1. Identification of the substance / preparation and company / undertaking

Product name	Cyclopentane
Chemical formula	C_5H_{10}
REACH registration number	01-2119463053-47-0000
Company	Harp International Ltd Gellihirion Industrial Estate Pontypridd Rhondda Cynon Taff CF37 5SX Tel: +44 (0) 1443 842255 Fax: +44 (0) 1443 841805 Email: harp@harpintl.com
Emergency phone number	+44 (0) 1270 502891 (24 hour)
Use	Foam blowing agent

2. Hazards identification

Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008/EC (CLP/GHS)
Flammable liquid: Flammable liquid 2 – highly flammable liquid and vapour
Aquatic Chronic 3 – harmful to aquatic life with long lasting effects

Classification according to Directive 67/548/EEC & 1999/45/EC
F; R11 / R52-53
Highly flammable
Harmful to aquatic organisms
May cause long term adverse effects in the aquatic environment
Risk advice to man and the environment: Contact with liquid may cause cold burns / frost bite

Label elements

Labelling Pictograms

Signal word	Danger

Hazard statements

H225	Highly flammable liquid and vapour
H412	Harmful to aquatic life with long lasting effects

Precautionary statements

Precautionary statement prevention

P210	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P240	Ground / bond container and receiving equipment
P243	Take precautionary measures against static discharge
P273	Avoid release to the environment

Precautionary statement response

P233	Keep container tightly closed
P241	Use explosion proof electrical/ventilating/lighting/equipment
P242	Use only non-sparking tools
P280	Wear protective gloves/protective clothing/eye protection/face protection
P303/361/353	IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
P370/378	In case of fire: Use only foam or powder fire extinguishers for extinction.

Precautionary statement storage

P403/235	Store in a well-ventilated place. Keep cool.

Precautionary statement disposal

P501	Dispose of contents and container in accordance with local regulations.

Other hazards

Contact with liquid may cause cold burns / frost bite. Repeated exposure may cause skin dryness or cracking.

3. Composition / information on ingredients

Substance / mixture:	Substance
CAS number	287-92-3
Index-Nr.	601-030-00-2
EC No (from EINECS)	206-016-6

Contains no other components or impurities which will influence the classification of the product.

4. First aid measures

Description of first aid measures

General advice	Remove victim to uncontaminated area wearing self-contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.
Inhalation	Remove victim to uncontaminated area wearing self-contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.
Skin contact	In case of frostbite spray with water for at least 15 minutes. Apply a sterile dressing. Remove contaminated clothing. Drench affected area with water for at least 15 minutes. Obtain medical assistance.
Eye contact	Immediately flush eyes thoroughly with water for at least 15 minutes.
Ingestion	Do not give victim anything to drink if they are unconscious. Do not induce vomiting. Seek immediate medical advice/attention.

Most important symptoms and effects, both acute and delayed

In high concentrations may cause asphyxiation. Symptoms may include loss of mobility / consciousness. Victim may not be aware of asphyxiation. In low concentrations may cause narcotic effects. Symptoms may include dizziness, headache, nausea and loss of co-ordination.

Indication of any immediate medical attention and special treatment needed

Get immediate medical advice / attention.

5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media	Use only carbon dioxide, water, foam or powder fire extinguishers.
Unsuitable extinguishing media	Do not use a solid water stream.

Special hazards arising from the substance or mixture

Specific hazards	Exposure to fire may cause containers to rupture or explode.
Hazardous combustion products	If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition: carbon dioxide, carbon monoxide

Advice for fire fighters

Specific methods	If possible, stop flow of product. Move container away or cool with water from a protected position. Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Extinguish any other fire. Prevent water used in emergency cases from entering sewers and drainage systems.
Special protective equipment	Use self-contained breathing apparatus and chemically protective clothing. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to EN 469 will provide a basic level of protection from chemical incidents. Guideline: EN 469:2005: Protective clothing for fire-fighters. Performance requirements for protective clothing for fire-fighting.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures
Consider the risk of potentially explosive atmospheres. Evacuate area. Ensure adequate air ventilation. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Eliminate ignition sources. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

Environmental precautions
Try to stop release.

Methods and materials for containment and cleaning up
Ventilate area. Keep away from ignition sources (including static discharges). Evacuate area. Prevent evaporation by covering with foam. Absorb excess liquid spillage on inorganic adsorbant material such as fine sand, brick dust etc. Place spent adsorbant in sealed packages and contact specialist waste disposal contractor.

Reference to other sections
See also sections 8 and 13.

7. Handling and storage

Precautions for safe handling
Only experienced and properly instructed persons should handle the product. The substance must be handled in accordance with good industrial hygiene and safety procedures. Avoid contact with skin. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your supplier if in doubt. Take precautionary measures against static discharges. Ensure equipment is adequately earthed. Purge air from system before introducing product. Do not smoke while handling product. Assess the risk of potentially explosive atmosphere and the need for explosion proof equipment. Consider the use of only non-sparking tools. Ensure the complete system has been (or is regularly) checked for leaks before use. Refer to suppliers handling instructions. Suck back of water into the container must be prevented. Do not allow backfeed into the container. Protect cylinders from physical damage; do not drag, roll, slide or drop. When moving cylinders, even for short distances, use a cart (trolley, hand truck etc.) designed to transport cylinders. Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use. If user experiences any difficulty operating valve, discontinue use and contact supplier. Never attempt to repair or modify container valves or safety relief devices. Damaged valves should be reported immediately to the supplier.

Keep container valve outlets clean and free from contaminants, particularly oil and water. Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment. Close container valve after each use and when empty, even if still connected to equipment. Never attempt to transfer products from one cylinder/container to another. Never use direct flame or electrical heating devices to raise the pressure of a container. Do not remove or deface labels provided by the supplier for the identification of the cylinder contents.

Conditions for safe storage, including any incompatibilities
Observe all regulations and local requirements regarding storage of containers. Segregate from other oxidants in store. Keep container below 49°C in a well-ventilated place. Containers should be stored in the vertical position and properly secured to prevent falling over. Stored containers should be periodically checked for general conditions and leakage. Container valve guards or caps should be in place. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible materials. All electrical equipment in the storage areas should be compatible with the risk of a potentially explosive atmosphere. Containers should not be stored in conditions likely to encourage corrosion.

Specific end uses
None

8. Exposure controls / personal protection

Control parameters

Exposure limit value

Value = 600ppm TWA (AIHA)
DNEL not available
PNEC not available

Exposure controls
Appropriate engineering controls
A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered. Gas detectors should be used when quantities of flammable gases /vapours may be released. The substance must be handled in accordance with good industrial hygiene and safety procedures. Consider a work permit system e.g. for maintenance activities. Systems under pressure should be regularly checked for leakages. Provide adequate general or local ventilation. Keep concentrations well below occupational exposure limits. Keep concentrations well below lower explosion limits.

Personal protective equipment
Eye and face protection
Protect eyes, face and skin from liquid splashes. Wear a face shield when transfilling and breaking transfer connections. Safety eyewear, goggles or face shield to EN166 should be used to avoid exposure to liquid splashes. Full face mask recommended. Guideline: EN: EN136 Respiratory protective devices. Full face masks. Requirements, testing, marking.

Skin and hand protection
Wear cold insulating gloves. Guideline: EN 511 Protective gloves against cold. Wear working gloves and safety shoes when handling cylinders.

Body protection
Protect eyes, face and skin from contact with product. Keep suitable chemically resistant protective clothing readily available for emergency use. Personal protective equipment for the body should be selected based on the task being performed and the risks involved. Guideline: EN 943 Protective clothing against liquid and gaseous chemicals, aerosols and solid particles.

Other protection
Wear flame resistant/retardant clothing. Take precautionary measures against static discharges. Wear working gloves and safety shoes when handling cylinders. ISO 20345 Safety footwear.

Respiratory protection
Keep self-contained breathing apparatus readily available for emergency use. Use SCBA in the event of high concentrations. The selection of the Respiratory Protective Device (RPD) must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected RPD. When allowed by a risk assessment Respiratory Protective Equipment (RPE) may be used. Guideline: EN 136: Respiratory protective devices. Full face masks. Requirements, testing, marking. Material: Filter AX. Guideline: EN 14387: Respiratory protective devices. Gas filter(s) and combined filter(s). Requirements, testing, marking.

Environmental Exposure Controls
Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods of waste product treatment. Specific risk management measures are not required beyond good industrial hygiene and safety procedures. Provide adequate general or local ventilation.

9. Physical and chemical properties

Appearance/colour	Colourless liquid
Odour	Faint. Poor warning properties at low concentrations
Odour threshold	Subjective and inadequate to warn for over exposure
Melting point	-94°C
Boiling point	49°C
Flash point	<-39°C
Flammability range	1,1 % (V) – 8,7 % (V)
Vapour pressure 20°C	0,35 bar
Relative density, gas	2,4
Solubility in water	156 mg/l at 25°C
Partition coefficient (n-octanol/water)	No data available
Auto-ignition temperature	361°C
Molecular weight	70,14 g/mol
Relative density, liquid	0,7
Other information	Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

10. Stability and reactivity

Reactivity	Unreactive under normal conditions
Chemical stability	Stable under normal conditions
Possibility of hazardous reactions	Can form potential explosive atmosphere in air. May react violently with oxidants.
Conditions to avoid	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
Incompatible materials	Air, oxidiser
Hazardous decomposition products	Under normal conditions of storage and use, hazardous decomposition products should not be produced. If involved in a fire, the following toxic and/or corrosive fumes may be produced by thermal decomposition: carbon dioxide, carbon monoxide.

11. Toxicological information

Information on toxicological effects

Acute oral toxicity	LD50 / rat, value in non-standard unit: 11.400 mg/kg
Acute inhalation toxicity	LC50 / mouse, 2hr exposure, value in non-standard unit: 106 mg/l LC50 / rat, value in non-standard unit: 106.000 m^3

Acute dermal toxicity	Not available
Acute toxicity other routes	May cause pneumonia if swallowed and enters airways
Skin irritation	Irritating to skin. Repeated exposure may cause skin dryness or cracking. May cause dermatitis by skin contact.
Eye irritation	Irritating to eyes. May cause mild, short-term discomfort to eyes.
Sensitisation	No data available
Repeated dose toxicity	Suppression of weight gain
Mutagenicity assessment	No data available
Carcinogenicity assessment	There is no evidence of carcinogenic effects
Toxicity to reproduction assessment	No data available
Teratogenicity assessment	No data available
Experiences with human exposure	Symptoms may include dizziness, headache, nausea, unconsciousness, irritation of the mucous membranes and dry coughs.

12. Ecological information

Toxicity
May cause long-term adverse effects in the aquatic environment.

	Species	Exposure time	Value type	Value type in standard unit
Acute and prolonged toxicity fish	Coho salmon	24 h	LC50	>100 mg/l
Acute toxicity aquatic invertebrates	Crustaceans	24 h	EC50	19,6 mg/l
Toxicity aquatic plants	Algae	3 h	EC50	116 mg/l

Persistence and degradability

Biodegradation	0%
Time	4 days

Bioaccumulative potential Bioaccumulation: log K_{ow} = 3
Because of the partition coefficient of the contaminant in the organic fraction of the soil (log K_{ow}), accumulation in organisms is not to be expected.

Mobility in soil Floats on water. Evaporates within a day from water or soil surfaces.

Results of PBT and vPvB assessment No data available

Other adverse effects None

13. Disposal considerations

Waste treatment methods
Do not discharge into areas where there is a risk of forming an explosive mixture with air. Waste product should be flared through a suitable burner with flash back arrestor. Toxic and corrosive gases formed during combustion should be scrubbed before discharge to atmosphere. Do not discharge into any place where its accumulation could be dangerous. Contact supplier if guidance is required.

14. Transport information

ADR/RID

Class	3
Classification code	F1
UN number	1146
Labelling no	3
Proper shipping name	CYCLOPENTANE
Packing group	II
Hazard number	33
Emergency Action Code	3YE
Tunnel restriction code	(D/E)
Environmental hazards	Environmentally hazardous
Special precautions for user	None

IATA

Class	3
UN number	1146
Labelling number	3
Proper shipping name	CYCLOPENTANE
Packing group	II
Environmental hazards	Environmentally hazardous
Special precautions for user	None

IMDG

Class	3
UN number	1146
Labelling no.	3
Proper shipping name	CYCLOPENTANE
Packing group	II
EmS	FE,SD
Environmental hazards	Environmentally hazardous
Special precautions for user	None

Transport in bulk according to Annex II of MARPOL73/78 and the IBC code

Substance name	CYCLOPENTANE
Ship type required	2
Pollution category	Y

Other transport information

Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or emergency. Before transporting product containers ensure that they are firmly secured. Ensure that the cylinder valve is closed and not leaking. Ensure that the valve outlet cap nut or plug (where provided) is correctly fitted. Ensure that the valve protection device (where provided) is correctly fitted. Ensure adequate ventilation. Ensure compliance with applicable regulations.

15. Regulatory information

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

Seveso Directive 96/82/EC: Covered

Chemical Safety Assessment

A Chemical Safety Assessment has not been carried out.

16. Other information

Ensure all national/local regulations are observed. Ensure operators understand the flammability hazard. The hazard of asphyxiation is often overlooked and must be stressed during operator training. Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.

Note
When using this document care should be taken as the decimal sign and its position complies with rules for the structure and drafting of international standards and is a comma on the line. As an example 2,000 is two (to three decimal places) and not two thousand, whilst 1.000 is one thousand and not one (to three decimal places).

This datasheet was prepared in accordance with Regulation (EC) No. 1907/2006.