

Safety Data Sheet

Heavy Fuel Oil**1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY/UNDERTAKING**

| | | | |
|-------------------------|---|--|---|
| Product Type/Use | Fuel for use in off-road diesel engines, boilers, furnaces and other combustion equipment. | | |
| Other Names | Name Fuel Oil Blend Component, Marine Fuel Oil 360, Marine Fuel Oil 25, Marine Fuel Oil 180, Marine, Marine Fuel Oil 180 FIJI, Inland Fuel Oil 180, Fuel Oil Tahiti, Fuel Oil TA, Fuel Oil 571. | | |
| Supplier | Shell Company of Australia Ltd. Level 2, 8 Redfern Road, Hawthorn East, Victoria 3123 (ABN 46 004 610 459) AUSTRALIA | | Telephone Numbers Emergency Tel. 1800 651 818 Telephone/Fax Number Tel: 03 9666 5444 Fax: 03 8823 4800 |

2. COMPOSITION/INFORMATION ON INGREDIENTS**Preparation Description**

Streams obtained from distillation and cracking processes and containing a mixture of saturated, aromatic and olefinic hydrocarbons with carbon numbers predominantly in the C9 to C50 range. Contains cracked components in which polycyclic aromatic compounds, mainly 3-ring but some 4 to 6 ring species, are present. Contains sulphur, oxygen, nitrogen compounds, vanadium and other metals at >10 ppm w/w. Hydrogen sulphide may be present both in the liquid and the vapour. Composition is complex and varies with the source of the crude oil.

| Name | CAS | EINECS | Proportion | Hazard | R Phrase |
|--------------------|------------|-----------|------------|-----------|------------------|
| Fuel oil, residual | 68476-33-5 | 270-675-6 | 99-100 % | T | R45, R66, R52/53 |
| Hydrogen sulphide | 7783-06-4 | 231-977-3 | 0-0.09 % | F+, T+, N | R12, R26, R50 |

Other Information

Heavy Fuel Oils are blends of residual fuels and distillate streams which always require heating before use. See Section 16 'Other Information' for full text of each relevant Risk Phrase.

3. HAZARDS IDENTIFICATION**Hazards Identification**

HAZARDOUS SUBSTANCE.

NON-DANGEROUS GOODS.

Hazard classification according to the criteria of NOHSC.



Dangerous goods classification according to the Australia Dangerous Goods Code.

Human Health Hazards

Fuel oil may cause cancer. Product classified as a Category 2 carcinogen. Hydrogen sulphide may accumulate in the head space of containers. The vapour phase in tanks and vessels should be regarded as a hazardous space. Hydrogen sulphide is very toxic by inhalation and may cause respiratory paralysis and death. This product is normally used as a hot liquid and contact may cause burns. Repeated exposure may cause skin dryness or cracking.

Safety Hazards

Not classified as flammable, but will burn. Therefore it should be treated as a potentially flammable liquid. Flammable vapours may be present even at temperatures below the flash point. May ignite on surfaces at temperatures above auto-ignition temperature.

Environmental Hazards

Harmful to aquatic organisms. May cause long term adverse effects in the aquatic environment.

4. FIRST AID MEASURES

Symptoms and Effects

Not expected to give rise to an acute hazard under normal conditions of use. Exposure to hydrogen sulphide, at concentrations above the recommended occupational exposure standard, may cause headache, dizziness, irritation of the eyes, upper respiratory tract, mouth and digestive tract, convulsions, respiratory paralysis, unconsciousness and even death. Unconsciousness as a result of exposure to hydrogen sulphide may occur extremely rapidly and without other symptoms. Contact with hot product may cause skin burns, including to the underlying skin. Owing to its high viscosity this product does not normally constitute an ingestion hazard. Ingestion will only occur in grossly abnormal circumstances. If ingested may lead to irritation of the mouth, irritation of the throat, irritation of the digestive tract, and vomiting.

Inhalation

Remove to fresh air. If breathing but unconscious, place in the recovery position. If breathing has stopped, apply artificial respiration. If heartbeat absent, give external cardiac compression. Monitor breathing and pulse. Seek urgent medical advice.

Skin

Wash skin with water using soap if available. Contaminated clothing must be removed as soon as possible. It must be laundered before reuse. When using high pressure equipment, injection of product under the skin can occur. If high pressure injuries occur, the casualty should be sent immediately to a hospital. Do not wait for symptoms to develop.

Eye

Flush eye with copious quantities of water. If persistent irritation occurs, obtain 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. OBTAIN MEDICAL ATTENTION IMMEDIATELY.

Advice to Doctor

No specific treatment indicated. Treat with supportive measures as appropriate to the patient's condition. High pressure injection injuries require prompt surgical intervention and possibly steroid therapy, to minimise tissue damage and loss of function.



5. FIRE FIGHTING MEASURES

Specific Hazards

Hazardous combustion products may include hydrogen sulphide, carbon monoxide, oxides of nitrogen, oxides of sulphur and unburnt hydrocarbons. Flammable vapours may be present even at temperatures below the flash point. The vapour is heavier than air, spreads along the ground and distant ignition is possible. Sinks in fresh water, floats on sea water and may be reignited on surface water.

Extinguishing Media

Foam, fine water spray and dry chemical powder. Carbon dioxide, Clean Agents (e.g. Inergen, Argonite etc.), sand or earth may be used for small fires only.

Unsuitable Extinguishing Media

Do not use water in a jet.

Protective Equipment

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

Other Information

Keep adjacent drums and tanks cool by spraying with water from a safe location. If possible remove them from the danger zone. If adequate cooling cannot be achieved, the area needs to be evacuated, and further fire fighting and cooling attempts should be carried out from a safe location.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions

Remove all possible sources of ignition in the surrounding area. May ignite on surfaces at temperatures above auto-ignition temperature. Evacuate all personnel. Do not breathe fumes, vapour. Avoid contact with skin, eyes, clothing. Ventilate contaminated area thoroughly. Wear chemical resistant knee length safety boots and PVC jacket and trousers. Wear safety glasses or full face shield if splashes are likely to occur.

Environmental Precautions

Prevent from spreading or entering into drains and surface waters (e.g. lakes, ponds, ditches, rivers and streams) by using sand, earth, or other appropriate non-combustible barriers. Inform local authorities if impacts cannot be prevented.

Clean-up Methods - Small Spillages

To minimize soil and groundwater contamination, absorb liquid with sand, earth or other recommended sorbent material, which is commercially available. Sweep up and remove to a suitable, clearly marked container for disposal in accordance with local regulations. Do not disperse using water.

Clean-up Methods - Large Spillages

Prevent from spreading by making a barrier with sand, earth or other containment material. Reclaim liquid directly or in an absorbent. Dispose of as for small spills.

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. If contamination of sites occurs remediation may require specialist advice. Observe all relevant local regulations.



7. HANDLING AND STORAGE

Handling

When using do not eat, drink or smoke. Only use in well-ventilated areas. Take precautionary measures against static discharges. Ensure all equipment is properly earthed. If using pressurised equipment, take extra care to avoid injection under the skin. Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. Avoid prolonged or repeated contact with skin. When handling product in drums, safety footwear should be worn and proper handling equipment should be used. Prevent spillages. Cloth, paper and other materials that are used to absorb spills present a fire hazard. Avoid their accumulation by disposing of them safely and immediately. In addition to any specific recommendations given for controls of risks to health, safety and the environment, an assessment of risks must be made to help determine controls appropriate to local circumstances.

Storage

This product must never be stored in buildings occupied by people. Tanks should be provided with a heating facility. Ensure heating coils are always covered with product (minimum 15 cm). Fuels coming into contact with hot, exposed heating coils, could result in the rapid generation of a flammable atmosphere. Keep in a bunded area with a sealed (low permeability) floor, to provide containment against spillage. Seek specialist advice for the design, construction and operation of bulk storage facilities.

Storage Temperatures

40°C Minimum.

Product Transfer

Electrostatic charges may be generated during pumping. Ensure electrical continuity by bonding all equipment. Wait 2 minutes after tank filling (for tanks such as those on road tanker vehicles) before opening hatches or manholes. Wait 30 minutes after tank filling (for large storage tanks) before opening hatches or manholes.

Tank Cleaning

Cleaning, inspection and maintenance of storage tanks is a specialist operation that requires the implementation of strict procedures and precautions. These include issuing of work permits, gas-freeing of tanks, using a manned harness, lifelines, and wearing air-supplied breathing apparatus. Prior to entry and whilst cleaning is underway, the atmosphere within the tank must be monitored using an oxygen meter and explosimeter. In addition, appropriate electrochemical sensors or colorimetric tubes must be used to check for the presence of hydrogen sulphide.

Recommended Materials

For containers or container linings, use mild steel or stainless steel. Aluminium may also be used for applications where it does not present an unnecessary fire hazard. Examples of suitable materials are: high density polyethylene (HDPE), polypropylene (PP), and Viton (FKM), which have been specifically tested for compatibility with this product. For container linings, use amine-adduct cured epoxy paint. For seals and gaskets use: graphite, PTFE, Viton A, Viton B.

Unsuitable Materials

Synthetic materials such as plastics and fibreglass may be unsuitable for containers or container linings depending on the material specification and intended use. Examples of materials to avoid are: natural rubber (NR), nitrile rubber (NBR), ethylene propylene rubber (EPDM), polymethyl methacrylate (PMMA), polystyrene, polyvinyl chloride (PVC), polyisobutylene. However, some may be suitable for glove materials.

Other Information

Ensure that all local and international regulations regarding handling and storage facilities are followed.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

Exposure Limits



| Substance | Regulations | Exposure Duration | Exposure Limit | Units | Notes |
|-------------------|-------------|-------------------|----------------|-------|-------|
| Hydrogen sulphide | NOHSC:1003 | TWA | 10 | ppm | |
| | NOHSC:1003 | TWA | 14 | mg/m3 | |
| | NOHSC:1003 | STEL | 15 | ppm | |
| | NOHSC:1003 | STEL | 21 | mg/m3 | |

NOHSC:1003 Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment [NOHSC:1003(1995)] - 3rd Edition

Exposure Controls

The level of personal protection and the types of controls necessary will vary depending on exposure conditions. Select controls based on a risk assessment of local circumstances. Use sealed systems as far as possible. Use local, intrinsically safe, exhaust ventilation if there is a risk of inhalation of vapours, mists, or aerosols. Provide eye washes and showers for emergency use.

Respiratory Protection

Care should be taken to keep exposures below applicable occupational exposure limits. If this cannot be achieved, use of a respirator fitted with an organic vapour cartridge combined with a particulate pre-filter should be considered. Where air-filtering respirators are unsuitable (e.g. where airborne concentrations are high, there is a confined space or a risk of oxygen deficiency) use appropriate positive pressure breathing apparatus.

Hand Protection

When handling heated product wear heat resistant gloves. Select gloves tested to a relevant standard (e.g. Europe EN374, US F739). When prolonged or frequent repeated contact occurs, Nitrile, Neoprene or PVC gloves may be suitable. (Breakthrough time of > 240 minutes). Breakthrough times for gloves vary 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. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended.

Eye Protection

Wear safety glasses or full face shield if splashes are likely to occur.

Body Protection

Minimise all forms of skin contact. In the event of risk from splashing wear e.g. Nitrile, PVC, or neoprene rubber apron. Wear safety shoes or boots which are chemical and petroleum distillate resistant.

Environmental Exposure Controls

Minimise release to the environment. An environmental assessment must be made to ensure compliance with local environmental legislation.

Exposure Measurement Methods

Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an Occupational Exposure Limit and adequacy of exposure controls. For some substances biological monitoring may also be appropriate. Information on suitable methods is available on request.

9. PHYSICAL AND CHEMICAL PROPERTIES

| | |
|------------------------------|---------------------|
| Colour | Dark brown/black. |
| Physical State | Viscous liquid. |
| Odour | Characteristic. |
| pH Value | Data not available. |
| Vapour Pressure | <0.1 kPa at 40°C. |
| Initial Boiling Point | circa 150°C. |



| | |
|--|--|
| Final Boiling Point | Cannot be determined (>600°C). |
| Solubility in Water | Negligible. |
| Density | <1010 kg/m ³ at 15°C. |
| Flash Point | >62°C (Method: PMCC (B)). |
| Flammable Limits - Upper | 5%(V/V) maximum. |
| Flammable Limits - Lower | 0.5%(V/V) minimum. |
| Auto-Ignition Temperature | >250°C. |
| Kinematic Viscosity | <700 mm ² /s at 50°C. |
| Vapour Density (Air=1) | >5 at 15°C. |
| Partition co-efficient, n-octanol/water | log Pow 3 to 6. |
| Other Information | The above properties are generic. There may be parameters for which National Specifications apply. |

10. STABILITY AND REACTIVITY

Stability

Stable under normal use conditions.

Conditions to Avoid

Heat, flames and sparks.

Materials to Avoid

Strong oxidizing agents e.g. chlorates and ammonium nitrate.

Hazardous Decomposition Products

Hazardous decomposition products are not expected to form during normal storage.

11. TOXICOLOGICAL INFORMATION

Basis for Assessment

Fuels are typically made from blending several refinery streams. Toxicological studies have been carried out on a variety of hydrocarbon blends and streams but not those containing additives. Information given is based on a knowledge of available data on the hydrocarbon blends and on a knowledge of the constituents.

Acute Toxicity - Oral

LD₅₀ > 5000 mg/kg.

Acute Toxicity - Dermal

LD₅₀ > 2000 mg/kg.

Acute Toxicity - Inhalation

Data not available.

Eye Irritation

Slightly irritating.

Skin Irritation

Slightly irritating.

Respiratory Irritation

Expected to be slightly irritating.

Skin Sensitisation

Not a skin sensitizer.

Carcinogenicity

Dermal application to mice causes skin tumours.

Mutagenicity

In-vitro mutagenicity studies show that mutagenic activity is related to 4-6 ring polycyclic aromatic content.



Reproductive Toxicity

Causes slight foetotoxicity in rats at doses which are maternally toxic.

Human Effects

Prolonged/repeated contact may cause defatting of the skin which can lead to dermatitis and may make the skin more susceptible to irritation and penetration by other materials. Under conditions of poor personal hygiene, excessive exposure may lead to irritation, oil acne and folliculitis and development of warty growths which may subsequently become malignant.

Other Information

High pressure injection of product into the skin may lead to local necrosis if the product is not surgically removed.

12. ECOLOGICAL INFORMATION

Basis for Assessment

Fuels are typically made from blending several refinery streams. Ecotoxicological studies have been carried out on a variety of hydrocarbon blends and streams but not those containing additives. Information given is based on a knowledge of the components and the ecotoxicology of similar products.

Mobility

Sinks in fresh water, but will float on seawater. Contains volatile components. Partly evaporates from water or soil surfaces, but a significant proportion will remain after one day. If it enters soil, it will adsorb to soil particles and will not be mobile. Large volumes may penetrate soil and could contaminate groundwater.

Persistence / Degradability

Major components are inherently biodegradable. Persists under anaerobic conditions. The volatile components oxidise rapidly by photochemical reactions in air.

Bioaccumulation

Contains components which may have the potential to bioaccumulate. May cause tainting of fish and shellfish.

Ecotoxicity

Poorly soluble mixture. Product is classified as harmful to aquatic organisms, LL/EL50 10-100 mg/l. (LL/EL50 expressed as the nominal amount of product required to prepare aqueous test extract). May cause physical fouling of aquatic organisms.

13. DISPOSAL CONSIDERATIONS

Waste Disposal

Waste arising from a spillage or tank cleaning should be disposed of in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor to deal satisfactorily with this type of product should be established beforehand. Do not dispose into the environment, in drains or in water courses. Do not dispose of tank water bottoms by allowing them to drain into the ground. This will result in soil and groundwater contamination.

Product Disposal

As for waste disposal.

Container Disposal

Recycle or dispose of in accordance with the legislation in force with a recognised collector or contractor. Do not pollute the soil, water or environment with the waste product.

14. TRANSPORT INFORMATION

Transport Information

Not dangerous for transport under ADG, IMO and IATA/ICAO regulations.

ADG UN Class

None Allocated

ADG Packing Group

None Allocated

ADG Hazchem Code

None Allocated

IMDG Hazard Class

None Allocated

IMDG Packing Group

None Allocated

Other Information

Packed goods are not a marine pollutant under IMDG. MARPOL rules apply for bulk shipments by sea.

15. REGULATORY INFORMATION

| | |
|------------------|---|
| EC Symbols | T |
| EC Risk Phrase | R45 May cause cancer. R52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment. R66 Repeated exposure may cause skin dryness and cracking. |
| EC Safety Phrase | S45 In case of accident or if you feel unwell seek medical advice immediately S53 Avoid exposure - obtain special instructions before use. S61 Avoid release to the environment. Refer to special instructions/safety data sheet. |

AICS (Australia)

All components listed.

National Legislation

National Code of Practice for the Preparation of Material Safety Data Sheets [NOHSC:2011]

List of Designated Hazardous Substances [NOHSC:10005].

Approved Criteria for Classifying Hazardous Substances [NOHSC:1008].

Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment [NOHSC:1003].

Australian Dangerous Goods Code.

Standard Uniform Scheduling of Drugs and Poisons.

Hazard Category

Carcinogenic (Category 2), Dangerous for the environment

Packaging & Labelling

Contains fuel oil, residual.

16. OTHER INFORMATION

Revisions Highlighted

No amendments made to information.

SDS Distribution

This document contains important information to ensure the safe storage, handling and use of this product. The information in this document should be brought to the attention of the person in your organisation responsible for advising on safety matters.

References

For detailed advice on Personal Protective equipment, refer to the following Australian Standards :-
HB 9 (Handbook 9) Manual of industrial personal protection.
AS/NZS 1337 Eye protectors for industrial applications.
AS/NZS 1715 Selection, use and maintenance of respiratory protective devices.
AS/NZS 1716 Respiratory protective devices.

Poisons Schedule

NS.

Restrictions

This product must not be used in applications other than those recommended without first seeking the advice of the supplier. Restricted to professional users only.

List of R Phrases in Section 2

R12 Extremely Flammable.
R26 Very toxic by inhalation.
R45 May cause cancer.
R50 Very toxic to aquatic organisms.
R66 Repeated exposure may cause skin dryness and cracking.
R52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Technical Contact Numbers

(03) 9666 5444.

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 Of SDS** ...

