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

Material Name Recommended Use /

Restrictions of Use

Residues (petroleum), vacuum. CAS 64741-56-6

: Paving grade bitumen for road paving.

: Shell Eastern Trading (PTE) Ltd Supplier

9 North Buona Vista Drive,

#07-01,

Tower 1, The Metropolis Singapore 138588

Singapore

Telephone

Emergency Telephone

Number

+65-6384 8000

+44 (0) 151 350 4595

2. HAZARDS IDENTIFICATION

GHS Classification

: Not classified

GHS Label Elements

Symbol(s)

No symbol

Signal Words No signal word

Hazard Statement

PHYSICAL HAZARDS:

Not classified as a physical hazard under GHS criteria.

HEALTH HAZARDS:

Not classified as a health hazard under GHS criteria.

ENVIRONMENTAL HAZARDS:

Not classified as an environmental hazard under GHS criteria.

GHS Precautionary Statements

Prevention

: No precautionary phrases.

Response

: No precautionary phrases.

Storage

: No precautionary phrases.

Disposal:

: No precautionary phrases.

1/14

Other Hazards which do not result in classification

Not classified as flammable but will burn. Do not allow molten material to contact water or liquids as this can cause violent eruptions, splatter hot material, or ignite flammable material. These deposits, (carbonaceous materials and iron sulphides), may be pyrophoric and self-ignite when brought into contact with air (opening of tank). Hydrogen sulphide (H2S), an extremely flammable and toxic gas, and other hazardous vapours may evolve and collect in the headspace of storage tanks, transport vessels and other enclosed containers. Hydrogen sulphide is highly toxic and may be fatal if inhaled. May dull the sense of smell and has a high odour threshold, so do not rely on odour as an indication of hazard. Contact with hot material can cause thermal burns which may result in permanent skin damage. Hot product may cause severe eye burns and/or blindness.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Mixture Description CAS No.

A blend of components derived from crude petroleum oil.

: 64741-56-6

Classification of components according to GHS

Chemical Identity	Synonyms	CAS	Hazard Class (category)	Hazard Statement	Conc.
Residues (petroleum),	Residues (petroleum).	64741-56-6	None, None;	None;	0.00 - 100.00 %
vacuum	vacuum				

Additional Information

: Contains hydrogen sulphide, CAS # 7783-06-4.

Hydrogen sulphide may be present both in the liquid and the vapour. Composition is complex and varies with the source of the crude oil.

4. FIRST-AID MEASURES

General Information

: DO NOT DELAY. Keep victim calm. Obtain medical treatment

immediately.

Inhalation

If inhalation of mists, fumes or vapour causes irritation to the

nose or throat, remove to fresh air. If rapid recovery does not occur, obtain medical attention. Casualties suffering ill effects as a result of exposure to hydrogen sulphide should be

removed to fresh air. Do not attempt to rescue the victim unless proper respiratory protection is worn. If the victim has difficulty breathing or tightness of the chest, is dizzy, vomiting, or unresponsive, give 100% oxygen with rescue breathing or Cardiopulmonary Resuscitation (CPR) as required and

transport to the nearest medical facility.

Skin Contact If contact with hot product, immediately cool the burn area by

flushing or immersing the affected area with water for at least 15 to 20 minutes. Do not attempt to remove anything from the burn area or apply burn creams or ointments. During transport do not cover the wound with dressing or sheet since these may adhere to the product. It should be noted this product contracts on cooling. Where a limb is encased, care should be taken to avoid the development of a tourniquet effect. In the event of this occurring, the adhering product must be softened and/or split to prevent restriction of blood flow. All burns should

receive medical attention.

Hot product - If contact with hot product, immediately cool the **Eye Contact**

burn area by flushing or immersing the affected area with water for at least 15 to 20 minutes. Do not attempt to remove anything from the burn area or apply burn creams or ointments. During transport do not cover the wound with dressing or sheet

since these may adhere to the product. Transport to the nearest medical facility for additional treatment. Cold product -Flush eye with copious quantities of water. If persistent

irritation occurs, obtain medical attention.

Ingestion Under normal conditions of use, this is not expected to be a

primary route of exposure.

Most Important H2S has a broad range of effects dependent on the airborne Symptoms/Effects, Acute concentration and length of exposure: 0.02 ppm odour threshold, smell of rotten eggs; 10 ppm eye and respiratory tract irritation; 100 ppm coughing, headache, dizziness, nausea, eye irritation, loss of sense of smell in minutes; 200 ppm potential for pulmonary oedema after >20-30 minutes; 500 ppm loss of consciousness after short exposures, potential for

> respiratory arrest; >1000ppm immediate loss of consciousness. may lead rapidly to death, prompt cardiopulmonary resuscitation may be required. Do not depend on sense of smell for warning. H2S causes rapid olfactory fatigue

(deadens sense of smell). There is no evidence that H2S will accumulate in the body tissue after repeated exposure.

Do not attempt to remove the product from the skin as it provides an airtight sterile covering, which will eventually fall away with the scab as the burn heals. If removal is attempted, mineral oil (not mineral spirits) or a mineral oil based ointment may be applied to help soften the product to facilitate removal.

Immediate medical attention, special treatment

& Delayed

Hydrogen sulphide (H2S) - CNS asphyxiant. May cause rhinitis, bronchitis and occasionally pulmonary oedema after severe exposure. CONSIDER: Oxygen therapy. Consult a Poison Control Center for guidance.

5. FIRE-FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

Specific hazards arising from Chemicals

: Hazardous combustion products may include: A complex mixture of airborne solid and liquid particulates and gases (smoke). Carbon monoxide. Unidentified organic and inorganic compounds. Boil-over of tanks and violent eruptions may occur in the presence of water.

Suitable Extinguishing

Media

Unsuitable Extinguishing

Media

Protective Equipment & Precautions for Fire

Fighters

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

Do not use water in a jet.

Proper protective equipment including chemical resistant gloves are to be worn; chemical resistant suit is indicated if large contact with spilled product is expected. Self-Contained Breathing Apparatus must be worn when approaching a fire in a confined space. Select fire fighter's clothing approved to

relevant Standards (e.g. Europe: EN469).

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.

Personal Precautions, Protective Equipment and Emergency Procedures Environmental

Environmental Precautions

Methods and Material for Containment and

Cleaning Up

: Avoid contact with skin, eyes and clothing. Hot product should be handled so that there is no risk of burns. Use compressed air or fresh air respiratory equipment in confined spaces.

Prevent from spreading or entering into drains, ditches or rivers by using sand, earth, or other appropriate barriers.

Small spillage:

Allow product to cool and solidify. Shovel into a suitable clearly marked container for disposal or reclamation in accordance

with local regulations. Large spillage:

Prevent from spreading by making a barrier with sand, earth or other containment material. Treat residues as for small

spillage.

Additional Advice

Local authorities should be advised if significant spillages

cannot be contained. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. For guidance on disposal of spilled material see Chapter 13 of this Material Safety Data Sheet.

7. HANDLING AND STORAGE

General Precautions

: Avoid contact with hot liquid to prevent thermal burns.

Precautions for Safe Handling

For quality, health and safety reasons do not exceed the recommended storage and handling temperature. Clean, dry and heat resistant hoses (free of twists, etc.) should be used. Do not use steam to empty pipelines and hoses. Use compressed air to blow product from the system or apply a vacuum to suck the product from the system. Do not use solvents to clear obstructions of pipelines. Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. Bulk storage tanks should be diked (bunded).

Conditions for Safe Storage

Keep dry. Keep container in a well-ventilated place. Prevent all contact with water and with moist atmosphere. In case of long-term storage, deposits may develop on walls and roofs of storage tanks. These deposits, (carbonaceous materials and iron sulphides), may be pyrophoric and self-ignite when brought into contact with air (opening of tank). Hydrogen sulphide may accumulate in tanks during long term storage at high temperatures. For this reason, tank vapour spaces should be regarded as hazardous. Refer to section 15 for any additional specific legislation covering the packaging and storage of this product. Storage Temperature: Temperature should be kept at least 30°C below flash point and should never exceed the industry recommended maximum safe working temperature of 200°C.

Recommended Materials Unsuitable Materials

: For containers or container linings, use stainless steel.

For containers or container linings avoid PVC, polyethylene or high density polyethylene.

Precautions During Discharge from Bitumen

Tanks

Tanks may be heated by hot oil, steam, electricity or flame tubes. When pumping product from a storage or road tank, care should be taken to avoid the risk of fire or explosion as a result of exposing hot heater tubes. The tubes should be covered by a minimum of 150mm of hot product, unless the heat has been switched off for a period of sufficient cooling. Bulk temperature should be kept as low as possible, to enable efficient discharge. A check should be made to ensure that the receiving tank has sufficient ullage space to accommodate the load.

Other Advice : The inherent toxic and olfactory (sense of smell) fatiguing

properties of hydrogen sulphide require that air monitoring alarms be used if concentrations are expected to reach harmful levels such as in enclosed spaces, heated transport vessels and spill or leak situations. If the air concentration exceeds 10 ppm, the area should be evacuated unless respiratory

protection is in use.

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	Туре	ppm	mg/m3	Notation
Residues (petroleum), vacuum	ACGIH	TWA(Inhala ble fraction.)		0.5 mg/m3	as benzene solubles
	SG OEL	TWA(Fume.		5 mg/m3	
Hydrogen Sulphide	ACGIH	TWA	1 ppm		
	ACGIH	STEL	5 ppm		-
	SG OEL	TWA	10 ppm	14 mg/m3	
-	SG OEL	STEL	15 ppm	21 mg/m3	

Additional Information : Product has a low volatility and at ambient temperature fume

formation will be low. Avoid vapours from heated materials to

prevent exposure to potentially toxic/irritating fumes.

Biological Exposure Index (BEI)

No biological limit allocated.

Appropriate Engineering : The level of protection and types of controls necessary will vary

Controls

depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include: Where material is heated, sprayed or mist formed, there is greater potential for airborne concentrations to be generated. Always observe good personal hygiene measures, such as washing hands after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping. Define procedures for safe handling and maintenance of controls. Educate and train workers in the hazards and control measures relevant to normal activities associated with this product. Ensure appropriate selection, testing and maintenance of equipment used to control exposure, e.g. personal protective equipment, local exhaust ventilation. Drain down system prior to equipment break-in or maintenance. Retain drain downs in sealed storage pending disposal or for subsequent recycle.

Individual Protection Measures

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

Respiratory Protection

No respiratory protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid breathing of material. Use self contained breathing apparatus in places where hydrogen sulphide vapours may accumulate.

Hand Protection

Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739) made from the following materials may provide suitable chemical protection: Heat resistant gloves and PVC or nitrile rubber gloves. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. For continuous contact we recommend gloves with breakthrough time of more than 240 minutes with preference for > 480 minutes where suitable gloves can be identified. For short-term/splash protection we recommend the same, but recognise that suitable gloves offering this level of protection may not be available and in this case a lower breakthrough time may be acceptable so long as appropriate maintenance and replacement regimes are followed. Glove thickness is not a good predictor of glove resistance to a chemical as it is dependent on the exact composition of the glove material. Chemical splash goggles (gas-tight monogoggles) and face

Eye Protection

shield with chin quard.

Protective Clothing Thermal Hazards

Chemical and heat resistant gloves, boots, and apron. When handling heated product, wear heat resistant gloves. safety hat with visor, and heat resistant coveralls (with cuffs over gloves and legs over boots), and heavy-duty boots, e.g.

leather for heat resistance.

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. Validated exposure measurement methods should be applied by a competent person and samples analysed by an accredited laboratory. Examples of sources of recommended exposure measurement methods are given below or contact the supplier. Further national methods may be available.

National Institute of Occupational Safety and Health (NIOSH), USA: Manual of Analytical Methods http://www.cdc.gov/niosh/ Occupational Safety and Health Administration (OSHA), USA: Sampling and Analytical Methods http://www.osha.gov/

Environmental Exposure Controls

Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour. Take appropriate measures to fulfil the requirements of relevant environmental protection legislation. Avoid contamination of the environment by following advice given in Chapter 6. If necessary, prevent undissolved material from being discharged to waste water. Waste water should be treated in a municipal or industrial waste water treatment plant before discharge to surface water.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Brown to black. Liquid at high temperatures.

Odour

Characteristic : Data not available

Odour threshold

: Not applicable.

Нq

: > 320 °C / 608 °F

Initial Boiling Point and

Boiling Range

: Data not available

Melting / freezing point Flash point

: > 230 °C / 446 °F (Cleveland Open Cup)

Upper / lower Flammability or : Data not available

Explosion limits

Auto-ignition temperature

: > 300 °C / 572 °F

Vapour pressure

: < 1 hPa

Relative Density

: Data not available

Density

: ca. 0.990 - 1.300 g/cm3 at 25 °C / 77 °F

Water solubility Solubility in other : Negligible. : Soluble.

solvents

n-octanol/water partition

coefficient (log Pow)

: Data not available

Dynamic viscosity Kinematic viscosity Vapour density (air=1) : Data not available : Data not available : Not applicable.

Electrical conductivity

This material is not expected to be a static accumulator.

Evaporation rate

: Not applicable.

(nBuAc=1) Hygroscopicity

Negligible.

Decomposition

Data not available

Temperature **Flammability**

: Not applicable.

10. STABILITY AND REACTIVITY

Chemical stability

No hazardous reaction is expected when handled and stored

according to provisions.

Possibility of Hazardous

Reactions

Data not available

Conditions to Avoid

: Heating above the maximum recommended storage and handling temperature, will cause degradation and evolution of

flammable vapours.

Incompatible Materials

: Do not allow molten material to contact water or liquids as this can cause violent eruptions, splatter hot material, or ignite flammable material. Reacts with strong oxidising agents. Avoid contamination of thermal insulation near hot surfaces by oil and bitumen and replace lagging where necessary, with a nonabsorbent type of insulation. Self-heating, leading to autoignition at the surfaces of porous or fibrous materials impregnated with bitumen or condensates from bituminous

fumes, can occur at temperatures below 100°C.

Hazardous

Hydrogen sulphide.

Decomposition Products Sensitivity to Mechanical

: Not applicable.

Impact

Sensitivity to Static

Discharge

: No, product cannot ignite due to static electricity.

11. TOXICOLOGICAL INFORMATION

Information on Toxicological effects

Basis for Assessment : Information given is based on product testing, and/or similar

products, and/or components. Unless indicated otherwise, the data presented is representative of the product as a whole,

rather than for individual component(s).

Likely Routes of

Exposure

: Skin and eye contact are the primary routes of exposure although exposure may occur through inhalation or following accidental ingestion. Inhalation is not expected to be a relevant route of exposure except under conditions where exposure to

vapours, aerosols or mists is possible.

Acute Oral Toxicity : Low toxicity: LD50 > 5000 mg/kg , Rat

Acute Dermal Toxicity : Expected to be of low toxicity: LD50 >2000 mg/kg , Rabbit

Acute Inhalation Toxicity

Skin corrosion/irritation

Expected to be slightly irritating. Contact with hot material can cause thermal burns which may result in permanent skin

damage.

Serious eye damage/irritation

Expected to be slightly irritating. Hot product may cause severe

eye burns and/or blindness.

Respiratory Irritation : Inhalation of vapours or mists may cause irritation to the

respiratory system.

Respiratory or skin sensitisation

Not expected to be a sensitiser.

Aspiration Hazard : Not considered an aspiration hazard.

Germ cell mutagenicity : Not considered a mutagenic hazard.

Carcinogenicity : Bitumens contain low concentrations of Polycyclic Aromatic

Compounds (PACs). At ambient temperatures and in undiluted bitumens these PACs are not considered to be bio-available. However, if bitumens are mixed with diluents to obtain a low viscosity at ambient temperatures, or heated it is believed that

such materials may become bio-available. A two-year

inhalation study that exposed rats to fumes collected from an

air-rectified asphalt was negative.

Material : Carcinogenicity Classification

Residues (petroleum), vacuum	:	ACGIH Group A4: Not classifiable as a human carcinogen.
Residues (petroleum), vacuum	•	IARC 2B: Occupational exposures to hard bitumens and their emissions during mastic asphalt work are 'possibly carcinogenic to humans' (IARC Group 2B)., Occupational exposures to straight-run bitumens and their fume condensates during road paving are 'possibly carcinogenic to humans' (IARC Group 2B).
Residues (petroleum), vacuum	:	GHS / CLP: No carcinogenicity classification
Hydrogen Sulphide	1:	GHS / CLP: No carcinogenicity classification

Reproductive and Developmental Toxicity

: Not expected to impair fertility. Not expected to be a

developmental toxicant.

Specific target organ toxicity - single exposure

Inhalation of vapours or mists may cause irritation to the

respiratory system.

Specific target organ toxicity - repeated

: Not expected to be a hazard.

exposure
Additional Information

Classifications by other authorities under varying regulatory

frameworks may exist.

12. ECOLOGICAL INFORMATION

Basis for Assessment

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. Unless indicated otherwise, the data presented is

representative of the product as a whole, rather than for

individual component(s).

Acute Toxicity

Poorly soluble mixture. May cause physical fouling of aquatic organisms. 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 practically non toxic; LL/EL/IL50 > 100 mg/l Expected to be practically non toxic: LL/EL/IL50 > 100 mg/l Expected to be practically non toxic; LL/EL/IL50 > 100 mg/l

Aquatic crustacea Algae/aquatic plants Microorganisms Chronic Toxicity

Expected to be practically non toxic: LL/EL/IL50 > 100 mg/l

Fish : NOEC/NOEL expected to be > 100 mg/l (based on modeled

data)

Aquatic crustacea : NOEC/NOEL expected to be > 100 mg/l (based on modeled

data)

Mobility : Adsorbs to soil and has low mobility. In water will either float or

sink, showing little tendency to disperse, the product will

adsorb to the sediment.

Persistence/degradability

Bioaccumulative

Potential

Expected to be not readily biodegradable.

Has the potential to bioaccumulate.

Other Adverse Effects : Not expected to have ozone depletion potential, photochemical

ozone creation potential or global warming potential.

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.

Container Disposal : Dispose in accordance with prevailing regulations, preferably to

a recognised collector or contractor. The competence of the collector or contractor should be established beforehand.

Local Legislation : Disposal should be in accordance with applicable regional,

national, and local laws and regulations.

14. TRANSPORT INFORMATION

Land (as per ADR classification): Regulated

Class : 9
Packing group : III
Hazard indentification no. : 99
UN number : 3257
Danger label (primary risk) : 9

Proper shipping name : ELEVATED TEMPERATURE LIQUID, N.O.S. (Bitumen)

Environmentally Hazardous : No

IMDG

Identification number UN 3257

Proper shipping name ELEVATED TEMPERATURE LIQUID, N.O.S.

Technical name (Bitumen)
Class / Division 9
Packing group III

Marine Pollutant:

No

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Pollution Category

Not applicable.Not applicable.

Ship Type Product Name

Not applicable.
Not applicable.

Special Precaution

Additional Information

IATA - Forbidden for transport on passenger and cargo aircraft

in molten state.

Not dangerous for conveyance under UN, IMO, ADR/RID, IATA codes if transported at ambient temperature.

MARPOL Annex 1 rules apply for bulk shipments by sea.

15. REGULATORY INFORMATION

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

Local Regulations

Workplace Safety and Health Act & Workplace Safety and Health (General Provision) Regulations

: This product is subject to the SDS, Labelling, PEL and other requirements in the Act/ Regulations.

Safety and Health (General Provision) Regulations Environmental Protection and Management Act and Environmental Protection and Management

 This product is not subject to the requirement in the Act/Regulations.

(Hazardous Substances) Regulations

Maritime and Port Authority of Singapore (Dangerous Goods, Petroleum and Explosives) Regulations Fire Safety Act, and Fire

: This product is not subject to the requirement in the Act/Regulations.

Fire Safety Act and Fire Safety (Petroleum & Flammable Materials)
Regulations

 This product is not subject to the requirement in the Act/Regulations.

Other Information

Environmental Protection and Management Act. Workplace

Safety and Health Act 2006.

16. OTHER INFORMATION

SDS Version Number

: 1.1

SDS Effective Date

: 10.03.2014

SDS 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.

SDS Distribution

The information in this document should be made available to

all who may handle the product.

Key Literature References

The quoted data are from, but not limited to, one or more sources of information (e.g. toxicological data from Shell Health Services, material suppliers' data, CONCAWE, EU IUCLID

date base, EC 1272 regulation, etc).

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.