

Safety Data Sheet

Gasoline, All Grades

Mercuria Energy Trading, Inc.

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name	Gasoline, All Grades
Synonyms	Conventional (Oxygenated and Nonoxygenated) Gasoline, Reformulated Gasoline, Oxygenated Gasoline, Motor Gasoline, Regular Gasoline, Mid-grade Gasoline, Premium Gasoline, Unleaded Gasoline, Conventional Blendstock for Oxygenate Blending, Reformulated Gasoline for Oxygenate Blending
Chemical Family	Petroleum Hydrocarbon
Intended Use	Fuel
MARPOL Annex I Category	Gasoline and Spirits
Supplier	Mercuria Energy Trading, Inc. 20 E Greenway Plaza Suite 650 Houston, TX 77046
24 Hour Emergency Numbers	Emergency Phone (24 hrs): 855-297-1501 Mercuria Health, Safety and Environmental: 720-214-6215 National Poison Control: 800-222-1222

2. HAZARDS IDENTIFICATION

GHS Classification

H224	Flammable liquid – Category 1
H304	Aspiration hazard – Category 1
H315	Skin corrosion/irritation – Category 2
H320	Eye damage/irritation – Category 2B
H335	May cause respiratory irritation – Category 3
H336	Specific target organ toxicity (single exposure) – Category 3 narcotic effects
H372	Specific target organ toxicity (repeated exposure) – Category 1 (liver, kidneys, bladder, blood, bone marrow, nervous system)
H350	Carcinogenicity – Category 1B
H401	Hazardous to the aquatic environment, acute hazard – Category 2
H411	Hazardous to the aquatic environment, long term hazard – Category 2

Label Elements



Signal Words Danger

GHS Hazard Statements

H224	Extremely flammable liquid and vapor
H304	May be fatal if swallowed and enters airways
H315	Causes skin irritation
H319	Causes serious eye irritation
H336	May cause drowsiness or dizziness
H350	May cause cancer
H411	Toxic to aquatic life with long lasting effects

GHS Precautionary Statements

P201	Obtain special instructions before use
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2. HAZARDS IDENTIFICATION

P202	Do not handle until all safety precautions have been read and understood
P210	Keep away from heat/sparks/open flames/hot surfaces – no smoking
P233	Keep container tightly closed
P240	Ground/bond container and receiving equipment
P241	Use explosion-proof electrical, ventilating and lighting equipment
P242	Use only non-sparking tools
P243	Take precautionary measures against static discharge
P260	Do not breathe mist/vapors
P264	Wash thoroughly after handling
P271	Use only outdoors or in a well-ventilated area
P273	Avoid release to the environment
P280	Wear protective gloves / protective clothing / eye protection / face protection
P281	Use personal protective equipment as required
P361, P352, P362	IF ON SKIN OR HAIR: Remove/take off immediately all contaminated clothing. Wash with plenty of soap and water. Take off contaminated clothing and wash before reuse.
P305,P351,P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P313	If eye irritation persists, get medical advice/attention
P301,P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
P331	Do NOT induce vomiting
P304,P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
P312	Call a POISON CENTER or doctor/physician if you feel unwell
P370,P378	In case of fire: Use dry chemical, carbon dioxide, or foam for extinction
P391	Collect spillage
P403,P233, P235	Store in a well-ventilated place. Keep container tightly closed, Keep cool
P501	Dispose of contents/container to approved facility

3. COMPOSITION / INFORMATION ON INGREDIENTS

Components	CAS Registration No.	Concentration (%)
Gasoline	86290-81-5	80 - 100
Benzene	71-43-2	< 0.1 - 5
n-Butane	106-97-8	5 - 15
Cumene	98-82-8	< 1 - 5
Cyclohexane	110-82-7	< 1 - 5
Ethyl Benzene	100-41-4	< 1 - 6
Ethyl Alcohol	64-17-5	< 1 - 10
n-Heptane	142-82-5	1 - 10
n-Hexane	110-54-3	< 1 - 10
Hexane (all isomers)	mixture	5 - 25
Naphthalene	91-20-3	< 1
n-Octane	111-65-9	1 - 20
n-Pentane	109-66-0	1 - 5
n-Propane	74-98-6	< 1 - 8
Toluene	108-88-3	1 - 30
1,2,4 Trimethyl Benzene	95-63-6	< 1 - 6
Xylene, all isomers	1330-20-7	1 - 25

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4. FIRST AID MEASURES

Inhalation (Breathing)	Move the exposed person to fresh air. If not breathing, clear airways and give artificial respiration. If breathing is difficult, humidified oxygen should be administered by qualified personnel. Seek medical attention if breathing difficulties continue.
Eye Contact	Flush eyes with water for at least 15 minutes. Hold eyelids apart to ensure complete irrigation of the eye. Remove contact lenses, if worn, after initial flushing. Do not use eye ointment. Seek medical attention.
Skin Contact	Remove contaminated shoes and clothing, and flush affected areas with large amounts of water. If skin surface is damaged, apply a clean dressing and seek medical attention. If skin surface is not damaged, clean affected area thoroughly with mild soap and water. Seek medical attention if tissue appears damaged or if pain or irritation persists. Launder or discard contaminated clothing.
Ingestion (Swallowing)	Aspiration hazard. Do not induce vomiting or give anything by mouth because the material can enter the lungs and cause severe lung damage. If spontaneous vomiting is about to occur, place victim's head below knees. If victim is drowsy or unconscious, place on the left side with head down. Do not leave victim unattended and observe closely for adequacy of breathing. Seek medical attention
Most Important Symptoms and Effects	Acute: Headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue Delayed: Dry skin and possible irritation with repeated or prolonged exposure
Potential Acute Health Effects	Inhalation: Breathing high concentrations may be harmful. Mist or vapor can irritate the throat and lungs. Breathing this material may cause central nervous system depression with symptoms including nausea, headache, dizziness, fatigue, drowsiness or unconsciousness. Effects of overexposure include irritation of the eyes, nose, throat and respiratory tract, blurred vision, photophobia (light sensitivity) and pulmonary edema (fluid accumulation in lungs). Severe exposures can result in nausea, vomiting, muscle weakness or convulsions, respiratory failure and death. Eye Contact: This product can cause eye irritation from short-term contact with liquid, mists or vapors. Symptoms include stinging, watering, redness and swelling. Effects may be more serious with repeated or prolonged contact. Skin Contact: This product is a skin irritant. Contact may cause redness, itching, burning and skin damage. Ingestion: Ingestion may result in nausea, vomiting, diarrhea and restlessness. Aspiration (inadvertent suction) of liquid into the lungs must be avoided as even small quantities in the lungs can produce chemical pneumonitis, pulmonary edema or hemorrhage and even death.
Potential Chronic Health Effects	Chronic effects of overexposure are similar to acute effects including central nervous system (CNS) effects and CNS depression. Effects may also include irritation of the digestive tract, irritation of the respiratory tract, nausea, vomiting and skin dermatitis.
Notes to Physician	Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in persons exposed to high concentrations of hydrocarbon solvents (e.g., in enclosed spaces or with deliberate abuse). The use of other drugs with less arrhythmogenic potential should be considered. If sympathomimetic drugs are administered, observe for the development of cardiac arrhythmias. Ingestion of this product or subsequent vomiting may result in aspiration of light hydrocarbon liquid, which may cause pneumonitis. Inhalation overexposure can produce toxic effects, monitor for respiratory distress. If cough or breathing difficulties

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4. FIRST AID MEASURES

develop, evaluate for upper respiratory tract inflammation, bronchitis and pneumonitis.

Skin contact may aggravate an existing dermatitis. High pressure injection injuries may cause necrosis of underlying tissue regardless of superficial appearance.

Federal regulations (29 CFR 1910.1028) specify medical surveillance programs for certain exposures to benzene above the action level or PEL (specified in Section (i)(1)(i) of the Standard). In addition, employees exposed in an emergency situation shall, as described in Section (i)(4)(i), provide a urine sample at the end of the shift for measurement of urine phenol.

5. FIRE FIGHTING MEASURES

Flammability Classification	OSHA Classification (29 CFR 1910.1200): Flammable Liquid NFPA Class-1B Flammable Liquid NFPA Ratings: Health: 1, Flammability: 3, Reactivity: 0
Flash Point	-45°C, -49°F Closed Cup (Tagliabue (ASTM D-56)
Flammable Limits	Lower Limit: 1.4% Upper Limit: 7.6%
Autoignition Temperature	280°C, 536°F
Combustion Products	Highly dependent on combustion conditions. Fume, smoke, carbon monoxide, carbon dioxide, sulfur and nitrogen oxides, aldehydes and unburned hydrocarbons.
Fire and Explosion Hazards	This material is extremely flammable and can be ignited by heat, sparks, flames or other sources of ignition (e.g., static electricity, pilot lights, mechanical/electrical equipment and electronic devices such as cell phones, computers, calculators and pagers which have not been certified as intrinsically safe). Vapors are heavier than air and can accumulate in low areas. May create vapor/air explosion hazard indoors, in confined spaces, outdoors or in sewers. Vapors may travel considerable distances to a remote source of ignition where they can ignite, flash back or explode. Product can accumulate a static charge that may cause a fire or explosion. A product container, if not properly cooled, can rupture in the heat of a fire.
Extinguishing Media	Dry chemical, carbon dioxide or foam is recommended. Water spray is recommended to cool or protect exposed materials or structures. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Water may be ineffective for extinguishment, unless used under favorable conditions by experienced fire fighters.
Fire Fighting	Use water spray to cool fire-exposed containers and to protect personnel. Isolate immediate hazard area and keep unauthorized personnel out. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water. Avoid spreading burning liquid with water used for cooling. For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear protective clothing. When the potential chemical hazard is unknown, in enclosed or confined spaces, or when explicitly required by regulations, a self-contained breathing apparatus should be worn. Wear other appropriate protective equipment as conditions warrant.

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6. ACCIDENTAL RELEASE MEASURES

Personal Precautions	Extremely Flammable. Spillage of liquid product will create a fire hazard and may form an explosive atmosphere. Keep all sources of ignition and hot metal surfaces away from spill/release. The use of explosion-proof electrical equipment is recommended. Stay upwind and away from spill/release. Isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment as conditions warrant per Exposure Controls/Personal Protection guidelines.
Environmental Precautions	Stop the leak if it can be done without risk. Prevent spilled material from entering waterways, sewers, basements or confined areas. Contain release to prevent further contamination of soils, surface water or groundwater. Clean up spill as soon as possible using appropriate techniques such as applying non-combustible absorbent materials or pumping. All equipment used when handling the product must be grounded. A vapor suppressing foam may be used to reduce vapors. Use clean non-sparking tools to collect absorbed material. Where feasible and appropriate, remove contaminated soil.
Methods for Containment and Clean Up	Immediate cleanup of any spill is recommended. Build dike far ahead of spill for containment and later recovery or disposal of spilled material. Absorb spill with inert material such as sand or vermiculite and place in suitable container for disposal. If spilled on water, remove with appropriate equipment like skimmers, booms or absorbents. In case of soil contamination, remove contaminated soil for remediation or disposal in accordance with applicable regulations.
Reporting	Report spills/releases as required, to appropriate local, state and federal authorities. US Coast Guard and Environmental Protection Agency regulations require immediate reporting of spills/release that could reach any waterway including intermittent dry creeks. Report spill/release to the National Response Center at (800) 424-8802. In case of accident or road spill, call the 24-hour emergency number (855) 297-1501.

7. HANDLING AND STORAGE

Precautions for Safe Handling	<p>Extremely flammable. May vaporize easily at ambient temperatures. The vapor is heavier than air and may create an explosive mixture of vapor and air. Beware of accumulation in confined spaces and low lying areas.</p> <p>Use non-sparking tools and explosion-proof equipment. Open container slowly to relieve any pressure. Bond and ground all equipment when transferring from one vessel to another. Can accumulate static charge by flow or agitation. Can be ignited by static discharge. Explosion-proof electrical equipment is recommended and may be required by fire codes.</p> <p>Warning! Use of this material in spaces without adequate ventilation may result in the generation of hazardous levels of combustion products and/or inadequate oxygen levels for breathing. Odor is an inadequate warning for hazardous conditions.</p> <p>To prevent and minimize fire or explosion risk from static accumulation and discharge, effectively bond and/or ground product transfer system. Do not use electronic devices (such as cellular phones, computers, calculators, pagers, etc.) in or around any fueling operation or storage area unless the devices are certified as intrinsically safe. Electrical equipment and fittings should comply with local fire codes.</p>
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7. HANDLING AND STORAGE

Precautions for Safe Storage Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces and all sources of ignition. Post area warnings: 'No Smoking or Open Flame'. Keep away from incompatible material. Outdoor or detached storage of portable containers is preferred. Indoor storage should meet OSHA standards and appropriate fire codes.

Portable containers should never be filled while they are in or on a motor vehicle or marine craft. Static electricity may ignite vapors when filling non-grounded containers or vehicles on trailers. To avoid static buildup, do not use a nozzle lock open device. Use only approved containers. Keep containers tightly closed. Place the container on the ground before filling. Keep the nozzle in contact with the container during filling.

Empty containers retain liquid and vapor residues and can be dangerous. Do NOT pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat, flame, sparks, static electricity or other sources of ignition; they may explode and cause injury or death. Do not attempt to refill or clean containers since residue is difficult to remove. Empty drums should be completely drained, properly closed and returned to the supplier or a qualified drum reconditioner. All containers should be disposed of in an environmentally safe manner in accordance with government regulations.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Component	ACGIH Exposure Limits	OSHA Exposure Limits	NIOSH Exposure Limits
Gasoline	300 ppm TWA 500 ppm STEL (as gasoline)	300 ppm TWA 500 ppm STEL (as petroleum distillate (naphtha))	450 ppm TWA 1100 ppm IDLH (as petroleum distillate (naphtha))
Benzene	0.5 ppm TWA 2.5 ppm STEL Skin	1 ppm TWA 5 ppm STEL Skin 25 ppm Ceiling 0.5 ppm Action Level	0.1 ppm TWA 1 ppm STEL Skin 500 ppm IDLH
n-Butane	800 ppm TWA		800 ppm TWA
Cumene	50 ppm TWA	50 ppm, 245 mg/m ³ PEL Skin	50 ppm, 245 mg/m ³ TWA Skin
Cyclohexane	100 ppm TWA	300 ppm, 1050 mg/m ³ PEL	300 ppm, 1050 mg/m ³ TWA 1300 ppm IDLH
Ethanol	1000 ppm TWA	1000 ppm, 1900 mg/m ³ PEL	1000 ppm, 1900 mg/m ³ TWA
Ethyl Benzene	20 ppm TWA 125 ppm STEL	100 ppm, 435 mg/m ³ PEL 125 ppm STEL	100 ppm, 435 mg/m ³ TWA 125 ppm, 545 mg/m ³ STEL 800 ppm IDLH
n-Heptane	400 ppm TWA 500 ppm STEL	1000 ppm, 1900 mg/m ³ PEL	85 ppm TWA 440 ppm Ceiling 750 ppm IDLH
n-Hexane	50 ppm TWA Skin	500 ppm, 1800 mg/m ³ PEL	50 ppm, 180 mg/m ³ TWA 1100 ppm IDLH
Hexane (all isomers)	500 ppm TWA 1000 ppm STEL		100 ppm, 350 mg/m ³ TWA 500 ppm, 1800 mg/m ³ Ceiling

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8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Component	ACGIH Exposure Limits	OSHA Exposure Limits	NIOSH Exposure Limits
Naphthalene	10 ppm TWA 15 ppm STEL	10 ppm, 50 mg/m ³ PEL	10 ppm, 50 mg/m ³ TWA 15 ppm, 75 mg/m ³ STEL 250 ppm IDLH
n-Octane	300 ppm TWA	500 ppm, 2350 mg/m ³ PEL	75 ppm, 350 mg/m ³ TWA 385 ppm, 1800 mg/m ³ Ceiling 1000 ppm IDLH
n-Pentane	600 ppm TWA	1000 ppm, 2950 mg/m ³ PEL	120 ppm, 350 mg/m ³ TWA 610 ppm, 1800 mg/m ³ Ceiling 1500 ppm IDLH
n-Propane	2500 ppm TWA	1000 ppm TWA	1000 ppm TWA 2100 ppm IDLH
Toluene	20 ppm TWA Skin	200 ppm TWA 300 ppm Ceiling 500 ppm Peak-10 min	100 ppm, 375 mg/m ³ TWA 150 ppm, 560 mg/m ³ STEL 500 ppm IDLH
1,2,4 Trimethyl Benzene	25 ppm TWA	25 ppm TWA	25 ppm, 125 mg/m ³ TWA
Xylene, all isomers	100 ppm TWA 150 ppm STEL	100 ppm, 435 mg/m ³ PEL 150 ppm STEL	100 ppm, 435 mg/m ³ TWA 150 ppm, 655 mg/m ³ STEL 900 ppm IDLH
Note: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional for further information.			
ACGIH - American Conference of Government Industrial Hygienists, OSHA - Occupational Safety and Health Administration, NIOSH - National Institute for Industrial Safety and Health, TWA - Time Weighted Average (8 hour average for ACGIH and OSHA, 10 hour average for NIOSH), STEL - 15 Minute Short Term Exposure Level, Skin - indicates potential for cutaneous absorption of liquid or vapor through the eyes or mucous membranes, Ceiling - Ceiling Level, Peak - Acceptable peak over the ceiling concentration for a specified number of minutes, IDLH - Immediately Dangerous to Life and Health			

Biological Exposure Indices (BEI)			
Material	Determinant	Sampling Time	BEI Level
Benzene	t,t-muconic acid in creatinine in urine	End of shift	500 µg/g
	s-phenylmercapturic acid in creatinine in urine	End of shift	25 µg/g
Ethyl Benzene	Sum of mandelic acid and phenylglyoxylic acid in creatinine in urine	End of shift at end of work week	0.7 g/g
	Ethyl Benzene in end exhaled air	Not critical	
n-Hexane	2,5-hexanedion without hydrolysis in urine	End of shift at end of work week	0.4 mg/l
Naphthalene	1-naphthol with hydrolysis + 2-naphthol with hydrolysis	End of shift	
Toluene	o-cresol with hydrolysis in creatinine in urine	End of shift	0.3 mg/g
	Toluene in blood	Prior to last shift of work week	0.02 mg/l
	Toluene in urine	End of shift	0.03 mg/l
Xylene	Methylhippuric acids in creatinine in urine	End of shift	1.5 g/g
ACGIH - American Conference of Government Industrial Hygienists			

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Personal Protective Equipment

General Considerations Consider the potential hazards of this material, applicable exposure limits, job activities and other substances in the work place when designing engineering controls and selecting personal protective equipment.

Engineering Controls Use process enclosures, local exhaust ventilation or other engineering controls to maintain airborne levels below the recommended exposure limits. An emergency eye wash station and safety shower should be located near the work station.

Personal Protective Equipment If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, personal protective equipment (PPE) is recommended. A hazard assessment of the work should be conducted by a qualified professional to determine what PPE is required.

Respiratory Protection A respiratory protection program that meets or exceeds OSHA 29 CFR 1910.134 and ANSI Z.88.2 should be followed whenever workplace conditions warrant the use of a respirator. When airborne concentrations are expected to exceed the established exposure limits given in Section 8, use a NIOSH approved air purifying respirator equipped with organic vapor cartridges/canisters. Use a full-face positive-pressure supplied air respirator in circumstances where air-purifying respirators may not provide adequate protection or where there may be the potential for airborne exposure above the exposure limits. If exposure concentration is unknown, IDLH conditions exist or there is a potential for exposure to hydrogen sulfide above exposure limits, use a NIOSH approved self contained breathing apparatus (SCBA) or equivalent operated in a pressure demand or other positive pressure mode.

Eye Protection Eye protection that meets or exceeds ANSI Z.87.1 is recommended if there is a potential for liquid contact to the eyes. Safety glasses equipped with side shields are recommended as minimum protection in industrial settings. Chemical goggles should be worn during transfer operations or when there is a likelihood of misting, splashing or spraying of this material. A face shield may be necessary depending on conditions of use.

Skin and Body Protection Avoid skin contact. Wear long-sleeved fire-retardant garments while working with flammable and combustible liquids. Additional chemical-resistant protective gear may be required if splashing or spraying conditions exist. This may include an apron, arm covers, impervious gloves, boots and additional facial protection.

Hand Protection Avoid skin contact. Use impervious gloves (e.g., PVC, neoprene, nitrile rubber). Check with glove suppliers to confirm the breakthrough performance of gloves. PVC and neoprene may be suitable for incidental contact. Nitrile rubber should be used for longer term protection when prolonged or frequent contact may occur. Gloves should be worn on clean hands and hands should be washed after removing gloves. Also wash hands with plenty of mild soap and water before eating, drinking, smoking, using toilet facilities or leaving work.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Transparent, clear to amber or red	Physical Form	Liquid
Odor	Pungent, gasoline	Odor Threshold	Not established
pH	Neutral	Vapor Pressure	5 – 15 psi 100°F, 38°C
Vapor Density	3 - 4 (air = 1)	Boiling Point/Range	80-437°F/26-225°C

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9. PHYSICAL AND CHEMICAL PROPERTIES

Percent Volatile	100%	Partition Coefficient	>1
Specific Gravity	0.68 – 0.78 @ 60°F	Density	5.66-6.50 lb/gal @ 60°F
Molecular Weight	100	Evaporation Rate	Not established
Flash Point	-49°F/-45°C	Test Method	Closed Cup (Tagliabue (ASTM D-56))
Explosive Limits	1.4% LEL, 7.6% UEL	Autoignition Temperature	536°F/280°C
Solubility in Water	Approximately 10%, oxygenated components of gasoline are more soluble than the hydrocarbon components. Ethanol has greater solubility in water than hydrocarbon or oxygenated components.		

10. STABILITY AND REACTIVITY

Stability	Stable under normal anticipated storage and handling temperatures and pressures. Extremely flammable liquid and vapor. Vapor can cause flash fire.
Conditions to Avoid	Avoid high temperatures and all possible sources of ignition. Prevent vapor accumulation.
Incompatibility (Materials to Avoid)	Avoid contact with strong oxidizing agents such as strong acids, alkalis, chlorine and other halogens, dichromates or permanganates, which can cause fire or explosion.
Hazardous Decomposition Products	Hazardous decomposition products are not expected to form during normal storage. The use of hydrocarbon fuel in an area without adequate ventilation may result in hazardous levels of combustion products (e.g., oxides of carbon, sulfur and nitrogen, benzene and other hydrocarbons) and/or dangerously low oxygen levels.
Hazardous Polymerization	Not known to occur

11. TOXICOLOGICAL INFORMATION

Overview	<p>This product is a transparent, clear to amber or red, volatile and extremely flammable liquid that may cause flash fires. Keep away from heat, sparks and flames and other sources of ignition. Never siphon this product by mouth. If swallowed, this product may be aspirated into the lungs and cause lung damage or death.</p> <p>This product contains benzene, which may cause cancer or be toxic to blood forming organs. It contains material that has caused cancer based on animal data.</p> <p>This material may contain benzene, ethyl benzene and naphthalene at concentrations above 0.1%. Benzene is considered to be a known human carcinogen by OSHA, IARC and NTP. IARC has classified ethyl benzene, gasoline and gasoline engine exhaust, ethyl benzene and naphthalene as possibly carcinogenic to humans (Group 2B) based on laboratory animal studies.</p>
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Toxicological Information of the Material.

Acute Toxicity	Dermal: Low Toxicity: LD50 > 2000 mg/kg (rabbit) Causes mild skin irritation. Repeated exposure may cause skin dryness or cracking that can lead to dermatitis.
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11. TOXICOLOGICAL INFORMATION

Inhalation: Product expected to have low degree of toxicity by inhalation:
LC 50 > 5.2 mg/l, 4 hr (rat) (vapor)
Effect of overexposure may include irritation of the digestive tract, irritation of the respiratory tract, nausea, vomiting, diarrhea and signs of central nervous system depression (e.g., headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue). Continued inhalation may result in unconsciousness and/or death.

Ingestion: Product expected to have low degree of toxicity by ingestion:
Oral LD50 >2000 mg/kg (rat)
Aspiration into the lungs when swallowed or vomited may cause chemical pneumonitis that can be fatal.

Eye Damage / Irritation
Sensitization

Causes serious eye irritation.

Skin: Not expected to be a skin sensitizer

Respiratory: Not expected to be a respiratory sensitizer

Specific Target Organ Toxicity

Single Exposure: High concentrations may cause irritation of the skin, eyes, digestive tract, irritation of the respiratory tract, nausea, vomiting, diarrhea and signs of central nervous system depression (e.g., headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue). Continued inhalation may result in unconsciousness and/or death.

Repeated Exposure: Two year inhalation studies of wholly vaporized unleaded gasoline and 90 day studies of various petroleum naphthas did not produce significant target organ toxicity in laboratory animals.

Kidney – caused kidney effects in male rats that are not considered relevant to humans (gasoline)

Peripheral Nervous System – repeated exposure causes peripheral neuropathy in animals (n-hexane)

Blood Forming Organs – repeated exposure affects the bone marrow (benzene)

Conditions Aggravated by Overexposure

Disorders of the organs or organ systems that may be aggravated by significant exposure to this material or its components include the skin, respiratory system, liver, kidneys, CNS, cardiovascular system and blood-forming system.

Carcinogenicity

Two year inhalation studies of vaporized unleaded gasoline produced an increased incidence of kidney tumors in male rats and liver tumors in female mice. Repeated skin application of various petroleum naphthas in mice for two years resulted in an increased incidence of skin tumors but only in the presence of severe skin irritation. Follow up mechanistic studies suggest that the occurrence of these tumors may be the consequence of promotional process and not relevant to human risk assessment. Epidemiology data collected from a study of more than 18,000 petroleum marketing and distribution workers showed no increased risk of leukemia, multiple myeloma or kidney cancer from gasoline exposure.

Gasoline and gasoline engine exhaust have been identified as possible carcinogens by the International Agency for Research on Cancer. Gasoline is a confirmed animal carcinogen with unknown relevance to humans (ACGIH Group A3), is possibly carcinogenic to humans (IARC 2B) and has carcinogenicity category 1B (GHS/CLP). May cause cancer based on component information.

Benzene

ACGIH

Group A1 Confirmed human carcinogen

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	NTP	Known to be a human carcinogen
	IARC	IARC 1 Carcinogenic to humans
	GHS/CLP	Carcinogenicity category 1A
Cumene	IARC	IARC 2B Possibly carcinogenic to humans
	GHS/CLP	No carcinogenicity classification
Cyclohexane	GHS/CLP	No carcinogenicity classification
	ACGIH	Group A3 Confirmed animal carcinogen with unknown relevance to humans
Ethyl Alcohol	GHS/CLP	No carcinogenicity classification
	ACGIH	Group A3 Confirmed animal carcinogen with unknown relevance to humans
Ethyl Benzene	IARC	IARC 2B Possibly carcinogenic to humans
	GHS/CLP	No carcinogenicity classification
n-Hexane	GHS/CLP	No carcinogenicity classification
	ACGIH	Group A4 Not classifiable as a human carcinogen
Naphthalene	NTP	Reasonably anticipated to be a human carcinogen
	IARC	IARC 2B Possibly carcinogenic to humans
	GHS/CLP	Carcinogenicity category 2
	ACGIH	Group A4 Not classifiable as a human carcinogen
Toluene	IARC	IARC 3 Not classifiable as to carcinogenicity to humans
	GHS/CLP	No carcinogenicity classification
Trimethylbenzene, all isomers	GHS/CLP	No carcinogenicity classification
	ACGIH	Group A4 Not classifiable as a human carcinogen
Xylene	IARC	IARC 3 Not classifiable as to carcinogenicity to humans
	GHS/CLP	No carcinogenicity classification

ACGIH - American Conference of Government Industrial Hygienists, IARC- International Agency for Research on Cancer, NTP – National toxicology Program, GHS/CLP GHS, Globally Harmonized System on Classification, Labeling and Packaging

Germ Cell Mutagenicity

Not expected to cause heritable genetic effects. Gasoline was negative in microbial mutagenicity and unscheduled DNA tests in rat hepatocytes. Gasoline did not induce chromosome aberrations in vivo in rat bone marrow cells and was negative in a mouse dominant lethal assay.

Reproductive and Developmental Toxicity

Not expected to cause reproductive toxicity. No evidence of developmental toxicity was found in pregnant laboratory animals (rats and mice) exposed to high vapor concentrations of unleaded gasoline and petroleum naphthas via inhalation. A two generation reproductive toxicity study of vapor recovery gasoline did not adversely affect reproductive function or offspring survival and development. Component information:
Toluene - Causes fetotoxicity at doses that are maternally toxic. Many case studies involving abuse during pregnancy indicate that toluene can cause birth defects, growth retardation and learning difficulties.
n-Hexane - May impair fertility at doses that produce other toxic effects.

Additional Information

Exposure to high concentrations of similar materials has been associated with irregular heart rhythms and cardiac arrest.

11. TOXICOLOGICAL INFORMATION

Toxicological Information of Components

Benzene 71-43-2

Target Organs: Prolonged or repeated exposures to benzene vapors has been linked to bone marrow toxicity which can result in blood disorders such as leukopenia, thrombocytopenia, and aplastic anemia. All of these diseases can be fatal. May cause myelodysplastic syndrome

Developmental: Exposure to benzene during pregnancy demonstrated limited evidence of developmental toxicity in laboratory animals. The effects seen include decreased body weight and increased skeletal variations in rodents. Alterations in hematopoiesis have been observed in the fetuses and offspring of pregnant mice.

Mutagenicity: Benzene exposure has resulted in chromosomal aberrations in human lymphocytes and animal bone marrow cells, and DNA damage in mammalian cells in vitro.

Cyclohexane 110-82-7

Target Organs: Cyclohexane can cause eye, skin and mucous membrane irritation, CNS depressant and narcosis at elevated concentrations. In experimental animals exposed to lethal concentrations by inhalation or oral route, generalized vascular damage and degenerative changes in the heart, lungs, liver, kidneys and brain were identified.

Developmental: Cyclohexane has been the focus of substantial testing in laboratory animals. Cyclohexane was not found to be genotoxic in several tests including unscheduled DNA synthesis, bacterial and mammalian cell mutation assays, and in vivo chromosomal aberration. An increase in chromosomal aberrations in bone marrow cells of rats exposed to cyclohexane was reported in the 1980's. However, a careful reevaluation of slides from this study by the laboratory which conducted the study indicates these findings were in error, and that no significant chromosomal effects were observed in animals exposed to cyclohexane. Findings indicate long-term exposure to cyclohexane does not promote dermal tumorigenesis.

Ethanol 64-17-5

Target Organs: Ingestion of alcoholic beverages has been classified by IARC as "carcinogenic to humans" (Group 1). Occupational exposures to ethanol and exposures other than by ingestion (i.e., dermal and inhalation) have not been associated with cancer in humans. Most adverse health effects associated with ethanol are related to chronic ingestion of alcoholic beverages. Alcoholism has been associated with liver, stomach, heart and nervous system damage, cancer, adverse reproductive effects and effects on the developing fetus. Many of these effects may be related to metabolic changes that result from constantly high blood levels of alcohol. This exposure pattern is significantly different from that of persons handling industrial ethanol in the workplace or from refueling cars with gasoline containing ethanol.

Developmental: Excessive consumption of alcoholic beverages during pregnancy has been associated with effects on the developing fetus referred to collectively as the fetal alcohol syndrome. The effects most frequently manifested include psychomotor dysfunction, growth retardation and a characteristic cluster of facial anomalies.

Mutagenicity: Excessive consumption of alcoholic beverages has been associated with chromosomal aberrations in white blood cells. Depending on the animal species being tested, ethanol may produce chromosomal damage, DNA damage and mutation in both somatic and germ cells.

Ethyl Benzene 100-41-4

Target Organs: In rats and mice exposed to 0, 75, 250, or 750 ppm ethyl benzene in a two year inhalation study there was mild damage to the kidney (tubular hyperplasia), liver (eosinophilic foci, hypertrophy, necrosis), thyroid (hyperplasia) and pituitary (hyperplasia).

n-Hexane 110-54-3

Target Organs: Excessive exposure to n-hexane can result in peripheral neuropathies. The initial symptoms are symmetrical sensory numbness and paresthesias of distal portions of the extremities. Motor weakness is typically observed in muscles of the toes and fingers but may also involve muscles of the arms, thighs and forearms. The onset of these symptoms may be delayed for several months to

11. TOXICOLOGICAL INFORMATION

a year after the beginning of exposure. The neurotoxic properties of n-hexane are potentiated by exposure to methyl ethyl ketone and methyl isobutyl ketone. Prolonged exposure to high concentrations of n-hexane (>1,000 ppm) has resulted in decreased sperm count and degenerative changes in the testes of rats but not those of mice.

Mutagenicity: May impair fertility at doses that produce other toxic effects.

Toluene 108-88-3

Target Organs: Epidemiology studies suggest that chronic occupational overexposure to toluene may damage color vision. Subchronic and chronic inhalation studies with toluene produced kidney and liver damage, hearing loss and central nervous system (brain) damage in laboratory animals. Intentional misuse by deliberate inhalation of high concentrations of toluene has been shown to cause liver, kidney, and central nervous system damage, including hearing loss and visual disturbances. Solvent abuse and noise interaction in the work environment may cause hearing loss. Abuse of vapors has been associated with organ damage and death.

Developmental: Exposure to toluene during pregnancy has demonstrated limited evidence of developmental toxicity in laboratory animals. The effects seen include decreased fetal body weight and increased skeletal variations in both inhalation and oral studies. Toluene causes foetotoxicity at doses that are maternally toxic. Many case studies involving abuse during pregnancy indicate that toluene can cause birth defects, growth retardation and learning difficulties.

Xylenes 1330-20-7

Target Organs: A six week inhalation study with xylene produced hearing loss in rats.

Developmental: Both mixed xylenes and the individual isomers produced limited evidence of developmental toxicity in laboratory animals. Inhalation and oral administration of xylene resulted in decreased fetal weight, increased incidences of delayed ossification, skeletal variations and resorptions.

12. ECOLOGICAL INFORMATION

Toxicity

This material is expected to be toxic to aquatic organisms with the potential to cause long term adverse effects in the aquatic environment. Acute aquatic toxicity studies on samples of gasoline and naphtha streams show acute toxicity values (LL/EL/IL50) greater than 1 mg/l and mostly in the range of 1 to 10 mg/l. These tests were carried out on water accommodated fractions in closed systems to prevent evaporative loss. Results are consistent with the predicted aquatic toxicity of these substances based on their hydrocarbon composition.

Classification H411, Chronic Category 2 – Toxic to aquatic life with long lasting effects

Coating action of oil can kill birds, plankton, aquatic life, algae and fish.

Persistence and Degradability

This material is not readily biodegradable. While some of the nonvolatile constituents are inherently biodegradable, some of the higher molecular weight components are persistent in water. The individual hydrocarbon components of this material are differentially soluble in water with aromatic hydrocarbons tending to be more water soluble than aliphatic hydrocarbons. If spilled, the lighter components will generally evaporate but depending on local environmental conditions (temperature, wind, soil type, mixing or wave action in water, etc), photo-oxidation and biodegradation, the remainder may become dispersed in the water column or absorbed to soil or sediment. Because of their differential solubility, the occurrence of hydrocarbons in groundwater will be at different proportions than the parent material. Under anaerobic conditions, such as in anoxic sediments, rates of biodegradation are negligible.

12. ECOLOGICAL INFORMATION

Persistence per IOPC Fund Definition Non-Persistent

Bioaccumulative Potential Contains components with the potential to bioaccumulate. The octanol water coefficient values measured for the hydrocarbon components of this material range from 3 to greater than 6, and therefore would be considered as having the potential to bioaccumulate.

Mobility **Air:** Contains volatile components. Lighter components will volatilize in the air. In air, the volatile hydrocarbons undergo photodegradation by reaction with hydroxyl radicals with half lives varying from 0.5 days for n-dodecane to 6.5 days for benzene.
Water: Spreads on a film on the surface of water. Significant proportion of spill will remain after one day. Lower molecular weight aromatic hydrocarbons and some polar compounds have low but significant water solubility. Some higher molecular weight compounds are removed by emulsification and these also slowly biodegrade while others adsorb to sediment and sink. Heavier fractions agglomerate to form tars, some of which sink.
Soil: Some constituents may be mobile and contaminate groundwater.

Other Adverse Effects Films form on water and may affect oxygen transfer and damage organisms.

13. DISPOSAL CONSIDERATIONS

Recover or recycle if possible. It is the responsibility of the generator to determine the toxicity and physical properties of the material generated so as to properly classify the waste and ensure disposal methods comply with applicable regulations.

This material, if discarded as produced, is not a RCRA "listed" hazardous waste. However, it should be fully characterized for ignitability (D001), reactivity (D003) and benzene (D018) prior to disposal (40 CFR 261). Use which results in chemical or physical change or contamination may subject it to regulation as a hazardous waste. Along with properly characterizing all waste materials, consult state and local regulations regarding the proper disposal of this material.

Do not dispose of tank water bottoms by draining onto the ground. This will result in soil and groundwater contamination. Waste arising from spillage or tank cleaning should be disposed of in accordance with applicable regulations.

Container contents should be completely used and containers should be emptied prior to discard. Container rinsate could be considered a RCRA hazardous waste and must be disposed of with care and in full compliance with federal, state and local regulations. Larger empty containers, such as drums, should be returned to the distributor or to a qualified drum reconditioner. To assure proper disposal of smaller empty containers, consult with state and local regulations and disposal authorities.

Safety Data Sheet

Gasoline, All Grades

Mercuria Energy Trading, Inc.

14. TRANSPORTATION INFORMATION

<p>United States Department of Transportation (US DOT)</p> <p>Transportation of Dangerous Goods (TDG) Canada</p>	<p>Shipping Description: UN1203, Gasoline, 3, PG-II</p> <p>Shipping Name: Gasoline</p> <p>Hazard Class and Division: 3</p> <p>ID Number: UN1203</p> <p>Packing Group: PGII</p> <p>Label: Flammable Liquid</p> <p>Placard: Flammable</p> <p>Emergency Response Guide: 128</p> <p>Marine Pollutant: Yes</p>
<p>International Maritime Organization</p> <p>International Maritime Dangerous Goods Code (IMO/IMDG)</p>	<p>Shipping Description: UN1203, Gasoline, 3, II (45°C)</p> <p>Shipping Name: Gasoline</p> <p>Hazard Class and Division: 3</p> <p>UN Number: 1203</p> <p>Label: Flammable Liquid</p> <p>EMS Guide: F-E, S-E</p> <p>Marine Pollutant: Yes</p>
<p>European Agreements Concerning the International Carriage by Rail (RID) and by Road (ADR)</p>	<p>Shipping Name: Gasoline</p> <p>Hazard Class: 3</p> <p>Packing Group: II</p> <p>Label: 3</p> <p>Danger Number: 33</p> <p>UN Number: 1203</p>
<p>International Civil Aviation Organization / International Air Transport Association (ICAO/IATA)</p>	<p>Shipping Name: Gasoline</p> <p>UN/ID Number: UN1203</p> <p>Hazard Class/Division: 3</p> <p>Packing Group: II</p> <p>Labels: Flammable</p> <p>Environmental Hazards: Yes</p> <p>Emergency Response Guide: 3H</p>

15. REGULATORY INFORMATION

United States Federal Regulatory Information

<p>EPA TSCA Inventory</p>	<p>This product and/or its components are listed on the Toxic Substances Control Act (TSCA) Inventory</p>
<p>EPA SARA 302/304 Emergency Planning and Notification</p>	<p>This material contains various chemicals subject to reporting under the Superfund Amendments and Reauthorization Act of 1986 (SARA).</p>
<p>EPA SARA 311/312 (Title III Hazard Categories)</p>	<p>Acute Health: Yes</p> <p>Chronic Health: Yes</p> <p>Fire Hazard: Yes</p> <p>Pressure Hazard: No</p> <p>Reactive Hazard: No</p>

EPA SARA Toxic Chemical Notification and Release Reporting (40 CFR 372) and CERCLA Reportable Quantities (40 CFR 302.4)

Component	CAS Number	Concentration	RQ
Benzene	71-43-2	< 5 %	10 lb
Cumene	98-82-8	< 5 %	5000 lb
Cyclohexane	110-82-7	< 5 %	1000 lb
Ethyl Benzene	100-41-4	< 6 %	1000 lb
n-Hexane	110-54-3	< 10 %	5000 lb

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Naphthalene	91-20-3	< 1	100 lb
Toluene	108-88-3	< 30 %	1000 lb
1,2,4 Trimethyl Benzene	95-63-6	< 6 %	not listed
Xylene, all isomers	1330-20-7	< 25 %	100 lb

CERCLA Section 101(14) excludes crude oil and crude oil fractions, including hazardous constituents of petroleum, from the definition of hazardous substances. The petroleum exclusion applies to this product.

EPA CWA and OPA

This product is classified as an oil under Section 311 of the Clean Water Act (CWA) and Oil Pollution Act of 1990 (OPA), subject to spill reporting requirements.

Canadian Regulatory Information

DSL/NDSL Inventory

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the SDS contains all the information required by the Regulations..

Workplace Hazardous Materials Information System (WHMIS) Hazard Class

B2 - Flammable Liquid
D2A: Material Causing Other Toxic Effects Very Toxic
D2B - Material Causing Other Toxic Effects - Toxic Material

European Union Regulatory Information

Labeling

Product is dangerous as defined by the European Union Dangerous Substances / Preparations Directives
Contains: Low Boiling Point Naphtha

Symbol

F+ Extremely Flammable
T Toxic
N Dangerous for the Environment

Risk Phrases

R12-45-38-65-67-51/53
Extremely flammable. May cause cancer. Irritating to skin. Harmful: may cause lung damage if swallowed. Vapors may cause drowsiness and dizziness. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases

S16-53-45-2-23-24-29-43-62
Keep away from sources of ignition – No smoking. Avoid exposure – obtain special instructions before use. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Keep out of reach of children. Do not breathe vapor. Avoid contact with skin. Do not empty into drains. In case of fire use foam/dry powder/CO₂. If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

California Proposition 65

This product may contain detectable quantities of the following chemicals, known to the State of California to cause cancer, birth defects, or other reproductive harm and which may be subject to the warning requirements of California Proposition 65. Chemicals known to the State of California to cause cancer, birth defects or other reproductive harm are created by the combustion of this product.

Carcinogens: Benzene, Ethyl Alcohol, Ethyl Benzene, Naphthalene, Unleaded Gasoline (wholly vaporized)

Developmental Toxicity: Benzene, Ethyl Alcohol, Toluene

Male Reproductive Toxicity: Benzene

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15. REGULATORY INFORMATION

Female Reproductive Toxicity: Toluene

Carcinogen Identification by International Agency for Research on Cancer

Group 1	Carcinogenic to Humans	Benzene
Group 2A	Probably Carcinogenic to Humans	
Group 2B	Possibly Carcinogenic to Humans	Cumene, Ethyl Benzene, Gasoline, Gasoline Engine Exhaust, Naphthalene
Group 3	Not Classifiable	Toluene, Xylenes

16. OTHER INFORMATION

Prepared By METI HSE

The information in this Material Safety Data Sheet (MSDS) is based on data considered to be accurate and obtained from sources which we believe are reliable. **However, the information is provided without any warranty, express or implied, regarding its correctness; and it should not be relied upon as a commercial specification of manufacturer or seller.** This information should be used to make an independent determination of the methods to safeguard workers and the environment.

The conditions or methods of handling, storage, use and disposal of the material are beyond our control and may be beyond our knowledge. **For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the material.**

The SDS was prepared and is to be used only for this material. If the material is used as a component in another product, this SDS information may not be applicable.