

Liquid Nitrogen from BOC Healthcare.

Product and Service Guide.



BOC: Living Healthcare

Contents.

- 3 Overview
- 4 Audit and risk assessment
- 5 Cryogenic safety training
- 6 Liquid nitrogen supply
- 7 Cryogenic storage equipment
- 8 Cryopreservation storage units
- 9 Offsite secure cryogenic storage
- 10 Related equipment

Overview.

BOC Healthcare is the UK's leading supplier of medical gases, associated equipment and related services to healthcare professionals. In hospitals, ambulance services, treatment centres, GP surgeries, veterinary and dental practices, its comprehensive range of medical gases provides a crucial element in the care of patients. BOC is a member of The Linde Group – the global market leader for medical gases and associated hospital therapies.

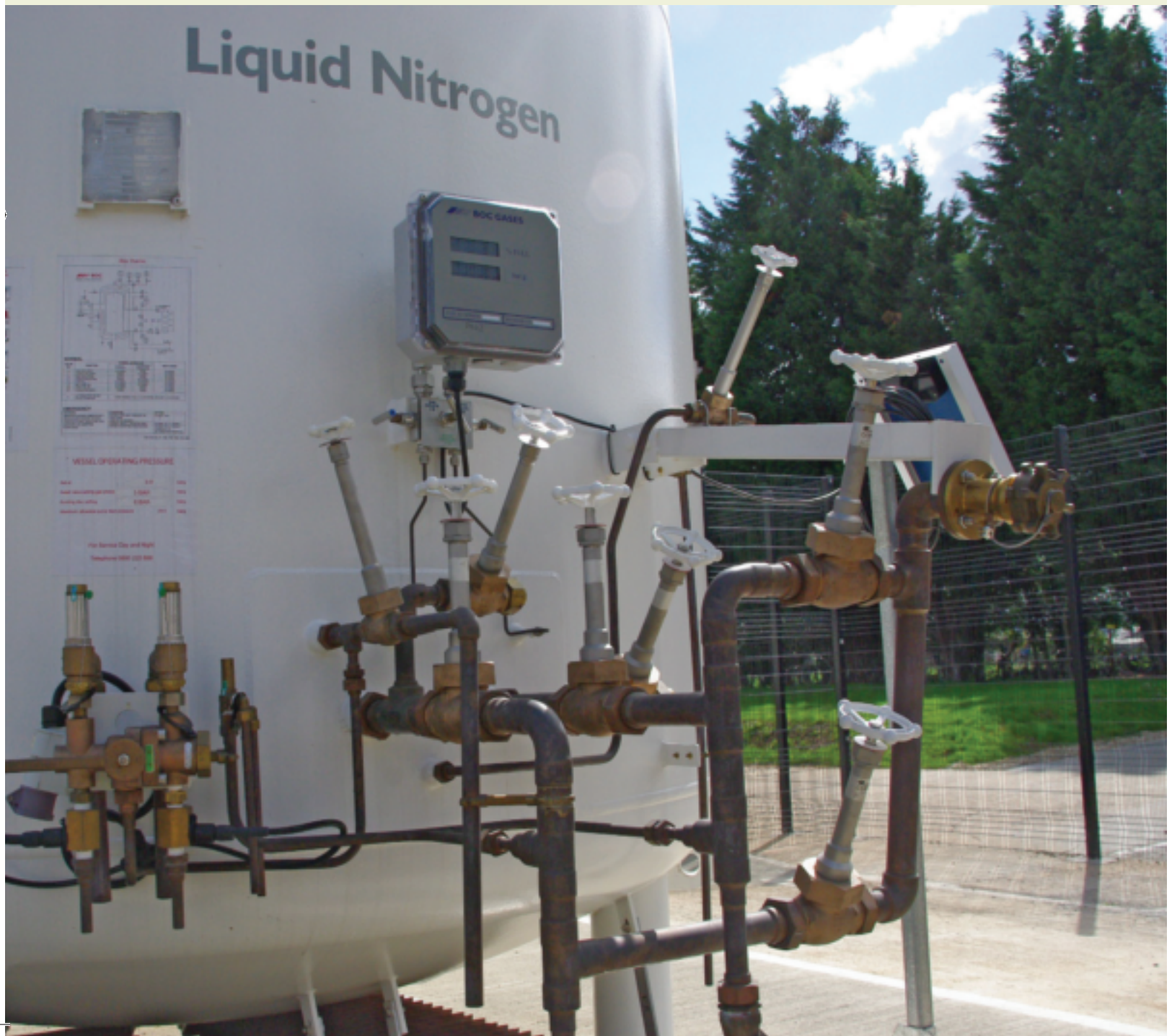
Liquid nitrogen is colourless, odourless, non-toxic and inert. It is a refrigerated liquefied gas with a boiling point of -196°C . In its liquid form nitrogen is used as a cryogen for many applications where very low temperatures or rapid temperature reduction is required, such as to safely store medical or research samples like blood, stem cells and plasma.

For a critical product like liquid nitrogen it is important that you partner with a supplier known for quality, reliability, security of supply and safety compliance. In order to meet your needs in providing a comprehensive service offer BOC Healthcare supplies a range of associated equipment and related services alongside your liquid nitrogen supply. This ensures you have the peace of mind that comes from knowing supply is secure and help is always at hand.

Audit and risk assessment.

For your peace of mind BOC Healthcare can provide you with a health-check and risk assessment of your existing liquid nitrogen system and systems of work. The audit is based on, and referenced to, Health Technical Memorandum (HTM) 02, EN737, BCGA codes of practice and best practice.

We will summarise any significant findings requiring immediate attention and all associated recommendations, providing an electronic copy and one complete bound copy of the survey and risk assessment. This quantified approach enables a prioritised programme of remedial actions to be constructed.



Cryogenic safety training.



To ensure that you and your staff are aware of and confident in the safe use and handling of liquid nitrogen within the healthcare environment, BOC Healthcare can deliver a medical gas safety course specifically for cryogenic gases.

The course is designed for staff employed in the storage, handling, decanting or transportation of liquid nitrogen dewars. It provides information on potential hazards, risk reduction, emergency procedures, roles and responsibilities for the safe use and handling of liquid nitrogen within the healthcare environment.

The three hour training course includes tuition, course notes, practical demonstration and assessment. It is normal to run two consecutive courses on the same day with a maximum of ten delegates per course. It can be run at customer premises as a full or half day course and is also available at BOC sites as per our training calendar.

Liquid nitrogen supply.

Expert advice with every delivery.

Delivered by the largest mini-bulk fleet in the UK and Ireland, BOC's Cryospeed service has wider and more frequent coverage than any other supplier. Our operators will deliver your liquid nitrogen without assistance, and have the experience and flexibility to react to changing requirements and provide true security of supply.

As a BOC customer, you'll have a dedicated Cryospeed Sales and Service Operator who'll not only deliver your liquid nitrogen when you need it, but will be a regular point of contact. Your highly trained operator provides a truly personal service and will:

- safely deliver your product when and where you need it
- perform detailed pre-delivery vessel inspections
- carry out planned preventative maintenance and repairs on vessels rented from BOC to give you peace of mind about operating safely
- offer advice on product and equipment safe handling, usage and storage
- offer advice on BOC's cryogenic equipment range, including suitable Personal Protective Equipment (PPE)
- provide practical, workable and understandable answers to all your commercial, technical and safety questions

Other than for repairs to faults caused by incorrect customer operation, all the above services are carried out for no additional charge.

Scheduled deliveries

Most customers rely on the simplicity and security of our scheduled delivery service. We can deliver liquid nitrogen into vessels ranging from small open dewars (0-50 litre) to large 2,000 litre vessels, delivering up to 1,000 litres at a time. Our operators are experts in understanding customer use patterns and adapting to changing requirements, so they'll look at your demand and schedule regular deliveries to ensure security of supply. That means there's no need for you to place orders and, if you expect changes in demand, let us know and we'll adapt to your needs. If anything unexpected happens outside of the normal delivery schedule, our operators are only a call away.

Unscheduled delivery

If you have sporadic demands which make scheduled delivery impractical, that's not a problem. Just give us 48-hours' notice of your requirement and we'll fit you into our schedules.

Emergency delivery

Sometimes unforeseen circumstances can catch us all out. We'll make every effort to get your supply to you in good time and, because we have the largest fleet and widest coverage, Cryospeed takes some beating in responding to an emergency.



Cryogenic storage equipment.

Cryogenic vessel range

BOC provides a wide range of cryogenic vessels, from 30 to 2,000 litres capacity, all of which are designed to meet high standards of quality and safety. We can advise on the most suitable storage solution for you, and provide installation and commissioning services, including emergency shutdown procedure and safety precautions.

Rented vessels

Most customers rent vessels from BOC. This gives more flexibility if requirements change, plus we take care of maintenance responsibilities and the requirements of the Pressure Systems Safety Regulations 2000 (PSSR). The vessel is checked each time it is filled and our operators can resolve most technical problems on the spot. Unlike some suppliers, we include all regular maintenance in the rental charge (including any parts and labour).

Customer owned vessels

If you have your own vessel, Cryospeed will fill it providing it is properly maintained as defined by the Pressure Systems Safety Regulations 2000 (PSSR).

To help with that, we offer maintenance packages to ensure that your vessel operates safely and complies with the regulations.

- For vertical vessels up to and including 500 litres we offer BOC Cryocare which includes:
 - Annual planned preventative maintenance (PPM) inspection
 - Seven-yearly PPM inspections in line with the written scheme of examination
- For vessels over 500 litres and all horizontal vessels we offer BOC OnStream which includes:
 - Provision of a PPM scheme to ensure your pressure systems are safe for use and running efficiently
 - The management of any necessary remedial works
 - Assistance in reducing the time spent on administration by preparing and updating written schemes of examination or providing advice and technical support

Cryopreservation storage units.



If you are using liquid nitrogen for cryogenic preservation, then BOC Healthcare can supply you with best-in-class DryStore freezers, which are fully compliant with the Medical Devices Directive (Directive 93/42/EEC) Class IIa. They offer exceptional sample security and operator safety as the storage area is completely free of liquid nitrogen. Instead, the liquid nitrogen is housed in a jacket that surrounds the chamber which means that temperature performance down to -190°C can be achieved, whilst maintaining a large lid for easy access.

Eliminate the contamination risks associated with liquid nitrogen

By housing liquid nitrogen within a thermal jacket that surrounds the DryStore chamber we have created a truly dry system. With correct operation there is no risk of cross contamination through liquid nitrogen contact.

Simple to use, safe to operate

Internal temperatures down to -190°C are achieved with excellent uniformity. The wide chamber neck allows safe, easy access, without compromising the safety of your samples.

Liquid nitrogen fills

The DryStore electronics allow for manual or fully-automated liquid nitrogen top-ups and have been designed to operate with both bulk nitrogen systems and small, portable vessels. Clear system monitoring is provided at all times with full backup features.

Enhanced monitoring & display

A graphical display gives a clear and instant indication of the DryStore status. Additional features allow the system performance to be logged on a PC and viewed over the internet. The unique DryStore software is compatible with most other cryogenic refrigerators.

Hassle free installation

Experts in cryogenic systems, with over thirty years' industry experience, BOC offers a complete system installation service. We can design and install liquid nitrogen storage and distribution systems, plus oxygen monitoring and emergency response equipment, giving a full turnkey solution for cryopreservation.

Offsite secure cryogenic storage.



If you would rather store your biological samples off-site then BOC's Cryobank offers a secure facility, with an assured liquid nitrogen supply.

BOC Cryobank utilises best-in-class DryStore cryogenic freezers, is licensed by the Human Tissue Authority (HTA) and complies with all relevant legislation. Storage solutions can be tailored to your specific requirements of volume and length of storage time.

Benefits of Cryobank off-site storage solutions:

Risk

Storing a proportion of samples off-site mitigates the risk of loss due to local incident or disaster, for example a thaw, contamination or other damage.

Cost

Locating your back up storage facilities at BOC Cryobank reduces the costs of in-house facilities and will free up valuable laboratory space. BOC Cryobank removes the need for investment and space for back-up storage.

Compliance

BOC operates a quality management system which complies with the relevant legislation for management of bio-samples.

Peace of Mind

Biological samples may be irreplaceable. Housing samples within the secure BOC Cryobank facility complete with full engineering back-up provides reassurance against in-house accidents.

Related equipment.

Signage

BOC Healthcare can provide the appropriate signage for the areas where liquid nitrogen is stored or used. These signs are bespoke to your facility, ensure that you comply with HTM and can include your emergency information. Please discuss signage needs with your BOC Healthcare Account Manager.

DryStore range

For small scale storage of segregated samples or where space is a premium, to large, centralised storage facilities, there is a DryStore cryogenic freezer to meet your requirements.

Storage capacity

	2ml vials	Blood bags (250ml and 500ml)	Blood bags (750ml)	Straw storage (goblets per system)	Pall bag storage (cassettes per system)
DryStore 8	7644	90	60	105	432
DryStore 12	12064	150	100	185	702
DryStore 23	23400	510	340	390	1620
DryStore 50	48375	810	560	726	3402

Capacity data taken from storage systems available from BOC. Other systems may vary. Blood bag capacity modelled on Baxter Bags 4R9953/4R9955/4R9957 respectively. Complete racking systems are available for each DryStore freezer.

Physical data

	External			Usable internal		Liquid nitrogen Capacity (l)
	Height (mm)	Width (mm)	Depth (mm)	Height (mm)	Diameter (mm)	
DryStore 8	1175	539	714	765	416	33
DryStore 12	1223	641	800	765	535	44
DryStore 23	1210	921	1070	760	787	74
DryStore 50	1445	1210	1425	870	1016	136

Dewars and dewar accessories

BOC can supply custom-made cryogenic equipment for cryogenic products.

Small laboratory open dewars

- Open neck stainless steel dewars
- Suitable for short term storage or immersion applications
- Resistant to vibration, impact and shock
- Come complete with handles and lids (except 0.6 litre dewar)

Part Number	Capacity (Litres)	External Diameter (mm)	External Height (mm)	Empty Weight (kg)	Full Weight (kg)
19310935	0.6	87	204	0.5	1.0
11858846	0.9	107	232	0.9	1.6
11880462	1.8	122	312	1.3	2.8
11858848	2.6	200	190	1.8	3.9
11858849	5.5	200	300	2.4	6.8

Larger open dewars

- Low pressure withdrawal device
- 51mm and 63mm neck diameter
- Allows safe dispensing of liquid nitrogen

Part Number	Capacity (Litres)	Evaporation Rate (L/day)	Static Holding time (days)	Empty weight (kg)	Full Weight (kg)	Neck Diameter (mm)	Height (mm)
19311186	10	0.20	50	5.5	13.7	51	560
19311187	20	0.18	111	9.1	25.3	51	570
19311188	25	0.25	100	7.4	27.6	51	585
11881939	35	0.27	130	12.2	40.5	63	650
11881810	50	0.28	179	15.5	55.9	63	810



Withdrawal device

- Low pressure withdrawal device
- 51mm and 63mm neck diameter
- Allows safe dispensing of liquid nitrogen

19311189	20 and 25 litre dewar
19311190	35 and 50 litre dewar



Roller base

- Allows easy and safe movement of dewars
- Adjustable to fit size of dewar

19311198



Tipping trolley

- Allows safe movement of 25 litre dewar

19311192	For 25 litre dewar
----------	--------------------

Oxygen monitoring

If there is too little oxygen (oxygen deficiency) there is a danger of asphyxiation.

BOC’s oxygen monitors help to ensure a working environment is safe. If levels become dangerous, the monitors will alarm. Repeater units mimic the alarm on the oxygen monitor and should be installed outside the room to warn against entry. BOC has a range of oxygen deficiency and enrichment monitors and repeaters to fit most requirements.

Personal oxygen monitor and alarm

Personal monitors offer protection for those regularly entering or working in an environment where changes to the composition of the surrounding air are a possibility.

- Alerts users to dangerous high or low oxygen levels (outside preset low and high levels)
- Monitors oxygen concentrations in surrounding air
- Cannot be switched off - protecting users at all times

- In alarm condition, LCD display cuts off to prevent subjective user decisions about levels of danger
- Easily calibrated by user in fresh air using LCD
- Belt/pocket clip provided
- Ear piece available for noisy environments
- LCD on top for optimal viewing by user and confirmation of continuous operation
- Warning alarm and low battery (service) alarm sited along side LCD display for optimal visibility
- Low battery alarm will sound for several days continuously
- Operates continuously for up to 2 years under normal ambient conditions, no need to recharge
- Replacement battery/sensor pack gives ongoing life at end of 2 year period
- Fully operational in superconductive magnetic fields
- Small compact size - 125mm x 65mm x 23mm
- Lightweight unit - approx. 200g

Wall mounted oxygen deficiency monitors



One 2 One O₂ monitor



Standard oxygen deficiency monitor

Monitor	Features	Benefits	Applications	Part Number
One 2 One O ₂	Combined monitor and repeater package. Audible alarm from both monitor and repeater. LCD on repeater shows % O ₂	Alarms sound inside and outside the room. No need for wiring or mains connection. No need for any additional parts to set up system – complete package.	Ideal for simple single room/ single source monitoring. System cannot be extended.	19312986
Standard oxygen deficiency monitor	Single monitor unit with sensor and inbuilt alarm. Alarms when oxygen levels are below normal levels.	Builds a modular system. Can connect to repeater units that switch emergency devices.	The oxygen monitor to use in more complex systems where asphyxiation is possible.	19307505

Replacement Battery & Sensor

Sensor Battery	Description	Part Number
For use with One 2 One O ₂ monitor	Pack contains replacement sensor and battery	19219529
For use with Standard oxygen deficiency monitor	Pack contains replacement sensor and battery	19310552

Wall mounted oxygen repeater units



Basic O₂ repeater no LCD display



Basic O₂ repeater with LCD display



Switching O₂ repeater

A. Basic repeater that can NOT switch attached electronic devices (e.g. fans/sirens)

Monitor	Features	Benefits	Applications	Part Number
Basic O ₂ repeater no LCD display	Connects to standard oxygen monitors. Diode and audible alarms. Battery Powered. 10m cable included.	Provides a remote warning alarm. Up to 4 repeaters can connect in series (daisy chain).	Low cost option for remote alarming away from the source of asphyxiant. Ideal for rooms with multiple entry points.	19208538
Basic O ₂ repeater with LCD display	Connects to standard oxygen monitors. Diode + audible alarm LCD display showing % O ₂ . Battery powered. 10m cable included.	Visual display of oxygen levels. Provides remote warning alarm. Up to 4 repeaters can connect in series (daisy chain).	For applications where users want the comfort of seeing % O ₂ levels displayed. Ideal for rooms with multiple entry points.	19307508

B. Switching repeater

Monitor	Features	Benefits	Applications	Part Number
Switching O ₂ repeater	Connects to standard oxygen monitors, Diode and audible alarm. LCD showing % O ₂ . Mains powered. Cable NOT included.	Has the capacity to switch external devices (switching box sold separately). Up to 4 repeaters can connect in series (daisy chain).	Use where more than one source of asphyxiant is present or where multiple locations are monitored. Ideal where additional emergency responses are required such as fans or sirens	19307507

C. Switching repeater that connects to up to 4 Standard O2 deficiency monitors

Monitor	Features	Benefits	Applications	Part Number
Multi-O ₂ monitor switching repeater	Connects up to 4 standard oxygen monitors, Diode and audible alarm	A central repeater for multiple units. Has the capacity to switch external devices (switching box sold separately). Up to 4 repeaters can connect in series (daisy chain).	Use where more than one source of asphyxiant is present or where multiple locations are monitored.	19308795

Battery, switching box and cable

Product	Description	Part Number
Battery for basic O ₂ repeater and display repeater		19310551
Switching box for switching repeaters	Connects repeater to mains powered device	19308796
10 m cable	Connects standard monitors to repeaters. Only the multi-monitor repeater comes w/out cables	19308898

Personal Protective Equipment (PPE)

Hand protection

It is important to use the correct hand protection when handling cryogenic liquid. This must protect from accidental liquid splashes and be easy to remove in an emergency.



Cryogenic gloves

- Protection from liquid splashes
- Hide glove with knitted wrist
- Thinsulate™ lined
- One size
- Made to EN511 standards

19002017



Cryogenic gauntlets

- Protection from liquid splashes
- Silicone coated water repellent leather glove
- Double insulated
- Resists temperature down to -170°C
- Made to EN511 standards

42679 (size 9)
42680 (size 10)



Cryogenic ultra-cold gloves

- Protection from liquid splashes
- 4 sizes with 3 different lengths available
- Resists temperatures down to -190°C
- Made to EN511 standards

GLO/CM/S, GLO/CM/M, GLO/CM/L,
GLO/CM/XL Mid arm length (37cm)

GLO/CMES/S, GLO/CMES/M, GLO/CMES/L,
GLO/CMES/XL Elbow length (50cm)

GLO/CMXS/S, GLO/CMXS/M, GLO/CMXS/L,
GLO/CMXS/XL Shoulder length (60cm)

Eye protection

It is important to protect your eyes against accidental splashes. BOC highly recommends that suitable eye wear should offer side protection to the users.



- Safety glasses**
- Polycarbonate, anti scratch lens
 - Provides side protection to the requirements of EN166
 - Adjustable to give a comfortable fit

NO/T56555



- Safety goggles**
- Anti mist goggles
 - Top and side can be worn over prescription glasses
 - Adjustable strap

53132



- Face shields**
- Clear polycarbonate visor
 - Chin guard to give added protection from liquid splashes
 - Adjustable head band
 - Conforms to EN166
 - Replacement clear visor available

48695

56089 (replacement visor)

Body protection

- Cryogenic aprons**
- Protects against cryogenic splashes
 - 100% waterproof
 - Reversible
 - Adjustable straps

19219215 (size S)
19219216 (size M)
19219217 (size L)
19219218 (size XL)



BOC Healthcare

Customer Service Centre, Priestley Road, Worsley, Manchester M28 2UT, United Kingdom

Tel 08456 447 764, Fax 0845 087 0062, bochealthcare-uk@boc.com, www.bochealthcare.co.uk

The stripe symbol and the letters BOC are registered trade marks of The BOC Group Limited. Both BOC Limited and The BOC Group Limited are members of The Linde Group, the parent company of which is Linde AG. Reproduction without permission is strictly prohibited. © BOC Limited 2011