Data Sheet No. S13001 Revision: 16 10 2002 REPLACES S13001: 27 06 00

This data sheet has been prepared in accordance with the requirements of the Data Sheet Directive 91/155/EEC.

RECOMMENDED USES

Avgas 100 LL is recommended for use as:

fuels for spark ignition internal combustion engines designed to run on leaded fuels when these engines are fitted to aircraft.

If Avgas 100 LL are used for a purpose not covered in this section, Shell International Trading and Shipping Company Limited would be grateful to receive information on the application.

KNOWN MISUSES/ABUSES

Avgas 100 LL is not to be used as:

a fuel for vehicles; solvents; cleaning agents; for lighting or brightening fires; as diesel fuel additives to prevent waxing in cold weather. It should never be siphoned by sucking the liquid up a tube by mouth or be stored or used near sources of heat or ignition.

The disposal of Avgas 100 LL to soil, watercourses and drains is a legal offence.

1: IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

PRODUCT: AVGAS 100 LL

COMPANY: SHELL UK OIL PRODUCTS LIMITED

TECHNICAL CONTACT: PRODUCT HSE DEPARTMENT

ADDRESS: STANLOW MANUFACTURING COMPLEX, PO BOX 3, ELLESMERE PORT, CH65 4HB

TELEPHONE: 0151-350-4000

EMERGENCY TELEPHONE NUMBER: 0151-350-4595

2: COMPOSITION/INFORMATION ON INGREDIENTS

Avgas 100 LL is a preparation manufactured from the substance Gasoline, which appears in EINECS and is covered by the entry given below, and additives.

Lead alkyls are present at a maximum concentration of 0.08% as lead.

EINECS NUMBER 289-220-8

CAS NUMBER 86290-81-5

Gasoline

A complex combination of hydrocarbons consisting primarily of paraffins, cycloparaffins, aromatic and olefinic hydrocarbons having carbon numbers predominantly greater than C3 and boiling in the range 30 Deg. C. to 260 Deg. C (86 Deg. F to 500 Deg. F.).

Avgas 100 LL contains the following constituents, which have health effects and are present at significant concentrations.

CONC.	COMPONENT	EINECS	CLASS RISK PHRASES
> 99%	Gasoline (Low Boiling Point Naphtha)	289-220-8	F+ R12 Extremely flammable T R45 May cause cancer Xn R65 Harmful: may cause lung damage if swallowed Xi R38 Irritating to skin R67 Vapours may cause drowsiness and dizziness N R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment
<0.08%	Tetraethyl Lead (Lead Alkyls as Lead)	78-00-2	T R61 May cause harm to the unborn child Xn R62 Possible risk of infertility T R26/27/28 Very toxic by inhalation,in contact with skin and if swallowed R33 Danger of cumulative effects

S13001 16:10:02 Page 1 of 9

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Exposure limit values exist for the following constituents:

Benzene
Ethylbenzene
n-Hexane
Toluene
Trimethylbenzenes
Xylene
and Lead Alkyls

3: HAZARD IDENTIFICATION

Avgas 100 LL is classified for supply purposes as: extremely flammable (R12), carcinogenic (R45: May cause cancer), Harmful (R20/21/22 - Harmful by inhalation, in contact with skin and if swallowed and R65: Harmful: may cause lung damage if swallowed)and as an irritant (R38: Irritating to skin).

Avgas 100 LL is also assigned the additional risk phrases - R67 vapours may cause drowsiness and dizziness and R33 - Danger of cumulative effects.

Avgas 100 LL is an extremely flammable liquid with a flashpoint of less than -40 Deg. C. Avgas 100 LL can readily explode in the presence of electrostatic charges generated, for example, during pumping or tank cleaning or by other sources of ignition or flame impingement on containers.

Exposure limits apply to the following constituents: benzene; ethylbenzene; n-hexane; toluene; trimethylbenzenes; xylene and lead alkyls which are present at significant concentrations. Normal exposures in the open air do not, however, present significant health risks provided care is taken to avoid undue exposure to vapours.

Exposure to higher vapour concentrations can lead to nausea, headache, drowsiness and dizziness, loss of consciousness, and, in oxygen deficient environments, death. A person exposed to significant concentrations of vapour may display drunken behaviour and his judgement can be impaired.

Accidental ingestion can lead to chemical burning of the mouth. Ingestion can lead to vomiting and aspiration into the lungs, which can result in chemical pneumonitis, which can be fatal.

Prolonged and repeated skin contact can lead to defatting of the skin, drying, cracking and dermatitis.

Avgas 100 LL is classified for conveyance purposes as a flammable liquid.

Avgas 100 LL contains gasoline which is classified as dangerous for the environment - N R51/53: Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

It will not biodegrade in anaerobic conditions and, hence, can be persistent. It contains components which have a high potential to bioaccumulate. It is expected to be slightly toxic to fish.

4: FIRST AID MEASURES

INHALATION

Remove the affected person to fresh air. If breathing has stopped administer artificial respiration. Give cardiac massage if necessary. If the person is breathing, but unconscious, place in the recovery position. Obtain medical assistance immediately.

SKIN

Flush the contaminated skin with water. Use soap if available. Contaminated clothing should be soaked with water, removed, and laundered before reuse.

EYES

Flush the eye with copious quantities of water. If irritation persists refer for medical attention.

INGESTION

DO NOT INDUCE VOMITING. If ingestion is suspected, wash out the mouth with water, and send to hospital immediately. Show this Data Sheet to the physician drawing attention to "Notes for Doctors" in Section 11 below.

S13001 16:10:02 Page 2 of 9

5: FIRE-FIGHTING MEASURES

Extinguishants - Large Fire : Foam/Water Fog - NEVER USE WATER JET

- Small Fire : Foam/Dry Powder/AFFF/CO2/Sand/Earth

6: ACCIDENTAL RELEASE MEASURES

LAND SPILLAGES

IMMEDIATE EMERGENCY ACTION

Clear people away from the area to a safe place Do not operate electrical equipment unless flameproof Summon aid of emergency services if warranted

Treat or refer casualties if necessary

FURTHER ACTION - FIRE

IF SAFE : -Stop product flow

Use foam, dry powder or carbon dioxide extinguishers
Containers exposed to fire can be cooled by water fog/spray

*** NEVER USE WATER JET ***

FURTHER ACTION - SPILLAGE

IF SAFE: -

Extinguish naked lights, eg cigarettes - AVOID MAKING SPARKS

Position fire fighting equipment

Try to stop the flow of liquid product

Prevent product entering waterways, drains etc. (Covering with wet sacking helps)

Use sand, earth or other suitable material

If product reaches waterways, drains etc. inform local and fire authorities

Reclaim product directly or absorb in suitable medium and transfer to suitable, clearly marked containers

See section 13 for disposal of contaminated product and waste

MARITIME SPILLAGES

Any spillage of Avgas 100 LL which results in overside pollution must be treated in accordance with the guidelines laid down in the respective Vessel Oil Spill Response Contingency Plan, as required by MARPOL 73/78 Annex 1, Regulation 26. Where the vessel is not required to comply with such legislation, the Owner's and/or Charterer's instructions must be followed. In the absence of any other guidelines, any spillage in territorial/coastal waters must be immediately reported to the appropriate maritime authority, e.g. coast guard, the vessel's local agent if applicable, and the vessel's Owner/Charterer. In international waters, any spillage should be reported to the nearest coastal state, and additional guidance should sought immediately from the vessel's Owner/Charterer.

7: HANDLING AND STORAGE

HANDLING

Avgas 100 LL is designed to be used in closed systems and in aircraft fuel systems. During aircraft fuelling and all other operations extreme care must be taken to avoid any sources of ignition from igniting the vapour. Special care must be exercised when working on aircraft fuel systems. Electrical continuity is required between the transport and storage vessels during product transfer.

STORAGE

The storage of gasolines may be subject to regulatory controls.

The main considerations relating to the storage of gasolines are the suitability of the storage vessel and the avoidance of sources of ignition, and the maintenance of quality. Aviation fuels are subject to stringent quality requirements in the interests of air safety and product integrity is of paramount importance. Precautions should be taken to avoid water coming into, or remaining, in contact with aviation fuels. The area around storage facilities should be kept clear of combustible material, including vegetation.

S13001 16:10:02 Page 3 of 9

8: EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

The following limits are taken from The Health and Safety Executive's Guidance Note EH40 Occupational Exposure Limits 2002.

Maximum Exposure Limits:

Benzene: 9 mg/cubic metre (3 ppm) 8-hour TWA value *

Occupational Exposure Standards:

Ethylbenzene: 441 mg/cubic metre (100 ppm) 8-hour TWA value

552 mg/cubic metre (125 ppm) 15-min TWA value

n-Hexane: 72 mg/cubic metre (20 ppm) 8-hour TWA value

Toluene: 191 mg/cubic metre (50 ppm) 8-hour TWA value

574 mg/cubic metre (150 ppm) 15-min TWA value

Trimethylbenzenes, 125 mg/cubic metre (25 ppm) 8-hour TWA value

all isomers or mixtures:

Xylene, all isomers: 441 mg/cubic metre (100 ppm) 8-hour TWA value (skin) 662 mg/cubic metre (150 ppm) 15-min TWA value

Lead alkyls * 0.10 mg/cubic metre 8-hour TWA value

Lower exposure limits may apply locally. Check national legislation for specific country data.

RECOMMENDED PROTECTIVE CLOTHING

Impervious gloves and overalls where regular contact is likely, and goggles if there is a risk of splashing. Respiratory protective equipment to BS EN 137 1993 - Specification for Respiratory Protective Devices Self-contained Open Circuit Compressed Air Breathing Apparatus - should be used where exposures are likely to exceed the exposure limits.

1 % vol.

9: PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Mobile liquid at ambient temperature

Appearance : Clear blue
Odour : Characteristic
Acidity/Alkalinity : Mildly acidic
Initial Boiling Point : ca. 35 Deg. C.

Flashpoint : Less than minus 40 Deg. C.

Flammability:

Autoflammability:

Flammability Limits

- Upper:

Not applicable
ca. 400 Deg. C.
6 % vol.

Explosive Properties:

Oxidising Properties:

Vapour Pressure @ 20 Deg. C.:

Relative Density @ 15 Deg. C.:

Solubility:

Water Solubility:

Very Low

Fat solubility/solvent:

Not applicable

Not applicable

Not applicable

Not applicable

Not applicable

Partition Coefficient, n-octanol water: 2 to >6 for constituents

Vapour Density (Air =1):

- Lower :

Viscosity @ 40 Deg. C.: 0.7 to 1.5 cSt.

10: STABILITY AND REACTIVITY

CONDITIONS TO AVOID

Sources of ignition. Elevated temperatures.

S13001 16:10:02 Page 4 of 9

^{*} The occupational exposure limits for lead are set out in the Control of Lead at Work Regulations 1998.

^{**} The MEL for Benzene will be further reduced to 1 ppm 8-hour TWA (3 mg/m3) by 27th June 2003.

MATERIALS TO AVOID

Strong oxidising agents, eg. chlorates which may be used in agriculture.

DECOMPOSITION PRODUCTS

The substances arising from the thermal decomposition of these products will largely depend upon the conditions bringing about decomposition. The following substances may be expected from normal combustion:

Carbon Dioxide Polycyclic Aromatic Hydrocarbons

Carbon Monoxide Unburnt Hydrocarbons

Water Unidentified Organic and Inorganic Compounds

Particulate Matter Nitrogen Oxides

11: TOXICOLOGICAL INFORMATION

ACUTE HEALTH HAZARDS AND ADVICE

Avgas 100 LL is classified as harmful, owing to the aspiration hazard, and as a skin irritant.

Avgas 100 LL satisfies the criteria for the additional risk phrase - vapours may cause drowsiness and dizziness.

The main hazards are: in the case of inhalation of higher vapour concentrations, of effects on the central nervous system; in the case of skin contact of, defatting and irritation; in the unlikely event of ingestion, of aspiration into the lungs with possible resultant chemically induced pneumonia; and lead absorption, mainly by skin contact and ingestion routes.

If the product is accidentally ingested, irritation to the gastric mucous membranes can lead to vomiting. If this occurs, there is a high probability of the product being aspirated into the lungs, which can lead to chemical pneumonitis which can be fatal.

INHALATION

Under normal conditions of use, where it is contained in closed systems, Avgas 100 LL is not expected to present an inhalation hazard.

However, in those circumstances where a person is exposed to significant vapour concentrations, the vapours may cause drowsiness and dizziness.

Precautions:

Inhalation of vapours should be avoided and exposures maintained below exposure limits by the use of general ventilation, or where this cannot be achieved, by the use of respiratory protective equipment.

Where, exceptionally, higher concentrations of the vapour may be encountered, e.g. in the event of a spillage in a badly ventilated area, persons should not be allowed to enter the area, even in an emergency, until the atmosphere has been checked and passed as safe for entry by a competent person.

First Aid:

Remove the affected person to fresh air. If breathing has stopped administer artificial respiration. Give cardiac massage if necessary. If the person is breathing, but unconscious, place in the recovery position. Obtain medical assistance immediately.

SKIN

Avgas 100 LL is classified as a skin irritant and has a defatting action on the skin. Alkyl lead is moderately toxic and can be absorbed through the skin.

Precautions:

Avoid contact with the skin by the use of suitable protective clothing, or careful handling of the product.

First Aid:

Flush the contaminated skin with water. Use soap if available. Contaminated clothing should be soaked with water, removed, and laundered before reuse.

S13001 16:10:02 Page 5 of 9

EYES

Avgas 100 LL may cause discomfort to the eye.

Precautions:

If there is a risk of splashing while handling the liquid, suitable eye protection should be used.

First Aid:

Flush the eye with copious quantities of water. If irritation persists refer for medical attention.

INGESTION

Avgas 100 LL is classified as harmful owing to the aspiration hazard. Accidental ingestion can lead to chemical burning of the mouth. Ingestion can lead to vomiting and aspiration into the lungs, which can result in chemical pneumonitis, which can be fatal. Alkyl lead is moderately toxic and can be absorbed through the gut.

Precautions:

Accidental ingestion is unlikely. Normal handling and hygiene precautions should be taken to avoid ingestion.

First Aid:

DO NOT INDUCE VOMITING. If ingestion is suspected, wash out the mouth with water, and send to hospital immediately. Show this Data Sheet to the physician drawing attention to "Notes for Doctors" below.

CHRONIC HEALTH HAZARD AND ADVICE

Avgas 100 LL is classified as a category 2 carcinogen, owing to the benzene content being greater than 0.1%. The effects of benzene include haematological and cromosomal changes and leukaemia.

Avgas 100 LL contains benzene, n-hexane, xylene, toluene and other hydrocarbons, which can be harmful to health in the event of prolonged and repeated exposure.

Lead alkyls are present at less than 0.08%. Lead accumulates in the body and can impair fertility and cause harm to the unborn child. However, there is no evidence of such effects arising from contact with the very low concentrations present in Avgas 100 LL.

Adherence to the recommended hygiene precautions will minimise any risks, which under normal conditions of use will be negligible.

NOTES FOR DOCTORS

HIGH PRESSURE INJECTION INJURIES

High pressure injection injuries require surgical intervention and possibly steroid therapy to minimise tissue damage and loss of function. Because entry wounds are small and do not reflect the seriousness of the underlying damage, surgical exploration to determine the extent of involvement may be necessary. Local anaesthetics or hot soaks should be avoided because they can contribute to swelling, vasospasm and ischaemia. PROMPT surgical decompression, debridement and evacuation of foreign material should be performed under general anaesthetic, and wide exploration is essential.

INGESTION AND ASPIRATION OF PETROLEUM PRODUCTS

There may be a risk to health where low viscosity products are aspirated into the lungs following vomiting, although this is uncommon in adults. Such aspiration would cause intense local irritation and chemical pneumonitis. Children, and those in whom consciousness is impaired, will be more at risk. Emesis of lubricants is not usually necessary, unless a large amount has been ingested, or some other compound has been dissolved in the product. If this is indicated - for example, when there is rapid onset of CNS depression from a large ingested volume - gastric lavage under controlled hospital conditions, with full protection of the airway is required. Supportive care may include oxygen, arterial blood gas monitoring, respiratory support and, if aspiration has occurred, treatment with corticosteroids and

S13001 16:10:02 Page 6 of 9

12: ECOLOGICAL INFORMATION

Avgas 100 LL contains one constituent, present at <0.08%, which is classified as dangerous for the environment R50/53 "Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment".

Avgas 100 LL contains one constituent, present at >99%, which is classified as dangerous for the environment R51/53 "Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment".

The information given below refers to the gasoline component.

<u>AIR</u>

Gasoline is a mixture of volatile components which when released to air will react rapidly with hydroxyl radicals and ozone.

WATER

If released to water, the majority of the product will evaporate rapidly but a small proportion will dissolve. Dissolved components will either be absorbed by sediments or evaporate to air. In aerobic water and sediment they will biodegrade, but under anaerobic conditions they will persist. The product is slightly toxic to aquatic organisms and contains components with the potential to bioaccumulate, but is unlikely to persist in the aquatic environment for sufficient time to pose a significant hazard.

SOIL

Small volumes released on land will evaporate, with a proportion of the product being absorbed in the upper soil layers and being subject to biodegradation. Larger volumes may penetrate into anaerobic soil layers in which the product will persist. The product may reach the water table on which it will form a floating layer, in which case the more soluble components will cause groundwater contamination. The product will move with groundwater. The movement of the product and the solubility of constituents can lead to contamination of sources of drinking water.

13: DISPOSAL CONSIDERATIONS

Avgas 100 LL is covered by the Special Waste Regulations. Avgas 100 LL should be disposed of to a licensed waste contractor. Any disposal route should comply with local byelaws and the requirements of the Environmental Protection Act, 1990. Avgas 100 LL is subject to the Special Waste Regulations 1996.

14: TRANSPORT INFORMATION

Dangerous for Conveyance

UN Number: 1203

Proper Shipping Name: Petrol or Motor Spirit or Gasoline

Symbol: Flammable Liquid Packing Group: II

Marine Pollutant : No

IATA/ICAO Hazard Class : 3

IMO Hazard Class * : 3.1
Class · 3

Classification Code : F1
Hazard Identification No. : 33

Hazchem Code : 3|Y|E

S13001 16:10:02 Page 7 of 9

^{*} Gasoline (Motor Spirit or Petrol) UN 1203 is not considered a marine pollutant by IMO. IMO have issued a corrigendum revoking the status of Gasoline (Motor Spirit or Petrol) UN 1203 as a marine pollutant. Further details can be obtained from IMO's web site (IMO.org) under "publications" - IMDG consolidated errata and corrigenda volume 2, page 16.

15: REGULATORY INFORMATION

This material has been classified according to the requirements of the Dangerous Substances Directive 67/548/EEC, the 28th Adaptation to Technical Progress and the Preparations Directive.

Dangerous for Supply

Symbols: Flame

Skull and crossbones Dead fish and tree

Extremely Flammable Categories of danger:

Carcinogenic Harmful Irritant

Dangerous for the Environment

R12 Extremely flammable Risk Phrases: R45 May cause cancer

Also

R20/21/22Harmful by inhalation, in contact with skin and if swallowed

R65 Harmful: may cause lung damage if swallowed

Irritating to skin R38

R33 Danger of cumulative effects

R67 Vapours may cause drowsiness and dizziness

R51/53 Toxic to aquatic organisms, may cause long-term adverse effects

in the aquatic environment

Safety Phrases: Keep out of the reach of children S₂

S23 Do not breathe vapour S24 Avoid contact with skin S29 Do not empty into drains

S43 In case of fire use foam/dry powder/AFFF/CO2

NEVER USE WATER

S45 In case of accident or if you fell unwell, seek medical advice immediately (show the label where possible) S53 Avoid exposure - Obtain special instructions before use

S61 Avoid release to the environment. Refer to special instructions /

safety data sheets

S62 If swallowed, do not induce vomiting : seek medical advice

immediately and show this container or label

Gasoline (Low Boiling Point Naphtha)

Contains: Tetraethyl Lead

16: OTHER INFORMATION

The references set out below give further information on specific aspects.

GUIDANCE NOTES AVAILABLE FROM HMSO

The cleaning and gas freeing of tanks containing flammable residues CS/15 HS(G)22 Electrical apparatus for use in potentially explosive atmospheres

HS(G)51 The storage of flammable liquids in containers HS(G)140 The safe use and handling of flammable liquids

Storing flammable liquids in tanks HS(G)176

HS(G)71 The storage of packaged dangerous substances FH/40

Occupational Exposure Limits The Carcinogenicity of Mineral Oils EH/58

MS24 Health surveillance of occupational skin disease

OTHER LITERATURE

Concawe Report 01/97 Petroleum Products - First Aid Emergency and Medical Advice

CAA - Aviation Fuel at Aerodromes - CAP 434

CAA - Offshore Helicopter Landing Areas: Guidance on Standards - CAP 437

Department of Trade and Industry - The Fuel of Land Planes and Helicopters - CAP 74
Department of Trade - Code of Portable Tanks and Road Tank Vehicles for the Carriage of Liquid Dangerous Goods in Ships Institute of Petroleum Marketing Safety Code

European Model Code of Safe Practice in the Storage and Handling of Petroleum Products Leaded Gasoline Tanks - Cleaning and Disposal of Sludge. Associated Octel Company

S13001 16:10:02 Page 8 of 9

ADDRESSES

HMSO, 49 High Holborn, London WC1V 6HB Concawe, Boulevard du Souverain 165 B - 1160 Brussels, Belgium Institute of Petroleum, 61 New Cavendish Street, London W1 Associated Octel Company Limited, PO Box 17, Oil Sites Road, Ellesmere Port, South Wirral L65 4HF

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S13001 16:10:02 Page 9 of 9