

# DryStore

Cryogenic preservation from BOC



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### Eliminate the risk of contamination from liquid nitrogen

→ DryStore refrigerators offer exceptional sample security and enhanced operator safety as the storage area is completely free of liquid nitrogen. Instead, the nitrogen is housed in a jacket surrounding the chamber. This means that temperatures down to  $-190^{\circ}\text{C}$  can be achieved while easy access is still allowed.

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### Peace of mind – your samples are safe

- You don't need to be an engineer to operate our state-of-the-art control systems! Sample status can be checked at a glance. Liquid nitrogen levels are topped-up automatically. Early warning alarms are clear and obvious.
- Furthermore, you can check your DryStore remotely and record the status of your samples minute-by-minute on any PC, giving a complete history of chamber conditions.

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### Help and advice at hand

- We understand how precious samples can be. So BOC offer an emergency engineering response, annual refrigerator servicing and DryCare, a full service package.

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### If you are building a new cryopreservation facility, choose BOC.

- We design and install bulk and mini-bulk liquid nitrogen storage and distribution systems. We also provide a suite of oxygen monitoring and emergency response equipment to ensure your facility is completely safe from Day One.



# Sample integrity

By housing liquid nitrogen in a jacket around the DryStore chamber, we have created a truly dry system.

## Keeping liquid nitrogen out of the storage chamber

Using liquid nitrogen for cooling brings risks if it is housed inside the storage chamber:

- Cross-contamination
- Risk of explosion: small pockets of liquid nitrogen can warm and expand rapidly as samples are removed from the chamber
- Risk to operators from splashes and cold burns

DryStore achieves temperatures down to  $-190^{\circ}\text{C}$  with no liquid nitrogen in the storage chamber.

## DryStore advantages

Features	Benefits
Liquid nitrogen housed in a jacket that surrounds the storage chamber	Cross-contamination risk minimised. Safety risks minimised. Achieves temperatures of $-190^{\circ}\text{C}$ without restricting chamber access.
Wide opening to sample storage area	Samples are easy to locate and retrieve. Vapour cloud rapidly clears Ideal for frequent access.
Temperature probe located at the top of the chamber, insulated from the chamber wall	Temperature is measured at one of the warmest points, ensuring all samples are safe, wherever they are in the chamber.
Fully automated liquid nitrogen top-up	Samples are maintained in specified conditions, hassle free. Manual top-up is also simple to do if needed.
Operates with liquid nitrogen supply from smaller cryogenic vessels or larger scale bulk containers	DryStore is a practical option whether you want a stand-alone vessel plus refrigerator, or a new addition to an existing liquid nitrogen distribution system.
State-of-the-art monitoring and control	Simple to operate, designed for peace of mind (see page 5).



*Pie packaging system in DryStore 12*

# The DryStore range

For small scale storage of segregated samples or where space is a premium, to large, centralised storage facilities, there is a DryStore refrigerator 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 refrigerator.

## Physical data

	External			Usable internal		Liquid nitrogen	
	Height (mm)	Width (mm)	Depth (mm)	Height (mm)	Diameter (mm)	Capacity (L)	Static evaporation* (L/day)
DryStore 8	1175	539	714	765	416	33	3
DryStore 12	1223	641	800	765	535	44	5
DryStore 23	1210	921	1070	760	787	74	9
DryStore 50	1445	1210	1425	870	1016	136	12

\*Evaporation rates are affected by usage patterns and contents of the DryStore.  
To get a more accurate evaporation rate specific to your usage please contact your Technical Specialist.

## Quality comes as standard

Each DryStore comes with its own performance test data. These show the temperature variation for the refrigerator with no liquid fills and when the lid is left open with no liquid fills. As well as in-house testing on each new refrigerator, DryStore has had its performance verified through independent testing.

## Medical devices directive

Where cryogenic refrigerators are used to store blood or body fluids for eventual administration, the Medical Devices Directive (Directive 93/42/EEC) Class IIa applies.

Fully compliant refrigerators are available featuring all the benefits of the DryStore range.



DryStore 23 (L) and DryStore 50 (R)

# Monitoring and control

Protecting the quality of your samples is paramount, so DryStore has been designed to provide the peace of mind that comes from visible sample security.

## Automatic filling

DryStore continually monitors its liquid nitrogen levels and tops up automatically when required. DryStore can also be configured to fill at a certain time each day in order to fit in with existing distribution systems. Manual filling is possible through simple stop/start switches.

## User interface

The DryStore system allows you to check the status of your machine at a glance. DryStore has:

- Large LCD screen showing the level and temperature clearly
- Graphic representation of the liquid level
- Graphic representation of vent and fill valves
- Written alarm indications
- A graphic heartbeat showing the electronics are active
- Switches for fill/stop and reset
- Date and time of last fill plus duration



## In-built protection

DryStore is an extremely secure environment, because of the attention we have paid to alarms and controls:

- High temperature alarm (above -150°C)
- Liquid nitrogen high and low-level alarms
- Excessive fill-time alarm
- Battery back-up of user interface
- Optional battery back-up of entire system
- Two solenoid fill valves – one functions purely as a safety back-up
- Fill cut-off if an attempt is made to manually fill above a safe level

## Remote monitoring

DryStore can be configured to dial several telephone numbers in the event of an alarm, with pre-recorded messages communicating the information. In addition, DryStore can be interrogated remotely by phone or PC to verify status.

## Data output

In many applications, a full record of a sample's history is vital in order to assure its viability, so a complete audit trail should always be available. When this level of rigour is required, DryStore is the perfect solution.

Bespoke data capture software has been developed for DryStore which records the status history of your refrigerator on your PC. The locally installed software can be configured to enable remote monitoring of DryStore's performance via the internet.

### Data logged every minute:

- Liquid nitrogen level
- Temperature
- All alarms
- Vessel filling

The software is compatible with various other makes of refrigerator. DryStore software can therefore be used with existing cryopreservation units.

Feature	Standard	Optional
Automatic filling	✓	
User interface	✓	
Alarm systems	✓	
Interface battery back-up	✓	
System battery back-up		✓
Dual solenoid	✓	
Remote telephone monitoring		✓
Automatic emergency phone calls		✓
BMS/HyperTerminal compatibility	✓	
Data capture software		✓
Gas vent (purge)		✓



# Service and support

Your DryStore is installed, you're up-and-running, but that's just the start of the service...

DryStore is simple to operate, but given the value of the samples you store, a new refrigerator can be a daunting prospect. When you buy a DryStore, you can count on BOC service.

## Dedicated service line

A direct phone number connects you to our cryopreservation experts. They will assess any problem and decide the best way to resolve it. That could mean guiding you through a process over the phone, or an engineer visit to your site the following day (free-of-charge in the first year of warranty). Critical calls are answered 24 hours a day, 365 days a year.

## Annual health check

We recommend that your DryStore is checked once every year and this can be arranged through BOC. We will visit your site and carry out a range of mechanical and electronic tests to ensure everything is in top condition.

## DryCare service package

Through our DryCare package, you can continue to receive on-site, next-day engineer response for critical situations after the first year of ownership via our 24 hour helpline. Where your samples are not at risk, but a visit is still required, we will be with you within three working days. Telephone support and advice are included, and the Annual Health Check too.

## On site training

Where additional staff need to use DryStore, or the operating personnel change, there may be a requirement for further training. This can be arranged through BOC and will be delivered by our cryopreservation experts.



## Turnkey solutions

No-one has more experience in designing and developing cryogenic applications, equipment and services than BOC.

A new cryopreservation facility involves more than just the purchase of DryStore refrigerators.

- Where will the liquid nitrogen be delivered?
- How will the liquid nitrogen be stored and in what volumes?
- Who will install the liquid nitrogen distribution systems?
- What are the safety implications of using liquid nitrogen?
- Who will install the appropriate monitoring and emergency response equipment?

## In-depth expertise

Our engineers have unrivalled experience in working with customers and architects, designing and installing cryopreservation facilities in the UK, Ireland and beyond.

Involving our experts early in the planning process will ensure your facility is safe, efficient and fit for purpose. We can project manage the design and installation of the complete facility from liquid nitrogen delivery point to DryStore.

## Gas monitoring and safety systems

If liquid nitrogen is to be used in a confined space, oxygen monitoring equipment should be installed as a matter of course. BOC can supply and install oxygen-monitors, alarms and emergency response equipment for your site.

## Tailored installations

From bulk tanks of liquid nitrogen for large cryopreservation facilities, to smaller cryogenic vessels connected to a single refrigerator, BOC has the right supply for you. Security of supply, expert service and trouble-free installation: this is why customers turn to BOC to supply liquid nitrogen systems for cryopreservation.



## Related products

For further information on the products below, please contact BOC or visit [www.BOCOnline.co.uk](http://www.BOCOnline.co.uk)

### Racking systems

A range of racking systems has been designed for DryStore. Storage solutions for all common sample types are available.

### Basic liquid refrigerators

For storage of a smaller number of straws or vials, where liquid nitrogen contact is not a problem, BOC offer a range of small liquid refrigerators.

### Dry shippers

Dry shippers are Dewars that are designed for the safe shipment of specimens at liquid nitrogen temperatures without the risk of spilling liquid nitrogen. When prepared correctly a dry shipper does not contain any free liquid nitrogen.

### Flasks, dewars & accessories

A range of equipment for handling and dispensing small quantities of liquid nitrogen in the laboratory environment is available from BOC. Visit [www.BOCOnline.co.uk](http://www.BOCOnline.co.uk) to see the product range available.

### Personal protective equipment

When working at cryogenic temperatures, appropriate eye and hand protection must be worn as a minimum. Visit [www.BOCOnline.co.uk](http://www.BOCOnline.co.uk) to see a range of personal protective equipment selected for liquid nitrogen use. For other laboratory safety products, from lab coats to disposable gloves, visit [www.bocsafetyproducts.co.uk](http://www.bocsafetyproducts.co.uk).

### Oxygen monitoring

BOC offer a range of off-the-shelf modular and stand-alone oxygen monitors and alarms. As well as wall-mounted equipment, personal oxygen monitors are available that clip onto clothing. If more complex systems are required, BOC's experts will be able to design and, if required, install this for you.

#### UNITED KINGDOM

To be put in touch with someone who can tell you more about DryStore, call BOC on

**0161 930 6010**

Or for general enquiries about cryogenic gas supply, call our BOC Customer Service Centre.

**0800 111 333**

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