SAFETY DATA SHEET
n-Pentane

Issue Date: 07.10.2016  Version: 1.1  SDS No.: 000010035086
Last revised date: 09.08.2018

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

1.1 Product identifier

Product name: n-Pentane

Additional identification
Chemical name: pentane

Chemical formula: C5H12
INDEX No.: 601-006-00-1
CAS-No.: 109-66-0
EC No.: 203-692-4
REACH Registration No.: 01-2119459286-30

1.2 Relevant identified uses of the substance or mixture and uses advised against

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

Supplier
BOC
Priestley Road, Worsley
M28 2UT Manchester

Telephone: 0800 111 333
E-mail: ReachSDS@boc.com

1.4 Emergency telephone number: 0800 111 333

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 as amended.

Physical Hazards
- Flammable liquids  Category 1  H224: Extremely flammable liquid and vapour.

Health Hazards
- Specific Target Organ Toxicity - Single Exposure  Category 3  H336: May cause drowsiness or dizziness.
- Aspiration Hazard  Category 1  H304: May be fatal if swallowed and enters airways.

Environmental Hazards
- Chronic hazards to the aquatic environment  Category 2  H411: Toxic to aquatic life with long lasting effects.
2.2 Label Elements

Contains: pentane

Signal Words: Danger

Hazard Statement(s):
- H224: Extremely flammable liquid and vapour.
- H336: May cause drowsiness or dizziness.
- H304: May be fatal if swallowed and enters airways.
- 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.
- P233: Keep container tightly closed.
- P261: Avoid breathing dust/fume/gas/mist/vapours/spray.
- P273: Avoid release to the environment.

Response:
- P301+P310: IF SWALLOWED: Immediately call a POISON CENTRE/doctor.
- P331: Do NOT induce vomiting.
- P304+P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
- P312: Call a POISON CENTRE/doctor/ if you feel unwell.
- P370+P378: In case of fire: Use foam to extinguish.
- P391: Collect spillage.

Storage: None.

Disposal: None.

Supplemental label information
- EUH066: Repeated exposure may cause skin dryness or cracking.

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

3.1 Substances

Chemical name: pentane
INDEX No.: 601-006-00-1
CAS-No.: 109-66-0
EC No.: 203-692-4
REACH Registration No.: 01-2119459286-30
Purity: 100%

The purity of the substance in this section is used for classification only, and does not represent the actual purity of the substance as supplied, for which other documentation should be consulted.

Trade name: 

SECTION 4: First Aid Measures

General: Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

4.1 Description of first aid measures

Inhalation: Move the exposed person to fresh air at once. If breathing stops, provide artificial respiration. Symptoms may include: Dizziness. Nausea, vomiting.

Eye contact: Flush thoroughly with water for at least 15 minutes. Get medical assistance.

Skin Contact: Promptly flush contaminated skin with soap or mild detergent and water. Promptly remove clothing if penetrated and flush the skin with water.

Ingestion: Do not induce vomiting. If vomiting occurs, the head should be kept low so that stomach vomit doesn’t enter the lungs. Get medical attention immediately.

4.2 Most important symptoms and effects, both acute and delayed: Vapour concentrations above recommended exposure levels are irritating to the eyes and the respiratory tract, may cause headaches and dizziness, are anaesthetic and may have other severe central nervous system effects. Repeated exposure may cause skin dryness or cracking.

4.3 Indication of any immediate medical attention and special treatment needed

Hazards: Vapour concentrations above recommended exposure levels are irritating to the eyes and the respiratory tract, may cause headaches and dizziness, are anaesthetic and may have other severe central nervous system effects. Repeated exposure may cause skin dryness or cracking.

Treatment: Do not give direct mouth-to-mouth resuscitation if swallowed. To protect rescuer, use air-viva, oxy-viva or one-way mask. Resuscitate in a well-ventilated area. If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately.
SECTION 5: Firefighting Measures

General Fire Hazards: Heat may cause the containers to explode.

5.1 Extinguishing media
Suitable extinguishing media: Water Spray or Fog Dry powder. Foam. Carbon dioxide.

Unsuitable extinguishing media: Do not use water jet as an extinguisher, as this will spread the fire.

5.2 Special hazards arising from the substance or mixture:
Flammable liquid. Closed containers may rupture violently when heated. Vapours are heavier than air and may travel to a source of ignition and flash back. Liquid floats on water and may travel to a source of ignition and spread fire. Incomplete combustion may form carbon monoxide.

5.3 Advice for firefighters
Special fire fighting procedures: In case of fire: Stop leak if safe to do so. Do not extinguish flames at leak because possibility of uncontrolled explosive re-ignition exists. Continue water spray from protected position until container stays cool. Use extinguishants to contain the fire. Isolate the source of the fire or let it burn out. Prevent run-off from entering drains, sewers, or streams.

Special protective equipment for firefighters: Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA. Guideline: EN 469 Protective clothing for firefighters. Performance requirements for protective clothing for firefighting. EN 15090 Footwear for firefighters. EN 659 Protective gloves for firefighters. EN 443 Helmets for fire fighting in buildings and other structures. EN 137 Respiratory protective devices - Self-contained open-circuit compressed air breathing apparatus with full face mask - Requirements, testing, marking.

SECTION 6: Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures: Evacuate area. Provide adequate ventilation. Consider the risk of potentially explosive atmospheres. In case of leakage, eliminate all ignition sources. Monitor the concentration of the released product. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. EN 137 Respiratory protective devices - Self-contained open-circuit compressed air breathing apparatus with full face mask - Requirements, testing, marking.

6.2 Environmental Precautions: Prevent further leakage or spillage if safe to do so.

6.3 Methods and material for containment and cleaning up: Provide adequate ventilation. Eliminate sources of ignition. Absorb spillage with non-combustible, absorbent material. Collect and reclaim or dispose in sealed containers at licensed waste disposal site.

6.4 Reference to other sections: Refer to sections 8 and 13.
SECTION 7: Handling and Storage:

7.1 Precautions for safe handling: Do not handle until all safety precautions have been read and understood. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Purge system with dry inert gas (e.g. helium or nitrogen) before product is introduced and when system is placed out of service. Containers, which contain or have contained flammable or explosive substances, must not be inerted with liquid carbon dioxide. Assess the risk of a potentially explosive atmosphere and the need for suitable equipment i.e. explosion-proof. Take precautionary measures against static discharges. Keep away from ignition sources (including static discharges). Provide electrical earthing of equipment and electrical equipment usable in explosive atmospheres. Use non-sparking tools. Refer to supplier's handling instructions. The substance must be handled in accordance with good industrial hygiene and safety procedures. Ensure the complete system has been (or is regularly) checked for leaks before use. Protect containers from physical damage; do not drag, roll, slide or drop. Do not remove or deface labels provided by the supplier for the identification of the container contents. When moving containers, even for short distances, use appropriate equipment eg. trolley, hand truck, fork truck etc. Provide adequate ventilation. Suck back of water into the container must be prevented. Do not allow backfeed into the container. Avoid sump back of water, acid and alkalies. Keep container below 50°C in a well ventilated place. Observe all regulations and local requirements regarding storage of containers. When using do not eat, drink or smoke. Store in accordance with. Never use direct flame or electrical heating devices to raise the pressure of a container. 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. Close container valve after each use and when empty, even if still connected to equipment.

7.2 Conditions for safe storage, including any incompatibilities: All electrical equipment in the storage areas should be compatible with the risk of a potentially explosive atmosphere. Segregate from oxidant gases and other oxidants being stored. Containers should not be stored in conditions likely to encourage corrosion. Stored containers should be periodically checked for general conditions and leakage. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible material.

7.3 Specific end use(s): None.

SECTION 8: Exposure Controls/Personal Protection

8.1 Control Parameters

Occupational Exposure Limits

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Type</th>
<th>Exposure Limit Values</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>n-Pentane</td>
<td>TWA</td>
<td>600 ppm 1,800 mg/m³</td>
<td>UK. EH40 Workplace Exposure Limits (WELs) (12 2011)</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>1,000 ppm 3,000 mg/m³</td>
<td>EU. Indicative Exposure Limit Values in Directives 91/322/EEC, 2000/39/EC, 2006/15/EC, 2009/161/EU (12 2009)</td>
</tr>
</tbody>
</table>
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8.2 Exposure controls

Appropriate engineering controls: Consider a work permit system e.g. for maintenance activities. Ensure adequate air ventilation. Provide adequate general and local exhaust ventilation. Keep concentrations well below lower explosion limits. Gas detectors should be used when quantities of flammable gases or vapours may be released. Provide adequate ventilation, including appropriate local extraction, to ensure that the defined occupational exposure limit is not exceeded. Systems under pressure should be regularly checked for leakages. Product to be handled in a closed system. Use only permanent leak tight installations (e.g. welded pipes). Take precautionary measures against static discharges.

Individual protection measures, such as personal protective equipment

General information: 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. Keep self contained breathing apparatus readily available for emergency use. Personal protective equipment for the body should be selected based on the task being performed and the risks involved. For waste disposal, see section 13. Do not eat, drink or smoke when using the product.

Eye/face protection: Safety eyewear, goggles or face-shield to EN166 should be used to avoid exposure to liquid splashes. Wear eye protection to EN 166 when using gases. Guideline: EN 166 Personal Eye Protection.


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Respiratory Protection: Not required.

Thermal hazards: No precautionary measures are necessary.

Hygiene measures: Specific risk management measures are not required beyond good industrial hygiene and safety procedures. Do not eat, drink or smoke when using the product.

Environmental exposure controls: For waste disposal, see section 13.

SECTION 9: Physical And Chemical Properties

9.1 Information on basic physical and chemical properties

Appearance
Physical state: liquid
Form: liquid
Colour: Colourless
Odour: Gasoline-like odor
Odour Threshold: Odour threshold is subjective and is inadequate to warn of overexposure.

pH: not applicable.
Freezing point: -129.67 °C Experimental result, Key study
Boiling Point: 35 °C
Sublimation Point: not applicable.
Critical Temp. (°C): No data available.
Flash Point: -40 °C
Evaporation Rate: 28.6 butyl acetate=1
Flammability (solid, gas): Flammable liquid.
Flammability limit - upper (%): 8 % (V) Other, Key study
Flammability limit - lower(%): 1.4 % (V)
Vapour pressure: 68.53 kPa (25 °C)
Vapour density (air=1): 2.49 AIR=1
Relative density: 0.6264 (20 °C)
Solubility(ies)
Solubility in Water: 38 mg/l (25 °C)
Partition coefficient (n-octanol/water): 3.39
Autoignition Temperature: 260 °C Experimental result, Key study
Decomposition Temperature: When heated to decom, emits acid smoke and irritating fumes.

Viscosity
Kinematic viscosity: No data available.
Dynamic viscosity: 0.224 mPa.s (25 °C)
Explosive properties: Not applicable.
Oxidising Properties: not applicable.
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9.2 Other information:
None.

Molecular weight: 72.15 g/mol (C5H12)
VOC content: EC Directive 2004/42: 630 g/l ~ 100 % (calculated)
Minimum ignition energy: 0.28 mJ

SECTION 10: Stability and Reactivity

10.1 Reactivity: No reactivity hazard other than the effects described in sub-section below.

10.2 Chemical Stability: Stable under normal conditions.

10.3 Possibility of Hazardous Reactions: Can form a potentially explosive atmosphere in air. May react violently with oxidants.

10.4 Conditions to Avoid: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

10.5 Incompatible Materials: Air and oxidisers.

10.6 Hazardous Decomposition Products: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological Information

General information: None.

11.1 Information on toxicological effects

Acute toxicity - Oral Product
Based on available data, the classification criteria are not met.

pentane LD 50 (Rat): > 2,000 mg/kg Remarks: Experimental result, Key study

Acute toxicity - Dermal Product
Based on available data, the classification criteria are not met.

Acute toxicity - Inhalation Product
Based on available data, the classification criteria are not met.

pentane LC 50 (Rat, 4 h): > 25.3 mg/l Remarks: Vapor Read-across based on grouping of substances (category approach), Key study

Repeated dose toxicity
pentane NOAEL (Rat, Inhalation): 30 mg/l Inhalation Read-across based on grouping of substances (category approach), Key study
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Skin Corrosion/Irritation
Product
Based on available data, the classification criteria are not met.

pentane
in vivo (Rabbit): Not classified as an Irritant Experimental result, Key study

Serious Eye Damage/Eye Irritation
Product
Based on available data, the classification criteria are not met.

pentane
in vivo (Rabbit, 48 hrs): Not irritating OECD GHS

Respiratory or Skin Sensitisation
Product
Based on available data, the classification criteria are not met.

Germ Cell Mutagenicity
Product
Based on available data, the classification criteria are not met.

Carcinogenicity
Product
Based on available data, the classification criteria are not met.

Reproductive toxicity
Product
Based on available data, the classification criteria are not met.

Specific Target Organ Toxicity - Single Exposure
Product
May cause drowsiness or dizziness.

Specific Target Organ Toxicity - Repeated Exposure
Product
Based on available data, the classification criteria are not met.

Aspiration Hazard
Product
May be fatal if swallowed and enters airways.

SECTION 12: Ecological Information

General information: Avoid release to the environment. Product is not allowed to be discharged into ground water or the aquatic environment.

12.1 Toxicity

Acute toxicity
Product
Toxic to aquatic life with long lasting effects.

Acute toxicity - Fish
pentane
LC 50 (Oncorhynchus mykiss, 96 h): 4.26 mg/l (Static renewal) Remarks: Experimental result, Supporting study

Acute toxicity - Aquatic Invertebrates
pentane
EC 50 (Daphnia magna, 48 h): 9.1 mg/l (Static) Remarks: Experimental result,

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Supporting study

Chronic toxicity - Aquatic Invertebrates
pentane
NOAEL (Daphnia magna, 21 d): 10.76 mg/l (QSAR) QSAR QSAR, Key study

Toxicity to aquatic plants
pentane
EC 50 (Green algae (Selenastrum capricornutum), 72 h): 10.7 mg/l
NOEC (Green algae (Selenastrum capricornutum), 72 h): 2.04 mg/l

12.2 Persistence and Degradability
Product
Not applicable to gases and gas mixtures..

Biodegradation
Inorganic The product is not readily biodegradable.

Photodegradation
pentane
Non-significant photolysis

Stability in water
pentane
87% Non-significant hydrolysis

12.3 Bioaccumulative Potential
Product
The substance has no potential for bioaccumulation.

Bioconcentration Factor (BCF)
pentane
Pimephales promelas, Bioconcentration Factor (BCF): 171 Aquatic sediment QSAR, Key study

12.4 Mobility in Soil
Product
The substance has low mobility in soil.
pentane
Henry’s Law Constant: 7,010 MPa (25 °C)

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

12.6 Other Adverse Effects:

Global Warming Potential
pentane
Global warming potential: 5
Contains greenhouse gas(es) not covered by 517/2014/EU. Contains greenhouse gas(es). When discharged in large quantities may contribute to the greenhouse effect.

EU F-Gases Subject to Emission Limits/Reporting (Annexes I, II), Regulation

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Section 12: Disposal Considerations

13.1 Waste treatment methods

General information: Do not discharge into any place where its accumulation could be dangerous. Consult supplier for specific recommendations. Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Disposal methods: Dispose of container via supplier only. Discharge, treatment, or disposal may be subject to national, state, or local laws.

Section 14: Transport Information

ADR
14.1 UN Number: UN 1265
14.2 UN Proper Shipping Name: PENTANES
14.3 Transport Hazard Class(es)
   Class: 3
   Label(s): 3
   Hazard No. (ADR): 33
   Tunnel restriction code: (D/E)
14.4 Emergency Action Code: 3YE
14.5 Packing Group: 1
14.6 Environmental hazards: Environmentally Hazardous
14.6 Special precautions for user: –

RID
14.1 UN Number: UN 1265
14.2 UN Proper Shipping Name: PENTANES
14.3 Transport Hazard Class(es)
   Class: 3
   Label(s): 3
14.4 Packing Group: 1
14.5 Environmental hazards: Environmentally Hazardous
14.6 Special precautions for user: –
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IMDG

14.1 UN Number: UN 1265
14.2 UN Proper Shipping Name: PENTANES
14.3 Transport Hazard Class(es):
   Class: 3
   Label(s): 3
   EmS No.: F-E, S-D
14.3 Packing Group: I
14.5 Environmental hazards: P
14.6 Special precautions for user: –

IATA

14.1 UN Number: UN 1265
14.2 Proper Shipping Name: Pentanes
14.3 Transport Hazard Class(es):
   Class: 3
   Label(s): 3
14.4 Packing Group: I
14.5 Environmental hazards: Environmentally Hazardous
14.6 Special precautions for user:
   Other Information:
   Passenger and cargo aircraft: Allowed.
   Cargo aircraft only: Allowed.

14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code: not applicable

Additional identification: 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 container valve is closed and not
leaking. Ensure adequate air ventilation.

SECTION 15: Regulatory information

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

EU Regulations

Regulation (EC) No. 1907/2006 Annex XVII Substances subject to restriction on marketing and use:

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>pentane</td>
<td>109-66-0</td>
<td>100%</td>
</tr>
</tbody>
</table>

Directive 92/85/EEC: on the safety and health of pregnant workers and workers who have recently given birth
or are breast feeding.:
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<table>
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</table>

Directive 96/82/EC (Seveso III): on the control of major accident hazards involving dangerous substances:

<table>
<thead>
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</tbody>
</table>

Directive 98/24/EC on the protection of workers from the risks related to chemical agents at work:

<table>
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<th>Concentration</th>
</tr>
</thead>
<tbody>
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</tr>
</tbody>
</table>

National Regulations


This Safety Data Sheet has been produced to comply with Regulation (EU) 2015/830.

15.2 Chemical safety assessment: No Chemical Safety Assessment has been carried out.

SECTION 16: Other Information

Revision Information: Not relevant.
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Key literature references and sources for data:
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 Industrial Gases Association (EIGA) Doc. 169 Classification and Labelling guide.
International Programme on Chemical Safety (http://www.inchem.org/)
ISO 10156:2010 Gases and gas mixtures - Determination of fire potential and oxidizing ability for the selection of cylinder valve outlets.
National Institute for Standards and Technology (NIST) Standard Reference Database Number 69.
The ESIS (European chemical Substances S Information System) platform of the former European Chemicals Bureau (ECB) ESIS (http://ecb.jrc.ec.europa.eu/esis/).
The European Chemical Industry Council (CEFIC) ERCards.
Threshold Limit Values (TLV) from the American Conference of Governmental Industrial Hygienists (ACGIH).
Substance specific information from suppliers.
Details given in this document are believed to be correct at the time of publication. EH40 (as amended) Workplace exposure limits.

Wordings of the H-statements in sections 2 and 3

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.

Training information: Users of breathing apparatus must be trained. Ensure operators understand the flammability hazard.

Classification according to Regulation (EC) No 1272/2008 as amended.
Flam. Liq. 1, H224
STOT SE 3, H336
Asp. Tox. 1, H304
Aquatic Chronic 2, H411

Other information: Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out. Ensure adequate air ventilation. Ensure all national/local regulations are observed. Ensure equipment is adequately earthed. 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. Note: When the Product Name appears in the SDS header the decimal sign and its position comply 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).
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Disclaimer:
This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.