MATERIAL SAFETY DATA SHEET

Residual Fuel Oil
99852-0, 99860-0, 99862-0, 99866-0

1. PRODUCT AND COMPANY IDENTIFICATION

Identification of substance/preparation
Heavy Fuel Oil
Common refinery name: Refinery Fuel Oil

Alternative Names: Atmospheric residue, Decanted oil, DCO, HS atmospheric residue, High sulphur atmospheric residue (HSAR), Low sulphur atmospheric residue (LSAR), LS atmospheric residue, CCCO, Catalytically cracked clarified oil, Heavy vacuum distillate, Heavy vacuum gas oil, VGO, Waxy distillate, Main Column Bottom (MCB), Light wax, Heavy wax, Distillates, heavy cat-cracked, Heavy cracked gas oil, HCCO, Heavy catalytically cracked distillate.

Application
Refinery Stream
For specific application advice see appropriate Technical Data Sheet.

Company Identification
Stanhope-Seta Ltd
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Telephone Number
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2. COMPOSITION / INFORMATION OR INGREDIENTS CONSIDERED HAZARDOUS TO HEALTH

CHEMICAL COMPOSITION:
Complex Hydrocarbon substance, one of the following:
- Residues (petroleum), atm. tower. EINECS No:265-045-2, CAS No: 64741-45-3
- Gas oils (petroleum), heavy vacuum, EINECS No: 265-058-3, CAS No: 64741-57-7
- Distillates (petroleum), heavy catalytic cracked, EINECS No: 562-063-0, CAS No: 64741-61-3
- Clarified oils (petroleum) catalytic cracked, EINECS No: 265-064-6, CAS No: 64741-62-4
- Fuel oil, residual, EINECS No: 270-675-6, CAS No: 68476-33-5
- Distillates (petroleum), light vacuum, EINECS No: 274-684-6, CAS No: 70592-77-7
- Distillates (petroleum), vacuum, EINECS No: 274-685-1, CAS No: 70592-78-8

HAZARDOUS COMPONENTS:
Hydrogen Sulphide (H2S) CAS No: 7783-06-4, 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.

3. HAZARDS IDENTIFICATION.

Contact with hot product may cause burns.
May cause cancer, classified as a category 2 carcinogen.
This material may contain significant quantities if 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. Harmful to aquatic organisms, may cause long term adverse effects in the aquatic environment.

4. FIRST AID MEASURES

EYES:
Wash eyes 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 eye lids are 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
Burns should be covered with clean cotton and gauze, and the casualty taken to hospital as soon as possible for medical examination and treatment. Never use gasoline, kerosene 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:**
If contamination of the mouth occurs, wash out thoroughly with water. 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.

**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 H2S 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 4 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 of pulmonary oedema develops.

**Note:** High Pressure Applications
Injection 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.

### 5. FIRE FIGHTING MEASURES:

**EXTINGUISHING MEDIA:**
For major fires call the fire service. Ensure an escape path is always available for 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 trained personnel wearing breathing apparatus.

**COMBUSTION PRODUCTS:**
Toxic fumes may be evolved on burning or exposure to heat. See Stability and Reactivity, section 10 of this safety data sheet.

### 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, of this safety data sheet. 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 spillages 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 he use of suitable barrier equipment. Recover product from the surface. Protect environmentally sensitive areas and water supplies. The product may sink making the recovery difficult.
In the case if spillage at sea approved dispersants may be used where authorised by the appropriate government/regulatory authorities.

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

In the event of spillages contact the appropriate authorities. If spillage occurs call the Environment Agency Emergency Hotline on 0800 807060 (24 hours, 7 days a week).

7. HANDLING AND STORAGE

STORAGE CONDITIONS:
Store and dispense in well ventilated areas 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.
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 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 trained operators wearing air-supplied breathing apparatus of an approved type and following procedures strictly in accordance with the statutory regulations governing such entry. Please see the comments in section 8 (exposure controls/personal protection) of this data sheet.
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 hydrogen sulphide may be reasonably anticipated, should be trained in the techniques of emergency resuscitation and in the care of an unconscious patient.

HANDLING PRECAUTIONS:
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.
Avoid contact with eye, 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.
Wash hands thoroughly after contact.
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.

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 headspace). Tank headspace 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 stage 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 spillage's, 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 are:
Hydrogen Sulphide
UK publication EH40 (Occupational Exposure Limits):
Occupational Exposure Standard: Long-term exposure limit (8 Hour TWA) 5ppm, 7mg/m³
Short-term exposure limit (15 min) 10ppm, 14mg/m³
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 PRECAUTIONS:
If operations are such that the excessive generation of vapour, mist or fumes 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 inhalation of hydrogen sulphide gas.
The use of respiratory equipment must be strictly in accordance with the manufacturer’s
instruction and any statutory requirements governing its selection and use.

9. PHYSICAL AND CHEMICAL PROPERTIES
TYPICAL VALUES:

<table>
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<tr>
<th>Grades</th>
<th>Heavy Fuel Oil</th>
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10. STABILITY AND REACTIVITY:
Stable at ambient temperatures.
Hazardous polymerisation reactions will occur.

MATERIALS TO AVOID:
Avoid contact with strong oxidising 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 (H2S).
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
EYES:
Unlikely to cause more than transient stinging or redness if accidental eye contact occurs.
Will cause burns if hot material contact eyes.

SKIN:
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.

INGESTION:
Unlikely to be swallowed in view of the high handling temperatures.

INHALATION:
May be irritating to eyes, nose and throat at high vapour concentration.
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.
Vapour, mist or fumes may contain polycyclic aromatic hydrocarbons some of which are known
to produce skin cancer. The inhalation of vapour, mists or fume over long periods may therefore
be hazardous.

Dust 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 throat irritation.
Repeated contact may result in serious irreversible disorders.
12. ECOLOGICAL INFORMATION

MOBILITY:
Spillage's may penetrate the soil causing ground water contamination.

PERSISTENCE & DEGRADABILITY:
This product is inherently biodegradable.

BIOACCUMULATIVE POTENTIAL:
This material may accumulate in sediments.

AQUATIC TOXICITY:
Harmful to aquatic organism, may cause long term adverse effect 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 store 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.

14. TRANSPORT INFORMATION

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

15. REGULATORY INFORMATION

EU CATEGORY OF DANGER:
Carcinogenic category 2
Dangerous for the environment

EU LABELLING:
Skull and crossbones
Indication of danger:
None

RISK (R) PHRASES:
R45 May cause cancer
R66 Repeated exposure may cause skin dryness or cracking.
R52/53 Harmful to aquatic organism, may cause long term adverse effect in the aquatic environments.

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 appropriate)
S61 Avoid release to the environments, refer to special instruction/safety data sheets.

The label must carry the following additional information: “EC Label”, Substance name, EINECS No.
Substance Name: Heavy fuel oil, EINECS No: 265-045-2, 265-058-3, 265-063-0, 265-064-6, 270-675-6, 274-684-6, 274-685-1
For non-fuel use only – “restricted to professional users. Attention – Avoid exposure – obtain special instruction before use”. Must be marked on packaging.

16. OTHER INFORMATION

The data and advice given only apply when the product is sold for the stated application or applications. The product is not sold as suitable for any other application. Use of the product for application other than that stated in this information sheet might give rise to risks not mentioned in this sheet.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as warranty or quality specification. The information relates only to the specific materials designated and may not be valid for such material in combination with any other materials or in any process, unless specified in the text.