Advanced Liquid Sampling Cells

For high sensitivity ATR measurements with FT-IR or dispersive instruments.

Liquid sampling cells

There are many combinations for liquid cells and they can be provided as static sealed (P/N GS20500 series), static demountable (P/N GS20510 series), flow sealed (P/N's GS20560 and GS20570 series) and flow demountable (P/N's GS20580 and GS20590 series) versions.

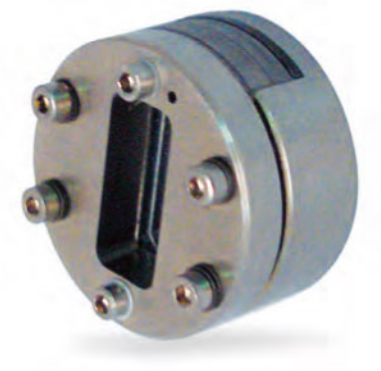
When you order a particular version you will receive the complete cell with windows of choice and a spacer at pathlength of choice all assembled together. Sealed cells have a lead spacer and lead top gasket and all components are permanently amalgamated/sealed together.

Demountable cells have a PTFE spacer and PTFE top gasket and as such allow for windows and spacer pathlengths to be interchangeable within these version cells. A threaded luer fitting, flushing tube, syringe needle, 2 PTFE washers and 3/32" Allen key are also included with the static version cells. The liquid is contained within the static version of liquid cells (sealed or demountable) by threaded stainless steel screw plugs.

The flow cells (GS20570 and GS20580 series) have an alternative front plate with permanent Swagelok connection fittings for 1/16" tubing.

The threaded luer and flushing tube cannot be attached to the flow cell front plate. The P/N's GS20570 and GS20580 series flow cells are, however, only suitable for use in the Electrical Heating Jacket P/N GS20730. For a liquid flow cell to be accommodated in the Variable Temperature Cell holder P/N GS21525, a different type of front flow plate is used with a static sealed GS20500 series cell.

These versions of flow cells for the Variable Temperature Cell Holder are P/N GS20560 series cells. The flow front plate on these liquid cells has



Key features

- Choice of pathlength
- Sealed or demountable cells
- Variety of window materials
- Static or flow modes
- Luer fittings and stainless steel plugs

two 1/16" stainless steel flow tubes welded to the sample inlet and outlet ports on the plate. The flow tubes are specifically shaped to allow for a liquid flow cell to fit in the Variable Temperature Cell Holder and be connected via Swagelok fittings to an external liquid supply.

Specac recommends use of a sealed cell within the Variable Temperature Cell Holder to offer the best sealing integrity to contain a liquid sample when in the local operating vacuum environment.

There are demountable flow cell equivalent versions of these sealed liquid flow cells that could be used in the Variable Temperature Cell holder. The flow front plate with stainless steel tubing and Swagelok fittings is attached to the demountable liquid cells GS20510 series. These demountable flow cells are GS20590 series type cells.

Either a sealed (GS20560 series) or demountable (GS20590 series) flow cell can be used in both the Variable Temperature Cell Holder and Electrical Heating Jacket. It is important to note that the P/N's GS20570 and GS20580 series flow cells cannot be used in the Variable Temperature Cell Holder. Please note that in order to use the flow cells in the Variable Temperature Cell Holder the flow option GS20080 must be fitted.

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Advanced Liquid Sampling Cells

Liquid Cells GS20500 Series volumes

(Rectangular windows - top drilled, bottom undrilled)
Mylar spacer 0.006 mm thick - 1.60 microliters
Mylar spacer 0.012 mm thick - 3.25 microliters
Mylar or lead spacer 0.025 mm thick - 6.80 microliters
PTFE or lead spacer 0.05 mm thick - 13.50 microliters
PTFE or lead spacer 0.10 mm thick - 27.00 microliters
PTFE or lead spacer 0.20 mm thick - 54.00 microliters
PTFE or lead spacer 0.50 mm thick - 135.00 microliters
PTFE or lead spacer 1.00 mm thick - 270.00 microliters

N.B. Please note that the figures produced are for an approximate volume of liquid contained between the window faces only. It does not include any extra amount of liquid that may be contained in the filling port sections of either type of liquid cell.

ordering information

GS20500* **NaCl Sealed Heatable Liquid Cell**
(Specify pathlength, from 0.025, 0.05, 0.1, 0.2, 0.5 and 1.0mm)

GS20501* **KBr Sealed Heatable Liquid Cell**
(Specify pathlength, from 0.025, 0.05, 0.1, 0.2, 0.5 and 1.0mm)

GS20502* **CaF2 Sealed Heatable Liquid Cell**
(Specify pathlength, from 0.025, 0.05, 0.1, 0.2, 0.5 and 1.0mm)

GS20503* **BaF2 Sealed Heatable Liquid Cell**
(Specify pathlength, from 0.025, 0.05, 0.1, 0.2, 0.5 and 1.0mm)

GS20508* **ZnSe Sealed Heatable Liquid Cell**
(Specify pathlength, from 0.025, 0.05, 0.1, 0.2, 0.5 and 1.0mm)

GS20510** **NaCl Demountable Heatable Liquid Cell**
(Specify pathlength, from 0.006, 0.012, 0.025, 0.05, 0.1, 0.2, 0.25, 0.5 and 1.0mm)

GS20511** **KBr Demountable Heatable Liquid Cell**
(Specify pathlength, from 0.006, 0.012, 0.025, 0.05, 0.1, 0.2, 0.25, 0.5 and 1.0mm)

GS20512** **CaF2 Demountable Heatable Liquid Cell**
(Specify pathlength, from 0.006, 0.012, 0.025, 0.05, 0.1, 0.2, 0.25, 0.5 and 1.0mm)

GS20513** **BaF2 Demountable Heatable Liquid Cell**
(Specify pathlength, from 0.006, 0.012, 0.025, 0.05, 0.1, 0.2, 0.25, 0.5 and 1.0mm)

GS20519** **ZnSe Demountable Heatable Liquid Cell**
(Specify pathlength, from 0.006, 0.012, 0.025, 0.05, 0.1, 0.2, 0.25, 0.5 and 1.0mm)

* Includes a complete cell with front plate, top lead gasket, top window, lead spacer (choice of pathlength) and bottom window all sealed together.

** Includes a complete cell with front plate, top PTFE gasket, top window, PTFE or Mylar spacer (choice of pathlengths) and bottom window that can be separated from each other.

Windows for Liquid Cells

GS20520 **Pair of NaCl windows**
GS20521 **Pair of KBr windows**
GS20522 **Pair of CaF2 windows**
GS20523 **Pair of BaF2 windows**
GS20596 **Pair of ZnSe windows**
GS20598 **Pair of Spec B (UV) windows**

Spares and Consumables for Liquid Cells

GS20040 **10 off Front & Rear PTFE Gaskets**
GS20050 **PTFE and Mylar Spacers Assorted**
(2 each of 0.006, 0.012, 0.025, 0.05, 0.1, 0.2, 0.5 and 1.0mm)***
GS20070 **10 off PTFE and Mylar Spacers** (select from 0.006, 0.012, 0.025, 0.05, 0.1, 0.2, 0.5 and 1.0mm)***
GS10030 **Flushing Tube Kit**
GS10040 **Threaded Luer Fitting**
GS10050 **10 off Syringe Needles**
GS10060 **2 off Stainless Steel Plugs**
GS10070 **10 off PTFE Sealing Washers**

Heatable Cell

GS20539 **Heatable Liquid Static Cells ESK**

*** Please note that 0.006, 0.012 and 0.025mm spacers are only available in Mylar while all other sizes are in PTFE only.

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Flow Cells for Variable Temperature Cell Holder & Heating Jackets

Please note :- In order to use the flow cells in the Variable Temperature Cell holder (GS21525) the flow option kit GS20080 must be fitted.

ordering information

GS20560* **NaCl Sealed Heatable Liquid Cell** with 1/1 6" Swagelok fittings for flow purposes. (Specify pathlength from 0.025, 0.05, 0.1, 0.2, 0.5 and 1.0mm)

GS20561* **KBr Sealed Heatable Liquid Cell** with 1/1 6" Swagelok fittings for flow purposes. (Specify pathlength from 0.025, 0.05, 0.1, 0.2, 0.5 and 1.0mm)

GS20562* **CaF2 Sealed Heatable Liquid Cell** with 1/1 6" Swagelok fittings for flow purposes. (Specify pathlength from 0.025, 0.05, 0.1, 0.2, 0.5 and 1.0mm)

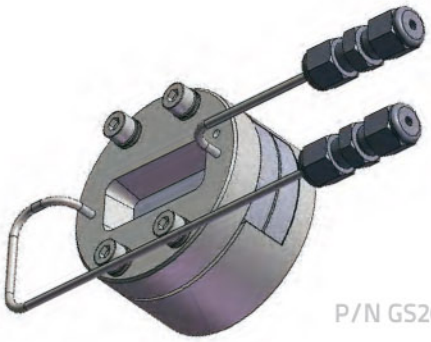
GS20563* **BaF2 Sealed Heatable Liquid Cell** with 1/1 6" Swagelok fittings for flow purposes. (Specify pathlength from 0.025, 0.05, 0.1, 0.2, 0.5 and 1.0mm)

GS20566* **ZnSe Sealed Heatable Liquid Cells** with 1/1 6" Swagelok fittings for flow purposes. (Specify pathlength from 0.025, 0.05, 0.1, 0.2, 0.5 and 1.0mm)

GS20590* **NaCl Demountable Heatable Liquid Cells** with 1/16" Swagelok fittings for flow purposes (Specify pathlength from 0.006, 0.012, 0.025, 0.05, 0.1, 0.2, 0.25, 0.5 and 1.0mm)

GS20591** **KBr Demountable Heatable Liquid Cells** with 1/16" Swagelok fittings for flow purposes (Specify pathlength from 0.006, 0.012, 0.025, 0.05, 0.1, 0.2, 0.25, 0.5 and 1.0mm)

GS20592** **CaF2 Demountable Heatable Liquid Cells** with 1/16" Swagelok fittings for flow purposes (Specify pathlength from 0.006, 0.012, 0.025, 0.05, 0.1, 0.2, 0.25, 0.5 and 1.0mm)



P/N GS20560/90

Key features

- Choice of pathlength
- Sealed or demountable cells
- Variety of window materials
- Flow mode

GS20593** **BaF2 Demountable Heatable Liquid Cells** with 1/16" Swagelok fittings for flow purposes (Specify pathlength from 0.006, 0.012, 0.025, 0.05, 0.1, 0.2, 0.25, 0.5 and 1.0mm)

GS20594** **ZnSe Demountable Heatable Liquid Cells** with 1/16" Swagelok fittings for flow purposes (Specify pathlength from 0.006, 0.012, 0.025, 0.05, 0.1, 0.2, 0.25, 0.5 and 1.0mm)

Heatable Flow Cell

GS20569 Heatable Liquid Flow Cell ESK

* Includes a complete cell with front flow plate, top lead gasket, top window, lead spacer and bottom window all sealed together.

** Includes a complete cell with front flow plate, top PTFE gasket, top window, PTFE or Mylar spacer (choice of pathlengths) and bottom window that can be separated from each other.

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Flow Cells for Heating Jackets

Flow Cells for P/N GS20710 and GS20730 only

ordering information

GS20570* **NaCl Sealed Heatable Liquid Cell** with 1/16" Swagelok fittings for flow purposes (Specify pathlength from 0.025, 0.05, 0.1, 0.2, 0.5 and 1.0mm)

GS20571* **KBr Sealed Heatable Liquid Cell** with 1/16" Swagelok fittings for flow purposes (Specify pathlength from 0.025, 0.05, 0.1, 0.2, 0.5 and 1.0mm)

GS20572* **CaF2 Sealed Heatable Liquid Cell** with 1/16" Swagelok fittings for flow purposes (Specify pathlength from 0.025, 0.05, 0.1, 0.2, 0.5 and 1.0mm)

GS20573* **BaF2 Sealed Heatable Liquid Cell** with 1/16" Swagelok fittings for flow purposes (Specify pathlength from 0.025, 0.05, 0.1, 0.2, 0.5 and 1.0mm)

GS20576* **ZnSe Sealed Heatable Liquid Cell** with 1/16" Swagelok fittings for flow purposes (Specify pathlength from 0.025, 0.05, 0.1, 0.2, 0.5 and 1.0mm)

GS20580** **NaCl Demountable Heatable Liquid Cells** 1/16" Swagelok fittings for flow purposes (Specify pathlength from 0.006, 0.012, 0.025, 0.05, 0.1, 0.2, 0.25, 0.5 and 1.0mm)

GS20581** **KBr Demountable Heatable Liquid Cells** 1/16" Swagelok fittings for flow purposes. (Specify pathlength from 0.006, 0.012, 0.05, 0.025, 0.1, 0.2, 0.25, 0.5 and 1.0mm)

GS20582** **CaF2 Demountable Heatable Liquid Cells** 1/16" Swagelok fittings for flow purposes. (Specify pathlength from 0.006, 0.012, 0.025, 0.05, 0.1, 0.2, 0.25, 0.5 and 1.0mm)

GS20583** **BaF2 Demountable Heatable Liquid Cells** 1/16" Swagelok fittings for flow purposes (Specify pathlength from 0.006, 0.012, 0.025, 0.05, 0.1, 0.2, 0.25, 0.5 and 1.0mm)

P/N GS20570/80

Key features

- Choice of pathlength
- Sealed or demountable cells
- Variety of window materials
- Flow mode

GS20586** **ZnSe Demountable Heatable Liquid Cells** with 1/16" Swagelok fittings for flow purposes (Specify pathlength from 0.006, 0.012, 0.025, 0.05, 0.1, 0.2, 0.25, 0.5 and 1.0mm)

Heatable Flow Cell

GS20569 **Heatable Liquid Flow Cell ESK**

* Includes a complete cell with front flow plate, top lead gasket, top window, lead spacer and bottom window all sealed together.

** Includes a complete cell with front flow plate, top PTFE gasket, top window, PTFE or Mylar spacer (choice of pathlengths) and bottom window that can be separated from each other.

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High Pressure Liquid Cell

High Pressure Liquid Cell

Specac produce High Pressure Liquid Cells that are capable of being operated to 5000psi with Sapphire or Spectrosil B windows and 2000psi with ZnSe windows. The pathlength of these cells can be 0.1mm, 0.2mm, 0.5mm, 1.0mm, 2mm, 5mm or 10mm as standard. The windows are permanently sealed in their window housing assemblies using Viton material O-rings and for most purposes the cells are rated to 180°C temperature operation. The cells as standard are provided with their own 3" x 2" mounting plate, which can be removed if the cell is placed into a heating accessory.

There are two 1/16" stainless steel flow tubes brazed to the High Pressure Liquid Cell body to introduce the fluid to the inner chamber of the cell. The cell can be filled for static operation or for flow. There is no security valve or over-pressurization device fitted as standard to the cell, but because the flow tubing is connected via Swagelok fittings, a safety device could be attached in line at this point to the Swagelok connections if required.

To be heated, the High Pressure Liquid Cell requires a heating device such as the Electrical Heating Jacket and temperature controller (GS20730), or the Variable Temperature Cell holder and temperature controller (GS21525).

Either heating accessory is designed to fit into the sampling compartment of a spectrometer via the standard 3" x 2" mounting plate, with the High Pressure Liquid Cell fitting directly into the Electrical Heating Jacket or the cell holder part of the Variable Temperature Cell holder. As an additional mounting option, the Variable Temperature Cell Holder can also be installed into a spectrometer via an appropriate Benchmark™ Baseplate.

For a volume of fluid needed to fill the High Pressure Liquid Cell, the smallest pathlength cell at 0.1mm requires approximately 15 microliters of fluid, whereas the 10mm pathlength cell requires 15 milliliters. This is the approximate amount of fluid that will be contained in the inner cell chamber at any time, irrespective of it being operated for static or flow conditions.

As standard the High Pressure Cells are fabricated in EN58 stainless steel but other materials are available on request.

Key features

- Choice of pathlength
- Sealed to ensure pressure capability
- Choice of windows from ZnSe, Spec B or sapphire

ordering information

GS05910 **High Pressure Short Pathlength Cell** 2000 psi (Specify pathlength from 0.5, 1 and 2mm and window material from ZnSe, Sapphire and Spec B)

GS05915 **High Pressure Short Pathlength Cell** 5000 psi (Specify pathlength from 0.5, 1 and 2mm and window material from Sapphire or Spec B)

GS05920 **High Pressure Long Pathlength Cell** 2000 psi (Specify pathlength from 5 and 10mm and window material from ZnSe, Sapphire and Spec B)

GS05925 **High Pressure Long Pathlength Cell** 5000 psi (Specify pathlength from 5 and 10mm and window material from Sapphire and Spec B)

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Sample Cell Holders introduction

Advanced Solid and Liquid Sample Cell Holders for Variable Temperature, Pressure and flow conditions.

Specac offers a range of transmission accessories to allow a sample to be studied at temperatures other than ambient.

The Variable Temperature Cell holder (P/N GS21525) can be used for the temperature range of -190°C to 250°C and the Electrical Heating Jacket (P/N GS20730) is used for temperatures from ambient to 250°C. Specific sample cell holders for liquids and solids are used within these accessories.

These are known as GS20500/GS20510 Series liquid cells and GS20600 and GS20610 solid cells. Liquid cells are supplied with windows from a wide range of materials, to suit for specific sample applications. (A comprehensive list of IR transmitting materials and their properties can be found at the back of the Specac catalogue.)

All of the sample cells can also be operated at ambient temperature and pressure when used with the 3" x 2" mount sample holder (P/N GS20740). For experiments at high pressures, High Pressure Heatable Liquid Flow Cells (P/N GS05910) series can be used in the Electrical Heating Jacket and Variable Temperature Cell holder. These cells are supplied with their own 3" x 2" mounting plate for use in Spectrometers at ambient temperature.

20500/20510 Series Liquid Cells Solids Holders & High Pressure Liquid Cells and Mount Holders compatibility table

Key: ■ = compatible *Cell holder/Mount**

Cell Series Type	*VT Cell / GS21525**	*EHJ / GS20730**	*WHJ / GS20710**	*Ambient / GS20740**
Liquid Cells				
GS20500 Sealed/Static	■	■	■	■
GS20510 Demountable/Static	■	■	■	■
GS20560 VT Cell Sealed/Flow	■	■	■	■
GS20570 EHJ Sealed/Flow		■	■	■
GS20580 EHJ Demountable/Flow		■	■	■
GS20590 VT Cell Demountable/Flow	■	■	■	■
Solids Holders				
GS20600		■	■	■
GS20610	■		■	■
High Pressure Liquid Cells				
GS05910	■	■	■	
GS05915	■	■	■	
GS05920	■	■	■	
GS05925	■	■	■	

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Variable Temperature Cell Holder

For the analysis of liquids or solids between -190°C and 250°C.

Variable Temperature Cell Holder

The Variable Temperature Cell Holder P/N GS21525 is the ideal accessory to use for the transmission study of liquid or solid samples at various temperatures ranging from -190°C to 250°C.

The Variable Temperature Cell Holder consists of a vacuum jacket with two window ports and a set of windows (NaCl as standard) which contains a refrigerant dewar/cell holder assembly. Liquid or solid sample holders are inserted into the heating block part of the dewar/cell holder and the assembled cell is operated within a vacuum environment maintained by the outer jacket.

Using a combination of refrigerant and control from the cell block heaters any temperature from -190°C to 250°C can be achieved. Choice of window materials for both the jacket and sample cell holders allows for use of this accessory in the UV, visible and IR regions.

The Variable Temperature Cell Holder is supplied with a high stability controller with a factory fitted option for control via RS232, RS485 or USB connectivity if ordered.

For certain applications such as Raman, Fluorescence and UV spectral measurements Specac offer a four window port version on the vacuum jacket as the Variable Temperature Cuvette Holder (GS21530), special quartz glass cuvettes are used to contain a liquid sample. The four window ports allow for collection of the scattered radiation from a cuvette cell at a 90 deg incident angle as well as at a 180 deg (standard tranmission) as measured from the Variable Temperature Cell Holder (GS21525). (Note cuvettes not supplied by Specac).

Key features

- Programmable controlled temperatures from -190°C to 250°C
- Dewar cooling system
- Heated Jacket windows to prevent condensation
- Flow mode option kit for liquids
- Benchmark™ Baseplate or 3"x2" mounting options

Applications

- Analysis under extreme temperature conditions
- Absorption band study at low temperatures
- Polymerization studies
- Phase transition studies
- Reaction kinetics
- Polymorphism
- Catalysis
- Oxidation studies

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Variable Temperature Cell Holder

ordering information

GS21525 Variable Temperature Cell Holder
Includes: Refrigerant dewar/cell holder
2 window port vacuum jacket with pair of NaCl windows (P/N GS 20800)
Fixed thermocouple (copper-constantan)
Low voltage supply cables
High Stability Temperature Controller with factory fitted option for control via RS232, RS485 or USB connectivity if ordered
This accessory also requires a liquid or solids sample holder (see pages 53 - 58)

Please specify spectrometer make and model for Baseplate version. For controller specify 220V or 110V and country of usage

GS21530 4 Port Variable Temperature Cuvette holder
Includes: Refrigerant dewar/cell holder
4 window port vacuum jacket with 2 pairs of Spectrosil-B quartz glass windows (P/N GS 20898)
Fixed thermocouple (copper-constantan)
Low voltage supply cables
High Stability Temperature Controller with factory fitted option for control via RS232, RS485 or USB connectivity if ordered

Please specify spectrometer make and model for Baseplate version. For controller specify 220V or 110V and country of usage

Replacement Windows for Variable Temperature Cell

GS20800 Pair of NaCl windows
GS20801 Pair of KBr windows
GS20802 Pair of CaF2 windows
GS20803 Pair of BaF2 windows
GS20812 Pair of Polyethylene windows
GS20896 Pair of ZnSe windows
GS20898 Pair of Spec B (UV) windows

Spares for Variable Temperature Cell holder

GS20200 Monitoring Thermocouple (copper-constantan)
GS20201 System Control Thermocouple (copper-constantan)
GS20810 Replacement set of O-rings
GS21526 VT Cell Holder ESK

Options

GS28000 RS232 Connection kit
GS28001 USB Connection kit
GS28002 RS485 Connection kit

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Electrical Heating Jacket

For liquid and solid sampling in transmission from ambient to 250°C

Electrical Heating Jacket

The Electrical Heating Jacket P/N GS20730, is used for the study of samples by transmission spectroscopy over a temperature range from ambient to 250°C. It consists of a central heatable chamber with a front cover plate. Liquid and solid sample cells are placed within the central chamber and held in place by the cover plate. The whole assembly (Jacket plus sample cell) is installed into a spectrometer sample compartment via the 3" x 2" slide mounting plate.

Heating to the Jacket is provided by its own dedicated low voltage (30 Volts) temperature controlling system, that is provided with the Heating Jacket as standard. A water cooling back plate incorporated into the 3" x 2" slide mounting plate of the Jacket acts to keep any heat at the central chamber from spreading to the mount area of the sample compartment during operation.

For the study of liquid samples, the liquid cells of the (GS20500/20510) Series type (static and flow versions) are placed into the Electrical Heating Jackets central chamber. If solid samples are to be analysed, then the specific solids holder (GS20600) is used within the Electrical Heating Jacket.

The Electrical Heating Jacket is supplied with a high stability power controller with a factory fitted option for control via RS232, RS485 or USB connectivity if ordered.

Key features

- Programmable controlled temps. up to 250°C
- Static or flow sampling capabilities
- Fully CE Safety compliant
- Protective water cooling system
- Standard 3" x 2" slide mount

ordering information

GS20730 **Electrical Heating Jacket**
Includes: Low voltage heated jacket with water cooling system NiCr/NiAl thermocouple
High Stability Temperature Controller factory fitted option for control via RS232, RS485 or USB connectivity if ordered
This accessory also requires a liquid or solids sample cell (See pages 51 - 57)

Please specify 220V or 110V and country of usage

Options

GS28000 **RS232 Connection kit**
GS28001 **USB Connection kit**
GS28002 **RS485 Connection kit**

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Water Heating Jacket

For liquid and solid sampling in transmission to 90°C.

Water Heating Jacket

The Water Heating Jacket is similar to the Electrical Heating Jacket, but it uses circulating water to heat the sample cell. A jacket around the circular aperture is filled with a solution, for example water, heated by a thermocirculating system.

Temperature control of the sample holder is reliant upon this thermocirculating system.

The sample cell holders used with Electrical Heating Jacket can also be used in this accessory.

ordering information

GS20710 **Water Heating Jacket**

Includes, Water Heating Jacket on a 3" x 2" mount

Requires, but does not include:

1. A liquid or solid sample cell
2. Thermocirculating system

Ambient Temperature Cell Holder

The Ambient Temperature Cell Holder has been designed to hold a variety of liquid and solid sample cell holders at ambient temperatures.

ordering information

GS20740 **Ambient Temperature Cell Holder**

Requires, but does not include:
Liquid or solid sample cell

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Advanced Solid Sampling Cells

Choice of sample sizes from 12mm to 30mm diameter and 0.1mm to 8mm thick.

P/N GS20600

P/N GS20610

There are two types of solids holder, P/N GS20600 and P/N GS20610. P/N GS20600 is used in the Electrical Heating Jacket P/N GS20730.

The body has a fixed size aperture of 10mm and hence solid samples can be analysed from 12mm to 28mm dia. and up to 3mm thick.

P/N GS20610 is used in the Variable Temperature Cell Holder P/N GS21525. The solids holder consists of outer and inner cell threaded bodies and three pairs of pressure plates. The varying aperture sizes of the pressure plates enable samples with a diameter of 12 - 17mm, 17 - 22mm and 22 - 30mm and thicknesses of a few microns to 8mm thick to be analysed.

Both of the solids holders do not require any windows for operation.

ordering information

GS20600 **Solids Holder for Heating Jackets** P/N GS20730 and P/N GS20710

GS20610 **Solids Holder for Variable Temperature Cell** P/N GS21525

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