

Model 74034 high temperature oven

The high temperature oven assembly enables the Model 7400 VSM system to be used to investigate the magnetic properties of materials at high temperature. This option consists of an electrically heated outer tube assembly with efficient thermal insulation to permit sample-zone temperature from 100 °C to 1000 °C (373 K to 1273 K). Temperatures from 30 °C to 1000 °C (303 K to 1273 K) are also possible, however, below 100 °C (373 K) measurement time increases.



The inner sample zone chamber is lined with a special heat-resistant and intrinsically non-magnetic material. A sample holder is provided which consists of a quartz tube sample rod attached to a boron-nitride sample cup. The oven secures to a special isolation mount support structure, the only special consideration being that the air gap between the coils must accommodate the 23 mm (0.9 in) outside diameter of the oven. A mechanical vacuum pump capable of maintaining inlet pressures down to 0.67 Pa (5×10^{-3} torr) must be supplied by the user.

This option features efficient thermal insulation, consisting of an evacuation outer chamber with multiple reflective heat shields. Sample zone temperatures as high as 1000 °C are attained with a power consumption of approximately 70 W. Two results of the low power consumption are minimal magnetic interference and increased temperature uniformity in the sample zone. The oven is particularly well suited to measuring Curie temperatures of ferromagnetic or ferrimagnetic materials at temperatures up to 1000 °C. The sensitivity of the Model 7400 VSM permits Curie temperature determinations at relatively low field intensities, allowing more inherently accurate determinations.

At room temperature and above, measurements may be performed on samples contained in an air or argon atmosphere to protect the sample from oxidation.

Included with Model 74034:

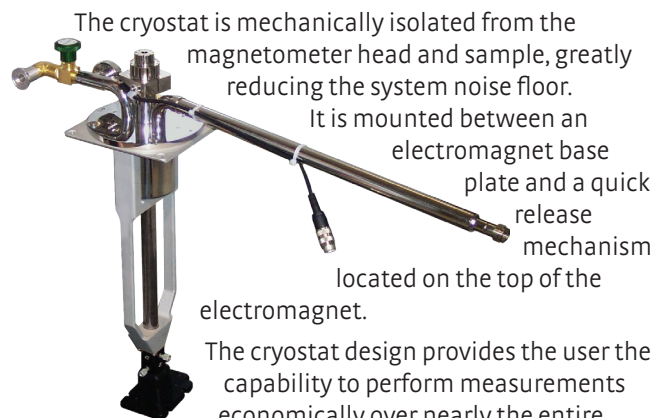
1. Oven assembly with mount
2. Gas handling box
3. Nickel Curie sample cylinder
4. Instrument cables and related accessories
5. Sample rods and holders
 - a. With 7404 and 7407: 740928 sample tail and holder kit
 - b. With 7410: 740941 sample tail and holder kit

Supplemental 74034 equipment requirements:

1. Lake Shore Model 741-VTA temperature option kit
2. A mechanical vacuum pump (Lake Shore E2M or similar) capable of achieving a blanked-off pressure below 0.67 Pa (5×10^{-3} torr) and a pumping speed of 1 m³/h, along with a KF-16 flange pump inlet
3. Argon gas cylinder with 5 to 10 psi regulator, and 3 mm (1/8 in) hose barb

Model 74018 variable temperature cryostat

The 7400 Series VSM cryostat is designed for rapid sample cooling with either LHe or LN₂ as well as easy sample insertion and interchange. It allows you to take measurements from 5.5 K to 450 K using LHe and from 85 K to 450 K using LN₂. A single-point measurement can be taken at 4.2 K (LHe) and at 77.6 K (LN₂). The sample is suspended in a proprietary insulated tube constructed of nonmagnetic material.



The cryostat is mechanically isolated from the magnetometer head and sample, greatly reducing the system noise floor. It is mounted between an electromagnet base plate and a quick release mechanism located on the top of the electromagnet.

The cryostat design provides the user the capability to perform measurements economically over nearly the entire accessible temperature range with a single cryostat. The transfer line is included with the cryostat.

Included with Model 74018:

1. Combination LHe/LN₂ cryostat with mount
2. LHe/LN₂ transfer line
3. Cryogen transfer kit
4. Instrument cables and related accessories
5. Sample rods and holders
 - a. With 7404 and 7407: 740929 sample tail and holder kit
 - b. With 7410: 740943 sample tail and holder kit

Supplemental 74018 equipment requirements:

1. Lake Shore Model 741-VTA temperature option kit
2. A mechanical vacuum pump (Lake Shore E2M or similar) capable of achieving a pressure below 0.67 Pa (5×10^{-3} torr) and a speed of 1 m³/h, along with a KF-16 flange pump inlet
3. Access to turbomolecular vacuum pump (Lake Shore TPS-FRG or similar) capable of doing better than 1.33×10^{-3} Pa (10^{-6} torr) for annual evacuation of transfer line vacuum space
4. LHe or LN₂ storage Dewar (Lake Shore 1220-50 or similar) with top withdraw fitting to accept the 12.7 mm (0.5 in) diameter transfer line — the transfer line furnished with the Model 74018 cryostat is particularly well adapted for use with 25 to 60 L storage vessels, and can be readily adapted to other capacity storage vessels (in most cases, a LHe Dewar will be provided by your local liquid gas distributor when LHe is delivered)
5. Gas cylinder with 1 to 5 psi pressure regulator to deliver clean, dry helium or nitrogen gas (depending on liquid cryogen)

Model 74034 and Model 74018

Model 74018 variable temperature cryostat specifications

With LHe	Temp range	4.2 K base, 5.5 K to 450 K control
	Temp stability	±0.1 K
With LN ₂	Temp range	77.6 K, 85 K to 450 K
	Temp stability	±0.2 K
Temperature resolution		0.001 K
Cool-down time		5 min (15 min initial cool-down)
Nominal ramp rate		Continuous flow
LHe liquid usage		<1 L/h when operating >7 K
LN ₂ liquid usage		<1 L/h when operating >7 K
Insulation		Vacuum
Sample zone dimensions	Bore size	7.1 mm (0.28 in)
	Outside diameter	22.4 mm (0.88 in)

Model 74034 high temperature oven specifications

Temp range		303 K to 1273 K
Temp stability		±0.1 K
Temp resolution		0.001 K
Nominal ramp rate		353 K/min at maximum heating rate of 80 W
Insulation		Vacuum plus multiple reflective shields
Sample zone dimensions	Bore size	7.1 mm (0.28 in)
	Outside diameter	25 mm (1.0 in)