

Low temperature cryostat for powder diffraction





PheniX

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The Phenix is a unique closed cycle cryostat especially designed for cooling flat plate powder samples to temperatures as low as 12K.

The system incorporates a small and efficient Oxford Cryosystems 2-stage Gifford McMahon (GM) cooler, which allows fast and controllable cooling with no consumption of cryogens such as helium or nitrogen. The PheniX offers excellent stability of 0.1 K, and fast cool-down and warm-up times for easy access and sample change.

Typical applications include:

- Investigation of materials at low temperature including organics, inorganics, drugs, minerals, metals and ceramics.
- Phase identification, quantitative analysis and determination of structure imperfections
- Determination of crystal structures & extraction of 3-D microstructural properties

The PheniX is designed to fit to vertical powder diffractometers and be used in both the theta - theta and theta - 2 theta modes. This is made possible by a uniquely designed rotating seal between the integrated GM Cryocooler and the sample stage. This allows the sample stage to move in the theta - 2 theta range of the detector without the high pressure hoses and cables becoming tangled up or interfering with other services in the enclosure.

The compact design means the PheniX can be easily fitted to the goniometer from the front with a specific adapter plate available for most popular types of goniometer.

Features of the PheniX

- Incorporates two stage Oxford Cryosystems GM Cryocooler, so no consumption of cryogens
- Base temperature of 12 K and excellent stability of 0.1 K
- Fast cool-down to 20 K in just 40 minutes and 12 K in 60 minutes
- Fast warm-up to room temperature from 12 K in just 45 minutes
- Compact chamber allows easy sample access and can be fitted to most popular vertical goniometers
- Complete programmability and ability to monitor and control remotely via Cryoconnector software and Oxford Connect website

Mode of Operation

A two stage Gifford McMahon (GM) closed cycle cooler made by Oxford Cryosystems is mounted within the body of the PheniX and operates using compressed helium gas provided by the Cryodrive compressor. It is important to note that there is no helium gas consumption in this system and the helium gas circuit in the Cryodrive/Coldhead combination is sealed.

The sample is cooled by the conduction of heat between the sample stage and the cold stages of the Coldhead, and the PheniX sample temperature is measured at the sample stage.

Heat leaks within the PheniX are reduced by a radiation shield incorporating mylar windows, and the robust PheniX lid incorporates X-ray transparent windows of Kapton.

A number of 20mm diameter chromium plated copper sample stages are provided with the PheniX system, however different materials may be available at an additional charge.

A vacuum system (optionally supplied) is used to continuously pump the vacuum space around the PheniX internals and the rotating seal to minimise unwanted heat leaks into the system.

Goniometer Mounting Plate

Oxford Cryosystems has worked with major X-ray companies to design a number of goniometer mounting plates, optimised for use with various X-ray systems. Please discuss the best option with your local office or agent before ordering the system.

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. We know that if your low temperature system were to let you down, then we would have let you down.

Because of our focus on low temperature systems, you will find that every one of our products has superior functionality, reliability and control. For example, the PheniX is built on a unique software platform which allows the constant monitoring of a wide range of inputs and outputs within the system. The controller then manages a number of unique relationships such as sample temperature as a function of coldhead motor speed.

Oxford Connect

The PheniX now incorporates our Oxford Connect feature. By using our Cryoconnector software and registering your system on Oxford Connect, you will be able to:

- Start, program and stop your Oxford Cryosystems device from your PC, tablet or smartphone
- Easily access historical performance data on the Oxford Connect website
- Enable remote technical assistance, allowing faster support of your device
- Receive email notifications when your device status changes



Technical Specifications

PheniX		
Temperature range	12-290 Kelvin	
Temperature stability	0.1 Kelvin	
Cool down time to 20 Kelvin	40 minutes	
Cool down time to 12 Kelvin	60 minutes	
PheniX coldhead dimensions & weight	120 mm W x 302 mm L x 259 mm H, 6 kg	
PheniX window materials	PheniX lid incorporating Kapton windows Mylar Radiation shield	
PheniX sample mounts	2 x 20 mm diameter Chromium-plated copper flat sample holder 2 x 20 mm diameter Chromium-plated copper sample holder with 1 mm recess	
PheniX Controller		
Dimensions & weight	263 mm W x 141 mm H x 299 mm D, 7.1 kg	
Mains Power supply	100-240 V, 50/60Hz	
Power Consumption	500VA	
K450 Helium Compressor		
	Electrical requirements	
	50 Hz	60 Hz

	50 Hz	60 Hz	
Supply Voltage	200 – 240 V	208 – 230 V	
Operating Current	17.0 A (@240 V)	15.7 A (@230 V)	
Operating Power	3.4 kW (@ 240 V)	3.6 kW (@230 V	
Supply Fuse Rating	20 A (Starting current: 65 A)		
Weights and Dimensions	639 mm H x 610 mm D x 540 mm W, 100 kg		
Water Cooling Requirements	Chiller requirement of 3.0 kW, Typical flow rate 5l/min at 18°C		
Turbomolecular Vacuum Outfit (ontionally supplied)			

Dimensions & weight 510 mm W x 740 mm H x 360 mm

Mains Power supply

510 mm W x 740 mm H x 360 mm D 220/240V 50/60 Hz or 115V 50/60Hz

Support for all our customers...

Aside from our development expertise, Oxford Cryosystems have also gained an excellent reputation over the past thirty years 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...

Although Oxford Cryosystems design their devices to be as efficient and economical to maintain as possible, products such as the Phenix, due to its mechanical components, will need reasonably regular maintenance.

Therefore, Oxford Cryosystems offers a choice of pre-paid scheduled maintenance packages for complete peace of mind, or the more traditional reactive servicing approach. Whatever route you choose, you can be assured that we will advise you of the optimal service intervals. We simply don't believe in annual servicing for the sake of it - if your product needs servicing only every 2 years, or even every 3, we will tell you! For further details on the service packages we offer, simply contact your local Oxford Cryosystems office or agent.



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