

# **MATERIAL SAFETY DATA SHEET**

## **Marine Residual Fuel Oil**

### **RMA to RML**

#### **1. Product and Company Name**

##### **Product**

Marine Residual Fuel Oil RMA to RML

Alternative Names: Bunker C

##### **Application**

Fuel for industrial, marine and commercial boilers and furnaces; fuel for low and medium speed diesel engines.

##### **Company**

KG Bominflot Gesellschaft für Mineralöle mbH & Co

Hanseviertel

Grosse Bleichen 30

20354 Hamburg

Germany

##### **Emergency Telephone Number**

+49 (0) 180 100 31 28

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#### **2. Composition/Information on Ingredients**

##### **Hazardous Components**

Hydrogen sulphide ( $H_2S$ ), 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.

Fuel oil, residual

- EINECS No: 270-675-6

- CAS No: 68476-33-5

- 100 % Wt

R40

Limited evidence of a carcinogenic effect

R52/53

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

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#### **3. Hazards Information**

Contact with hot product may cause burns.

May cause cancer, classified as a category 2 carcinogen.

*This material may contain significant quantities of polycyclic aromatic hydrocarbons (PCAs), some of which have been shown by experimental studies to induce skin cancer. Repeated exposure may cause skin dryness or cracking.*

*Vapours containing hydrogen sulphide may accumulate during storage or transport and may also be vented during filling of tanks. Hydrogen sulphide has a typical "bad egg" smell but at high concentrations the sense of smell is rapidly lost, therefore do not rely on sense of smell for detecting hydrogen sulphide. Use specially designed measuring instruments for determining its concentration.*

*During cleaning of engines, components and boilers there is a risk of inhalation of ash from combustion which may contain potentially harmful components such as vanadium and other heavy metal oxides. This may cause irritation of the respiratory tract and possibly, difficulty in breathing.*

### **Acute effects of exposure to man**

Inhalation	<i>Contains or may release hydrogen sulphide (H<sub>2</sub>S) gas. H<sub>2</sub>S concentrations above permissible concentrations can cause headache, nausea, vomiting, dizziness and diarrhoea. At Concentrations above 300 ppm, respiratory paralysis, causing unconsciousness and death, can occur.</i>
Skin contact	<i>Prolonged or widespread skin contact may result in the absorption of potentially harmful amounts of material. Brief contact may cause slight irritation. Prolonged contact, as with clothing wetted with material, may cause more severe irritation and discomfort, seen as local redness and swelling. Believed not to be a skin sensitizer.</i>
Eye contact	<i>May cause irritation, experienced as mild discomfort and seen as slight excess redness of the eye.</i>
Ingestion	<i>If more than several mouthfuls are swallowed, abdominal discomfort, nausea and diarrhoea may occur.</i>

### **Chronic effects of exposure to man**

<i>Medical conditions aggravated by exposure</i>	<i>Because of its irritating properties, repeated skin contact may aggravate an existing dermatitis (skin condition).</i>
<i>Other remarks</i>	<i>This product , or a component of this product, has caused skin cancer when repeatedly applied to the skin of laboratory animals without any effort to remove the material between applications.</i>

### **Effects of exposure to the environment**

*Some short-term toxicity to aquatic and marine organisms, may cause long-term adverse effects in the aquatic environment.*

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## **4. First Aid Measures**

### **Eyes**

*Wash eye thoroughly with copious quantities of water, ensuring eyelids are held open. Obtain medical advice if any pain or redness develops or persists. If hot material enters the eye, flood immediately with cold water to dissipate the heat, if possible, ensuring eyelids are held open. Take the casualty to hospital for examination and treatment without delay.*

### **Skin**

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

*If hot product causes burns, the affected area should be flooded immediately with, or immersed in cold water for 10 minutes, or longer if pain persists. Burns should be covered with clean cotton or gauze, and the casualty taken to hospital as soon as possible for examination and treatment.*

*Never use gasoline, kerosine or other solvents to remove fuel oil from skin or clothing.*

*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. If symptoms persist 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 H<sub>2</sub>S may reasonably be anticipated, should be trained in the techniques of emergency resuscitation and in the care of an unconscious patient.*

### **Medical Advice**

*If ingested, do not induce vomiting.*

*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.*

### **Other recommendations**

*Remove and dry-clean or launder clothing soaked or soiled with this material before reuse. Dry cleaning of contaminated clothing may be more effective than normal laundering. Inform individuals responsible for cleaning of potential hazards associated with handling contaminated clothing.*

*The odour of hydrogen sulphide (H<sub>2</sub>S) gas is offensive and similar to rotten eggs. H<sub>2</sub>S gas deadens the sense of smell, even at low concentrations. DO NOT depend on odour to detect presence of gas.*

*WARNING. Rescue of overexposed persons should be attempted only after notifying others of the emergency and only if appropriate personal protective equipment and positive pressure self-contained breathing apparatus (SCBA) is available.*

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## **5. Fire Fighting Measures**

*For major fires call the Fire Service.*

*Ensure an escape path is always available from any fire.*

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

Avoid spraying directly into storage containers because of the danger of boil-over.  
Fires in confined spaces should be dealt with by trained personnel wearing approved breathing apparatus.

### **Combustion Products**

Toxic fumes may be evolved on burning or exposure to heat (See Stability and Reactivity, Section 10).

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## **6. Accidental Release Measures**

Ensure good ventilation.

Evacuate all non essential personnel from the immediate area.

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

Depending upon its temperature the product may be liquid, semi-solid or solid.

Protect drains from spills and prevent entry of product, since this may result in blockage on cooling. Should blockage occur, notify the appropriate authority immediately.

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.

Spilled material may make surfaces slippery.

Recovery of large spillages should be effected by specialist personnel.

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.

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

The foam blanket should be maintained until the area is declared safe.

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.

Vapour may collect in any confined space.

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.

The product may sink making recovery difficult.

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

Regular surveillance on the location of the spillage should be maintained.

In the event of spillages contact the appropriate authorities.

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## **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.

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.

Take all necessary precautions against accidental spillage into soil or water.

## **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 remove warning labels from containers.*

*Protect containers against static electricity, lighting and physical damage.*

*Empty packages may contain some remaining product. Retain hazard warning labels on empty packages as a guide to the safe handling, storage and disposal of empty packaging.*

*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 ( $H_2S$ ) 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.*

*It is advisable that all who are engaged in operations in which contact with hydrogen sulphide ( $H_2S$ ) may be reasonably anticipated, should be trained in the techniques of emergency resuscitation and in the care of an unconscious patient.*

## **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.*

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## **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 ( $H_2S$ ): 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.*

*When handling heated material suitable protective clothing of an appropriate standard should be worn to prevent thermal burns.*

*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 ( $H_2S$ ) 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.

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## **9. Physical and Chemical Properties**

### **Typical Values**

	<b>Test Method</b>	<b>Units</b>	<b>RMA - RMK</b>
<b>Grades</b>			
<b>Physical state</b>			liquid
<b>Colour</b>			black
<b>Odour</b>			characteristic hydrocarbon
<b>Density @ 15°C</b>	ASTM D 1298	kg/m <sup>3</sup>	1010 max
<b>Flash point (PMC)</b>	ASTM D 93	°C	60 min
<b>Kinematic viscosity @ 50°C</b>	ASTM D 445	mm <sup>2</sup> /s	30 - 700

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## **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.

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.

Overheating in storage may cause partial vapourisation and decomposition with the production of toxic hydrogen sulphide gas ( $H_2S$ ).

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.*

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## **11. Toxicological Information**

### **Acute**

<i>Eyes</i>	<i>Unlikely to cause more than transient stinging or redness if accidental eye contact occurs. Will cause burns if hot material contacts eyes.</i>
<i>Skin</i>	<i>Will cause burns if hot material contacts skin As with all such products containing potentially harmful levels of PCAs, prolonged or repeated skin contact may eventually result in dermatitis or more serious irreversible skin disorders including cancer.</i>
<i>Ingestion</i>	<i>Unlikely to be swallowed in view of the high handling temperatures. Unlikely to cause harm if accidentally swallowed in small doses, though larger quantities may cause nausea and diarrhoea.</i>
<i>Inhalation</i>	<i>Will injure the lungs if aspiration occurs, e.g. during vomiting. May be irritating to eyes, nose and throat at high vapour concentrations. May be toxic by inhalation when hydrogen sulphide (H<sub>2</sub>S) is present in the vapour. Hydrogen sulphide (H<sub>2</sub>S) gas may in addition produce irritation of the eyes and respiratory tract. Vapour, mists or fumes may contain polycyclic aromatic hydrocarbons some of which are known to produce skin cancer. The inhalation of vapour, mists or fumes over long periods may therefore be hazardous. 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.</i>

### **Chronic**

*As with all such products containing potentially harmful levels of PCAs, prolonged or repeated skin contact may eventually result in dermatitis or more serious irreversible skin disorders including cancer.  
This product, or a component of this product, has caused skin cancer when repeatedly applied to the skin of laboratory animals without any effort to remove the material between applications.*

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## **12. Ecological Information**

### **Mobility**

*Spillages may penetrate the soil causing ground water contamination.*

### **Persistence and degradability**

*Believed to biodegrade slowly.*

### **Bioaccumulative potential**

*This material may accumulate in sediments.*

### **Aquatic toxicity**

*Some short-term toxicity to aquatic and marine organisms. Limited data available indicates aquatic toxicity in the range 10 – 100 mg/l. 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.*

**Remarks**

*This product, due to its density, can either float, sink or form emulsions if spilled on to water depending on the environmental conditions.*

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

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**14. Transport Information**

*Not classified as hazardous for transport (ADR, RID, UN, IMO, IATA/ICAO).*

**Sea Transport**

IMO/IMDG	Petroleum distillates, N.O.S. (contains hydrocarbons)
UN No.	1268
IMO, IMDG Class	3.3
Packing Group	III
Marine pollutant	No
EmS No	3-07
MFAG Table No	311

**Road/Rail Transport**

ADR/RID	Petroleum distillates, N.O.S. (contains hydrocarbons)
UN No.	1268
ADR/RID Class	3,31 (c)
Packing Group	III
Hazard Identification No.	30
CEPIC Tremcard No	30G35
UK Emergency action code	3Z
Pollutant to the aquatic Environment	No

**Inland waterways**

ADNR Class	3,31 (c)
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**Air Transport**

IATA/ICAO	Petroleum distillates, N.O.S. (contains hydrocarbons)
UN No.	1268
IATA/ICAO Class	3
Packing Group	III

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**15. Regulatory Information**



**EU Category of Danger**

Carcinogenic category 2

Dangerous for the environment

**EU Labelling**

Symbol

Skull and crossbones

Indication of danger

None

**Risk (R) Phrases**

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

**Safety (S) Phrases**

S53

Avoid exposure - obtain special instructions before use.

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.

**Additional Information**

The label must carry the following additional information: "EC Label", Substance name: Fuel oil, residual, EINECS No: 270-675-6

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

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## 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.

The ash from combusting products will contain nickel, vanadium and other potential toxic heavy metal oxides. Take appropriate precautions to avoid contact with and inhalation of ash and ash dust from combustion and exhausted spaces.

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.*