Material Safety Data Sheet

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY/UNDERTAKING

Material Name : **DSO**
Uses : Refinery stream. Fuel oil blending.

Manufacturer/Supplier : **Qatar Shell GTL Limited**
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Doha
Qatar

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2. COMPOSITION/INFORMATION ON INGREDIENTS

Mixture Description : A complex combination of disulfides obtained by subjecting naphtha or gases from various refinery processes to a sweetening process to convert mercaptans. The disulfides have carbon numbers predominantly in the range of C2 through C8 with a pungent odour.
Synonyms : Disulphide Oil, DSO, Diaryl Sulphide

Hazardous Components

Chemical Identity	CAS	EINECS	Symbol(s)	R-phrase(s)	Conc.
Naphthalene	91-20-3	202-049-5	Xn, N	R22; R40; R50/53	5,00 - 10,00 %
Propyl benzene	103-65-1	203-132-9	Xi, N, Xn	R10; R37; R51/53; R65	1,00 - 2,00 %

Additional Information : Refer to chapter 16 for full text of EC R-phrases.

NFPA Rating (Health, Fire, Reactivity) : 1, 2, 0

3. HAZARDS IDENTIFICATION

EC Classification : Dangerous for the environment.
Carcinogenic, category 3.

Health Hazards : Breathing of high vapour concentrations may cause central nervous system (CNS) depression resulting in dizziness, light-headedness, headache and nausea. Harmful if inhaled. May cause moderate irritation to skin. Repeated exposure may cause skin dryness or cracking. Harmful if swallowed.
Signs and Symptoms : If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest

congestion, shortness of breath, and/or fever. The onset of respiratory symptoms may be delayed for several hours after exposure.
Defatting dermatitis signs and symptoms may include a burning sensation and/or a dried/cracked appearance.

Safety Hazards : May ignite on surfaces at temperatures above auto-ignition temperature. Vapour in the headspace of tanks and containers may ignite and explode at temperatures exceeding auto-ignition temperature, where vapour concentrations are within the flammability range. Electrostatic charges may be generated during pumping. Electrostatic discharge may cause fire.

4. FIRST AID MEASURES

Inhalation : Remove to fresh air. If rapid recovery does not occur, transport to nearest medical facility for additional treatment. Resuscitate or administer oxygen as needed.

Skin Contact : Remove contaminated clothing. Immediately flush skin with large amounts of water for at least 15 minutes, and follow by washing with soap and water if available. If redness, swelling, pain and/or blisters occur, transport to the nearest medical facility for additional treatment.

Eye Contact : Immediately flush eyes with large amounts of water for at least 15 minutes while holding eyelids open. Transport to the nearest medical facility for additional treatment.

Ingestion : If swallowed, do not induce vomiting: transport to nearest medical facility for additional treatment. If vomiting occurs spontaneously, keep head below hips to prevent aspiration. If any of the following delayed signs and symptoms appear within the next 6 hours, transport to the nearest medical facility: fever greater than 101° F (38.3°C), shortness of breath, chest congestion or continued coughing or wheezing.

Advice to Physician : Treat symptomatically.

5. FIRE FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

Specific Hazards : Hazardous combustion products may include: A complex mixture of airborne solid and liquid particulates and gases (smoke). Carbon monoxide. Unidentified organic and inorganic compounds. Carbon monoxide may be evolved if incomplete combustion occurs. Flammable vapours may be present even at temperatures below the flash point.

Suitable Extinguishing Media : Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.

Unsuitable Extinguishing Media : Do not use water in a jet.

Protective Equipment for Firefighters : Proper protective equipment including breathing apparatus must be worn when approaching a fire in a confined space.

Additional Advice : Keep adjacent containers cool by spraying with water.

6. ACCIDENTAL RELEASE MEASURES

Avoid contact with spilled or released material. For guidance on selection of personal protective

equipment see Chapter 8 of this Material Safety Data Sheet. See Chapter 13 for information on disposal. Observe the relevant local and international regulations. Evacuate the area of all non-essential personnel. Ventilate contaminated area thoroughly.

Protective measures	:	Do not breathe fumes, vapour. Do not operate electrical equipment. Shut off leaks, if possible without personal risks. Remove all possible sources of ignition in the surrounding area. Use appropriate containment (of product and fire fighting water) to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers. Attempt to disperse the vapour or to direct its flow to a safe location for example by using fog sprays. Take precautionary measures against static discharge. Ensure electrical continuity by bonding and grounding (earthing) all equipment.
Clean Up Methods	:	For small liquid spills (< 1 drum), transfer by mechanical means to a labelled, sealable container for product recovery or safe disposal. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely. For large liquid spills (> 1 drum), transfer by mechanical means such as vacuum truck to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Retain as contaminated waste. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely. Shovel into a suitable clearly marked container for disposal or reclamation in accordance with local regulations.
Additional Advice	:	Notify authorities if any exposure to the general public or the environment occurs or is likely to occur. Local authorities should be advised if significant spillages cannot be contained.

7. HANDLING AND STORAGE

General Precautions	:	Avoid breathing vapours or contact with material. Only use in well ventilated areas. Wash thoroughly after handling. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material. Air-dry contaminated clothing in a well-ventilated area before laundering. Properly dispose of any contaminated rags or cleaning materials in order to prevent fires. Prevent spillages. Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. Never siphon by mouth. Contaminated leather articles including shoes cannot be decontaminated and should be destroyed to prevent reuse. For comprehensive advice on handling, product transfer, storage and tank cleaning refer to the product supplier.
Handling	:	Avoid inhaling vapour and/or mists. When using do not eat or drink. Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks. Earth all equipment. Electrostatic charges may be generated during pumping.

		Electrostatic discharge may cause fire. Not expected to be a health hazard when used under normal conditions. Avoid contact with skin, eyes and clothing.
Storage	:	Drum and small container storage: Drums should be stacked to a maximum of 3 high. Use properly labelled and closeable containers. Tank storage: Tanks must be specifically designed for use with this product. Bulk storage tanks should be diked (bunded). Locate tanks away from heat and other sources of ignition. Must be stored in a diked (bunded) well-ventilated area, away from sunlight, ignition sources and other sources of heat. The vapour is heavier than air. Beware of accumulation in pits and confined spaces.
Product Transfer	:	Avoid splash filling. Wait 2 minutes after tank filling (for tanks such as those on road tanker vehicles) before opening hatches or manholes. Wait 30 minutes after tank filling (for large storage tanks) before opening hatches or manholes. Keep containers closed when not in use. Do not use compressed air for filling, discharging or handling. Contamination resulting from product transfer may give rise to light hydrocarbon vapour in the headspace of tanks that have previously contained gasoline. This vapour may explode if there is a source of ignition. Partly filled containers present a greater hazard than those that are full, therefore handling, transfer and sampling activities need special care.
Recommended Materials	:	For containers, or container linings use mild steel, stainless steel. For seals and gaskets use: graphite, PTFE, Viton A, Viton B.
Unsuitable Materials	:	Some synthetic materials may be unsuitable for containers or container linings depending on the material specification and intended use. Examples of materials to avoid are: natural rubber (NR), nitrile rubber (NBR), ethylene propylene rubber (EPDM), polymethyl methacrylate (PMMA), polystyrene, polyvinyl chloride (PVC), polyisobutylene. However, some may be suitable for glove materials. Copper. Copper alloys. Aluminium.
Container Advice	:	Containers, even those that have been emptied, can contain explosive vapours. Do not cut, drill, grind, weld or perform similar operations on or near containers.
Additional Information	:	Ensure that all local regulations regarding handling and storage facilities are followed.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

If the American Conference of Governmental Industrial Hygienists (ACGIH) value is provided on this document, it is provided for information only.

Occupational Exposure Limits

Material	Source	Type	ppm	mg/m3	Notation
Indene	ACGIH	TWA	5 ppm		
Naphthalene	ACGIH	TWA	10 ppm		
	ACGIH	STEL	15 ppm		

	ACGIH	SKIN_DES			Can be absorbed through the skin.

Biological Exposure Index (BEI) - See reference for full details
No biological limit allocated.

Material	Source	Hazard Designation
Naphthalene	ACGIH	Not classifiable as a human carcinogen.

Exposure Controls : The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include: Use sealed systems as far as possible. Adequate ventilation to control airborne concentrations below the exposure guidelines/limits. Local exhaust ventilation is recommended. Eye washes and showers for emergency use.

Personal Protective Equipment : Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

Respiratory Protection : If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are unsuitable (e.g. airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. All respiratory protection equipment and use must be in accordance with local regulations.

Hand Protection : Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, glove thickness, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced.
Select gloves tested to a relevant standard (e.g. Europe EN374, US F739). For incidental contact/splash protection Neoprene, PVC gloves may be suitable.

Eye Protection : Chemical splash goggles (chemical monogoggles). Approved to EU Standard EN166.

Protective Clothing : Chemical resistant gloves/gauntlets, boots, and apron (where risk of splashing).

Monitoring Methods : Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to

		confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate.
Environmental Exposure Controls	:	Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Yellow to brown. Liquid at 20 °C.
Odour	:	Mercaptan.
pH	:	Not applicable
Initial Boiling Point and Boiling Range	:	ca. 120 - 275 °C / 248 - 527 °F
Melting / freezing point	:	ca. -17,8 °C / -0,0 °F
Flash point	:	Typical > 93 °C / > 199 °F
Upper / lower Flammability or Explosion limits	:	Data not available
Vapour pressure	:	Data not available
Density	:	ca. 1,08 - 1,12 g/cm3 at 15 °C / 59 °F
Water solubility	:	Data not available
Solubility in other solvents	:	Data not available
n-octanol/water partition coefficient (log Pow)	:	Data not available
Dynamic viscosity	:	Data not available
Kinematic viscosity	:	Data not available
Vapour density (air=1)	:	Data not available
Evaporation rate (nBuAc=1)	:	Data not available

10. STABILITY AND REACTIVITY

Stability	:	Stable under normal conditions of use.
Conditions to Avoid	:	Avoid heat, sparks, open flames and other ignition sources.
Materials to Avoid	:	Strong oxidising agents. Strong acids. Copper. Aluminium. Copper alloys.
Hazardous Decomposition Products	:	Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases, including carbon monoxide, carbon dioxide and other organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation.

11. TOXICOLOGICAL INFORMATION

Basis for Assessment	:	Information given is based on product testing, and/or similar products, and/or components.
Acute Oral Toxicity	:	Harmful if swallowed. LD50 > 300 - <= 2000 mg/kg
Acute Dermal Toxicity	:	Expected to be of low toxicity: LD50 > 5000 mg/kg
Acute Inhalation Toxicity	:	Harmful if inhaled. LC50 > 10.0 - <= 20.0 mg/l
Skin Irritation	:	Causes skin irritation.
Eye Irritation	:	Causes eye irritation.
Respiratory Irritation	:	Inhalation of vapours or mists may cause irritation to the respiratory system.
Sensitisation	:	May cause sensitisation by skin contact.
Repeated Dose Toxicity	:	Not expected to be a hazard.
Mutagenicity	:	Not expected to be mutagenic.
Carcinogenicity	:	May cause cancer.
Reproductive and	:	Not expected to impair fertility. Not expected to be a

Developmental Toxicity developmental toxicant.

12. ECOLOGICAL INFORMATION

Incomplete ecotoxicological data are available for this product. The information given below is based partly on a knowledge of the components and the ecotoxicology of similar products.

Acute Toxicity	:	Expected to be practically non toxic: LL/EL/IL50 > 100 mg/l (to aquatic organisms) LL/EL50 expressed as the nominal amount of product required to prepare aqueous test extract.
Fish	:	Expected to be toxic: LL/EL/IL50 1-10 mg/l
Aquatic crustacea	:	Expected to be toxic: LL/EL/IL50 1-10 mg/l
Algae/aquatic plants	:	Expected to be toxic: LL/EL/IL50 1-10 mg/l
Microorganisms	:	Expected to be toxic: LL/EL/IL50 1-10 mg/l
Mobility	:	Sinks in water.
Persistence/degradability	:	Major constituents are expected to be inherently biodegradable, but the product contains components that may persist in the environment. Oxidises rapidly by photo-chemical reactions in air.
Bioaccumulation	:	Contains constituents with the potential to bioaccumulate.

13. DISPOSAL CONSIDERATIONS

Material Disposal	:	Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. Do not dispose into the environment, in drains or in water courses. Waste arising from a spillage or tank cleaning should be disposed of in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor should be established beforehand.
Container Disposal	:	Send to drum recoverer or metal reclaimer. Drain container thoroughly. After draining, vent in a safe place away from sparks and fire. Residues may cause an explosion hazard if heated above the flash point. Do not puncture, cut or weld uncleaned drums. Do not pollute the soil, water or environment with the waste container. Comply with any local recovery or waste disposal regulations.

14. TRANSPORT INFORMATION

Land (as per ADR classification): Regulated

Class	:	9
Packing group	:	III
Hazard indentification no.	:	90
UN number	:	3082
Danger label (primary risk)	:	9
Proper shipping name	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Diaryl Disulphide containing Naphthalene)
Environmentally Hazardous	:	Yes

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IMDG

Identification number	UN 3082
Proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
Technical name	(Diaryl Disulphide containing Naphthalene)
Class / Division	9
Packing group	III
Marine pollutant:	Yes

IATA (Country variations may apply)

UN number	:	3082
Proper shipping name	:	Environmentally hazardous substance, liquid, n.o.s.
Technical name	:	(Diaryl Disulphide containing Naphthalene)
Class / Division	:	9
Packing group	:	III

15. REGULATORY INFORMATION

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

EC Classification	:	Dangerous for the environment. Carcinogenic, category 3.
EC Symbols	:	Xn Harmful.
EC Risk Phrases	:	R20/22 Harmful by inhalation and if swallowed. R43 May cause sensitization by skin contact. R67 Vapours may cause drowsiness and dizziness. R40 Limited evidence of a carcinogenic effect. R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. R36/38 Irritating to eyes and skin.
EC Safety Phrases	:	S23 Do not breathe fumes, vapour or spray. S24/25 Avoid contact with skin and eyes. S36/37/39 Wear suitable protective clothing, gloves and eye/face protection. S62 If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label. S29 Do not empty into drains. S60 This material and its container must be disposed of as hazardous waste.
Classification triggering components	:	Contains naphthalene.

16. OTHER INFORMATION

R-phrase(s)

R10	Flammable.
R20/22	Harmful by inhalation and if swallowed.
R22	Harmful if swallowed.
R36/38	Irritating to eyes and skin.
R37	Irritating to respiratory system.
R40	Limited evidence of a carcinogenic effect.
R43	May cause sensitization by skin contact.
R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R51/53	Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R65	Harmful: may cause lung damage if swallowed.
R67	Vapours may cause drowsiness and dizziness.

MSDS Version Number : 1.1

MSDS Effective Date : 12.06.2012

MSDS Revisions : A vertical bar (|) in the left margin indicates an amendment from the previous version.

Uses and Restrictions : This product must not be used in applications other than those recommended in Section 1, without first seeking the advice of the supplier.

MSDS Distribution : The information in this document should be made available to all who may handle the product.

Disclaimer : This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.