SAFETY DATA SHEET

R115/15 Bitumen

Version 4.4	Revision Date 04.06.2025	Print Date 05.06.2025

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : R115/15 Bitumen

Product code : 003E0439

Manufacturer or supplier's details

Supplier : The Shell Company of Thailand Ltd
Klongtoey
10 Soonthornkosa Road
Bangkok
10110
Thailand

Telephone : (+66) 26579888

Telefax : (+66) 26579609

Emergency telephone number : +66 (0) 2262-7333

Contact for Safety Data Sheet : If you have any enquiries about the content of this SDS please email bitumenSDS@shell.com

Recommended use of the chemical and restrictions on use

Recommended use : Oxidised bitumen for roofing, flooring, mastic, pipe coating and paint applications.

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

2. HAZARDS IDENTIFICATION

GHS Classification

Based on available data this substance / mixture does not meet the classification criteria.

GHS label elements

Hazard pictograms : No Hazard Symbol required

Signal word : No signal word

Hazard statements : 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.

Precautionary statements :

Prevention:
No precautionary phrases.

Response:
No precautionary phrases.

Storage:
No precautionary phrases.

Disposal:
No precautionary phrases.

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 is highly toxic and may be fatal if inhaled.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.May dull the sense of smell and has a high odour threshold, so do not rely on odour as an indication of hazard.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Substance

3.1 Substances

Chemical nature : A blend of components derived from crude petroleum oil.

Components

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 and the contributing process plants at that time.

4. FIRST-AID MEASURES

General advice	:	DO NOT DELAY. Keep victim calm. Obtain medical treatment immediately. Vapourisation of H2S that has been trapped in clothing can be dangerous to rescuers. Maintain respiratory protection to avoid contamination from the victim to rescuer. Mechanical ventilation should be used to resuscitate if at all possible.
If inhaled	:	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.
In case of 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.
In case of eye contact	:	Hot product - If contact with hot product, immediately cool the burn area by flushing with large amounts of water. Do not attempt to remove anything from the burn area. Do not apply burn creams or ointments. Transport to the nearest medical facility for additional treatment. During transport do not cover the wound with dressing or sheet since these may adhere to the product. All burns should receive medical attention. Cold product - Flush eye with copious quantities of water. Remove contact lenses, if present and easy to do. Continue rinsing. If persistent irritation occurs, obtain medical attention.
If swallowed	:	Under normal conditions of use, this is not expected to be a primary route of exposure.

Most important symptoms and effects, both acute and delayed	:	Respiratory irritation signs and symptoms may include a temporary burning sensation of the nose and throat, coughing, and/or difficulty breathing. Eye irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blurred vision. H2S has a broad range of effects dependent on the airborne 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.
Protection of first-aiders	:	When administering first aid, ensure that you are wearing the appropriate personal protective equipment according to the incident, injury and surroundings.
Notes to physician	:	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. 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

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.
Specific hazards during firefighting	:	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. Hydrogen sulphide (H2S) and toxic sulphur oxides may be given off when this material is heated. Do not depend on

sense of smell for warning.

Special protective equipment for firefighters	:	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

Personal precautions, protective equipment and emergency procedures	:	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.
Environmental precautions	:	Prevent from spreading or entering into drains, ditches or rivers by using sand, earth, or other appropriate barriers.
Methods and materials for containment and cleaning up	:	Small spillage: Allow product to cool and solidify. Prevent from spreading or entering into drains, ditches or rivers by using sand, earth, or other appropriate barriers. Large spillage: Prevent from spreading by making a barrier with sand, earth or other containment material. Treat residues as for small spillage.
Additional advice	:	For guidance on selection of personal protective equipment see Section 8 of this Safety Data Sheet. Local authorities should be advised if significant spillages cannot be contained. For guidance on disposal of spilled material see Section 13 of this Safety Data Sheet.

7. HANDLING AND STORAGE

General Precautions	:	Avoid contact with hot liquid to prevent thermal burns.
Advice on safe handling	:	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. Vapours containing hydrogen sulphide will accumulate during storage or transport and will also be vented during filling of

tanks. Stay upwind and away from newly opened hatches and allow to vent thoroughly before handling material. Steam may be used to vent hatches. Keep all sources of ignition away from loading area.
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).

Avoidance of contact : 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 non-absorbent type of insulation.
Self-heating, leading to auto-ignition at the surfaces of porous or fibrous materials impregnated with bitumen or condensates from bituminous fumes, can occur at temperatures below 100°C.

Storage

Other data : 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).
Vapours containing hydrogen sulphide will accumulate during storage or transport and will also be vented during filling of tanks. Stay upwind and away from newly opened hatches and allow to vent thoroughly before handling material. Steam may be used to vent hatches. Keep all sources of ignition away from loading area.

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.

Packaging material	:	Suitable material: For containers or container linings, use stainless steel. Unsuitable material: For containers or container linings avoid PVC, polyethylene or high density polyethylene.
Specific use(s)	:	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.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Hydrogen sulfide	7783-06-4	CEIL	20 ppm	TH OEL
Hydrogen sulfide		PEAK	50 ppm	TH OEL
Hydrogen sulfide	7783-06-4	TWA	1 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Further information: Central Nervous System impairment, Upper Respiratory Tract irritation			
Hydrogen sulfide		STEL	5 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Further information: Central Nervous System impairment, Upper Respiratory Tract irritation			
Hydrogen sulfide		TWA	5 ppm 7 mg/m3	Shell Internal Standard (SIS) for 8 hour TWA.
Hydrogen sulfide		STEL	10 ppm 14 mg/m3	Shell Internal Standard (SIS) for 15 min (STEL)
Hydrogen sulfide	7783-06-4	CEIL	20 ppm	OSHA Z-2
Hydrogen sulfide		Peak	50 ppm	OSHA Z-2
Hydrogen sulfide		TWA	1 ppm	ACGIH
Hydrogen sulfide		STEL	5 ppm	ACGIH

Biological occupational exposure limits

No biological limit allocated.

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/

Engineering measures : 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:
Where material is heated, sprayed or mist formed, there is greater potential for airborne concentrations to be generated.
Adequate ventilation to control airborne concentrations.

General Information

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 subsequent recycle.

Personal protective equipment

Protective measures

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.

Select a filter suitable for the combination of organic gases and vapours and particles [Type A/Type P boiling point >65°C (149°F)].

In areas where hydrogen sulphide vapours may accumulate, a positive-pressure air-supplied respirator is advised.

Hand protection
Remarks : 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. When handling heated product wear heat resistant gloves.

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 recognize that suitable gloves offering this level of protection may not be available and in this case a lower breakthrough time maybe 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.

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. 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.

Eye protection : Wear safety glasses and face shield (preferably with a chin guard) if splashes are likely to occur.

Skin and body protection : For normal operations with hot material wear chemical and heat resistant boots and overalls (with cuffs over gloves and

legs over boots).
The use of a neck apron is recommended.

Thermal hazards : When handling heated product, wear heat resistant gloves, safety hat with chin strap, face shield (preferably with a chin guard), safety glasses, heat resistant coveralls (with cuffs over gloves and legs over boots), neck protection and heavy duty boots, e.g. leather for heat resistance.

Environmental exposure controls

General advice : Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour.
Minimise release to the environment. An environmental assessment must be made to ensure compliance with local environmental legislation.
Information on accidental release measures are to be found in section 6.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Solid at room temperature. Liquid at high temperatures.
Colour	:	Brown to black
Odour	:	characteristic
Odour Threshold	:	Data not available
pH	:	Not applicable
Softening point	:	110 - 120 °C / 230 - 248 °F Method: ASTM D36
Initial boiling point and boiling range	:	>= 500 °C / >= 932 °FMethod: ASTM D1160
Flash point	:	> 230 °C / 446 °F Method: ASTM D92 (COC)
Evaporation rate	:	Not applicable
Flammability (solid, gas)	:	Not applicable
Flammability (liquids)	:	Not classified as flammable but will burn.
Upper explosion limit	:	Data not available
Lower explosion limit	:	Data not available
Vapour pressure	:	Data not available
Relative vapour density	:	Not applicable
Relative density	:	Data not available

Density	:	>= 942 kg/m3 (70 °C / 158 °F) Method: ISO 12185 900 - 1,160 g/cm3 (15.0 °C / 59.0 °F) Method: Unspecified
Solubility(ies)		
Water solubility	:	negligible
Solubility in other solvents	:	soluble
Partition coefficient: n-octanol/water	:	log Pow: > 6
Auto-ignition temperature	:	> 300 °C / 572 °F
Decomposition temperature	:	Data not available
Viscosity		
Viscosity, dynamic	:	Data not available
Viscosity, kinematic	:	Data not available
Particle characteristics		
Particle size	:	Data not available
Explosive properties	:	Classification Code: Not classified.
Oxidizing properties	:	Not applicable
Conductivity	:	This material is not expected to be a static accumulator.

10. STABILITY AND REACTIVITY

Reactivity	:	The product does not pose any further reactivity hazards in addition to those listed in the following sub-paragraph.
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 non-absorbent type of insulation.
Self-heating, leading to auto-ignition at the surfaces of porous or fibrous materials impregnated with bitumen or condensates from bituminous fumes, can occur at temperatures below 100°C.

Hazardous decomposition products : Hydrogen sulphide.

11. TOXICOLOGICAL INFORMATION

Information on 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 toxicity

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

No data available

IARC	
Asphalt, Oxidised	Occupational exposures to oxidized bitumens and their emissions during roofing are ‘probably carcinogenic to humans’ (IARC Group 2A). 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).
	Occupational exposures to oxidized bitumens and their emissions during roofing are 'probably carcinogenic to humans' (IARC Group 2A). 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).

Reproductive toxicity

No data available

STOT - single exposure

No data available

STOT - repeated exposure

No data available

Aspiration toxicity

No data available

12. ECOLOGICAL INFORMATION

Ecotoxicity

No data available

Persistence and degradability

No data available

Bioaccumulative potential

Product:

Partition coefficient: n-octanol/water : log Pow: > 6

Mobility in soil

No data available

Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	Recover or recycle if possible. Waste product should not be allowed to contaminate soil or water. Waste, spills or used product is dangerous waste. 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. 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. Do not dispose into the environment, in drains or in water courses. Do not dispose of tank water bottoms by allowing them to drain into the ground. Disposal should be in accordance with applicable regional, national, and local laws and regulations. Local regulations may be more stringent than regional or national requirements and must be complied with. MARPOL - see International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) which provides technical aspects at controlling pollutions from ships.
Contaminated packaging	:	Dispose in accordance with prevailing regulations, preferably to a recognized collector or contractor. The competence of the collector or contractor should be established beforehand.

14. TRANSPORT INFORMATION

International Regulations

ADR

UN number	:	3257
Proper shipping name	:	ELEVATED TEMPERATURE LIQUID, N.O.S. (Bitumen)
Class	:	9
Packing group	:	III
Labels	:	9
Hazard Identification Number	:	99
Environmentally hazardous	:	no

IATA-DGR

UN/ID No.	:	UN 3257 (Not permitted for transport)
Proper shipping name	:	ELEVATED TEMPERATURE LIQUID, N.O.S. (Bitumen)
Class	:	9

Packing group	:	Not Assigned
Remarks	:	IATA - Forbidden for transport on passenger and cargo aircraft in molten state.

IMDG-Code

UN number	:	UN 3257
Proper shipping name	:	ELEVATED TEMPERATURE LIQUID, N.O.S. (Bitumen)
Class	:	9
Packing group	:	III
Labels	:	9
Marine pollutant	:	no

Maritime transport in bulk according to IMO instruments

MARPOL Annex 1 rules apply for bulk shipments by sea.

Special precautions for user

Remarks	:	Special Precautions: Refer to Section 7, Handling & Storage, for special precautions which a user needs to be aware of or needs to comply with in connection with transport.
Additional Information	**:**	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

Safety, health and environmental regulations/legislation specific for the substance or mixture

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

Hazardous Substance Act. B.E. 2535

Notification of the Ministry of Industry on the Transport of Hazardous Substances Responsible by the Department of Industrial Works B.E. 2558 (2015)

Notification of the Ministry of Industry Re: Registration of Containers Used to Transport Hazardous Materials Responsible by the Department of Industrial Works B.E. 2558 (2015)

Notification of the Department of Land Transport Re: Transport Documents that Must Be Provided for Vehicles Used in the Transport of Dangerous Goods B.E. 2563 (2020)

16. OTHER INFORMATION

Abbreviations and Acronyms

AIIC - Australian Inventory of Industrial Chemicals; ANTT - National Agency for Transport by Land of Brazil; ASTM - American Society for the Testing of Materials; bw - Body weight; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; Nch - Chilean Norm; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NOM - Official Mexican Norm; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TDG - Transportation of Dangerous Goods; TECI - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative; WHMIS - Workplace Hazardous Materials Information System

Further information

Training advice	:	Provide adequate information, instruction and training for operators.
Other information	:	A vertical bar (|) in the left margin indicates an amendment from the previous version.
Sources of key data used to compile the Safety Data Sheet	:	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).

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 only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the

specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

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