

SAFETY DATA SHEET

Revision Date : 22.02.2016

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Main Column Bottoms
Chemical name : Clarified Oils (Petroleum)
Synonyms : FCCU fractionator bottoms, Slurry oil
Product use : Bunker fuel oil blending

Supplier : Engen Refinery Durban (Tel: 031-460 3109, a/h: 031-430 3109)
Health Emergency Telephone : +27 (0) 21 689 5227 (Red Cross Poison Service)
Transport Emergency Telephone : +27 (0) 11 975 1278/83 (Hazchemwise)
Customer Service Centre : 0860 036 436 (Sales and Technical Information)
Engen Website : <http://www.engen.co.za/>

2. HAZARDS IDENTIFICATION

Emergency response data : Dark brown Semi-solid. Material is combustible. Storage tank headspace may contain flammable vapours. DOT ERG No. : 128

GHS Classification:

Health

| | | |
|---------------------|--|---------|
| Acute oral toxicity | Hazard category 4. May be harmful if swallowed. | Warning |
| Skin irritation | Hazard category 3. Practically non-irritating. | Warning |
| Eye irritation | Hazard category 2B. May cause mild eye irritation. | Warning |

Environmental

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| Aquatic toxicity | : Hazard category 3. May cause long-term adverse effects in the aquatic environment. | Warning |
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Physical

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| Flammability | : Hazard category 4. Combustible product. |
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GHS Labels/Pictograms:



Hazard Statements

Combustible product. May be harmful if swallowed. May cause eye and mild skin irritation.

Precautionary Statements

Response

IN CASE OF FIRE: Use carbon dioxide, foam or dry chemical for extinction. IF SWALLOWED: Get medical attention if you feel unwell. IF IN EYES: Rinse cautiously with water for several minutes. IF ON SKIN: If irritation occurs, get medical attention.

Storage

Store in a well-ventilated place and keep the container cool and tightly closed.

Disposal

Do not discharge into lakes, streams, ponds and ground water supply.

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See Section 11 for further health effects/toxicological data.

3. COMPOSITION/INFORMATION ON INGREDIENTS

| Chemical name | CAS-No. | Weight% |
|----------------------------|----------------|----------------|
| Clarified Oils (Petroleum) | 64741-62-4 | > 99.00 |
| Benzene | 71-43-2 | < 0.10 |

See Section 8 for Exposure Limits (if applicable).

4. FIRST AID MEASURES

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| Inhalation | : | Remove from further exposure. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with mechanical device or use mouth-to-mouth resuscitation with a mouthpiece. |
| Skin contact | : | Remove contaminated clothing. Dry wipe exposed skin and cleanse with hand cleaner, soap and water. Launder contaminated clothing before reuse. (See Section 16 - Injection Injury) |
| Eye contact | : | Flush thoroughly with water for at least 15 minutes. Get medical assistance. |
| Ingestion | : | Do not induce vomiting or give anything by mouth to a groggy or unconscious person. |
| Note to doctors | : | Material if aspirated into the lungs may cause chemical pneumonitis. Skin contact may aggravate an existing dermatitis. Treat appropriately. |

5. FIRE-FIGHTING MEASURES

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| Extinguishing media | : | Carbon dioxide, foam, dry chemical and water fog. |
| Special fire fighting procedure | : | Water spray should only be used to keep fire-exposed containers cool, flush spills away from exposures, disperse vapours and protect personnel attempting to stop leak. Prevent runoff from fire control or dilution from entering streams, municipal sewers, or drinking water supply. |
| Special protective equipment for firefighters | : | For fires in enclosed areas, fire fighters must use Self-Contained Breathing Apparatus. |
| Unusual fire and explosive hazards | : | During abnormal operations Hydrogen sulphide may be present. Hydrogen sulphide, an extremely flammable, very toxic gas, may collect in the vapour space of tanks or other enclosed vessels. Flammable. |
| Products of decomposition | : | Fumes, smoke, carbon monoxide, sulphur oxides, aldehydes and other decomposition products, in the case of incomplete combustion. |
| Flash Point | : | > 205 °C (ASTM D-93) |
| Upper Explosion Limit (UEL) | : | 7 %(V) |
| Lower Explosion Limit (LEL) | : | 0.6 %(V) |
| NFPA Hazard Id | : | Health: 3; Flammability: 2; Reactivity: 0 |

6. ACCIDENTAL RELEASE MEASURES

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- Procedure if material is released or spilled : Report spills/releases as required to appropriate authorities. Divert product to refinery Effluent Treatment Plant.
- Methods for cleaning up : Eliminate sources of ignition. Warn personnel in the downwind areas of fire and explosion hazard, and warn them to stay clear.
LAND SPILL: Shut off source taking normal safety precautions. Take measures to minimize the effects on ground water. Recover by pumping using explosion-proof equipment or contain spilled liquid with sand or other suitable absorbent and remove mechanically into containers. If necessary, dispose of absorbed residues as directed in Section 13.
WATER SPILL: Not applicable.
- Personal precautions : See Section 8.
- Environmental precautions : Prevent spill from entering stormwater drains and the Badullah Canal. Advise the relevant authorities if external contaminations have occurred.
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7. HANDLING AND STORAGE

- Safe handling advice : Keep product away from high energy ignition sources, heat, sparks, pilot lights, static electricity, and open flames. Harmful in contact with or if absorbed through the skin. Avoid inhalation of vapours or mists. Use in well ventilated area away from all ignition sources. See Section 8 for additional personal protection advice when handling this product.
- Storage information : This product should be contained within pipes, exchangers, towers and other storage vessels which comply with the relevant engineering standards.
- Storage and handling procedures : Can be stored in floating roof tanks in the refinery tankfarm.
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8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational Exposure Limits (OELs)

| Components | CAS-No. | Source | TWA | Value | Notations |
|-------------------|----------------|---------------|------------|--------------|------------------|
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Note : This product does not contain any components which have recognised exposure limits. An estimated LTEL of 0.2 mg/m³ is recommended.

LTEL: Long Term Exposure Limits - Time Weight Average (TWA) over 8 hours.

STEL: Short Term Exposure Limits - Time Weight Average (TWA) over 15 Minutes

Note: Limits Shown for guidance only. Follow applicable regulations.

Personal Protective Equipment (PPE)

- Engineering controls : Use in well ventilated area. Explosive-proof ventilation equipment with local exhaust is desirable.
- Respiratory protection : Approved respiratory equipment must be used when airborne concentrations are unknown or exceed the recommended exposure limit. Self-Contained Breathing Apparatus may be required for use in confined or enclosed spaces.
- Eye protection : If splash with liquid is possible, chemical type goggles should be worn.
- Skin and body protection : Impervious gloves must be worn. If body contact is likely, appropriate personal protective equipment must be worn. Good personal hygiene

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practices should always be followed.

9. PHYSICAL AND CHEMICAL PROPERTIES

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| Appearance | : | Semi-solid. |
| Colour | : | Dark brown |
| Odour | : | Hydrocarbon |
| Boiling point | : | > 170 °C |
| Flash Point | : | > 205 °C (ASTM D-93) |
| Upper Explosion Limit (UEL) | : | 7 %(V) |
| Lower Explosion Limit (LEL) | : | 0.6 %(V) |
| Vapour pressure | : | < 1 hPa |
| Density | : | 1.08 g/cm ³ @ 20 °C (ASTM D-4052) |
| Pour point | : | < -40 °C |
| Viscosity, kinematic | : | > 850 mm ² /s @ |

10. STABILITY AND REACTIVITY

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| Stability | : | Stable. |
| Conditions to avoid | : | Extreme heat and high energy sources of ignition, such as sparks and static electricity. |
| Materials to avoid | : | Halogens, strong acids, alkalis and oxidizers. |
| Hazardous decomposition products | : | Fumes, smoke, carbon monoxide, sulphur oxides, aldehydes and other decomposition products, in the case of incomplete combustion. |

11. TOXICOLOGICAL INFORMATION

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| Acute oral toxicity | : | (Rats): Harmful (LD50: Greater than 300 but 2000 mg/kg or less). Based on testing of similar products and/or components. Warning Hazard category 4. Harmful if swallowed. |
| Acute dermal toxicity | : | (Rats): Harmful (LD50: Greater than 300 but 2000 mg/kg or less). Based on testing of similar products and/or components. Warning Hazard category 4. May be harmful in contact with skin. |
| Acute inhalation toxicity | : | Not expected to occur in normal industrial use. |
| Skin irritation | : | (Rabbits): Mild irritant. (Primary Irritation Index: greater than 0.5 but less than 3). Based on testing of similar products and/or the components. Warning Hazard category 3. Causes mild skin irritation. |
| Eye irritation | : | (Rabbits): Mild irritant. (Draize score: greater than 6 but 15 or less). Based on testing of similar products and/or the components. Warning Hazard category 2B. May cause mild eye irritation. |
| Respiratory and skin sensitization | : | Aromatic oils contain polycyclic compounds implicated in allergic skin sensitization and photosensitization studies in both animals and humans. |
| Germ cell mutagenicity | : | This product tested negative in a series of mutagenic tests. |
| Carcinogenicity | : | Aromatic oils and extracts are carcinogenic in lifetime mouse skin painting bioassays. |
| Reproductive toxicity (Teratogenicity) | : | Negative in a series of genetic assays and teratological studies. |
| Specific target organ toxicity (STOT) - single exposure | : | No significant effects expected. |

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| Specific target organ toxicity (STOT) - repeated exposure | : | Repeated dermal application to rats for 13 weeks was carried out with aromatic oils similar to components used in this product. Resulting effects included increased mortality, increased liver weight, decreased thymus gland weight and lymphoid tissue and blood disorders. Kidney and bone marrow toxicity and skin irritation were also observed in some cases. Skin cleansing studies show that toxic effects are not likely to occur if the aromatic oil is removed using guidance in Section 4. See Section 8 for recommended protection and precautions |
| Aspiration hazard | : | Not expected to occur in normal industrial use. |

12. ECOLOGICAL INFORMATION

Ecotoxicity effects

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| Toxicity to fish | : | Insoluble product, no significant effects. |
| Toxicity to aquatic organisms | : | Insoluble product, no significant effects. (Green algae) LC/EC50: 9.4 mg/l at 8 hours. |

Elimination information (persistence and degradability)

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| Biodegradability | : | The majority of the components in this product would be expected to be inherently biodegradable through photodegradation. |
| Mobility | : | Dissolution of the higher molecular weight hydrocarbon components in water will be limited, but losses through sediment adsorption may be significant. |
| Bioaccumulation | : | Not established. |

Further information on ecology

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| Remarks | : | This product is not expected to have short-term harmful effects on aquatic organisms (LL50 or EL50 >100 mg/L), however, there may be long-term adverse effects. |
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13. DISPOSAL CONSIDERATIONS

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| Waste disposal | : | This product is suitable for recycling or safe disposal at approved facilities. |
| Contaminated packaging | : | Empty containers retain residue (liquid and/or vapour) and can be dangerous. DO NOT PRESSURIZE, 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. Do not attempt to refill or clean container since residue is difficult to remove. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. |
| Other regulations | : | Disposal of unused product may be subject to RCRA regulations (40 CFR 261). Disposal of the used product may also be regulated due to ignitability, corrosivity, reactivity, or toxicity as determined by the Toxicity Characteristic Leaching Procedure (TCLP). |
| Flash Point | : | > 205 °C (ASTM D-93) |

14. TRANSPORT INFORMATION

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| Note | : | This product is not regulated by the following: U.S. DOT (CFR), ADR, |
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IATA and IMDG.

15. REGULATORY INFORMATION

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| US OSHA Hazard Communication Standard | : | Product assessed in accordance with OSHA 29 CFR 1910.1200 and determined to be hazardous. |
| Governmental Inventory Status | : | All components comply with TSCA, EINECS/ELINCS, AICS, METI, DSL, KECI, ENCS, PICCS and IECSC. |
| EU Labelling | : | Product is dangerous as defined by the European Union Dangerous Substances/Preparations Directives. |
| Symbols | : | T Toxic |
| R-Phrase(s) | : | R45, R48/21 May cause cancer., Harmful: danger of serious damage to health by prolonged exposure in contact with skin. |
| S-Phrase(s) | : | S23, S36/37, S28, S53, S62 Do not breathe vapour., Wear suitable protective clothing and gloves., After contact with skin, wash immediately., Avoid exposure - obtain special instructions before use., If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label. |
| Note | : | Contains Aromatic Oils. |

SARA

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| U.S. Superfund Amendments and Reauthorization Act SARA Title III | : | This product contains no "EXTREMELY HAZARDOUS SUBSTANCES". |
| SARA (311/312) Reportable Hazard Categories | : | Fire Chronic Acute |

The following product ingredients are cited on the lists below

| Chemical name | CAS-No. | Concentration [%] | List Citations |
|----------------------------|------------|-------------------|---|
| Clarified Oils (Petroleum) | 64741-62-4 | > 99.00 | 7, 16 |
| Benzene | 71-43-2 | < 0.10 | 1, 2, 4, 6, 9, 10, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26 |

Regulatory List Searched

| | | | | |
|---------------|---------------|---------------|-------------|-------------|
| 1 = ACGIH ALL | 6 = IARC 1 | 11 = TSCA 4 | 17 = CA P65 | 22 = MI 293 |
| 2 = ACGIH A1 | 7 = IARC 2A | 12 = TSCA 5a2 | 18 = CA RTK | 23 = MN RTK |
| 3 = ACGIH A2 | 8 = IARC 2B | 13 = TSCA 5e | 19 = FL RTK | 24 = NJ RTK |
| 4 = NTP CARC | 9 = OSHA CARC | 14 = TSCA 6 | 20 = IL RTK | 25 = PA RTK |
| 5 = NTP SUS | 10 = OSHA Z | 15 = TSCA 12b | 21 = LA RTK | 26 = RI RTK |

Code Key: CARC = Carcinogen; SUS = Suspected Carcinogen

16. OTHER INFORMATION

Note: Engen products do not contain PCBs.

INJECTION INJURY WARNING: 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

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doctor 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.

Note: No significant changes have been made to this Safety Data Sheet since the previous date.

Disclaimer

Information given herein is offered in good faith as accurate, but without guarantee. Conditions of use and suitability of the product for particular uses are beyond our control; all risks of use of the product are therefore assumed by the user and we expressly disclaim all warranties of every kind and nature, including warranties of merchantability and fitness for a particular purpose in respect to the use or suitability of the product. Nothing is intended as a recommendation for uses which infringe valid patents or as extending license under valid patents. Appropriate warnings and safe handling procedures should be provided to handlers and users.

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|-------------|---|--|
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