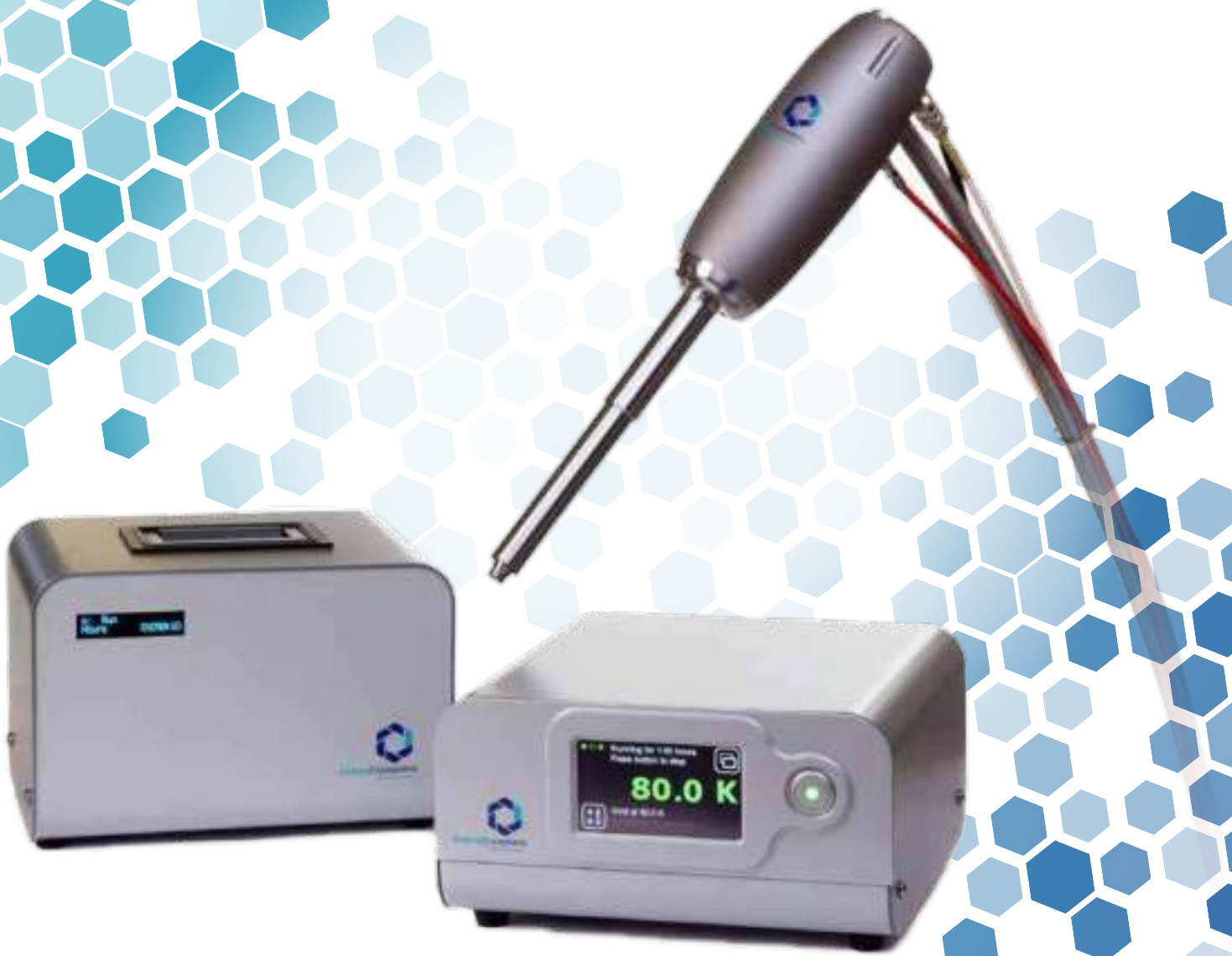
The 800 series Cryostream



OxfordCryosystems

The 800 series Cryostream

Thirty years after the invention of the first Cryostream Cooler, Oxford Cryosystems launched the 800 series Cryostream. This version is now available with an integrated Autofill system, making manual Dewar refills a thing of the past.

The 800 series is the fourth generation of the Cryostream, and is built on an extensive platform of expertise and experience gained since the first model was built in the Clarendon Laboratory, University of Oxford.

The system has evolved dramatically over that time, but we'd like to think that the 800 series holds true to the values of the very first Cryostream cooler; to offer true reliability, ease of use and low cost of ownership.

We've ensured that the system offers low cost of ownership by retaining the low nitrogen consumption rates for which it has become known (half the liquid consumption of some alternative systems), and have also improved service intervals so that maintenance is minimal.

Specific improvements to the new Cryostream 800 include an entirely new control interface with touch screen, offering an additional web-based control and monitoring service. This allows a user to switch the Cryostream on before leaving home in the morning, or to receive an email alert if the temperature changes for any reason.

The space-saving 800 series coldhead now integrates the shield gas feed, offering more uniform integration on all commercially available X-ray equipment.

Mode of Operation

Whether 800 series, Plus or Compact, all Cryostream systems have the same unique mode of operation, allowing the systems to offer faster cool-down, higher stability, lower LN2 consumption and superior laminar flow than other systems.

The silent pump is responsible for the gas flow from an unpressurised Dewar, through a flexible vacuum insulated transfer line, into the Cryostream coldhead.

Once inside the coldhead, the liquid nitrogen passes through a heater, which evaporates most of the liquid into vapour. This vapour then flows outward along one path of the heat exchanger, through the temperature controller, to arrive at the inlet of the pump at approximately 10 K below room temperature.

The flow rate of the gas from the pump is regulated by a variable flow controller. This gas flows back into the Cryostream coldhead where it is re-cooled along the second path of the heat exchanger. The gas temperature is then regulated by a heater and sensor before entering the nozzle of the Cryostream. The gas then flows along the isothermal nozzle and out over the sample. The temperature indicated on the Controller is a mapped temperature for the crystal position.

The default Cryostream gas flow rate is 5 L /minute, which equates to roughly 0.6 L of liquid nitrogen per hour. This means that a 60 litre Dewar will last for up to 4 days so can easily be run over a weekend without refilling.

Turbo mode gives an increased flow rate of 10 litres/ minute if required.

Features of the 800 series Cryostream

- Best available temperature range of 80- 500K
- Highly laminar gas flow system avoiding ice formation
- Proven stability in excess of 0.1 K
- On-line and local data logging, monitoring and control
- Optional integrated Autofill system
- Fast cool-down to 100 Kelvin in just 20 minutes
- Low & constant LN2 consumption of 0.6 L/ hour* means a 60 litre dewar can last up to 4 days
- Highly accurate mapping of temperature at crystal position

*At temperatures < 90 K, LN2 consumption may increase to 1.2 L/hour

What's New?

The 800 series controller offers an ergonomic design with a touch screen, and comes with USB and ethernet ports, allowing all users to monitor and control their system via our web interface, Oxford Connect.

The new gas pump gives silent long-term performance. The colour screen indicates the hour count and status, for easy checking or diagnosis.

The sleek new 800 series coldhead is more than just an aesthetic upgrade. All services now enter the head at 90 degrees to the nozzle, saving a full 10cm of space from the nozzle to the top of the head- perfect for smaller enclosures or where space is at a premium.

The new Varibeam stand combines strength and rigidity with flexibility and low weight to give precision alignment of the cold nitrogen gas stream. The Varibeam can be adjusted to suit almost all known diffractometer configurations.

The 800 coldhead now incorporates a shield gas channel, so that the dry air or nitrogen shield gas is introduced at the top of the head, not close to the nozzle. Again, an ergonomic upgrade that will make the Cryostream easier than ever to integrate with any X-ray system.

Cryostream peripherals

AD61 Dry Air Unit

As with any open flow low temperature device, it is crucial to shroud the cryogenic nitrogen gas stream in a second dry gas stream to prevent atmospheric moisture from freezing on the crystal. The combination of this outer and inner stream is called the Laminar Flow System. When the flows are balanced, the outer stream protects the inner nitrogen stream and avoids ice formation at the sample.

The Oxford Cryosystems' AD61 is used to provide dry air for the outer gas stream. Using dry air rather than nitrogen means the 800 series uses significantly less liquid nitrogen than other low temperature systems. The pressure from the AD61 also ensures a good barrier between the nitrogen cold stream and the air of the laboratory. This pressure is vital to avoid the unwanted build up of ice on the sample.

The AD61 offers:

- Variable flow up to 25 litres / minute
- Dry air with a dew point of better than -60°C
- Long service intervals (12,000 hours between service)

ES60 Dewar

This 60 litre Dewar has been commissioned by Oxford Cryosystems to provide the optimal capacity for the 800 series Cryostream. The volume allows uninterrupted running of the Cryostream for up to 4 days, meaning it can be left running over a weekend. The ES60 is the perfect depth for the transfer line, meaning that all of the nitrogen in the Dewar can be used, and has a neck opening of 5cm, minimising nitrogen boil-off.

Autofill

The 800 series Cryostream is now offered with an integrated Autofill system, which comprises:

- Cryostream coldhead and all associated components
- Autofill-ready 800 series controller
- Level probe and oscillator box
- Solenoid valve and cross-piece
- All Autofill hoses and cables.

The integrated Autofill option means that simply by using the Cryostream 800 controller, the user will be able to:

- View the remaining level of liquid nitrogen in the 60L Dewar vessel
- Set the Autofill system to fill the 60 L Dewar once the level falls to a predetermined minimum and stop at a safe maximum, (20% and 80% of the length of the capacitance probe)
- Set the Autofill system to fill the 60 L Dewar at a convenient timed interval, for example, once every 24 hours
- Refill the Dewar manually if required, by setting the Autofill to Monitor mode, and monitoring the liquid level on the controller.
- Use Cryoconnector and Oxford Connect options to remotely monitor liquid levels via the web and receive warnings if the level falls below a predetermined set point*

The Cryostream with integrated Autofill system is easy to assemble, and will arrive pre-calibrated and optimised for the standard 60L Cryostream Dewar.

* For reasons of safety, it is not possible to activate the flow of liquid nitrogen from a remote location

Technical Specifications

800 series Cryostream	
Temperature range	80-400 Kelvin (or 80-500 Kelvin for 800 series Plus)
Liquid nitrogen consumption	0.6 litres/hour at 5 litres/minute gas flow
Temperature stability	0.1 Kelvin
Cool down time to 100 Kelvin	20 minutes
Length of flexible transfer line	1500 mm (standard) or 3000 mm (special configuration)
Cryostream controller	
Dimensions & weight	263 mm W x 141 mm H x 299 mm D
Mains Power supply	100- 240 V, 50/60 Hz
Power Consumption	500VA
800 series gas pump	
Dimensions & weight	263 mm W x 184 mm H x 272 mm D
AD61 Dry Air Unit	
Dimensions & weight	660 mm W x 415 mm H x 300 mm D, 42 kg
Mains Power supply	230V 50Hz or 100/115V 50/60Hz
Power Consumption	750VA
Varibeam Support Stand	
Max. table to sample height (Cryostream vertical)	600 mm
Max. horizontal distance to sample from Varibeam column	430 mm
Weight	7 kg
ES60 Dewar vessel	
Volume	60 litres
Construction	welded stainless steel
Overall height	725 mm
Overall diameter	457 mm
Internal depth	650 mm
Weight empty	36 kg
Weight full	Approx 96 kg
Neck size	NW50 KF fitting 50mm bore

Support for all our customers…

Aside from our development expertise, Oxford Cryosystems have also gained an excellent reputation amongst our global users for customer service and support.

Whilst Oxford Cryosystems' products are known for their reliability and ease of use, users may occasionally require advice on technical aspects of their system. Technical support is offered to all Oxford Cryosystems customers on all products. There are no time limits, no expensive telephone numbers and no small print. If you need support, you'll get it - it's that simple!

Service when you need it...

Oxford Cryosystems design our low temperature devices to be as efficient and economical to maintain as possible, and the 800 series Cryostream is a prime example of this philosophy. The minimal servicing that is required can be done easily by the user. Alternatively we are happy to offer service work at our UK site or can offer site visits by an Oxford Cryosystems engineer.

For further details on the service packages we offer, simply contact your local Oxford Cryosystems office or agent.

The Oxford Cryosystems Philosophy

When you buy a product from Oxford Cryosystems, you are investing in over thirty years of research and development in low temperature devices for X-ray crystallography. We see your low temperature device as more than just an accessory; to us, it is central to your research.

Because of our focus on low temperature systems, you will find that every one of our products has superior functionality, reliability and control. All of our low temperature devices are built on a unique proprietary software platform which allows the constant monitoring of up to 14 different parameters. The controller manages a number of unique relationships such as gas temperature as a function of flow or cooling power as a function of vacuum quality.

A perfect example of our superior engineering is the unique gas delivery nozzle design which is used by both the 800 series Cryostream and Cobra. Experience and development have led us to create the ideal laminar flow system ensuring that the likelihood of ice forming anywhere near the sample is virtually zero, and that the temperature at the crystal is accurately mapped and very stable.

These are just a few of the many unique design features engineered into all Oxford Cryosystems' low temperature devices. We take great pride in taking our product development that bit further, so that our customers benefit from the most stable, reliable and efficient devices available.

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