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

Material Name	:	**Pentane Blend 85/15**
Product Code	:	Q1128
Supplier	:	Shell - See Bill of Lading for details
Emergency Telephone Number	:	+1 703-527-3887

2. HAZARDS IDENTIFICATION

GHS Classification : Flammable liquids, Category 1
Aspiration hazard, Category 1
Specific target organ toxicity - single exposure, Category 3 Narcotic effects.
Acute hazards to the aquatic environment, Category 2
Hazardous to the aquatic environment - Long-term Hazard, Category 2

GHS Label Elements

Symbol(s) :

Signal Words : Danger

GHS Hazard statements : PHYSICAL HAZARDS:
H224: Extremely flammable liquid and vapour.
HEALTH HAZARDS:
H336: May cause drowsiness or dizziness.
H304: May be fatal if swallowed and enters airways.
EUH066: Repeated exposure may cause skin dryness or cracking.
ENVIRONMENTAL HAZARDS:
H411: Toxic to aquatic life with long lasting effects.

GHS Precautionary Statements

Prevention : P210: Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P243: Take precautionary measures against static discharge.
P261: Avoid breathing dust/fume/gas/mist/vapours/spray.
P273: Avoid release to the environment.

Response : P301+P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P312: Call a POISON CENTER or doctor/physician if you feel

unwell.

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 :

Aggravated Medical Condition : Pre-existing medical conditions of the following organ(s) or organ system(s) may be aggravated by exposure to this material: Skin. Eyes. Respiratory system.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Identity : Pentane Blend 85/15
Mixture Description : Mixture of n-pentane and iso-pentane.

4. FIRST-AID MEASURES

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

Skin Contact : Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available. If persistent irritation occurs, obtain medical attention.

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. Do not induce vomiting.

Notes to physician

Most important symptoms and effects, both acute and delayed : Defatting dermatitis signs and symptoms may include a burning sensation and/or a dried/cracked appearance.
Breathing of high vapour concentrations may cause central nervous system (CNS) depression resulting in dizziness, light-headedness, headache and nausea.
If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath, and/or fever.
Respiratory irritation signs and symptoms may include a temporary burning sensation of the nose and throat, coughing, and/or difficulty breathing.

Immediate medical : Potential for chemical pneumonitis. Treat symptomatically.

attention, special treatment

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

6. ACCIDENTAL RELEASE MEASURES

Observe all relevant local and international regulations.

Personal Precautions, Protective Equipment and Emergency Procedures	:	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.
Environmental Precautions	:	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.
Methods and Material for Containment and Cleaning Up	:	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

Precautions for Safe Handling	:	Avoid contact with skin, eyes and clothing. Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks. 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. The vapour is heavier than air, spreads along the ground and distant ignition is possible. Handle and open container with care in a well-ventilated area. Ventilate workplace in such a way that the Occupational Exposure Limit (OEL) is not exceeded. Do not empty into drains.
Conditions for Safe 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. Must be stored in a diked (bunded) well-ventilated area, away from sunlight, ignition sources and other sources of heat. Storage Temperature: Ambient.
Product Transfer	:	Refer to guidance under Handling section. If positive displacement pumps are used, these must be fitted with a non-integral pressure relief valve.
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.
Other Advice	:	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
Pentane, -n	ACGIH	TWA	600 ppm		
Pentane, iso-	ACGIH	TWA	600 ppm		

Biological Exposure Index (BEI)

No biological limit allocated.

Appropriate Engineering Controls : The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include: Use sealed systems as far as possible. Adequate explosion-proof ventilation to control airborne concentrations below the exposure guidelines/limits. Local exhaust ventilation is recommended. Firewater monitors and deluge systems are recommended. 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 : 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. 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	:	Safety spectacles (safety glasses).
Protective Clothing	:	Wear antistatic and flame retardant clothing if a local risk assessment deems it so. Chemical resistant gloves/gauntlets, boots, and apron. Skin protection not ordinarily required beyond standard issue work clothes.
Thermal hazards	:	Not applicable
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/ 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. Take appropriate measures to fulfill 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

The physical and chemical property data are typical values and do not constitute a specification.

Appearance	:	Colourless Liquid.
Odour	:	Paraffinic
Odour threshold	:	
pH	:	Not applicable
Initial Boiling Point and Boiling Range	:	33 - 35 °C / 91 - 95 °F
Melting / freezing point	:	< -130 °C / -202 °F
Flash point	:	-50 °C / -58 °F(IP 170)
Upper / lower Flammability or Explosion limits	:	1.3 - 7.8 %(V)
Auto-ignition temperature	:	400 °C / 752 °F(ASTM E-659) 275 °C / 527 °F(DIN 51794)
Flammability (solid, gas)	:	Yes, in certain circumstances product can ignite due to static electricity.
Vapour pressure	:	167 kPa at 50 °C / 122 °F61 kPa at 20 °C / 68 °F
Relative Density	:	
Density	:	630 kg/m3 at 15 °C / 59 °F
Water solubility	:	< 0.05 g/l at 25 °C / 77 °F
Solubility in other solvents	:	Readily soluble in various organic solvents.
n-octanol/water partition coefficient (log Pow)	:	3.4
Decomposition temperature	:	Note:: Stable under normal conditions of use.
Dynamic viscosity	:	
Viscosity, kinematic	:	0.32 mm2/s at 25 °C / 77 °F
Vapour density (air=1)	:	2.5 at 20 °C / 68 °F
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.
Reaction with water	:	floats
Volatile organic carbon	:	84 % (EC/1999/13)
Molecular weight	:	72 g/mol

10. STABILITY AND REACTIVITY

Chemical stability	:	Stable under normal conditions of use.
Conditions to Avoid	:	Avoid heat, sparks, open flames and other ignition sources.
Incompatible Materials	:	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.

Possibility of Hazardous Reactions : Data not available.

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.

Likely Routes of Exposure : Exposure may occur via inhalation, ingestion, skin absorption, skin or eye contact, and accidental ingestion.

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

Acute Dermal Toxicity : Expected to be of low toxicity:

Acute Inhalation Toxicity : Low toxicity: LC50 >20 mg/l , 4 hours, Rat
High concentrations may cause central nervous system depression resulting in headaches, dizziness and nausea.

Skin Corrosion/Irritation : Not irritating to skin.

Serious Eye Damage/Irritation : Not irritating to eye.

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

Respiratory or skin sensitisation : Not a skin sensitiser.

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

Germ Cell Mutagenicity : Not mutagenic.

Carcinogenicity : Not expected to be carcinogenic.

Material	:	**Carcinogenicity Classification**
Pentane, -n	:	GHS / CLP: No carcinogenicity classification
Pentane, iso-	:	GHS / CLP: No carcinogenicity classification

Reproductive and Developmental Toxicity : Not expected to impair fertility. Not a developmental toxicant.

Specific target organ toxicity - single exposure : May cause drowsiness or dizziness.

Specific target organ toxicity - repeated exposure : Expected to have low toxicity on repeated exposure. Repeated exposure may cause skin dryness or cracking.

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

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.
Acute Toxicity		
Fish	:	Toxic: LL/EL/IL50 >1 - <=10 mg/l
Aquatic crustacea	:	Toxic: LL/EL/IL50 >1 - <=10 mg/l
Algae/aquatic plants	:	Harmful: LL/EL/IL50 >10 - <=100 mg/l
Microorganisms	:	Practically non toxic: LL/EL/IL50 > 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 > 10 - <= 100 mg/l (based on modeled data)
Mobility	:	Floats on water. If the product enters soil, one or more constituents will or may be mobile and may contaminate groundwater.
Persistence/degradability	:	Readily biodegradable. Oxidises rapidly by photo-chemical reactions in water.
Bioaccumulative Potential	:	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	:	MARPOL - see International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) which provides technical aspects at controlling pollutions from ships. 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. Refer to Section 7 before handling the product or containers. 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

IMDG

Identification number	UN 1265
UN proper shipping name	PENTANES
Class / Division	3
Packing group	I
Marine Pollutant:	No

IATA (Country variations may apply)

UN number	:	1265
UN proper shipping name	:	Pentanes
Class / Division	:	3
Packing group	:	I

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

Pollution Category	**:**	Y
Ship Type	**:**	3
Product Name	**:**	Pentane (all isomers)
Special Precaution	**:**	Refer to Chapter 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	**:**	**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.

Chemical Inventory Status

DSL	:	Listed.
INV (CN)	:	Listed.
ENCS (JP)	:	Listed.
TSCA	:	Listed.
EINECS	:	Listed.
KECI (KR)	:	Listed.
PICCS (PH)	:	Listed.

16. OTHER INFORMATION

SDS Version Number	:	1.1
SDS Effective Date	:	07.11.2013
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.