BOC GASES
Medical

Data Sheet

Medical Helium (He)

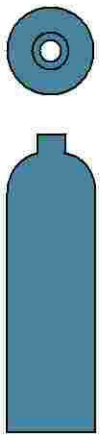
PRESENTATION

Pharmaceutical form

Compressed medical gas (for medicinal use only)

Specification

Complies with British Pharmacopoeia specification 1988



Purity	99.95% (min)
Oxygen	100.0 vpm (max)
Moisture	15.0 vpm (max)
Hydrocarbons	5.0 vpm (max)

Physical data

Molecular weight	4.003
Physical state in cylinder	Gas
Specific gravity of gas at 15°C and 1013mb	0.13
Density of gas at 15°C and 1013mb	0.169 kg/m^3
Combustion characteristics	Non flammable. Does not support combustion

USES

Because of its low density, helium flows through an orifice much more easily that other medical gases.

Helium is used with at least 21% oxygen in the following circumstances:

- to assist the flow of oxygen into the alveoli of patients with severe respiratory obstruction
- to prevent atelectasis
- in various concentrations, in conjunction with air or oxygen, for gas transfer lung function tests.

DOSAGE AND ADMINISTRATION

There is no distinction generally between the use of helium in age groups.

In its role as a carrier for oxygen, helium is administered through the lungs by inhalation with 21% or higher concentrations of oxygen by mask or endotracheal tube. Cylinders should only be used in conjunction with medical helium gas pressure regulators, although medical oxygen gas pressure regulators may be used on the F-size helium cylinders.

CONTRA-INDICATIONS, WARNINGS ETC

None applicable.

Interactions with other medicaments and other forms of interaction

None applicable.

Effects on ability to drive and to use machines
None applicable.

Other undesirable effects (frequency and seriousness)
With helium, the only undesirable effect will result from less than 21% oxygen being given with the helium when, with decreasing oxygen levels, asphyxia will result.

Use in pregnancy and lactation
Helium does not adversely affect pregnancy and lactation.

Other special warnings and precautions
Helium should never be used with less than 21% oxygen.
Helium will diffuse through rubber tubing.
Care is needed in the handling and use of medical helium gas cylinders.

Overdose (symptoms, emergency procedures, antidotes)
As detailed in 'Other undesirable effects'

Incompatibilities (major)
There are no incompatibilities with helium in clinical practice.

PHARMACEUTICAL PRECAUTIONS

Cylinders should be kept out of the reach of children.
Helium is considerably lighter than air, non-toxic, inert and will not support life. At high concentrations it acts as an asphyxiant by displacement of air. Symptoms of asphyxiation include rapid and gasping respiration, rapid fatigue, nausea and vomiting and cyanosis and may lead to loss of consciousness and death from anoxia. Helium should never be inhaled except in approved mixtures with other gases and under authorised circumstances.
The normal precautions required in the storage and use of medical gas cylinders are applicable. These are fully explained in the associated brochure 'Gas Safe — in the hospital' and on the reverse of this Data Sheet.

United Nations Substance Identification (UNSI) No.	1046
Emergency action code (Hazchem)	2 T
A.D.R. Hazard identification No.	–
C.E.F.I.C. tremcard No.	–

Occupational exposure standard (OES)
There is no OES for medical helium in the UK.

LEGAL CATEGORY

Pharmacy

PACKAGE QUANTITIES

Cylinder data	Colour code (BS 1319C):	Body colour — Brown (06 C 39) Shoulder colour — Brown (06 C 39) Colour references to BS 5252
	Cylinder pressure:	137 bar (max) at 15°C

Cyl size	Valve type	Valve outlet connection	Nominal contents [1] (litres)	Nominal weight of gas [1] (kg)	Approx cylinder weight [2] (kg)	Approx cylinder dimensions [3] (mm)
D	Pin Index	Yoke fitting	300	0.05	3.4	535 x 102
F	Bullnose	$^5/_8$" BSP (f)	1200	0.20	14.5	930 x 140

NOTES

1. Actual contents and weights of gas may vary about the nominal figures indicated.

2. This is the approximate weight of a cylinder and valve without gas but including neck ring where appropriate. Some cylinders manufactured to older standards may weigh more than this. Add the nominal weight of gas to obtain the approximate weight of a full cylinder.

3. The length includes the cylinder valve.

FURTHER INFORMATION

Expiry date

Three years from filling date

Pharmacological particulars

The characteristics of helium are:

- Inert, odourless, colourless gas
- Molecular weight: 4.00
- Boiling point: -269 °C (at 1 bar)
- Density: 0.169 kg/m^3 (at 15°C)

Helium has no physiological activity, and will not support life.

Pharmacokinetic particulars

Helium has a low coefficient of solubility and high rate of diffusion compared with nitrogen. It is completely inert and non-toxic. When helium replaces the nitrogen in air, the specific gravity of the resultant helium/oxygen (79:21) mixture is 341 (compared with air at 1000). This mixture flows through bronchi three time more easily than air. In patients with respiratory obstruction , therefore, more oxygen may be presented to the alveoli for the same ventilatory effort. The absorption of helium from alveoli is very slow. Inhalation of helium may be used to prevent atelectasis.

PRODUCT LICENCE NUMBER

PL0735/5008

DATE OF PREPARATION

July 1994 (Revision 1)

BOC GASES
Medical

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Safe handling and storage of medical gas cylinders

General

1. All personnel handling gas cylinders and responsible for pipeline gas supplies should have adequate knowledge of the properties of the gas, precautions to be taken, actions in the event of an emergency and the correct operating procedures for their installations.
2. If you own your cylinders you must be aware of, and discharge your statutory obligations with regard to maintenance and testing.
3. Ensure that when cylinders are collected the driver has been properly instructed in the method of handling cylinders and in dealing with any emergency.

Storage of cylinders

1. Cylinders should be stored under cover, preferably inside, kept dry and clean and not subjected to extremes of heat or cold.
2. Cylinders should not be stored near stocks of combustible materials or near sources of heat.
3. Warning notices prohibiting smoking and naked lights must be posted clearly.
4. Emergency services should be advised of the location of the cylinder store.
5. Medical cylinders containing different gases should be segregated within the store.
6. Full and empty cylinders should be stored separately. Full cylinders should be used in strict rotation.
7. Medical cylinders should be stored separately from industrial and other non-medical cylinders.
8. Cylinders must not be repainted, have any markings obscured or labels removed.
9. F size cylinders and larger should be stored vertically. E size cylinders and smaller should be stored horizontally.
10. Precautions should be taken to protect cylinders from theft.

Preparation for use

1. Cylinder valves should be opened momentarily prior to use to blow any grit or foreign matter out of the outlet.
2. Ensure that the connecting face on the yoke, manifold or regulator is clean and the sealing washer or 'O' ring where fitted is in good condition.
3. Cylinder valves must be opened slowly.
4. Only the appropriate regulator should be used for the particular gas concerned.
5. Pipelines for medical gases should be installed in accordance with the conditions set out in HTM 2022.
6. Cylinder valves and any associated equipment must never be lubricated and must be kept free from oil and grease.

Leaks

1. Should leaks occur these will usually be evident by a hissing noise.
2. Leaks can be found by brushing the suspected area with an approved leak test solution such as 1% *Teepol HB7 solution.
3. The gland packing around the valve spindle may become loose and can be cured by tightening the gland nut clockwise. Do not overtighten.
4. Sealing or jointing compounds must never be used to cure a leak.
5. Never use excessive force when connecting equipment to cylinders.

Use of cylinders

1. Cylinders should be handled with care and not knocked violently or allowed to fall.
2. Cylinders should only be moved with the appropriate size and type of trolley.
3. When in use cylinders should be firmly secured to a suitable cylinder support.
4. Cylinders containing liquefiable gas must always be used vertically with the valve uppermost.
5. Medical gases must only be used for medicinal purposes.
6. Smoking and naked lights must not be allowed within the vicinity of cylinders or pipeline outlets.
7. After use cylinder valves should be closed using moderate force only and the pressure in the regulator or tailpipe released.
8. When empty the cylinder valve must be closed.
9. Ensure the plastic valve cap is refitted to bullnose valves/outlets.
10. Immediately return empty cylinders to the empty cylinder store for return to BOC.

Further information concerning specific problems arising from the storage and handling of gases, hazards and first aid treatment can be obtained from BOC.

General references

'Gas Safe — with medical gases' BOC Limited.

'Safe Under Pressure' BOC Limited.

Handbook of Compressed Gases, Compressed Gas Association Inc., Reinhold (1990).

Gas Data Book, Matheson Gas Products (1971) .

The Road Traffic (Carriage of Dangerous Substances in Packages etc) Regulations 1986, SI.1986, No 1951 and supporting Code of Practice.

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SAFETY DATA SHEET

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

MSDS Nr	061A
Product name	Helium
Chemical formula	He
Company identification	see page 3
Emergency phone number	0645-645555

2. Composition/information on ingredients

Substance/Preparation	Substance.
Components/Impurities	Contains no other components or impurities which will influence the classification of the product.
CAS Nr	07440-59-7
EEC Nr (from EINECS)	2311685

3. Hazards identification

Hazards identification	Compressed gas. In high concentrations may cause asphyxiation.

4. 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 artifical respiration if breathing stopped.

5. Fire fighting measures

Specific hazards	Exposure to fire may cause containers to rupture/explode. Non flammable.
Hazardous combustion products	None.
Suitable extinguishing media	All known extinguishants can be used.
Specific methods	If possible, stop flow of product. Move container away or cool with water from a protected position.
Special protective equipment for fire fighters	In confined space use self-contained breathing apparatus.

6. Accidental release measures

Personal precautions	Evacuate area. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Ensure adequate air ventilation.
Environmental precautions	Try to stop release.
Clean up methods	Ventilate area.

7. handling and storage

Handling and storage	Suck back of water into the container must be prevented. Do not allow backfeed into the container. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt. Refer to supplier's container handling instructions. Keep container below 50°C in a well ventilated place.

8. Exposure controls/personal protection

Personal protection	Ensure adequate ventilation.

9. Physical and chemical properties

Molecular weight	4
Melting point	Not applicable.
Boiling point	-269°C
Critical temperature	-268°C
Relative density, gas	0.14 (air=1)
Relative density, liquid	Not applicable.
Vapour pressure 20°C	Not applicable.
Solubility mg/1 water	1.5mg/1
Appearance/Colour	Colourless gas.
Odour	No odour warning properties.

10. Stability and reactivity

Stability and reactivity	Stable under normal conditions.

11. Toxicological information

General	No known toxicological effects from this product.

12. Ecological information

General	No known ecological damage caused by this product.

13. Disposal considerations

General	Do not discharge into any place where its accumulation could be dangerous. To atmosphere in a well ventilated place. Contact supplier if guidance is required.

14. Transport information

UN Nr	1046
Class/Div	2.2
ADR/RID Item Nr	2,1a
ADR/RID Hazard Nr	20
Tremcard Nr	828
Groupcard Nr	20g01
Labelling ADR	Label 2: non flammable non toxic gas.
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 and: - cylinder valve is closed and not leaking - valve outlet cap nut or plug (where provided) is correctly fitted - valve protection device (where provided) is correctly fitted - adequate ventilation. - compliance with applicable regulations.

15. Regulatory information

Number in Annex 1 of Dir 67/548	Not included in Annex I.
EC Classification	Proposed by the industry Not classified as dangerous substance.
Labelling of cylinders	
-Symbols	Road transport symbols are used and selected according to the most stringent product classification - EC or ADR. Label 2: non flammable non toxic gas.
-Risk phrases	RAs Asphyxiant in high concentrations.
-Safety phrases	S9 Keep container in well ventilated place. S23 Do not breathe the gas

16. Other information

Ensure all national/local regulations are observed.
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.
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