

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

Our easy to use, compact and efficient **Optistat** cryostats offer a wide range of options to suit most spectroscopy applications. They provide a wide temperature range (from 2 K up to 500 K) while providing excellent optical access.

The **Optistat** model of choice will depend on the base temperature, cooling technology and sample environment required for your experiments.

### Typical applications:

- UV/visible reflectivity & absorption
- FTIR spectroscopy
- THz spectroscopy
- Photoluminescence
- Electroluminescence
- Raman scattering
- Electrical transport measurements
- Photovoltage/current
- Ultrafast spectroscopy

	Temperature range	Cooling technology	Sample environment
<b>OptistatCF</b>	2.3 – 500 K	Helium or nitrogen	Static or dynamic exchange gas
<b>OptistatCF-V</b>	2.3 – 500 K	Helium or nitrogen	Vacuum
<b>OptistatDN</b>	77.2 – 500 K	Nitrogen only	Static exchange gas
<b>OptistatDN-V</b>	77.2 – 500 K	Nitrogen only	Vacuum



For microscopy applications, see the guide on our **Microstat™** products



*The Business of Science®*



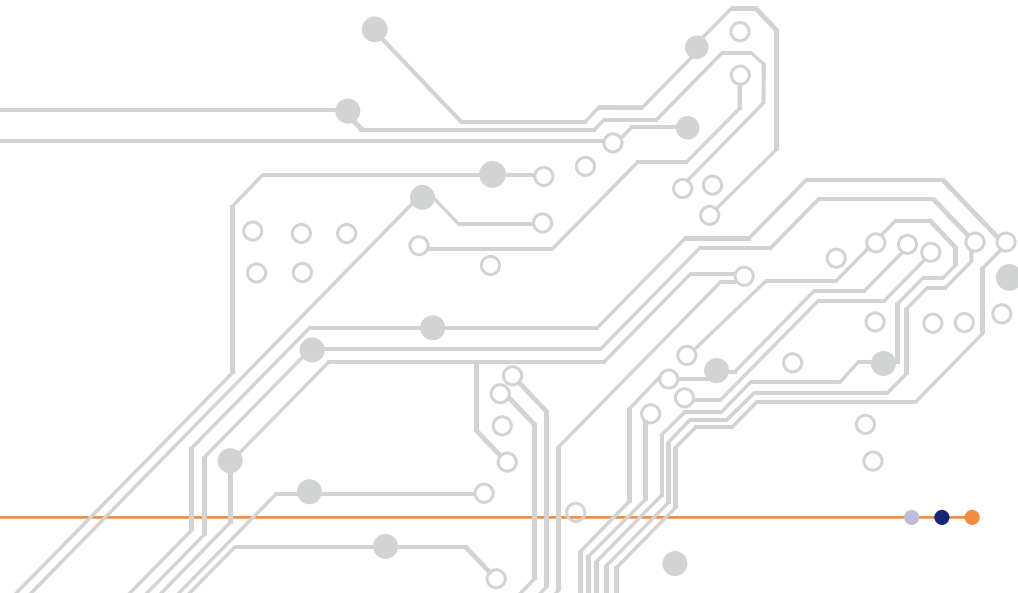
## Advantages and trade offs

Table 1: Advantages and trade offs of each cooling technology for the **Optistat** range of cryostats

Cryostat type	Advantages	Trade offs	Product
<b>Helium continuous flow cryostat</b>	<ul style="list-style-type: none"> <li>• Small size for easy integration into spectrometers</li> <li>• Low base temperature (2.3 K)</li> <li>• Can be used with nitrogen</li> </ul>	<ul style="list-style-type: none"> <li>• Continuous use of a helium transfer line and helium dewar</li> </ul>	<b>OptistatCF</b> <b>OptistatCF-V</b>
<b>Nitrogen bath cryostat</b>	<ul style="list-style-type: none"> <li>• Small size for easy integration into spectrometers</li> <li>• Low running cost</li> <li>• No need for external dewar and transfer tube</li> </ul>	<ul style="list-style-type: none"> <li>• Limited base temperature (77.2 K)</li> </ul>	<b>OptistatDN</b> <b>OptistatDN-V</b>

Table 2: Advantages and trade offs for the different sample environments

Sample space environment	Advantages	Trade offs	Product
<b>Static exchange gas (circulating cryogen doesn't come into the sample space)</b>	<ul style="list-style-type: none"> <li>• Rapid sample change (via top loading probe)</li> <li>• Homogeneous sample cooling</li> <li>• No liquid in the optical beam path</li> </ul>	<ul style="list-style-type: none"> <li>• More optical windows</li> <li>• Larger working distance from sample to external optics</li> </ul>	<b>OptistatCF</b> <b>OptistatDN</b>
<b>Dynamic exchange gas (circulating cryogen exiting the heat exchanger flows into the sample space)</b>	<ul style="list-style-type: none"> <li>• Rapid sample change (via top loading probe)</li> <li>• Homogeneous sample cooling ideal for low conductivity sample</li> <li>• Faster cool down times</li> <li>• Cryostat can be operated in single shot</li> </ul>	<ul style="list-style-type: none"> <li>• More optical windows</li> <li>• Larger working distance from sample to external optics</li> <li>• Presence of liquid in the optical beam path</li> </ul>	<b>OptistatCF</b> dynamic option
<b>Vacuum</b>	<ul style="list-style-type: none"> <li>• Fewer windows in the optical beam path</li> <li>• Larger sample space</li> <li>• Short working distance to room temperature</li> </ul>	<ul style="list-style-type: none"> <li>• Slower sample change</li> <li>• Potential for temperature gradient across the sample</li> </ul>	<b>OptistatCF-V</b> <b>OptistatDN-V</b>



## Full system integration and control

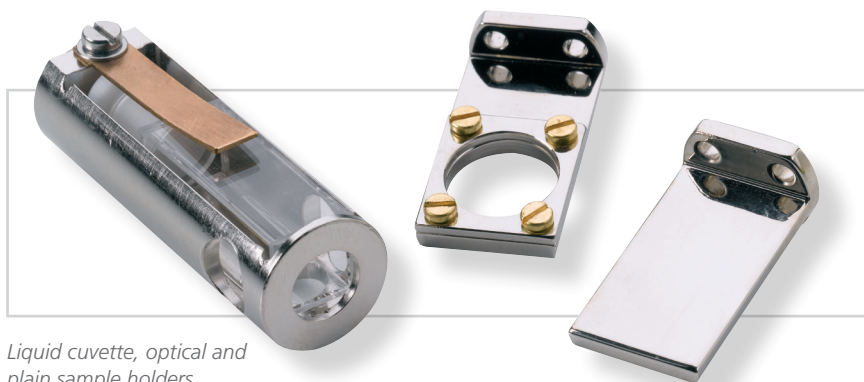
## System components designed for optimum cryostat performance

## Sample holder and rod options

We offer two types of sample holders. The plain sample holder is used for reflection experiments and the optical one for transmission.

For liquid samples, a liquid cuvette sample holder is also available.

*From left to right, precision height and adjust rotate and standard sample rods. Can be supplied with double sample holder for reference measurements.*



*Liquid cuvette, optical and plain sample holders.*

For exchange gas cryostats, we can supply sample rods allowing a precise position of your sample.

The *simple height adjust and rotate sample rod* provides sliding adjustment with locking screws to hold a fixed position. The range of vertical motion is 32 mm. Positioning accuracy is 0.5 mm (height) and 1° (rotation).

The *precision height and adjust rotate sample rod* provides height adjust with a resolution of 10 µm and a goniometer for setting the rotation angle with a resolution of 12 minutes.



## Intelligent cryogenic environment controller

Easy monitoring and control of the sample stage

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

## Continuous flow helium cryostat, sample in exchange gas

This helium cryostat is ideal for experiments requiring high sample throughput and low conductivity samples.

- Wide temperature range: from 2.3 K to 500 K
- Quick sample change in less than 5 minutes via top-loading sample probe
- Superb optical access (f/1) for measurements requiring light collection
- Optimised clear beam throughput (15 mm diameter aperture) allows a large illumination area for measurements involving the detection of low intensity light
- The most economical use of cryogenics on the market: less than 0.55 L/h at 4.2 K using a Low Loss Transfer tube
- Versatile: wide range of sample holders/rods including liquid cuvette for liquid samples and simple/precise height adjust/rotate sample rod
- Compact size allowing easy integration into commercial spectrometers
- Electrical measurements via 10-pin electrical feed wire to heat exchanger and/or wired on coax connectors
- Can be operated in pull mode (using a gas flow pump to pull the helium from a storage dewar to the sample space) or push mode (by pressurising the storage dewar)

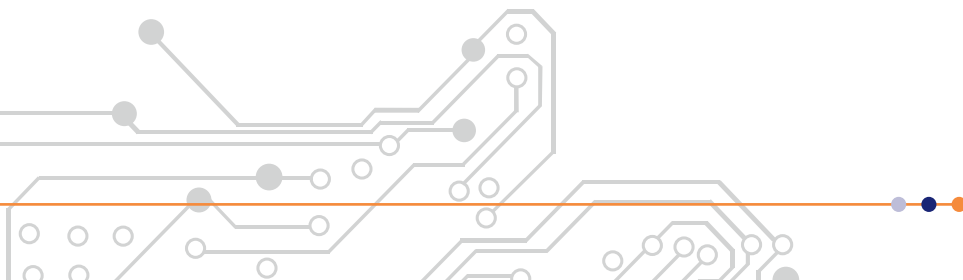
The lowest helium consumption on the market



For more information please visit:  
[www.oxinst.com/optistatCF](http://www.oxinst.com/optistatCF)

Specifications				
Model	OptistatCF static used in 'pull' mode	OptistatCF static used in 'push' mode	OptistatCF dynamic in 'pull' mode	OptistatCF dynamic used in 'push' mode
Temperature range	2.3 – 500 K*	4.2 – 500 K*	2.3 – 500 K* 1.6 – 500 K* in single shot	4.2 – 500 K*
Temperature stability	± 0.1 K (measured over 10 min period)			
Maximum sample space	20 mm diameter			
Sample holder dimensions	19 mm wide x 30 mm long (optical sample holder version has a 15 mm aperture)			
Cool down from ambient to 4.2 K (mins)	25			

All specifications refer to the base model cryostat with 2 sets of Spectrosil B window used with an LLT transfer tube, EPS 40 (40 m<sup>3</sup>/hr helium pumping system) and a **Mercury**iTC temperature controller. \*For 500 K operation, high temperature sapphire inner windows are required.



## Continuous flow helium cryostat, sample in vacuum

This helium cryostat is well suited for experiments requiring a large sample space and minimum number of windows in the optical beam path (reducing reflective losses). It is also a very versatile instrument as its tail is interchangeable between **MicrostatHe** and **MicrostatHe-R** with rectangular tail, ideal for microscopy and magneto-optical Kerr effect applications.

The lowest helium consumption on the market



- Wide temperature range: from 2.3 K to 500 K
- Large sample space enabling studies of sample with a wide range of size and geometry
- Superb optical access (f/0.9) for measurements requiring light collection
- Optimised clear beam throughput (23 mm diameter aperture) allows a large illumination area for measurements involving the detection of low intensity light
- The most economical use of cryogens on the market: less than 0.45 L/h at 4.2 K using a Low Loss Transfer tube
- No cold windows enabling the use of any window material above 300 K
- Demountable radiation shield windows to maximise transmission intensity
- Can be operated in pull mode (using a gas flow pump to pull the helium from a storage dewar to the sample space) or push mode (by pressurising the storage dewar)
- Electrical measurements via 10-pin electrical feed wire to heat exchanger and/or wired on coax connectors
- Compact size allowing easy integration into commercial spectrometers

For more information please visit: [www.oxinst.com/optistatCFV](http://www.oxinst.com/optistatCFV)

Specifications		
Model	OptistatCF-V used in 'pull' mode	OptistatCF-V used in 'push' mode
Temperature range	2.3 – 500 K	4.2 – 500 K
Temperature stability	± 0.1 K (measured over 10 min period)	
Maximum sample space (space within radiation shield)	30 mm wide x 58 mm long	
Sample holder dimensions	20 mm wide x 50 mm long (optical sample holder version has a 12.5 mm aperture)	
Sample change time (mins)	60	
Cool down from ambient to 4.2 K (mins)	10	

All specifications refer to the base model cryostat with 2 sets of Spectrosil B window used with an LLT transfer tube, EPS 40 (40 m<sup>3</sup>/hr helium pumping system) and a **Mercury**iTC temperature controller.





## Nitrogen bath cryostat, sample in exchange gas

Longest hold time on the market

This nitrogen cryostat is ideal for experiments which require 77.2 K base temperature, high sample throughput and for samples which are difficult to cool by conduction. Its small footprint is ideal in laboratory where space is limited. It doesn't require any external dewar or transfer tube.

- Wide temperature range: from 77.2 K to 500 K
- Quick sample change in less than 5 minutes via top-loading sample probe
- 15 hours cryogen hold time before refills required providing the convenience of a full working day operation
- Superb optical access (f/1) for measurements requiring light collection
- Electrical measurements via 10-pin electrical feed wire to heat exchanger and/or wired on coax connectors
- Optimised clear beam throughput (15 mm diameter aperture) allows a large illumination area for measurements involving the detection of low intensity light
- Versatile: wide range of sample holders/rods including liquid cuvette for liquid samples and simple/precise height adjust/rotate sample rods
- Compact size allowing easy integration into commercial spectrometers



For more information please visit:  
[www.oxinst.com/optistatDN](http://www.oxinst.com/optistatDN)

Specifications	
Temperature range	77.2 – 500 K*
Temperature stability	± 0.1 K (measured over 10 min period)
Maximum sample space	20 mm diameter
Sample holder dimensions	19 mm wide x 30 mm long (optical sample holder version has a 15 mm aperture)
Cool down from ambient to 77 K (mins)	20
Liquid nitrogen capacity	1.2 L
Hold time at 77 K	≥ 15 hours

\*For 500 K operation, high temperature sapphire inner windows are required.

## Nitrogen bath cryostat, sample in vacuum

This nitrogen cryostat is ideal for experiments which require 77.2 K base temperature, a large sample space and a minimum number of windows in the optical beam path thus reducing reflective losses.

Smallest footprint.  
Large sample space

- Wide temperature range: from 77.2 K to 500 K
- Large sample space enabling studies of sample with a wide range of size and geometry
- 15 hours cryogen hold time before refills required providing the convenience of a full working day operation
- Superb optical access (f/1) for measurements requiring light collection
- Electrical measurements via 10-pin electrical feed wire to heat exchanger and/or wired on coax connectors
- Optimised clear beam throughput (35 mm diameter aperture) allows a large illumination area for measurements involving the detection of low intensity light
- No cold windows enabling the use of any window material above 300 K
- Compact size allowing easy integration into commercial spectrometers

For more information please visit:  
[www.oxinst.com/optistatDN-V](http://www.oxinst.com/optistatDN-V)



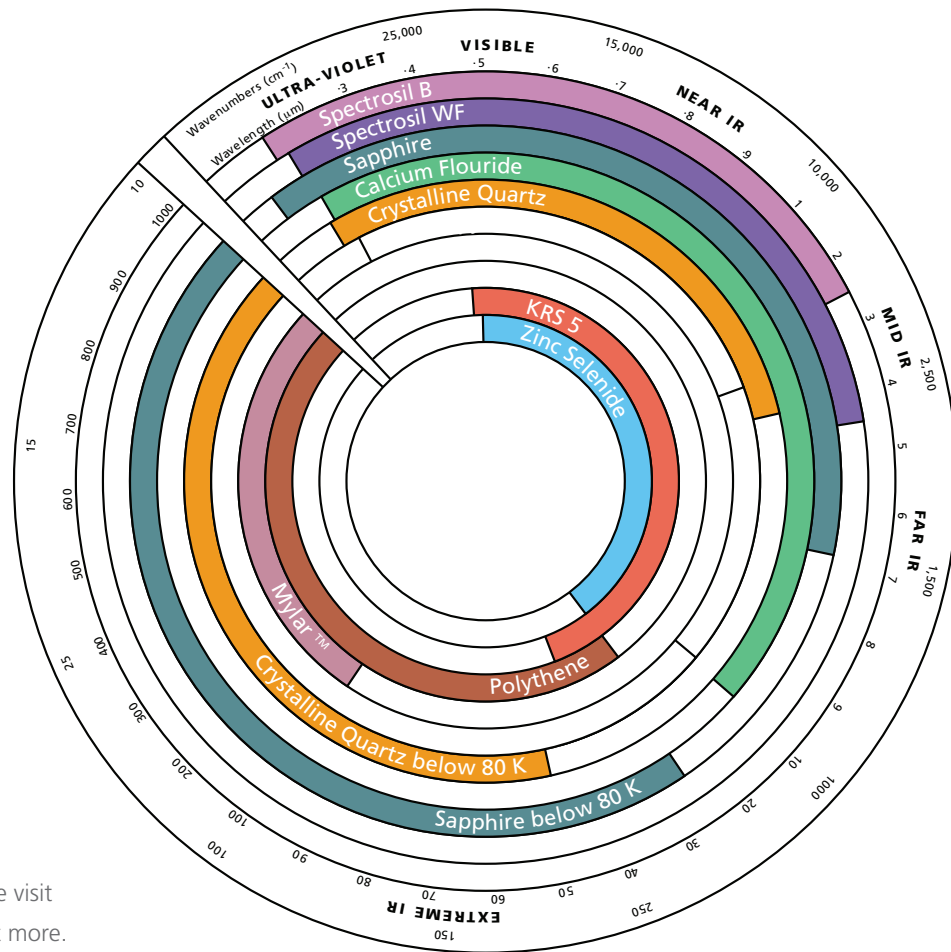
Specifications	
Temperature range	77.2 – 500 K
Temperature stability	± 0.1 K (measured over 10 min period)
Maximum sample space	20 mm diameter
Sample holder dimensions	20 mm wide x 50 mm long
Sample change time (mins)	60
Cool down from ambient to 77 K (mins)	20
Liquid nitrogen capacity	1.2 L
Hold time at 77 K	≥ 15 hours

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

On the **Optistat** range of optical cryostats, all windows are demountable and may be exchanged by the customer at a later date for measurements over different regions of the optical spectrum. Up to five sets of windows can be provided (four radial; one axial). We can provide 'wedge' (non-parallel faces) windows and anti-reflection coatings, to limit the reflection of windows. The materials selected will be determined by the wavelength and intensity of the radiation and whether beam polarisation is required.

Exchangeable windows

- Spectrosil B
- Spectrosil WF
- Sapphire
- Calcium Fluoride
- Crystalline Quartz
- 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.

Visit [www.oxinst.com/optistat](http://www.oxinst.com/optistat) or email to [nanoscience@oxinst.com](mailto:nanoscience@oxinst.com)

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