

SAFETY DATA SHEET

Classified in accordance with 29 CFR 1910.1200

1. Identification

Product identifier: AROMATIC CONCENTRATE GRADE 2**Other means of identification****Common name(s),** 85% AC1 and 15% PFO Mixture; AC2**synonym(s):****SDS number:** NOVA-0003**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****Manufacturer**

Company Name: NOVA Chemicals
Address: P.O. Box 2518, Station M
Calgary, Alberta, Canada T2P 5C6
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-USA) (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 2A
Germ Cell Mutagenicity Category 1B
Carcinogenicity Category 1A
Toxic to reproduction 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 HazardsAcute 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)
(Hearing organs)
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/lighting] equipment. Use non-sparking tools. Take action to prevent static discharges. These alone may be insufficient to remove static electricity. Do not breathe dust/fume/gas/mist/vapors/spray. Wash hands thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face protection.

Response:

IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. Immediately call a POISON CENTER/doctor. 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/attention. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor 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 advice/attention. IF exposed or concerned: Get medical advice/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/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

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 | 25 - 45% |
| 4,7-Methano-1H-indene, 3a,4,7,7a-tetrahydro- | Dicyclopentadiene, DCPD | 77-73-6 | 8 - 19% |
| Toluene | Methylbenzene | 108-88-3 | 2 - 7% |
| 1,3-Cyclopentadiene | Cyclopentadiene | 542-92-7 | 0.85 - 6.9% |
| Benzene, ethenyl- | Styrene | 100-42-5 | 0.86 - 5.4% |
| 1,3-Pentadiene | Piperylene | 504-60-9 | 1 - 5% |
| 1,3-Butadiene, 2-methyl- | Isoprene | 78-79-5 | 0.08 - 3.6% |
| Naphthalene | Naphthalene | 91-20-3 | 0.40 - 2.8% |
| 1-Octene | Octylene | 111-66-0 | 0.01 - 2.5% |
| 1-Pentene | Pent-1-ene | 109-67-1 | 1.3 - 2.3% |
| Cyclopentene | 1-Cyclopentene | 142-29-0 | 1.5 - 2% |
| 1H-Indene | Indene, Benzocyclopentadiene | 95-13-6 | 0 - 2% |
| 2-Octene | Octene-2 | 111-67-1 | 0 - 1.8% |
| Benzene, ethyl- | Ethylbenzene, Phenylethane | 100-41-4 | 0.2 - 1% |
| Benzene, dimethyl- | Xylene (mixed isomers) | 1330-20-7 | 0.08 - 1% |
| n-Undecane | Undecane | 1120-21-4 | 0.009 - 1% |
| 1,3-Butadiene | Vinylethylene | 106-99-0 | 0.2 - 0.7% |
| 1,1'-Biphenyl | Biphenyl | 92-52-4 | 0.01 - 0.2% |

* All concentrations are percent by weight.

Additional Information: This product is a mixture of CAS # 68921-67-5 - Hydrocarbons, ethylene-manuf.-by-product distn. residues and CAS # 69013-21-4 - Pyrolysis Fuel Oil. 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/doctor if you feel unwell.

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

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

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

5. Fire-fighting measures

General Fire Hazards: Extremely flammable liquid and vapor. 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 firefighters

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 Firefighters must use standard protective equipment including flame

for fire-fighters: retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures:

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:

Wear appropriate personal protective equipment. 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. 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/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 dust/fume/gas/mist/vapors/spray. Avoid contact with skin and eyes. Keep away from incompatible materials such as oxidizing agents and acids. Wash thoroughly after handling. Do not eat, drink or smoke when using the product. Use only outdoors or in a well-ventilated area. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face protection. In case of inadequate ventilation, use respiratory protection.

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. 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-: 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.

| Chemical Identity | Type | Exposure Limit Values | Source |
|----------------------------------------------|-------------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| Benzene | TWA | 0.5 ppm | US. ACGIH Threshold Limit Values, as amended |
| | STEL | 2.5 ppm | US. ACGIH Threshold Limit Values, as amended |
| | STEL | 5 ppm | US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053), 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 |
| | 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 |
| | 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 |
| 4,7-Methano-1H-indene, 3a,4,7,7a-tetrahydro- | TWA | 5 ppm 30 mg/m ³ | US. OSHA Table Z-1-A (29 CFR 1910.1000), as amended |
| | REL | 5 ppm 30 mg/m ³ | US. NIOSH: Pocket Guide to Chemical Hazards, as amended |
| | STEL | 1 ppm | US. ACGIH Threshold Limit Values, as amended |
| Toluene | TWA | 0.5 ppm | US. ACGIH Threshold Limit Values, as amended |
| | TWA | 20 ppm | US. ACGIH Threshold Limit Values, as amended |
| | STEL | 150 ppm 560 mg/m ³ | US. OSHA Table Z-1-A (29 CFR 1910.1000), as amended |
| | TWA | 100 ppm 375 mg/m ³ | US. OSHA Table Z-1-A (29 CFR 1910.1000), as amended |
| | MAX. CONC | 500 ppm | US. OSHA Table Z-2 (29 CFR 1910.1000), as amended |
| | TWA | 200 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 |
| | STEL | 150 ppm 560 mg/m ³ | US. NIOSH: Pocket Guide to Chemical Hazards, as amended |
| REL | 100 ppm 375 mg/m ³ | US. NIOSH: Pocket Guide to Chemical Hazards, as amended | |
| IDLH | 500 ppm | US. NIOSH. Immediately Dangerous to Life or Health (IDLH) Values, as amended | |

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|---------------------|-----------|---------|-----------|-------------------------------------------------------------------------------|
| 1,3-Cyclopentadiene | TWA | 0.5 ppm | | US. ACGIH Threshold Limit Values, as amended |
| | STEL | 1 ppm | | US. ACGIH Threshold Limit 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 |
| | 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 |
| Benzene, ethenyl- | STEL | 40 ppm | | US. ACGIH Threshold Limit Values, as amended |
| | TWA | 20 ppm | | US. ACGIH Threshold Limit Values, as amended |
| | STEL | 100 ppm | 425 mg/m3 | US. OSHA Table Z-1-A (29 CFR 1910.1000), as amended |
| | TWA | 50 ppm | 215 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 |
| | MAX. CONC | 600 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 |
| | 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 |
| | IDLH | 700 ppm | | US. NIOSH. Immediately Dangerous to Life or Health (IDLH) Values, as amended |
| Naphthalene | TWA | 10 ppm | | US. ACGIH Threshold Limit Values, as amended |
| | PEL | 10 ppm | 50 mg/m3 | US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000), as amended |
| | STEL | 15 ppm | 75 mg/m3 | US. OSHA Table Z-1-A (29 CFR 1910.1000), as amended |
| | TWA | 10 ppm | 50 mg/m3 | US. OSHA Table Z-1-A (29 CFR 1910.1000), 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 |
| 1H-Indene | 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 |
| | REL | 10 ppm | 45 mg/m3 | US. NIOSH: Pocket Guide to Chemical Hazards, as amended |
| Benzene, ethyl- | TWA | 20 ppm | | US. ACGIH Threshold Limit Values, as amended |
| | PEL | 100 ppm | 435 mg/m3 | US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000), as amended |
| | STEL | 125 ppm | 545 mg/m3 | US. OSHA Table Z-1-A (29 CFR 1910.1000), as amended |
| | TWA | 100 ppm | 435 mg/m3 | US. OSHA Table Z-1-A (29 CFR 1910.1000), 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 |
| Benzene, dimethyl- | TWA | 100 ppm | | US. ACGIH Threshold Limit Values, as amended |
| | STEL | 150 ppm | | US. ACGIH Threshold Limit Values, as amended |
| | PEL | 100 ppm | 435 mg/m3 | US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000), as amended |

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|---------------|----------|-----------|-------------------------|--------------------------------------------------------------------------------|
| | TWA | 100 ppm | 435 mg/m ³ | US. OSHA Table Z-1-A (29 CFR 1910.1000), as amended |
| | STEL | 150 ppm | 655 mg/m ³ | US. OSHA Table Z-1-A (29 CFR 1910.1000), as amended |
| | REL | 100 ppm | 435 mg/m ³ | US. NIOSH: Pocket Guide to Chemical Hazards, as amended |
| | STEL | 150 ppm | 655 mg/m ³ | US. NIOSH: Pocket Guide to Chemical Hazards, as amended |
| 1,3-Butadiene | TWA | 2 ppm | | US. ACGIH Threshold Limit Values, 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 ppm | | US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053), as amended |
| | TWA | 1,000 ppm | 2,200 mg/m ³ | US. OSHA Table Z-1-A (29 CFR 1910.1000), as amended |
| | IDLH | 2,000 ppm | | US. NIOSH. Immediately Dangerous to Life or Health (IDLH) Values, as amended |
| 1,1'-Biphenyl | TWA | 0.2 ppm | | US. ACGIH Threshold Limit Values, as amended |
| | PEL | 0.2 ppm | 1 mg/m ³ | US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000), as amended |
| | TWA | 0.2 ppm | 1 mg/m ³ | US. OSHA Table Z-1-A (29 CFR 1910.1000), as amended |
| | REL | 0.2 ppm | 1 mg/m ³ | US. NIOSH: Pocket Guide to Chemical Hazards, as amended |
| | IDLH | | 100 mg/m ³ | US. NIOSH. Immediately Dangerous to Life or Health (IDLH) Values, as amended |

Biological Limit Values

| Chemical Identity | Exposure Limit Values | Source |
|----------------------------------------------------------------------------------------------------------------------|--------------------------------|-----------|
| Benzene (t,t-Muconic acid: Sampling time: End of shift.) | 500 µg/g (Creatinine in urine) | ACGIH BEI |
| Benzene (S-Phenylmercapturic acid: Sampling time: End of shift.) | 25 µg/g (Creatinine in urine) | ACGIH BEI |
| Toluene (toluene: Sampling time: End of shift.) | 0.03 mg/l (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 |
| Benzene, ethenyl- (Mandelic acid plus phenylglyoxylic acid: Sampling time: End of shift.) | 400 mg/g (Creatinine in urine) | ACGIH BEI |
| Benzene, ethenyl- (styrene: Sampling time: End of shift.) | 40 µg/l (Urine) | ACGIH BEI |
| Benzene, ethyl- (Sum of mandelic acid and phenylglyoxylic acid: Sampling time: End of shift.) | 0.15 g/g (Creatinine in urine) | ACGIH BEI |
| Benzene, dimethyl- (Methylhippuric acids: Sampling time: End of shift.) | 1.5 g/g (Creatinine in urine) | ACGIH BEI |
| 1,3-Butadiene (1,2-Dihydroxy-4-(N-acetylcysteiny)-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 | Can be absorbed through the skin. | US. ACGIH Threshold Limit Values, as amended |
| Naphthalene | Can be absorbed through the skin. | 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

| | |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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. Air supplied breathing apparatus must be used when oxygen concentrations are low or if airborne concentrations exceed the limits of the air-purifying respirators. |
| 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 to dark brown |
| Odor: | Pungent |
| Odor Threshold: | 0.011 ppm (DCPD) 0.0045 ppm (H2S) |
| pH: | not applicable |
| Melting point/freezing point: | -38 - -25 °C (-36 - -13 °F) (Aromatic Concentrate Grade 1) |
| Initial boiling point and boiling range: | 20 - 420 °C (68 - 788 °F) (by simulated distillation) |
| Flash Point: | < -30 °C (-22 °F) (estimated) (Aromatic Concentrate Grade 2) |

| | |
|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Evaporation rate: | No data available. |
| Flammability (solid, gas): | not applicable |
| Upper/lower limit on flammability or explosive limits | |
| Flammability Limit - Upper (%): | 7.8 %(V) (Benzene) 5.9 %(V) (Naphthalene) |
| Flammability Limit - Lower (%): | 1.2 %(V) (Benzene) 0.9 %(V) (Naphthalene) |
| Vapor pressure: | 13.43 kPa (20 °C (68 °F)) 47.32 kPa (54 °C (129 °F)) 26.89 kPa (37.8 °C (100.0 °F)) (estimated) (Aromatic Concentrate Grade 2) |
| Vapor density: | 2.8 (Air=1) (Benzene) |
| Density: | 840 - 869 kg/m ³ |
| Relative density: | 0.84 - 0.869 (15 °C (59 °F)) (Water=1) |
| Solubility(ies) | |
| Solubility in water: | 0.0018 g/ml Slightly Soluble (Benzene) |
| Solubility (other): | No data available. |
| Partition coefficient (n-octanol/water): | 2.13 (Benzene) (Log Pow) |
| Auto-ignition temperature: | 400 - 500 °C (752 - 932 °F) (Aromatic Concentrate Grade 1) |
| Decomposition temperature: | No data available. |
| Viscosity: | 0.7 mm ² /s (40 °C (104 °F)), (Aromatic Concentrate Grade 2) estimated |

10. Stability and reactivity

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|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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). |
| Ingestion: | Harmful if swallowed. May be fatal if swallowed and enters airways. Ingestion of this product may result in vomiting, nausea, abdominal pain and central nervous system effects. 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: 747.25 mg/kg

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

Inhalation Product: ATEmix: 12.83 mg/l Vapor

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.
Naphthalene Overall evaluation: 2B. Possibly carcinogenic to humans.
Benzene, ethyl- Overall evaluation: 2B. Possibly carcinogenic to humans.
1,3-Butadiene Overall evaluation: 1. Carcinogenic 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. |
| Naphthalene | Reasonably Anticipated to be a Human Carcinogen. |
| 1,3-Butadiene | Known To Be Human Carcinogen. |

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050), 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:** Atmospheric oxidation constitutes a significant route of degradation. Product is likely to biodegrade significantly.**BOD/COD Ratio****Product:** No data available.**Bioaccumulative potential****Bioconcentration Factor (BCF)****Product:** No data available.**Components:**4,7-Methano-1H-indene, Carp, Bioconcentration Factor (BCF): 58.9 - 384
3a,4,7,7a-tetrahydro-**Partition Coefficient n-octanol / water (log Kow)****Product:** 2.13 (Benzene) (Log Pow)**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/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal. 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: | 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

1,3-Cyclopentadiene

Reportable quantity

De minimis concentration: 1.0% One-Time Export Notification only.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050), as amended**Chemical Identity**

Benzene

OSHA hazard(s)

Cancer
 Central nervous system
 Aspiration
 Flammability
 respiratory tract irritation
 Eye
 Blood
 Skin
 1,3-Butadiene
 Eye irritation
 respiratory tract irritation
 Central nervous system
 Cancer
 Flammability

CERCLA Hazardous Substance List (40 CFR 302.4):**Chemical Identity**

Benzene

Toluene

Benzene, ethenyl-

1,3-Pentadiene

1,3-Butadiene, 2-methyl-

Naphthalene

1-Octene

1-Pentene

Cyclopentene

2-Octene

2-Hexene

Benzene, ethyl-

Benzene, dimethyl-

1,3-Butadiene

Pentane, 3-methyl-

1,1'-Biphenyl

Name on List:

BENZENE
 BENZENE, METHYL-
 STYRENE
 1,3-PENTADIENE
 ISOPRENE
 NAPHTHALENE
 RCRA HAZARDOUS WASTE NO. D001
 RCRA HAZARDOUS WASTE NO. D001
 RCRA HAZARDOUS WASTE NO. D001
 RCRA HAZARDOUS WASTE NO. D001
 RCRA HAZARDOUS WASTE NO. D001
 RCRA HAZARDOUS WASTE NO. D001
 ETHYLBENZENE
 BENZENE, DIMETHYL
 1,3-BUTADIENE
 RCRA HAZARDOUS WASTE NO. D001
 BIPHENYL

Reportable quantity

10 lbs.
 1000 lbs.
 1000 lbs.
 100 lbs.
 100 lbs.
 100 lbs.
 100 lbs.
 100 lbs.
 100 lbs.
 100 lbs.
 100 lbs.
 100 lbs.
 100 lbs.
 100 lbs.
 100 lbs.
 100 lbs.
 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

| <u>Chemical Identity</u> | <u>Reporting threshold for other users</u> | <u>Reporting threshold for manufacturing and processing</u> |
|-------------------------------------------------|---------------------------------------------------|--------------------------------------------------------------------|
| 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. |
| Naphthalene | 10000 lbs | 25000 lbs. |
| Benzene, ethyl- | 10000 lbs | 25000 lbs. |
| Benzene, dimethyl- | 10000 lbs | 25000 lbs. |
| 1,3-Butadiene | 10000 lbs | 25000 lbs. |

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

| <u>Chemical Identity</u> | <u>Reportable quantity</u> |
|--------------------------|----------------------------|
| 1,3-Pentadiene | 10000 lbs |
| 1,3-Butadiene, 2-methyl- | 10000 lbs |
| 1-Pentene | 10000 lbs |
| 1,3-Butadiene | 10000 lbs |
| Hydrogen sulfide | 10000 lbs |

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

| <u>Chemical Identity</u> | <u>Reportable quantity</u> |
|--------------------------|----------------------------|
| Benzene | 10 lbs. |
| Toluene | 1000 lbs. |
| Benzene, ethenyl- | 1000 lbs. |
| 1,3-Butadiene, 2-methyl- | 100 lbs. |
| Naphthalene | 100 lbs. |
| Benzene, ethyl- | 1000 lbs. |
| Benzene, dimethyl- | 100 lbs. |
| Hydrogen sulfide | 100 lbs. |

US State Regulations**US. California Proposition 65**

WARNING: 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-; Naphthalene; Benzene, ethyl-; which is [are] known to the State of California to cause cancer.

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.

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

US. New Jersey Worker and Community Right-to-Know Act

| <u>Chemical Identity</u> |
|----------------------------------------------|
| Benzene |
| 4,7-Methano-1H-indene, 3a,4,7,7a-tetrahydro- |
| Toluene |
| 1,3-Cyclopentadiene |
| Benzene, ethenyl- |
| 1,3-Pentadiene |
| 1,3-Butadiene, 2-methyl- |
| Naphthalene |
| 1-Pentene |
| Cyclopentene |
| 1H-Indene |
| Benzene, ethyl- |
| Benzene, dimethyl- |
| n-Undecane |
| 1,3-Butadiene |
| 1,1'-Biphenyl |

US. Pennsylvania RTK - Hazardous Substances**Chemical Identity**

Benzene
4,7-Methano-1H-indene, 3a,4,7,7a-tetrahydro-
Toluene
1,3-Cyclopentadiene
Benzene, ethenyl-
1,3-Pentadiene
1,3-Butadiene, 2-methyl-
Naphthalene
1-Octene
1-Pentene
Cyclopentene
1H-Indene
2-Octene
2-Hexene
1,3-Butadiene

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: 12/10/2019
Revision Information: 12/10/2019: SDS Update
Version #: 5.0

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".

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