# SAFETY DATA SHEET

**(SOLAS regulation VI/5-1 format)**

## SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

### PRODUCT

**Product Name:** **Marine Fuel Oil USGC**
**Alternate Product Name:** Marine FO 0.50%S (RMG 380), VERY LOW SULFUR MARINE FUEL OIL (VLSFO) 380
**Product Description:** Petroleum Hydrocarbons
**Product Code:** 709794-00
**Intended Use:** Fuel oil
**MARPOL Annex I Category:** Fuel and residual oils, including ship's bunkers
**See Section 14 for transportation information related to the Bill of Lading, other shipping documents**

### COMPANY IDENTIFICATION

| Country | Company | Emergency Telephone Number |
|---|---|---|
| International Sales | ExxonMobil Marine Fuels<br>Ermyn House<br>MP 31 Ermyn Way<br>Leatherhead, KT22 8UX UK | (UK) (+44) (0) 23 8089 1558 |
| Australia | MOBIL OIL AUSTRALIA PTY LTD<br>A.B.N. 88 004 052 984<br>664 Collins St<br>Docklands<br>Victoria 3008 Australia | +1 609 737 4411 |
| Belgium | ExxonMobil Petroleum & Chemical BV<br>Polderdijkweg<br>Haven 447 - 2030<br>Antwerpen, Belgium | +32 (0) 487 545 780 |
| Canada | Imperial Oil<br>505 Quarry Park Boulevard SE<br>Calgary, AB T2C 5N1 Canada | 1-866-232-9563 |
| Fiji | Mobil Oil Australia Pty Ltd - t/a Mobil Oil Fiji<br>Level 6, ANZ House,<br>25 Victoria Parade,<br>Suva, Fiji Islands | +1 609 737 4411 |
| France | Esso SAF<br>Tour Manhattan La Defense 2<br>5/6 Place de l'Iris<br>92400 Courbevoie France | +33 08 1000 3353 |
| Hong Kong | ExxonMobil Hong Kong Limited:<br>2201, 22/F, Central Plaza<br>18 Harbour Road, Wanchai, Hong Kong | +1 609 737 4411 |
| Italy | Esso Italiana SRL<br>Viale Castello della Magliana 25<br>Rome 00148 Italy | +39 0382 24444 |
| New Zealand | Mobil Oil New Zealand Limited<br>Vero Centre<br>48 Shortland Street<br>Auckland 1140 | National Poison Center +64 3 479 7248<br>Freephone 0800 764 766 |

| | | |
|---|---|---|
| | New Zealand | |
| Norway | Esso Norge AS<br>Drammensveien 149<br>Skøyen N-0213<br>Oslo, Norway | Emergency: (NO) +47 33 37 73 00<br>Poison: (NO) +47 22 59 13 00 |
| Singapore | ExxonMobil Asia Pacific Pte Limited<br>1 HarbourFront Place #06-00<br>HarbourFront Tower One<br>Singapore 098633 | 01-609-737-4411 |
| Thailand | Esso (Thailand) Public Company Limited<br>3195/17-29 Rama 4 Road,<br>Klong Ton, Klong Toey District<br>Bangkok, Thailand 10110 | +1-609-737-4411 |
| United Kingdom | Esso Petroleum Company Limited<br>Ermyn House<br>MP 31 Ermyn Way<br>Leatherhead, KT22 8UX UK | +32 (0) 487 545 780 |
| United States | ExxonMobil Oil Corporation<br>22777 Springwoods Village Parkway<br>Spring, TX 77389 USA | +1 609 737 4411 |

**This (M)SDS is a document with no country specific information included.**

## SECTION 2 HAZARDS IDENTIFICATION

This material is hazardous according to UN GHS Criteria. Classification includes all GHS hazard classes. For hazard categories with two cut-off/concentration limits, classification was based on the higher limit.

**GHS CLASSIFICATION:**

Flammable liquid: Category 4.
Acute inhalation toxicant: Category 4.
Skin irritation: Category 2.
Germ Cell Mutagen: Category 1B.
Carcinogen: Category 1B.
Reproductive toxicant (developmental): Category 2.
Specific target organ toxicant (repeated exposure): Category 2.
Acute aquatic toxicant: Category 1.
Chronic aquatic toxicant: Category 1.

**GHS Label Elements:**
**Pictogram:**

**Signal Word:** Danger

**Hazard Statements:**

Physical: H227: Combustible liquid.
Health: H315: Causes skin irritation. H332: Harmful if inhaled. H340: May cause genetic defects. H350: May cause cancer. H361: Suspected of damaging the unborn child. H373: May cause damage to organs through

prolonged or repeated exposure.
Environmental: H410: Very toxic to aquatic life with long lasting effects.

**Precautionary Statements:**

Prevention: P201: Obtain special instructions before use. P202: Do not handle until all safety precautions have been read and understood. P210: Keep away from flames and hot surfaces. No smoking. P260: Do not breathe mist / vapours. P264: Wash skin thoroughly after handling. P271: Use only outdoors or in a well-ventilated area. P273: Avoid release to the environment. P280: Wear protective gloves/protective clothing/eye protection/face protection.
Response: P302 + P352: IF ON SKIN: Wash with plenty of soap and water. P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing. P308 + P313: IF exposed or concerned: Get medical advice/attention. P312: Call a POISON CENTER or doctor/physician if you feel unwell. P332 + P313: If skin irritation occurs: Get medical advice/attention. P362 + P364: Take off contaminated clothing and wash it before reuse. P370 + P378: In case of fire: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish. P391: Collect spillage.
Storage: P403 + P235: Store in a well-ventilated place. Keep cool. P405: Store locked up.
Disposal: P501: Dispose of contents and container in accordance with local regulations.

**Contains:** Residues (petroleum), atmospheric; Clarified oils (petroleum), catalytic cracked; Residues (petroleum), catalytic reformer fractionator; Fuels, diesel; DISTILLATES (PETROLEUM), FULL-RANGE STRAIGHT-RUN MIDDLE; Gas oils (petroleum), hydrodesulfurized heavy vacuum; Distillates (petroleum), heavy thermal cracked; Gas oils (petroleum), heavy vacuum; Distillates (petroleum), hydrodesulfurized middle; Distillates (petroleum), light catalytic cracked; Distillates (petroleum), light thermal cracked; Fuel oil, residual; Residues (petroleum), hydrocracked; Residues (petroleum), steam-cracked light; Residues (petroleum), thermal cracked

Other hazard information:

PHYSICAL / CHEMICAL HAZARDS

Thermal burn hazard - contact with hot material may cause thermal burns. Material can accumulate static charges which may cause an ignition. Material can release vapours that readily form flammable mixtures. Vapour accumulation could flash and/or explode if ignited. Combustible.

HEALTH HAZARDS

High-pressure injection under skin may cause serious damage. Hydrogen sulphide, a highly toxic gas, is expected to be present. Signs and symptoms of overexposure to hydrogen sulphide include respiratory and eye irritation, dizziness, nausea, coughing, a sensation of dryness and pain in the nose, and loss of consciousness. Odour does not provide a reliable indicator of the presence of hazardous levels in the atmosphere. May be irritating to the eyes, nose, throat, and lungs.

ENVIRONMENTAL HAZARDS

No additional hazards.

**NOTE:** This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

## SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is defined as a mixture.

## Hazardous Substance(s) or Complex Substance(s) required for disclosure

| Name | CAS# | Concentration* | GHS Hazard Codes |
|---|---|---|---|
| Residues (petroleum), atmospheric | 68333-22-2 | 0 - 50% | H332, H350(1B), H361(D), H373, H400(M factor 1), H410(M factor 1) |
| Clarified oils (petroleum), catalytic cracked | 64741-62-4 | 0 - 50% | H332, H350(1B), H361(D), H373, H400(M factor 1), H410(M factor 1) |
| Residues (petroleum), catalytic reformer fractionator | 64741-67-9 | 0 - 15% | H227, H304, H332, H350(1B), H361(D), H373, H400(M factor 1), H410(M factor 1) |
| Fuels, diesel | 68334-30-5 | 0 - 50% | H226, H304, H332, H351, H315, H373, H401, H411 |
| DISTILLATES (PETROLEUM), FULL-RANGE STRAIGHT-RUN MIDDLE | 68814-87-9 | 0 - 50% | H304, H332, H373, H401, H411 |
| Gas oils (petroleum), hydrodesulfurized heavy vacuum | 64742-86-5 | 0 - 50% | H332, H350(1B), H361(D), H373, H400(M factor 1), H410(M factor 1) |
| Distillates (petroleum), heavy thermal cracked | 64741-81-7 | 0 - 50% | H227, H332, H350(1B), H361(D), H373, H400(M factor 1), H410(M factor 1) |
| Gas oils (petroleum), heavy vacuum | 64741-57-7 | 0 - 75% | H332, H350(1B), H361(D), H373, H400(M factor 1), H410(M factor 1) |
| Distillates (petroleum), hydrodesulfurized middle | 64742-80-9 | 0 - 50% | H304, H332, H350(1B), H315, H373, H401, H411 |
| Distillates (petroleum), light catalytic cracked | 64741-59-9 | 0 - 50% | H226, H304, H332, H350(1B), H315, H373, H400(M factor 1), H410(M factor 1) |
| Distillates (petroleum), light thermal cracked | 64741-82-8 | 0 - 50% | H227, H332, H350(1B), H315, H373, H400(M factor 1), H410(M factor 1) |
| Fuel oil, residual | 68476-33-5 | 0 - 90% | H332, H350(1B), H361(D), H373, H400(M factor 1), H410(M factor 1) |
| Residues (petroleum), hydrocracked | 64741-75-9 | 0 - 20% | H332, H350(1B), H361(D), H373, H400(M factor 1), H410(M factor 1) |
| Residues (petroleum), steam-cracked light | 68513-69-9 | 0 - 20% | H227, H340(1B), H350(1B), H315, H401, H411 |
| Residues (petroleum), thermal cracked | 64741-80-6 | 0 - 20% | H332, H350(1B), H361(D), H373, H400(M factor 1), H410(M factor 1) |
| VACUUM RESIDUUM (PETROLEUM) | 64741-56-6 | 0 - 10% | None |

## Hazardous Constituent(s) Contained in Complex Substance(s) required for disclosure

| Name | CAS# | Concentration* | GHS Hazard Codes |
|---|---|---|---|
| ethylbenzene | 100-41-4 | < 1% | H225, H304, H332, H373, H401, H412 |
| hydrogen sulphide | 7783-06-4 | < 0.1% | H220, H280, H330(2), H400(M factor 1) |
| naphthalene | 91-20-3 | < 1% | H228(2), H302, H351, H400(M factor 1), H410(M factor 1) |

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

NOTE: Carbon monoxide (CO) may be present in the material in trace quantities and, when present, may accumulate to toxic or flammable concentrations in enclosed spaces such as tanks or tanker/railcar headspaces.

## SECTION 4 FIRST AID MEASURES

### INHALATION

Immediately remove from further exposure. Get immediate medical assistance. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. Give supplemental oxygen, if available. If breathing has stopped, assist ventilation with a mechanical device.

### SKIN CONTACT

Remove contaminated clothing. Dry wipe exposed skin and cleanse with waterless hand cleaner and follow by washing thoroughly with soap and water. For those providing assistance, avoid further skin contact to yourself or others. Wear impervious gloves. Launder contaminated clothing separately before reuse. Discard contaminated articles that cannot be laundered. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury. For hot product: Immediately immerse in or flush affected area with large amounts of cold water to dissipate heat. Cover with clean cotton sheeting or gauze and get prompt medical attention.

### EYE CONTACT

Flush thoroughly with water for at least 15 minutes. Get medical assistance.

### INGESTION

Seek immediate medical attention.

### ACUTE AND DELAYED SYMPTOMS/EFFECTS

See Toxicological Section

## SECTION 5 FIRE FIGHTING MEASURES

### EXTINGUISHING MEDIA

**Appropriate Extinguishing Media:** Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

**Inappropriate Extinguishing Media:** Straight streams of water

### FIRE FIGHTING

**Fire Fighting Instructions:** Evacuate area. Prevent run-off from fire control or dilution from entering streams, sewers or drinking water supply. Fire-fighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

**Unusual Fire Hazards:** Combustible. The product may form flammable mixtures and can burn only when heated above the flash point. Hazardous material. Firefighters should consider protective equipment indicated in Section 8.

**Hazardous Combustion Products:** Aldehydes, Hydrogen sulphide, Incomplete combustion products, Oxides of carbon, Smoke, Fume, Sulphur oxides

**FLAMMABILITY PROPERTIES**

**Flash Point [Method]:** >60°C (140°F) [ASTM D-93]
**Flammable Limits (Approximate volume % in air):** LEL: N/D UEL: N/D
**Autoignition Temperature:** >250°C (482°F) [ASTM E659]

## SECTION 6 ACCIDENTAL RELEASE MEASURES

**NOTIFICATION PROCEDURES**

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

**PROTECTIVE MEASURES**

Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required, due to toxicity or flammability of the material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

For emergency responders: Respiratory protection: half-face or full-face respirator with filter(s) for organic vapor and, when applicable, H2S, or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Work gloves that are resistant to aromatic hydrocarbons are recommended. Note: gloves made of polyvinyl acetate (PVA) are not water-resistant and are not suitable for emergency use. Chemical goggles are recommended if splashes or contact with eyes is possible. Small spills: normal antistatic work clothes are usually adequate. Large spills: full body suit of chemical resistant, antistatic material is recommended.

**SPILL MANAGEMENT**

**Land Spill:** Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do so without risk. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Prevent entry into waterways, sewer, basements or confined areas. A vapour-suppressing foam may be used to reduce vapour. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Use clean non-sparking tools to collect absorbed material. Large Spills: Water spray may reduce vapour, but may not prevent ignition in enclosed spaces.

**Water Spill:** Stop leak if you can do so without risk. Confine the spill immediately with booms. Warn other shipping. Remove from the surface by skimming or with suitable absorbents. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

**ENVIRONMENTAL PRECAUTIONS**

Large Spills: Dyke far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

## SECTION 7 HANDLING AND STORAGE

**HANDLING**

Avoid all personal contact. Residual fuel oils may require heating and other forms of pre-treatment before use and will normally be stored and handled in facilities fitted with heating systems. Users should ensure their facilities are capable of storing and handling these fuels at or just above an appropriate temperature. Proper temperatures for storage and handling will depend on a number of factors such as the viscosity of the fuel and the specific requirements of the heating plant or engine that will consume the fuel. Users should consult the fuel supplier on appropriate storage and handling temperatures. Potentially toxic/irritating fumes/vapour may be evolved from heated or agitated material. Harmful amounts of H2S may be present. The toxic and olfactory (sense of smell) fatigue properties of hydrogen sulfide require that air monitoring alarms and respiratory protection be used where the concentration might be expected to reach a harmful level, such as in an enclosed space, heated transport vessel, or in a spill or leak situation.

Do not use electronic devices (including but not limited to cellular phones, computers, calculators, pagers or other electronic devices, etc.) during safety critical tasks, such as bulk fuel loading or unloading operations, or in storage areas where vapours may be present, unless the devices are certified intrinsically safe by an approved national testing agency and to the safety standards required by national and/or local laws and regulations. Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). When the material is handled in bulk, an electrical spark could ignite any flammable vapors from liquids or residues that may be present (e.g., during switch-loading operations). Use proper bonding and/or earthing procedures. However, bonding and earthing may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

**Static Accumulator:** This material is a static accumulator. A liquid is typically considered a nonconductive, static accumulator if its conductivity is below 100 pS/m (100x10E-12 Siemens per meter) and is considered a semiconductive, static accumulator if its conductivity is below 10,000 pS/m. Whether a liquid is nonconductive or semiconductive, the precautions are the same. A number of factors, for example liquid temperature, presence of contaminants, anti-static additives and filtration can greatly influence the conductivity of a liquid.

## STORAGE

The type of container used to store the material may affect static accumulation and dissipation. Keep container closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area. Storage containers should be earthed and bonded. Fixed storage containers, transfer containers and associated equipment should be earthed and bonded to prevent accumulation of static charge.

## SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

### EXPOSURE LIMIT VALUES

**Exposure limits/standards (Note: Exposure limits are not additive)**

| Substance Name | Form | Limit/Standard | | | Note | Source | Year |
|---|---|---|---|---|---|---|---|
| ATMOSPHERIC TOWER BOTTOMS..C13 [benzene solubles] | Total oil mist | TWA | 0.1 mg/m3 | | Skin | ExxonMobil | 2021 |
| CATALYTIC CRACKED CLARIFIED OIL HEAVY FUEL OIL [benzene solubles] | Total oil mist | TWA | 0.1 mg/m3 | | Skin | ExxonMobil | 2021 |
| CATALYTIC REFORMER FRACTIONATOR RESIDUE (PETROLEUM) [benzene solubles] | Total oil mist | TWA | 0.1 mg/m3 | | Skin | ExxonMobil | 2021 |
| Fuels, diesel | Stable Aerosol. | TWA | 5 mg/m3 | | Skin | ExxonMobil | 2021 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Fuels, diesel | Vapour. | TWA | 200 mg/m3 | | Skin | ExxonMobil | 2021 |
| DIESEL OIL..C9-20 [total hydrocarb, vapour&aerosol] | Inhalable fraction and vapour | TWA | 100 mg/m3 | | Skin | ACGIH | 2020 |
| ethylbenzene | | TWA | 20 ppm | | | ACGIH | 2020 |
| GAS OILS (PETROLEUM), HYDRODESULFURIZED HEAVY VACUUM [benzene solubles] | Total oil mist | TWA | 0.1 mg/m3 | | Skin | ExxonMobil | 2021 |
| HEAVY THERMAL CRACKED DISTILLATE [benzene solubles] | Total oil mist | TWA | 0.1 mg/m3 | | Skin | ExxonMobil | 2021 |
| HEAVY VACUUM GAS OIL (PETROLEUM) [benzene solubles] | Total oil mist | TWA | 0.1 mg/m3 | | Skin | ExxonMobil | 2021 |
| Distillates (petroleum), hydrodesulfurized middle | Stable Aerosol. | TWA | 5 mg/m3 | | | ExxonMobil | 2021 |
| Distillates (petroleum), hydrodesulfurized middle | Vapour. | TWA | 200 mg/m3 | | Skin | ExxonMobil | 2021 |
| Distillates (petroleum), hydrodesulfurized middle | Inhalable fraction. | TWA | 5 mg/m3 | | | ACGIH | 2020 |
| hydrogen sulphide | | STEL | 14 mg/m3 | 10 ppm | | ExxonMobil | 2021 |
| hydrogen sulphide | | TWA | 7 mg/m3 | 5 ppm | | ExxonMobil | 2021 |
| Distillates (petroleum), light thermal cracked | Stable Aerosol. | TWA | 5 mg/m3 | | | ExxonMobil | 2021 |
| Distillates (petroleum), light thermal cracked | Vapour. | TWA | 200 mg/m3 | | | ExxonMobil | 2021 |
| naphthalene | | TWA | 10 ppm | | Skin | ACGIH | 2020 |
| RESIDUAL FUEL OIL [benzene solubles] | Total oil mist | TWA | 0.1 mg/m3 | | Skin | ExxonMobil | 2021 |
| RESIDUES (PETROLEUM), HYDROCRACKED [benzene solubles] | Total oil mist | TWA | 0.1 mg/m3 | | Skin | ExxonMobil | 2021 |
| RESIDUES (PETROLEUM), THERMAL CRACKED [benzene solubles] | Total oil mist | TWA | 0.1 mg/m3 | | Skin | ExxonMobil | 2021 |
| VACUUM RESIDUUM (PETROLEUM) [benzene solubles] | Fume, inhalable | TWA | 0.5 mg/m3 | | | ACGIH | 2020 |
| Carbon monoxide | | TWA | 25 ppm | | | ACGIH | 2020 |

**Biological limits**

| Substance Name | Specimen | Sampling Time | Limit | Determinant | Source |
|---|---|---|---|---|---|
| ethylbenzene | Creatinine in urine | End of shift | 0.15 g/g | Sum of mandelic acid and phenylglyoxylic acid | ACGIH BELs (BEIs) |
| naphthalene | No Biological Specimen provided | End of shift | | 1-Naphthol, with hydrolysis + 2-Naphthol, with hydrolysis | ACGIH BELs (BEIs) |

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

## ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

Use explosion-proof ventilation equipment to stay below exposure limits.

## PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

**Respiratory Protection:** If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

Positive-pressure, air-supplied respirator in areas where H2S vapours may accumulate is recommended.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapour warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

**Hand Protection:** Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

Chemical resistant gloves are recommended. If product is hot, thermally protective, chemical resistant gloves are recommended. If contact with forearms is likely, wear gauntlet style gloves. Nitrile,Viton

**Eye Protection:** If contact with material is likely, chemical goggles are recommended.

**Skin and Body Protection:** Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

Chemical/oil resistant clothing is recommended. If product is hot, thermally protective, chemical resistant apron and long sleeves are recommended.

**Specific Hygiene Measures:** Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

## ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

## SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

**Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.**

**GENERAL INFORMATION**

**Physical State:** Liquid
**Colour:** Black
**Odour:** Petroleum/Solvent
**Odour Threshold:** N/D

**IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION**

**Relative Density (at 15 °C):** < 1.01
**Density (at 15 ºC):** 800 kg/m3 (6.68 lbs/gal, 0.8 kg/dm3) - 991 kg/m3 (8.27 lbs/gal, 0.99 kg/dm3) [ISO 12185]
**Flammability (Solid, Gas):** N/A
**Flash Point [Method]:** >60°C (140°F) [ASTM D-93]
**Flammable Limits (Approximate volume % in air):** LEL: N/D UEL: N/D
**Autoignition Temperature:** >250°C (482°F) [ASTM E659]
**Boiling Point / Range:** 238°C (460°F) [ASTM D86]
**Decomposition Temperature:** N/D
**Vapour Density (Air = 1):** N/D
**Vapour Pressure:** 0.133 kPa (1 mm Hg) at 20 °C
**Evaporation Rate (n-butyl acetate = 1):** N/D
**pH:** N/A
**Log Pow (n-Octanol/Water Partition Coefficient):** N/D
**Solubility in Water:** Negligible
**Viscosity:** >20.5 cSt (20.5 mm2/sec) at 40ºC | <=500 cSt (500 mm2/sec) at 50°C [ISO 3104]
**Oxidizing Properties:** See Hazards Identification Section.

**OTHER INFORMATION**

**Freezing Point:** N/D
**Melting Point:** N/A

## SECTION 10 STABILITY AND REACTIVITY

**STABILITY:** Material is stable under normal conditions.

**CONDITIONS TO AVOID:** Excessive heat. High energy sources of ignition.

**MATERIALS TO AVOID:** Alkalies, Halogens, Strong Acids, Strong oxidisers

**HAZARDOUS DECOMPOSITION PRODUCTS:** Material does not decompose at ambient temperatures.

**POSSIBILITY OF HAZARDOUS REACTIONS:** Hazardous polymerization will not occur.

## SECTION 11 TOXICOLOGICAL INFORMATION

**INFORMATION ON TOXICOLOGICAL EFFECTS**

| Hazard Class | Conclusion / Remarks |
|---|---|
| **Inhalation** | |
| Acute Toxicity: No end point data for material. | Moderately toxic. Based on assessment of the components. |
| Irritation: No end point data for material. | Elevated temperatures or mechanical action may form vapours, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs. |
| **Ingestion** | |
| Acute Toxicity: No end point data for material. | Minimally Toxic. Based on assessment of the components. |
| **Skin** | |
| Acute Toxicity: No end point data for material. | Minimally Toxic. Based on assessment of the components. |
| Skin Corrosion/Irritation: No end point data for material. | Irritating to the skin. Based on assessment of the components. |
| **Eye** | |
| Serious Eye Damage/Irritation: No end point data for material. | May cause mild, short-lasting discomfort to eyes. Based on assessment of the components. |
| **Sensitisation** | |
| Respiratory Sensitization: No end point data for material. | Not expected to be a respiratory sensitizer. |
| Skin Sensitization: No end point data for material. | Not expected to be a skin sensitizer. Based on assessment of the components. |
| **Aspiration:** Data available. | Not expected to be an aspiration hazard. Based on physico-chemical properties of the material. |
| **Germ Cell Mutagenicity:** No end point data for material. | Caused genetic effects in laboratory animals, but the relevance to humans is uncertain. Based on assessment of the components. |
| **Carcinogenicity:** No end point data for material. | Caused cancer in laboratory animals. Based on assessment of the components. |
| **Reproductive Toxicity:** No end point data for material. | Caused damage to the fetus in laboratory animals, but the relevance to humans is uncertain. Based on assessment of the components. |
| **Lactation:** No end point data for material. | Not expected to cause harm to breast-fed children. |
| **Specific Target Organ Toxicity (STOT)** | |
| Single Exposure: No end point data for material. | Not expected to cause organ damage from a single exposure. |
| Repeated Exposure: No end point data for material. | Contains a substance that may cause damage to organs from prolonged or repeated exposure. Based on assessment of the components. |

## TOXICITY FOR SUBSTANCES

| NAME | ACUTE TOXICITY |
|---|---|
| ethylbenzene | Inhalation Lethality: 4 hour(s) LC50 17.8 mg/l (Vapour) (Rat); Oral Lethality: LD 50 3.5 g/kg (Rat) |
| hydrogen sulphide | Inhalation Lethality: 4 hour(s) LC50 444 ppm (Gas) (Rat) |
| naphthalene | Inhalation Lethality: 4 hour(s) LC50 > 0.4 mg/l (Max attainable vapor conc.) (Rat); Oral Lethality: LD 50 533 mg/kg (Mouse) |

## OTHER INFORMATION

**For the product itself:**

Target Organs Repeated Exposure: Blood, Bone marrow, Liver, Spleen, Thymus

**Contains:**
HYDROGEN SULPHIDE: Chronic health effects due to repeated exposures to low levels of H2S have not been established. High level (700 ppm) acute exposure can result in sudden death. High concentrations will lead to cardiopulmonary arrest due to nervous system toxicity and pulmonary edema. Lower levels (150 ppm) may overwhelm sense of smell, eliminating warning of exposure. Symptoms of overexposure to H2S include headache, fatigue, insomnia, irritability, and gastrointestinal problems. Repeated exposures to approximately 25 ppm will irritate mucous membranes and the respiratory system and have been implicated in some eye damage. Middle distillates with cracked stocks: Carcinogenic in animal tests. Caused mutations in-vitro. Repeated dermal exposures to high concentrations in test animals resulted in reduced litter size and litter weight, and increased fetal resorptions at maternally toxic doses. Dermal exposure to high concentrations resulted in severe skin irritation with weight loss and some mortality. Inhalation exposure to high concentrations resulted in respiratory tract irritation, lung changes/infiltration/accumulation, and reduction in lung function. Middle distillates: Carcinogenic in animal tests. Lifetime skin painting tests produced tumours, but the mechanism is due to repeated cycles of skin damage and restorative hyperplasia. This mechanism is considered unlikely in humans where such prolonged skin irritation would not be tolerated. Did not cause mutations in-vitro. Inhalation of vapours did not result in reproductive or developmental effects in laboratory animals. Inhalation of high concentrations in animals resulted in respiratory tract irritation, lung changes and some reduction in lung function. Non-sensitising in test animals. NAPHTHALENE: Exposure to high concentrations of naphthalene may cause destruction of red blood cells, anemia, and cataracts. Naphthalene caused cancer in laboratory animal studies, but the relevance of these findings to humans is uncertain.
Residual fuel oil: Carcinogenic in animal tests. Caused mutations in-vitro. Dermal exposure to high concentrations resulted in maternal toxicity, decreased fetal weight and fetal survival, and some external fetal malformations. Dermal studies in animals: increased mortality, skin irritation, liver, kidney, thymus, bone marrow, blood and lymphoid tissue toxic effects. Possible allergen and photoallergen. ETHYLBENZENE: Caused cancer in laboratory animal studies. The relevance of these findings to humans is uncertain.

**IARC Classification:**
**The following ingredients are cited on the lists below:**

| Chemical Name | CAS Number | List Citations |
|---|---|---|
| Residues (petroleum), catalytic reformer fractionator | 64741-67-9 | 3 |
| ethylbenzene | 100-41-4 | 3 |
| Gas oils (petroleum), hydrodesulfurized heavy vacuum | 64742-86-5 | 3 |
| Gas oils (petroleum), heavy vacuum | 64741-57-7 | 1 |
| Distillates (petroleum), hydrodesulfurized middle | 64742-80-9 | 1 |
| Distillates (petroleum), light catalytic cracked | 64741-59-9 | 1 |
| Distillates (petroleum), light thermal cracked | 64741-82-8 | 1 |
| naphthalene | 91-20-3 | 1, 3 |
| Residues (petroleum), hydrocracked | 64741-75-9 | 3 |
| Residues (petroleum), thermal cracked | 64741-80-6 | 3 |

--REGULATORY LISTS SEARCHED--
1 = IARC 1 2 = IARC 2A 3 = IARC 2B

## SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data for the material, components of the material, or for similar materials, through the application of bridging principals.

**ECOTOXICITY**

Material -- Expected to be very toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

**MOBILITY**

Majority of components -- Low solubility and floats and is expected to migrate from water to the land. Expected to partition to sediment and wastewater solids.

Majority of components -- Low potential to migrate through soil.

**PERSISTENCE AND DEGRADABILITY**

**Biodegradation:**

Material -- Expected to be inherently biodegradable

**BIOACCUMULATION POTENTIAL**

Majority of components -- Has the potential to bioaccumulate, however metabolism or physical properties may reduce the bioconcentration or limit bioavailability.

**INTERNATIONAL OIL POLLUTION COMPENSATION (IOPC)**

Material is considered a persistent oil.

## SECTION 13 DISPOSAL CONSIDERATIONS

**DISPOSAL METHODS**

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

**MARPOL** - see International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) which provides technical aspects at controlling pollutions from ships.

**DISPOSAL RECOMMENDATIONS**

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

**Empty Container Warning** Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

## SECTION 14 TRANSPORT INFORMATION

**SEA (IMDG)**

**Proper Shipping Name:** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Heavy fuel oil)
**Hazard Class & Division:** 9
**EMS Number:** F-A, S-F
**UN Number:** 3082
**Packing Group:** III
**Marine Pollutant:** Yes
**Label(s):** 9
**Transport Document Name:** UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Heavy fuel oil), 9, PG III, MARINE POLLUTANT

**Note - this material is being carried under the scope of MARPOL Annex I**

## SECTION 15 REGULATORY INFORMATION

**REGULATORY STATUS AND APPLICABLE LAWS AND REGULATIONS**

**Listed or exempt from listing/notification on the following chemical inventories :** NDSL, TSCA

## SECTION 16 OTHER INFORMATION

**N/D = Not determined, N/A = Not applicable**
**KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):**
H220: Extremely flammable gas; Flammable Gas, Cat 1
H225: Highly flammable liquid and vapour; Flammable Liquid, Cat 2
H226: Flammable liquid and vapour; Flammable Liquid, Cat 3
H227: Combustible liquid; Flammable Liquid, Cat 4
H228(2): Flammable solid; Flammable Solid, Cat 2
H280: Contains gas under pressure; may explode if heated; Pressurized Gas
H302: Harmful if swallowed; Acute Tox Oral, Cat 4
H304: May be fatal if swallowed and enters airways; Aspiration, Cat 1
H315: Causes skin irritation; Skin Corr/Irritation, Cat 2
H330(2): Fatal if inhaled; Acute Tox Inh, Cat 2
H332: Harmful if inhaled; Acute Tox Inh, Cat 4
H340(1B): May cause genetic defects; Germ Cell Mutagenicity, Cat 1B
H350(1B): May cause cancer; Carcinogenicity, Cat 1B
H351: Suspected of causing cancer; GHS Carcinogenicity, Cat 2
H361(D): Suspected of damaging the unborn child; Repro Tox, Cat 2 (Develop)
H373: May cause damage to organs through prolonged or repeated exposure; Target Organ, Repeated, Cat 2
H400: Very toxic to aquatic life; Acute Env Tox, Cat 1
H401: Toxic to aquatic life; Acute Env Tox, Cat 2
H410: Very toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 1
H411: Toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 2
H412: Harmful to aquatic life with long lasting effects; Chronic Env Tox, Cat 3

**THIS MATERIAL SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:**
Section 08: Exposure Limits Table information was modified.
Section 16: HCode Key information was modified.
Revision Date: 01 Dec 2022

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DGN: 7209065I (1030880)

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