

# MICROSTAT

## Microstat™ Product Family

Optical cryostats for microscopy

NEW LOOK • NEW FEATURES • NEW ACCESSORIES • NEW SOFTWARE




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INSTRUMENTS

*The Business of Science®*

# Which **Microstat** is right for you?

The **Microstat** range of optical cryostats has been specifically designed to provide a wide temperature range (from 2.2 K up to 500 K) while allowing excellent optical access and short working distances required for microscopy applications. These cryostats easily integrate with commercial microscopes and spectrometers.

The **Microstat** model of choice will depend on the base temperature and level of mechanical stability required for your experiments and whether or not you need a magnetic field. If our standard range doesn't suit your requirements, Oxford Instruments can also provide you with tailored solutions.



	<b>MicrostatN2</b>	<b>MicrostatHe2</b>	<b>MicrostatHires2</b>	<b>MicrostatMO2</b>
<b>Cooling medium</b>	Liquid nitrogen	Liquid helium or liquid nitrogen	Liquid helium or liquid nitrogen	Liquid helium
<b>Temperature range</b>	77 - 500 K	2.2 - 500 K	2.7 - 500 K	6 - 300 K
<b>Temperature stability</b>	± 1 K	± 0.1 K	± 0.1 K	± 0.1 K
<b>Magnetic field</b>	NA	NA <sup>1</sup>	NA <sup>1</sup>	5 T
<b>Cooldown time</b>	< 10 min	< 10 min	< 15 min	4 hours
<b>Sample space diameter x height (mm)</b>	20 x 2	20 x 5	20 x 5	11 x 11
<b>Working distance<sup>2</sup> (mm)</b>	2	4.5 to 5.5 8 for rectangular tail	2.2 to 5.7	8.5
<b>Vibration (vertical)<sup>3</sup></b>	< 0.1 µm	< 0.1 µm	< 20 nm	< 20 nm
<b>Lateral sample holder drift at constant temperature<sup>3</sup></b>	< 1 µm / hour	< 1 µm / hour	150 nm / hour	< 4 nm / min
<b>Cryogenic consumption (L/hr) at 4.2 K for helium at 80 K for nitrogen</b>	< 0.5 (nitrogen)	< 0.45 (helium)	< 0.75 (helium)	2 (helium)

For full details see product page.

**Note 1:** Rectangular tail **MicrostatHe2** and **MicrostatHires2** pillared version are suitable for use with an electromagnet.

**Note 2:** Working distance defined as the distance from the sample holder to the window top surface

**Note 3:** The stability will be dependent upon the final system's configuration and the environment that the equipment is used in.

## Microstat family

# MICRO

## The **Microstat** system

### Full system integration and control

With the new Mercury electronics and Oxsoft IDK software, you have new levels of control! Find out more at [www.oxinst.com/mercury](http://www.oxinst.com/mercury)

#### System components designed for optimum cryostat performance

##### **NEW** Transfer tube (helium cryostats only):

It plays an important part in the overall helium consumption and base temperature capability of helium cooled cryostats.

Oxford Instruments Low Loss Transfer tubes (LLT) use the cold gas exiting the cryostat to cool the shields surrounding the incoming liquid within the transfer tube. As a result, the consumption of our cryostats is the lowest on the market, dramatically reducing your running costs.

We can also offer an extra flexible transfer tube for those with restricted space in their labs. Please note that as this does not use the gas cooled mechanism, helium consumption will be higher than for the LLT range. However it will be well suited to those who need a lightweight and more flexible transfer tube.

##### **NEW** Gas flow controller

The new VC-U gas flow controller now includes the nitrogen and helium flow meters as standard.

#### **NEW** Intelligent cryogenic environment controller

Easy monitoring and control of the sample stage

The **Mercury**iTC controller combines several instruments into one allowing temperature control at the heat exchanger and gas flow control as well as an extra sensor channel for thermometry measurement directly at the sample stage. Everything can be accessed through touch screen front panel or remotely via Labview compatible Oxsoft IDK software.

**Example MicrostatHe2:** You can control the temperature with a sensor and heater at the heat exchanger, monitor and control the gas flow, AND have an extra sensor channel to measure sample temperature.

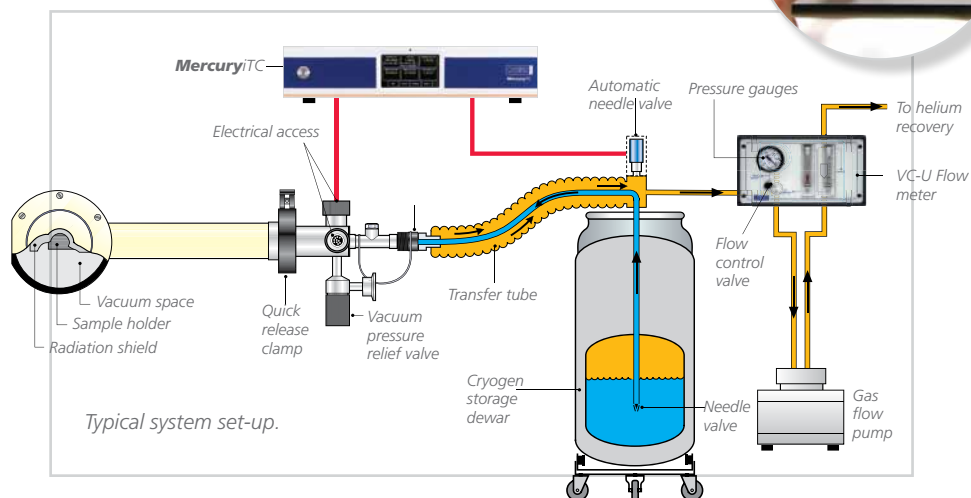
#### **NEW** Magnet power supply

Best in class stability performance and optimised for accuracy and low noise

The **Mercury**iPS is used to energise the magnet of the **Microstat**MO.

#### **NEW** Oxsoft IDK instrument development kit software

With the new Oxsoft IDK, you have new levels of control. You can design remote control and configuration programs and integrate your system into your preferred experiment control architecture.



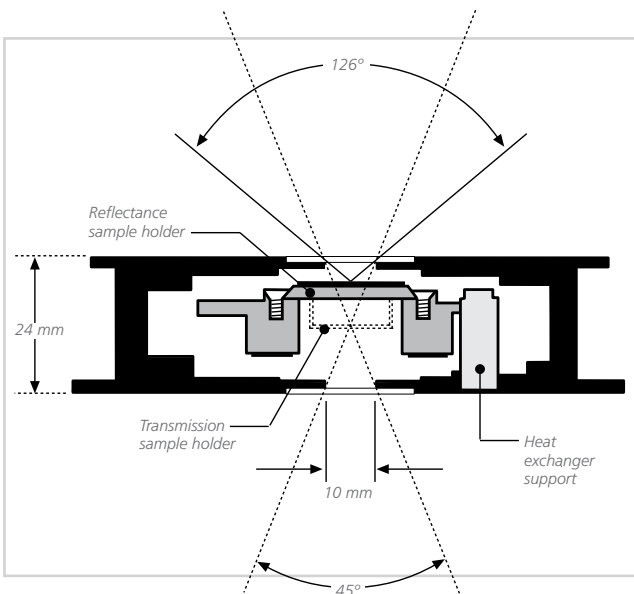
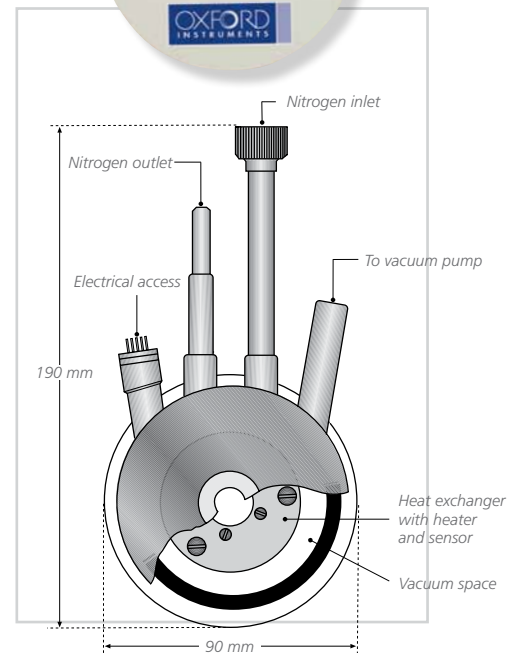
# MicrostatN2

## Compact nitrogen cooled

New look! Lower base temperature! Reduced nitrogen consumption!

This cryostat has been designed for experiments requiring liquid nitrogen temperatures. It is very compact and lightweight and only requires a compact nitrogen container which is very convenient when space is limited.

- Wide temperature range: from 77 K to 500 K
- Extremely compact: 90 mm diameter by 24 mm thickness. Only 400 g!
- Economical use of cryogenics: less than 0.5 L/h
- Quick cooldown: 80 K in less than 10 minutes
- Adjustable sample holders accommodate samples up to 8 mm thickness
- Easy integration into commercial microscopes facilitated by its compact size and short working distance (as low as 3 mm). Interface plate available as option for attaching the **MicrostatN2** directly onto microscope translation stage
- Suitable for reflection and transmission experiments via choice of sample holders
- Electrical measurements via 4-pin electrical feed wire to heat exchanger



Schematic cross-section view of **MicrostatN2**. Note the window aperture and angles of admittance for 0.5 mm thick windows.

### Two sizes of windows to choose from depending on sample sizes:

Optical Specifications	Reflectance	
	0.5 mm	1.5 mm
Window thickness	0.5 mm	1.5 mm
Clear access diameter	10 mm	25 mm
Sample holder to window top surface	3 mm	3 mm
Angle of admittance (to surface of sample holder at centre)	126 °	160 °
Max sample thickness	2 mm	1 mm
Max sample diameter	20 mm	20 mm

**Note:** All dimensions are approximate and relate to the top window with plain sample holder.



# MicrostatHe2

## MicrostatHe2 Rectangular tail

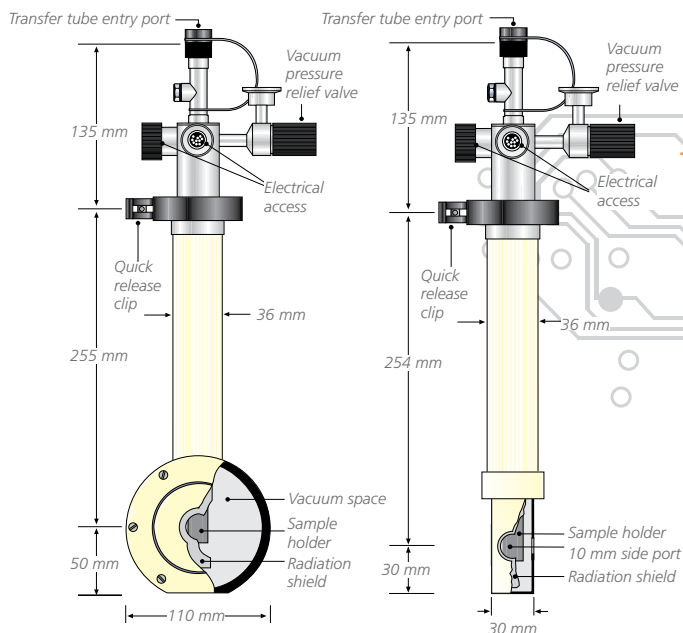
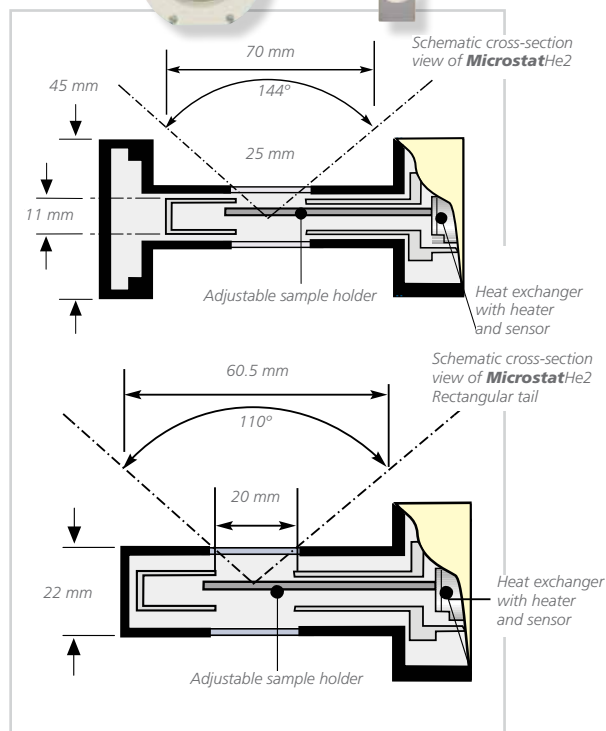
Multi-experiments,  
helium cooled

Lowest helium  
consumption and fastest  
cooldown on the market



This helium cryostat is well suited for experiments requiring a low temperature environment and which can evolve in the future due to its flexibility.

- Wide temperature range: 2.2 K to 500 K
- Easy integration into commercial microscopes facilitated by its compact size and short working distance (as low as 4.5 mm). Interface plate available as option for attaching the **MicrostatHe2** directly onto microscope translation stage
- Economical use of cryogens: the lowest consumption on the market using only 0.45 l/hr at 4.2 K
- Rapid cooldown time: 4.2 K in less than 10 minutes!
- Suitable for reflection and transmission experiments via choice of sample holders
- Adjustable working distance via sample holder. Can be adjusted to less than 3 mm
- Interchangeable tail between the **OptistatCF-V**, **MicrostatHe2** and **MicrostatHe2 Rectangular tail**
- Can be used with liquid nitrogen
- Electrical measurements via 10-pin electrical feed wire to heat exchanger. Optional coaxial cables



MicrostatHe2 and MicrostatHe2 Rectangular tail dimensions.

Cryostat	MicrostatHe2		MicrostatHe2 Rect. tail
	Window thickness	0.5 mm	1.5 mm
Clear access diameter	10 mm	25 mm	20 mm
Sample holder to window top surface	4.5 mm	5.5 mm	8 mm
Angle of admittance (to surface of sample holder at centre)	102 °	144 °	110 °
Max sample thickness	5 mm	5 mm	4 mm
Max sample diameter	20 mm	20 mm	20 mm

# MicrostatHires2

## High resolution helium cooled

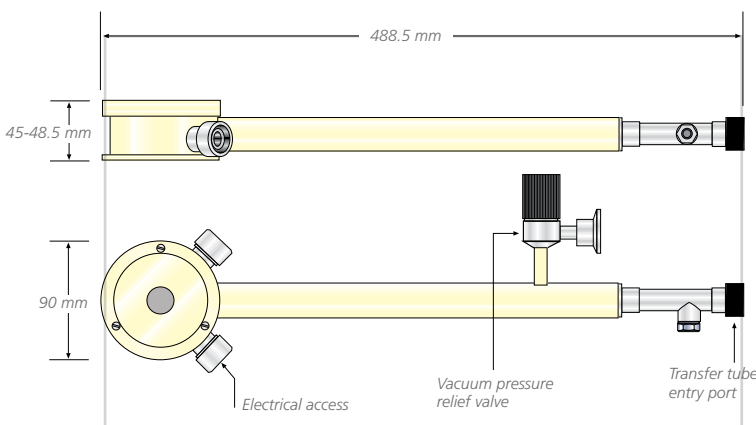
The lowest vibration microscopy cryostat on the market

This cryostat has been designed to minimise vibration and sample drift at stable and constant temperatures. This is achieved by cooling the sample on a stable cold platform rather than a cold finger and feeding the helium to the heat exchanger via a capillary thus isolating the helium flow vibration. The **MicrostatHires2** is particularly well suited to sensitive applications such as micro-photoluminescence mapping of semiconductor microstructures with sub-micron spatial resolution.

- Wide temperature range: from 2.7 K to 500 K
- Low sample drift: 0.15  $\mu\text{m}$  per hour (typical) at 4.2 K enabling measurements over many hours. 13  $\mu\text{m}$  (typical) cooling from 300 K to 4.2 K
- Low sample vibration: < 20 nm typical
- Extremely short working distance of 2.2 mm enabling the use of high magnification optics
- Adjustable top flange (3.5 mm adjustable distance) enabling samples of different thicknesses
- Rapid cooldown time: 4.2 K in less than 15 minutes!
- Easy integration into commercial microscopes facilitated by its compact size. Only 90 mm diameter by 45 mm thickness. Lightweight 1.5 kg only
- Economical use of cryogens: the lowest consumption on the market using only 0.75 l/hr at 4.2 K
- Suitable for reflection and transmission experiments via choice of sample holders
- Experimental flexibility: may be operated in any orientation
- Electrical measurements via 10-pin electrical feed wire to heat exchanger. Optional coaxial cables



Pillared version available as an option for use with electromagnets.



Optical Specifications	Reflectance	
Window thickness	0.5 mm	1.5 mm
Clear access diameter	10 mm	25 mm
Sample holder to window top surface	2.2 mm	2.2 mm
Angle of admittance (to surface of sample holder at centre)	142 °	166 °
Max sample thickness	5 mm	4 mm
Max sample diameter	20 mm	20 mm

All dimensions are approximate and relate to top window with plain sample holder in central position.

## MicrostatMO2

### System for high resolution magneto-optical measurements



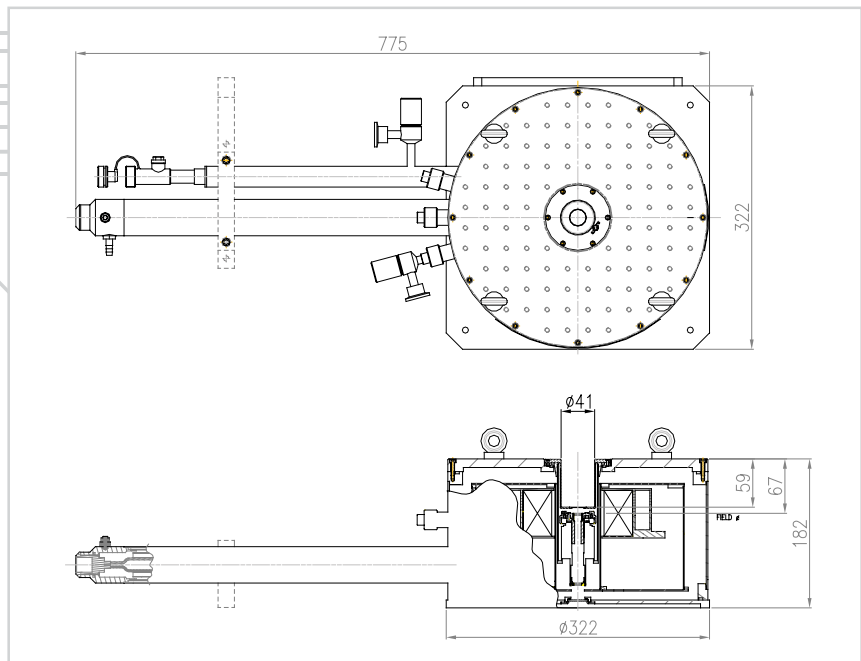
Improved 300K operation

The **MicrostatMO2** is a compact stable cryostat, which provides a cryogenic environment (6 K) ideal for sensitive optical and electrical measurements in magnetic field (up to 5 T).

- Wide temperature range: from 6 K to 300 K
- Magnetic field up to 5 T, satisfying the majority of spectroscopy applications
- Low sample drift: typically 4 nm/min
- Low sample vibration: < 20 nm typical
- Short working distance of 8.5 mm enabling the use of high magnification optics
- Can be operated horizontally or vertically, providing flexibility for setting-up the experiment
- Designed for easy integration of optical components on the cryostat top plate
- Can be used for reflection and transmission measurements
- Minimum downtime: Convenient continuous operation including improved 300 K operation
- Quick sample change using a demountable sample holder. Two options are available: a copper sample platform for lower base temperature or a sapphire platform for optical transmission measurements
- System can be cooled using a pressurised liquid helium dewar for convenient operation with minimum vibration
- Mounting bracket supplied to clamp the cryostat to the bench thus reducing vibrations introduced by the transfer tube

#### Typical applications:

- Flux visualisation of superconducting materials. 5 T magnetic field extends the range of samples that may be studied to include materials with strong flux pinning
- Electrical transport measurements using very small currents for nanoscale samples, quantum devices and nano-devices
- Measurement of dimensional changes of magneto-restrictive materials



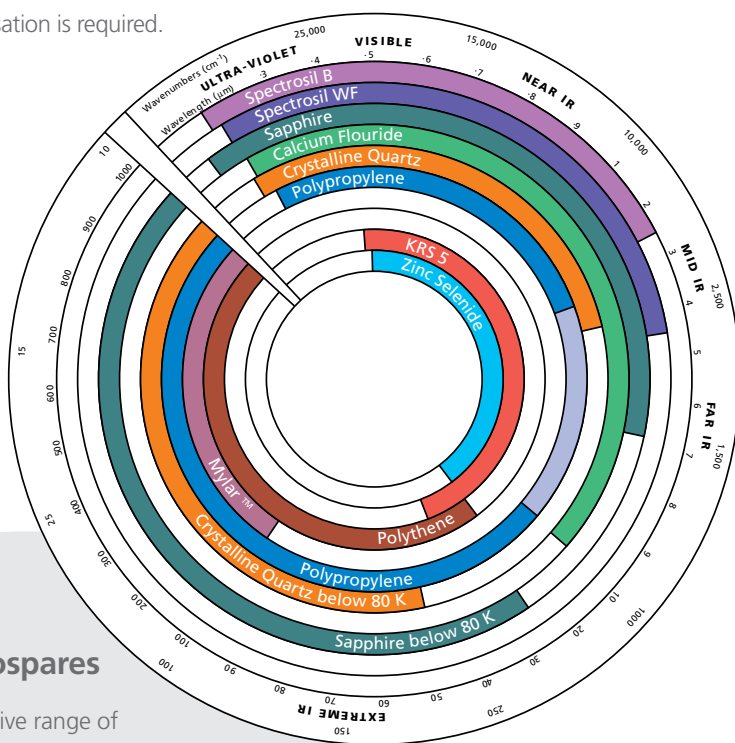
# MICRO

## Cryogenic spares and accessories

### Extensive choice of windows to suit your experiment's needs

**Microstat** cryostats are used in experiments where the samples must be irradiated or measurements made on emitted radiation from such samples. It is, therefore, essential that appropriate windows can be incorporated into your cryostat to permit radiation to pass through the sample space. In **Microstat** cryostats, the windows are glued and the materials selected will be determined by the wavelength and intensity of the radiation and whether or not beam polarisation is required.

- Spectrosil B
- Spectrosil WF
- Sapphire
- Calcium Fluoride
- Crystalline Quartz
- Polypropylene
- KRS 5
- Zinc Selenide
- Polythene
- Mylar™
- Crystalline Quartz below 80 K
- Sapphire below 80 K



### OIDirect Cryospares

We offer an extensive range of accessories for your cryostats. Please visit [www.cryospares.com](http://www.cryospares.com) to find out more.

[www.oxford.instruments.com/microstat](http://www.oxford.instruments.com/microstat) for more information

### Oxford Instruments NanoScience

For more information please email: [nanoscience@oxinst.com](mailto:nanoscience@oxinst.com)

#### UK

Abingdon, Oxfordshire  
Tel: +44 1865 393 200

#### China

Shanghai  
Tel: +86 21 6490 8280

#### Germany

Wiesbaden  
Tel: +49 6122 937 171

#### Italy

Pieve Emanuele, Milan  
Tel: +39 335 7378794

#### Japan

Tokyo  
Tel: +81 3 5245 3261

#### USA

Concord, MA  
Tel: +1 978 369 9933

[www.oxford-instruments.com](http://www.oxford-instruments.com)

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