Values, as amended
	TWA	1 ppm		US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053), as amended
	STEL	5 ppm		US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053), as amended
	OSHA_ACT	0.5 ppm		US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053), as amended
	TWA	1 ppm		US. OSHA Table Z-1-A (29 CFR 1910.1000), as amended
	STEL	5 ppm		US. OSHA Table Z-1-A (29 CFR 1910.1000), as amended
	Ceiling	25 ppm		US. OSHA Table Z-2 (29 CFR 1910.1000), as amended
	TWA	10 ppm		US. OSHA Table Z-2 (29 CFR 1910.1000), as amended
	MAX. CONC	50 ppm		US. OSHA Table Z-2 (29 CFR 1910.1000), as amended
	TWA	0.02 ppm		US. ACGIH Threshold Limit Values, as amended
4,7-Methano-1H-indene, 3a,4,7,7a-tetrahydro-	REL	5 ppm	30 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended
	TWA	5 ppm	30 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000), as amended
	TWA	0.5 ppm		US. ACGIH Threshold Limit Values, as amended
	STEL	1 ppm		US. ACGIH Threshold Limit Values, as amended
1,3-Cyclopentadiene	REL	75 ppm	200 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended
	IDLH	750 ppm		US. NIOSH. Immediately Dangerous to Life or Health (IDLH) Values, as amended
	PEL	75 ppm	200 mg/m3	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000), as amended
	TWA	75 ppm	200 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000), as amended
	STEL	1 ppm		US. ACGIH Threshold Limit Values, as amended
	TWA	0.5 ppm		US. ACGIH Threshold Limit Values, as amended
Toluene	TWA	20 ppm		US. ACGIH Threshold Limit Values, as

				amended
	STEL	150 ppm	560 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended
	REL	100 ppm	375 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended
	IDLH	500 ppm		US. NIOSH. Immediately Dangerous to Life or Health (IDLH) Values, as amended
	STEL	150 ppm	560 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000), as amended
	TWA	100 ppm	375 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000), as amended
	TWA	200 ppm		US. OSHA Table Z-2 (29 CFR 1910.1000), as amended
	MAX. CONC	500 ppm		US. OSHA Table Z-2 (29 CFR 1910.1000), as amended
	Ceiling	300 ppm		US. OSHA Table Z-2 (29 CFR 1910.1000), as amended
Benzene, ethenyl-	REL	50 ppm	215 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended
	STEL	100 ppm	425 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended
	TWA	50 ppm	215 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000), as amended
	STEL	100 ppm	425 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000), as amended
	TWA	100 ppm		US. OSHA Table Z-2 (29 CFR 1910.1000), as amended
	Ceiling	200 ppm		US. OSHA Table Z-2 (29 CFR 1910.1000), as amended
	MAX. CONC	600 ppm		US. OSHA Table Z-2 (29 CFR 1910.1000), as amended
	IDLH	700 ppm		US. NIOSH. Immediately Dangerous to Life or Health (IDLH) Values, as amended
	STEL	20 ppm		US. ACGIH Threshold Limit Values, as amended
	TWA	10 ppm		US. ACGIH Threshold Limit Values, as amended
Benzene, dimethyl-	STEL	150 ppm	655 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended
	REL	100 ppm	435 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended
	PEL	100 ppm	435 mg/m3	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000), as amended
	TWA	100 ppm	435 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000), as amended
	STEL	150 ppm	655 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000), as amended
	TWA	20 ppm		US. ACGIH Threshold Limit Values, as amended
1H-Indene	REL	10 ppm	45 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended
	TWA	5 ppm		US. ACGIH Threshold Limit Values, as amended
	TWA	10 ppm	45 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000), as amended
Pentane, 2-methyl-	Ceil_Time	510 ppm	1,800 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended
	REL	100 ppm	350 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended
	STEL	1,000 ppm	3,600 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000), as amended
	TWA	500 ppm	1,800 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000), as amended
	TWA	200 ppm		US. ACGIH Threshold Limit Values, as amended

1,3-Butadiene	TWA	2 ppm		US. ACGIH Threshold Limit Values, as amended
	IDLH	2,000 ppm		US. NIOSH. Immediately Dangerous to Life or Health (IDLH) Values, as amended
	TWA	1 ppm		US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053), as amended
	OSHA_ACT	0.5 ppm		US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053), as amended
	STEL	5 ppm		US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053), as amended
	TWA	1,000 ppm	2,200 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000), as amended
Benzene, ethyl-	TWA	20 ppm		US. ACGIH Threshold Limit Values, as amended
	REL	100 ppm	435 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended
	STEL	125 ppm	545 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended
	IDLH	800 ppm		US. NIOSH. Immediately Dangerous to Life or Health (IDLH) Values, as amended
	PEL	100 ppm	435 mg/m3	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000), as amended
	TWA	100 ppm	435 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000), as amended
	STEL	125 ppm	545 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000), as amended
Naphthalene	TWA	10 ppm		US. ACGIH Threshold Limit Values, as amended
	REL	10 ppm	50 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended
	STEL	15 ppm	75 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended
	IDLH	250 ppm		US. NIOSH. Immediately Dangerous to Life or Health (IDLH) Values, as amended
	PEL	10 ppm	50 mg/m3	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000), as amended
	TWA	10 ppm	50 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000), as amended
	STEL	15 ppm	75 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000), as amended
Pentane, 3-methyl-	Ceil_Time	510 ppm	1,800 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended
	REL	100 ppm	350 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended
	STEL	1,000 ppm	3,600 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000), as amended
	TWA	500 ppm	1,800 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000), as amended
	TWA	200 ppm		US. ACGIH Threshold Limit Values, as amended

Please refer to the latest edition of the appropriate source text and consult an industrial hygienist or similar professional, or local agencies, for further information.

Biological Limit Values

Chemical Identity	Exposure Limit Values	Source
Benzene (S-Phenylmercapturic acid: Sampling time: End of shift.)	25 µg/g (Creatinine in urine)	ACGIH BEI
Benzene (t,t-Muconic acid: Sampling time: End of shift.)	500 µg/g (Creatinine in urine)	ACGIH BEI
Toluene (toluene: Sampling time: Prior to last shift of work week.)	0.02 mg/l (Blood)	ACGIH BEI

Toluene (o-Cresol, with hydrolysis: Sampling time: End of shift.)	0.3 mg/g (Creatinine in urine)	ACGIH BEI
Toluene (toluene: Sampling time: End of shift.)	0.03 mg/l (Urine)	ACGIH BEI
Benzene, ethenyl- (styrene: Sampling time: End of shift.)	20 µg/l (Urine)	ACGIH BEI
Benzene, ethenyl- (Mandelic acid plus phenylglyoxylic acid: Sampling time: End of shift.)	150 mg/g (Creatinine in urine)	ACGIH BEI
Benzene, ethyl- (Sum of mandelic acid and phenylglyoxylic acid: Sampling time: End of shift.)	150 mg/g (Creatinine in urine)	ACGIH BEI
Benzene, dimethyl- (Methylhippuric acids: Sampling time: End of shift.)	0.3 g/g (Creatinine in urine)	ACGIH BEI
1,3-Butadiene (1,2-Dihydroxy-4-(N-acetylcysteinyl)-butane: Sampling time: End of shift.)	2.5 mg/l (Urine)	ACGIH BEI
1,3-Butadiene (Mixture of N-1- and N-2-(hydroxybutenyl)valine hemoglobin (Hb) adducts: Sampling time: Not critical.)	2.5 pmol/g (Blood)	ACGIH BEI

Exposure guidelines

Chemical Identity	Notations	Source
Benzene	Danger of cutaneous absorption	US. ACGIH Threshold Limit Values, as amended
Naphthalene	Danger of cutaneous absorption	US. ACGIH Threshold Limit Values, as amended

Appropriate 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.

Individual protection measures, such as personal protective equipment (PPE)

General information:

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.

Eye/face protection:

Safety glasses. Chemical goggles are recommended if splashing is possible or to prevent eye irritation from vapors.

Skin Protection

Hand Protection:

Chemical resistant gloves.

Skin and Body Protection:

Wear appropriate clothing to prevent any possibility of skin contact. Wear work clothes with 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 fiber clothing (i.e., cotton or wool) is recommended. Synthetic clothing can generate static electricity and is not recommended where a flammable vapor release may occur. Wear

chemical-resistant safety footwear with good traction to prevent slipping. Static Dissipative (SD) rated footwear is also recommended.

Respiratory Protection: Appropriate NIOSH approved air-purifying respirator or self-contained breathing apparatus should be used. Supplied air breathing apparatus must be used when oxygen concentrations are low or if airborne concentrations exceed the limits of the air-purifying respirators or IDLH levels.

Hygiene measures: 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.

9. Physical and chemical properties

Appearance	
Physical state:	liquid
Form:	liquid
Color:	Pale yellow
Odor:	Pungent
Odor Threshold:	0.011 ppm (DCPD) 0.0045 ppm (H2S)
Melting point/freezing point:	-38 - -25 °C (-36 - -13 °F)
Initial boiling point and boiling range:	20 - 282 °C (68 - 540 °F) (by simulated distillation)
Flammability:	Not applicable
Upper/lower limit on flammability or explosive limits	
Flammability Limit - Upper (%):	7.8 %(V) (Benzene)
Flammability Limit - Lower (%):	1.2 %(V) (Benzene)
Flash Point:	< -30 °C (-22 °F) (estimated)
Auto-ignition temperature:	400 - 500 °C (752 - 932 °F)
Decomposition temperature:	No data available.
pH:	Not applicable
Kinematic viscosity:	0.47 - 0.66 mm2/s (40 °C (104 °F))
Solubility(ies)	
Solubility in water:	0.0018 g/ml Slightly Soluble (Benzene)
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	3.3 - 5.4 (25 °C (77 °F), Measured)
Vapor pressure:	41 kPa (20 °C (68 °F)) 0.95 atm (54 °C (129 °F)) 40 kPa (37.8 °C (100.0 °F)) (Reid Vapor Pressure)
Evaporation rate:	No data available.
Density:	840 - 870 kg/m3
Relative density:	0.84 - 0.86 (15 °C (59 °F)) (Water=1)
Vapor density:	2.8 (Air=1) (Benzene)
Particle characteristics	
Particle Size:	Not applicable
Other information	
Explosive properties:	No data available.

10. Stability and reactivity

Reactivity: Reactive with oxidizing agents, acids and halogens. May attack and degrade some types of plastics, rubbers and coatings. Some minor

components of product may react at elevated temperatures and pressures, causing hydrocarbon deposits. Hydrogen sulfide and other sulfur compounds may be corrosive.

Chemical Stability: Material is stable under normal conditions.

Possibility of hazardous reactions: No data available.

Conditions to avoid: Exposure to open flame or excessive heat can cause fire or explosion. Keep away from heat, sparks and open flame.

Incompatible Materials: Oxidizing agents, acids and halogens.

Hazardous Decomposition Products: Upon decomposition, this product emits carbon monoxide, carbon dioxide, low molecular weight hydrocarbons.

11. Toxicological information

Information on likely routes of exposure

Inhalation: Harmful if inhaled. Excessive inhalation of this product may result in heartbeat irregularities and central nervous system effects including headache. Excessive inhalation of this material may also cause damage to blood systems and possibly cancer (leukemia). Minute amounts aspirated into the lungs during ingestion or vomiting may cause severe pulmonary injury. Prolonged exposure may cause hearing impairment.

Ingestion: Harmful if swallowed. Minute amounts aspirated into the lungs during ingestion or vomiting may cause severe pulmonary injury. Ingestion of this product may result in vomiting, nausea, abdominal pain and central nervous system effects including headache, sleepiness, dizziness, nausea, loss of coordination, and in extreme conditions coma and possibly death. Ingestion may also cause blood disorders.

Skin Contact: Causes skin irritation.

Eye contact: Causes serious eye irritation.

Symptoms related to the physical, chemical and toxicological characteristics

Inhalation: Respiratory irritation. Heartbeat irregularities and central nervous system effects including headache.

Ingestion: Vomiting, nausea, abdominal pain and central nervous system effects including headache.

Skin Contact: Skin irritation.

Eye contact: Eye irritation.

Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

Oral
Product: ATEmix: 712.73 mg/kg

Dermal
Product: Not classified for acute toxicity based on available data.

Inhalation
Product: ATEmix: 15.78 mg/l

Repeated dose toxicity
Product: No data available.

Components:
Benzene — LOAEL (Rat, Oral): 25 mg/kg (Target Organ(s): Blood)
LOAEL (Rat, Inhalation - vapor): 0.958 mg/l (Target Organ(s): Blood)
LOAEL (Human, Inhalation - vapor): 0.0018 mg/l (Target Organ(s): Blood)

Skin Corrosion/Irritation
Product: Causes skin irritation.

Serious Eye Damage/Eye Irritation
Product: Causes serious eye irritation.

Respiratory or Skin Sensitization
Product: No data available.

Components:
4,7-Methano-1H-indene, 3a,4,7,7a-tetrahydro- — Skin sensitization, Draize (Guinea Pig): Not a skin sensitizer.

Carcinogenicity
Product: May cause cancer.

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:

Benzene	Overall evaluation: 1. Carcinogenic to humans.
Benzene, ethenyl-	Overall evaluation: 2A. Probably carcinogenic to humans.
1,3-Butadiene, 2-methyl-	Overall evaluation: 2B. Possibly carcinogenic to humans.
1,3-Butadiene	Overall evaluation: 1. Carcinogenic to humans.
Benzene, ethyl-	Overall evaluation: 2B. Possibly carcinogenic to humans.
Naphthalene	Overall evaluation: 2B. Possibly carcinogenic to humans.

ACGIH Carcinogen List:

Benzene	Group A1: Confirmed human carcinogen.
Benzene, ethenyl-	Group A3: Confirmed animal carcinogen with unknown relevance to humans.
Pentane, 2-methyl-	Group A3: Confirmed animal carcinogen with unknown relevance to humans.
1,3-Butadiene	Group A2: Suspected human carcinogen.
Benzene, ethyl-	Group A3: Confirmed animal carcinogen with unknown relevance to humans.
Naphthalene	Group A3: Confirmed animal carcinogen with unknown relevance to humans.
Pentane, 3-methyl-	Group A3: Confirmed animal carcinogen with unknown relevance to humans.

US. National Toxicology Program (NTP) Report on Carcinogens:

Benzene	Known To Be Human Carcinogen.
Benzene, ethenyl-	Reasonably Anticipated to be a Human Carcinogen.
1,3-Butadiene, 2-methyl-	Reasonably Anticipated to be a Human Carcinogen.
1,3-Butadiene	Known To Be Human Carcinogen.
Naphthalene	Reasonably Anticipated to be a Human Carcinogen.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053), as amended:

Benzene	Cancer
1,3-Butadiene	Cancer

Germ Cell Mutagenicity

In vitro
Product: May cause genetic defects.

In vivo
Product: May cause genetic defects.

Reproductive toxicity
Product: Suspected of damaging fertility or the unborn child.

Specific Target Organ Toxicity - Single Exposure
Product: May cause respiratory irritation.

Specific Target Organ Toxicity - Repeated Exposure
Product: Blood, Auditory system - Causes damage to organs through prolonged or repeated exposure.

Central nervous system, hearing organs - May cause damage to organs through prolonged or repeated exposure.

Aspiration Hazard
Product: May be fatal if swallowed and enters airways.

Other effects: No data available.

12. Ecological information

Ecotoxicity:

Acute hazards to the aquatic environment:

Fish
Product: LC 50 (Oncorhynchus mykiss, 96 h): 1.0 mg/l semi-static
Very toxic to aquatic life.

Aquatic Invertebrates
Product: LC 50 (Daphnia magna, 48 h): 1.2 mg/l Static

Toxicity to Aquatic Plants
Product: EC 50 (Algae (Pseudokirchneriella subcapitata), 96 h): 1.8 mg/l

Chronic hazards to the aquatic environment:

Fish
Product: Very toxic to aquatic life with long lasting effects.

Aquatic Invertebrates
Product: Very toxic to aquatic life with long lasting effects.

Toxicity to Aquatic Plants
Product: Very toxic to aquatic life with long lasting effects.

Persistence and Degradability

Biodegradation
Product: 7.3 - 29 % (28 d)
The product is not readily biodegradable.

BOD/COD Ratio
Product: No data available.

Bioaccumulative potential
Bioconcentration Factor (BCF)
Product: No data available.

Partition Coefficient n-octanol / water (log Kow)
Product: 3.3 - 5.4 (25 °C (77 °F), Measured)

Mobility in soil: 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.

Other adverse effects: No data available.

13. Disposal considerations

Disposal instructions: Dispose of contents and container in accordance with local regulations. Waste generator is advised to carefully consider hazardous properties and control measures needed for other materials that may be found in the waste.

Contaminated Packaging: Check local, federal and state environmental regulations prior to disposal.

14. Transport information

DOT

UN number or ID number:	UN 3295
UN Proper Shipping Name:	Hydrocarbons, liquid, n.o.s.
Transport Hazard Class(es)	
Class:	3
Label(s):	3
Packing Group:	I
Marine Pollutant:	Yes
Special precautions for user:	Reference Emergency Response Guidebook No. 128, latest revision.
Reportable quantity	Benzene 10 lbs
	1,3-Butadiene 10 lbs

15. Regulatory information

US Federal Regulations

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Chemical Identity	Reportable quantity
1,3-Cyclopentadiene	De minimis concentration: 1.0% Subject to One-Time Reporting Requirements (Per Country)

US. Toxic Substances Control Act (TSCA) Section 5(a)(2) Final Significant New Use Rules (SNURs) (40 CFR 721 and 725, Subpt E)

None present or none present in regulated quantities.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053), as amended

Chemical Identity	OSHA hazard(s)
Benzene	Blood
	Central nervous system
	Cancer
	Aspiration
	respiratory tract irritation
	Flammability
	Skin
	Eye
1,3-Butadiene	Cancer
	Central nervous system
	Flammability
	respiratory tract irritation

Eye irritation

CERCLA Hazardous Substance List (40 CFR 302.4):

Chemical Identity	Name on List:	Reportable quantity
Benzene	BENZENE	10 lbs.
Toluene	BENZENE, METHYL-	1000 lbs.
Benzene, ethenyl-	STYRENE	1000 lbs.
1,3-Pentadiene	1-METHYLBUTADIENE	100 lbs.
1-Pentene	RCRA Hazardous Waste No. D001	100 lbs.
Cyclopentene	RCRA Hazardous Waste No. D001	100 lbs.
2-Hexene	RCRA Hazardous Waste No. D001	100 lbs.
1,3-Butadiene, 2-methyl-	ISOPRENE	100 lbs.
Benzene, dimethyl-	Xylenes (isomers and mixture)	100 lbs.
1,3-Butadiene	1,3-BUTADIENE	10 lbs.
Benzene, ethyl-	ETHYLBENZENE	1000 lbs.
Naphthalene	NAPHTHALENE	100 lbs.
Pentane, 3-methyl-	RCRA Hazardous Waste No. D001	100 lbs.
1-Octene	RCRA Hazardous Waste No. D001	100 lbs.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

Flammable (gases, aerosols, liquids, or solids), Acute toxicity (any route of exposure), Skin Corrosion or Irritation, Serious eye damage or eye irritation, Germ Cell Mutagenicity, Carcinogenicity, Reproductive toxicity, Specific target organ toxicity (single or repeated exposure), Aspiration Hazard, Hazards Not Otherwise Classified (HNOC)

US. EPCRA (SARA Title III) Section 304 Extremely Hazardous Substances Reporting Quantities and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Hazardous Substances

None present or none present in regulated quantities.

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 313 Toxic Chemicals (40 CFR 372.65) - Supplier Notification Required

Chemical Identity	Reporting threshold for other users	Reporting threshold for manufacturing and processing
Benzene	10000 lbs	25000 lbs.
4,7-Methano-1H-indene, 3a,4,7,7a-tetrahydro-	10000 lbs	25000 lbs.
Toluene	10000 lbs	25000 lbs.
Benzene, ethenyl-	10000 lbs	25000 lbs.
1,3-Butadiene, 2-methyl-	10000 lbs	25000 lbs.
Benzene, dimethyl-	10000 lbs	25000 lbs.
1,3-Butadiene	10000 lbs	25000 lbs.
Benzene, ethyl-	10000 lbs	25000 lbs.
Naphthalene	10000 lbs	25000 lbs.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):

Chemical Identity	Reportable quantity
1,3-Pentadiene	10000 lbs
1-Pentene	10000 lbs
1,3-Butadiene, 2-methyl-	10000 lbs
1,3-Butadiene	10000 lbs
Hydrogen sulfide	10000 lbs

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3)

Chemical Identity	Reportable quantity
Benzene	10 lbs.
Toluene	1000 lbs.
Benzene, ethenyl-	1000 lbs.

1,3-Butadiene, 2-methyl-	100 lbs.
Benzene, dimethyl-	100 lbs.
Benzene, ethyl-	1000 lbs.
Naphthalene	100 lbs.
Hydrogen sulfide	100 lbs.

US State Regulations

US. California Proposition 65

WARNING: This product can expose you to chemicals including, Toluene; which is [are] known to the State of California to cause birth defects or other reproductive harm.

This product can expose you to chemicals including, Benzene; 1,3-Butadiene; which is [are] known to the State of California to cause cancer and birth defects or other reproductive harm.

This product can expose you to chemicals including, Benzene, ethenyl-; 1,3-Butadiene, 2-methyl-; Benzene, ethyl-; Naphthalene; which is [are] known to the State of California to cause cancer.

For more information go to www.P65Warnings.ca.gov.

Inventory Status

Canada DSL Inventory List:	On or in compliance with the inventory
US TSCA Inventory:	On or in compliance with the inventory

16. Other information, including date of preparation or last revision

Issue Date: 04/24/2025

Revision Information:
04/24/2025: SDS Update – GHS classification change, composition edits, OEL edits, section 15 edits, and phrase edits
09/09/2024: SDS Update – phrase edits
07/19/2024: SDS Update – OEL updates and phrase edits
06/22/2022: SDS Update – address updated, composition edits, OEL updates, section 9 updates, section 15 updates, phrase edits
12/04/2019: SDS Update

Version #: 10.0

Abbreviations and acronyms:
ACC = American Chemistry Council; ACGIH = American Conference of Governmental Industrial Hygienists; BOD = Biochemical Oxygen Demand; C = Ceiling; CAS = Chemical Abstracts Service; CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act; CFR = Code of Federal Regulations; COD = Chemical Oxygen Demand; DOT = Department of Transportation; DSL = Domestic Substances List; EC50 = Effective Concentration 50%; EPA = Environmental Protection Agency; GHS = Globally Harmonized System for the Classification and Labelling of Chemicals; HPV = High Production Volume; IARC = International Agency for Research on Cancer; LC50 = Lethal Concentration 50%; LD50 = Lethal Dose 50%; NFPA = National Fire Protection Association; NIOSH = National Institute for Occupational Safety and Health; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit; PMCC = Pensky-Martens Closed Cup; PPE = Personal Protective Equipment; RCRA = Resource Conservation and Recovery Act; REL = Recommended Exposure Limit; SARA = Superfund Amendments and Reauthorization Act; SCBA = Self Contained Breathing Apparatus; SDS = Safety Data Sheet; STEL = Short Term Exposure Limit; TLV = Threshold Limit Value; TSCA = Toxic Substances Control Act; TWA = Time Weighted Average

Further Information: 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".

For additional information on storing and handling flammable liquids, refer to the National Fire Protection Association (NFPA) 30, "Flammable and Combustible Liquids Code".

Disclaimer:

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 SDS. NOVA CHEMICALS DOES NOT ASSUME RESPONSIBILITY FOR SDS OBTAINED FROM THIRD PARTY SOURCES.**

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