

Standard Specification	HelioxVL	HelioxVT	HelioxTL	HelioxAC-V
<b>Sample environment</b>	Vacuum	Vacuum	Liquid	Vacuum
<b>Sample space</b>	40 mm sample space to suit 52 mm cold bore magnet	25 mm sample space for VT30, 43 mm sample space for VT50	38 mm	130 mm diameter x 100 mm height
<b>Base temperature</b> (no applied heat load, with standard radiation shields)	≤ 245 mK for ≥ 90 hours	≤ 300 mK for ≥ 40 hours	≤ 260 mK for ≥ 50 hours	≤ 300 mK for ≥ 50 hours
<b>Maximum temperature</b>	1.2 K as standard. Higher temperature option available: up to 300 K in zero field, up to 100 K in magnetic field	1.2 K as standard. Higher temperature option available: up to 300 K	1.2 K as standard. Higher temperature option available: up to 80 K	300 K as standard
<b>Cooling power</b> (with standard radiation shields)	40 μW at ≤ 290 mK for ≥ 10 hrs	50 μW at ≤ 350 mK for 6 hrs	400 μW at ≤ 300 mK for 6 hrs	100 μW at 350 mK for > 6 hrs
<b>Temperature stability</b>	± 3 mK at T ≤ 1.2 K	± 3 mK at T ≤ 1.2 K	± 3 mK at T ≤ 1.2 K (on the probe)	± 3 mK at T ≤ 2 K; ± 0.1 K at T > 2 K (measured over a 10 minute period; see note 1)
<b>Thermometers</b>	Uncalibrated RuO <sub>2</sub> sensors on the <sup>3</sup> He pot and the 1 K plate, uncalibrated carbon sensor on the <sup>3</sup> He sorb	Uncalibrated RuO <sub>2</sub> sensors on the <sup>3</sup> He pot and the 1 K plate, Resistance sensor on sorption pump	Uncalibrated RuO <sub>2</sub> sensors on the <sup>3</sup> He pot and the 1 K plate, Resistance sensor on sorption pump, uncalibrated RuO <sub>2</sub> on top loading probe	Uncalibrated RuO <sub>2</sub> sensors and calibrated Cernox sensors on <sup>3</sup> He pot, uncalibrated carbon sensors on sorb and other critical control elements
<b><sup>3</sup>He regeneration time</b>	30 min	40 min	50 min	Typically 3 hours (note 2)
<b>Liquid helium consumption</b> (typical)	3 litres to cool the insert from room temperature to 4.2 K. 0.04 l/hr running at base temperature	Consumption of the VTI 100-150 cc/hr	2 litres to cool probe to 4 K. 0.09 l/hr additional consumption to run	N/A
<b>Sample access</b>	Sliding seal with clamp, via removal of IVC at greased cone seal. Two line-of-sight ports to the sample space, 6.0 mm clear internal diameter. NW16 flanges at room temperature	Brass IVC with greased cone seal	Via top-loading probe	Via removal of IVC
<b>Cryogenic service interval</b>	N/A	N/A	N/A	15,000 hours
<b><sup>3</sup>He</b>	Not included	Not included	Not included	Not included

**Note 1:** using a temperature controller to stabilise

**Note 2:** for low heat capacity sample and standard radiation shields. 3 hours is the time to recondense <sup>3</sup>He charge and cool the <sup>3</sup>He pot to ≤ 320 mK (if <sup>3</sup>He initially at < 4 K)

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## Experimental access

HelioxVL	HelioxVT	HelioxTL	HelioxAC-V
<ul style="list-style-type: none"> <li>● 24-way Fischer connector and mating plug at room temperature</li> <li>● Nomex woven ribbon cable of 12 twisted pairs (24 wires)</li> <li>● 0.1 mm diameter constantan wires with polyester insulation</li> <li>● 25-way miniature D-type connector and plug on top of <math>^3\text{He}</math> pot</li> </ul>	<ul style="list-style-type: none"> <li>● 10-way loom of constantan wires (twisted pairs) to connector on the <math>^3\text{He}</math> pot</li> </ul>	<ul style="list-style-type: none"> <li>● Via top loading probe</li> <li>● 24-way loom of twisted pair constantan to tag strip in the 1 K region</li> <li>● Blank top fitting for customer use. 2 off 6 mm diameter ports to allow fitting of extra wiring, fibre optics, etc</li> </ul>	<ul style="list-style-type: none"> <li>● 24-way constantan loom (12 twisted pairs)</li> <li>● 0.1 mm diameter wire with polyester insulation</li> <li>● 24-way Fischer connector at room temperature</li> <li>● 25-way micro D connector mounted on the <math>^3\text{He}</math> pot</li> <li>● Spare 22 mm internal diameter access port to the cryostat vacuum chamber</li> <li>● The port is fitted to the cryostat top plate and has an NW25 flange termination</li> </ul>

## Options

IN200 HelioxVL  $^3\text{He}$  insert for Integra systems

TH100	Temperature controller
PP100/PP200	1K plate pumping manifold/system
HT100	Extended temperature range
CH100	Standard experimental wiring
CH200	Standard experimental wiring with four additional coaxial wires
LS100	Line-of-sight port blanked off and empty
LS200	Line-of-sight port with 24-way loom
LS300	Line-of-sight port with four S1 coaxial cables
LS400	Line-of-sight port with UT85 coaxial cable
LS500	Line-of-sight with 24-way loom and four S1 coaxial cables
SA100/200/300	100/150/200 mm clear sample space
SA310	Low eddy current sample holder

## HelioxVLTD HelioxVL for transport dewar

HELVLHT	High temperature upgrade
HD120H	120 litre helium dewar
HELIOXMAG	Integral magnet 2 T, 4 T, 6 T
HELIOXCL	Magnet current leads
UNIVSTD+4S1	Additional 4 x stainless steel co-axial cables wired to the $^3\text{He}$ pot
24C	24-way constantan loom
4S1	4 x flexible co-axial cables wired to the $^3\text{He}$ pot
24C+4S1	Combination of 4S1 and 24-way loom
UT85VL	1 x semi-rigid stainless steel co-axial cable wired to 1 K plate
HELVL1KPUMP	1 K stage pumping system ( <b>Heliox</b> 1 K pump)
HELVL1KMAN	1 K pump manifold only option

## HelioxVT

HELVTHT	High temperature upgrade
<b>HelioxVT30SYS</b>	<b>HelioxVT</b> to fit standard 30 mm sample space VTI
<b>HelioxVT50SYS</b>	<b>HelioxVT</b> to fit 50 mm sample space VTI
VTI50	50 mm sample space VTI to suit <b>HelioxVT50SYS</b>

## HelioxTL

HELHT	High temperature upgrade
HEL3TLP38	Spare top loading probe for wide bore insert
HE3TLPUMP	Pumping manifold for 1 K pot (Rotary pump, pumping lines, vacuum valves and gauge)

## HelioxAC-V

24C-HAC	24-way constantan loom
4S1-HAC	4 x flexible stainless steel co-axial cables wired to the $^3\text{He}$ pot
24C+4S1-HAC	24-way wired connector + 4 x flexible stainless steel co-axial cables wired to $^3\text{He}$ pot

## Generic parts:

H4-600	Turbo pumping kit excluding vacuum gauge
H4-601	Turbo pumping kit including vacuum gauge
ISOM	Isobus master cable
CONCAB	1 x ISOM and 2 x ISOS cables
ROTH1VL	$\text{RuO}_2$ thermometer, type 1, 30 point calibrated
ROTH2VL	$\text{RuO}_2$ thermometer, type 2, generically calibrated