SAFETY DATA SHEET

Waste Plastic Pyrolysis Oil

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Waste Plastic Pyrolysis Oil

Product code : X3601, X4601, X4602, X4603, X4608

Manufacturer or supplier's details

Supplier :
SHELL EASTERN CHEMICALS (S)
A REGISTERED BUSINESS OF SHELL EASTERN TRADING (PTE) LTD (UEN:198902087C)
9 North Buona Vista Drive , #07-01
The Metropolis Tower 1
Singapore 138588
Singapore

Telephone : +65 6384 8269
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Contact for Safety Data Sheet :

Emergency telephone number : +800 2537 8747 (ALERT SGS- toll Free) or +65 6542 9595 (ALERT SGS)

Recommended use of the chemical and restrictions on use

Recommended use : Raw material for use in the chemical industry.

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

2. HAZARDS IDENTIFICATION

GHS Classification

Flammable liquids : Category 2
Acute toxicity : Category 4
Aspiration hazard : Category 1
Skin irritation : Category 2
Eye irritation : Category 2
Acute toxicity : Category 4
Specific target organ toxicity - single exposure : Category 3 (Narcotic effects, Inhalation)
Germ cell mutagenicity : Category 1B
Carcinogenicity : Category 1B
Reproductive toxicity : Category 2

Specific target organ toxicity - repeated exposure	:	Category 1
Short-term (acute) aquatic hazard	:	Category 2
Long-term (chronic) aquatic hazard	:	Category 2

GHS label elements

Hazard pictograms :

Signal word : Danger

Hazard statements : PHYSICAL HAZARDS:
H225 Highly flammable liquid and vapour.
HEALTH HAZARDS:
H302 Harmful if swallowed.
H304 May be fatal if swallowed and enters airways.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H332 Harmful if inhaled.
H336 May cause drowsiness or dizziness.
H340 May cause genetic defects.
H350 May cause cancer.
H361 Suspected of damaging fertility or the unborn child.
H372 Causes damage to organs through prolonged or repeated exposure.
ENVIRONMENTAL HAZARDS:
H401 Toxic to aquatic life.
H411 Toxic to aquatic life with long lasting effects.

Precautionary statements :

Prevention:
P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P273 Avoid release to the environment.

Response:
P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor/ .?.

Storage:
P405 Store locked up.

Disposal:
P501 Dispose of contents and container to appropriate waste site or reclaimer in accordance with local and national regulations.

Other hazards which do not result in classification

None known.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

3.2 Mixtures

Components

Chemical name	CAS-No.	Classification	Concentration (% w/w)
Fuel Oil, Pyrolysis	69013-21-4	Flam. Liq.2; H225 Acute Tox.4; H302 Asp. Tox.1; H304 Skin Irrit.2; H315 Eye Irrit.2A; H319 Carc.1A; H350 STOT RE1; H372 Aquatic Chronic2; H411	0 - 100
Distillates (petroleum), cracked stripped steam-cracked petroleum distillates, C10-12 fraction	68477-40-7	Flam. Liq.3; H226 Acute Tox.4; H302 Skin Irrit.2; H315 Eye Irrit.2; H319 Carc.2; H351 Asp. Tox.1; H304 Aquatic Acute2; H401 Aquatic Chronic2; H411	0 - 100
Fuels, diesel	68334-30-5	Flam. Liq.4; H227 Asp. Tox.1; H304 Acute Tox.4; H332 Skin Irrit.2; H315 Carc.2; H351 STOT RE2; H373 Aquatic Acute2; H401 Aquatic Chronic2; H411	0 - 51
naphtha	8030-30-6	Flam. Liq.1; H224 Skin Irrit.2; H315 Carc.1B; H350 Muta.1B; H340 Repr.2; H361	0 - 32

		Asp. Tox.1; H304 STOT SE3; H336 Aquatic Acute2; H401 Aquatic Chronic2; H411	
residues (petroleum),atm.tower	64741-45-3	Flam. Liq.4; H227 Carc.1B; H350 Acute Tox.4; H332 Repr.2; H361 STOT RE2; H373 Aquatic Acute1; H400 Aquatic Chronic1; H410	0 - 24
Kerosine (petroleum)	8008-20-6	Flam. Liq.4; H227 Asp. Tox.1; H304 Skin Irrit.2; H315 STOT SE3; H336 Aquatic Acute2; H401 Aquatic Chronic2; H411	0 - 18

For explanation of abbreviations see section 16.

Further information

Contains:

Chemical name	Identification number	Concentration (% w/w)
Benzene	71-43-2	0 - 5
Cumene	98-82-8	0 - 1
Cyclohexane	110-82-7	0 - 2
Ethylbenzene	100-41-4	0 - 10
Naphthalene	91-20-3	0 - 25
Toluene	108-88-3	0 - 14
Trimethylbenzene (all isomers)	25551-13-7	0 - 1
Indene	95-13-6	0 - 10
Xylene, mixed isomers	1330-20-7	0 - 2
Dicyclopentadiene	77-73-6	0 - 10
n-Hexane	110-54-3	0 - 16
Pentene	109-67-1	0 - 3
undecane	1120-21-4	0 - 2
Isoprene	78-79-5	0 - 1
Biphenyl	92-52-4	0 - 1
styrene	100-42-5	>= 0 - <= 25
pentane	109-66-0	>= 0 - < 5

4. FIRST-AID MEASURES

If inhaled : Remove to fresh air. If rapid recovery does not occur, transport to nearest medical facility for additional treatment.

		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.
In case of 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.
In case of eye contact	:	Immediately flush eye(s) with plenty of water. Remove contact lenses, if present and easy to do. Continue rinsing. Transport to the nearest medical facility for additional treatment.
If swallowed	:	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. Rinse mouth.
Most important symptoms and effects, both acute and delayed	:	Skin irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blisters. 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. Breathing of high vapour concentrations may cause central nervous system (CNS) depression resulting in dizziness, light-headedness, headache, nausea and loss of coordination. Continued inhalation may result in unconsciousness and death. Damage to blood-forming organs may be evidenced by: a) fatigue and anaemia (RBC), b) decreased resistance to infection, and/or excessive bruising and bleeding (platelet effect). Peripheral nerve damage may be evidenced by impairment of motor function (incoordination, unsteady walk, or muscle weakness in the extremities, and/or loss of sensation in the arms and legs). Auditory system effects may include temporary hearing loss and/or ringing in the ears. Skin or eye contact with uncured photopolymer, vapours or condensate may result in skin or eye irritation, rash or allergic skin rashes. Eye irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blurred vision.

Ingestion may result in nausea, vomiting and/or diarrhoea.

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	:	Treat symptomatically. IMMEDIATE TREATMENT IS EXTREMELY IMPORTANT! Call a doctor or poison control center for guidance. 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 may be evolved if incomplete combustion occurs. Unidentified organic and inorganic compounds.
Specific extinguishing methods	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
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 and eyes.
Environmental precautions	:	Use appropriate containment to prevent uncontrolled release. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers.

Local authorities should be advised if significant spillages cannot be contained.

Methods and materials for containment and cleaning up	:	Slippery when spilt. Avoid accidents, clean up immediately. Prevent from spreading by making a barrier with sand, earth or other containment material. Reclaim liquid directly or in an absorbent. Soak up residue with an absorbent such as clay, sand or other suitable material and dispose of properly.
Additional advice	:	For guidance on selection of personal protective equipment see Section 8 of this Safety Data Sheet. For guidance on disposal of spilled material see Section 13 of this Safety Data Sheet.

7. HANDLING AND STORAGE

General Precautions	:	Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. 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.
Advice on safe handling	:	Avoid prolonged or repeated contact with skin. Avoid inhaling vapour and/or mists. When handling product in drums, safety footwear should be worn and proper handling equipment should be used. Properly dispose of any contaminated rags or cleaning materials in order to prevent fires. Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (≤ 1 m/s until fill pipe submerged to twice its diameter, then ≤ 7 m/s). Avoid splash filling.
Avoidance of contact	:	Strong oxidising agents.

Storage

Other data	:	Keep container tightly closed and in a cool, well-ventilated place. Use properly labeled and closable containers.
Packaging material	:	Suitable material: For containers or container linings, use mild steel or high density polyethylene. Unsuitable material: PVC.
Container Advice	:	Polyethylene containers should not be exposed to high temperatures because of possible risk of distortion.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Benzene	71-43-2	PEL (long term)	1 ppm 3.18 mg/m3	SG OEL
Benzene	71-43-2	TWA	0.25 ppm 0.8 mg/m3	Shell Internal Standard (SIS) for 8-12 hour TWA.
Benzene		STEL	2.5 ppm 8 mg/m3	Shell Internal Standard (SIS) for 15 min (STEL)
Benzene	71-43-2	STEL	2.5 ppm	ACGIH
Benzene	71-43-2	TWA	0.5 ppm	ACGIH
Benzene		STEL	2.5 ppm	ACGIH
Benzene		PEL	1 ppm	OSHA CARC
Benzene		STEL	5 ppm	OSHA CARC
Benzene		TWA	10 ppm	OSHA Z-2
Benzene		CEIL	25 ppm	OSHA Z-2
Benzene		Peak	50 ppm	OSHA Z-2
naphtha	8030-30-6	PEL (long term)	300 ppm 1,370 mg/m3	SG OEL
naphtha	8030-30-6	TWA	100 ppm 400 mg/m3	OSHA Z-1
Cumene	98-82-8	PEL (long term)	50 ppm 246 mg/m3	SG OEL
Cumene	98-82-8	TWA	50 ppm 245 mg/m3	NIOSH REL
Cumene		TWA	50 ppm 245 mg/m3	OSHA Z-1
Cumene		TWA	5 ppm	ACGIH
Cyclohexane	110-82-7	PEL (long term)	300 ppm 1,030 mg/m3	SG OEL
Cyclohexane	110-82-7	TWA	100 ppm	ACGIH
Cyclohexane		TWA	300 ppm 1,050 mg/m3	OSHA Z-1
Cyclohexane		TWA	300 ppm 1,050 mg/m3	NIOSH REL
Kerosine (petroleum)	8008-20-6	TWA	100 mg/m3	NIOSH REL
Kerosine (petroleum)		TWA	200 mg/m3	ACGIH
Kerosine (petroleum)		TWA	500 ppm 2,000 mg/m3	OSHA Z-1
Ethylbenzene	100-41-4	PEL (long term)	100 ppm 434 mg/m3	SG OEL
Ethylbenzene		PEL (short term)	125 ppm 543 mg/m3	SG OEL
Ethylbenzene	100-41-4	TWA	20 ppm	ACGIH

Ethylbenzene		TWA	100 ppm 435 mg/m3	NIOSH REL
Ethylbenzene		ST	125 ppm 545 mg/m3	NIOSH REL
Ethylbenzene		TWA	100 ppm 435 mg/m3	OSHA Z-1
Fuels, diesel	68334-30-5	X (inhalable fraction)		US. ACGIH Threshold Limit Values
Fuels, diesel		TWA (inhalable fraction)		US. ACGIH Threshold Limit Values
Fuels, diesel	68334-30-5	TWA (Inhalable fraction and vapor)	100 mg/m3	ACGIH
Naphthalene	91-20-3	PEL (long term)	10 ppm 52 mg/m3	SG OEL
Naphthalene		PEL (short term)	15 ppm 79 mg/m3	SG OEL
Naphthalene	91-20-3	TWA	10 ppm 50 mg/m3	NIOSH REL
Naphthalene		ST	15 ppm 75 mg/m3	NIOSH REL
Naphthalene		TWA	10 ppm 50 mg/m3	OSHA Z-1
Naphthalene		TWA	10 ppm	ACGIH
Toluene	108-88-3	PEL (long term)	50 ppm 188 mg/m3	SG OEL
Toluene	108-88-3	TWA	20 ppm	ACGIH
Toluene		TWA	200 ppm	OSHA Z-2
Toluene		CEIL	300 ppm	OSHA Z-2
Toluene		Peak	500 ppm	OSHA Z-2
Trimethylbenzene (all isomers)	25551-13-7	PEL (long term)	25 ppm 123 mg/m3	SG OEL
Trimethylbenzene (all isomers)	25551-13-7	TWA	10 ppm	ACGIH
Trimethylbenzene (all isomers)		TWA	25 ppm 125 mg/m3	OSHA P0
Indene	95-13-6	PEL (long term)	10 ppm 48 mg/m3	SG OEL
Indene	95-13-6	TWA	5 ppm	ACGIH
Xylene, mixed isomers	1330-20-7	PEL (long term)	100 ppm 434 mg/m3	SG OEL
Xylene, mixed isomers		PEL (short term)	150 ppm 651 mg/m3	SG OEL
Xylene, mixed isomers	1330-20-7	TWA	100 ppm 435 mg/m3	OSHA Z-1
Xylene, mixed isomers		TWA	20 ppm	ACGIH
Xylene, mixed isomers		STEL	150 ppm 655 mg/m3	OSHA P0
Xylene, mixed isomers		TWA	100 ppm 435 mg/m3	OSHA P0
Dicyclopentadiene	77-73-6	PEL (long	5 ppm	SG OEL

		term)	27 mg/m3	
Dicyclopentadiene	77-73-6	TWA	0.5 ppm	ACGIH
Dicyclopentadiene		STEL	1 ppm	ACGIH
n-Hexane	110-54-3	PEL (long term)	50 ppm 176 mg/m3	SG OEL
n-Hexane	110-54-3	TWA	500 ppm 1,800 mg/m3	OSHA Z-1
n-Hexane		TWA	50 ppm	ACGIH
Isoprene	78-79-5	TWA	3 ppm 8.4 mg/m3	Shell Internal Standard (SIS) for 8 hour TWA.
Biphenyl	92-52-4	PEL (long term)	0.2 ppm 1.3 mg/m3	SG OEL
Biphenyl	92-52-4	TWA	0.2 ppm	ACGIH
Biphenyl		TWA	0.2 ppm 1 mg/m3	OSHA Z-1

Biological occupational exposure limits

Component	CAS-No.	Control parameters	Biological specimen	Sampling time	Permissible concentration	Basis
Benzene	71-43-2	s-phenylmercapturic acid (spma)	Urine	End of shift	45.µg/g creatinine	SG BTLV
Benzene		tt-muconic acid (ttma)	Urine	End of shift	1.6.mg/g creatinine	SG BTLV
Toluene	108-88-3	toluene	Blood	Prior to last shift of workweek	0.05 mg/l	SG BTLV
Xylene, mixed isomers	1330-20-7	methylhippuric acid	Urine		1.5.g/g creatinine	SG BTLV

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 suitable, select an appropriate combination of mask and filter. Where air-filtering respirators are unsuitable (e.g. airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus. All respiratory protection equipment and use must be in

accordance with local regulations.

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

Hand protection

Remarks	:	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, 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 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. Select gloves tested to a relevant standard (e.g. Europe EN374, US F739). When prolonged or frequent repeated contact occurs, Nitrile gloves may be suitable. (Breakthrough time of > 240 minutes.) For incidental contact/splash protection Neoprene, PVC gloves may be suitable.
Eye protection	:	Wear goggles for use against liquids and gas. If a local risk assessment deems it so then chemical splash goggles may not be required and safety glasses may provide adequate eye protection.
Skin and body protection	:	Wear chemical resistant gloves/gauntlets and boots. Where risk of splashing, also wear an apron.
Thermal hazards	:	Not applicable

Environmental exposure controls

General advice	:	Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour. Information on accidental release measures are to be found in section 6.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	liquid
Colour	:	Various colours
Odour	:	pungent
Odour Threshold	:	Data not available
pH	:	Not applicable
Melting point/freezing point	:	Data not available
Initial boiling point and boiling range	:	> 35 °C / 95 °F
Flash point	:	< 23 °C / 73 °F
Evaporation rate	:	Data not available
Flammability (solid, gas)	:	Not applicable
Upper explosion limit	:	Data not available
Lower explosion limit	:	Data not available
Vapour pressure	:	Data not available
Relative vapour density	:	Data not available
Relative density	:	0.7538 - 0.8106 (15 °C / 59 °F)
Density	:	0.7538 - 0.8106 g/cm3 (15 °C / 59 °F)
Solubility(ies)		
Water solubility	:	insoluble
Solubility in other solvents	:	Data not available
Partition coefficient: n-octanol/water	:	Data not available
Auto-ignition temperature	:	Data not available
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

Surface tension	:	Data not available
Conductivity	:	Low conductivity: < 100 pS/m, The conductivity of this material makes it a static accumulator., A liquid is typically considered nonconductive if its conductivity is below 100 pS/m and is considered semi-conductive if its conductivity is below 10,000 pS/m., Whether a liquid is nonconductive or semiconductive, the precautions are the same., A number of factors, for example liquid temperature, presence of contaminants, and anti-static additives can greatly influence the conductivity of a liquid
Molecular weight	:	Data not available

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	:	Stable.
Possibility of hazardous reactions	:	Reacts with strong oxidising agents.
Conditions to avoid	:	Extremes of temperature and direct sunlight.
Incompatible materials	:	Strong oxidising agents.
Hazardous decomposition products	:	Hazardous decomposition products are not expected to form during normal storage.

11. TOXICOLOGICAL INFORMATION

Basis for assessment	:	Information given is based on product data, a knowledge of the components and the toxicology 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

Product:

Acute oral toxicity	:	LD50 Rat: > 300 - 2,000 mg/kg Remarks: Harmful if swallowed.
Acute inhalation toxicity	:	Rat: Exposure time: 4 h Remarks: Harmful if inhaled. LC50 > 10,0 - <= 20,0 mg/l

Acute dermal toxicity : LD50 Dermal Rabbit: > 2,000 mg/kg
Remarks: Low toxicity

Components:

residues (petroleum),atm.tower:
Acute oral toxicity :
Remarks: Based on available data, the classification criteria are not met.

Acute inhalation toxicity : LC 50 Rat, male and female: 4.1 - 4.5 mg/l
Exposure time: 4 h
Method: Test(s) equivalent or similar to OECD Test Guideline 403
Remarks: Harmful if inhaled.

Acute dermal toxicity :
Remarks: Based on available data, the classification criteria are not met.

Skin corrosion/irritation

Product:

Remarks: Causes skin irritation.

Components:

residues (petroleum),atm.tower:
Remarks: Based on available data, the classification criteria are not met.

Serious eye damage/eye irritation

Product:

Remarks: Causes eye irritation.

Components:

residues (petroleum),atm.tower:
Remarks: Based on available data, the classification criteria are not met.

Respiratory or skin sensitisation

Product:

Remarks: Not a sensitiser.
Based on available data, the classification criteria are not met.

Components:

residues (petroleum),atm.tower:
Remarks: Based on available data, the classification criteria are not met.

Germ cell mutagenicity

Product:

: Remarks: Contains Benzene, CAS # 71-43-2., May cause heritable genetic damage

Components:

residues (petroleum),atm.tower:

Genotoxicity in vitro : Remarks: Based on available data, the classification criteria are not met.

: Remarks: Based on available data, the classification criteria are not met.

Carcinogenicity

Product:

Remarks: Contains Benzene, CAS # 71-43-2., Known human carcinogen., May cause leukaemia (AML - acute myelogenous leukaemia)., May cause MDS (Myelodysplastic Syndrome).

Components:

residues (petroleum),atm.tower:
Species: Mouse
Application Route: Dermal
Method: Test(s) equivalent or similar to OECD Test Guideline 451
Remarks: May cause cancer.

Material	GHS/CLP Carcinogenicity Classification
Benzene	Carcinogenicity Category 1A
naphtha	Carcinogenicity Category 1B
Cumene	No carcinogenicity classification.
Cyclohexane	No carcinogenicity classification.
Kerosine (petroleum)	No carcinogenicity classification.
Ethylbenzene	No carcinogenicity classification.
Fuels, diesel	Carcinogenicity Category 2
Naphthalene	Carcinogenicity Category 2
residues (petroleum),atm.tower	Carcinogenicity Category 1B
Toluene	No carcinogenicity classification.
Fuel Oil, Pyrolysis	Carcinogenicity Category 1A
Trimethylbenzene (all isomers)	No carcinogenicity classification.
Xylene, mixed isomers	No carcinogenicity classification.

Indene	No carcinogenicity classification.
n-Hexane	No carcinogenicity classification.
Dicyclopentadiene	No carcinogenicity classification.
Pentene	No carcinogenicity classification.
undecane	No carcinogenicity classification.
Isoprene	Carcinogenicity Category 1B
Biphenyl	No carcinogenicity classification.
Distillates (petroleum), cracked stripped steam-cracked petroleum distillates, C10-12 fraction	Carcinogenicity Category 2

Material	**Other Carcinogenicity Classification**
Benzene	IARC: Group 1: Carcinogenic to humans
naphtha	IARC: Group 3: Not classifiable as to its carcinogenicity to humans
Cumene	IARC: Group 2B: Possibly carcinogenic to humans
Ethylbenzene	IARC: Group 2B: Possibly carcinogenic to humans
Naphthalene	IARC: Group 2B: Possibly carcinogenic to humans
Toluene	IARC: Group 3: Not classifiable as to its carcinogenicity to humans
Xylene, mixed isomers	IARC: Group 3: Not classifiable as to its carcinogenicity to humans
Isoprene	IARC: Group 2B: Possibly carcinogenic to humans

Reproductive toxicity

Product:

:

Remarks: Contains n-Hexane, CAS # 110-54-3., Suspected of damaging fertility or the unborn child., May impair fertility at doses which produce other toxic effects., Affects reproductive system in animals; considered to be secondary to other toxic effects., Causes foetotoxicity in animals at doses which are maternally toxic.

Remarks: Contains Toluene, CAS # 108-88-3., Causes foetotoxicity in animals at doses which are maternally toxic., Many case studies involving abuse during pregnancy indicate that toluene can cause birth defects, growth retardation and learning difficulties.

Components:

residues (petroleum),atm.tower:

: Species: Rat

Method: Test(s) equivalent or similar to OECD Test Guideline 414
Remarks: Based on data from similar materials, Suspected of damaging fertility or the unborn child.

STOT - single exposure

Product:

Remarks: High concentrations may cause central nervous system depression resulting in headaches, dizziness and nausea; continued inhalation may result in unconsciousness and/or death., Inhalation of vapours or mists may cause irritation to the respiratory system.

Components:

residues (petroleum),atm.tower:
Remarks: Based on available data, the classification criteria are not met.

STOT - repeated exposure

Product:

Remarks: Causes damage to organs through prolonged or repeated exposure.

Target Organs: Blood, Blood-forming organs, Immune system
Remarks: Contains Benzene, CAS # 71-43-2., Blood: may cause haemolysis of red blood cells and/or anaemia., Blood-forming organs: repeated exposure affects the bone marrow., Immune System: animal studies on this material or its components have demonstrated immunotoxicity.

Target Organs: Central nervous system, Auditory system, Respiratory system, Visual system
Remarks: Contains Toluene, CAS # 108-88-3., Central nervous system: repeated exposure affects the nervous system., Auditory system: prolonged and repeated exposures to high concentrations have resulted in hearing loss in rats. Solvent abuse and noise interaction in the work environment may cause hearing loss., Respiratory system: repeated exposure affects the respiratory system. Effects were seen at high doses only., Visual system: may cause decreased color perception.

Target Organs: Peripheral nervous system
Remarks: Contains n-Hexane, CAS # 110-54-3., Peripheral nervous system: repeated exposure causes peripheral neuropathy in animals.

Components:

residues (petroleum),atm.tower:
Exposure routes: Skin contact
Remarks: May cause damage to organs or organ systems through prolonged or repeated exposure.

Repeated dose toxicity

Components:

residues (petroleum),atm.tower:

Rat:
Application Route: Skin contact
Exposure time: 90 d
Method: Test(s) equivalent or similar to OECD Test Guideline 411
Remarks: Based on data from similar materials

Aspiration toxicity

Product:

Aspiration into the lungs when swallowed or vomited may cause chemical pneumonitis which can be fatal.

Further information

Product:

Remarks: Exposure to very high concentrations of similar materials has been associated with irregular heart rhythms and cardiac arrest.

Remarks: Myelodysplastic syndrome (MDS) was observed in individuals exposed to very high levels (50 ppm to 300 ppm range) of benzene over a long period of time in the workplace. The relevance of these results to lower levels of exposure is not known.

Remarks: 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).

Ecotoxicity

Product:

Toxicity to fish (Acute toxicity)	:	Remarks: Toxic LL/EL/IL50 > 1 <= 10 mg/l
Toxicity to crustacean (Acute toxicity)	:	Remarks: LC/EC/IC50 >1 - <=10 mg/l Toxic
Toxicity to algae/aquatic plants (Acute toxicity)	:	Remarks: Toxic LL/EL/IL50 > 1 <= 10 mg/l

Toxicity to fish (Chronic toxicity)	:	Remarks: Data not available
Toxicity to crustacean (Chronic toxicity)	:	Remarks: NOEC/NOEL > 1.0 - <= 10 mg/l
Toxicity to microorganisms (Acute toxicity)	:	Remarks: Data not available

Components:
residues (petroleum),atm.tower :

Toxicity to fish (Acute toxicity)	:	LL50 (Oncorhynchus mykiss (rainbow trout)): 79 mg/l Exposure time: 96 h Method: Test(s) equivalent or similar to OECD Guideline 203 Remarks: Very toxic to fish.
Toxicity to crustacean (Acute toxicity)	:	EL50 (Daphnia magna (Water flea)): 0.22 mg/l Exposure time: 48 h Method: Test(s) equivalent or similar to OECD Guideline 202
Toxicity to algae/aquatic plants (Acute toxicity)	:	EL50 (Raphidocelis subcapitata (freshwater green alga)): 0.32 mg/l Exposure time: 72 h Method: Test(s) equivalent or similar to OECD Test Guideline 201 NOEL (Raphidocelis subcapitata (freshwater green alga)): 0.05 mg/l Exposure time: 72 h Method: Test(s) equivalent or similar to OECD Test Guideline 201
M-Factor (Short-term (acute) aquatic hazard)	:	1
Toxicity to fish (Chronic toxicity)	:	Remarks: Data not available
Toxicity to crustacean(Chronic toxicity)	:	Remarks: Data not available
M-Factor (Long-term (chronic) aquatic hazard)	:	1

Persistence and degradability

Product:

Biodegradability	:	Remarks: Major constituents are inherently biodegradable, but contains components that may persist in the environment.

Components:
residues (petroleum),atm.tower :

Biodegradability	:	Remarks: Data not available

Bioaccumulative potential

Product:

Bioaccumulation	:	Remarks: Does not bioaccumulate significantly.

Partition coefficient: n-octanol/water : Remarks: Data not available

Components:

residues (petroleum),atm.tower :

Bioaccumulation : Remarks: Data not available

Mobility in soil

Product:

Mobility : Remarks: If the product enters soil, one or more constituents will or may be mobile and may contaminate groundwater.

Other adverse effects

no data available

13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : 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 product should not be allowed to contaminate soil or ground water, or be disposed of into the environment.
Waste, spills or used product is dangerous waste.

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. Disposal should be in accordance with applicable regional, national, and local laws and regulations.

Local legislation
Remarks : Disposal should be in accordance with applicable regional, national, and local laws and regulations.

All relevant environmental regulations in Singapore must be complied with.

14. TRANSPORT INFORMATION

International Regulations

ADR

UN number	:	3295
Proper shipping name	:	HYDROCARBONS, LIQUID, N.O.S.
Class	:	3
Packing group	:	II
Labels	:	3
Hazard Identification Number	:	33
Environmentally hazardous	:	yes

IATA-DGR

UN/ID No.	:	UN 3295
Proper shipping name	:	HYDROCARBONS, LIQUID, N.O.S.
Class	:	3
Packing group	:	II
Labels	:	3

IMDG-Code

UN number	:	UN 3295
Proper shipping name	:	HYDROCARBONS, LIQUID, N.O.S. (NAPHTHA)
Class	:	3
Packing group	:	II
Labels	:	3
Marine pollutant	:	yes

Maritime transport in bulk according to IMO instruments

MARPOL Annex 1 rules apply for bulk shipments by sea.

Special precautions for user

Not applicable

15. REGULATORY INFORMATION

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

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.

Fire Safety Act and Fire Safety (Petroleum & Flammable Materials) Regulations	This product is subject to the requirements in the Act/ Regulations.

Maritime and Port Authority of Singapore (Dangerous Goods, Petroleum and Explosives) Regulations	This product is subject to the requirements of this regulation.

Environmental Protection and Management Act and Environmental Protection and	This product is not subject to the requirements in the Act/Regulations.

Management (Hazardous Substances) Regulations	

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

Other international regulations

The components of this product are reported in the following inventories:

AIIC	:	Listed
TSCA	:	Listed
TCSI	:	Listed
DSL	:	Listed
KECI	:	Listed
IECSC	:	Listed
NZIoC	:	Listed

16. OTHER INFORMATION

Full text of H-Statements

H224	Extremely flammable liquid and vapour.
H225	Highly flammable liquid and vapour.
H226	Flammable liquid and vapour.
H227	Combustible liquid.
H302	Harmful if swallowed.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H336	May cause drowsiness or dizziness.
H340	May cause genetic defects.
H350	May cause cancer.
H351	Suspected of causing cancer.
H361	Suspected of damaging fertility or the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure.
H373	May cause damage to organs through prolonged or repeated exposure.
H400	Very toxic to aquatic life.
H401	Toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
H411	Toxic to aquatic life with long lasting effects.

Full text of other abbreviations

Acute Tox.	Acute toxicity
Aquatic Acute	Short-term (acute) aquatic hazard
Aquatic Chronic	Long-term (chronic) aquatic hazard
Asp. Tox.	Aspiration hazard
Carc.	Carcinogenicity
Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquids
Muta.	Germ cell mutagenicity
Repr.	Reproductive toxicity
Skin Irrit.	Skin irritation
STOT RE	Specific target organ toxicity - repeated exposure

STOT SE Specific target organ toxicity - single exposure

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	:	This product is intended for use in closed systems only.
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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