Material Safety Data Sheet

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

Material Name : **n-Hexane**
Product Code : Q1258

Supplier : SHELL EASTERN CHEMICALS (S)
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2. COMPOSITION/INFORMATION ON INGREDIENTS

Material Formal Name : n-Hexane
CAS No. : 110-54-3
EINECS No. : 203-777-6

Hazardous Components

Chemical Name	CAS	EINECS	Symbol(s)	R-phrase(s)	Conc.
n-Hexane	110-54-3	203-777-6	F, Xn, N	R11; R38; R48/20; R62; R65; R67; R51/53	< 98.00 %W

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

3. HAZARDS IDENTIFICATION

Health Hazards : Vapours may cause drowsiness and dizziness. Slightly irritating to respiratory system. Irritating to skin. Repeated exposure may cause skin dryness or cracking. Vapours may be irritating to the eye. Harmful: may cause lung damage if swallowed. Possibility of organ or organ system damage from prolonged exposure; see Chapter 11 for details. Target organ(s): Central nervous system (CNS). Peripheral nervous system. Harmful: danger of serious damage to health by prolonged exposure through inhalation. Causes serious nerve damage by prolonged exposure resulting in sensory loss. Possible risk of impaired fertility.

Signs and Symptoms : If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath, and/or fever.

Safety Hazards	:	Highly flammable. In use, may form flammable/explosive vapour-air mixture. This material is a static accumulator. Even with proper grounding and bonding, this material can still accumulate an electrostatic charge. If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur.
Environmental Hazards	:	Expected to be toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

4. FIRST-AID MEASURES

General Information	:	DO NOT DELAY. Keep victim calm. Obtain medical treatment immediately.
Inhalation	:	Remove to fresh air. If rapid recovery does not occur, transport to nearest medical facility for additional treatment.
Skin Contact	:	Remove contaminated clothing. Immediately flush skin with large amounts of water for at least 15 minutes, and follow by washing with soap and water if available. If redness, swelling, pain and/or blisters occur, transport to the nearest medical facility for additional treatment.
Eye Contact	:	Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.
Ingestion	:	If swallowed, do not induce vomiting: transport to nearest medical facility for additional treatment. If vomiting occurs spontaneously, keep head below hips to prevent aspiration. If any of the following delayed signs and symptoms appear within the next 6 hours, transport to the nearest medical facility: fever greater than 101° F (38.3° C), shortness of breath, chest congestion or continued coughing or wheezing. Give nothing by mouth.
Advice to Physician	:	Potential for chemical pneumonitis. Call a doctor or poison control center for guidance.

5. FIRE-FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

Specific Hazards	:	Carbon monoxide may be evolved if incomplete combustion occurs. Will float and can be reignited on surface water. The vapour is heavier than air, spreads along the ground and distant ignition is possible.
Suitable Extinguishing Media	:	Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only. Do not discharge extinguishing waters into the aquatic environment.
Unsuitable Extinguishing Media	:	Do not use water in a jet.
Protective Equipment for Firefighters	:	Wear full protective clothing and self-contained breathing apparatus.
Additional Advice	:	Keep adjacent containers cool by spraying with water.

6. ACCIDENTAL RELEASE MEASURES

Observe all relevant local and international regulations.

Protective measures	:	Avoid contact with spilled or released material. Immediately remove all contaminated clothing. For guidance on selection of personal protective equipment see Chapter 8 of this Safety Data Sheet. For guidance on disposal of spilled material see Chapter 13 of this Safety Data Sheet. Shut off leaks, if possible without personal risks. Remove all possible sources of ignition in the surrounding area. Use appropriate containment (of product and fire fighting water) to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers. Attempt to disperse the vapour or to direct its flow to a safe location for example by using fog sprays. Take precautionary measures against static discharge. Ensure electrical continuity by bonding and grounding (earthing) all equipment.
Clean Up Methods	:	For small liquid spills (< 1 drum), transfer by mechanical means to a labelled, sealable container for product recovery or safe disposal. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely. For large liquid spills (> 1 drum), transfer by mechanical means such as vacuum truck to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Retain as contaminated waste. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely.
Additional Advice	:	See Chapter 13 for information on disposal. Notify authorities if any exposure to the general public or the environment occurs or is likely to occur. Vapour may form an explosive mixture with air.

7. HANDLING AND STORAGE

General Precautions	:	Avoid breathing vapours or contact with material. Only use in well ventilated areas. Wash thoroughly after handling. On guidance on selection of personal protective equipment see Chapter 8 of this Safety Data Sheet. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.
Handling	:	Even with proper grounding and bonding, this material can still accumulate an electrostatic charge. If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur. Be aware of handling operations that may give rise to additional hazards that result from the accumulation of static charges. These include but are not limited to pumping (especially turbulent flow), mixing, filtering, splash filling, cleaning and filling of tanks and containers, sampling, switch loading, gauging, vacuum truck operations, and mechanical movements. These activities may lead to static discharge e.g. spark formation. 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. Do NOT

		use compressed air for filling, discharging, or handling operations.
Storage	:	Electrostatic charges will be generated during pumping. Electrostatic discharge may cause fire. Ensure electrical continuity by bonding and grounding (earthing) all equipment to reduce the risk. The vapours in the head space of the storage vessel may lie in the flammable/explosive range and hence may be flammable.
Product Transfer	:	Refer to guidance under Handling section.
Recommended Materials	:	For containers, or container linings use mild steel, stainless steel. For container paints, use epoxy paint, zinc silicate paint.
Unsuitable Materials	:	Avoid prolonged contact with natural, butyl or nitrile rubbers.
Container Advice	:	Containers, even those that have been emptied, can contain explosive vapours. Do not cut, drill, grind, weld or perform similar operations on or near containers.
Additional Information	:	Ensure that all local regulations regarding handling and storage facilities are followed. See additional references that provide safe handling practices for liquids that are determined to be static accumulators: American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practices on Static Electricity). CENELEC CLC/TR 50404 (Electrostatics – Code of practice for the avoidance of hazards due to static electricity).

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

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

Occupational Exposure Limits

Material	Source	Type	ppm	mg/m3	Notation
n-Hexane	ACGIH	SKIN_DES			Can be absorbed through the skin.
	ACGIH	TWA	50 ppm		

Biological Exposure Index (BEI)

Material	Determinant	Sampling time	BEI	Reference
n-Hexane	2,5-Hexanedion, without hydrolysis in Urine	Sampling time: End of shift at end of work week.	0.4 mg/l	ACGIH BEL (2011)

Additional Information	:	Skin notation means that significant exposure can also occur by absorption of liquid through the skin and of vapour through the eyes or mucous membranes.
Exposure Controls	:	The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include: Adequate explosion-proof ventilation to control airborne concentrations below the exposure

		guidelines/limits. Local exhaust ventilation is recommended. Eye washes and showers for emergency use. 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
Personal Protective Equipment	:	Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.
Respiratory Protection	:	If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are unsuitable (e.g., airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. Select a filter suitable for organic gases and vapours [boiling point <65 °C (149 °F)]
Hand Protection	:	Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739, AS/NZS:2161) made from the following materials may provide suitable chemical protection: Longer term protection: Nitrile rubber gloves. Incidental contact/Splash protection: PVC or neoprene rubber gloves For continuous contact we recommend gloves with breakthrough time of more 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. 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	:	Chemical splash goggles (chemical monogoggles).

Protective Clothing	:	Wear antistatic and flame retardant clothing. Chemical resistant gloves/gauntlets, boots, and apron.
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. 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/ Health and Safety Executive (HSE), UK: Methods for the Determination of Hazardous Substances, http://www.hse.gov.uk/ Institut für Arbeitsschutz Deutschen Gesetzlichen Unfallversicherung (IFA), Germany. http://www.dguv.de/inhalt/index.jsp L'Institut National de Recherche et de Securité, (INRS), France http://www.inrs.fr/accueil
Environmental Exposure Controls	:	Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Colourless Liquid.
Odour	:	Paraffinic Sweet
Odour threshold	:	Data not available.
pH	:	Not applicable
Boiling point	:	69 °C / 156 °F
Melting / freezing point	:	-95 °C / -139 °F
Flash point	:	-22 °C / -8 °F
Upper / lower Flammability or Explosion limits	:	1.2 - 7.5 %(V)
Auto-ignition temperature	:	235 °C / 455 °F(ASTM E-659)
Vapour pressure	:	6.1 kPa at 0 °C / 32 °F 16 kPa at 20 °C / 68 °F 54 kPa at 50 °C / 122 °F
Specific gravity	:	Data not available.
Density	:	665 kg/m3 at 15 °C / 59 °F
Water solubility	:	Insoluble.
Solubility in other solvents	:	Hydrocarbon solvent(s) Miscible.
n-octanol/water partition coefficient (log Pow)	:	3.9
Dynamic viscosity	:	0.30 mPa.s at 25 °C / 77 °F
Kinematic viscosity	:	0.45 mm2/s at 25 °C / 77 °F
Vapour density (air=1)	:	3.0
Electrical 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 semi-conductive, 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.
Evaporation rate (nBuAc=1)	:	8 (ASTM D 3539)
Surface tension	:	18.5 mN/m at 20 °C / 68 °F
Molecular weight	:	86 g/mol
Decomposition temperature	:	Data not available.

10. STABILITY AND REACTIVITY

Stability	:	Stable under normal conditions of use.
Conditions to Avoid	:	Avoid heat, sparks, open flames and other ignition sources.
Materials to Avoid	:	Strong oxidising agents.
Hazardous Decomposition Products	:	Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases, including carbon monoxide, carbon dioxide and other organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation.
Sensitivity to Static Discharge	:	Yes, in certain circumstances product can ignite due to static electricity.

11. TOXICOLOGICAL INFORMATION

Basis for Assessment	:	Information given is based on product testing, and/or similar products, and/or components.
Acute Oral Toxicity	:	Low toxicity: LD50 >5000 mg/kg , Rat
Acute Dermal Toxicity	:	Low toxicity: LD50 >2000 mg/kg , Rabbit
Acute Inhalation Toxicity	:	Low toxicity by inhalation. LC50 >20 mg/l Rat
Skin corrosion/irritation	:	Causes mild skin irritation. Prolonged/repeated contact may cause defatting of the skin which can lead to dermatitis.
Serious eye damage/irritation	:	Not irritating to eye. Vapours may be irritating to the eye.
Respiratory Irritation	:	Data not available.
Sensitisation	:	Not expected to be a sensitiser.
Repeated Dose Toxicity	:	Central nervous system: repeated exposure affects the nervous system. Peripheral nervous system: causes peripheral neuropathy which can be potentiated by ketones. Kidney: caused kidney effects in male rats which are not considered relevant to humans
Germ cell mutagenicity	:	Not mutagenic.
Carcinogenicity	:	Not expected to be carcinogenic. Tumours produced in animals are not considered relevant to humans.

Material	:	**Carcinogenicity Classification**
n-Hexane	:	GHS / CLP: No carcinogenicity classification

Reproductive and Developmental Toxicity	:	Suspected of damaging fertility or the unborn child. Causes foetotoxicity at doses which are maternally toxic. Affects reproductive system in animals at doses which produce other toxic effects.

12. ECOLOGICAL INFORMATION

Acute Toxicity

Fish	:	Expected to be harmful: LL/EL/IL50 >10 - <=100 mg/l
Aquatic crustacea	:	Expected to be harmful: LL/EL/IL50 >10 - <=100 mg/l
Algae/aquatic plants	:	Expected to be toxic: LL/EL/IL50 >1 - <=10 mg/l
Microorganisms	:	Expected to be harmful: LL/EL/IL50 >10 - <=100 mg/l
Chronic Toxicity		
Fish	:	NOEC/NOEL expected to be > 1.0 - <= 10 mg/l (based on modeled data)
Aquatic crustacea	:	NOEC/NOEL expected to be > 1.0 - <= 10 mg/l (based on modeled data)
Mobility	:	Adsorbs to soil and has low mobility. Floats on water.
Persistence/degradability	:	Readily biodegradable. Oxidises rapidly by photo-chemical reactions in air.
Bioaccumulation	:	Not expected to bioaccumulate significantly.
Other Adverse Effects	:	In view of the high rate of loss from solution, the product is unlikely to pose a significant hazard to aquatic life.

13. DISPOSAL CONSIDERATIONS

Material Disposal	:	Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. Do not dispose into the environment, in drains or in water courses. Waste product should not be allowed to contaminate soil or water.
Container Disposal	:	Drain container thoroughly. After draining, vent in a safe place away from sparks and fire. Residues may cause an explosion hazard. Do not puncture, cut or weld uncleaned drums. Send to drum recoverer or metal reclaimer.
Local Legislation	:	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 in compliance.

14. TRANSPORT INFORMATION

Land (as per ADR classification): Regulated

Class	:	3
Packing group	:	II
Hazard identification no.	:	33
UN number	:	1208
Danger label (primary risk)	:	3
UN proper shipping name	:	HEXANES
Environmental hazards	:	Yes

IMDG

Identification number	UN 1208
UN proper shipping name	HEXANES
Class / Division	3
Packing group	II
Marine Pollutant:	Yes

IATA (Country variations may apply)

UN number	:	1208
UN proper shipping name	:	Hexanes
Class / Division	:	3
Packing group	:	II

Additional Information : This product may be transported under nitrogen blanketing. Nitrogen is an odourless and invisible gas. Exposure to nitrogen may cause asphyxiation or death. Personnel must observe strict safety precautions when involved with a confined space entry.

15. REGULATORY INFORMATION

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

EC Label Name	:	NAPHTHA (PETROLEUM), HYDROTREATED, LIGHT
EC Classification	:	Highly flammable. Harmful. Dangerous for the environment.
EC Symbols	:	F Highly flammable. Xn Harmful. N Dangerous for the environment.
EC Risk Phrases	:	R11 Highly flammable. R38 Irritating to skin. R48/20 Harmful: danger of serious damage to health by prolonged exposure through inhalation. R62 Possible risk of impaired fertility. R65 Harmful: may cause lung damage if swallowed. R67 Vapours may cause drowsiness and dizziness. R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
EC Safety Phrases	:	S9 Keep container in a well-ventilated place. S16 Keep away from sources of ignition - No smoking. S23 Do not breathe gas/fumes/vapour/spray S24/25 Avoid contact with skin and eyes. Adequate explosion-proof ventilation to control airborne concentrations. S61 Avoid release to the environment. Refer to special instructions/Safety data sheets. S62 If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

Chemical Inventory Status

AICS	:	Listed.
DSL	:	Listed.

INV (CN)	:	Listed.	
TSCA	:	Listed.	
EINECS	:	Listed.	265-151-9
KECI (KR)	:	Listed.	KE-25623
PICCS (PH)	:	Listed.	

16. OTHER INFORMATION

R-phrase(s)

R11	Highly flammable.
R38	Irritating to skin.
R48/20	Harmful: danger of serious damage to health by prolonged exposure through inhalation.
R51/53	Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R62	Possible risk of impaired fertility.
R65	Harmful: May cause lung damage if swallowed.
R67	Vapours may cause drowsiness and dizziness.

SDS Version Number : 2.0

SDS Effective Date : 07.02.2014

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

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

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