

MATERIAL SAFETY DATA SHEET

Marine Distillate Fuels

DMB and DMC

1. Product and Company Name

Product

Marine Distillate Fuels DMB and DMC

Alternative Names: DMB - Distillate Diesel Oil, MDO, Marine Diesel Oil, DMC - Blended diesel oil, MDO,

Marine Diesel Oil, Blended Marine Diesel Oil

Gas oils, including ship's bunkers

Application

Fuel for diesel engines or heating/boiler plant

Company

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Germany

Emergency Telephone Number

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2. Hazards Identification

Health effects

Possible carcinogenic effects in contact with skin.

Vapours or mist are irritating for mucous membranes, notably in the eyes.

While moving product hydrogen sulphide may be evolved under certain conditions such as elevated temperature. This gas is very toxic. Risk of hydrogen sulphide intoxication.

If swallowed accidentally, the product may enter the lungs due to its low viscosity and lead to the rapid development of very serious inhalation pulmonary lesions (medical survey during 48 hours).

Environmental impact

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

Physico-chemical hazards

The product may form flammable mixtures with air when heated above the flash point.

In the presence of hot spots, there is a special risk of fire or explosion under certain conditions involving accidental release of vapour or leaks of hot product under pressure.

Product classification

Category 2, carcinogen

Harmful: May cause lung damage if swallowed.

Dangerous for the environment.

3. Composition/Information on Ingredients

Common names, synonyms:

DMB - Distillate Diesel Oil, MDO, Marine Diesel Oil, DMC - Blended diesel oil, MDO, Marine Diesel Oil, Blended Marine Diesel Oil

Chemical Composition

Complex mixture of mainly middle distillate hydrocarbons in the C10-C30 range. The resulting fuel can be paraffinic, naphthenic or aromatic in nature. Performance additives may be added.

DMB may contain trace amounts of residual fuel oil.

DMC will typically contain about 20% by volume of residual fuel oil.

Total sulphur content may range up to 2.0% or as limited by local, national or international regulations.

Hazardous Components

Hydrogen sulphide (H₂S), an extremely toxic and highly flammable gas, and other flammable light hydrocarbon gases may collect in vapour spaces where product is stored.

Polycyclic aromatic hydrocarbons will be present, some of which have been shown by experimental studies to induce skin cancer.

*Fuels, **diesel*** - EINECS No: 269-822-7
- CAS No: 68334-30-5
- >70 % Wt

R45 May cause cancer

R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

R65 Harmful: may cause lung damage if swallowed

R66 Repeated exposure may cause skin dryness or cracking

*Fuel oil, **residual*** - EINECS No: 270-675-6
- CAS No: 68476-33-5, T
- <30% Wt

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 or cracking

4. First Aid Measures

General

In case of serious or persistent conditions, consult a doctor or call for emergency medical aid.

Eyes

Wash eye thoroughly with copious quantities of water, ensuring eyelids are held open for at least 15 minutes and consult a specialist.

Skin

Wash skin thoroughly with soap and water as soon as reasonably practicable. Remove heavily contaminated clothing and wash underlying skin.

Medical advice must be obtained urgently if product under high pressure has been injected through the skin.

Ingestion

Except as a deliberate act, the ingestion of large amounts of product is unlikely. If it should occur, do not induce vomiting; obtain medical advice.

If contamination of the mouth occurs, wash out thoroughly with water.

Inhalation

If inhalation of mists, fumes or vapour causes irritation to the nose or throat, or coughing, remove to fresh air, keep warm and allow to rest. If symptoms persist or breathing is difficult, apply mechanical ventilation immediately and obtain medical advice.

Exposure to hydrogen sulphide:

Casualties suffering ill effects as a result of exposure to hydrogen sulphide should be immediately removed to fresh air and medical assistance obtained without delay.

Unconscious casualties must be placed in the recovery position. Monitor breathing and pulse rate and if breathing has failed, or is deemed inadequate, respiration must be assisted, preferably by the mouth to mouth method. Administer external cardiac massage if necessary. Seek medical attention immediately.

It is advisable that all who are engaged in operations in which contact with H₂S may reasonably be anticipated, should be trained in the techniques of emergency resuscitation and in the care of an unconscious patient.

Medical Advice

Inhalation of hydrogen sulphide may cause central respiratory depression leading to coma and death. It is irritant to the respiratory tract causing chemical pneumonitis and pulmonary oedema. The onset of pulmonary oedema may be delayed for 24 to 48 hours. Treat with oxygen and ventilate as appropriate. Administer broncho-dilators if indicated and consider administration of corticosteroids. Keep casualty under surveillance for 48 hours in case pulmonary oedema develops.

Note: High Pressure Applications

Injections through the skin resulting from contact with the product at high pressure constitute a major medical emergency. Injuries may not appear serious at first but within a few hours tissue becomes swollen, discoloured and extremely painful with extensive subcutaneous necrosis.

Surgical exploration should be undertaken without delay. Thorough and extensive debridement of the wound and underlying tissue is necessary to minimise tissue loss and prevent or limit permanent damage. Note that high pressure may force the product considerable distances along tissue planes.

Product can be aspirated on swallowing or following regurgitation of stomach contents, and can cause severe and potentially fatal chemical pneumonitis, which will require urgent treatment. Because of the risk of aspiration, induction of vomiting and gastric lavage should be avoided. Gastric lavage should be undertaken only after endotracheal intubation. Monitor for cardiac dysrhythmias.

5. Fire Fighting Measures

For major fires call the Fire Service. Ensure an escape path is always available from any fire.

There is a danger of flashback if sparks or hot surfaces ignite vapour.

Use foam, dry powder or water fog. **DO NOT USE** water jets.

Fires in confined spaces should be dealt with by trained personnel wearing approved breathing apparatus and fire-resistant clothing.

Combustion Products

Incomplete combustion and thermolysis may produce gases of varying toxicity such as carbon monoxide, carbon dioxide, various hydrocarbons, aldehydes and soot (See Stability and Reactivity, Section 10). These may be highly dangerous if inhaled.

6. Accidental Release Measures

Personal protection

Evacuate all non essential personnel from the immediate area.

If spillage has occurred in a confined space, ensure adequate ventilation and check that a safe, breathable atmosphere is present before entry. Ensure good ventilation.

Vapour may collect in any confined space.

Wear protective clothing (See Exposure Controls/Personal Protection, Section 8).

Spilled material may make surfaces slippery.

After spillage/leakage

Isolate spillage from all ignition sources including road traffic.

Protect drains from potential spills to minimise contamination. Do not wash product into drainage system.

Vapour is heavier than air and may travel to remote sources of ignition (e.g. along drainage systems, in basements etc.).

Any spillage should be regarded as a potential fire risk.

Large and uncontained spillages should be smothered with foam to reduce the risk of ignition.

Spillages of hot product in confined spaces may be especially hazardous because highly toxic hydrogen sulphide gas may be present. For spillages in such confined spaces the use of approved breathing apparatus by personnel specially trained in its use may be required.

In the case of spillage on water, prevent the spread of product by the use of suitable barrier equipment.

Recover product from the surface. Protect environmentally sensitive areas and water supplies.

In the case of spillage at sea approved dispersants may be used where authorised by the appropriate government/regulatory authorities.

In the event of spillages contact the appropriate authorities.

Spill cleanup methods

Scrape up bulk of solid material and remove liquid with sand or other suitable inert absorbent material. If necessary, clean the contaminated area using hot water and detergent: absorb the washings - do not wash into drains.

Use mechanical means such as pumps, skimmers and absorbent materials. Never use dispersing agents.

Contain and collect the spilled product with sand or any other inert absorbent material.

It is advised that stocks of suitable absorbent material should be held in quantities sufficient to deal with any spillage which may be reasonably anticipated.

Preserve the waste in closed and sealed recipients.

Handover contaminated materials to an approved collector.

Recovery of large spillages should be effected by specialist personnel.

Prevention of secondary risks

Remove all sources of ignition.

7. Handling and Storage

Handling

Ensure good ventilation and avoid as far as reasonably practicable the inhalation and contact with vapours, mists or fumes which may be generated during use. If such vapour, mists or fumes are generated, their concentration in the workplace air should be controlled to the lowest reasonably practicable level.

Do not siphon product by mouth.

Avoid contact with skin and observe good personal hygiene. Wash hands thoroughly after contact.

Avoid contact with eyes. If splashing is likely to occur wear a full face visor or chemical goggles as appropriate.

Avoid inhalation of dust from combustion/exhaust spaces.

Whilst using do not eat, drink or smoke.

Use disposable cloths and discard when soiled. Do not put soiled cloths into pockets.

The product may contain volatile hydrocarbons which may accumulate in the container headspace, thereby creating a flammable or explosive atmosphere.

Storage

Store and dispense only in well ventilated areas away from heat and sources of ignition.

Store and use only in equipment/containers designed for use with this product.

Containers must be properly labelled and kept closed when not in use.

Do not enter storage tanks without breathing apparatus unless the tank has been well ventilated and the tank atmosphere has been shown to contain hydrocarbon vapour concentrations of less than 1% of the lower flammability limit and an oxygen concentration of at least 20% volume.

Confined spaces contaminated with hydrogen sulphide must always be considered as constituting potentially life threatening environments. Entry into such spaces must never be undertaken except under extreme emergency when no alternative is possible and then only by trained operators wearing air-supplied breathing apparatus of an approved type and following procedures strictly in accordance with the Statutory Regulations governing such entry (See Exposure Controls/Personal Protection, Section 8). Always have sufficient people standing by outside the tank with appropriate breathing apparatus and equipment to effect a quick rescue.

Fire Prevention

Light hydrocarbon vapours can build up in the headspace of tanks. These can cause flammability/explosion hazards even at temperatures below the normal flash point (note: flash point must not be regarded as a reliable indicator of the potential flammability of vapour in tank headspaces). Tank headspaces should always be regarded as potentially flammable and care should be taken to avoid static electrical discharge and all ignition sources during filling, ullaging and sampling from storage tanks.

Will present a flammability hazard if heated above flash point but bulk liquids at normal storage temperatures will present virtually no fire hazard. If fuel contacts hot surfaces, or leaks from high pressure fuel pipes, the vapour and/or mists generated will create a flammability or explosion hazard.

When the product is pumped (e.g. during filling, discharge or ullaging) and when sampling, there is a risk of static discharge. Ensure equipment used is properly earthed or bonded to the tank structure.

Product contaminated rags, paper or material used to absorb spillages, represent a fire hazard, and should not be allowed to accumulate. Dispose of safely immediately after use.

Empty containers represent a fire hazard as they may contain some remaining flammable product and vapour. Never cut, weld, solder or braze empty containers.

8. Exposure Controls/Personal Protection

Exposure Limits

There is no appropriate occupational exposure limit for this material.

Ensure good ventilation.

Avoid, as far as reasonably practicable, inhalation of vapour, mists or fumes generated during use.

If vapour, mists or fumes are generated, their concentration in the workplace air should be controlled to the lowest reasonably practicable level.

Relevant exposure limits for Hydrogen sulphide (H₂S): ACGIH (USA): TLV 10 ppm (8 hr TWA); 15ppm (15 min STEL).

Protective Clothing

Wear face visor or goggles in circumstances where eye contact can accidentally occur.

If skin contact is likely, wear impervious protective clothing and/or gloves.

Protective clothing should be regularly inspected and maintained; overalls should be dry-cleaned, laundered and preferably starched after use.

Respiratory Protection

If operations are such that the excessive generation of vapour, mist or fume may be anticipated, to which operators may unavoidably be exposed, then suitable approved respiratory equipment should be worn.

Note: Approved air-supplied breathing apparatus must be worn where there may be potential for inhalation of hydrogen sulphide (H₂S) gas.
The use of respiratory equipment must be strictly in accordance with the manufacturers' instructions and any statutory requirements governing its selection and use.
Oxygen levels should be at least 19.5 % in confined spaces or other work areas.

9. Physical and Chemical Properties

The data below are typical values and do not constitute a specification.

	Units	DMB	DMC
Grades			
Physical state		liquid	liquid
Colour		dark brown -> black[may be dyed to comply with local regulations/requirements]	black[may be dyed to comply with local regulations/requirements]
Odour		characteristic hydrocarbon	characteristic hydrocarbon
Pour Point	°C	-20 to 6	-20 to 6
Boiling Range	°C	160 to 450	160 to 550
Density @ 15°C	kg/m ³	900 max	920 max
Kinematic viscosity @ 40°C	mm ² /s	11 max	14 max
Flash point (PMC)	°C	60 min	60 min
Upper/lower flammability or explosive limits	% volume in air	lower 1, upper 6	lower 1, upper 6
Vapor Pressure	kPa	<0.04 (estimated)	<0.04 (estimated)
Vapor Density (Air = 1)		>1 (estimated)	>1 (estimated)
Autoignition temperature	°C	350	350

10. Stability and Reactivity

Stable at ambient temperatures.
Hazardous polymerisation reactions will not occur.

Conditions to Avoid

Sources of ignition such as naked flames, sparks, hot surfaces, static electricity.
Avoid storage at or near flash point.

Materials to Avoid

Avoid contact with strong oxidizing agents.

Hazardous Decomposition Products

Thermal decomposition products will vary with conditions.

Hydrogen sulphide (H₂S) may be released on heating and may accumulate on confined spaces.

Incomplete combustion will generate smoke, carbon dioxide and hazardous gases, including carbon monoxide.

Fuel oil ash/dust can be hazardous if inhaled. Before working in combustion/exhaust spaces or handling fuel oil ash/dust the area should be thoroughly damped down with water. If this is not possible, wear full breathing apparatus or positive pressure filter sets. Protective clothing must always be worn. When inspecting combustion/exhaust spaces, wear full face dust respirator and protective clothing.

11. Toxicological Information

Acute

Eyes Unlikely to cause more than transient stinging or redness if accidental eye contact occurs.

Skin Unlikely to cause harm to the skin on brief or occasional contact but prolonged or repeated exposure may lead to dermatitis and to the development of characteristic skin lesions such as oil blisters or warts, which may give rise to malignant tumours.

Ingestion If swallowed accidentally, the product may enter the lungs due to its low viscosity and lead to the rapid development of very serious inhalation pulmonary lesions (medical survey for 48 hours min).

Inhalation May cause irritation to eyes, nose and throat due to exposure to vapour, mists or fumes. May be toxic by inhalation when hydrogen sulphide is present in the vapour. Hydrogen sulphide gas may in addition produce irritation of the eyes and respiratory tract. Dusts generated during the removal of ash deposits from engine/boiler combustion surfaces or exhaust spaces, will be harmful if inhaled and may cause nausea and eye, nose and throat irritation. Repeated contact may result in serious irreversible disorders.

Chronic

As with all such products containing potentially harmful levels of PCAs/PAHs, prolonged or repeated skin contact may eventually result in dermatitis or more serious irreversible skin disorders including cancer.

12. Ecological Information

Mobility

Spillages may penetrate the soil causing ground water contamination.

This material may accumulate in sediments.

Persistence and degradability

"Persistent" according to International Oil Pollution Compensation (IOPC) definition.

Intrinsically biodegrades, but very slowly.

Bioaccumulative potential

Potentially bioaccumulate.

Aquatic toxicity

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Spills may form a film on water surfaces causing physical damage to organisms. Oxygen transfer could also be impaired.

13. Disposal Considerations

Dispose of by incineration or other suitable means under conditions approved by the local authority or via a licensed waste disposal contractor.

At sea, used or unwanted product should be stored for eventual discharge into port approved waste oil disposal facilities.

Empty packages may contain some remaining product. Disposal via authorised waste collector.

Hazard warning labels are a guide to the safe handling of empty packaging and should not be removed.

14. Transport Information

Sea Transport

Flammable Liquids

IMO/IMDG	Gas oil
UN No.	1202
IMO, IMDG Class	3
Classification Code	F1
Packing Group	III
Marine pollutant	No
EmS No	3-07
MFAG Table No	311
Hazard Label(s)	3
Safety Card	F-E, S-E

Road/Rail Transport

Flammable Liquids

ADR/RID	Gas oil
UN No.	1202
ADR/RID Class	3
Classification Code	F1
Packing Group	III
Hazard Identification No.	30

CEFIC Tremcard No	26
UK Emergency action code	3Z
Pollutant to the aquatic Environment	No
Hazard Label(s)	3

Inland waterways

Flammable Liquids

ADNR	Gas oil
UN No.	1202
ADNR Class	3
Packing Group	III
Hazard Label(s)	3

Air Transport

Flammable liquids

IATA/ICAO	Gas oil
UN No.	1202
IATA/ICAO Class	3
Packing Group	III
Hazard Label(s)	3

This product is being carried under the scope of MARPOL Annex I

15. Regulatory Information

EU Category of Danger

Carcinogenic category	2
	Harmful
	Dangerous for the environment

EU Labelling

Symbol	- Skull and crossbones
	- Dead tree and fish

Risk (R) Phrases

R45	May cause cancer.
R51/53	Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment
R65	Harmful: may cause lung damage if swallowed.
R66	Repeated exposure may cause skin dryness or cracking

Safety (S) Phrases

- S24 Avoid contact with skin
- S36/37 Wear suitable protective clothing and gloves.
- S43 In case of fire, use foam/dry powder/CO2. Never use water jets.
- S45 In case of accident or if you feel unwell, seek medical advice immediately (show label where possible).
- 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.

Hazardous ingredients

Fuels, diesel, No 2

Additional Information

For non-fuel use only - "Restricted to professional users. Attention - Avoid exposure - obtain special instructions before use." must be marked on packaging.

16. Other Information

Hazardous concentrations of hydrogen sulphide (H_2S) gas can accumulate in storage and rundown tanks, marine vessel compartments, sump pits or other confined spaces. When opening valves, hatches and dome covers, stand upwind, keep face as far from the opening as possible and avoid breathing any gases or vapours. When exposure concentrations are unknown and respiratory protection is not used, personal H_2S warning devices should be worn, These devices should not be relied on to warn of life threatening concentrations. H_2S fatigues the sense of smell rapidly. The rotten egg odour of H_2S disappears quickly, even though high concentrations are still present. The ACGIH TLV/TWA for H_2S is 10 ppm, the STEL 15 ppm.

The company recommends that all exposures to this product be minimized by strictly adhering to recommended occupational control procedures to avoid any potential adverse health effects.

All information contained in this Material Safety Data Sheet and, in particular, the health and safety and environmental information is accurate to the best of our knowledge and belief as at the date of issue specified. However, the company makes no warranty or representation, express or implied, as to the accuracy or completeness of such information.

The provision of this Material Safety Data Sheet is not intended, of itself, to obviate the need for all users to satisfy themselves that the product described is suitable for their individual purposes and that the safety precautions and environmental advice are adequate for their individual purposes and situation. Further, it is user's obligation to use this product safely and to comply with all applicable laws and regulations concerning the use of the product.

The company accepts no responsibility for any injury, loss or damage, consequent upon any failure to follow the safety and other recommendations contained in this Material Safety Data Sheet, nor from any hazards inherent in the nature of the material, nor from any abnormal use of the material.

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