Safety data sheet
n-Pentane

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier
Product name
n-Pentane

EC No (from EINECS): 203-692-4
CAS No: 109-66-0
Index-Nr. 601-006-00-1
Chemical formula n-C5H12
REACH Registration number:
01-2119459286-30

1.2. Relevant identified uses of the substance or mixture and uses advised against
Relevant identified uses
Industrial and professional. Perform risk assessment prior to use.
Uses advised against
Consumer use.

1.3. Details of the supplier of the safety data sheet
Company identification
BOC, Priestley Road, Worsley, Manchester M28 2UT
E-Mail Address ReachSDS@boc.com

1.4. Emergency telephone number
Emergency phone numbers (24h): 0800 111 333

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification acc. to Regulation (EC) No 1272/2008/EC (CLP/GHS)
Flammable liquid: Flam. Liq. 1 – Extremely flammable liquid and vapour
Aspiration hazard: Asp. Tox. 1 – May be fatal if swallowed and enters airways
Specific target organ toxicity - single: STOT SE 3 – May cause drowsiness or dizziness
Aquatic Chronic 2 - Hazardous to the aquatic environment – Toxic to aquatic life with long lasting effects

Classification acc. to Directive 67/548/EEC & 1999/45/EC:
F+; R12 **|** Xn; R65, R66, R67 **|** N; R51/53
Extremely flammable.
Harmful: may cause lung damage if swallowed.
Repeated exposure may cause skin dryness or cracking.
Vapours may cause drowsiness and dizziness.
Toxic to aquatic organisms, may cause long term adverse effects in the aquatic environment.

2.2. Label elements
- Labelling Pictograms

- Signal word

Danger

- Hazard Statements

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

- Precautionary Statements

Precautionary Statement Prevention

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233	Keep container tightly closed.
P240	Ground / bond container and receiving equipment.
P241	Use explosion-proof electrical, ventilating, and lighting equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P261	Avoid breathing mist / vapours.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves / eye protection / face protection.

Precautionary Statement Response

P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER/doctor/physician.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
P304 + P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P312	Call a POISON CENTER/doctor/physician if you feel unwell.
P331	Do NOT induce vomiting.
P370 + P378	In case of fire: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish.
P391	Collect spillage.

Precautionary Statement Storage

P403 + P233 + P235	Store in a well-ventilated place. Keep container tightly closed. Keep cool.
P405	Store locked up.

Precautionary Statement Disposal

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

2.3. Other hazards
None.
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SECTION 3: Composition/information on ingredients

Substance / Mixture: Substance.

3.1. Substances

CAS No: 109-66-0
Index-Nr.: 601-006-00-1
EC No (from EINECS): 203-692-4
REACH Registration number:
01-2119459286-30
Contains no other components or impurities which will influence the classification of the product.

3.2. Mixtures
Not applicable.

SECTION 4: First aid measures

4.1. Description of first aid measures
First Aid General Information:
Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.
First Aid 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.
First Aid Skin / Eye:
Remove contaminated clothing. Drench affected area with water for at least 15 minutes. Obtain medical assistance. Immediately flush eyes thoroughly with water for at least 15 minutes.
First Aid Ingestion:
Do not let victim drink anything.
Do NOT induce vomiting.
Get immediate medical advice/attention.

4.2. 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.
May have damaging effect on respiratory system, central nervous system and liver. Depression of central nervous system.
Symptoms may include dizziness, headache, nausea, unconsciousness, irritation of the mucous membranes and dry coughs. Irregular cardiac activity.

4.3. Indication of any immediate medical attention and special treatment needed
Get immediate medical advice/attention.

SECTION 5: Fire fighting measures

5.1. Extinguishing media
Suitable extinguishing media
Alcohol-resistant foam. Dry Powder. Carbon dioxide. Water fog. Use water spray or fog to control fire fumes

Unsuitable extinguishing media
Do not use a solid water stream.

5.2. Special hazards arising from the substance or mixture
Specific hazards
Exposure to fire may cause containers to rupture/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.

5.3. Advice for fire-fighters
Specific methods
If possible, stop flow of product. Move container away or cool with water from a protected position. If leaking do not extinguish a 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 for fire-fighters
Normal firefighters' equipment consists of an appropriate SCBA (open-circuit positive pressure compressed air type) in combination with fire kit. Equipment and clothing to the following standards will provide a suitable level of protection for firefighters.
Guideline:
EN 469:2005: Protective clothing for firefighters. Performance
requirements for protective clothing for firefighting., EN 137 Respiratory protective devices — Self-contained open-circuit
compressed air breathing apparatus with full face mask — Requirements, testing, marking., EN 15090 Footwear for firefighters., EN 443 Helmets for fire fighting in buildings and other structures., EN 659 Protective gloves for firefighters.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures
Consider the risk of potentially explosive atmospheres. Evacuate area. Ensure adequate air ventilation. Use self-contained breathing apparatus and chemically protective clothing. Eliminate ignition sources. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

6.2. Environmental precautions
Try to stop release.

6.3. Methods and material 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 adsorbent material such as fine sand, brick dust etc. Place spent adsorbent in sealed packages and contact specialist waste disposal contractor.

6.4. Reference to other sections
See also sections 8 and 13.

SECTION 7: Handling and storage

7.1. 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 supplier's 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 cylinder 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 contaminates 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.

7.2. 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 35°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 potentially explosive atmosphere. Containers should not be stored in conditions likely to encourage corrosion.

7.3. Specific end use(s)
None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters
Exposure limit value

Value type	value	Note
Great Britain - LTEL	600 ppm	EH 40/07

Derived No Effect Levels

Product/ingredient name	Type	Exposure	Value	Population	Effects
n-Pentane	DNEL	Long term Dermal	432 mg/kg bw/day	Workers	Systemic
	DNEL	Long term Inhalation	3.000 mg/m^3	Workers	Systemic

Predicted No Effect Concentrations

Type	Environmental Compartment	Value
PNEC	Fresh water	0,23 mg/l
PNEC	Marine	0,23 mg/l
PNEC	Intermittent release	0,88 mg/l
PNEC	STP (Sewage Treatment Plant)	3,6 mg/l
PNEC	Sediment	1,2 mg/kg dw
PNEC	Soil	0,55 mg/kg

8.2. 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. Consider 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.

Personal protective equipment
Eye and face protection
Protect eyes, face and skin from liquid splashes. Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. 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.

Skin protection
Hand protection
Advice: Wear working gloves and safety shoes while handling containers. Chemically resistant gloves complying with EN 374 should be worn at all times when handling chemical products if a risk assessment indicates this is necessary
Material:
Nitrile
Guideline:
EN 374-1/2/3 Protective gloves against chemicals and microorganisms

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.
EN ISO 20345 Personal protective equipment - Safety footwear. ISO/TR 2801:2007 Clothing for protection against heat and flame - General recommendations for selection, care and use of protective clothing.

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 for waste product treatment. Provide adequate general or local ventilation.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties
General information

Appearance/Colour: Colourless liquid.
Odour: Faint. Poor warning properties at low concentrations.
Odour threshold:
Odour threshold is subjective and inadequate to warn for over exposure.
Melting point: -130°C
Boiling point: 35°C
Flash point: -49 °C
Flammability range: 1,1 %(V) – 7,8%(V)
Vapour Pressure 20 °C: 0,566 bar
Relative density, gas: 2,49
Solubility in water: 40 mg/l
Partition coefficient: n-octanol/water: No data available.
Autoignition temperature: 260 °C
Molecular weight: 72,15 g/mol
Relative density, liquid: 0,601 – 0,651

9.2. Other information
Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

SECTION 10: Stability and reactivity

10.1. Reactivity
Unreactive under normal conditions.

10.2. Chemical stability
Stable under normal conditions.

10.3. Possibility of hazardous reactions
Can form potential explosive atmosphere in air., May react violently with oxidants.

10.4. Conditions to avoid
Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

10.5. Incompatible materials
Air, Oxidiser.

10.6. 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.

SECTION 11: Toxicological information

11.1. Information on toxicological effects
Acute oral toxicity
Value: LD50
Species: Rat
Value in non-standard unit: > 2.000 mg/kg
Slightly toxic.

Acute inhalation toxicity
Value: LC50
Species: Rat
Value in non-standard unit: > 25,3 mg/l
Slightly toxic.
Acute dermal toxicity
Slightly toxic
Acute toxicity other routes
May be fatal if swallowed and enters airways.
Skin irritation
Not classified as an irritant. Repeated exposure may cause skin dryness or cracking. May cause dermatitis by skin contact.
Eye irritation
Not classified as an irritant. May cause mild, short-term discomfort to eyes.
Sensitization
This substance is not classified as a sensitiser.
Repeated dose toxicity
Not expected to cause damage to organs from prolonged or repeated exposure.
Assessment mutagenicity
There is no evidence of mutagenic potential.
Assessment carcinogenicity
No evidence of carcinogenic effects.
Assessment toxicity to reproduction
No indication of toxic effects.
Assessment teratogenicity
No indication of teratogenic effects.

SECTION 12: Ecological information

12.1. Toxicity
May cause long-term adverse effects in the aquatic environment.
Acute and prolonged toxicity fish
Species: Rainbow trout (Oncorhynchus mykiss)
Exposure time: 96 h
Value type: LC50
Value in standard unit mg/l: 4,26 mg/l
Acute toxicity aquatic invertebrates
Species: Daphnia magna
Exposure time: 48 h
Value type: EC50
Value in standard unit mg/l: 2,7 mg/l
Toxicity aquatic plants
Species: Algae
Exposure time: 72 h
Value type: NOEC
Value in standard unit mg/l: 7,51 mg/l

Species: Algae
Exposure time: 72 h
Value type: EC50
Value in standard unit mg/l: 10,7 mg/l

12.2. Persistence and degradability
Atmospheric degradation
The substance degrades rapidly in the atmosphere.
Readily biodegradable
Photo degradation
Half life (direct photolysis): 3,95 d
Non-significant photolysis.
Stability in water
Degradation: 87%
Duration: 28 days
Non-significant hydrolysis

12.3. Bioaccumulative potential
Not determined

12.4. Mobility in soil
Because of its high volatility, the product is unlikely to cause ground or water pollution.

12.5. Results of PBT and vPvB assessment
Not classified as PBT or vPvB.

12.6. Other adverse effects
None

SECTION 13: Disposal considerations

13.1. 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. Dispose of container via supplier only.

SECTION 14: Transport information

ADR/RID

14.1. UN number
1265

14.2. UN proper shipping name
PENTANES

14.3. Transport hazard class(es)
Class: 3
Classification Code: F1
Labels: 3
Hazard number: 33
Emergency Action Code: 3YE
Tunnel code: (D/E)

14.4. Packing group (Packing Instruction)
I

14.5. Environmental hazards

Environmentally Hazardous.

14.6. Special precautions for user
None.

IMDG

14.1. UN number
1265

14.2. UN proper shipping name
PENTANES

14.3. Transport hazard class(es)
Class: 3
Labels: 3
EmS: F-E,S-D

14.4. Packing group (Packing Instruction)
I

14.5. Environmental hazards
None

14.6. Special precautions for user
None.

14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code
Substance name: PENTANE (ALL ISOMERS)
Ship type required: 3
Pollution category: Y

IATA

14.1. UN number
1265

14.2. UN proper shipping name
PENTANES

14.3. Transport hazard class(es)
Class: 3
Labels: 3

14.4. Packing group (Packing Instruction)
I

14.5. Environmental hazards
Environmentally Hazardous.

14.6. Special precautions for user
None.

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 an 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.

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture
Seveso Directive 96/82/EC: Covered.

Other regulations
Dangerous Substances and Explosive Atmospheres Regulations (DSEAR 2002 No. 2776)
Management of Health and Safety at Work Regulations (1999 No. 3242)
The Regulatory Reform (Fire Safety) Order 2005 (2005 No. 1541)
Control of Substances Hazardous to Health Regulations (COSHH, 2002 No. 2677)
Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations (EPS, 1996 No. 192)
Provision and Use of Work Equipment Regulations (PUWER, 1998 No. 2306)
Personal Protective Equipment Regulations (1992 No. 2966)
Control of Major Accident Hazards Regulations (COMAH, 1999 No. 743)
Chemical Hazards Information and Packaging for Supply (CHIP, 1994 No. 3247)
Pressure Systems Safety Regulations (PER, 2000 No. 128)
This Safety Data Sheet has been produced to comply with Regulation (EU) 453/2010.

15.2. Chemical safety assessment
CSA has been carried out

SECTION 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.
Advice
Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted. Details given in this document are believed to be correct at the time of going to press.
Further information
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).
References

Various sources of data have been used in the compilation of this
SDS, they include but are not exclusive to:
Agency for Toxic Substances and Diseases Registry (ATSDR) (http://www.atsdr.cdc.gov/)
European Chemical Agency: Guidance on the Compilation of Safety Data Sheets.
European Chemical Agency: Information on Registered Substances http://apps.echa.europa.eu/registered/registered-sub.aspx#search
European Industrial Gases Association (EIGA) Doc. 169/11 Classification and Labelling guide.
ISO 10156:2010 Gases and gas mixtures -- Determination of fire potential and oxidizing ability for the selection of cylinder valve outlets.
International Programme on Chemical Safety (http://www.inchem.org/)
Matheson Gas Data Book, 7th Edition.
National Institute for Standards and Technology (NIST) Standard Reference Database Number 69
The ESIS (European chemical Substances 5 Information System) platform of the former European Chemicals Bureau (ECB) ESIS (http://ecb.jrc.ec.europa.eu/esis/).
The European Chemical Industry Council (CEFIC) ERICards.
Threshold Limit Values (TLV) from the American Conference of Governmental Industrial Hygienists (ACGIH).
United States of America's National Library of Medicine's toxicology data network TOXNET (http://toxnet.nlm.nih.gov/index.html)
Substance specific information from suppliers.
EH40 (as amended) Workplace exposure limits.

End of document