



Issue 2: Date 28th June 2006

E85 (Unleaded Gasoline)

This data sheet has been prepared in accordance with the requirements of EC Directive 2004/73/EC.

RECOMMENDED USES

E85 Unleaded Gasoline is recommended for use as :

fuel for spark ignition internal combustion engines designed to run on unleaded fuels when these engines are not fitted to aircraft.

KNOWN MISUSES/ABUSES

E85 Unleaded Gasoline is not to be used as :

fuel in aircraft; solvent; cleaning agent; for lighting or brightening fires; as diesel fuel additive 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 E85 Unleaded Gasoline to soil, watercourses and drains is a legal offence.

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

PRODUCT : E85 (UNLEADED GASOLINE)
 COMPANY : SHELL GLOBAL SOLUTIONS
 ADDRESS : CHESHIRE INNOVATION PARK,
 ADDRESS : POSTAL ADDRESS: PO BOX 1, CHESTER, CH1 3SH
 DELIVERIES: POOL LANE, INCE, CHESTER, CHESHIRE; CH2 4NU
 EMERGENCY TELEPHONE NUMBER : 0151-350-4595 (24 hrs)

2: COMPOSITION/INFORMATION ON INGREDIENTS

Preparation Description

E85 Unleaded Gasoline is a preparation consisting of approx. 85% by volume ethanol (which may be bio-derived) plus approx. 15% by volume unleaded gasoline.

| COMPONENT | EINECS | CLASS | RISK PHRASES |
|---|----------------|-------|---|
| > 80% Ethanol ('bioethanol') | 200-578-6 | F | R11 Highly Flammable |
| <20% Gasoline (Low Boiling Point Naphtha) | 289-220-8 T | F+ | R12 Extremely flammable |
| | | R45 | May cause cancer |
| | | | R46 May cause heritable genetic damage |
| | | Xn | R63 Possible risk of harm to the unborn child |
| | | 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 on the environment |

Exposure limit values exist for the following constituents which may be present at > 0.1%v/v:

Butane, Benzene, cyclohexane, ethanol, ethylbenzene, n-Hexane, n-heptane, toluene, trimethylbenzenes, Xylene,

3: HAZARD IDENTIFICATION

E85 Unleaded Gasoline is classified for supply purposes as: extremely flammable (R12), carcinogenic (R45: May cause cancer), Mutagenic (R46: May cause heritable genetic damage), Harmful (R65: May cause lung damage) and irritant

(R38 Irritating to skin) E85 Unleaded gasoline is also assigned the additional risk phrase R67; Vapours may cause drowsiness and dizziness.

E85 Unleaded gasoline is an extremely flammable liquid with flashpoint of less than -40 Deg. C., which 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 a number of constituents (see section 2), some of 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, dizziness, and in extreme cases, 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.

E85 Unleaded Gasoline is classified for conveyance purposes as flammable liquids.

The ethanol portion is biodegradable and not classified as hazardous for the environment. The unleaded gasoline portion however is classified as dangerous for the environment N R51/53: Toxic to aquatic organisms, may cause long-term adverse affects 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. Protect airway if vomiting begins. Give nothing by mouth. If breathing but unconscious, place in recovery position. If breathing has stopped, apply artificial respiration. 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.

5: FIRE-FIGHTING MEASURES

Extinguishants - Large Fire : Alcohol resistant foam/Water Fog - NEVER USE WATER JET
 - Small Fire : Alcohol resistant foam /Dry Powder/AFFF/CO2/Sand/Earth

Proper protective equipment must be worn, this should include breathing apparatus when approaching a fire in a confined space.

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 alcohol resistant 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 suit clearly marked containers.

See Section 13 for disposal of contaminated product and waste

MARITIME SPILLAGES

Maritime spillages should be dealt with using a Shipboard Oil Pollution Emergency Plan (SOPEP), as required by MARPOL Annex 1 Regulation 26.

OTHER INFORMATION

Local authorities should be advised if significant spillages cannot be contained. Observe all relevant local regulations. If contamination of sites occurs remediation may require specialist advice. In the UK, Advice may be obtained from Environment Agency Emergency Hotline 0800 80 70 60 (24hr).

7: HANDLING AND STORAGE

HANDLING

E85 Unleaded Gasoline is designed to be used in closed systems and in vehicle fuel systems. During vehicle 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 vehicle fuels systems and in particular vehicle running tanks. These must always be removed from the vehicle in the open air after the battery has itself been disconnected and removed. E85 Unleaded Gasoline can readily explode in the presence of electrostatic charges generated, for example, during pumping or tank cleaning. Electrical continuity is required between the transport and storage vessels during product transfer. Avoid splash filling.

STORAGE

The storage of any petroleum spirit is subject to legislative controls. E85 Gasoline must never be stored in buildings occupied by people. Small volumes (maximum 5 litres), may be stored in a suitably designed portable container. Such containers should be stored in well-ventilated areas, flameproof cabinets or stores. Use properly labelled and closeable containers. Keep container tightly closed in a dry, well-ventilated place away from direct sunlight and other sources of heat or ignition. Take suitable precautions when opening sealed containers, as pressure can build up during storage. Keep in a bonded area with a sealed (low permeability) floor, to provide containment against spillage. Prevent ingress of water. Stack drums to a height not exceeding 3 metres without the use of racking. Locate tanks away from heat and other sources of ignition. Gasolines in bulk must be stored in properly designed tanks. Seek specialist advice for the design, construction and operation of bulk storage. Cleaning, inspection and maintenance of storage tanks is a specialist operation which requires the implementation of strict procedures and precautions.

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 2005

Workplace Exposure Limits :

| | |
|-------------|--|
| Benzene : | 3 mg/cubic metre (1 ppm) 8-hour TWA value |
| Butane | 1450 mg/cubic metre (600 ppm) 8-hour TWA value 1810 mg/cubic metre (750 ppm) 15-min TWA value |
| Cyclohexane | 350 mg/cubic metre (100 ppm) 8-hour TWA value 1050 mg/cubic metre (300 ppm) 15-min TWA value |
| Ethanol | 1920 mg/cubic metre (1000 ppm) 8-hour TWA value |

| | |
|----------------------------|--|
| 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 |
| n-Heptane | 500 ppm 8-hour TWA value |
| Methyl-tert-butyl ether | 92 mg/cubic metre (25 ppm) 8-hour TWA value 275 mg/cubic metre (75 ppm) 15-min TWA value |
| Naphthalene | 53 mg/cubic metre (10 ppm) 8-hour TWA value 18 mg/cubic metre (15 ppm) 15-min 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 |
| Xylene, all isomers (Skin) | 220 mg/cubic metre (50 ppm) 8-hour TWA value 441 mg/cubic metre (100 ppm) 15-min TWA value: |

RECOMMENDED PROTECTIVE CLOTHING

Impervious gloves and overalls where regular contact is likely, and goggles if there is a risk of splashing.

Select gloves tested to a relevant standard (e.g. Europe EN374, US F739). When prolonged or frequent repeated contact occurs, Nitrile gloves may be suitable. For incidental contact/splash protection Neoprene or PVC gloves may be suitable. Breakthrough times for gloves varies depending on, e.g. chemical resistance, material thickness, frequency and duration of contact. Selection should also take into account other usage requirements, e.g. dexterity, heat resistance, other chemical substances handled. Always seek advice from glove suppliers. Contaminated gloves should be replaced

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.

9: PHYSICAL AND CHEMICAL PROPERTIES

| | |
|--|--|
| Physical State : | Mobile liquid at ambient temperature |
| Appearance : | Clear water white/straw/pale orange |
| Odour : | Characteristic |
| Acidity/Alkalinity : | Not applicable |
| Initial Boiling Point : | ca. 30 Deg. C. |
| Flashpoint : | Less than minus 40 Deg. C. |
| Flammability : | Not applicable |
| Autoflammability : | 300 Deg. C. (based on gasoline) |
| Flammability Limits | - Upper: 19 % vol.(estimated based on values for gasoline& ethanol) - Lower: 1 % vol. (estimated based on values for gasoline& ethanol) |
| Explosive Properties : | Not applicable |
| Oxidising Properties : | Not applicable |
| Vapour Pressure @ 20 Deg. C: | 32 to 52 kPa |
| Relative Density @ 15 Deg. C.: | 0.760 to 0.790 |
| Solubility : | Water Solubility : Very Low (gasoline portion) however alcohol portion will dissolve |
| Fat solubility/solvent : | Not available |
| Partition Coefficient, n-octanol water : | Not available |
| Vapour Density (Air =1) : | Not available |
| Viscosity @ 40 Deg. C. : | 0.5 to 1 Cst. |

10: STABILITY AND REACTIVITY

CONDITIONS TO AVOID

Sources of ignition. Elevated temperatures.

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 Carbon Monoxide, Water, Particulate Matter Sulphur Oxides, Polycyclic Aromatic Hydrocarbons, Unburnt Hydrocarbons, Unidentified Organic and Inorganic Compounds, Nitrogen Oxides

11: TOXICOLOGICAL INFORMATION

ACUTE HEALTH HAZARDS AND ADVICE

E85 Unleaded Gasoline is classified as harmful by aspiration and as skin irritants.

E85 Unleaded gasoline 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.

Exposure to higher vapour concentrations can lead to nausea, headache, drowsiness, 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.

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, E85 Unleaded Gasoline 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

E85 Unleaded Gasoline is classified as skin irritant and is expected to have a defatting action on 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.

EYES

E85 Unleaded Gasoline 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

E85 Unleaded Gasoline 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.

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

E85 Unleaded Gasoline is classified as category 2 carcinogen and , category 2 Mutagen owing to the benzene content being greater than 0.1%. However it is not classified as category 3 Reproductive Toxicants due to the toluene content being <5%. They contain benzene, n-hexane, xylene, toluene and other hydrocarbons which can be harmful to health in the event of prolonged and repeated exposure.

The effects include haematological and chromosomal changes and leukaemia. 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, which may lead to local necrosis, 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..

INGESTION AND ASPIRATION OF PETROLEUM PRODUCTS

There may be a risk to health where low viscosity products are aspirated into the lungs following vomiting.

Treat symptomatically. In cases of ingestion, consider gastric lavage. Gastric lavage must only be undertaken after cuffed endotracheal intubation in view of the risk of aspiration. Administration of carbon for medicinal use (carbo medicinalis) may reduce absorption from the digestive tract. In cases of chemical pneumonitis, antibiotic and corticosteroid therapy should be considered, but only under expert guidance and with special care facilities.

12: ECOLOGICAL INFORMATION

The information given below is general for gasolines, which are classified as dangerous for the environment - N R51/53: Toxic to aquatic organisms, may cause long-term adverse effects on the aquatic environment.

AIR

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 gasoline portion 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.

The alcohol portion is expected to be water soluble and is expected to be readily bio-degradable (possibility of oxygen depletion)

SOIL

Small volumes of gasoline 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

E85 unleaded Gasoline is covered by the Special Waste Regulations. E85 Unleaded Gasoline should be disposed of to a licensed waste contractor. Any disposal route should also comply with local byelaws. In the UK, E85 Unleaded Gasoline is subject to Hazardous Waste (England and Wales) Regulations 2005..

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
Class : 3
Classification code : F1
Hazard Identification No. : 33
Hazchem Code : 3YE

Gasoline (Motor spirit or Petrol) UN 1203 is not considered a marine pollutant by IMO.

15: REGULATORY INFORMATION

This material has been classified according to the requirements of the Dangerous Substances Directive, 67/548/EEC and the 29th Adaptation to Technical Progress 2004/73/EC and the Preparations Directive.

Dangerous for Supply

Symbols : Flame
Skull and crossbones

Categories of danger : Extremely flammable
Carcinogenic Category 2
Mutagenic Category 2
Harmful
Irritant

Risk Phrases : R12 Extremely flammable
R45 May cause cancer
R46 May cause heritable genetic damage

Also :

R65 Harmful: may cause lung damage if swallowed
R38 Irritating to skin
R67 Vapours may cause drowsiness and dizziness
R52/53 Harmful to aquatic organisms, may cause long term adverse effects on the environment

Safety Phrases : 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 Sheet.
S62 If swallowed, do not induce vomiting : seek medical advice immediately and show this container or label

Contains : Gasoline (Low Boiling Point Naphtha) and ethanol

16: OTHER INFORMATION

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

LEGISLATION

Carriage of Dangerous Goods by Road and Rail (Classification, Packaging and Labelling) Regulations
Carriage of Dangerous Goods by Road Regulations (1996)
Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2004
Chemical (Hazards, Information, and Packaging for Supply) Regulations 2002
Consumer Protection Act 1987
Control of Substances Hazardous to Health Regulations (as amended 2002)
Control of Pollution Act 1974
Control of Pollution (Oil Storage) (England) Regulations 2001
Dangerous Substances and Explosive Atmospheres Regulations 2002
Environmental Protection Act 1990
Environmental Act 1995
Factories Act 1961
Health and Safety at Work Act 1974
Health and Safety (First Aid) Regulations 1981
Merchant Shipping (Dangerous Goods and Marine Pollutants) Regulations
Personal Protective Equipment (EC Directive) Regulations 2002
Personal Protective Equipment at Work Regulations 1992
Road Traffic (Carriage of Dangerous Substances in Packages etc.) Regulations
Road Traffic (Carriage of Dangerous Substances in Road Tankers and Tank Containers) Regulations
Road Traffic (Training of Drivers of Vehicles Carrying Dangerous Goods) Regulations
Reporting of Injuries, Diseases and Dangerous Occurrences Regulations
Special Waste Regulations
Water Resources Act 1991
Water Industry Act 1991

GUIDANCE NOTES

CS/15 The cleaning and gas freeing of tanks containing flammable residues
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
HS(G)176 Storing flammable liquids in tanks
HS(G)71 The storage of packaged dangerous substances
EH/40 Occupational Exposure Limits
EH/58 The Carcinogenicity of Mineral Oils
MS24 Health surveillance of occupational skin disease

BRITISH STANDARDS

BS 799 Specification for Oil Burning Equipment
BS 2000 Methods of Test for Petroleum and its Products
BS 2869 Fuel Oils for Oil Engines and Burners for Non-Marine Use
BS 5345 Selection, Installation and Maintenance of Electrical Apparatus for Use in Potentially Explosive Atmospheres
BS 5410 Oil Firing
BS 5958 Control of Undesirable Static Electricity

OTHER LITERATURE

CONCAWE Report 01/97 Petroleum Products - First Aid Emergency and Medical Advice
CONCAWE Report 6/05 Classification and labelling of Petroleum substances according to EU dangerous substances directive
CONCAWE Report 01/54 environmental classification of petroleum substances summary data and rationale
CONCAWE Report 5/02 amended safety data sheet directive (2001/58/EC).
Department of the Environment - Waste Management - The Duty of Care - A Code of Practice
Institute of Petroleum Marketing Safety Code
European Model of Safe Practice in the Storage and Handling of Petroleum Products.
Department of Trade - Code of Portable Tanks and Road Tank Vehicles for the Carriage of Liquid Dangerous Goods in Ships.

ADDRESSES

CONCAWE, Boulevard du Souverain 165 B – 1160 Brussels, Belgium
Institute of Petroleum, 61 New Cavendish Street, London W1

MSDS HISTORY: Version Number: 2

Issue Date: 28th June 2006

Revisions: Revisions are marked with vertical bar on left hand side of text
Latest revision: (main changes): Revised classification (following 29th ATP to the DSD), new exposure limits, new references & PPE advice.

Further Information

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It does not constitute a guarantee for any specific property of the product.

END.