

Material Safety Data Sheet

Unleaded Gasoline with Ethanol



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1. PRODUCT AND COMPANY IDENTIFICATION

Product name: Unleaded Gasoline with Ethanol
MARPOL Annex I Category: Gasoline and Spirits
REACH Registration No: 01-2119471335-39-0012
Intended use: Fuel for spark ignition piston engines – **NOT** recommended for aviation piston engines
Uses Advised Against: Uses other than those covered by the exposure scenarios appended to this Safety Data Sheet, are not supported
Company: Rix Petroleum Limited
 Witham House
 45 Spyvee Street
 Hull
 HU8 7JR
 Telephone No: (Hull) 01482 224422

2. COMPOSITION / INFORMATION ON INGREDIENTS

Component	CASRN	EINECS	REACH Reg No	Concentration ¹	CLP Classification ²	DSD Classification ³
Gasoline(Benzene)	86290-81-5	289-220-8	01-2119471335-39	>90	H350 H304	Carc.Cat.2;R45 Xn; R65
Toluene	108-88-3	203-625-9	Not Applicable	4-23	H225 H361d H304 H373 H315 H336	F;R11 Repr.Cat.3;R63 Xn;R48/20-65 Xi;R38 R67
Ethanol	64-17-5	200-578-6	Not Applicable	< 10	H225	F;R11
n-Hexane	110-54-3	203-777-6	Not Applicable	< 2	H225 H361f H304 H373 H315 H336 H411	F;R11 Repr.Cat.3;R62 Xn;R65-48/20 Xi;R38 R67 N;R51-53
Benzene	71-43-2	200-753-7	01-2119447106-44	<1	H225 H350 H340 H372 H304 H319 H315	F;R11 Carc.Cat.1;R45 Muta.Cat.2;R46 T;R48/23/24/25 Xn;R65, Xi;R36/38

¹All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

²Regulation EC 1272/2008.

³Superseded Directives 67/548/EEC and 1999/45/EC.

Total Sulphur: < 0.1 wt%

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3. HAZARDS IDENTIFICATION

3.1 Classification of the substance or mixture

CLP Classification (EC No 1272/2008):

- H224 – Flammable liquids – Category 1
- H304 – Aspiration Hazard – Category 1
- H315 – Skin corrosion/irritation – Category 2
- H340 – Germ cell mutagenicity – Category 1B
- H350 – Carcinogenicity – Category 1B
- H361D – Reproductive toxicity – Category 2
- H361F – Reproductive toxicity – Category 2
- H336 – Specific target organ toxicity (single exposure) – Category 3
- H411 – Hazardous to the aquatic environment, chronic toxicity – Category 2

Superseded DSD Classification (67/548/EEC and 1999/45/EC):

F+;R12, Xi;R38, Carc.Cat. 1;R45, Muta.Cat.2;R46, Repr.Cat. 3;R62, Repr.Cat 3;R63, Xn;R65, R67, N;R51/53

3.2 Label Elements:



DANGER

H224 – Extremely flammable liquid and vapour.

H304 – May be fatal if swallowed and enters airways.

H315 – Causes skin irritation.

H336 – May cause drowsiness or dizziness.

H340 – May cause genetic defects.

H350 – May cause cancer.

H361 – Suspected of damaging fertility or the unborn child.

H411 – Toxic to aquatic life with long lasting effects.

P201 - Obtain special instructions before use.

P210 – Keep away from heat/sparks/open flames/hot surfaces – No smoking.

P280 – Wear protective gloves/protective clothing/eye protection/face protection.

P301+P310 – IF SWALLOWED – immediately call a POISON CENTRE or doctor/physician.

P403+P233 – Store in a well-ventilated place. Keep container tightly closed.

P501: Dispose of contents/container to approved disposal facility.

3.3 Other Hazards:

Does not meet the criteria for persistent, bio-accumulative and toxic (PBT) or very persistent, very bio-accumulative (vPvB) substances.

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4. FIRST AID MEASURES

4.1 Description of first aid measures:

Eye Contact: If irritation or redness develops from exposure, flush eyes with clean water. If symptoms persist, seek medical attention.

Skin Contact: Remove contaminated shoes and clothing and flush affected area(s) with large amounts of water. If skin surface is damaged, apply a clean dressing and seek medical attention. If skin surface is not damaged, cleanse affected area(s) thoroughly by washing with mild soap and water or a waterless hand cleaner. If irritation or redness develops, seek medical attention. Wash contaminated clothing before reuse. If product is injected into or under the skin, or into any part of the body, regardless of appearance of the wound or its size, the individual should be evaluated immediately by a physician. (See Note to Physician.)

Inhalation (Breathing): If respiratory symptoms develop, move victim away from source of exposure and into fresh air in a position comfortable for breathing. If breathing is difficult, oxygen or artificial respiration should be administered by qualified personnel. If symptoms persist, seek medical attention.

Ingestion (Swallowing): Aspiration hazard: do not induce vomiting or give anything by mouth because this material can enter

the lungs and cause severe lung damage. If victim is drowsy or unconscious and vomiting, place on the left side with the head down. If possible, do not leave victim unattended and observe closely for adequacy of breathing. Seek medical Attention.

4.2 Most important symptoms and effects:

Acute: Headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue.

Delayed: None known or anticipated. See Section 11 for information on effects from chronic exposure, if any.

4.3 Indication of immediate medical attention and special treatment needed:

Notes to Physician: When using high-pressure equipment, injection of product under the skin can occur. In this case, the casualty should be sent immediately to hospital. Do not wait for symptoms to develop. High-pressure hydrocarbon injection injuries may produce substantial necrosis of underlying tissue despite an innocuous appearing external wound. These injuries often require extensive emergency surgical debridement and all injuries should be evaluated by a specialist in order to assess the extent of injury. Early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury. 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.

5. FIRE-FIGHTING MEASURES

5.1 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. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam. Water may be ineffective for extinguishment, unless used under favourable conditions by experienced fire fighters.

5.2 Special hazards arising from the substance or mixture:

Unusual fire & explosion hazards: Extremely flammable. This material can be ignited by heat, sparks, flames or other sources of ignition (e.g. static electricity, pilot lights or mechanical/electrical equipment, and electrical devices such as cell phones, computers, calculators, and pagers which have not been certified as intrinsically safe). Vapours may travel considerable distances to a source of ignition where they can ignite, flash back, or explode. May create vapour/air explosion hazard indoors, in confined spaces, outdoors, or in sewers. This product will float and can be reignited on surface water. Vapours are heavier than air and can accumulate in low areas. If container isn't properly cooled, it can rupture in the heat of fire

Hazardous combustion products: Combustion may yield smoke, carbon monoxide and other products of incomplete

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combustion. Oxides of nitrogen and sulphur may also be formed.

5. FIRE-FIGHTING MEASURES continued...

5.3 Special protective actions for fire-fighters:

For fires beyond the initial stage, emergency responders in the immediate hazard area should wear protective clothing. When the potential chemical hazard is unknown, in enclosed or confined spaces, a self-contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area and keep unauthorised personnel out. Stop spill/release if it can be done safely. Move undamaged containers from immediate hazard area if it can be done safely. Water spray may be useful in minimising or dispersing vapours and to protect personnel. Avoid spreading burning liquid with water used for cooling purposes. Cool equipment exposed to fire with water, if it can be done safely.

See Section 9. for Flammable Properties including Flash Point and Flammable (Explosive) Limits

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures:

Extremely flammable. Spillages 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 if safe to do so. The use of explosion-proof electrical equipment is recommended. Stay upwind and away from spill/release. Avoid direct contact with material. For large spillages, notify persons down wind and of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment, including respiratory protection, as condition warrant (see Section 8.) See Sections 2 and 7 for additional information on hazards and precautionary measures.

6.2 Environmental precautions:

Stop spill/release if it can be done safely. Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems and natural waterways. Use foam on spills to minimize vapours. Use water sparingly to minimize environmental contamination and reduce disposal requirements. If spill occurs on water, notify appropriate authorities and advise shipping of any hazard.

6.3 Methods and material for containment and cleaning up:

Notify relevant authorities in accordance with all applicable regulations. Immediate cleanup of any spill is recommended. Dyke far ahead of spill for later recovery or disposal. Absorb spill with inert material such as sand or vermiculite and place in suitable container for disposal. If spilled on water, remove with appropriate methods (eg skimming, booms or absorbents). In case of soil contamination, remove contaminated soil for remediation or disposal, in accordance with local regulations.

Recommended measures are based on the most likely spillage scenarios for this material; however, local conditions and regulations may influence or limit the choice of appropriate actions to be taken.

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7. HANDLING & STORAGE

7.1 Precautions for safe handling:

Keep away from ignition sources such as heat/sparks/open flame – No smoking. Take precautionary measures against static discharge. Non-sparking tools should be used. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves/clothing and eye/face protection. Wash thoroughly after handling. Use good personal hygiene practices and wear appropriate personal protective equipment.

Extremely flammable. May vaporise easily at ambient temperatures. The vapour is heavier than air and may create an explosive mixture of vapour and air. Beware of accumulation in confined spaces and low lying areas. Open container slowly to relieve any pressure. Electrostatic charge may accumulate and create hazardous condition when handling or processing this material. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding container(s) and equipment before transferring material. The use of explosion-proof electrical equipment is recommended and may be required (see appropriate fire codes for specific bonding /grounding requirements). Do not enter confined spaces such as tanks or pits without following proper entry procedures. Do not wear contaminated clothing or shoes. Keep contaminated clothing away from sources of ignition such as sparks or open flames.

For use as a motor fuel only. Do not use as a solvent due to its flammable and potentially toxic properties. Siphoning by mouth can result in lung aspiration which can be harmful or fatal.

The use hydrocarbon fuel in an area without adequate ventilation may result in hazardous levels of incomplete combustion products (e.g. carbon monoxide, oxides of sulphur and nitrogen, benzene and other hydrocarbons) and/or dangerously low oxygen levels.

High pressure injection of hydrocarbon fuels, hydraulic oils or greases under the skin may have serious consequences even though no symptoms or injury may be apparent. This can happen accidentally when using high pressure equipment such as high pressure grease guns, fuel injection apparatus or from pinhole leaks in tubing of high pressure hydraulic oil equipment.

7.2 Conditions for safe storage, including any incompatibles:

Portable containers: static electricity may ignite gasoline vapours when filling portable container(s). To avoid static buildup do not use a nozzle lock open device. Use only approved containers for the storage of gasoline. Place the container on the ground before filling. Keep the nozzle in contact with the container during filling. Do not fill any portable container in or on a vehicle or marine craft. Keep container(s) tightly closed and proper labelled. Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces, and all sources of ignition. Store only in approved container. Post area "No Smoking or Open Flame." Keep away from any incompatible material (see Section 10) protect container(s) against physical damage.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, flame, sparks or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged and promptly shipped to the supplier or a drum re-conditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. Before working on or in tanks which contain or have contained this material, refer to appropriate guidance pertaining to cleaning, repairing, welding or other contemplated operations. Outdoor or detached storage is preferred. Indoor storage should meet Country or Committee standards and appropriate fire codes.

7.3 Specific end use(s):

Refer to supplemental exposure scenarios if attached.

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8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters:

Occupational Exposure Limits:

Component:	US-ACGIH:	UK-EH40:	Other:
Gasoline (Benzene)	STEL: 500ppm TWA: 300ppm	None	None
Ethanol	STEL: 1000ppm;A3	STEL: 3000ppm STEL: 5760mg/m ³	None
Toluene	TWA: 20ppm	STEL: 100ppm STEL: 384 mg/m ³	None
n-Hexane	TWA: 50ppm	STEL: 60ppm	None

	Skin	STEL: 216mg/m ³	
Benzene	STEL: 2.5 ppm TWA: 0.5ppm Skin	STEL: 3ppm STEL: 9.75mg/m ³	None

STEL= Short Term Exposure Limit (15 minutes.); TWA= Time Weighted Average (8 hours); None= No Occupational Exposure Limit

Biological Limit Values:

Component:	US-ACGIH:	EU 98/24/EC:	UK-EH40:
Gasoline (Benzene)	None	None	None
Ethanol	None	None	None
Toluene	o-Cresol in urine: 0.5mg/L, end of shift (B) ; Hippuric acid in urine: 1.6g/g creatinine, End of shift (B,Ns); Toluene in blood: 0.05 mg/L, prior to last shift of workweek	None	None
n-Hexane	2,5-Hexanedione (without hydrolysis) in urine: 0.4mg/L, end of shift at end of workweek (metabolite is specific to n-hex- ane and methyl n-butyl ketone)	None	None
Benzene	S-Phenylmercapturic acid in urine: 25µg/g creatinine, end of shift (B); t,t-Muconic acid in urine: 500µg/g creatinine, end of shift (B)	None	None

None = No Biological Limit Value

Relevant DNEL and PNEC: Pending

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8. EXPOSURE CONTROLS / PERSONAL PROTECTION continued ...

8.2 Exposure controls:

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional engineering controls may be required.

Eye/Face Protection: The use of eye protection that meets or exceeds EN 166 is recommended to protect against potential eye contact, irritation or injury. Depending on conditions of use, close fitting eye protection and a face shield may be necessary.

Skin/Hand Protection: The use of gloves impervious to the specific material handled is advised to prevent skin contact. Users should check with manufacturers to confirm the breakthrough performance of their products. Depending on exposure and use conditions, additional protection may be necessary to prevent skin contact including use of items such a chemical resistant boots, aprons, arm covers, hoods, coverall, or encapsulated suits. Suggested protective materials: Nitrile Wear thermal insulating gloves and face shield or eye protection when working with materials that present thermal hazards (hot or cold).

Respiratory Protection:

Where there is potential for airborne exposure above the exposure limit an approved air purifying respirator equipped with Type A, organic gases and vapour filters (as specified by the manufacturer) may be used.

A respiratory protection program that follows recommendations for the selection, use, care and maintenance of respiratory protective devices in EN 529:2005 should be followed whenever workplace conditions warrant a respirator's use. Air purifying respirators provide limited protection and cannot be used in atmospheres that exceed the maximum use concentration (as directed by regulation or the manufacturers instructions.) in oxygen deficient (less than 19.5% oxygen) situations, or under conditions that immediately dangerous to life and health

(Other Protective Equipment:)

Eye wash and quick-drench shower facilities should be available in the work area. Thoroughly clean shoes and wash contaminated clothing before reuse.

Environmental Exposure Controls: Refer to Sections 6, 7, 12 and 13.

Suggestions provided in this section for exposure control and specific types of protective equipment are based on readily available information. Users should consult with the specific manufacturer to confirm the performance of their protective equipment. Specific situations may require consultation with industrial hygiene, safety or engineering professionals.

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9. PHYSICAL & CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties:

Data represents typical values and is not intended to state precise specifications. N/A = Not Applicable; N/D = Not Determined

Appearance:	Clear, pale yellow (may be dyed various colours)
Physical Form:	Liquid
Odour:	Gasoline
Odour Threshold:	N/D
pH:	N/A
Melting/Freezing Point:	N/D
Initial Boiling Point/Range:	22-210°C
Flash Point:	-40°C (ASTM D56)
Evaporation Rate (nBuAc=1):	10-11
Flammability (solid, gas):	Extremely Flammable
Upper Explosive Limits (vol % in air):	7.6

Lower Explosive Limits (vol % in air):	1.3
Vapour Pressure:	60 kPa @20°C
Relative Vapour Density (air=1):	>1
Relative Density (water=1):	0.75 @ 15°C
Solubility (ies):	Solubility in water: 001g/L
Partition Coefficient (n-octanol/water) (Kow):	N/D
Auto-ignition Temperature:	450°C
Decomposition Temperature:	N/D
Viscosity:	0.5-1.5 mm ² /s @20°C
Explosive Properties:	N/A
Oxidising Properties:	N/A

9.2 Other Information

Pour Point:	N/D
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10. STABILITY & REACTIVITY

10.1 Reactivity:	Not chemically reactive.
10.2 Chemical stability:	Stable under normal ambient and anticipated conditions of use.
10.3 Possibility of hazardous reactions:	Hazardous reactions not anticipated.
10.4 Conditions to avoid:	Avoid high temperatures and all sources of ignition. Prevent vapour accumulation.
10.5 Incompatible materials:	Avoid contact with strong oxidising agents and strong reducing agents.
10.6 Hazardous decomposition products:	Not anticipated under normal conditions of use.

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11. TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects of Substance/Mixture:

Acute Toxicity	Hazard	Additional Information	LC50/LD50 Data
Inhalation	Unlikely to be harmful.		>5.2 mg/L
Skin Absorption	Unlikely to be harmful.		3.75 g/kg
Ingestion (Swallowing)	Unlikely to be harmful.		14 g/kg
Aspiration Hazard:	May be fatal if swallowed and enters airways.		
Skin Corrosion/Irritation:	Causes skin irritation. Repeated exposure may cause skin dryness or cracking.		
Serious Eye Damage/Irritation:	Causes mild eye irritation.		
Signs and Symptoms:	Effects of overexposure can include slight irritation of the respiratory tract, nausea, vomiting, and signs of nervous system depression. (e.g. headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue.) Continued exposure to high concentrations can result in vomiting, cardiac irregularities and sudden loss of consciousness.		

Skin Sensitisation:	Not expected to be a skin sensitizer.
Respiratory Sensitisation:	Not expected to be a respiratory sensitizer.
Specific Target Organ Toxicity (Single Exposure):	May cause drowsiness and dizziness.
Specific Target Organ Toxicity (Repeated Exposure):	Not expected to cause organ effects from repeated exposure. Two year inhalation studies of wholly vaporized unleaded gasoline, as well as vapours of gasoline, did not produce significant target organ toxicity in laboratory animals. Nephropathy in male rats, characterized by the accumulation of alpha-2-u- globulin in epithelial cells of the proximal tubules was observed, however follow-up studies suggest that these changes are unique to the male rat.
Carcinogenicity:	May cause cancer. Based on component information. Two year inhalation studies of wholly vaporized unleaded gasoline produced increased incidences of kidney tumours in male rats and liver tumours in female mice. Follow-up studies suggest that occurrence of the kidney tumors may be linked to alpha-2-u-globulin nephropathy, and most likely unique to the male rat. 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. Nevertheless unleaded gasoline has been identified as a possible carcinogen by IARC.
Germ Cell Mutagenicity:	May cause genetic defects. Based on component information. 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 Toxicity:	Suspected of damaging the unborn child. Suspected of damaging fertility... based on component information. No evidence of developmental toxicity was found in pregnant laboratory animals (rats and mice) exposed to up to 9,000 ppm vapour of unleaded gasoline via inhalation. Vapour recovery gasoline was evaluated in a two generation reproductive toxicity study at concentrations up to 7400 ppm. No reproductive parameters were adversely affected and no deleterious effects on offspring survival or growth were observed.
Other comments:	None Known.

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11. TOXICOLOGICAL INFORMATION continued...

11.2 Information on Hazardous Components

Toluene

Carcinogenicity: Exposure of rats and mice to toluene at concentrations ranging from 120-1200ppm for two years did not demonstrate evidence of carcinogenicity. Toluene has not been listed as a carcinogen by IARC.

Target Organs: Epidemiology studies suggest the chronic occupational overexposure to toluene may damage colour vision. Sub chronic 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.

Reproductive Toxicity: Exposure to toluene during pregnancy has demonstrated limited evidence of developmental toxicity in laboratory animals. Decreased foetal body weight and increased skeletal variations in both inhalation and oral studies, but only at doses that were maternally toxic. No foetal toxicity was seen at doses that were not maternally toxic. Decreased sperm

counts have been observed in male rats in the absence of a reduction in fertility. Toluene has been reported to cause mental or growth retardation in the children of solvent abuser who directly inhale toluene during pregnancy.

Ethanol

Carcinogenicity: 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.

Target Organs: Chronic alcoholism has been associated with damage to the liver in humans (e.g. cirrhosis of the liver.) Excessive consumption of alcoholic beverages has also been associated with adverse effects on the central nervous system, digestive system and cardiovascular system.

Reproductive Toxicity: Adverse reproductive effects are not anticipated from workplace inhalation exposure. Excessive consumption of alcoholic beverages during pregnancy has been associated with effects on the developing foetus referred to collectively as the foetal alcohol syndrome. The effects most frequently manifested include psychomotor dysfunction, growth retardation and characteristic cluster of facial anomalies. It also affects the reproductive system including reduced sperm count and motility and loss of libido in men, abnormal menstrual function, and decreased plasma estradiol and progesterone levels in women.

n-Hexane

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 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.

Reproductive toxicity: Prolonged exposure to high concentrations of n-Hexane (>1000ppm) resulted in decreased sperm count and degenerative changes in the testes of rats but not those of mice.

Benzene

Carcinogenicity: Benzene is an animal carcinogen and is know to produce acute myelogenous leukemia (a form of cancer) in humans. Benzene has been identified as a human carcinogen by IARC, the US National Toxicology Program and the US-Occupational Safety and Health Administration.

Target organs: Prolonged or repeated exposures to benzene vapours can cause damage to the blood and blood forming

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organs, including disorders like leukopenia, thrombocytopenia, and aplastic anaemia.

11. TOXICOLOGICAL INFORMATION continued...

Reproductive Toxicity: Some studies in occupationally exposed women have suggested benzene exposure increased risk of miscarriage and stillbirth and decreased birth weight and gestational age. The size of the effects detected in these studies was small, and ascertainment of exposure and outcome in some cases relied on self-reports, which may limit the reliability of these results.

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

12. ECOLOGICAL INFORMATION

- 12.1 Toxicity:** Acute aquatic toxicity studies on samples of gasoline and naphtha show acute toxicity values greater than 1 mg/L and mostly in the range 1-100mg/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. These substances should be regarded as toxic to aquatic organisms, with the potential to cause long term adverse effects in the aquatic environment.
Classification: H411; Chronic Cat 2.
- 12.2 Persistence and degradability:** The hydrocarbons in this material are not readily biodegradable but are regarded as inherently biodegradable since their hydrocarbon components can be degraded by micro-organisms.
Persistence per IOPC Fund definition: Persistent
- 12.3 Bioaccumulative potential:** Log Kow values measured for the hydrocarbon components of this material range from 3 to greater than 6 and therefore are regarded as having the potential to bioaccumulate. In practice, metabolic processes or physical properties may prevent this effect or limit bioavailability.
- 12.4 Mobility in Soil and Environmental Fate:** On release to water, hydrocarbons will float on the surface and since they are sparingly soluble, the only significant loss is volatilization to air. In air, these hydrocarbons are photodegraded by reaction with hydroxyl radicals with half lives varying from 6.5 days for benzene to 0.5 days for n-dodecane.
- 12.5 Results of PBT and vPvB Assessment:** Not a PBT or vPvB substance.
- 12.6 Other Adverse Effects:** None anticipated.

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13. DISPOSAL CONSIDERATIONS

13.1 Waste Treatment Methods

European Waste Code: 13 07 2 petrol

This material, if discarded as produced, would be considered as hazardous waste pursuant to Directive 91/689/EEC on hazardous waste, and subject to the provisions of that Directive unless Article 1(5) of that Directive applies. This code has been assigned based upon the most common uses for this material and may not reflect contaminants resulting from actual use. Waste generators/producers are responsible for assessing the actual process used when generating the waste and its contaminants in order to assign the proper waste disposal code.

Disposal must be in accordance with Directive 2006/12/EC and other applicable national or regional provisions and based upon material characteristics at time of disposal. For incineration of waste, follow Directive 2000/76/EC. For landfill of waste, follow Directive 1999/31/EC. Product is suitable for burning in an enclosed controlled burner for fuel value if >5000 BTU, or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products. Follow Directive 2000/76/EC.

Empty Containers: Container contents should be completely used and containers emptied prior to discard. Empty drums should be properly sealed and promptly returned to a drum re-conditioner. All containers should be disposed of in an environmentally safe manner and in accordance with applicable regulations.

14. TRANSPORT INFORMATION

14.1	UN Number:	UN1203
14.2	UN proper shipping name:	GASOLINE or MOTOR SPIRIT or PETROL
14.3	Transport hazard class(es):	3
14.4	Packing group:	II
14.5	Environmental hazards:	Marine pollutant
14.6	Special precautions for user:	<i>If transported in bulk by marine vessel in international waters, product is being carried under the scope of MARPOL Annex 1.</i>
14.7	Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code:	Not Applicable.

15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture.

EC 1272/2008 - Classification, labelling and packaging of substances and mixtures.
EN 166:2002 - Eye protection.
EN 529:2005 - Respiratory protective devices.
BS EN 374-1:2003 Protective gloves against chemicals and micro-organisms.
Workplace Exposure Limits, EH40/2005 - Control of Substances Hazardous to Health.
Directive 91/689/EEC on hazardous waste (European Waste Codes).
Directive 2000/76/EC on incineration of waste.
Directive 1999/31/EC on landfill of waste.

Export Rating: NLR (No Licence Required).

15.2 Chemical Safety Assessment

A chemical safety assessment has been carried out for the substance/mixture.

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16. OTHER INFORMATION

List of relevant hazard statements:

H224:	Extremely flammable liquid and vapour.
H225:	Highly flammable liquid and vapour.
H304:	May be fatal if swallowed and enters airways.
H315:	Causes skin irritation.
H319:	Causes serious eye irritation.
H336:	May cause drowsiness or dizziness.
H340:	May cause genetic defects.
H350:	May cause cancer.
H361:	Suspected of damaging fertility or the unborn child.

H372:	Causes damage to organs through prolonged or repeated exposure.
H373:	May cause damage to organs through prolonged or repeated exposure.
H411:	Toxic to aquatic life with long lasting effects.
R11:	Highly flammable.
R12:	Extremely flammable.
R20:	Harmful by inhalation.
R23:	Toxic by inhalation.
R24:	Toxic in contact with skin.
R25:	Toxic if swallowed.
R36:	Irritating to eyes.
R38:	Irritating to skin.
R45:	May cause cancer.
R46:	May cause heritable genetic damage.
R48:	Danger of serious damage to health by prolonged exposure.
R62:	Possible risk of impaired fertility.
R63:	Possible risk of harm to the unborn child.
R65:	Harmful: may cause lung damage if swallowed.
R67:	Vapours may cause drowsiness and dizziness.
R51/53:	Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

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16. OTHER INFORMATION

Guide to Abbreviations:

ACGIH:	American Conference of Governmental Industrial Hygienists.
ADR:	Agreement on Dangerous Goods by Road.
BMGV:	Biological Monitoring Guidance Value.
CASRN:	Chemical Abstracts Service Registry Number.
CEILING:	Ceiling Limit (15 minutes).
EINECS:	European Inventory of Existing Commercial Chemical Substances.
EPA:	[US] Environmental Protection Agency.
TRGS:	[Germany] Technical Rules for Dangerous Substances.
IARC:	International Agency for Research on Cancers

ICAO/IATA:	International Civil Aviation Organisation / International Air Transport Association.
IMDG:	International Maritime Dangerous Goods.
Ireland-HSA:	Ireland's National Health & Safety Authority.
LEL:	Lower Explosive Limit.
N/A:	Not Applicable.
N/D:	Not Determined.
NTP:	[US] National Toxicological Program.
PBT:	Persistent, Bio-accumulative and Toxic.
RID:	Regulations concerning the International Transport of Dangerous Goods by Rail.
STEL:	Short Term Exposure Limit (15 minutes).
TLV:	Threshold Limit Value.
TWA:	Time Weighted Average (8 hours).
UEL:	Upper Explosive Limit.
UK-EH40:	United Kingdom EH40/2005 Workplace Exposure Limits.
vPvB:	very Persistent, very Bio-accumulative.

This safety data sheet serves to complete but not to replace the technical product sheets. The information contained herein is given in good faith and is accurate to the best of knowledge at the date indicated above. It is understood by the user that any use of the product for purposes other than those for which it was designed entails potential risk. The information given herein in no way dispenses the user from knowing and applying all provisions regulating his activity. The user bears sole liability for the precautions required when using the product. The regulatory texts indicated herein are intended to aid the user to fulfill his obligations. This list is not to be considered complete and exhaustive. It is the user's responsibility to ensure that he is subject to no other obligations than those mentioned.