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

1.1 Product identifier
   Product name: C5H12 1000 PPM; C5H12 1000 PPM; C4H10 2500 PPM; C4H10 2500 PPM; C3H8 2500 PPM; C2H6 5000 PPM; CH4 1%; N2 97.55%

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
   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 Directive 67/548/EEC or 1999/45/EC as amended.
   Not classified

   Classification according to Regulation (EC) No 1272/2008 as amended.
   Physical Hazards
   Gases under pressure Compressed gas H280: Contains gas under pressure; may explode if heated.

2.2 Label Elements

   Signal Words: Warning
   Hazard Statement(s): H280: Contains gas under pressure; may explode if heated.
   Precautionary Statement
   Prevention: None.
**SAFETY DATA SHEET**

**C5H12 1000 PPM;C5H12 1000 PPM;C4H10 2500 PPM;C4H10 2500 PPM;C3H8 2500 PPM;C2H6 5000 PPM;CH4 1 %;N2 97.55 %**

Issue Date: 18.08.2015  
Last revised date: 08.08.2016  
Version: 1.1  
SDS No.: 000010026670

**Response:** None.

**Storage:** P403: Store in a well-ventilated place.

**Disposal:** None.

**Supplemental label information**  
EIGA-As: Asphyxiant in high concentrations.

**2.3 Other hazards:** None.

**SECTION 3: Composition/ information on ingredients**

**3.2 Mixtures**

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Chemical formula</th>
<th>Concentration</th>
<th>CAS-No.</th>
<th>EC No.</th>
<th>REACH Registration No.</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>pentane</td>
<td>C5H12</td>
<td>1,000PPM</td>
<td>109-66-0</td>
<td>203-692-4</td>
<td>01-2119459286-30</td>
<td>#</td>
</tr>
<tr>
<td>isopentane; 2-methylbutane</td>
<td>C5H12</td>
<td>1,000PPM</td>
<td>78-78-4</td>
<td>201-142-8</td>
<td>01-2119475602-38</td>
<td>#</td>
</tr>
<tr>
<td>ethane</td>
<td>C2H6</td>
<td>5,000PPM</td>
<td>74-84-0</td>
<td>200-814-8</td>
<td>01-2119486765-21</td>
<td></td>
</tr>
<tr>
<td>Butane</td>
<td>C4H10</td>
<td>2,500PPM</td>
<td>106-97-8</td>
<td>203-448-7</td>
<td>01-2119474691-32</td>
<td>#</td>
</tr>
<tr>
<td>Isobutane</td>
<td>C4H10</td>
<td>2,500PPM</td>
<td>75-28-5</td>
<td>200-857-2</td>
<td>01-2119485395-27</td>
<td></td>
</tr>
<tr>
<td>Propane</td>
<td>C3H8</td>
<td>2,500PPM</td>
<td>74-98-6</td>
<td>200-827-9</td>
<td>01-2119486944-21</td>
<td></td>
</tr>
<tr>
<td>Methane</td>
<td>CH4</td>
<td>1%</td>
<td>74-82-8</td>
<td>200-812-7</td>
<td>01-2119474442-39</td>
<td></td>
</tr>
</tbody>
</table>

The concentrations of the components in the SDS header, product name on page one and in section 3.2 are in mol due to regulatory requirements. All concentrations are nominal.  
# # This substance has workplace exposure limit(s).  
PBT: persistent, bioaccumulative and toxic substance.  
vPvB: very persistent and very bioaccumulative substance.
SAFETY DATA SHEET

C5H12 1000 PPM; C5H12 1000 PPM; C4H10 2500 PPM; C4H10 2500 PPM; C3H8 2500 PPM; C2H6 5000 PPM; CH4 1 %; N2 97.55 %

Issue Date: 18.08.2015
Last revised date: 08.08.2016
Version: 1.1
SDS No.: 000010026670

SECTION 4: First Aid Measures

General: In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/ consciousness. Victim may not be aware of asphyxiation. 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: In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/ consciousness. Victim may not be aware of asphyxiation. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

Eye contact: Adverse effects not expected from this product.
SAFETY DATA SHEET

C5H12 1000 PPM; C5H12 1000 PPM; C4H10 2500 PPM; C4H10 2500 PPM; C3H8 2500 PPM; C2H6 5000 PPM; CH4 1 %; N2 97.55 %

Issue Date: 18.08.2015
Last revised date: 08.08.2016
Version: 1.1
SDS No.: 000010026670

Skin Contact: Adverse effects not expected from this product.

Ingestion: Ingestion is not considered a potential route of exposure.

4.2 Most important symptoms and effects, both acute and delayed:
Respiratory arrest.

4.3 Indication of any immediate medical attention and special treatment needed
Hazards: None.
Treatment: None.

SECTION 5: Firefighting Measures

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

5.1 Extinguishing media
Suitable extinguishing media: Material will not burn. In case of fire in the surroundings: use appropriate extinguishing agent.

Unsuitable extinguishing media: None.

5.2 Special hazards arising from the substance or mixture:
Hazardous Combustion Products: None.

5.3 Advice for firefighters
Special fire fighting procedures: In case of fire: Stop leak if safe to do so. 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.

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.
SAFETY DATA SHEET

C5H12 1000 PPM; C5H12 1000 PPM; C4H10 2500 PPM; C4H10 2500 PPM; C3H8 2500 PPM; C2H6 5000 PPM; CH4 1 %; N2 97.55 %

Issue Date: 18.08.2015  Last revised date: 08.08.2016  Version: 1.1  SDS No.: 000010026670

SECTION 6: Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures:
Evacuate area. Provide adequate ventilation. 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. Guideline 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.

6.4 Reference to other sections:
Refer to sections 8 and 13.

SECTION 7: Handling and Storage:

7.1 Precautions for safe handling:
Only experienced and properly instructed persons should handle gases under pressure. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Refer to supplier's handling instructions. The substance must be handled in accordance with good industrial hygiene and safety procedures. 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. Secure cylinders in an upright position at all times, close all valves when not in use. Provide adequate ventilation. Suck back of water into the container must be prevented. Do not allow backfeed into the container. Avoid suckback of water, acid and alkalis. 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 local/ regional/ national/ international regulations. 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. Damaged valves should be reported immediately to the supplier Close container valve after each use and when empty, even if still connected to equipment. Never attempt to repair or modify container valves or safety relief devices. Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment. Keep container valve outlets clean and free from contaminates particularly oil and water. If user experiences any difficulty operating container valve discontinue use and contact supplier. Never attempt to transfer gases from one container to another. Container valve guards or caps should be in place.
SAFETY DATA SHEET

C5H12 1000 PPM; C5H12 1000 PPM; C4H10 2500 PPM; C4H10 2500 PPM; C3H8 2500 PPM; C2H6 5000 PPM; CH4 1%; N2 97.55 %

Issue Date: 18.08.2015
Last revised date: 08.08.2016
Version: 1.1
SDS No.: 000010026670

7.2 Conditions for safe storage, including any incompatibilities:
Containers should not be stored in conditions likely to encourage corrosion. 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 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>Butane</td>
<td>TWA</td>
<td>600 ppm</td>
<td>1,450 mg/ m3</td>
</tr>
<tr>
<td></td>
<td>STEL</td>
<td>750 ppm</td>
<td>1,810 mg/ m3</td>
</tr>
<tr>
<td>pentane</td>
<td>TWA</td>
<td>600 ppm</td>
<td>1,800 mg/ m3</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>1,000 ppm</td>
<td>3,000 mg/ m3</td>
</tr>
<tr>
<td>isopentane; 2-methylbutane</td>
<td>TWA</td>
<td>600 ppm</td>
<td>1,800 mg/ m3</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>1,000 ppm</td>
<td>3,000 mg/ m3</td>
</tr>
</tbody>
</table>

### DNEL-Values

<table>
<thead>
<tr>
<th>Critical component</th>
<th>type</th>
<th>Value</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>pentane</td>
<td>Worker - inhalative, long-term - systemic</td>
<td>3000 mg/ m3</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Worker - dermal, long-term - systemic</td>
<td>432 mg/ kg bw/ day</td>
<td>-</td>
</tr>
<tr>
<td>isopentane; 2-methylbutane</td>
<td>Worker - inhalative, long-term - systemic</td>
<td>3000 mg/ m3</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Worker - dermal, long-term - systemic</td>
<td>432 mg/ kg bw/ day</td>
<td>-</td>
</tr>
</tbody>
</table>

### PNEC-Values

<table>
<thead>
<tr>
<th>Critical component</th>
<th>type</th>
<th>Value</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>pentane</td>
<td>Aquatic (freshwater)</td>
<td>230 µg/ l</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Soil</td>
<td>0.55 mg/ kg</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Sediment (marine water)</td>
<td>1.2 mg/ kg</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Sewage treatment plant</td>
<td>3600 µg/ l</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Sediment (freshwater)</td>
<td>1.2 mg/ kg</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Aquatic (marine water)</td>
<td>230 µg/ l</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Aquatic (intermit. releases)</td>
<td>880 µg/ l</td>
<td>-</td>
</tr>
</tbody>
</table>
8.2 Exposure controls

Appropriate engineering controls:
Consider a work permit system e.g. for maintenance activities. Ensure adequate air ventilation. Provide adequate ventilation, including appropriate local extraction, to ensure that the defined occupational exposure limit is not exceeded. Oxygen detectors should be used when asphyxiating gases may be released. Systems under pressure should be regularly checked for leakages. Preferably use permanent leak tight connections (e.g. welded pipes). Do not eat, drink or smoke when using the product.

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.


Skin protection
Hand Protection: Wear working gloves while handling containers Guideline: EN 388 Protective gloves against mechanical risks.

Body protection: No special precautions.

Other: Wear safety shoes while handling containers Guideline: ISO 20345 Personal protective equipment - Safety footwear.

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: Gas
Form: Compressed gas
Colour: C5H12: Colourless
C2H6: Colourless
C4H10: Colourless
C4H10: Colourless
SAFETY DATA SHEET

C5H12 1000 PPM; C5H12 1000 PPM; C4H10 2500 PPM; C4H10 2500 PPM; C3H8 2500 PPM; C2H6 5000 PPM; CH4 1 %; N2 97.55 %

C3H8: Colorless
CH4: Colorless
N2: Colorless
C5H12: Colourless

Odour:
C5H12: Gasoline-like odor
C2H6: Odorless
C4H10: Gasoline-like or natural gas odor
C4H10: Gasoline-like or natural gas odor
C3H8: Odorless
CH4: Odorless
N2: Odorless gas
C5H12: Faint

Odour Threshold:
Odour threshold is subjective and is inadequate to warn of over exposure.

pH:
not applicable.

Melting Point:
No data available.

Boiling Point:
No data available.

Sublimation Point:
not applicable.

Critical Temp. (°C):
No data available.

Flash Point:
Not applicable to gases and gas mixtures.

Evaporation Rate:
Not applicable to gases and gas mixtures.

Flammability (solid, gas):
This product is not flammable.

Flammability limit - upper (%):
not applicable.

Flammability limit - lower (%):
not applicable.

Vapour pressure:
No reliable data available.

Vapour density (air=1):
0.99 (calculated) (15 °C)

Relative density:
No data available.

Solubility(ies):

Solubility in Water:
No data available.

Partition coefficient (n-octanol/ water):
Not known.

Autoignition Temperature:
not applicable.

Decomposition Temperature:
Not known.

Viscosity

Kinematic viscosity:
No data available.

Dynamic viscosity:
No data available.

Explosive properties:
Not applicable.

Oxidising Properties:
not applicable.

9.2 Other information:
None.

SECTION 10: Stability and Reactivity

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

SDS_GB - 000010026670
SAFETY DATA SHEET

C5H12 1000 PPM; C5H12 1000 PPM; C4H10 2500 PPM; C4H10 2500 PPM; C3H8 2500 PPM; C2H6 5000 PPM; CH4 1%; N2 97.55%

Issue Date: 18.08.2015
Last revised date: 08.08.2016
Version: 1.1
SDS No.: 000010026670

10.2 Chemical Stability: Stable under normal conditions.

10.3 Possibility of Hazardous Reactions: None.

10.4 Conditions to Avoid: None.

10.5 Incompatible Materials: No reaction with any common materials in dry or wet conditions.

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.

Component information:
- pentane: LD 50 (Rat): >2,000 mg/kg
- isopentane; 2-methylbutane: LD 50 (Rat): >2,000 mg/kg

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.

Component information:
- pentane: LC 50 (Rat, 4 h): >25.3 mg/l Remarks: Vapor
- isopentane; 2-methylbutane: LC 50 (Rat, 4 h): >25.3 mg/l Remarks: Vapor

Repeated dose toxicity
Component information:
- pentane: NOAEL (Rat(Female, Male), Inhalation): 20,000 mg/m3
- isopentane; 2-methylbutane: NOAEL (Rat(Female, Male), Inhalation): 20,000 mg/m3
- NOAEL (Rat, Inhalation): 30 mg/l

SDS_GB - 000010026670
SAFETY DATA SHEET

C5H12 1000 PPM; C5H12 1000 PPM; C4H10 2500 PPM; C4H10 2500 PPM; C3H8 2500 PPM; C2H6 5000 PPM; CH4 1 %; N2 97.55 %

Issue Date: 18.08.2015  Last revised date: 08.08.2016  Version: 1.1  SDS No.: 000010026670

ethane  NOAEL (Rat (Female, Male), Inhalation): 19,678 mg/m³ Inhalation Experimental result, Key study
        NOAEC (Rat, Inhalation): 19678 mg/m³

Butane  NOAEL (Rat (Female, Male), Inhalation, >= 42 d): 16,000 ppm(m) Inhalation Experimental result, Key study

Isobutane  NOAEL (Rat (Female, Male), Inhalation, >= 42 d): 16,000 ppm(m) Inhalation Experimental result, Key study

methane  NOAEL (Rat (Female, Male), Inhalation, 13 Weeks): 10,000 ppm(m) Inhalation Read-across based on grouping of substances (category approach), Key study
        NOAEC (Rat, Inhalation): 4000 ppm
        LOAEC (Rat, Inhalation): 12000 ppm

Skin Corrosion/ Irritation Product

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

Component information
pentane  in vivo (Rabbit): Not classified as an Irritant

isopentane; 2-methylbutane  in vivo (Rabbit): Not classified as an Irritant

Serious Eye Damage/ Eye Irritation Product

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

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

isopentane; 2-methylbutane  in vivo (Rabbit, 24 hrs): Not irritating OECD GHS

ethane  Not irritating

Butane  Not irritating

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.

In vitro Component information
ethane  Ames test in vitro: (OECD Guideline 471 (Bacterial Reverse Mutation Test)): Negative.
SAFETY DATA SHEET

C5H12 1000 PPM; C5H12 1000 PPM; C4H10 2500 PPM; C4H10 2500 PPM; C3H8 2500 PPM; C2H6 5000 PPM; CH4 1 %; N2 97,55 %

Issue Date: 18.08.2015
Last revised date: 08.08.2016
Version: 1.1
SDS No.: 000010026670

methane
Chromosome aberration (OECD Guideline 473 (In Vitro Mammalian Chromosome Aberration Test)): Negative.

**In vivo Component information**

ethane

methane

**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.

**Reproductive toxicity (Fertility)**
**Component information**
methane
Gestation: Rat Inhalation (OECD Guideline 422 (Combined Repeated Dose Toxicity Study with the Reproduction / Developmental Toxicity Screening Test))
NOAEC: 9,000 ppm
Fertility: Rat Inhalation (OECD Guideline 422 (Combined Repeated Dose Toxicity Study with the Reproduction / Developmental Toxicity Screening Test))
NOAEC: 3,000 ppm

**Developmental toxicity (Teratogenicity)**
**Component information**
methane
Rat Inhalation (OECD Guideline 422 (Combined Repeated Dose Toxicity Study with the Reproduction / Developmental Toxicity Screening Test))
NOAEC: 9,000 ppm

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

**Component information**

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

**Aspiration Hazard**
**Product**
Not applicable to gases and gas mixtures.

**SECTION 12: Ecological Information**

**12.1 Toxicity**

**Acute toxicity**
**Product**
No ecological damage caused by this product.
SAFETY DATA SHEET

C5H12 1000 PPM; C5H12 1000 PPM; C4H10 2500 PPM; C4H10 2500 PPM; C3H8 2500 PPM; C2H6 5000 PPM; CH4 1 %; N₂ 97.55 %

Issue Date: 18.08.2015
Last revised date: 08.08.2016
Version: 1.1
SDS No.: 000010026670

Acute toxicity - Fish
Component information
pentane
LC 50 (Oncorhynchus mykiss, 96 h): 4.26 mg/l (Static renewal) Remarks: experimental result
isopentane; 2-methylbutane
LC 50 (Oncorhynchus mykiss, 96 h): 4.26 mg/l (Static renewal) Remarks: interpreted
LC 50 (Rainbow trout (Oncorhynchus mykiss), 96 h): 4.26 mg/l
ethane
LC 50 (Various, 96 h): 147.54 mg/l (QSAR) Remarks: QSAR QSAR, Key study
LC 50 (Fish, 96 h): 91.4 mg/l
Butane
LC 50 (Various, 96 h): 147.54 mg/l (QSAR) Remarks: QSAR QSAR, Key study
Isobutane
LC 50 (Various, 96 h): 147.54 mg/l (QSAR) Remarks: QSAR QSAR, Key study
propane
LC 50 (Various, 96 h): 147.54 mg/l (QSAR) Remarks: QSAR QSAR, Key study
LC 50 (Fish, 96 h): 49.9 mg/l
methane
LC 50 (Various, 96 h): 91.42 mg/l (QSAR) Remarks: QSAR QSAR, Key study
LC 50 (Various (Freshwater), 96 h): 27.98 mg/l (calculated)

Acute toxicity - Aquatic Invertebrates
Component information
pentane
EC 50 (Water flea (Daphnia magna), 48 h): 2.7 mmol/ m³
isopentane; 2-methylbutane
EC 50 (Water flea (Daphnia magna)): 2.3 mg/l
ethane
EC 50 (Water flea (Daphnia magna), 48 h): 46.6 mg/l
Butane
LC 50 (Water flea (Daphnia magna), 48 h): 14.2 mg/l
propane
EC 50 (Water flea (Daphnia magna), 48 h): 27.1 mg/l
methane
LC 50 (Water flea (Daphnia magna), 48 h): 27.14 mg/l

Toxicity to microorganisms
Component information
ethane
EC 50 (Alga, 72 h): 16.5 mg/l
propane
EC 50 (Alga, 72 h): 11.9 mg/l
methane
EC 50 (Alga, 96 h): 19.37 mg/l Not harmful to microorganisms
SAFETY DATA SHEET

C5H12 1000 PPM; C5H12 1000 PPM; C4H10 2500 PPM; C4H10 2500 PPM; C3H8 2500 PPM; C2H6 5000 PPM; CH4 1 %; N2 97,55 %

Issue Date: 18.08.2015
Last revised date: 08.08.2016
Version: 1.1
SDS No.: 000010026670

12.2 Persistence and Degradability
Product

Biodegradation
Component information
methane
100 %

Photodegradation
Component information
pentane
Non-significant photolysis

Stability in water
Component information
pentane
87 % Non-significant hydrolysis

12.3 Bioaccumulative Potential
Product

The product is expected to biodegrade and is not expected to persist for long periods in an aquatic environment.

12.4 Mobility in Soil
Product

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

Component information
pentane
Henry's Law Constant: 7,010 MPa (25 °C)
isopentane; 2-methylbutane
Henry's Law Constant: 7,851 MPa
methane
Henry's Law Constant: 3,690 MPa (25 °C)

12.5 Results of PBT and vPvB assessment
Product

Not classified as PBT or vPvB.
SAFETY DATA SHEET
C5H12 1000 PPM; C5H12 1000 PPM; C4H10 2500 PPM; C4H10 2500 PPM; C3H8 2500 PPM; C2H6 5000 PPM; CH4 1%; N2 97.55%

Issue Date: 18.08.2015
Last revised date: 08.08.2016
Version: 1.1
SDS No.: 000010026670

12.6 Other Adverse Effects:

Global Warming Potential
Global warming potential: 0.2
Contains fluorinated greenhouse gases covered by the Kyoto protocol. When discharged in large quantities may contribute to the greenhouse effect.

Component information
methylene
UN / IPCC Greenhouse Gas Global Warming Potentials (IPCC Fourth Assessment Report, Climate Change, Table TS.2)
- Global warming potential: 25 100-yr
pentane
Global warming potential: 5
isopentane; 2-methylbutane
Global warming potential: 5
ethane
Global warming potential: 6
Butane
Isobutane
Global warming potential: 3
propane
Global warming potential: 3

SECTION 13: Disposal Considerations

13.1 Waste treatment methods

General information:
Do not discharge into any place where its accumulation could be dangerous. Vent to atmosphere in a well ventilated place.

Disposal methods:
Refer to the EIGA code of practice (Doc.30 "Disposal of Gases", downloadable at http://www.eiga.org) for more guidance on suitable disposal methods. Dispose of container via supplier only. Discharge, treatment, or disposal may be subject to national, state, or local laws.

European Waste Codes
Container: 16 05 05: Gases in pressure containers other than those mentioned in 16 05 04.
SECTION 14: Transport Information

ADR
14.1 UN Number: UN 1956
14.2 UN Proper Shipping Name: COMPRESSED GAS, N.O.S. (Nitrogen, Methane)
14.3 Transport Hazard Class(es)
   Class: 2
   Label(s): 2.2
   Hazard No. (ADR): 20
   Tunnel restriction code: (E)
   Emergency Action Code: 2TE
14.4 Packing Group: -
14.5 Environmental hazards: not applicable
14.6 Special precautions for user: -

RID
14.1 UN Number: UN 1956
14.2 UN Proper Shipping Name COMPRESSED GAS, N.O.S. (Nitrogen, Methane)
14.3 Transport Hazard Class(es)
   Class: 2
   Label(s): 2.2
14.4 Packing Group: -
14.5 Environmental hazards: not applicable
14.6 Special precautions for user: -

IMDG
14.1 UN Number: UN 1956
14.2 UN Proper Shipping Name: COMPRESSED GAS, N.O.S. (Nitrogen, Methane)
14.3 Transport Hazard Class(es)
   Class: 2.2
   Label(s): 2.2
   EmS No.: F-C, S-V
14.3 Packing Group: -
14.5 Environmental hazards: not applicable
14.6 Special precautions for user: -

IATA
14.1 UN Number: UN 1956
14.2 Proper Shipping Name: Compressed gas, n.o.s. (Nitrogen, Methane)
14.3 Transport Hazard Class(es): Class: 2.2
   Label(s): 2.2
14.4 Packing Group: -
14.5 Environmental hazards: not applicable
14.6 Special precautions for user: -

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: not applicable
SAFETY DATA SHEET

C5H12 1000 PPM; C5H12 1000 PPM; C4H10 2500 PPM; C4H10 2500 PPM; C3H8 2500 PPM; C2H6 5000 PPM; CH4 1 %; N2 97,55 %

Issue Date: 18.08.2015
Last revised date: 08.08.2016
Version: 1.1
SDS No.: 000010026670

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. Container valve guards or caps should be in place. 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>0.1 - 1.0%</td>
</tr>
<tr>
<td>isopentane; 2-methylbutane</td>
<td>78-78-4</td>
<td>0.1 - 1.0%</td>
</tr>
<tr>
<td>propane</td>
<td>74-98-6</td>
<td>0.1 - 1.0%</td>
</tr>
</tbody>
</table>

Directive 2004/37/EC on the protection of workers from the risks related to exposure to carcinogens and mutagens at work.:

<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>0.1 - 1.0%</td>
</tr>
<tr>
<td>isopentane; 2-methylbutane</td>
<td>78-78-4</td>
<td>0.1 - 1.0%</td>
</tr>
<tr>
<td>ethane</td>
<td>74-84-0</td>
<td>0.1 - 1.0%</td>
</tr>
<tr>
<td>propane</td>
<td>74-98-6</td>
<td>0.1 - 1.0%</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.:

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>methane</td>
<td>74-82-8</td>
<td>1.0 - 10%</td>
</tr>
<tr>
<td>pentane</td>
<td>109-66-0</td>
<td>0.1 - 1.0%</td>
</tr>
<tr>
<td>isopentane; 2-methylbutane</td>
<td>78-78-4</td>
<td>0.1 - 1.0%</td>
</tr>
<tr>
<td>ethane</td>
<td>74-84-0</td>
<td>0.1 - 1.0%</td>
</tr>
<tr>
<td>propane</td>
<td>74-98-6</td>
<td>0.1 - 1.0%</td>
</tr>
</tbody>
</table>
SAFETY DATA SHEET
C5H12 1000 PPM; C5H12 1000 PPM; C4H10 2500 PPM; C4H10 2500 PPM; C3H8 2500 PPM; C2H6 5000 PPM; CH4 1%; N2 97.55%

Issue Date: 18.08.2015
Last revised date: 08.08.2016
Version: 1.1
SDS No.: 000010026670
17/19

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

<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>0.1 - 1.0%</td>
</tr>
<tr>
<td>isopentane; 2-methylbutane</td>
<td>78-78-4</td>
<td>0.1 - 1.0%</td>
</tr>
<tr>
<td>ethane</td>
<td>74-84-0</td>
<td>0.1 - 1.0%</td>
</tr>
<tr>
<td>Butane</td>
<td>106-97-8</td>
<td>0.1 - 1.0%</td>
</tr>
<tr>
<td>Isobutane</td>
<td>75-28-5</td>
<td>0.1 - 1.0%</td>
</tr>
<tr>
<td>propane</td>
<td>74-98-6</td>
<td>0.1 - 1.0%</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>methane</td>
<td>74-82-8</td>
<td>1.0 - 10%</td>
</tr>
<tr>
<td>pentane</td>
<td>109-66-0</td>
<td>0.1 - 1.0%</td>
</tr>
<tr>
<td>isopentane; 2-methylbutane</td>
<td>78-78-4</td>
<td>0.1 - 1.0%</td>
</tr>
<tr>
<td>ethane</td>
<td>74-84-0</td>
<td>0.1 - 1.0%</td>
</tr>
<tr>
<td>Butane</td>
<td>106-97-8</td>
<td>0.1 - 1.0%</td>
</tr>
<tr>
<td>Isobutane</td>
<td>75-28-5</td>
<td>0.1 - 1.0%</td>
</tr>
<tr>
<td>propane</td>
<td>74-98-6</td>
<td>0.1 - 1.0%</td>
</tr>
</tbody>
</table>

National Regulations


This Safety Data Sheet has been produced to comply with Regulation (EU) 453/2010.

15.2 Chemical safety assessment: No Chemical Safety Assessment has been carried out.
SECTION 16: Other Information

Revision Information: Not relevant.

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 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).
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.

Wording of the R-phrases and H-statements in sections 2 and 3

H224 Extremely flammable liquid and vapour.
H280 Contains gas under pressure; may explode if heated.
H304 May be fatal if swallowed and enters airways.
H336 May cause drowsiness or dizziness.
H411 Toxic to aquatic life with long lasting effects.
R12 Extremely flammable.
R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R65 Harmful: may cause lung damage if swallowed.
R66 Repeated exposure may cause skin dryness or cracking.
R67 Vapours may cause drowsiness and dizziness.

Training information: Users of breathing apparatus must be trained. The hazard of asphyxiation is often overlooked and must be stressed during operator training. Ensure operators understand the hazards.

Classification according to Regulation (EC) No 1272/2008 as amended.
Press. Gas Compr. Gas, H280
SAFETY DATA SHEET

C5H12 1000 PPM; C5H12 1000 PPM; C4H10 2500 PPM; C4H10 2500 PPM; C3H8 2500 PPM; C2H6 5000 PPM; CH4 1 %; N2 97,55 %

Issue Date: 18.08.2015
Last revised date: 08.08.2016
Version: 1.1
SDS No.: 000010026670

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. 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).

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.