Safety data sheet
Deuterium, compressed

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

1.1. Product identifier
Product name
Deuterium, compressed

EC No (from EINECS): 231-952-7
CAS No: 7782-39-0
Index-Nr. -
Chemical formula D2
REACH Registration number:
Registration deadline not expired.

1.2. Relevant identified uses of the substance or mixture and uses advised against
Relevant identified uses
Deuterium should only be used as authorised by National Authorities as it is an isotope of Hydrogen.
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)
Press. Gas (Compressed gas) - Contains gas under pressure; may explode if heated.
Flam. Gas 1 - Extremely flammable gas.

Classification acc. to Directive 67/548/EEC & 1999/45/EC
F+; R12
Extremely flammable.
Risk advice to man and the environment
Compressed gas.

2.2. Label elements
- Labelling Pictograms

- Signal word

Danger

- Hazard Statements

H280	Contains gas under pressure; may explode if heated.
H220	Extremely flammable gas.

- Precautionary Statements

Precautionary Statement Prevention

P210	Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

Precautionary Statement Response

P377	Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381	Eliminate all ignition sources if safe to do so.

Precautionary Statement Storage

P403	Store in a well-ventilated place.

Precautionary Statement Disposal

None.

2.3. Other hazards
None.

SECTION 3: Composition/information on ingredients

Substance / Mixture: Substance.

3.1. Substances
Deuterium, compressed
CAS No: 7782-39-0
Index-Nr.: -
EC No (from EINECS): 231-952-7
REACH Registration number:
Registration deadline not expired.
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:
Adverse effects not expected from this product.
First Aid Ingestion:
Ingestion is not considered a potential route of exposure.

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.

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

SECTION 5: Fire fighting measures

5.1. Extinguishing media
Suitable extinguishing media
Water. Dry powder. Foam.
Unsuitable extinguishing media
Carbon dioxide.

5.2. Special hazards arising from the substance or mixture
Specific hazards
Exposure to fire may cause containers to rupture/explode.
Hazardous combustion products
None.

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. Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Extinguish any other fire.
Special protective equipment for fire-fighters
In confined space use self-contained breathing apparatus.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures
Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Ensure adequate air ventilation. Eliminate ignition sources. Evacuate area. Consider the risk of potentially explosive atmospheres.

6.2. Environmental precautions
Try to stop release.

6.3. Methods and material for containment and cleaning up
Ventilate area.

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

SECTION 7: Handling and storage

7.1. Precautions for safe handling
Ensure equipment is adequately earthed. Suck back of water into the container must be prevented. Purge air from system before introducing gas. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt. Keep away from ignition sources (including static discharges). Refer to supplier's handling instructions. The substance must be handled in accordance with good industrial hygiene and safety procedures. Purge system with dry inert gas (e.g. helium or nitrogen) before gas is introduced and when system is placed out of service. Consider the use of only non-sparking tools. Do not smoke while handling product. Only experienced and properly instructed persons should handle gases under pressure. Protect containers from physical damage; do not drag, roll, slide or drop. 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 container contents. When moving containers, even for short distances, use appropriate equipment eg. trolley, hand truck, fork truck etc. 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. Ensure the complete gas system has been (or is regularly) checked for leaks before use. If user experiences any difficulty operating container valve discontinue use and contact supplier. Close container valve after each use and when empty, even if still connected to equipment.

7.2. Conditions for safe storage, including any incompatibilities
Segregate from oxidant gases and other oxidants in store. Keep container below 50°C in a well ventilated place. Observe all regulations and local requirements regarding storage of containers. Containers should not be stored in conditions likely to encourage corrosion. Cylinders 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. 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. Container valve guards or caps should be in place.

7.3. Specific end use(s)
None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters
No occupational exposure limit.

8.2. Exposure controls
Appropriate engineering controls
Product to be handled in a closed system. Gas detectors should be used when quantities of flammable gases/vapours may be released. Keep concentrations well below lower explosion limits. Consider work permit system e.g. for maintenance activities. Systems under pressure should be regularly checked for leakages. The substance must be handled in accordance with good industrial hygiene and safety procedures. Provide adequate general or local ventilation.
Personal protective equipment
Eye and face protection
Wear eye protection to EN 166 when using gases.
Skin protection

Other protection
Wear working gloves and safety shoes while handling containers.
Respiratory protection
Not required
Thermal hazards
Not required
Environmental Exposure Controls
Specific risk management measures are not required beyond good industrial hygiene and safety procedures. Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties
General information
Appearance/Colour: Colourless gas.
Odour: None.
Melting point: -254 °C
Boiling point: -250 °C
Flash point: Not applicable for gases and gas mixtures.
Flammability range: 6,6 %(V) - 79,6 %(V)
Vapour Pressure 20 °C: Not applicable.
Relative density, gas (Air=1): 0,14
Solubility in water: No reliable data available.
Autoignition temperature: 560 °C
Explosive properties:
Explosive acc. EU legislation: Not explosive.
Explosive acc. transp. reg.: Not explosive.
Oxidising properties: Not applicable.
Molecular weight: 4 g/mol
Critical temperature: -235 °C
Relative density, liquid (Water=1): Not applicable.

9.2. Other information

Burns with an invisible flame.

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 potentially 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
Oxidising agents. Air, Oxidiser. For material compatibility see latest version of ISO-11114.

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

SECTION 11: Toxicological information

11.1. Information on toxicological effects
General
No known toxicological effects from this product.

SECTION 12: Ecological information

12.1. Toxicity
No known ecological damage caused by this product.

12.2. Persistence and degradability
Not applicable.

12.3. Bioaccumulative potential
Not applicable.

12.4. Mobility in soil
The substance is a gas, not applicable.

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

12.6. Other adverse effects
Not applicable.

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 gas should be flared through a suitable burner with flash back arrestor. Do not discharge into any place where its accumulation could be dangerous. Contact supplier if guidance is required.
EWC Nr. 16 05 04*

SECTION 14: Transport information

ADR/RID

14.1. UN number
1957

14.2. UN proper shipping name
Deuterium, compressed

14.3. Transport hazard class(es)
Class: 2
Classification Code: 1F
Labels: 2.1
Hazard number: 23
Tunnel restriction code: (B/D)
Emergency Action Code: 2SE

14.4. Packing group (Packing Instruction)
P200

14.5. Environmental hazards
None.

14.6. Special precautions for user
None.

IMDG

14.1. UN number
1957

14.2. UN proper shipping name
Deuterium, compressed

14.3. Transport hazard class(es)
Class: 2.1
Labels: 2.1
EmS: FD,SU,

14.4. Packing group (Packing Instruction)
P200

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
Not applicable.

IATA

14.1. UN number
1957

14.2. UN proper shipping name
Deuterium, compressed

14.3. Transport hazard class(es)
Class: 2.1
Labels: 2.1

14.4. Packing group (Packing Instruction)
P200

14.5. Environmental hazards
None.

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 container 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)
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
A CSA does not need to be carried out for this product.

SECTION 16: Other information

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:

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.
United States of America's National Library of Medicine's toxicology data network TOXNET (http://toxnet.nlm.nih.gov/index.html)
Agency for Toxic Substances and Diseases Registry (ATSDR) (http://www.atsdr.cdc.gov/)
Threshold Limit Values (TLV) from the American Conference of Governmental Industrial Hygienists (ACGIH).
Substance specific information from suppliers.
EH40 (as amended) Workplace exposure limits.

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