PIKE TECHNOLOGIES

TRANSMISSION

Transmission sampling is a popular method for the collection of infrared spectra for qualitative or quantitative analysis. Samples range from solids to liquids and gases. Applying automation technologies to transmission sampling can improve precision and workflow efficiency.

Automated Vertical Accessories
Multi-SamplIR™ and RotatIR™

Automated Horizontal Multi-Sample System
High capacity sampling

XY Autosampler
For high-throughput microplate format sampling

Liquid Cells
For comprehensive sampling of liquids

Dies, Presses, Grinders
For complete solids preparation

Holders, Windows, Polishing Kit
For optimizing transmission sampling

Gas Cells
Short-Path, Long-Path and Heated
For comprehensive gas sampling

THEORY AND APPLICATIONS INCLUDED

PIKE TECHNOLOGIES, INC., 6125 COTTONWOOD DRIVE, MADISON, WI 53719
(608) 274-2721 · WWW.PIKETECH.COM · SALES@PIKETECH.COM

Transmission Multi-SamplIR – *Automated In-Sample Compartment Accessory*

Features

- In-compartment automated transmission sampling
- Selectable number of samples, size, configuration and placement
- Multiple point analysis on single sample
- Custom sampling plates
- Fully automated and manual versions available

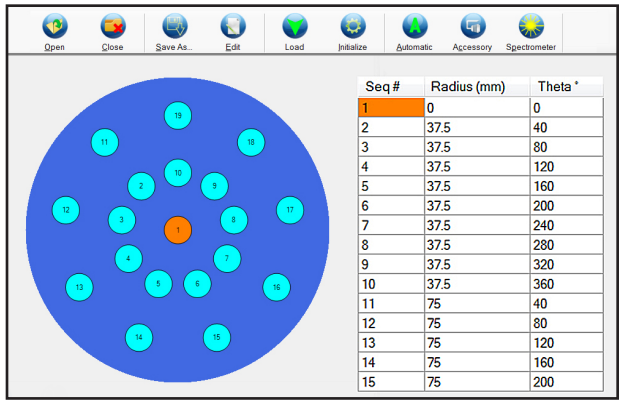
The PIKE Technologies Transmission Multi-SamplIR accessory is designed to speed FTIR analysis. The accessory accommodates up to 18 samples (depending on sampling plate configuration) for unattended analysis. Flexible test sequences are easily defined and automatically implemented. This Multi-SamplIR is ideal for analyzing a wide range of materials including films, slides, pellets, windows and large area samples like multilayer coated substrates.

Samples are conveniently mounted onto a sampling plate and held in place during the analysis. The plates can be configured for different sample quantities, types and geometries. The system can be set to perform automated mapping of the sample, producing transmission spectra as a function of position. Sampling plates are easily mounted on the support ring with spring-loaded clips, ensuring that the plate remains precisely located and correctly registered. The support ring mounts on the accessory's drive and is rotated and translated laterally through a distance of 75 mm to produce an R-theta motion covering the entire sampling range of the accessory.

Each system incorporates two precision stepper motors for rotation and translation of the plate. The motors are driven by the PIKE Motion Control Unit.

The operation is managed by PIKE Technologies' AutoPRO software, which provides full user programmability and an easy-to-learn "point-and-click" environment. Polar or X, Y coordinates may be used to define test points. AutoPRO software allows complex test sequences to be set up, stored as methods and implemented with full flexibility. Spectral data collection of pre-defined positions may be initiated through AutoPRO when using most FTIR spectrometers. The USB Motion Control Unit incorporates a smart power supply and works with 85–265 VAC, 47–63 Hz power lines.

The Transmission Multi-SamplIR accessory is designed to fit most FTIR spectrometers. Please contact us for more product details.



Seq #	Radius (mm)	Theta °
1	0	0
2	37.5	40
3	37.5	80
4	37.5	120
5	37.5	160
6	37.5	200
7	37.5	240
8	37.5	280
9	37.5	320
10	37.5	360
11	75	40
12	75	80
13	75	120
14	75	160
15	75	200

AutoPRO software configured for the Transmission Multi-SamplIR.

Ordering Information

Part Number	Description
074-26XX	Automated Transmission Multi-SamplIR for FTIR *Includes AutoPRO software and a motion control unit (85–265 VAC), and a Standard Sampling Plate for 13-mm pellets (18 positions)*

Notes: Replace XX with your spectrometer's Instrument Code. Click for List >
This accessory requires a minimum FTIR beam height of 3.5".

Options

Part Number	Description
074-3661	Additional Standard Sampling Plate

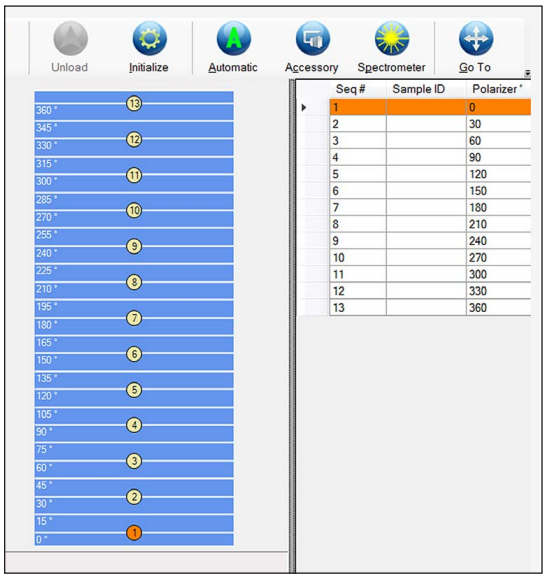
Note: If you need custom sampling plates or options not described here, please contact us.

RotatIR –
Automated Rotating Sample Stage

The RotatIR features a standard 2 x 3" slide mount for easy positioning of different types of transmission sample holders.

AutoPRO software allows complex test sequences to be setup, stored as methods and implemented with full flexibility. The USB Motion Control Unit incorporates a smart power supply and works with 85–265 VAC, 47–63 Hz power lines.

The PIKE RotatIR accessory is designed to fit most FTIR spectrometers. Please contact us for more product details.



AutoPRO software for programming pre-defined angles.

Features

- **Automated selection of sample transmission angle**
- **Programmable from 0 to 360 degrees with resolution of 0.2 degree**
- **Automated collection of spectra at the defined angle of transmission via AutoPRO software**
- **Compatible with most FTIR systems**

The PIKE Technologies RotatIR is designed for automated selection of the sample transmission angle relative to the IR beam in the FTIR sample compartment. Applications include the study of sample thickness and sample reflectivity. Selection of the angle of transmission is automated through the use of PIKE Technologies AutoPRO software, the Motor Control Unit and the integrated stepper motor. Spectral data collection of pre-defined angles may be initiated through AutoPRO when using most FTIR spectrometers.

Ordering Information

Part Number	Description
091-20XX	RotatIR Automated Rotating Sample Stage *Includes AutoPRO software and a Motion Control Unit (85–265 VAC)*

Note: Replace XX with your spectrometer's Instrument Code. Click for List >

Options

Part Number	Description
162-5400	Film Sampling Card, 20-mm clear aperture (10 ea.)

Note: If you need options not described here, please contact us.

Film sampling cards for the RotatIR accessory.

Automated Horizontal Transmission Accessory – *For Films or Pellets*

Features

- **Fully automated transmission analysis of polymer films, pellets or other transmission samples for FTIR**
- **Standard specular reflectance sampling**
- **Sampling capacity of up to 114 samples, depending upon size**
- **Continuous operation with multiple plates**
- **Purgeable optical design for high-quality FTIR spectra**

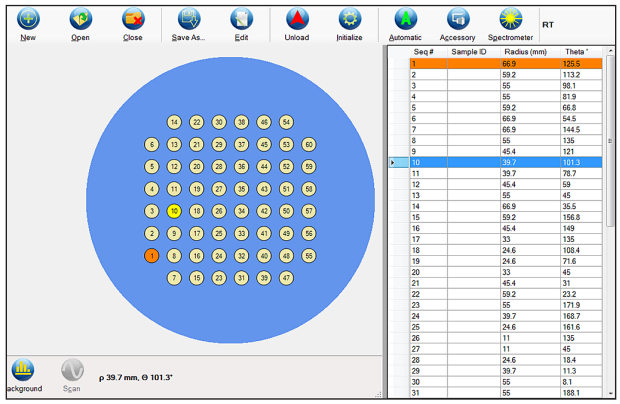
PIKE Technologies offers the Automated Horizontal Transmission Accessory for increasing sample throughput for analysis of films and pellet samples.

The Automated Horizontal Transmission Accessory is available in an 8" or a 12" version depending upon sample loading requirements. The 8" version will accommodate up to 37 25-mm diameter samples. The 12" version will accommodate up to 83 25-mm diameter samples. PIKE Technologies manufactures custom sampling plates to meet your exact sampling needs. Please contact us for other configurations.

Both the 8" and 12" versions are capable of performing specular reflection analysis as well as transmission analysis, if required for your application.

The operation is managed by PIKE Technologies' AutoPRO software, which provides full user programmability and an easy-to-learn "point-and-click" environment. AutoPRO software allows complex test sequences to be set up, stored as methods and implemented with full flexibility. Data collection of pre-defined positions may be initiated through AutoPRO when using most FTIR spectrometers. The Motion Control Unit incorporates a smart power supply and works with 85–265 VAC, 47–63 Hz power lines.

The Automated Horizontal Transmission Accessory is compatible with most FTIR spectrometers.



The PIKE Autosamplers are controlled by AutoPRO software, with a point-and-click user environment to define sampling positions.

Ordering Information

Part Number	Description
075-28XX	Automated 8" Horizontal Transmission Accessory *Includes motion control unit (85–265 VAC), AutoPRO software and one 37-position sampling plate*
075-29XX	Purge-Ready Automated 8" Horizontal Transmission Accy *Includes motion control unit (85–265 VAC), AutoPRO software and one 37-position sampling plate (order Purge Enclosure separately)*
076-28XX	Automated 12" Horizontal Transmission Accessory *Includes motion control unit (85–265 VAC), AutoPRO software and one 83-position sampling plate*

Notes: Replace XX with your spectrometer's Instrument Code. Click for List >
P/N 076-28XX is purge-ready; order purge enclosure separately.

Options

Part Number	Description
075-3881	Additional Sampling Plate for 8" Automated Horizontal Transmission Accessory
076-3881	Additional Sampling Plate for 12" Automated Horizontal Transmission Accessory
016-3000	Purge Enclosure for 8" Horizontal Transmission Accessory
017-3000	Purge Enclosure for 12" Horizontal Transmission Accessory

Notes: Purge enclosures will not fit all spectrometer models. For more options or custom plates, please contact PIKE Technologies.

XY Autosampler – *Transmission and Reflection, Automated Sampling in Microplate Format*

Features

- **Complete hardware and software package for automated analysis with standard 24-, 48-, or 96-well plates. Special plate configurations available.**
- **Diffuse reflectance of powdered samples or specular reflectance sampling for reaction residues**
- **Gold-coated optics version for highest performance mid-IR and near-IR sampling**
- **Optional transmission sampling with integrated DTGS or InGaAs detector**
- **Fully enclosed, purgeable design with CD-style loading tray**
- **In-compartment mounting, compatible with most FTIR spectrometers**

The PIKE Technologies XY Autosampler is designed around standard 24-, 48- or 96-well microplate architectures – ideal for high-efficiency sample loading and FTIR analysis. The loading tray moves to a position outside of the accessory for easy loading and unloading of samples while conserving the purge. This also permits interface to a robot/autoloader.

Applications include high throughput analysis of liquid residues and chemical reactions, powdered samples, and automated diffuse reflection analysis. The XY Autosampler is available with standard all reflective aluminum optics or with gold-coated optical components for highest performance in mid-IR and optimized NIR sampling.

The optical design of the XY Autosampler is based upon a precision ellipsoidal reflector. The size of the spot illuminated at the sample is approximately 2 mm – ideal for up to 96-well configurations. The accessory is compatible with most FTIR spectrometers.

Specifications

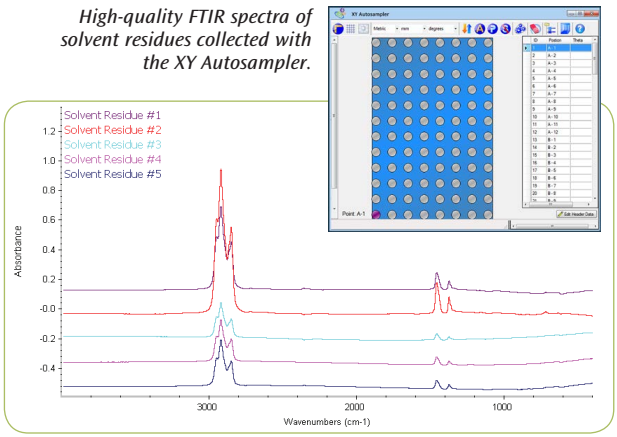
Optics	Elliptical – 3X beam demagnification
Accuracy	+/- 25 µm
Mechanical Specifications	
Repeatability	+/- 5 µm
Resolution	1 µm
Minimum Run Time	56 seconds for 96-well plate (actual time is spectrometer and application dependent)
Computer Interface	USB
Dimensions (W x D x H)	159 x 336 x 141 mm (including micrometer)
Weight	4.6 kg

A unique 96-well silicon plate is available for mid-IR sample analysis by transmission. For diffuse reflection measurements a dedicated plate is available featuring 96 polished cavities for placement of powder samples. Please contact us if you require specialized sampling plate configurations.

The XY Autosampler features an X, Y stage with both axes driven by high-precision servo motors with optical encoders for speed and reproducibility. USB and DC power are the only external connections required for this accessory. The transmission option requires a spectrometer external IR detector port.

Programming and control of the XY Autosampler is done through PIKE Technologies' AutoPRO software, which can be integrated easily with most FTIR software packages.

High-quality FTIR spectra of solvent residues collected with the XY Autosampler.



Ordering Information

Part Number	Description
047-22XX	XY Autosampler – Diffuse Reflectance/Transmission *Includes AutoPRO software, integrated **DTGS detector**, 96-well diffuse reflectance and 96-well transmission sampling plates*
047-62XX	XY Autosampler – Diffuse Reflectance/Transmission with Gold-Coated Optics *Includes AutoPRO software, integrated **DTGS detector**, 96-well diffuse reflectance and 96-well transmission sampling plates*
047-23XX	XY Autosampler – Diffuse Reflectance/Transmission *Includes AutoPRO software, integrated **InGaAs detector**, 96-well diffuse reflectance sampling plate*
047-63XX	XY Autosampler – Diffuse Reflectance/Transmission with Gold-Coated Optics *Includes AutoPRO software, integrated **InGaAs detector**, 96-well diffuse reflectance sampling plate*

Notes: Replace XX with your spectrometer's Instrument Code. Click for List >
For transmission option your spectrometer must be capable of interfacing with an external detector. A glass-bottom well plate is recommended for NIR transmission measurements. For diffuse-only options of this accessory, please see the Diffuse Reflectance section.

Options

Part Number	Description
073-9110	96-Well Diffuse Reflectance Sampling Plate
073-9130	96-Well Si Transmission Sampling Plate

Press-On Demountable Cell – *For Viscous Liquids and Mulls*

The PIKE Technologies Press-On Demountable Liquid Cell is recommended for fast and convenient qualitative analysis of viscous liquids and mull samples. Simply spot the sample onto the middle of the transparent IR window and slip the second window over the top. The windows are conveniently held in place by the friction fit of the Demountable Cell Holder. The Press-On Demountable Cell is available in 2 sizes – 25-mm and 32-mm diameter and has optional Teflon spacers to assist with sampling pathlength. A wide variety of window types and spacer pathlengths are available to cover NIR, mid-IR and far-IR spectral regions and sample composition from organic to aqueous.

The PIKE Technologies Press-On Demountable Liquid Cell is designed with a standard 2" x 3" plate for use with all FTIR spectrometers.

Features

- **Flexible window selection for optimizing spectral range and sample compatibility**
- **Demountable cell design for optimal cleaning of difficult samples**
- **Compatible with all FTIR spectrometers**

Ordering Information

Press-On Demountable Liquid Cell Holders

Part Number	Description
162-3600	Press-On Demountable Liquid Cell Holder for 25-mm Windows *Includes cell holder, and O-ring*
162-3610	Press-On Demountable Liquid Cell Holder for 32-mm Windows *Includes cell holder, and O-ring*

Windows for Press-On Demountable Liquid Cell

(select minimum of 2)

Part Number		
25 x 4 mm	32 x 3 mm	Description
160-1217	160-1147	BaF_2
160-1211	160-1143	CaF_2
160-1138	160-1137	Ge
160-1133	160-1132	KBr
160-1127	160-1126	KRS-5
160-1124	160-1122	NaCl
160-5214	160-5216	Polyethylene
160-1116	160-1159	Si
160-1114	160-1113	ZnSe

Spacers for Press-On Demountable Liquid Cell *(Optional)*

Part Number		
25 mm	32 mm	Pathlength (mm)
162-1110	162-1210	0.015
162-1120	162-1220	0.025
162-1130	162-1230	0.050
162-1140	162-1240	0.100
162-1150	162-1250	0.200
162-1160	162-1260	0.500
162-1170	162-1270	1.000
162-1190	162-1290	Assortment

Notes: Spacer pathlength packages above include 12 each of the spacers. The assortment package includes 2 each of the different pathlengths.

Replacement Parts

Part Number	Description
162-3621	Viton® O-Rings for barrel, 25 mm (12 ea.)
162-1330	Viton O-Rings for barrel, 32 mm (12 ea.)
162-3620	Teflon® O-Ring, 25 mm (12 ea.)
162-1320	Teflon O-Ring 32 mm (12 ea.)

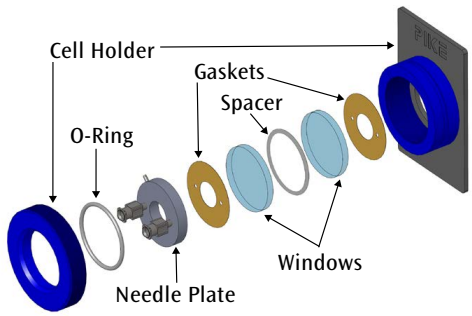
Note: For more options for the Press-On Demountable Liquid Cell, please contact PIKE Technologies.

Demountable Liquid Cells –
For Versatile Pathlength Liquid Sampling

The PIKE Technologies Demountable Liquid Cell is ideal for qualitative and quantitative analysis of liquid samples where it is desirable to optimize the pathlength for varying samples. It is well suited for samples where it is useful to disassemble the cell for cleaning. A wide selection of window types and spacer pathlengths are available to cover mid-IR, NIR and far-IR spectral regions and sample composition from organic to aqueous.

The PIKE Technologies Demountable Liquid Cell is designed with a standard 2" x 3" plate for use with all FTIR spectrometers. The needle plate includes Luer-Lok™ fittings for easy syringe filling of the sample. The window size is 32 x 3 mm and the clear aperture of the cell is 13 mm.

An O-ring seal option of the demountable cell replaces the flat sealing gasket with two small O-rings to seal around the drilled window filling holes. This modified needle plate version is recommended for users with highly volatile, low surface tension samples and low pressure flow experiments.



Demountable liquid cell assembly layout.

Features

- **Flexible window selection for optimizing spectral range and sample compatibility**
- **Flexible pathlength to optimize sample absorbance**
- **Demountable cell design for optimal cleaning of difficult samples**
- **Compatible with all FTIR spectrometers**
- **Temperature control version available (see page 98)**

Ordering Information

Demountable Liquid Cell Holders

Part Number	Description
162-1100	Demountable Liquid Cell Holder *Includes cell holder, gaskets and one complete set of spacers – select windows below*
162-1200	Demountable Liquid Cell Holder with O-ring Seal *Includes cell holder, gasket, perfluoroelastomer O-rings and one complete set of spacers – select windows below*

Notes: Requires selection of windows. Please select 2 syringes from the next column for filling the demountable liquid cell.

32 x 3 mm Windows for Demountable Liquid Cell

(must select minimum of 1 Plain and 1 Drilled)

Part Number		
Plain	Drilled	Description
160-1147	160-1146	BaF_2
160-1143	160-1142	CaF_2
160-1137	160-1136	Ge
160-1132	160-1131	KBr
160-1126	160-1125	KRS-5
160-1122	160-1121	NaCl
160-5216	160-5215	Polyethylene
160-1159	160-1158	Si
160-1113	160-1112	ZnSe

Notes: Demountable Liquid Cell Holder with O-ring Seal (PN 162-1200) is recommended with polyethylene windows.

Spacers for Demountable Liquid Cell *(optional)*

Part Number	Pathlength (mm)
162-1210	0.015
162-1220	0.025
162-1230	0.050
162-1240	0.100
162-1250	0.200
162-1260	0.500
162-1270	1.000
162-1290	Assortment

Notes: Spacer pathlength packages above include 12 each of the spacers. The assortment package includes 2 each of the different pathlengths.

Replacement Parts

Part Number	Description
162-1104	Demountable Liquid Cell Needle Plate
162-1113	Demountable Alignment Caps (2 ea.)
162-1112	Nylon Leur Caps (2 ea.)
162-1300	Teflon Stoppers for Needle Plate (12 ea.)
162-1310	Teflon Gaskets (12 ea.)
162-1320	Teflon O-Rings (12 ea.)
161-0520	Glass Syringe, 1 mL
161-0521	Glass Syringe, 2 mL
161-0522	Glass Syringe, 5 mL

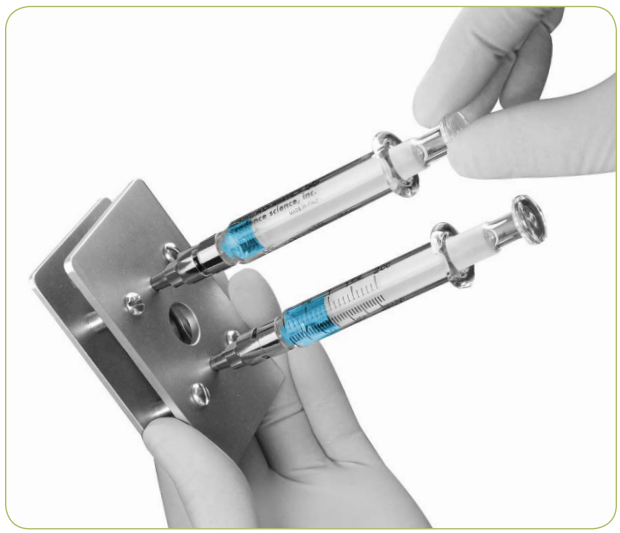
Note: For more options, please contact PIKE Technologies.

Super-Sealed Liquid Cells –
For Precision, Fixed Pathlength Liquid Sampling

The PIKE Technologies Super-Sealed Liquid Cells are ideal for quantitative analysis of liquid samples, especially where precise, reproducible pathlength is required. They are designed to be leak-proof for long-lasting sampling and cost efficiency.

The cells are amalgamated, further sealed with epoxy, and held firmly within the standard 2" x 3" slide mount card compatible with all FTIR spectrometers. Each Super-Sealed Liquid Cell includes Luer-Lok fittings for easy syringe filling of the sample. The clear aperture of the assembled cell is 13 mm.

The PIKE Technologies Super-Sealed Cells are available in a wide variety of window materials and sampling pathlengths.



Features

- Permanently mounted cell with fixed pathlength to provide maximum reproducibility of sample absorbance
- Flexible window selection for optimizing spectral range and sample compatibility
- Full range of cell pathlengths for optimized quantitative measurements
- Compatible with all FTIR spectrometers

Ordering Information

Super-Sealed Liquid Cells – Window Options

Path (mm)	0.015	0.025	0.05	0.10	0.15	0.20	0.50	1.0	5.0	10.0
Volume (mL)	**0.005**	**0.009**	**0.018**	**0.036**	**0.054**	**0.072**	**0.18**	**0.36**	**1.80**	**3.60**
BaF_2	162-1640	162-1641	162-1642	162-1643	162-1649	162-1644	162-1645	162-1646	162-1647	162-1648
CaF_2	162-1630	162-1631	162-1632	162-1634	162-1635	162-1636	162-1633	162-1637	162-1638	162-1639
CsI	162-1680	162-1681	162-1682	162-1683	162-1689	162-1684	162-1685	162-1686	162-1687	162-1688
KBr	162-1620	162-1621	162-1622	162-1623	162-1624	162-1625	162-1626	162-1627	162-1628	162-1629
KRS-5	162-1660	162-1661	162-1662	162-1663	162-1669	162-1664	162-1665	162-1666	162-1667	162-1668
NaCl	162-1610	162-1611	162-1612	162-1613	162-1614	162-1615	162-1616	162-1617	162-1618	162-1619
SiO_2	162-1609	162-1601	162-1602	162-1603	162-1690	162-1604	162-1605	162-1606	162-1607	162-1608
ZnSe	162-1650	162-1651	162-1652	162-1653	162-1659	162-1654	162-1655	162-1656	162-1657	162-1658
ZnS	162-1670	162-1671	162-1672	162-1673	162-1679	162-1674	162-1675	162-1676	162-1677	162-1678

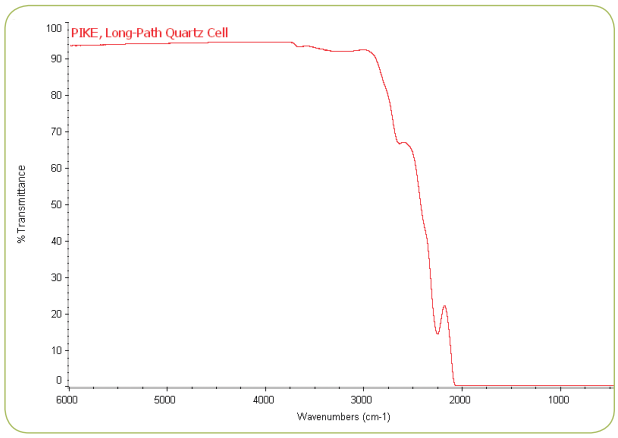
Notes: *Please select 2 syringes (below) for filling the Super-Sealed Cell.* All Super-Sealed Cells include Teflon® stoppers.

Options and Replacement Parts

Part Number	Description
161-0520	Glass Syringe, 1 mL
161-0521	Glass Syringe, 2 mL
161-0522	Glass Syringe, 5 mL
162-1300	Teflon Stoppers (12 ea.)

Note: For other options please contact PIKE Technologies.

Long-Path Quartz Liquid Cells –
For Analysis of Hydrocarbon Content and Related Measurements



Spectrum of 10-mm Long-Path Quartz Cell.

Features

- **For the analysis of hydrocarbon content of water, soil and other environmental samples**
- **For analysis of polymer additives after extraction**
- **Highest quality quartz cells for clear infrared spectral transmission and optimized result**

The PIKE Technologies Long-Path Quartz Liquid Cells are ideal for the quantitative analysis of hydrocarbons in water and soil samples or for the analysis of additive content in polymers after extraction. Sample extracts are easily transferred to the quartz cells for infrared analysis. Pathlengths ranging from 10 mm to 100 mm are available for optimization of the sample absorbance. The cells are manufactured of special grade IR quartz which is fully transparent in the hydrocarbon absorbance region. The quartz cells are compatible with organic and aqueous solvents and are suitable for use with the D7066-04 ASTM method. A 2" x 3" slide mount holder is available for the cells.

Specifications

Cell Pathlength (mm)	Nominal Volume (mL)	Number of Stoppers
10	2.80	1
20	5.60	2
50	14.10	2
100	28.20	2

All cylindrical cells have an outside diameter of 22 mm and an inside diameter of 19 mm.

Ordering Information

Long-Path Quartz Liquid Cells

Part Number	Description
162-1801	Long-Path Quartz Cell, 10 mm
162-1802	Long-Path Quartz Cell, 20 mm
162-1805	Long-Path Quartz Cell, 50 mm
162-1810	Long-Path Quartz Cell, 100 mm

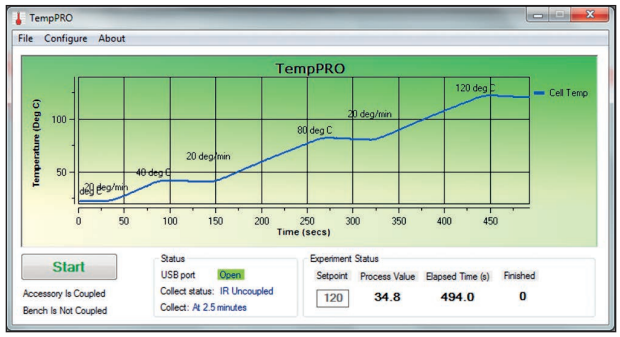
Notes: Cells include Teflon stoppers. Select slide sample holder below.

Holders for Long-Path Quartz Liquid Cell

Part Number	Description
161-2530	Slide Sample Holder, Quartz Cell, 10–20 mm
161-2540	Slide Sample Holder, Quartz Cell, 50 mm
161-2550	Slide Sample Holder, Quartz Cell, 100 mm

Note: Please contact PIKE Technologies for replacement Teflon stoppers and items not described on this list.

Falcon Mid-IR Transmission Accessory –
For Precise Temperature Control of Demountable Liquid Cells



PIKE TempPRO software for kinetic experiments.

Features

- **Peltier temperature control from 5 to 130 °C**
- **Wide selection of windows for optimizing spectral range and sample compatibility**
- **Flexible pathlength to control sample absorbance**
- **Demountable cell design for easy cleaning of difficult samples**
- **Available for most FTIR spectrometers**

The PIKE Technologies Falcon Mid-IR Transmission Accessory is recommended for qualitative and quantitative analysis of liquids and protein solutions where it is necessary to control the temperature of the sample. Temperature range of the accessory is 5 to 130 °C with +/- 0.5% accuracy. Heating and cooling is controlled by a built-in Peltier device providing for reproducible ramping and for reaching target temperatures quickly and reliably. The system is driven by a digital temperature controller – directly or via PC.

A wide variety of window types and spacer pathlengths are available for this product. Window options cover NIR, mid-IR and far-IR spectral regions and sample compositions from organic to aqueous. A complete transmission cell for use with the Falcon Mid-IR Accessory consists of two 32 mm x 3 mm size windows (drilled and undrilled), an assorted spacer set, the needle plate with Luer-Lok fittings, two gaskets and a proprietary cell mount.

The full Falcon configuration requires the accessory base with cell holder, user selected windows, and one of the available temperature controllers. The Falcon accessory is compatible with most brands of FTIR spectrometers.

Liquid Recirculator

Specifications

Temperature Control	Peltier (cooling and heating)
Temperature Range	5 to 130 °C
Accuracy	+/- 0.5%
Sensor Type	3 wire Pt RTD (low drift, high stability)
Temperature Controllers	
Digital	+/- 0.5% of set point
Digital PC	+/- 0.5% of set point, graphical setup, up to 20 ramps, USB interface
Input Voltage	90–264 V, auto setting, external power supply
Output Voltage	16 VDC/150 W max.
Dimensions (W x D x H)	89 x 121 x 83 mm (without FTIR baseplate and mount)

Notes: Peltier device must be water cooled for proper operation – this is achieved by running cold tap water through the water jacket integrated into the accessory shell, or by the use of an external liquid circulator.

Ordering Information

Part Number	Description
111-40XX	Falcon Mid-IR Base with Cell Holder *Includes temperature-controlled base, demountable cell, gaskets and one complete set of spacers. Select digital temperature controller (below) and windows (next page)*

Notes: Replace XX with your spectrometer's Instrument Code. Click for List >
Please select 2 syringes (next page) for filling the demountable liquid cell.

Temperature Controllers *(must select one)*

Part Number	Description
076-1230	Digital Temperature Control Module for Falcon Accessory
076-1430	Digital Temperature Control Module, PC Control for Falcon Accessory

Notes: Digital Temperature Control Module is required to control temperature. PC version includes PIKE TempPRO software.

Liquid Recirculator

Part Number	Description
170-1100	Liquid Recirculator

32 x 3 mm Windows for Falcon Demountable Liquid Cells

(must select minimum of 1 Plain and 1 Drilled)

Part Number		
Plain	Drilled	Description
160-1147	160-1146	BaF_2
160-1143	160-1142	CaF_2
160-1137	160-1136	Ge
160-1132	160-1131	KBr
160-1126	160-1125	KRS-5
160-1122	160-1121	NaCl
160-1159	160-1158	Si
160-1113	160-1112	ZnSe

Notes: For window compatibility please consult the Materials Properties table on page 125 of this catalog. For additional window selections please see page 111 of this catalog.

Demountable Liquid Cell Spacers *(Optional)*

Part Number	Pathlength (mm)
162-1210	0.015
162-1220	0.025
162-1230	0.050
162-1240	0.100
162-1250	0.200
162-1260	0.500
162-1270	1.000
162-1290	Assortment

Notes: Spacer packages above include 12 spacers. The assortment package includes 2 each of the different pathlengths.

Demountable Liquid Cell Replacement Parts

Part Number	Description
162-1600	Demountable Liquid Cell for the Falcon Mid-IR Accessory
162-1300	Teflon Stoppers (12 ea.)
162-1311	Viton Gasket, 32 mm (12 ea.)
162-1310	Teflon Gasket, 32 mm (12 ea.)
161-0520	Glass Syringe, 1 mL
161-0521	Glass Syringe, 2 mL
161-0522	Glass Syringe, 5 mL

Note: For other options for the Demountable Liquid Cell, please contact PIKE Technologies.

Falcon NIR Transmission Accessory – *Quantitative and Qualitative Analysis of Liquids under Precise Temperature Control*

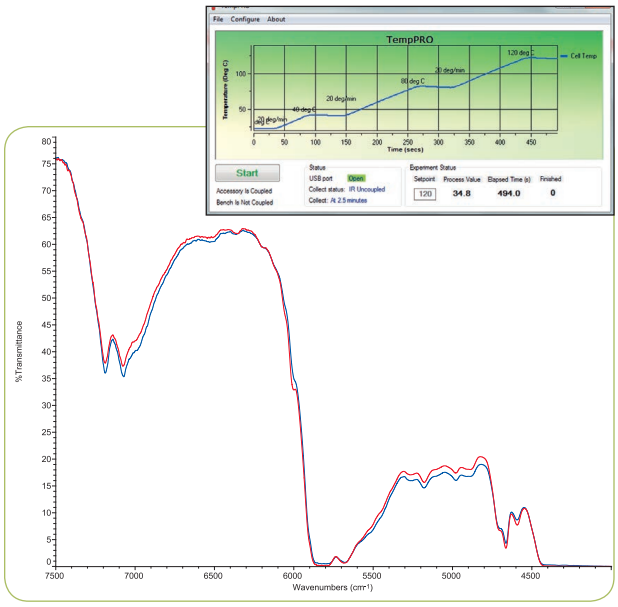
Features

- **Fast, easy quantitative and qualitative analysis of samples under precise Peltier temperature control**
- **Choice of cuvette and vial adapters**
- **Compatible with disposable 5-, 8- and 12-mm vials**
- **Excellent thermal accuracy and precision**
- **Available for most FTIR spectrometers**

The PIKE Technologies Falcon NIR Transmission Accessory is an excellent choice for quantitative and qualitative analysis of liquid samples in the NIR spectral region. Temperature range of the accessory is 5 to 130 °C with +/- 0.5% accuracy. Heating and cooling is controlled by a built-in Peltier device. The Peltier element provides for reproducible ramping and for reaching target temperatures quickly and reliably. The system is driven by a Digital Temperature Controller – directly or via PC.

Individual sample holders are designed to accommodate standard 5-mm, 8-mm and 12-mm glass vials and 1-cm cuvettes. Sample holders are pin-positioned to ensure maximum reproducibility.

The complete Falcon NIR configuration requires the accessory base, cell holder, and one of the available temperature controllers. The Falcon accessory is compatible with most brands of FTIR spectrometers.



NIR transmission spectra of cooking oils in 8-mm glass vials measured at 32 °C with the Falcon NIR Transmission Accessory.

Specifications

Temperature Control	Peltier (cooling and heating)
Temperature Range	5 to 130 °C
Accuracy	+/- 0.5%
Sensor Type	3 wire Pt RTD (low drift, high stability)
Temperature Controllers	
Digital	+/- 0.5% of set point
Digital PC	+/- 0.5% of set point, graphical setup, up to 20 ramps, USB interface
Input Voltage	90–264 V, auto setting, external power supply
Output Voltage	16 VDC/150 W max.
Dimensions (W x D x H)	89 x 121 x 83 mm (without FTIR baseplate and mount)

Notes: Peltier device must be water-cooled for proper operation – this is achieved by running cold tap water through the water jacket integrated into the accessory shell, or by the use of an external liquid circulator.

Ordering Information

Part Number	Description
110-60XX	Falcon NIR Base *Includes temperature-controlled base. Digital Temperature Controller and sample holder need to be selected from the tables below for a complete system.*

Note: Replace XX with your spectrometer's Instrument Code. Click for List >

Temperature Controllers *(must select one)*

Part Number	Description
076-1230	Digital Temperature Control Module
076-1430	Digital Temperature Control Module, PC Control

Notes: Digital Temperature Control Module is required to control temperature. PC version includes PIKE TempPRO software.

Sample Holders *(must select one or more)*

Part Number	Description
111-3610	Vial Holder, 5 mm
111-3620	Vial Holder, 8 mm
111-3630	Vial Holder, 12 mm
111-3640	Cuvette Holder, 1 cm

Options

Part Number	Description
162-0205	Glass Vials, 5 mm (200 ea.)
162-0208	Glass Vials, 8 mm (200 ea.)
162-0212	Glass Vials, 12 mm (200 ea.)
162-0255	Falcon Quartz Cuvette, 1 cm

Note: Please see more cuvette options on page 140.

Liquid Recirculator

Part Number	Description
170-1100	Liquid Recirculator

Cryostat190 – *Ultra-Low Temperature Accessory for Liquid and Solid Transmission Sampling*

Features

- **Temperature range is -190 to 150 °C**
- **Liquid and solids holders**
- **Cryostat cooling system with 10 L Dewar**
- **Fits most spectrometers**

The Cryostat190 is a temperature controlled transmission accessory for the spectroscopic analysis of liquids and solids. Using a liquid nitrogen cryostat in combination with resistive heating the accessory's temperature range is -190 to 150 °C.

The temperature control system uses a mass flow controller to precisely meter the liquid nitrogen flow to maintain steady sub-ambient temperatures or to control temperature ramping with accuracy. The 10 L Dewar provides cooling up to 10 hours, which is convenient for extended time studies and experiments that require long-term signal averaging.

Spectroscopic measurements at low temperatures may be performed to refine the absorbance bands, which are generally sharper and narrower, to reduce sample degradation and to investigate unstable intermediates.

Specifications

Dimensions (W x D x H)	130 x 130 x 287 mm (excludes baseplate and fittings)
Weight	3 kg
Accessory Body	Stainless steel
Clear Aperture	20 mm
Cooling Method	Liquid nitrogen
Cooling Hold Time	10 hours
Temperature Accuracy	+/- 1 °C (-190 °C to 150 °C) +/- 0.5 °C (-190 °C to 150 °C)
Temperature Sensor	RTD (PT100 Ω)
Operating Voltage	100 VAC
Operational Conditions	
Temperature Range	15–35 °C
Humidity Range	Below 90% RH
Pressure Range	Ambient

Note: Electrical transformer may be required.

Ordering Information

Part Number	Description
162-43XX	Cryostat190 *Includes Cryostat, 10 L liquid nitrogen Dewar, diaphragm pump for flow of the liquid nitrogen, temperature controller with mass flow controller*

Notes: Replace XX with your spectrometer's Instrument Code. Click for List >
Requires pump for vacuum (sold separately, see below).

Sample Holders *(must select one)*

Part Number	Description
162-4301	Cryostat190 Liquid Transmission holder
162-4302	Cryostat190 Solid Transmission holder

Windows for Cryostat190 *(must select two)*

Part Number	Description
160-1132	Window, KBr, 32 x 3 mm
160-1126	Window, KRS-5, 32 x 3 mm
160-5216	Window, Polyethylene, 32 x 3 mm

Windows for Cryostat190 Liquid Holder *(must select two)*

Part Number	Description
160-1133	Window, KBr, 25 x 4 mm
160-1114	Window, ZnSe, 25 x 4 mm
160-1312	Window, KRS-5, 25 x 4 mm
160-5214	Window, Polyethylene, 25 x 4 mm

Spacers for Cryostat190 Liquid Holder *(optional)*

Part Number	Pathlength
162-1110	Spacer, 0.015 mm
162-1120	Spacer, 0.025 mm
162-1130	Spacer, 0.050 mm
162-1140	Spacer, 0.100 mm
162-1150	Spacer, 0.200 mm
162-1160	Spacer, 0.500 mm
162-1170	Spacer, 1.000 mm
162-1190	Spacer, assortment

Options

Part Number	Description
162-4303	Rotary Pump for Vacuum Insulation
162-4304	O-Ring for Liquid Cell (2 ea.)

Liquid nitrogen cooled system and temperature control module.

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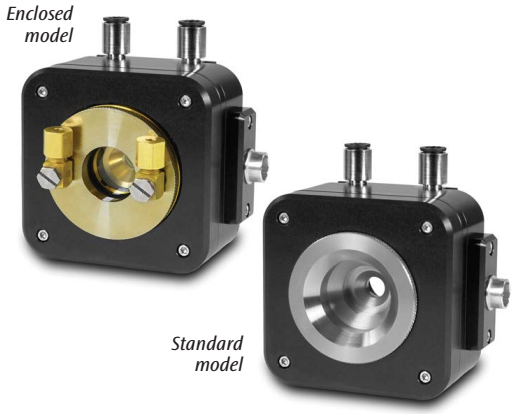
Heated Solid Transmission Accessory – *Measurements of Optical Components and Polymers*



Two configurations are available, the standard and enclosed model. The enclosed version offers a sealed environment around the sample, making this an ideal accessory for glove box applications and creating an inert or reacting gas blanket around the sample. The accessory requires a liquid recirculator prevent overheating.

The temperature of the Heated Solid Transmission Accessory is regulated by a digital temperature controller. PC interfaced and free-standing versions are available.

Features

- Quick sample loading and unloading
- Selection of different size sample holders
- Wide temperature range – from ambient to 300 °C
- Environmentally enclosed configuration

The Heated Solid Transmission Accessory is designed to analyze solid samples at temperatures ranging from ambient to 300 °C. It supports a set of optional sample mounts able to hold samples from 12 mm to 30 mm in diameter and up to 3-mm thick. Sample loading is simple and does not require any tools. The accessory is equipped with a standard 2" x 3" slide that makes it easy to mount in all types of spectrometers and most spectrophotometers. The heating time from ambient temperature to 300 °C is 30 minutes.

Specifications

Cell Body	Aluminum
Mount	2" x 3" Slide Mount
Temperature Range	Ambient to 300 °C
Sample Thickness	3 mm max.
Dimensions (W x D x H)	77 x 51 x 93 mm
Cooling Requirements	
Coolant Temp	6 to 28 °C
Coolant Pressure	0.1–2 kgf/cm^2
Coolant Flow Rate	20–1000 mL/min
Temperature Controllers	
Digital	+/- 0.5% of set point
Digital PC	+/- 0.5% of set point, graphical setup, up to 20 ramps, USB interface
Input Voltage	90–264 auto-setting external power supply
Output Voltage	6A/24 VAC max.
Controller Dimensions (W x D x H)	140 x 200 x 60 mm

Ordering Information

Part Number	Description
112-1000	Heated Solid Transmission Accessory, standard
112-1100	Heated Solid Transmission Accessory, enclosed

Note: Select at least one sample holder, which is specific to the configuration of the accessory – standard or enclosed.

Sample Holders *(must choose at least one)*

Part Number	Description
112-2010	12–15 mm Diameter Sample Holder, standard
112-2020	16–20 mm Diameter Sample Holder, standard
112-2030	21–25 mm Diameter Sample Holder, standard
112-2040	26–30 mm Diameter Sample Holder, standard
112-2110	12–15 mm Diameter Sample Holder, enclosed
112-2120	16–20 mm Diameter Sample Holder, enclosed
112-2130	21–25 mm Diameter Sample Holder, enclosed

Temperature Controllers *(must select one or more)*

Part Number	Description
076-1410	Temperature Controller – PC Control
076-1210	Temperature Controller

Note: PC version includes PIKE TempPRO software.

Liquid Recirculator

Part Number	Description
170-1100	Liquid Recirculator

25 x 2 mm Windows *(must select two or more for enclosed model only)*

Part Number	Description	Part Number	Description
160-1306	BaF_2	160-5086	SiO_2
160-1212	CaF_2	160-5122	SiO_2, Low OH
160-1305	KBr	160-1155	ZnSe
160-5213	Polyethylene		

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Bolt Press & Hydraulic Die – *Low-Cost Pellet Preparation*

The PIKE Technologies Bolt Press and Hydraulic Die are low-cost tools for making KBr pellets for transmission FTIR analysis.

The press and die consist of a stainless steel barrel with two hardened and polished 13-mm rams. The barrels are equipped with a fitting which allows evacuation of air while the pellet is formed. For the Bolt Press, the pressure is applied to the sample by tightening the bolts against each other with standard 15/16" wrenches – included. For the Hydraulic Die the pressure is applied to the sample by placing it in a hydraulic press – up to 10,000 psi. Once a clear pellet is formed, the rams are removed and the sample is analyzed while still in the barrel (barrel is placed directly in the beam using the Press Holder with a standard 2" x 3" slide mount). Both accessories form a 13-mm pellet.

The PIKE Technologies Bolt Press and Hydraulic Die both include a holder.

Ordering Information

Pellet Press

Part Number	Description
161-2500	Bolt Press for 13-mm pellets
161-3500	Hydraulic Die for 13-mm pellets

Notes: The Bolt Press includes evacuable barrel, 2 anvil bolts, 2 15/16" wrenches, and Bolt Press Holder. The Hydraulic Die includes evacuable barrel, 2 rams and Hydraulic Die Holder. The maximum force limit 5 ton.

Options and Replacement Parts

Part Number	Description
160-8010	KBr Powder, 100 g
161-5050	Agate Mortar and Pestle, 50 mm
161-2511	Wrench Set for Bolt Press (2 ea.)
161-2520	Holder for Bold Press
161-2513	Barrel for Bolt Press
161-2525	Anvils for Bolt Press
161-3502	Anvils for Hydraulic Die

Note: For more pellet press options, please contact PIKE Technologies.

Hand Press – *For Making Smaller Pellets*

The PIKE Technologies Hand Press is an ideal solution for laboratories that require only occasional preparation of KBr pellets and cannot justify the expense of a hydraulic press.

The Hand Press is an efficient, reliable and inexpensive tool which simplifies making small pellets. It consists of a long stainless steel barrel and movable stage controlled by a lever capable of applying high pressure to the KBr/powder mixture. The Hand Press comes complete with three standard die sets (7, 3 and 1 mm). The pellet preparation involves loading of the powdered sample into the die chamber, placement of the upper anvil in the press and application of hand pressure to the lever (this is sufficient to provide clear, high-quality KBr disks). The Die Collar with the formed pellet is removed from the press and in most cases it can be placed directly in the beam of the spectrometer for analysis. The Hand Press is equipped with a platen position dial for adjustment of the force applied to the die for reproducible sample preparation.

Ordering Information

Part Number	Description
161-1100	Hand Press for 7-mm, 3-mm, and 1-mm pellets *Includes 7-mm, 3-mm, and 1-mm die sets, anvils, die collars, anvil ejectors and Dual Pellet Holder*

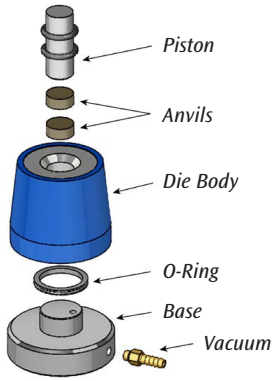
Options and Replacement Parts

Part Number	Description
161-5700	Dual Pellet Holder for 7-mm, 3-mm, and 1-mm pellets
161-1018	Single Pellet Holder for 7-mm pellets
160-8010	KBr Powder, 100 g
161-5050	Agate Mortar and Pestle, 50 mm
161-1027	Hand Press Body
161-1028	Die Set, 1-mm
161-1024	Die Set, 3-mm
161-1010	Die Set, 7-mm
161-1019	Die Set, 1-, 3- and 7-mm

Note: For more Hand Press options, please contact PIKE Technologies.

Evacuable Pellet Press –
For Preparation of High Quality Pellets

Pellet preparation involves placement of the anvil in the die chamber and covering it with the pre-measured amount of KBr/sample mix. The second anvil is placed on the sample and the plunger is inserted into the chamber. The entire assembly is placed in a hydraulic press and compressed (a vacuum line can be connected to the base to remove air from the sample). For analysis, the formed pellet is ejected from the die with an extractor and mounted onto a standard 2" x 3" sample holder.



Evacuable pellet press assembly.

Features

- **Ideal for making high-quality KBr pellets**
- **Apply up to 20,000 lbs (9,071 kg) of pressure**
- **Evacuable to prevent cloudy pellets**
- **Requires hydraulic press**

The PIKE Technologies Evacuable Pellet Press is the preferred accessory for making pellets for FTIR analysis. Preparation of KBr pellets with a 13-mm die and a hydraulic press is the most popular method used to make samples for transmission measurements. It is also required by a number of standardized procedures, including some USLP and ASTM methods. Advantages of this approach include the generation of high-quality pellets, reproducibility, and the ability to deal with relatively difficult samples.

The PIKE Evacuable Pellet Press Kit features the following components: a stainless steel base with vacuum outlet, the main die block with a 13-mm cylinder, two polished anvils and a plunger. All components are made of hardened stainless steel and surfaces that come in contact with the sample are highly polished. Two O-rings are used to seal the base/die assembly and the plunger.

Ordering Information

Part Number	Description
161-1900	Evacuable Pellet Press for 13-mm pellets *Includes die block, anvils and pellet extracting tool*

Options and Replacement Parts

Part Number	Description
160-8010	KBr Powder, 100 g
161-5050	Agate Mortar and Pestle, 50 mm
162-5300	Magnetic Film Holder for 13-mm pellets and film samples
162-5410	Sample Card for 13-mm pellets (10 ea.)
161-1908	Pellet Extracting Tool
161-1903	Anvils for PIKE Evacuable Pellet Press (2 ea.)
161-1902	Pellet Die Piston
161-1906	Piston O-Rings (2 ea.)
161-1907	Base O-Rings (2 ea.)
430-1110	Vacuum Pump, 110V
430-1220	Vacuum Pump, 220V
161-1070	ShakIR, Heavy Duty Sample Grinder, 110/220V *Includes mount for 1" vials*
161-1035	ShakIR Stainless Steel Vial with Ball, 1" long x 0.5"+

Notes: ShakIR requires stainless steel vial and ball P/N 161-1035. For more Evacuable Pellet Press options, please contact PIKE Technologies.

Pixie –
Manual Hydraulic Pellet Press

The comprehensive Pixie Package provides all necessary components to start making pellets in the lab. It includes a 7-mm die, two extra pellet collars, pellet holder, pestle and mortar set, KBr powder and spatula. All die components are made of hardened stainless steel and the parallel surfaces that come in contact with the sample are highly polished for obtaining optimal pellet quality.

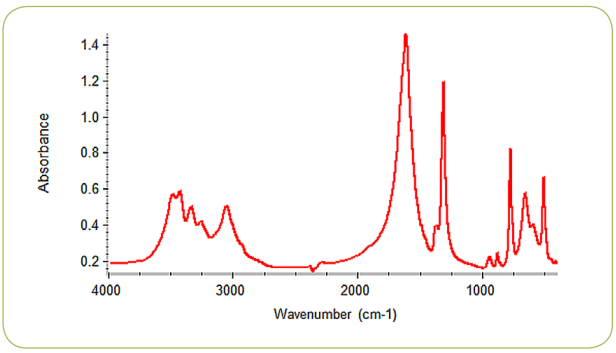
7-mm Die Set and Pellet Holder

Features

- 7-mm diameter die
- Applied force up to 2.5 tons
- Integrated force gauge
- Easy-to-use, ergonomic design
- Small footprint

PIKE Technologies introduces Pixie, a portable hydraulic press for making high-quality KBr pellets. With the press' ergonomic design, pellet making is easy and effortless. Pixie's small footprint makes it ideal for limited bench-space environments and glove boxes, and for storability. KBr pellets for IR transmission measurements are required by a number of standardized procedures, including some USLP and ASTM methods. Advantages of pellet making are spectral reproducibility and the ability to deal with relatively difficult or limited-mass samples.

The pellet preparation involves loading of the powdered KBr/sample matrix into the die chamber and placing the assembled die onto the platform of the hydraulic press. Force up to 2.5 tons may be applied. The die collar containing the newly formed pellet is placed into the designated holder and is positioned in the spectrometer's 2 x 3" slide mount holder for measurement.



Spectrum of calciumoxalate hydrate; KBr pellet made with Pixie press.

Specifications

	Metric	English
Ram Force, max	2.3 metric tons	2.5 tons
Platen Diameter	20.2 mm	0.8"
Die Height Range	22–39 mm	0.86–1.54"
Maximum Die Width	79 mm	3.11"
Mass	4.5 kg	10 lbs
Dimensions (W x D x H)		
Metric	127 x 192 x 201 (min.) mm	
English	5.0 x 7.8 x 7.9 (min.)"	

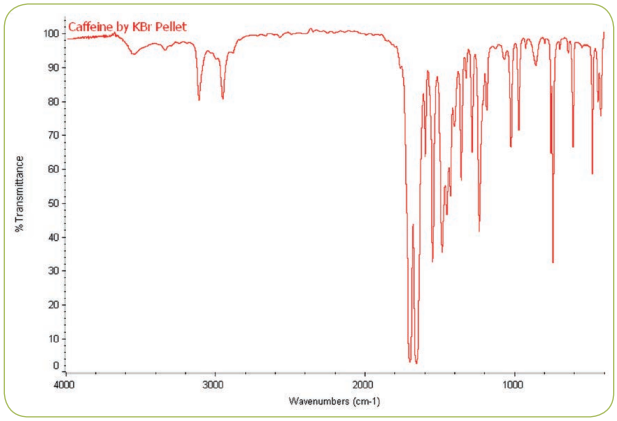
Ordering Information

Part Number	Description
181-1410	Pixie Hydraulic Press Package *Includes Pixie Hydraulic Press, 7-mm die set with two additional die collars, pellet holder, 35-mm agate mortar, KBr (50 g) and spoon spatula*
181-1400	Pixie Hydraulic Press

Options and Replacement Parts

Part Number	Description
161-1010	7-mm Die Set
161-1018	Single Pellet Holder for 7-mm pellets
161-1011	7-mm Collar
161-8010	KBr Powder, 100 g
161-5035	Agate Mortar and Pestle, 35 mm
042-3035	Spatula, spoon style
042-3050	Spatula, flat style

CrushIR –
Digital Hydraulic Press



FTIR spectrum of caffeine in KBr pellet made using the PIKE CrushIR Hydraulic Press and Evacuable Pellet Press

Features

- **Up to 15 tons of force**
- **Digital force readout for exceptional reproducibility**
- **Adjustable maximum force**
- **Small footprint**
- **Transparent safety shield**

PIKE Technologies offers an advanced hydraulic press for making excellent-quality KBr pellets and thin films for transmission FTIR analysis. With its integrated digital force reading, the CrushIR™ provides exceptional reproducibility.

The PIKE CrushIR features a small footprint and includes a transparent protective shield, making it safe for operation in a busy laboratory environment. Access for vacuum hose and other utilities is made through a port in the rear of the press.

The adjustable top screw provides flexibility for die designs of short and longer dimensions yielding an open stand range from 2" to 4" (5 to 11.5 cm). The efficient sized ram stroke of 0.2" (5 mm) and adjustment screw speeds pellet making by minimizing the time required to achieve the desired force. All mechanical components of the press are enclosed in a safety metal cabinet.

The PIKE Evacuable Pellet Press and 13-mm pellet holder are an excellent addition to the PIKE CrushIR. A packaged version of these 3 products is available.

Specifications

	Metric	English
Clamp Force, max	13.6 metric tons	15 US tons
Platen Diameter	100 mm	3.94"
Ram Stroke	5 mm	0.2"
Die Height Range	5–11.5 cm	2–4"
Dimensions (W x D x H)	31 x 25 x 35 cm	12 x 9.8 x 13.5"
Mass	23.6 kg	52 lbs
Input Voltage	90–264 V, auto setting, external power supply	
Output Voltage	9 VDC/18 W	

Ordering Information

Hydraulic Press *(select one)*

Part Number	Description
181-1100	PIKE CrushIR Hydraulic Press
181-1110	PIKE CrushIR Hydraulic Press, Evacuable Pellet Press and Magnetic Holder
181-1120	PIKE CrushIR Heated Platens Package *Includes CrushIR, Heated Platens and Digital Temperature Control Module*

Note: The PIKE CrushIR Hydraulic Press includes an integrated safety shield.

Options and Replacement Parts

Part Number	Description
161-1900	Evacuable Pellet Press for 13-mm pellets
160-8010	KBr Powder, 100 g
161-5050	Agate Mortar and Pestle, 50 mm
162-5300	Magnetic Film Holder for 13-mm pellets
162-5410	Sample Card for 13-mm pellets (10 ea.)
430-1110	Vacuum Pump, 110V
430-1220	Vacuum Pump, 220V
161-1070	ShakIR, Heavy Duty Sample Grinder, 110/220V
161-1035	Stainless Steel Vial with Ball for ShakIR

Notes: ShakIR requires stainless steel vial and ball P/N 161-1035. For more Evacuable Pellet Press options, please contact PIKE Technologies.

Heated Platens Accessory – *For Making Thin Films of Polymeric Samples for Transmission FTIR Analysis*

Features

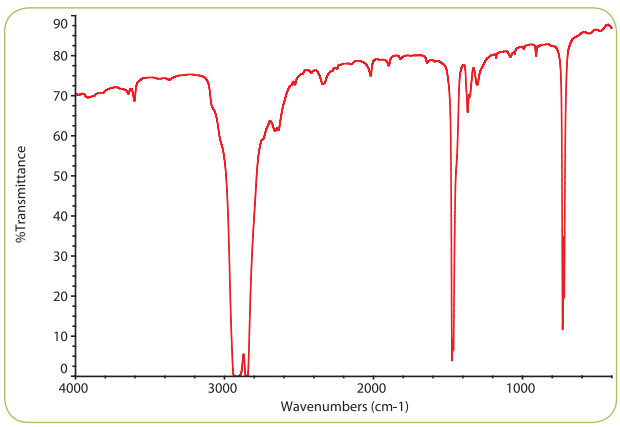
- **Fast, efficient means of making thin films for transmission spectroscopy**
- **Temperature range – ambient to 300 ºC**
- **Standard stainless steel spacer set (15, 25, 50, 100, 250 and 500 microns all with 25-mm ID) included with accessory**
- **Integral design for easy insertion and removal of heated platens into the hydraulic press**
- **Included insulating disks to minimize heat loss during film pressing**
- **Standard cooling chamber included**

The PIKE Heated Platens Accessory is designed to efficiently make thin films of polymer materials for infrared transmission spectroscopy. IR transmission spectra of thin films, which are made from polymer pellets or other plastic sample forms, offer more sensitivity than typical ATR spectra. Polymer films are ideal for investigating polymer additives.

Typically a 2–5 milligram portion of polymer is cut from the pellet or other plastic sample and placed between aluminum disks within the heated base of the platens. The temperature of the platens is chosen to match the melting point of the polymer material. The top plate of the heated platens accessory is placed over the assembly and the unit is inserted into the hydraulic press. A low force (2 tons) is generally applied to the sample in the heated platens accessory to make excellent films.

The PIKE Heated Platens Accessory includes insulating disks to maintain the desired temperature at the sample's melting point when making thin polymer films. These insulating disks improve the quality of thin films by making them more IR transmissive. Flattening the polymer below its melting point produces cloudy film. Pressing the polymer film when it is above it's melting point may cause polymer degradation.

The PIKE Heated Platens Accessory is compatible with the PIKE CrushIR™ Hydraulic Press and other hydraulic presses (please inquire).



Transmission spectrum of thin film of high-density polyethylene produced from PIKE Heated Platens Accessory.

Specifications

Composition	Stainless steel platens, mirrored surfaces
Temperature Range	Ambient to 300 ºC
Temperature Stability	Insulated, < 3 ºC loss at 125 ºC set point during press of film
Input Voltage	100–240 VAC, auto setting, external power supply
Operating Voltage	24 VDC/100 W
Sensor Type	3 wire Pt RTD (low drift, high stability)
Heating Time	Ambient to 100 ºC, less than 7 minutes
Cooling Chamber	Standard, convection via liquid circulation (not supplied)
Pressing Height	3.3 cm
Spacer Thickness	15, 25, 50, 100, 250 and 500 microns
Spacer ID	25 mm
Dimensions (W x D x H)	64 x 264 x 52 mm
Maximum Force	6 US tons

Ordering Information

Part Number	Description
181-2000	PIKE Heated Platens Accessory
181-1120	PIKE CrushIR Heated Platens Package *Includes CrushIR hydraulic press, Heated Platens and digital temperature control module*

Notes: The Heated Platens Accessory includes spacer set, thermal insulating disks, cooling chamber, aluminum disks and magnetic film holder. P/N 181-2000 requires selection of temperature controller below.

Temperature Controller for Heated Platens *(must select)*

Part Number	Description
076-1220	Digital Temperature Control Module

Note: The digital temperature controller is required for operation of the Heated Platens Accessory.

Options and Replacement Parts

Part Number	Description
181-3000	Spacer Set, 15, 25, 50, 100, 250, 500 microns
181-3020	Aluminum Disks (50 ea.)
181-3010	Spacer, 15 micron
181-3011	Spacer, 25 micron
181-3012	Spacer, 50 micron
181-3013	Spacer, 100 micron
181-3014	Spacer, 250 micron
181-3015	Spacer, 500 micron
162-5300	Magnetic Film Holder for 13-mm pellets and film samples
162-5410	Sample Card for 13-mm pellets (10 ea.)

ShakIR and Super ShakIR – *For Optimized Sample Grinding*

Standard ShakIR

Super ShakIR

ShakIR accessories provide a fast and simple method of mixing and grinding samples for diffuse reflectance sampling and in preparation for making KBr pellets. A small amount of sample or the IR transparent diluent (typically KBr) is simply scooped into a vial with mixing ball. The accessory thoroughly mixes and pulverizes the contents within seconds.

The standard ShakIR uses reciprocating motion of the vial holder that follows a "figure 8" path. The vial is swung through a 5 degree arc at high RPMs causing the ball to strike the end of the vial, which is sufficient to grind most materials into a powder.

The accessory provides electronic control for precise and reproducible setting of grinding time up to 95 seconds. The protective shield provides security to grinder operation. The ShakIR construction and weight offer long-term, reliable operation and minimized vibration and noise. The ShakIR features a small footprint. The base is 15 cm x 18 cm with a height of 28 cm.

The Super ShakIR also uses "figure 8" reciprocating motion for sample grinding, plus it offers more control over grinding speed and time intervals – specifically, 6 RPM levels from 2500 to 4600 are available and samples can be ground from 5 to 60 seconds. This provides a wide range of settings for bringing even very difficult samples to fine powder consistency quickly.

The Super ShakIR features a heavy-duty metal body with a chemically-resistant stainless steel grinding chamber. The unit operates quietly, regardless of RPM settings. The grinding chamber is protected by the door with a viewing window. For safety, the accessory will not operate until the door is fully closed. The Super ShakIR footprint is 18 cm x 28 cm and its height is 16 cm.

Features

- **Produce finely powdered mix of sample and diluent – ideal for clear pellets and excellent diffuse reflectance spectra**
- **Minimize exposure of sample to atmospheric moisture – a chief cause of cloudy pellets**
- **Options for grinding ordinary and difficult samples**
- **Built-in safety features**

Ordering Information

ShakIR

Part Number	Description
161-1070	ShakIR, Heavy Duty Sample Grinder, 110/220V *Includes mount for 1" vials*

ShakIR Vials *(required)*

Part Number	Description
161-1035	Stainless Steel Vial with Ball, 1" long x 0.5"

Options and Replacement Parts for ShakIR

Part Number	Description
161-1037	Spare Stainless Steel Ball
160-8010	KBr Powder, 100 g

Super ShakIR

Part Number	Description
161-1080	Super ShakIR, Sample Grinder, 110/220V *Includes mount for 1.7" vials with 2 end-cups, a stainless steel vial, 50 stainless steel balls and a bullet-shaped bead*

Options and Replacement Parts for Super ShakIR

Part Number	Description
161-1038	Bullet-Shaped Bead
161-1039	Stainless Steel Vial, 1.7" long
161-1041	Stainless Steel Balls, assorted sizes (50 pieces)
161-1036	Polymer Vials (20 ea.)

Sample Preparation Accessories – *For Solid Material Analysis* *(powders, mull agents, grinding tools and more)*

Features

- Accessories for analysis of solids by transmission and diffuse reflectance
- Materials for pellets and mulls

Preparation of samples for FTIR analysis by diffuse reflection or transmission analysis requires a number of tools and accessories for convenient and high quality results. PIKE Technologies has assembled these tools to make your FTIR sampling easier.

IR transparent powders and chunks, mulling agents and manual sample grinding tools with a complete selection of agate mortars and pestles are in stock and ready for immediate delivery.

Ordering Information

IR Transparent Powders

Part Number	Description
160-8010	KBr Powder, 100 g

IR Transparent Chunks

Part Number	Description
160-8015	KBr Chunks, 100 g

Agate Mortar and Pestles

Part Number	Description
161-5035	Agate Mortar and Pestle, 35 mm
161-5040	Agate Mortar and Pestle, 40 mm
161-5050	Agate Mortar and Pestle, 50 mm
161-5065	Agate Mortar and Pestle, 65 mm
161-5095	Agate Mortar and Pestle, 95 mm
161-5100	Agate Mortar and Pestle, 100 mm

Note: The 50-mm Agate Mortar and Pestle is our most popular size and recommended for most applications.

Spatulas for Solids and Mulls

Part Number	Description
042-3035	Spatula – spoon
042-3050	Spatula – flat

Mulling Agents

Part Number	Description
161-0500	Nujol
161-0510	Fluorolube

Note: For more sample preparation tool options contact PIKE Technologies.

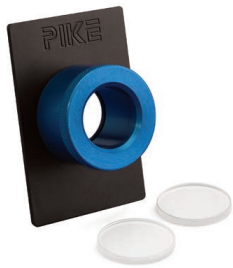
Sample Holders –
For Transmission FTIR Analysis of Pellets and Films

All PIKE Technologies transmission holders are constructed of high-quality materials and feature a 2" x 3" standard slide mount compatible with all FTIR spectrometers.

Universal Sample Holder

Heavy-Duty Magnetic Film Holder

Magnetic Film/Pellet Holder



Press-On Demountable Cell Holders

Single Pellet Holder

Dual Pellet Holder

Sampling Cards

Bolt Press and Gas Cell Holders

The **Universal Sample Holders** feature a spring-loaded mechanism which conveniently keeps in place films, salt plates, KBr pellets and other materials. The clear aperture of the holders is 20 mm and 10 mm. This universal holder offers great sample mounting flexibility.

Heavy-Duty Magnetic Film Holder is designed to hold thick polymer materials and other transmission samples. The holder features a large size magnet and steel plate with a 20-mm aperture.

The **Magnetic Film/Pellet Holder** is used to mount KBr pellets and thin polymer films. Its components include a steel plate and flexible magnetic strip. The holder is designed to support 13-mm KBr pellets and films less than 0.5-mm thick.

Press-On Demountable Cell Holders are used for the analysis of smears and mulls. Available in 25-mm and 38-mm versions, both include mounting plate and pressure cap. Windows and spacers must be ordered separately.

The **Single Pellet Holder** for 7-mm KBr pellets is designed for use with the PIKE Technologies Hand Press and Pixie Hydraulic Press. For making only 7-mm pellets, this version is more convenient than the Dual Pellet Holder.

A **Dual Pellet Holder** for 1-, 3- and 7-mm KBr pellet collars features semi-circular mounts with slots accommodating specified size pellets as made using the PIKE Technologies Hand Press.

The PIKE Technologies **Sampling Cards** are inexpensive sample holders for analysis of films, polymers, 13-mm KBr pellets and other materials. Self-adhesive treated sides make sample preparation easy. The cards also offer compact and convenient means of sample storage.

Bolt Press and Gas Cell Holders – three different sizes are available. Each holder has detachable support rods for different sized accessories. The holders can also be used for placing salt plates and other large samples.

Ordering Information

Part Number	Description
162-5600	Universal Sample Holder, 20-mm aperture*
162-5610	Universal Sample Holder, 10-mm aperture*
162-5500	Heavy-Duty Magnetic Film Holder
162-5300	Magnetic Film Holder for 13-mm pellets and film samples
162-3600	Press-On Demountable Cell Holders for 25-mm windows
162-3610	Press-On Demountable Cell Holders for 32-mm windows
161-1018	Single Pellet Holder
161-5700	Dual Pellet Holder*
162-5410	Sample Card for 13-mm pellets (10 ea.)*
162-5400	Film Sampling Card, 20-mm aperture (10 ea.)*
161-2520	Bolt Press Holder
162-2105	Gas Cell Holder, 25 mm x 50 or 100 mm
162-2205	Gas Cell Holder, 38 mm x 50 or 100 mm

Notes: For more sample holder options, please contact PIKE Technologies. Holders marked "*" fit all standard 2" x 3" slide mounts, but due to their height may not allow for a complete sample compartment door closure on some smaller spectrometers. Please consult PIKE Technologies before placing an order.

Replacement Parts

Part Number	Description
162-5611	O-Rings for Universal Sample Holder, 25 mm (6 ea.)
162-5612	O-Rings for Universal Sample Holder, 10 mm (6 ea.)

Disks, Windows and Powders –
For Transmission FTIR Analysis of Solid and Liquid Samples

PIKE Technologies offers premier stock window and crystal materials – a carefully selected range of IR transparent materials most often used by IR spectroscopists. They fit PIKE accessories and cell holders available from other vendors. All windows, crystals and powders are made from the best quality material. The optical components are individually packaged and silica gel is included with those materials which are affected by humidity. Products highlighted in red are in stock and available for immediate delivery. Please refer to the next pages for full range of IR optical materials, windows and crystals.

Note: Save on price and shipping cost by selecting 6-pack versions of popular crystals.

Ordering Information

Powders

Part Number	Description
160-8010	KBr Powder, 100 g

Chunks

Part Number	Description
160-8015	KBr Chunks, 100 g

Disks, 13 mm Diameter

1 mm Thickness

Part Number	Description
160-5003	KBr, 13 x 1 mm
160-5004	NaCl, 13 x 1 mm
160-1149	BaF_2, 13 x 1 mm
160-5001	CaF_2, 13 x 1 mm

2 mm Thickness

Part Number	Description
160-1301	AMTIR, 13 x 2 mm
160-1218	BaF_2, 13 x 2 mm
160-1213	CaF_2, 13 x 2 mm
160-1198	CsI, 13 x 2 mm
160-1191	Ge, 13 x 2 mm
160-1135	KBr, 13 x 2 mm
160-1008	KBr, 13 x 2 mm (6-pack)
160-1173	KRS-5, 13 x 2 mm
160-1170	NaCl, 13 x 2 mm
160-1005	NaCl, 13 x 2 mm (6-pack)
160-5201	SiO_2, 13 x 2 mm
160-5120	SiO_2, low OH, 13 x 2 mm
160-1160	Si, 13 x 2 mm
160-1241	ZnS, 13 x 2 mm
160-1115	ZnSe, 13 x 2 mm
160-1001	ZnSe, 13 x 2 mm (6-pack)

Disks, 20 mm Diameter

2 mm Thickness

Part Number	Description
160-1148	BaF_2, 20 x 2 mm
160-1144	CaF_2, 20 x 2 mm
160-1197	CsI, 20 x 2 mm
160-1139	Ge, 20 x 2 mm
160-1134	KBr, 20 x 2 mm
160-1128	KRS-5, 20 x 2 mm
160-1169	NaCl, 20 x 2 mm
160-5211	Polyethylene, 20 x 2 mm
160-5119	SiO_2, 20 x 2 mm
160-5121	SiO_2, low OH, 20 x 2 mm
160-1118	Si, 20 x 2 mm
160-5118	ZnS, 20 x 2 mm
160-1304	ZnSe, 20 x 2 mm

Disks, 25 mm Diameter

2 mm Thickness

Part Number	Description
160-1201	AMTIR, 25 x 2 mm
160-1306	BaF_2, 25 x 2 mm
160-1212	CaF_2, 25 x 2 mm
160-1002	CaF_2, 25 x 2 mm (6-pack)
160-1308	CsI, 25 x 2 mm
160-1307	Ge, 25 x 2 mm
160-1305	KBr, 25 x 2 mm
160-1172	KRS-5, 25 x 2 mm
160-1168	NaCl, 25 x 2 mm
160-1004	NaCl, 25 x 2 mm (6-pack)
160-5213	Polyethylene, 25 x 2 mm
160-5086	SiO_2, 25 x 2 mm
160-5122	SiO_2, low OH, 25 x 2 mm
160-1117	Si, 25 x 2 mm
160-5084	ZnS, 25 x 2 mm
160-1155	ZnSe, 25 x 2 mm
160-1007	ZnSe, 25 x 2 mm (6-pack)

Ordering Information

Disks, 25 mm Diameter

4 mm Thickness

Part Number	Description
160-1217	BaF_2, 25 x 4 mm
160-1211	CaF_2, 25 x 4 mm
160-1196	CsI, 25 x 4 mm
160-1138	Ge, 25 x 4 mm
160-1133	KBr, 25 x 4 mm
160-1009	KBr, 25 x 4 mm (6-pack)
160-1127	KRS-5, 25 x 4 mm
160-1124	NaCl, 25 x 4 mm
160-1012	NaCl, 25 x 4 mm (6-pack)
160-5214	Polyethylene, 25 x 4 mm
160-5089	SiO_2, 25 x 4 mm
160-5123	SiO_2, low OH, 25 x 4 mm
160-1116	Si, 25 x 4 mm
160-5087	ZnS, 25 x 4 mm
160-1114	ZnSe, 25 x 4 mm
160-1109	ZnSe , double AR coated, 25 x 4 mm
160-1110	ZnSe, single AR coated, 25 x 4 mm

5 mm Thickness

Part Number	Description
160-1311	BaF_2, 25 x 5 mm
160-1210	CaF_2, 25 x 5 mm
160-1316	CsI, 25 x 5 mm
160-1313	Ge, 25 x 5 mm
160-1189	KBr, 25 x 5 mm
160-1003	KBr, 25 x 5 mm (6-pack)
160-1312	KRS-5, 25 x 5 mm
160-1123	NaCl, 25 x 5 mm
160-1011	NaCl, 25 x 5 mm (6-pack)
160-5100	SiO_2, 25 x 5 mm
160-5124	SiO_2, low OH, 25 x 5 mm
160-5090	ZnS, 25 x 5 mm
160-1154	ZnSe, 25 x 5 mm

Disks, 32 mm Diameter

3 mm Thickness

Part Number	Description
160-1200	AMTIR, 32 x 3 mm
160-1199	AMTIR, drilled, 32 x 3 mm
160-1147	BaF_2, 32 x 3 mm
160-1017	BaF_2, 32 x 3 mm (6-pack)
160-1146	BaF_2, drilled, 32 x 3 mm
160-1018	BaF2, drilled, 32 x 3 mm (6-pack)
160-1143	CaF_2, 32 x 3 mm
160-1142	CaF_2, drilled, 32 x 3 mm
160-1195	CsI, 32 x 3 mm
160-1194	CsI, drilled, 32 x 3 mm
160-1137	Ge, 32 x 3 mm
160-1136	Ge, drilled, 32 x 3 mm
160-1132	KBr, 32 x 3 mm
160-1010	KBr, 32 x 3 mm (6-pack)
160-1131	KBr, drilled, 32 x 3 mm
160-1015	KBr, drilled, 32 x 3 mm (6-pack)
160-1126	KRS-5, 32 x 3 mm
160-1125	KRS-5, drilled, 32 x 3 mm
160-1122	NaCl, 32 x 3 mm
160-1013	NaCl, 32 x 3 mm (6-pack)
160-1121	NaCl, drilled, 32 x 3 mm
160-1014	NaCl, drilled, 32 x 3 mm (6-pack)
160-5216	Polyethylene, 32 x 3 mm
160-5215	Polyethylene, drilled, 32 x 3 mm
160-5049	SiO_2, 32 x 3 mm
160-5125	SiO_2, low OH, 32 x 3 mm
160-5052	SiO_2, drilled, 32 x 3 mm
160-5126	SiO_2, drilled, low OH, 32 x 3 mm
160-1159	Si, 32 x 3 mm
160-1158	Si, drilled, 32 x 3 mm
160-5047	ZnS, 32 x 3 mm
160-5048	ZnS, drilled, 32 x 3 mm
160-1113	ZnSe, 32 x 3 mm
160-1112	ZnSe, drilled, 32 x 3 mm

Disks, 37.5 mm Diameter

4 mm Thickness

Part Number	Description
160-1281	BaF_2, 37.5 x 4 mm
160-1286	ZnSe, 1-side AR coated, 37.5 x 4 mm
160-1287	CaF_2, 37.5 x 4 mm
160-1288	KBr, 37.5 x 4 mm
160-1289	KCl, 37.5 x 4 mm
160-1290	NaCl, 37.5 x 4 mm
160-1291	ZnSe, 37.5 x 4 mm

Disks, 38 mm Diameter

3 mm Thickness

Part Number	Description
160-1349	BaF_2, 38 x 3 mm
160-1350	Ge, 38 x 3 mm
160-5220	KBr, 38 x 3 mm
160-1344	KRS-5, 38 x 3 mm
160-5218	Polyethylene, 38 x 3 mm
160-1233	SiO_2, 38 x 3 mm
160-5127	SiO_2, low OH, 38 x 3 mm
160-1353	Si, 38 x 3 mm
160-1315	ZnS, 38 x 3 mm
160-5025	ZnSe, 38 x 3 mm

6 mm Thickness

Part Number	Description
160-1357	AMTIR, 38 x 6 mm
160-1322	BaF_2, 38 x 6 mm
160-1342	CaF_2, 38 x 6 mm
160-1326	CsI, 38 x 6 mm
160-1323	Ge, 38 x 6 mm
160-1320	KBr, 38 x 6 mm
160-1343	KRS-5, 38 x 6 mm
160-1321	NaCl, 38 x 6 mm
160-5219	Polyethylene, 38 x 6 mm
160-1355	SiO_2, 38 x 6 mm
160-5128	SiO_2, low OH, 38 x 6 mm
160-1324	Si, 38 x 6 mm
160-1329	ZnSe, 38 x 6 mm

Note: Products highlighted in red are in stock and available for immediate delivery.

Disks, 41 mm Diameter

3 mm Thickness

Part Number	Description
160-1216	BaF_2, 41 x 3 mm
160-1209	CaF_2, 41 x 3 mm
160-1188	KBr, 41 x 3 mm
160-1167	NaCl, 41 x 3 mm
160-5217	Polyethylene, 41 x 3 mm
160-5157	ZnS, 41 x 3 mm
160-1341	ZnSe, 41 x 3 mm

Disks, 49 mm Diameter

3 mm Thickness

Part Number	Description
160-5161	ZnS, 49 x 3 mm
160-1153	ZnSe, 49 x 3 mm

6 mm Thickness

Part Number	Description
160-5027	BaF_2, 49 x 6 mm
160-5206	CaF_2, 49 x 6 mm
160-5029	CsI, 49 x 6 mm
160-1187	KBr, 49 x 6 mm
160-5205	KRS-5, 49 x 6 mm
160-1166	NaCl, 49 x 6 mm
160-5164	SiO_2, 49 x 6 mm
160-5129	SiO_2, low OH, 49 x 6 mm

Disks, 50 mm Diameter

3 mm Thickness

Part Number	Description
160-5030	BaF_2, 50 x 3 mm
160-1208	CaF_2, 50 x 3 mm
160-5173	CsI, 50 x 3 mm
160-1186	KBr, 50 x 3 mm
160-1171	KRS-5, 50 x 3 mm
160-1165	NaCl, 50 x 3 mm
160-5177	ZnS, 50 x 3 mm
160-1152	ZnSe, 50 x 3 mm

Windows, 29 mm x 14 mm

4 mm Thickness

Part Number	Description
160-1215	BaF_2, 29 x 14 x 4 mm
160-5010	BaF_2, drilled, 29 x 14 x 4 mm
160-1207	CaF_2, 29 x 14 x 4 mm
160-5011	CaF_2, drilled, 29 x 14 x 4 mm
160-5007	Ge, 29 x 14 x 4 mm
160-5012	Ge, drilled, 29 x 14 x 4 mm
160-1185	KBr, 29 x 14 x 4 mm
160-1184	KBr, drilled, 29 x 14 x 4 mm
160-5009	KRS-5, 29 x 14 x 4 mm
160-5014	KRS-5, drilled, 29 x 14 x 4 mm
160-1164	NaCl, 29 x 14 x 4 mm
160-1163	NaCl, drilled, 29 x 14 x 4 mm

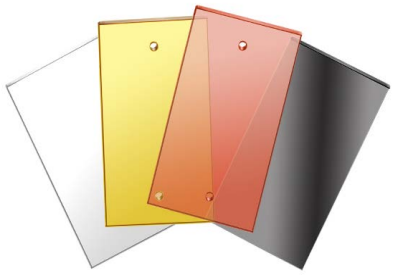
Windows, 38 mm x 19 mm

2 mm Thickness

Part Number	Description
160-1269	AMTIR, 38 x 19 x 2 mm
160-1270	AMTIR, drilled, 38 x 19 x 2 mm
160-1157	Si, 38 x 19 x 2 mm
160-1156	Si, drilled, 38 x 19 x 2 mm
160-1275	ZnS, 38 x 19 x 2 mm
160-1276	ZnS, drilled, 38 x 19 x 2 mm
160-1151	ZnSe, 38 x 19 x 2 mm
160-1150	ZnSe, drilled, 38 x 19 x 2 mm

4 mm Thickness

Part Number	Description
160-1214	BaF_2, 38 x 19 x 4 mm
160-1145	BaF_2, drilled, 38 x 19 x 4 mm
160-1141	CaF_2, 38 x 19 x 4 mm
160-1140	CaF_2, drilled, 38 x 19 x 4 mm
160-1193	CsI, 38 x 19 x 4 mm
160-1192	CsI, drilled, 38 x 19 x 4 mm
160-1190	Ge, 38 x 19 x 4 mm
160-5032	Ge, drilled, 38 x 19 x 4 mm
160-1130	KBr, 38 x 19 x 4 mm
160-1129	KBr, drilled, 38 x 19 x 4 mm
160-5031	KRS-5, 38 x 19 x 4 mm
160-5016	KRS-5, drilled, 38 x 19 x 4 mm
160-1162	NaCl, 38 x 19 x 4 mm
160-1006	NaCl, 38 x 19 x 4 mm (6-pack)
160-1161	NaCl, drilled, 38 x 19 x 4 mm
160-1292	SiO_2, 38 x 19 x 4 mm
160-5130	SiO_2, low OH, 38 x 19 x 4 mm
160-1293	SiO_2, drilled, 38 x 19 x 4 mm
160-5131	SiO_2, drilled, low OH, 38 x 19 x 4 mm



Windows, 41 mm x 23 mm

3 mm Thickness

Part Number	Description
160-1277	ZnS, 41 x 23 x 3 mm
160-1279	ZnS, drilled, 41 x 23 x 3 mm
160-1111	ZnSe, 41 x 23 x 3 mm
160-1280	ZnSe, drilled, 41 x 23 x 3 mm

6 mm Thickness

Part Number	Description
160-5146	BaF_2, 41 x 23 x 6 mm
160-5152	BaF_2, drilled, 41 x 23 x 6 mm
160-5147	CaF_2, 41 x 23 x 6 mm
160-5153	CaF_2, drilled, 41 x 23 x 6 mm
160-1183	KBr, 41 x 23 x 6 mm
160-1182	KBr, drilled, 41 x 23 x 6 mm
160-1120	NaCl, 41 x 23 x 6 mm
160-1119	NaCl, drilled, 41 x 23 x 6 mm

Note: For disk and window sizes other than shown here, please contact PIKE Technologies.

Note: Products highlighted in red are in stock and available for immediate delivery.

PIKE Technologies
www.piketech.com
608-274-2721

Crystal Polishing Kit –
Extending the Life of IR Transparent Windows

Scratched and fogged windows diminish the quality of transmission FTIR spectra. Their continuous replacement can be impractical and quite expensive. A number of standard infrared windows can be quickly restored to quality condition with the PIKE Technologies Crystal Polishing Kit. The kit includes all the necessary components to re-polish KBr and NaCl windows quickly and effectively.

Note: We do not recommend polishing KRS-5 windows due to safety hazards and for this reason do not include materials for polishing KRS-5 windows.

Features

- **Complete kit for polishing IR transparent windows**
- **Reduces cost of transmission analysis by extending KBr and NaCl window lifetime**

Ordering Information

Part Number	Description
162-4000	Crystal Polishing Kit *Includes wooden base, glass plates, polishing pads, brushes and polishing compounds*

Replacement Parts

Part Number	Description
162-4010	Glass Plate
162-4011	Polishing Pads (6 ea.)
162-4015	Brushes (6 ea.)
162-4012	Grinding Compound, 400 grit
162-4013	Grinding Compound, 600 grit
162-4014	Polishing Compound

Note: For other options for window polishing, please contact PIKE Technologies.

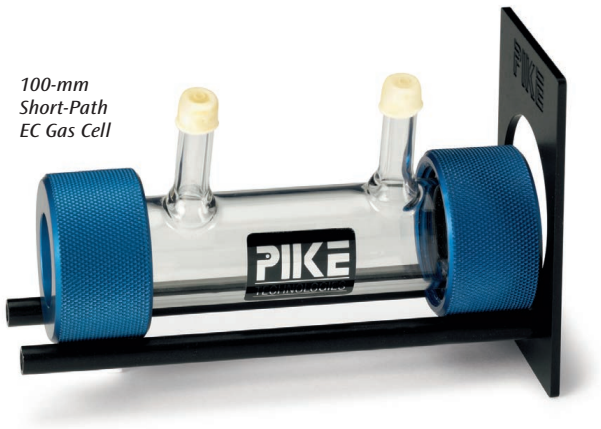
Short-Path Gas Cells –
For Samples with Higher Vapor Phase Concentration

100-mm Short-Path HT Cell

PIKE Technologies offers several choices for analysis of gas samples with component concentrations generally above 1% by weight. Our Short-Path HT Gas Cells provide high throughput by virtue of their greater inside diameter providing more energy at the FTIR detector. The Short-Path HT Gas Cells also include glass stopcocks for flow input of the gas sample and sealing.

The PIKE Technologies Short-Path EC Gas Cells are recommended for use with occasional gas sampling and offer an economical choice with standard septum-styled sealing of the vapor phase sample.

Both our Short-Path HT and EC Gas Cells are available in 50-mm and 100-mm versions. The complete gas cell requires your selection of the appropriate IR transparent windows. Both HT and EC Gas Cells are slide mount accessories, compatible with all FTIR spectrometers.



100-mm Short-Path EC Gas Cell

Features

- Gas cells for measuring higher vapor phase concentration
- High throughput and economy versions
- 100-mm and 50-mm pathlengths
- Fits all FTIR spectrometers

Ordering Information

Short-Path Gas Cells

Part Number	Description
162-2200	Short-Path HT Gas Cell, 100 mm pathlength
162-2250	Short-Path HT Gas Cell, 50 mm pathlength
162-2100	Short-Path EC Gas Cell, 100 mm pathlength
162-2150	Short-Path EC Gas Cell, 50 mm pathlength

Notes: The Short-Path Gas Cells include the glass body, o-rings and cell holder. HT Gas Cells require selection of two 38 mm x 6 mm windows. EC Gas Cells require selection of two 25 mm x 4 mm windows.

Windows for Short-Path Gas Cell

(must select minimum of 2)

Part Number		
38 x 6 mm	25 x 4 mm	Description
160-1322	160-1217	BaF_2
160-1342	160-1211	CaF_2
160-1320	160-1133	KBr
160-1321	160-1124	NaCl
160-1329	160-1114	ZnSe

.

Replacement Parts

Part Number		
HT Gas Cell	EC Gas Cell	Description
162-2209	162-2109	Viton O-Rings (2 ea.)
162-2202	162-2102	Cell Window Cap
162-2205	162-2105	Gas Cell Holder
162-2201	162-2101	Glass Body for 100-mm Cell
162-2255	162-2155	Glass Body for 50-mm Cell
162-2107	162-2106	Septum Caps (12 ea.)

Note: For options not shown here, please contact PIKE Technologies.

Heated Gas Flow Cell –
For Streaming Gas Analysis

Specifications

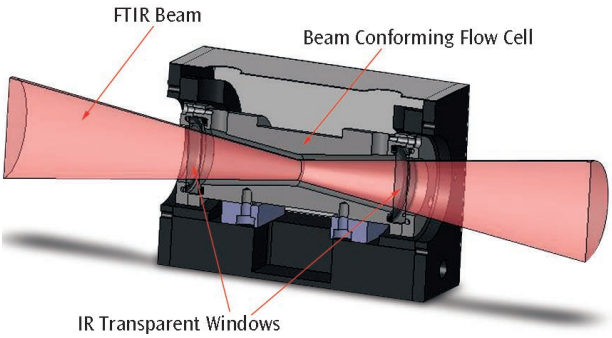
Temperature Range	Ambient to 300 °C
Accuracy	+/- 0.5% of set point
Voltage	24 VAC
Sensor Type	3 wire Pt RTD (low drift, high stability)
Controllers	
Input Voltage	115/230 V, switchable
Output Voltage	10 A/24 VAC
Dimensions (W x D x H)	91 x 140 x 121 mm (excludes baseplate mount)

Features

- **High IR throughput, minimum cell volume ideal for preserving flowing gas composition**
- **Temperature control to 300 °C**
- **Your choice of IR transparent windows – user-changeable**
- **Compatible with most FTIR spectrometers**

The PIKE Technologies Heated Gas Flow Cell is recommended for high-performance FTIR sampling of flowing gas samples. The beam-conforming design of the Heated Gas Flow Cell provides for minimum cell volume (38.5 mL) and a 100 mm pathlength, compatible with most FTIR spectrometers. This beam-conforming design also provides maximum IR throughput with no vignette of the IR beam. The gas cell may be heated up to 300 °C to prevent condensation of higher molecular weight gas species. The PIKE Technologies Heated Gas Flow Cell includes standard Swagelok® fittings for connection to 1/8" tubing and its stainless steel composition is compatible with pressurized applications up to 100 psi.

Temperature control is provided by either digital or digital PC controllers from PIKE Technologies. The Heated Gas Flow Cell requires selection of your choice of 38 mm x 6 mm IR transparent windows and temperature controller.



Optical geometry for PIKE Technologies Heated Gas Flow Cell.

Ordering Information

Part Number	Description
162-20XX	Heated Gas Flow Cell *Includes cell, high-temp O-rings, and FTIR mounting plate*

Note: Replace XX with your spectrometer's Instrument Code. Click for List >

Temperature Controllers *(must select one)*

Part Number	Description
076-1410	Digital Temperature Control Module, PC Control
076-1210	Digital Temperature Control Module

Note: Digital Temperature Control Module, PC Control includes PIKE TempPRO software.

IR Transparent Windows for Heated Gas Flow Cell
(select minimum of 2)

Part Number	Description
160-1322	BaF_2 Window, 38 x 6 mm
160-1320	KBr Window, 38 x 6 mm
160-1343	KRS-5 Window, 38 x 6 mm
160-1329	ZnSe Window, 38 x 6 mm

Notes: For window compatibility please consult the Windows Materials Properties table on page 125 of this catalog. For additional window selections please see page 112 of this catalog.

Replacement Parts and Options

Part Number	Description
162-2009	Viton O-Rings, max. temp. 200 ºC, (2 ea.)
162-2309	High-Temperature O-Rings, max. temp. 325 ºC (1 ea.)
162-2308	High-Temperature O-Rings, max. temp. 325 ºC (4 ea.)

Notes: Gas Cell requires 4 O-rings total. For high-temperature purge tubes and other options, please contact PIKE Technologies.

Low-Volume Heated Gas Cell –
Near-Instantaneous Feedback on Compositional Changes

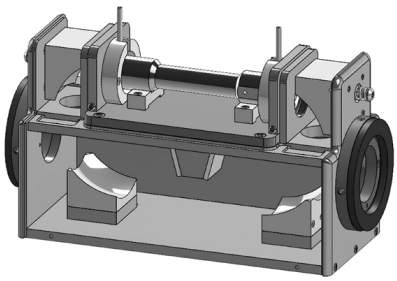
PIKE Technologies' Low-Volume Heated Gas Cell is an experimentally attractive, independent solution for the practitioner dealing with gas analysis and quantitative challenges. In the polymer materials field, for example, it offers simple gas compositional analysis of headspace volatiles originating in small-volume sealed material aging experiments.

To optimize the energy throughput, this unique cell uses a set of transfer optics that focuses the IR beam from the spectrometer onto the entrance of the 7-mm bore cell body. The interior of the gas cell body is highly polished and gold coated for maximum IR transmission. The gas cell may be heated up to 300 °C to prevent condensation of higher molecular weight gas species.

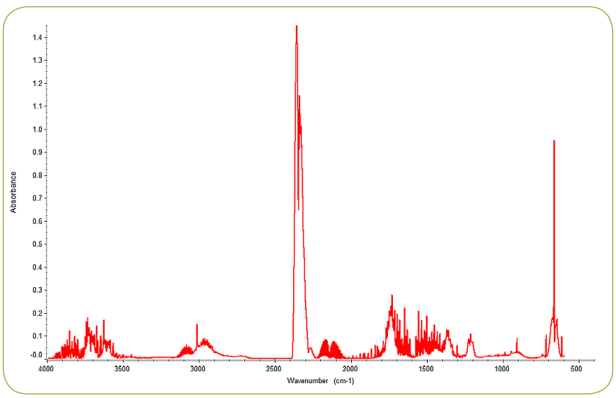
Features

- **Short pathlength, 10 or 12 cm**
- **Volume less than 5 ml**
- **Temperature control to 300 °C**
- **Precision transfer optics for beam focusing**

The new Low-Volume Heated Gas Cell by PIKE Technologies is ideal for infrared applications such as determining and quantifying off-gassing and headspace species where gas volume is limited. At less than 5 ml, the gas cell volume is a fraction of that found in typical short-path gas cells of similar lengths (10 to 12 cm). It connects easily to simple gas flow experimental setups as an IR screening diagnostic tool. Due to its low internal volume, it offers near-instantaneous feedback on gas compositional changes.



Optical geometry for PIKE Technologies' Low-Volume Heated Gas Cell.



Volatiles from an ampoule filled with epoxy aged for 2 d at 240 °C; spectrum shows predominately H_2O and CO_2 with some evidence of CO, CH_4 and C_3H_6.

Specifications

Gas Cell Pathlength	10 or 12 cm
Gas Cell Diameter	7 mm
Gas Cell Volume	3.8 or 4.6 ml
Temperature Range	Ambient to 300 °C
Accuracy	+/- 0.5% of set point
Voltage	24 VAC
Sensor Type	3-wire Pt RTD (low drift, high stability)
Controllers	
Input Voltage	115/230V
Output Voltage	10A/24 VAC
Dimensions (W x D x H)	
12 cm pathlength	223 x 110 x 134 mm
10 cm pathlength	197 mm x 110 x 134 mm (excludes baseplate mount)
Gas Ports	1/8" tubing, welded

Ordering Information

Part Number	Description
164-62XX	Low Volume Heated Gas Cell, 10 cm
164-61XX	Low Volume Heated Gas Cell, 12 cm

Note: Replace XX with your spectrometer's Instrument Code. Click for List >

Temperature Controllers *(must select one)*

Part Number	Description
076-1410	Digital Temperature Control Module, PC Control
076-1210	Digital Temperature Control Module

Note: Digital Temperature Controller, PC Control includes PIKE TempPRO software.

13 x 2 mm Windows *(must select minimum of two)*

Part Number	Description	Part Number	Description
160-1218	BaF_2	160-1170	NaCl
160-1213	CaF_2	160-1115	ZnSe
160-1135	KBr	160-5201	SiO_2

Replacement Parts

Part Number	Description
164-4010	Viton O-Rings, max. temp. 200 ºC (2 ea.)
162-4011	High-Temperature O-Rings, max. temp. 300 ºC (2 ea.)

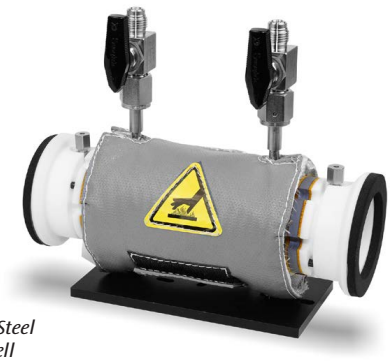
Note: Low-Volume Heated Gas Cell requires 4 O-rings total.

Stainless Steel Short-Path Gas Cells –
For Measurement of High Concentration Vapor Components

Features

- **Measurement of high concentration vapor phase samples**
- **Wide range of pathlengths, from 1 to 20 cm**
- **Heated option up to 300 °C**
- **Baseplate-mounted for stability in the sample compartment**

For analyzing more concentrated gases, PIKE Technologies is offering Stainless Steel Short-Path Gas Cells. The durable construction of the metal body may be used under pressure when matched with a suitable IR window. Cell pathlengths are 1, 2, 5, 10, 15, and 20 cm. For maximum precision or to prevent condensation of specific components, heated models are available for a maximum temperature of 200 and 300 °C.



Heated Stainless Steel Short-Path Gas Cell

Specifications

Temperature Range	Ambient to 200 °C or 300 °C
Accuracy	+/- 0.5% of set point
Voltage	115 or 230 VAC
Sensor Type	RTD
Controllers	
Digital Display	+/- 0.1 °C
Input Voltage	115/230 V, switchable
Output Voltage	10 A/24 VAC

All cells are delivered with welded VCR fittings. To offer the greatest flexibility, users may optimize their configuration further by choosing Swagelok valves with VCR or 1/4" compression termination. PIKE gas cells have been designed for easy maintenance and cleaning. Our gas cells are baseplate-mounted for stability in the spectrometer sample compartment and offer purge collars to eliminate atmospheric water vapor and CO_2 interferences in the spectrum.

Custom pathlengths and cell materials are available. Contact PIKE Technologies for special orders.

1/4" termination

Valve with VCR termination

Ordering Information

Stainless Steel Short-Path Gas Cell

Part Number	Description
164-21XX	Stainless Steel Gas Cell, 1 cm
164-22XX	Stainless Steel Gas Cell, 2 cm
164-25XX	Stainless Steel Gas Cell, 5 cm
164-20XX	Stainless Steel Gas Cell, 10 cm
164-27XX	Stainless Steel Gas Cell, 15 cm
164-29XX	Stainless Steel Gas Cell, 20 cm

Notes: Replace XX with your spectrometer's Instrument Code. Click for List >
Windows not included; order separately. 1 and 2 cm pathlength gas cells use 25 x 4 mm windows and all others use 38 x 6 mm windows. Not all pathlengths fit commercial spectrometer sample compartments.

Heated Short-Path Gas Cells

Part Number 200 °C	Part Number 300 °C	Description
164-41XX	164-31XX	Heated Stainless Steel Gas Cell, 1 cm
164-42XX	164-32XX	Heated Stainless Steel Gas Cell, 2 cm
164-45XX	164-35XX	Heated Stainless Steel Gas Cell, 5 cm
164-40XX	164-30XX	Heated Stainless Steel Gas Cell, 10 cm
164-47XX	----------	Heated Stainless Steel Gas Cell, 15 cm

Notes: Replace XX with your spectrometer's Instrument Code. Click for List >
Windows not included; order separately. 1 and 2 cm pathlength gas cells use 25 x 4 mm windows and all others use 38 x 6 mm windows. Not all pathlengths and heating options fit commercial spectrometer sample compartments. High-temperature O-rings are included with the 300 °C model. Heated short-path gas cells include a digital temperature controller and heating assembly. Purging is not an option on the 15 cm heated gas cell. Please contact PIKE Technologies for custom pathlengths.

IR Transparent Windows for Stainless Steel Short-Path Gas Cell *(select minimum of 2)*

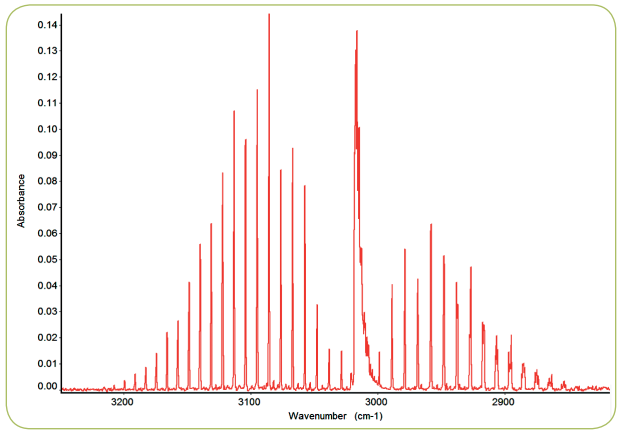
Part Number 25 x 4 mm (1, 2 cm)	Part Number 38 x 6 mm (5, 10, 15, 20 cm)	Description
160-1217	160-1322	BaF_2
160-1211	160-1342	CaF_2
160-1133	160-1320	KBr
160-1127	160-1343	KRS-5
160-1124	160-1321	NaCl
160-1114	160-1239	ZnSe
160-1110	----------	ZnSe, Anti-Reflective Coating, 1-side
160-1109	----------	ZnSe, Anti-Reflective Coating, 2-sides

Valves and Replacement Parts

Part Number	Description
164-4000	VCR Valve to VCR Termination Kit
164-4001	Valve to 1/4 inch Termination Kit
164-4002	1/4 inch Termination Kit
164-4006	Viton O-Rings, 25 mm, max. temp. 200 °C (2 ea.)
164-4008	Viton O-Rings, 38 mm, max. temp. 200 °C (2 ea.)
164-4007	High Temperature O-Rings, 25 mm, 300 °C (2 ea.)
164-4009	High Temperature O-Rings, 38 mm, 300 °C (2 ea.)

Notes: Fitting kits include one for inlet and one for outlet. Contact us for other fitting options. Gas cell requires 4 O-rings total.

Long-Path Gas Cells –
For Measurement of Low Concentration Vapor Components



C-H stretch spectral region for methane gas.

The anodized aluminum base includes spectrometer-specific baseplate allowing placement of the accessory in the FTIR sample compartment. As a standard feature, the optical base is fully purgeable allowing for the elimination of atmospheric water vapor and CO_2 interference in the spectrum.

Features

- **Long-Path gas cells for measurements of vapor species to ppb levels**
- **Fixed and variable pathlength versions**
- **Heated versions available up to 200 °C**
- **Standard fully purgeable optics**
- **Fits most FTIR spectrometers**

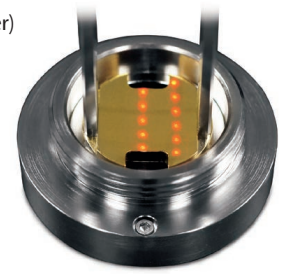
PIKE Technologies offers several Long-Path Gas Cells for analysis of trace components in gas samples – typical concentrations may range from the ppm to ppb levels. The Long-Path Cells feature a folded path design providing an extended pathlength within a compact dimension. The FTIR beam enters the cell through an IR transparent window and reflects a number of times between the accessory mirrors before exiting to the detector. The number of reflections is determined by the optical configuration of the cell and may be selected as a permanently aligned version or a user-adjustable version (variable-path cells). Typical applications include air pollution studies, gas purity determinations, monitoring of industrial processes, exhaust gas analysis and many others.

All Long-Path Gas Cells are manufactured by PIKE Technologies. The fixed and variable long-path body assemblies are nickel-coated aluminum, stainless steel or heavy-wall borosilicate glass. Gas cells may be operated under vacuum or pressure. The top of the cell is enclosed by the valve assembly with stainless steel Swagelok valves with barb fittings. Tube compression fittings are available upon request.

For optimal performance the mirrors have been diamond turned and coated with the highest quality gold for maximum reflectivity and inertness. The accessory mirrors are mounted permanently with mechanical mirror mounts to eliminate out-gassing chemicals that may occur when using epoxies to secure the mirrors. Windows are easily replaceable and a variety of window materials are available.

Variable-Path Gas Cell

The construction and main components of the variable-path gas cells are identical with those described above, with an exception of the internal mirror assembly. The cell has an adjustable mirror located at the top of the enclosure (position controlled with a micrometer) and one stationary mirror. Adjustments to the mirror position allow selection of different pathlengths supported by the cell. The variable-path gas cell has an integrated laser that enables the determination of the pathlength by counting the number of laser reflections on the bottom mirror.



Laser reflections shown on the bottom mirror of the variable-path gas cell for pathlength determination.

Long-Path Gas Cell Specifications

	2.4 m Fixed	5.0 m Fixed	10.0 m Fixed	20.0 m Fixed	30.0 m Fixed	1–16 m Variable
Base Path (mm)	100	157	250	500	625	333
Body Material	Metal	Metal	Glass or Metal	Glass or Metal	Glass	Glass
Optics Coatings	Gold	Gold	Gold	Gold	Gold	Gold
Window Material	KBr	KBr	KBr	KBr	KBr	KBr
Window Dimension (mm)	37.5 x 4	25 x 4	25 x 4	25 x 4	25 x 4	25 x 4
# Window	1	2	2	2	2	2
Cell Volume (L)	0.1	0.5	2.2	7.2	12.8	3.5

Heated Long-Path Gas Cell Specifications

Temperature Range	Ambient to 200 °C
Accuracy	+/- 0.5%
Voltage	115 or 230 VAC
Sensor Type	RTD
Controllers	
Digital Display	+/- 0.1 °C
Input Voltage	115 or 230 V, specify
Output Voltage	115 or 230 VAC/10A, specify

Note: Other line voltages may require an additional transformer.

Some gas measurement applications require temperature control for higher precision or to prevent condensation of specific components. PIKE Technologies offers heated versions of our fixed- and variable-path gas cells up to 200 °C. For temperature accuracy, the temperature sensor has been embedded inside the gas cell as opposed to mounted on the exterior of the cell.

Contact PIKE Technologies on how to upgrade an existing cell to the heated version. Custom pathlengths and cell materials are available. Contact us for special orders.

5-m Heated Gas Cell

Ordering Information

Long-Path Gas Cells

Part Number	Description
163-12XX	2.4 m Metal Gas Cell
163-13XX	2.4 m Stainless Steel Gas Cell
163-15XX	5 m Metal Gas Cell
163-14XX	5 m Stainless Steel Gas Cell
163-10XX	10 m Metal Gas Cell
163-17XX	10 m Stainless Steel Gas Cell
163-11XX	10 m Glass Gas Cell
163-16XX	1–16v m Glass Gas Cell
163-18XX	20 m Stainless Steel Gas Cell
163-20XX	20 m Glass Gas Cell
163-30XX	30 m Glass Gas Cell

Notes: Replace XX with your spectrometer's Instrument Code. Click for List >
Metal Gas Cell bodies are made of nickel-plated aluminum. Long-Path Gas Cells include KBr window(s). Additional window materials can be ordered from the table in the next column.

Replacement Parts

Part Number	Description
076-1240	Long-Path Gas Cell Temperature Control Module
076-1440	Long-Path Gas Cell Temperature Control Module, PC control
163-1009	Pathlength Verification Tool, 2.4 m and 5 m
163-10910	Pathlength Verification Tool, 10 m and 20 m
163-1001	Viton Gas Cell Window O-Ring, 5, 10, 20, 16v m (4 ea.)
163-1208	Perfluoroelastomer O-Ring Kit, 2.4 m
163-1506	Perfluoroelastomer O-Ring Kit, 5 m
163-1007	Perfluoroelastomer O-Ring Kit, 10 m
163-2006	Perfluoroelastomer O-Ring Kit, 20 m

Note: Temperature control modules are 115/230 V switchable. PC control module includes PIKE Technologies' TempPRO software. Please call PIKE Technologies for replacement O-rings or other parts not listed here.

Heated Long-Path Gas Cells

Part Number	Description
163-42XX	2.4 m Heated Metal Gas Cell, 115 V
163-42XX-30	2.4 m Heated Metal Gas Cell, 230 V
163-35XX	2.4 Heated Stainless Steel Gas Cell, 115 V
163-35XX-30	2.4 Heated Stainless Steel Gas Cell, 230 V
163-45XX	5 m Heated Metal Gas Cell, 115 V
163-45XX-30	5 m Heated Metal Gas Cell, 230 V
163-31XX	5 m Heated Stainless Steel Gas Cell, 115 V
163-31XX-30	5 m Heated Stainless Steel Gas Cell, 230 V
163-40XX	10 m Heated Metal Gas Cell, 115 V
163-40XX-30	10 m Heated Metal Gas Cell, 230 V
163-32XX	10 m Heated Stainless Steel Gas Cell, 115 V
163-32XX-30	10 m Heated Stainless Steel Gas Cell, 230 V
163-41XX	10 m Heated Glass Gas Cell, 115 V
163-41XX-30	10 m Heated Glass Gas Cell, 230 V
163-46XX	1–16v Heated Glass Gas Cell, 115 V
163-46XX-30	1–16v Heated Glass Gas Cell, 230 V
163-43XX	20 m Heated Glass Gas Cell, 115 V
163-43XX-30	20 m Heated Glass Gas Cell, 230 V
163-33XX	20 m Heated Stainless Steel Gas Cell, 115 V
163-33XX-30	20 m Heated Stainless Steel Gas Cell, 230 V

Notes: Replace XX with your spectrometer's Instrument Code. Click for List >
Metal Gas Cell bodies are made of nickel-plated aluminum. Heated Long-Path Gas Cells include KBr window(s). Additional window materials can be ordered from the table below. Heated Long-Path Gas Cells include a digital temperature controller and heating jacket. Contact PIKE Technologies for configurations using PC control temperature module including TempPRO software. Heated Long-Path Gas Cells may be heated to 200 °C.

Replacement Windows

Part Number 25 x 4 mm	Part Number 37.5 x 4 mm	Description
160-1217	160-1281	BaF_2
160-1211	160-1287	CaF_2
160-1133	160-1288	KBr
160-1178	160-1289	KCl
160-1127	----------	KRS-5
160-1124	160-1290	NaCl
160-1114	160-1291	ZnSe
160-1110	160-1286	ZnSe, Anti-Reflective Coating 1-Side
160-1109	----------	ZnSe, Anti-Reflective Coating 2-Sides

Transmission Sampling Techniques – *Theory and Applications*

FTIR sampling by transmission is a very popular method for collection of infrared spectra. Its use is easy to explain – the methods are intuitive and do not require sophisticated sampling accessories. In many cases, the sample can be placed directly into the path of the infrared beam (with the help of sample holder) and scanned. Further benefits of transmission sampling techniques include compatibility with automated sampling and microsampling techniques such as IR Microscopy.

Transmission techniques are well documented and have been successfully used for many years. A large number of spectral libraries contain transmission spectra and are often used as references for the purpose of qualitative analysis. Transmission techniques offer many advantages and should be used whenever possible, unless reliable sample preparation becomes too difficult, too time consuming or impossible. Transmission is also widely used for quantitative applications, as significant numbers of basic measurements adhere to the Beer-Lambert law. The law provides a mathematical relationship between the infrared radiation absorbed by the sample and the sample concentration:

$$A = a \bullet b \bullet c$$

Where

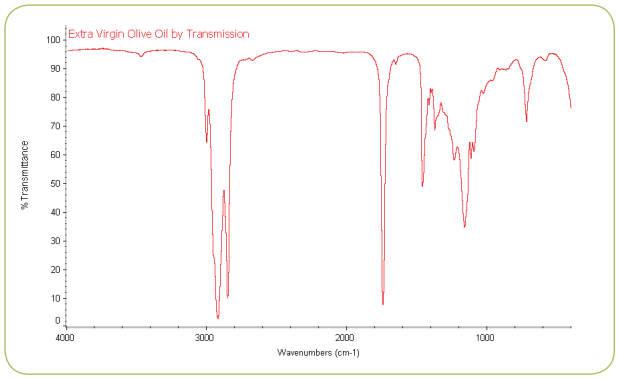
A = absorbance
a = absorptivity
b = pathlength
c = sample concentration

The Beer-Lambert law states that absorbance is linearly proportional to sample concentration (with sample pathlength and absorptivity constant). The actual measurements are generated in percent transmittance (which is not a linear function of concentration); however, they can be converted in real time to absorbance by all modern FTIR software packages. As mentioned before, transmission measurements are intuitive and simple. Many samples are too thick to be measured directly and they have to be processed in some way before meaningful data can be collected. Some of the sample preparation techniques are time consuming and can be destructive. Liquids and pastes are generally the easiest samples to run. A large number of liquid cells and windows are available for liquid measurements. Solid samples (with the exception of thin films) require sample preparation – making a pellet (typically potassium bromide – KBr) or a mull. Gas samples require a suitable gas cell with a pathlength sufficient to detect the desired component.

Sample Preparation and Analysis

Liquids

Most liquids and dissolved solids are easy to measure by transmission. Viscous liquids or pastes can be simply pressed between two IR transparent windows and measured by FTIR.



FTIR spectrum of 1 drop of extra virgin olive oil pressed between 25-mm KBr windows and held in the IR beam using the PIKE Universal Sample Holder.

Thin liquids or samples in solvent may be best run by using a demountable liquid cell or a sealed cell, consisting of two windows with a precision spacer in-between. One of the windows has two drilled holes for the introduction and evacuation of the sample. A large number of cell options are available – these include permanently sealed cells and demountable cells with different window materials and a wide selection of spacers.

The pathlength of liquid cells can be easily measured with your FTIR spectrometer. Just place the empty cell into the FTIR and collect its spectrum. The frequency of the sine wave spectrum (produced by back reflection within the cell) provides the pathlength using the following equation;

$$P = (10 \bullet N) / (2 \bullet \Delta\ cm^{-1})$$

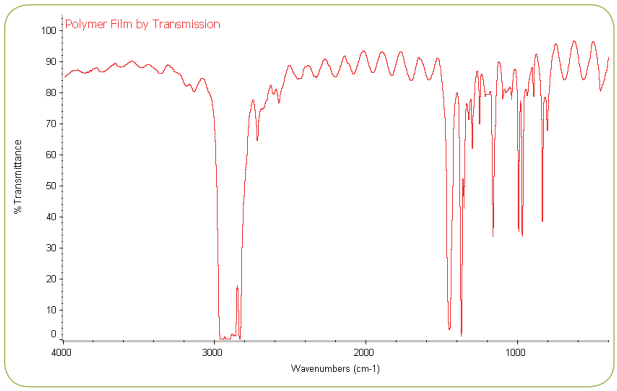
Where

P = pathlength of cell in mm
N = number of fringes within $\Delta\ cm^{-1}$
$\Delta\ cm^{-1}$ = wavenumber difference of fringe count

It is very important to select compatible IR transparent windows for your liquid samples. Please refer to the table on the last page of this note to select your windows. If you still have questions, please call us.

Solids

The easiest to analyze are film and polymer samples less than 200 micrometers thick (ideal thickness for the major component of a polymer film is about 20 microns). These samples can be simply placed into a sample holder and immediately scanned.



Polymer film from product packaging material – held in place with the PIKE Universal Sample Holder. Polymer is identified as Atactic Polypropylene and the film is determined to be 27.1 microns thick.

The thickness of the polymer film can be calculated from the fringe pattern in the spectrum using the following equation:

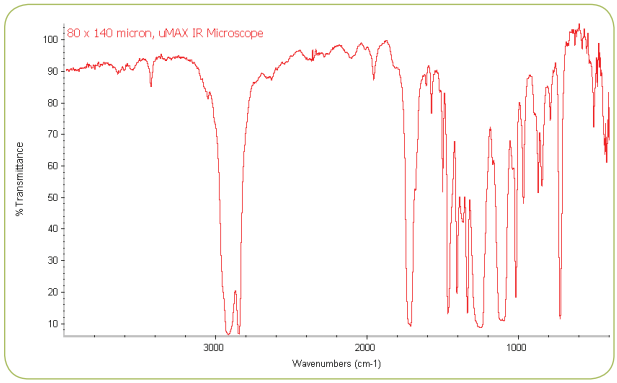
$$T = (10000 \bullet N) / (2 \bullet n \bullet \Delta\ cm^{-1})$$

Where

T = thickness of polymer film in microns
N = number of fringes within Δ cm^{-1}
Δ cm^{-1} = wavenumber difference of fringe count
n = refractive index of polymer

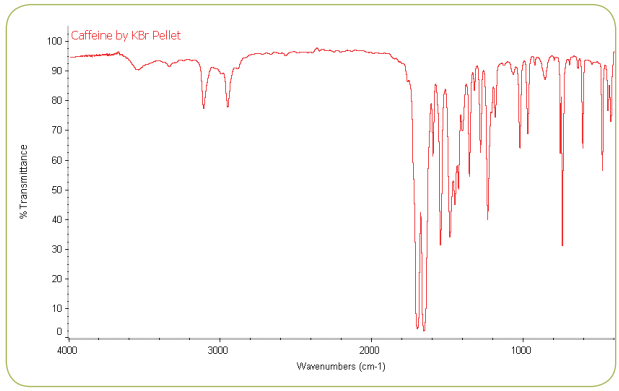
The same procedure can be used for samples which can be sliced and pressed to an appropriate thickness – especially for IR microsampling. PIKE Technologies' Heated Platens Accessory is ideal for making thin polymer films.

For IR microsampling, one can place a small sliced sample into a sample compression cell and apply pressure to hold the sample and to thin it to a useable thickness – as shown in the following spectral data.



Micro spectrum of a layered polymer using a PIKE µMAX IR Microscope and Compression Cell with KBr windows.

However, the majority of solid materials must be prepared before their infrared spectra can be collected. In many cases sample preparation involves grinding of the sample and mixing it with an IR transparent material such as KBr and then pressing a pellet. While this method of solids analysis is time consuming, it produces an excellent result.



FTIR spectrum of caffeine prepared as a 13-mm KBr Pellet and held in position with the PIKE Sampling Card.

Solid Sample Preparation Tips

The best method for preparation of solid samples involves mixing the sample (about 5% by weight) with an IR transparent material (typically KBr) and pressing a pellet. The mixing is best done with the ShakIR accessory which produces a fully mixed and pulverized sample in about 20 seconds. The grinding and mixing can also be done with a mortar and pestle – but not as well. Generation of a pellet involves pressing the prepared mixture with a hydraulic or hand press into a hard disk. The pellet, ideally 0.5 to 1 mm thick is then placed in a transmission holder and scanned. Typically, the pellet technique provides good quality spectra with a wide spectral range and no interfering absorbance bands.

Samples which do not grind well and/or are affected by solvents and mulling agents can be analyzed with high-pressure techniques. Typical samples include fibers and paint chips. The accessory used for such applications utilizes two diamond anvils. Difficult samples are placed between the diamonds and crushed, compressed and flattened to the thickness necessary to obtain good-quality FTIR spectra. Diamond cells are transparent to IR radiation except in the region of 2400 cm^{-1} to 1700 cm^{-1}. The high-pressure diamond cells require the use of a beam condenser or an infrared microscope.

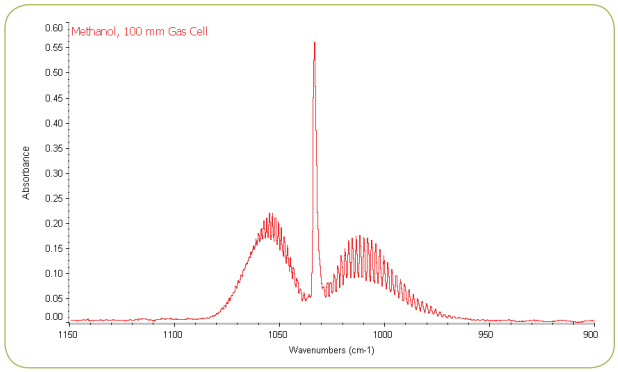
An alternate method for analysis of solid materials involves making a mull. Mulls are sample suspensions in Nujol (refined mineral oil) or Fluorolube (perfluorohydrocarbon). The process is based upon mixing 1 to 2 drops of the mulling agent with a ground sample until a uniform paste is formed. The paste is transferred onto a KBr or other IR transparent disk, placed in the sample compartment of the spectrometer and scanned. The advantage of this technique is that it is a relatively quick and simple procedure; disadvantages include interference from mulling agent absorption bands. Both Nujol and Fluorolube have characteristic spectral features and in most cases have to be used as a pair in order to generate a complete mid IR spectrum. Nujol is used below 1330 cm^{-1}, Fluorolube above 1330 cm^{-1}. Some sample preparation is needed and the quality of the results and amenability to automation and microsampling offer significant advantages.

Gases

Analysis of gas samples is a unique form of transmission sampling by FTIR as the identified sample does not need to be of pure composition. At high spectral resolution, most gas mixtures can be identified and quantified since absorbance bands can be selected within the spectrum, which are resolved and distinct from other components within the sample.

Simple demountable cells (50 mm to 100 mm) are recommended for samples in a 1–10% by weight concentration range.

For highly dilute samples (ppm to ppb concentrations), long-path cells are required. The long-path cell reflects the IR beam several times through the sample using a set of mirrors positioned on the opposite ends of the cell, producing a pathlength from 2.4 to 30 meters – or more. It is important to select window materials compatible with the investigated sample. Gas sampling accessories can be fitted with different windows to accommodate the physical and chemical characteristics of the measured gas. Some gas measurement applications require temperature control for higher precision or to prevent condensation of specific components. Special designs for high-pressure and temperature controlled experiments are also available.



FTIR Spectrum of Methanol Vapor measured with the PIKE 100-mm gas cell using 0.50 cm^{-1} spectral resolution.

Summary

Transmission sampling by FTIR provides an excellent means for sample identification and quantification of sample components. Most samples measured by transmission techniques require some sample preparation; however, the quality of the results and amenability to automation and microsampling offer significant advantages.

Properties of Select Infrared Transmitting Materials For Transmission Spectroscopy

Material	Comments	SWL cm^{-1}	LWL cm^{-1}	RI	Solubility g/100 g	Hardness kg/mm^2	MP °C	pH Range
AMTIR	GeAsSe glass, brittle	11000	593	2.50	0.00	170	370	1–9
BaF_2	Barium Fluoride	66600	691	1.45	0.17	82	1280	5–8
CaF_2	Calcium Fluoride	79500	896	1.40	0.0017	158	1360	5–8
CsI	Cesium Iodide, very hygroscopic, Somewhat Toxic	42000	172	1.73	44	20	621	NA
Diamond	Type IIa, strong IR absorbance between 2700–1800 cm^{-1}, costly	30000	<2	2.40	0.00	5700	550 flash point	1–14
Ge	Germanium, brittle, becomes opaque at elevated temperatures	5500	432	4.00	0.00	780	936	1–14
KBr	Potassium Bromide, most widely used for mid-IR applications	48800	345	1.52	53	6	730	NA
KRS-5	Thallium Bromide/Thallium Iodide, Extremely Toxic!	17900	204	2.37	0.05	40	414	5–8
NaCl	Sodium Chloride	52600	457	1.49	36	18	801	NA
Polyethylene	For Far-IR, swells with some organic solvents	625	<4	1.52	0.00		110	1.5–14
SiO_2	Silicon Dioxide	50000	2315	1.53	0.00	460	1713	1–14
Si	Silicon, strong IR absorbance between 624–590 cm^{-1}	8900	624, 30	3.41	0.00	1150	1420	1–12
ZnS	Zinc Sulfide	17000	690	2.20	0.00	240	1830	5–9
ZnSe	Zinc Selenide	15000	461	2.40	0.00	120	1526	5–9

Notes: The above table is meant to be a general guide – brief and concise. For more information about these materials, consult appropriate reference books and Safety Data Sheets (MSDS).

SWL – Shortest wavelength for transmission, 1 mm, 50% transmission
LWL – Longest wavelength for transmission, 1 mm, 50% transmission
RI – Refractive index, at relevant wavelength
MP – Melting point

Ordering Terms, Contact Information and Guarantee

Part Numbers and Price

The PIKE price list includes accessories that may be used with a variety of makes and models of spectrometers. Please specify the part number and description when ordering, including your instrument type and model number. Click here for a list of spectrometer and spectrophotometer instrument codes. When placing an order, substitute these codes for the final two digits (XX) in the accessory part number.

PIKE Technologies is continually extending the accessory product range. If you are unable to find a required item, please contact us to discuss your needs. We will be glad to assist.

Payment Terms

Purchase Order Number, cash in advance, MasterCard and Visa are acceptable. Payment is net 30 days, and shipments are FOB Madison, WI USA. Freight charges are prepaid and added to your invoice. If you wish to pay freight charges, please specify this on your order. Prepayment is required for international customers.

International Handling Fee

For orders placed from outside the United States or Canada, a handling fee of $40 will apply per order to cover the costs associated with the additional documentation and bank charges required for international shipments.

Ways to Order

Many products are available for purchase directly through our website. These items are marked on our website with a red shopping cart icon.

Please include the following information when placing an order: your name, phone number, product part number, quantity, ship to address, bill to address, purchase order number and spectrometer model on which the accessory will be used.

Orders may be placed via mail, phone, fax, e-mail or on our website. We accept Visa and Mastercard via phone and direct online purchases. For security purposes, do not send credit card information via e-mail. An electronic order form is available on our website (for P.O. Numbers only – do not use this form for credit card orders). There is no minimum order requirement. Please use the following addresses and phone/fax numbers when placing your orders:

PIKE Technologies, Inc.
6125 Cottonwood Drive
Madison, WI 53719
(608) 274-2721 (TEL)
(608) 274-0103 (FAX)
orders@piketech.com (E-MAIL)
www.piketech.com

Delivery

The delivery/shipment date is confirmed upon receipt of an order. Special requirements and custom accessories are subject to different lead times. Please contact us for price quotes and delivery information on these products.

Guarantee

All PIKE products are guaranteed to be free from defects in material and workmanship for a period of 12 months from the date of shipment. Should you be dissatisfied, or have any queries, please contact us immediately and we will promptly repair or replace the product at no charge.

Product Returns

Please contact PIKE to receive your Return Material Authorization (RMA) number if you wish to return any of our products. A restocking fee may apply. Customers are responsible for shipping charges for all returned products. For products under warranty, back-to-customer shipping charges will be covered by PIKE. Please do not return any products without obtaining the RMA number first.

Technical Assistance

PIKE Technologies offers comprehensive technical assistance. Please contact us via mail, phone, fax or e-mail with your questions.

International Distribution

PIKE Products are available worldwide. Call or send us an e-mail and we will provide you with an address of the sales office closest to your location. All exports are handled in accordance with the US Export Administration Regulations.

PIKE on the Web

Visit our web site to find out more information about new products, up-to-date PIKE news, pricing, and to see the latest copy of the PIKE Reflections Newsletter! www.piketech.com • info@piketech.com

Customer satisfaction is very important to all of us here at PIKE Technologies, Inc. We have hopefully made the ordering process very fast and easy for you. If you have any questions or concerns about our products or services, please don't hesitate to contact us. We will be happy to make adjustments to fit your needs.

Products and prices are subject to change without notification.

FTIR and UV-Vis Instrument Codes

When ordering a PIKE accessory, replace the XX or XXX portion of the product's part number with your spectrometer's instrument code below. For assistance, please contact a PIKE customer service representative at (608) 274-2721 or sales@piketech.com.

FTIR Instrument Codes (XX)

ABB Bomem	
FTLA2000-100 (Arid Zone)	80
Michelson 100, MB Series	81
MB 3000	82
Agilent	
Excalibur™, Scimitar™, FTS, 600-IR Series	10
Excalibur™, Scimitar™, 600-IR Series with recognition	13
Analect (See Hamilton Sundstrand)	
Bio-Rad (See Agilent)	
Bruker Optics	
IFS™, Vector™, Equinox™ Series.	50
Tensor™, Vertex™ with recognition (Quick-Lock)	51
Buck Scientific	
M500	65
Digilab (See Agilent)	
Hamilton Sundstrand AIT	
Diamond 20	60
Horiba	
7000 Series	35
Interspectrum	
Interspec 200-X	90
Jasco	
300/600 Series	56
400	57
4000/6000 Series	58
JEOL	
Winspec™ Series	46
Lambda Scientific	
Lambda FTIR 7600	66
Lambda FTIR 8600	64
Lumex	
INFRALUM FT-02, FT-08	67
Mattson (See Thermo Electron)	
Midac	
M Series	30
Nicolet (See Thermo Electron)	
Oriel	95
Optical Table	99
PerkinElmer	
1700 Series	70
Spectrum™ GX, 2000	71
Spectrum BX / RX, 1600, Paragon 1000	73
Frontier, Spectrum One, 65, 100, 400 with recognition	74
Spectrum Two with recognition	75
Shimadzu	
8300, 8400 Series, IRPrestige™-21, IRAffinity-1s	15
IRPrestige™-21, IRAffinity-1s with recognition (QuickStart)	16
IRTracer™-100	18
IRTracer™-100 with recognition	19
Thermo Electron / Nicolet / Mattson	
Infinity, Galaxy, RS Series	20
Genesis™, Satellite, IR 300	21
Impact™ 400, Magna, Protege™, 500 / 700 Series	40
Avatar™, Nexus™, Nicolet™, iS™10, iS™50	40
Model 205/210	41
Nicolet iS™5	42
Avatar, Nexus, Nicolet Series with recognition (Smart)	47
Varian (see Agilent)	

UV-Vis Instrument Codes (XXX)

Agilent/Varian	
Cary 50	100
Cary 60	111
Cary 100, 300	110
Cary 4000, 5000, 6000i	120
Jasco	
600 Series	600
Optical Table	999
PerkinElmer	
Lambda 650, 750, 850, 950 and 1050	700
Lambda 25, 35, 45	730
Shimadzu	
1600 and 1700	200
1800 Series	210
2600	240
3600	220
Thermo Fisher Scientific	
Evolution 300/600	400
Evolution 200	410

Helpful Links

Order Form

Quote Request Form

Application Notes

Visit our Website

Contact Us

PIKE TECHNOLOGIES

6125 Cottonwood Drive, Madison, WI 53719

(608) 274-2721 (Tel), (608 274-0103 (Fax)

www.piketech.com · sales@piketech.com