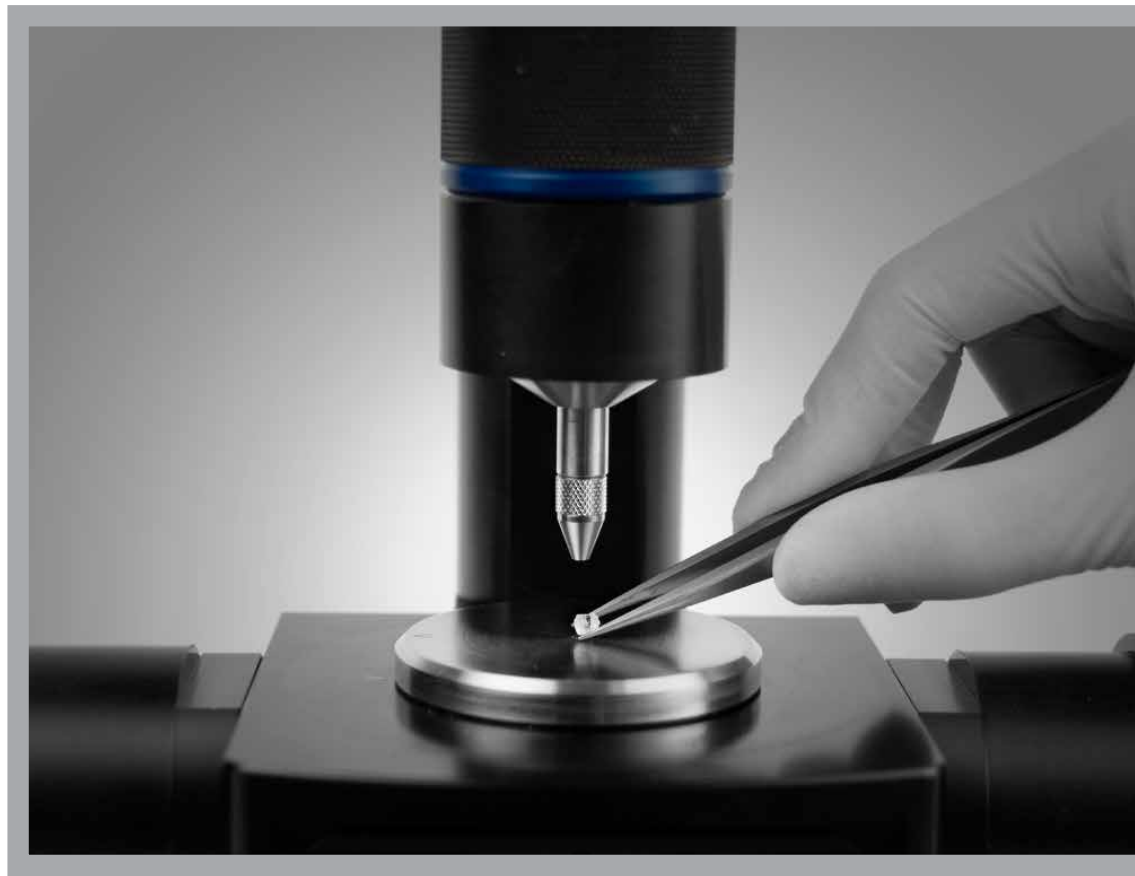


Attenuated Total Reflection (ATR)



ATR products successfully replace constant-path transmission cells and salt plates used for analysis of liquid and semi-liquid materials. Horizontal ATR accessories are used to analyze films, pastes, solids and fine powders. Thanks to the reproducible effective pathlength, ATR is well suited for both qualitative and quantitative applications. Several temperature control options are available.

IRIS

AT A GLANCE

- ▶ High-performance monolithic diamond ATR
- ▶ Full spectral range for mid- and far-IR measurements
- ▶ Precision optics and design for high energy throughput
- ▶ Optional Ge ATR crystal for high refractive index samples
- ▶ Additional sampling tools — Flow-Through Attachment and Liquids Retainer



Generate high-quality spectra with the IRIS Diamond ATR. Measure a wide range of sample types, including powders, gels, liquids and solids. Ideal for research, QA/QC and sample identification.

PERFORMANCE AND DESIGN

ADVANTAGES OF DIAMOND

The mechanical properties and chemical compatibility of diamond make it an ideal ATR element for nearly all samples. With the diamond's Knoop hardness, 5-10 times greater than other common ATR elements, the IRIS diamond ATR may be used to measure extremely hard samples without concern of damage to the accessory.

The pH tolerance of diamond spans 1-14, adding to this ATR element's versatility to handle samples ranging from strong bases to strong acids, and everything in between. A unique feature of the IRIS, is the PTFE seal between the diamond and the ATR stainless steel plate housing. Unlike many commercial accessories where the ATR crystal is sealed with epoxy, the PTFE seal of the IRIS will stand up to long-term exposure to organic and caustic samples.

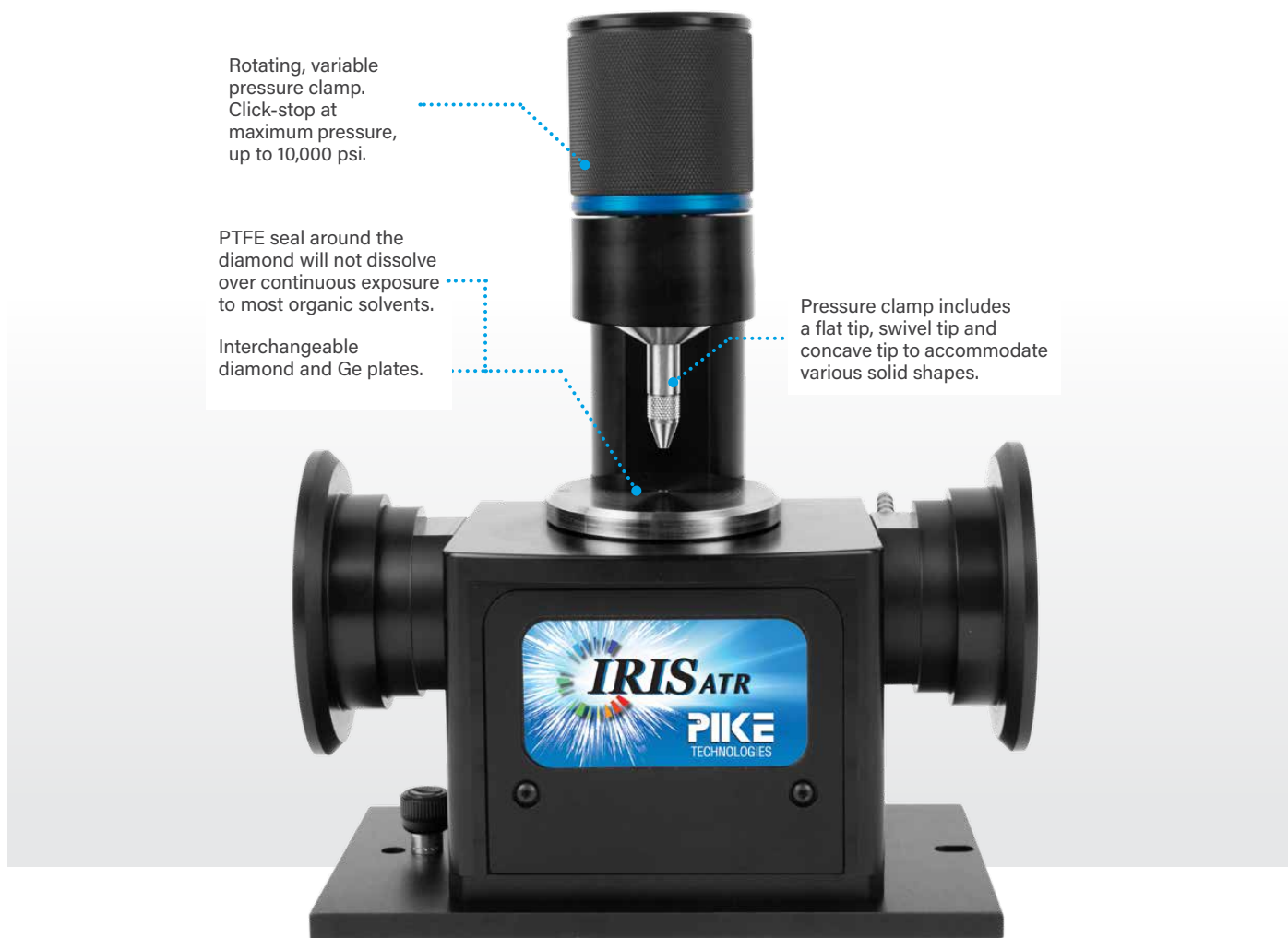
Two monolithic diamond plate models are offered for IRIS. The standard performance diamond plate has a range from 4000–400 cm^{-1} , and for those wishing to make measurements into the far-IR, an extended-range diamond plate with a cutoff of 30 cm^{-1} is available. For measurements solidly in the mid-IR range, the standard performance plate is most popular and is recommended.

BENEFITS OF GERMANIUM

To provide users with the added flexibility, IRIS may be configured with a Ge ATR plate for measuring samples with a high refractive index such as carbon black-filled samples and inorganic materials (e.g. oxides, aluminas, titania and minerals). The Ge element offers an expanded transmission range, 4000–450 cm^{-1} . Swapping the ATR plates is easy, and efficient.

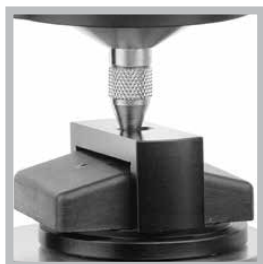
PRECISION OPTICS - OPTIMAL PERFORMANCE

By using the precision diamond-turned mirrors in its efficient optical design, IRIS is a high energy throughput ATR accessory. This allows for quick measurements to be made, generally less than one minute to complete. Adding to the accessories robustness and reliability is the mechanical construction of the ATR crystal plate, which uses a strong metal brace underneath the ATR element to prevent microscopic movements of the ATR crystal. These features in combination with a small monolithic diamond (1.8 mm diameter) produce high quality spectra across the full mid-IR region including the diamond phonon bands region, inherent to all diamonds.



IRIS SAMPLING TOOLS

The Liquids Retainer with Volatiles Cover (left) offers a trough configuration while reducing the amount of evaporation when taking IR measurements of highly volatile liquid samples. The Flow-Through Attachment (right) allows for handling samples that pose a hazard, and are degraded from ambient exposure.



DIGITAL FORCE ADAPTER

The high-pressure clamp may be mated with the Digital Force Adapter, which is ideal for applications that require controlled and reproducible pressure. The magnitude of applied force is displayed on an external easy-to-read LCD readout.

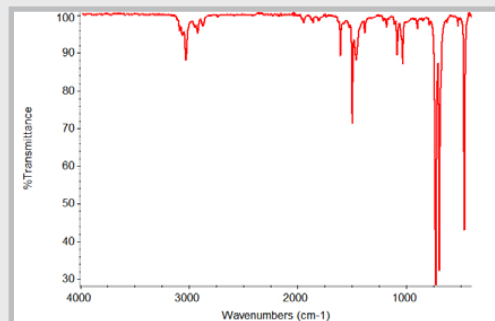


SPECIFICATIONS

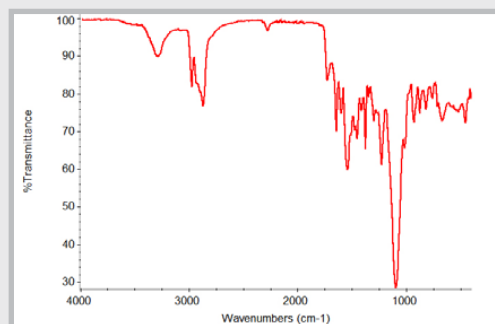
ATR Crystal Choices	Monolithic diamond or Ge
Spectral Range, Diamond	4000 to 400 cm^{-1}
Spectral Range, Diamond Ext. Range	4000 to 30 cm^{-1}
Spectral Range, Ge	4000 to 450 cm^{-1}
Crystal Plate Mounting	User-changeable plates
Crystal Plate Housing	Stainless steel
Angle Of Incidence	45 degrees, nominal
Diamond Surface Diameter	1.8 mm
Digital Force Adapter (option)	Load cell sensor for precise and reproducible pressure control. Attaches directly to High-Pressure IRIS clamps. Digital readout.
Press Clamp	Rotating, continuous variable pressure; click-stop at maximum pressure.
Maximum Pressure	10,000 psi
Sample Access	47 mm, ATR crystal to pressure mount
Accessory Dimensions (W X D X H)	102 x 97 x 91 mm (excludes FTIR baseplate and mount)
FTIR Compatibility	Most, specify model and type

IRIS APPLICATION

The IRIS is a robust and reliable diamond ATR that allows for IR analysis of most all samples in the lab. Whether it is a rigid polymer, strong organic solvent, powder and more—IRIS has it covered.



Toluene spectrum, showing absorbance bands across the full spectral range to 400 cm^{-1} .



Polyurethane spectrum, showing unreacted isocyanate monomer at 2280 cm^{-1} . Usable spectral results can be obtained across this diamond phonon band region.

PART NUMBER	DESCRIPTION
Base Optics (<i>required</i>)	
027-18XX	IRIS
Notes: Replace XX with your spectrometer's Instrument Code listed in the back of the catalog. Base includes purge tubes, purge kit, and selected spectrometer base mount.	
Crystal Plates (<i>must select 1 or more</i>)	
027-2100	Diamond Crystal Plate
027-2110	Diamond Crystal Plate, Extended Range
027-2120	Ge Crystal Plate
Notes: Crystal plates are pre-aligned. Plate housing is stainless steel. Contact PIKE for Hastelloy options.	
Clamp and Clamp Accessories (<i>required for solid or powdered samples</i>)	
027-3025	High-Pressure Clamp
027-3027	High-Pressure Confined Space Clamp
076-6029	Digital Force Adapter
025-3095	Flat Tip for High-Pressure Clamp
025-3093	Swivel Tip for High-Pressure Clamp
025-3092	Concave Tip for High-Pressure Clamp
025-3099	Tip Assortment for High-Pressure Clamp
Notes: The High-Pressure Clamp is required for analysis of solids, powders and use of Liquids Retainer, Flow-Through Attachment or the Digital Force Adapter. Pressure clamp includes a flat tip, a swivel tip and a concave tip.	
Optional Sampling Tools	
026-5013	Liquids Retainer and Volatiles Cover Set
026-5010	Liquids Retainer
026-5012	Flow-Through Attachment, 100 μL
Notes: Flow-Through Attachment and Liquids Retainer require High-Pressure Clamp.	



MIRacle

AT A GLANCE

- ▶ Highest IR throughput ATR
- ▶ Complete flexibility
- ▶ Fully configurable
- ▶ Pinned-in-place, changeable crystal plates
- ▶ Optional specular reflection plate
- ▶ Temperature control, flow-through attachment and sealed clamp

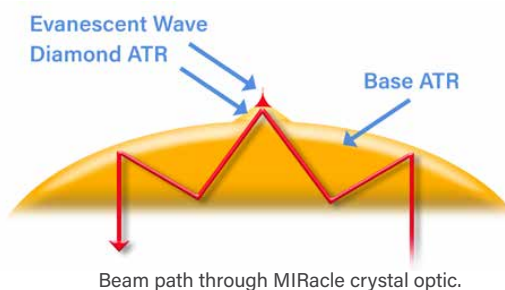


TEMPERATURE CONTROL
OPTIONS AVAILABLE

The MIRacle™ ATR is a high-performance FTIR sampling tool for solid, liquid, or polymer samples. With options for interchangeable single, 3- or 9-reflection crystal plates, and for heating or cooling, the MIRacle offers a flexible platform to address a wide range of FTIR sampling applications.

MIRACLE OPTICAL DESIGN

In the patented MIRacle optical design, the ATR crystal focuses the IR beam and also provides the ATR sampling interface. This technology delivers the greatest energy throughput for a commercially-available, small area ATR, that saves considerable data collection time and produces high quality spectra.



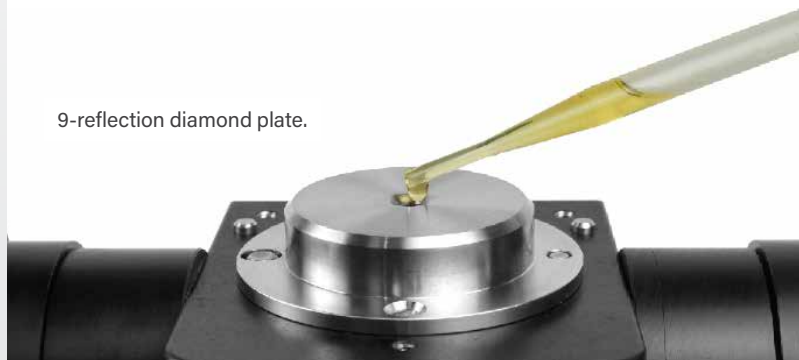
ATR PLATES

The MIRacle is one of our most configurable ATR accessories. The crystal plates are pinned in place and easily changeable within seconds with no alignment required. With this flexibility, you can change the crystal type to precisely match your sampling requirements.

The single reflection diamond/ZnSe is the most popular MIRacle ATR plate, and is an ideal universal ATR element that can accommodate samples across the pH spectrum and extremely hard samples. Table 1 summarizes the various MIRacle ATR crystal characteristics and typical applications for each.

For applications requiring enhanced spectral sensitivity for measuring minor components, the MIRacle may be configured with multiple reflection ATR plates. The 3-reflection diamond/ZnSe crystal plates are available in flat and trough style, and 9-reflection diamond/ZnSe is offered in trough style only.

9-reflection diamond plate.



MIRacle Crystal Plate	Application	Hardness (kg/mm ²)	Cutoff cm ⁻¹ Spectral Range	Refractive Index @ 1000 cm ⁻¹	Depth of Penetration @ 45°, μ	pH Range of Sample
Diamond/ZnSe	Ideal for hard samples, acids or alkaline	5700	525	2.4	2.0	1-14
Diamond/KRS-5	When you need full mid-IR spectral range	5700	250	2.4	2.0	1-14
Ge	General purpose and carbon filled or rubber	550	575	4.0	0.66	1-14
Si	Excellent for far-IR spectral measurement	1150	8900-1500, 475-40	3.4	0.85	1-12
ZnSe	General purpose ATR crystal	120	520	2.4	2.0	5-9
Note: crystal plates are covered by PIKE Technologies' patent numbers 5,965,889 and 6,128,075 or are manufactured under license of 5,200,609, 5,552,604 and 5,703,366.						

PRESS CLAMP OPTIONS

Recommended for most applications, the high-pressure clamps are calibrated to deliver over 10,000 psi of pressure when used with the single reflection crystal plates, and have a slip-clutch mechanism to prevent excessive pressure from being applied to the crystal. All clamps include three tips to accommodate hard, soft and pellet-shaped samples.



High-Pressure Clamp for routine sampling.



Confined Space Clamp for limited area in sample compartment.



Micrometer Clamp for low pressure.

MIRacle Clamp Pressure	Max Force (lbf)	Crystal Diameter (mm)	Pressure (psi)
High-Pressure Clamps	40	1.8	10,141
		6.0	913
Micrometer Pressure Clamp	8	1.8	2,028
		6.0	183

DIGITAL FORCE ADAPTER

The high-pressure clamp may be mated with the Digital Force Adapter (DFA), which attaches directly to the clamping assembly. The DFA's embedded load cell exhibits high linearity, reproducibility, and exceptional accuracy. The magnitude of applied force is displayed on an external easy-to-read LCD readout.



SEALED CLAMP

The Sealed Sample Chamber for the MIRacle Single Reflection ATR accessory attaches to dedicated single reflection diamond, ZnSe or Ge crystal ATR plates allowing the complete assembly to be moved from the spectrometer to a protective environment for sample handling. Once the sample has been loaded onto the ATR crystal, the sealed clamp may be engaged, shielding the sample from the external environment. Typical applications include studies of toxic or chemically aggressive solids and powders.

The chamber is made of stainless steel and is sealed against the crystal plate with a chemically resistant O-ring. The chamber contains an internal, spring-loaded anvil that compresses the sample against the ATR crystal at a preset, clutch-controlled setting.



Sealed Sample Chamber.

TEMPERATURE CONTROL

The MIRacle can be configured with temperature-controlled ATR plates. For resistively heated and Peltier plates, the temperature controller has a touch-screen panel, and is ready to use with PIKE TempPRO software. This program offers a graphical user interface for easy profile set up, and initiates data collection as a function of time and temperature when used with most commercial spectrometers. The liquid jacketed and Peltier plates require user-provided liquid circulator.

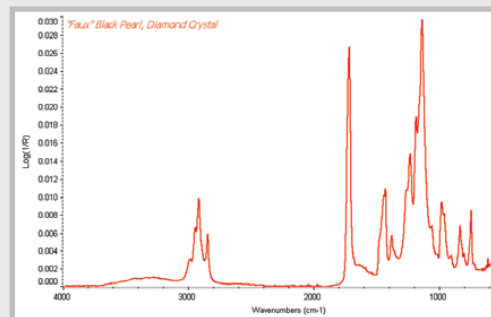


SPECIFICATIONS

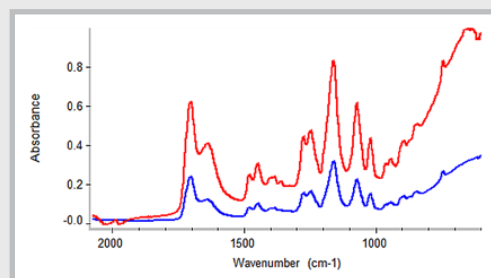
ATR Crystal Choices	Diamond/ZnSe, Diamond/KRS-5, Ge, ZnSe, Si
Crystal Plate Mounting	User-changeable plates
Crystal Plate Housing	Stainless steel or Hastelloy
Angle Of Incidence	45 degrees, nominal
Crystal Dimensions (surface)	1.8 mm single reflection 6.0 mm 3- and 9-reflection
Pressure Device	Rotating, continuously variable pressure; click-stop at maximum (high-pressure clamp)
Digital Force Adapter (option)	Load cell sensor for precise and reproducible pressure control. Attaches directly to high-pressure MIRacle clamps. Digital readout. Not for use with heated plates.
Maximum Pressure	10,000 psi
Sample Access	55 mm, ATR crystal to pressure mount
Heating Options	Ambient to 60 or 130 °C maximum
Peltier Option	Ambient to 10 or 90 °C maximum
Accuracy	+/- 0.5° up to 100 °C +/- 0.5% of set point > 100 °C
Sensor Type	3 wire Pt RTD (low drift, high stability)
Temperature Control	Touch-panel display with USB interface. PIKE TempPRO software for PC control with unlimited ramps and automated data collection.
CE	
Input	100-240 VAC, auto setting, external power supply
Output	1.3A/24 VDC 30 W maximum
Specular Reflection Option	Optional, 45 degree nominal angle of incidence
Purge Sealing	Purge tubes and purge line connector included
Accessory Dimensions (W X D X H)	104 x 103 x 210 mm (excludes FTIR baseplate and mount)
FTIR Compatibility	Most, specify model and type

MIRACLE APPLICATION

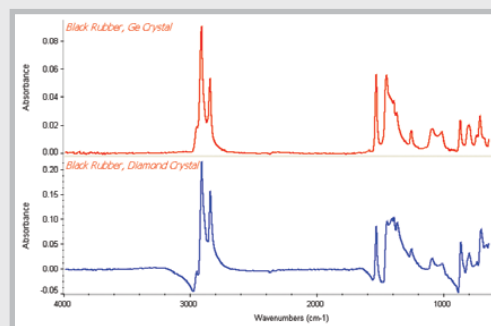
The MIRacle ATR is a universal sampling accessory. With its wide range of plates available, including single and multiple reflection, this accessory can accommodate most all samples.



Faux black pearl spectrum, collected using MIRacle diamond ATR crystal. Diamond is the most robust of all ATR elements, and is ideal for hard samples.



Hydrogel spectrum, collected using the 3-reflection diamond/ZnSe crystal (red) and single reflection diamond/ZnSe (blue). Multiple reflection ATR crystals increase sensitivity for liquid and pliable solids.



Black rubber spectrum, collected using a single reflection Ge crystal (red) and a single reflection diamond crystal (blue).

The spectrum run on the Ge crystal plate exhibits a normal baseline and symmetric absorbance bands, while the spectrum run on the diamond crystal plate has a baseline shifted and asymmetric absorbance bands.

For high refractive index samples such as carbon-filled rubber and some inorganic samples, Ge crystal is best.

PART NUMBER	DESCRIPTION
Base Optics (<i>required</i>)	
025-18XX	MIRacle Notes: Replace XX with your spectrometer's Instrument Code listed in the back of the catalog. Base includes purge tubes, purge kit, and selected spectrometer base mount.
Crystal Plates (<i>must select 1 or more</i>)	
025-2108	Diamond/ZnSe Performance Crystal Plate
025-2107	Diamond/ZnSe HS Performance Crystal Plate
025-2028	Diamond/KRS-5 Performance Crystal Plate
025-2027	Diamond/KRS-5 HS Performance Crystal Plate
025-2018	ZnSe Performance Crystal Plate
025-2058	Ge Performance Crystal Plate
025-2098	Si Performance Crystal Plate
025-2118	3-Reflection Diamond/ZnSe Performance Crystal Plate
025-2120	3-Reflection Diamond/ZnSe Performance Crystal Plate, Trough
025-2038	3-Reflection ZnSe Performance Crystal Plate
025-2218	9-Reflection Diamond/ZnSe Performance Crystal Plate, Trough
025-2208	Specular Reflection Performance Plate Notes: Crystal plates are pre-aligned. Plate housing is stainless steel. Contact PIKE for more Hastelloy (HS) options.
Pressure Clamps (<i>required for solid and powdered samples</i>)	
025-3025	Performance High-Pressure Clamp
076-6025	Digital Force Adapter for High-Pressure Clamp
025-3029	Performance Micrometric, Low-Pressure Clamp
025-3027	Performance High-Pressure Confined Space Clamp
076-6028	Digital Force Adapter for High-Pressure Confined Space Clamp Notes: The High-Pressure Clamp is recommended for general applications. Pressure clamps include a flat tip, a swivel tip and a concave tip. The Digital Force Adapter requires High-Pressure Clamp, P/N 025-3025 or 025-3027 (sold separately), and may not be used at temperatures above ambient.

PART NUMBER	DESCRIPTION
Sampling Options	
025-4018	Heated ZnSe Performance Crystal Plate
025-4058	Heated Ge Performance Crystal Plate
025-4108	Heated Diamond/ZnSe Performance Crystal Plate (60 °C max.)
025-4025	MIRacle Peltier ZnSe Plate
025-4026	MIRacle Peltier Ge Plate
025-2104	Liquid Jacketed Diamond/ZnSe Performance Crystal Plate (60 °C max.)
025-2014	Liquid Jacketed ZnSe Performance Crystal Plate
025-2054	Liquid Jacketed Ge Performance Crystal Plate
025-2094	Liquid Jacketed Si Performance Crystal Plate
026-5014	Flow-Through Attachment, 100 µL
026-5013	Liquids Retainer and Volatiles Cover Set
076-1610	Digital Temperature Control Module
007-0207	PIKE TempPRO Software
076-1625	Digital Temperature Control Module – Peltier ATR Note: For heated diamond/ZnSe crystal plate, the maximum crystal temperature is 60 °C. The maximum temperature for ZnSe heated plate is 130 °C. Germanium become optically opaque at 90 °C. Temperature controller 076-1610 is required for heated crystal plates. Digital Temperature Control Module 076-1625 is required for Peltier plates. If PC control is desired, TempPRO software must be purchased (sold separately). Liquid jacketed crystal plates require customer-provided circulator.
Sealed High-Pressure Clamp (<i>must select the sealed clamp and at least one crystal ATR plate</i>)	
025-6020	Sealed High-Pressure Clamp
025-6108	Diamond/ZnSe Sealed Clamp Performance Plate
025-6018	ZnSe Sealed Clamp Performance Plate
025-6058	Ge Sealed Clamp Performance Plate
Replacement Parts	
025-3099	Tip Assortment for High-Pressure Clamp
025-3095	Flat Tip for High-Pressure Clamp
025-3093	Swivel Tip for High-Pressure Clamp
025-3092	Concave Tip for High-Pressure Clamp
025-3053	MIRacle Micrometer Clamp Tip Assortment
025-3052	Flat Tip for Micrometric Clamp
025-3061	Swivel Tip for Micrometric Clamp
025-3054	Concave Tip for Micrometric Clamp
025-3094	7.8 mm ATR Pressure Tip for High-Pressure Clamp
025-3096	7.8 mm ATR Pressure Tip for Micrometer Clamp Notes: Please contact us for items not described in this list. Reconditioning service for used MIRacle crystal plates is available.

MIRacle Peltier

AT A GLANCE

- Sub-ambient measurements to 10 °C without a refrigerated liquid circulator, up to 90 °C
- Fast heating and cooling rates, 10 °C/min and 5 °C/min, respectively
- Precision temperature stability across the range, including ambient temperatures

The MIRacle Peltier is a versatile temperature control option for your ATR accessory. Add it to your existing MIRacle or configure a new ATR.

The MIRacle ZnSe and Ge ATR Peltier plates offer temperature control ranging from 10 to 90 °C. The Peltier elements used to control temperature are very responsive, and provide rapid heating and cooling rates. For making steady-state measurements, temperature stability from 10 °C through 90 °C is excellent. Like all MIRacle ATR plates, the Peltier plate is pinned in place and easily changeable with no alignment required.



PART NUMBER	DESCRIPTION
025-4025	MIRacle Peltier ZnSe Plate
025-4026	MIRacle Peltier Ge Plate
076-1625	Digital Temperature Control Module – Peltier ATR
007-0207	PIKE TempPRO Software

Notes: MIRacle Peltier configuration requires MIRacle base, Peltier crystal plate and temperature controller (TempPRO software is optional). A clamp and small press tip (P/N 025-3094 or 025-3050 for high pressure or micrometer clamp, respectively) is required for testing solids. See the MIRacle product datasheet, page 25, for information on these components. The Peltier plate requires a liquid recirculator (P/N 170-1100) or another device to flow room-temperature water through the plate.

SPECIFICATIONS

ATR Crystal Choices	Ge, ZnSe
Crystal Plate Mounting	User-changeable plates
Crystal Plate Housing	Stainless steel
Angle Of Incidence	45 degrees, nominal
Crystal Dimension	1.8 mm diameter
Sample Access	55 mm, ATR crystal to pressure mount
Temperature Range	10 - 90 °C
Accuracy	+/- 0.5° up to 90 °C
Heating Rate	10 °C/min
Cooling Rate	5 °C/min
Sensor Type	3 wire Pt RTD (low drift, high stability)
Temperature Control	Touch-panel display. USB interface for PC control using TempPRO software
Input	100–240 VAC, auto setting, external power supply
Output	24 VDC/150 W maximum
Accessory Dimensions (W X D X H)	104 x 123 x 210 mm

Applications ideal for the MIRacle Peltier are characterizing chemical structure through phase changes and as a function of heating/cooling rates, and developing high-quality calibration methods where precise temperature stability may be achieved.



TEMPERATURE CONTROLLER

The temperature controller for the Peltier has a touch-screen panel, and is ready to use with PIKE TempPRO software. This program offers a graphical user interface for easy profile set up, and initiates data collection as a function of time and temperature when used with most commercial spectrometers.

ATR Sampling Tools

IRIS, MIRACLE AND GLADIATR

LIQUIDS RETAINER AND VOLATILES COVER

The Liquids Retainer with Volatiles Cover offers a trough configuration while reducing the amount of evaporation when taking IR measurements of highly volatile liquid samples.



FLOW-THROUGH ATTACHMENT

The Flow-Through Attachment allows for handling samples that pose a hazard and are degraded from ambient exposure.



DIGITAL FORCE ADAPTER FOR HIGH-PRESSURE CLAMP

The Digital Force Adapter attaches directly to the clamping assembly to precisely measure the applied force by using an embedded load cell that exhibits high linearity and exceptional accuracy. The magnitude of applied force is displayed on an external easy-to-read LCD readout. The digital clamp is ideal for applications that require controlled and reproducible pressure. This option may not be used with temperature-controlled plates.



PART NUMBER	DESCRIPTION
Sampling Tools	
026-5014	Flow-Through Attachment, 100 μ L (300 $^{\circ}$ C max.)
026-5013	Liquids Retainer and Volatiles Cover Set (210 $^{\circ}$ C max.)
026-5015	Liquids Retainer and Volatiles Cover Set (300 $^{\circ}$ C max.)
Notes: For temperature-controlled options, see respective product page. Flow-Through Attachment and Liquids Retainer require High-Pressure Clamp.	
Specular Reflection Performance Plates	
025-2208	MIRacle
026-2200	GladiATR
Digital Force Adapter for High-Pressure Clamp	
076-6025	MIRacle
076-6026	GladiATR
076-6027	IRIS
Note: Digital Force Adapter requires High-Pressure Clamp.	

GLADIATR AND MIRACLE

SPECULAR REFLECTION PLATE

The GladiATR and MIRacle may be converted from an ATR accessory to a specular reflection accessory by using the Specular Reflection Plate. The angle of incidence is 45 degrees, and the plate is easily interchangeable with ATR plates.

TEMPERATURE CONTROL OPTIONS

The GladiATR and MIRacle can be configured with liquid jacketed plates and resistively heated crystal plates with temperature control module. The PIKE controller has a touch-panel interface with USB port and is ready for use with PIKE TempPRO software. TempPRO provides a graphical user interface for temperature control and kinetics measurements. The liquid jacketed plates require user-provided liquid circulator.



MIRacle temperature-controlled ATR plate.

GladiATR

AT A GLANCE

- ▶ Diamond crystal design
- ▶ High energy throughput
- ▶ Full spectral range for analysis in the mid-IR and far-IR regions
- ▶ Temperature control options, sub-ambient up to 300 °C
- ▶ Optional Ge crystal plate



TEMPERATURE CONTROL
OPTIONS AVAILABLE

The GladiATR is a durable diamond ATR which is widely used in research and general testing laboratories. Its rugged design makes it ideal for use in environments where large numbers of samples are measured, while its configurability offers the flexibility to accommodate a variety of samples.

DIAMOND ATR ELEMENT

The GladiATR diamond crystal is a monolithic prism which will not scratch or fracture even at extreme pressures. This design permits analysis of hard, intractable objects such as coated metal wires, polymer pellets and geological samples without damage to the ATR crystal. The diamond crystal is brazed into the stainless steel or Hastelloy plate, which makes the GladiATR compatible with pressure up to 30,000 psi.

HIGH ENERGY THROUGHPUT

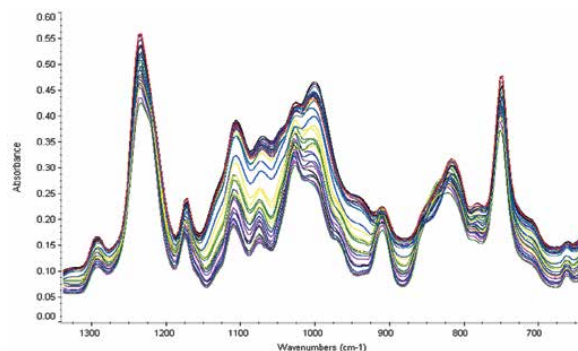
The energy throughput of the GladiATR is exceptional. This significantly improves spectral quality and reduces sampling time. This high-performance ATR is designed and manufactured using all reflecting optics providing full spectral range in the mid-IR and far-IR spectral regions.

GE CRYSTAL PLATE

An optional Ge crystal plate is available for analysis of high refractive index samples, and offers an extended spectral range from 5000–450 cm^{-1} . Crystal plates are easily changeable.

TEMPERATURE CONTROL

Temperature-controlled crystal plates are available for thermal studies. The resistively heated diamond plate has a range from ambient to 300 °C. The temperature controller has a touch-screen panel and is ready to use with PIKE TempPRO software. This program offers a graphical user interface for easy profile set up, and initiates data collection as a function of time and temperature when used with most commercial spectrometers. For sub-ambient studies, liquid jacketed plates are an option, which requires user-provided liquid circulator. The liquid jacketed/heated GladiATR diamond plate blends the benefits of both resistive heating and liquid jacketing.



ATR/FTIR spectra from cure of thermoset epoxy using the heated diamond crystal plate on the GladiATR.



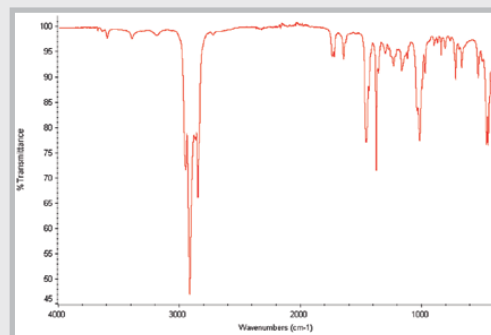
SPECIFICATION

ATR Crystal Choices	Diamond, Ge
Crystal Plate Mounting	User changeable plates
Crystal Type	Monolithic
Diamond Mounting	Brazed
Crystal Plate Housing	Stainless steel
Angle Of Incidence	45 degrees, nominal
Crystal Dimensions (surface)	3.0 mm diameter
Optics	All reflective
Pressure Device	Rotating, continuously variable pressure; click stop at maximum
Digital Force Adapter (option)	Load cell sensor for precise and reproducible pressure control. Attaches directly to GladiATR clamp. Digital readout. For ambient temperature measurements only.
Maximum Pressure	30,000 psi
Sample Access	80 mm, ATR crystal to pressure mount
Spectral Range, Diamond	4000 to 30 cm^{-1} (IR optics dependent)
Spectral Range, Ge	4000 to 450 cm^{-1}
Heating Options	Diamond, 300 °C maximum Ge, 130 °C maximum
Accuracy	+/- 0.5° up to 100 °C +/- 0.5% of set point > 100 °C
Sensor Type	3 wire Pt RTD (low drift, high stability)
Temperature Control	Touch-panel display with USB interface. PIKE TempPRO software for PC control with unlimited ramps and automated data collection.
CE	  
Input	100-240 VAC, auto setting, external power supply
Output	4A/24 VDC, 100 W maximum. 6A/24 VDC, 150 W max. (300 °C version)
Cooling Options	Liquid jacketed crystal plates available
Specular Reflection Option	Optional, 45 degree nominal angle of incidence
Purge Sealing	Purge tubes and purge line connector included
Accessory Dimensions (W X D X H)	140 x 205 x 340 mm (excludes FTIR baseplate and mount)
FTIR Compatibility	Most, specify model and type

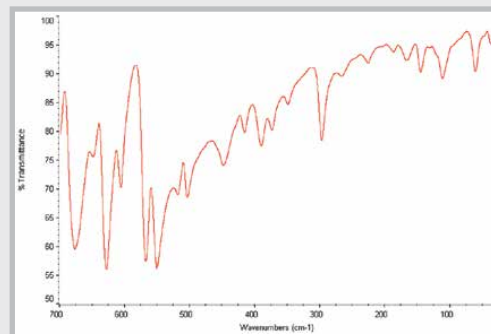


APPLICATION

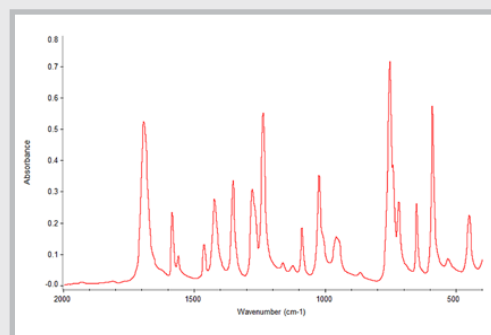
The GladiATR is a robust ATR accessory that may be configured with a full spectral range diamond or an extended-range Ge crystal. Measurements may also be made at sub-ambient temperatures using the liquid jacketed plates and up to 300 °C using the resistively heated diamond plate.



Polymer pellet spectrum collected using GladiATR with diamond crystal. Spectral range in the mid-IR is 4000–400 cm^{-1} .



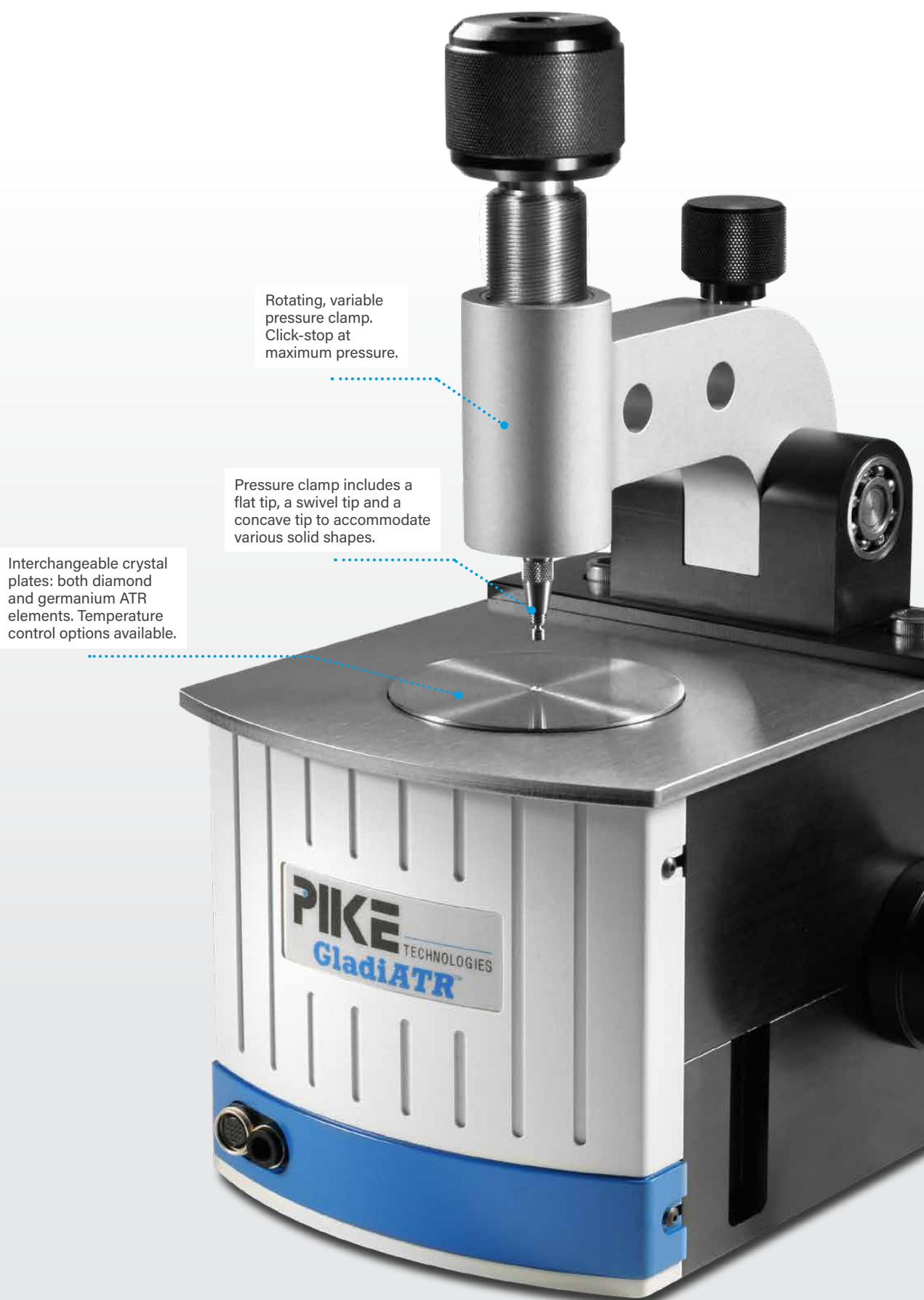
Sulfathiazole spectrum collected using GladiATR with diamond crystal plate and far-IR optics in an FTIR instrument.



Bromoacetophenone spectrum collected using GladiATR with extended range Ge crystal plate.

PART NUMBER	DESCRIPTION
Base Optics (<i>must select</i>)	
026-18XX	GladiATR with heating capability up to 300 °C Notes: Replace XX with your spectrometer's Instrument Code listed in the back of the catalog. All GladiATRs include purge tubes, purge kit, and selected spectrometer base mount. Crystal plates must be selected from the table below. High-Pressure Clamp, Digital Force Adapter and Liquids Retainer/Volatiles Cover are optional and need to be ordered separately, if required.
GladiATR Stainless Top (<i>must select one</i>)	
026-2001	GladiATR Standard Stainless Top Note: Stainless top is not required for temperature controlled plates.
Crystal Plates for GladiATR (<i>must select one or more</i>)	
026-2100	Diamond Crystal Plate
026-2050	Ge Crystal Plate
026-2200	Specular Reflection Plate Notes: GladiATR crystal plates are pre-aligned and pinned-in-place. Changing crystal plates is easy and fast to optimize sampling results. Plate housing is stainless steel; contact us for Hastelloy options. Reconditioning service is available.
Pressure Clamp for GladiATR, All Models (<i>must select for solid or powdered samples</i>)	
026-3020	High-Pressure Clamp
076-6026	Digital Force Adapter for High-Pressure Clamp Notes: The High-Pressure Clamp is required for analysis of solids, powders and use of Liquids Retainer, Flow-Through Attachment and/or Digital Force Adapter (Digital Force Adapter may be used when measuring samples at ambient temperature only). Pressure clamp includes a flat tip, a swivel tip and a concave tip.

PART NUMBER	DESCRIPTION
GladiATR Temperature Controlled Crystal Plates	
026-4102	Heated Diamond Crystal Plate, 300 °C
026-4119	Liquid Jacketed/Heated Diamond Crystal Plate
026-4115	Liquid Jacketed Diamond Crystal Plate
026-4121	Heated Ge Crystal Plate, 130 °C
026-4131	Liquid Jacketed Ge Crystal Plate, 130 °C
076-1610	Digital Temperature Control Module
007-0207	PIKE TempPRO Software Notes: Ge becomes optically opaque at 150 °C; maximum operating temperature for this crystal is 130 °C. Temperature controller is required for heated crystal plates. If PC control is desired, TempPRO software must be purchased (sold separately). Liquid jacketed crystal plates require customer-provided circulator.
GladiATR Sampling Options	
025-3099	Tip Assortment for High-Pressure Clamp
025-3095	Flat Tip for High-Pressure Clamp
025-3093	Swivel Tip for High-Pressure Clamp
025-3092	Concave Tip for High-Pressure Clamp
026-5014	Flow-Through Attachment, 300 °C, 100 µL
026-5013	Liquids Retainer and Volatiles Cover Set
026-5015	Liquids Retainer and Volatiles Cover Set, 300 °C Note: Flow-Through Attachment and Liquids Retainer are compatible with all crystal plate offerings (require High-Pressure Clamp).



GladiATR Vision

AT A GLANCE

- ▶ View through diamond crystal
- ▶ 110X magnification
- ▶ USB image capture, document sample image
- ▶ Diamond crystal design—scratch and fracture resistant
- ▶ Full spectral range for mid-IR and far-IR analysis
- ▶ Optional heated, viewing crystal plate



TEMPERATURE CONTROL
OPTIONS AVAILABLE



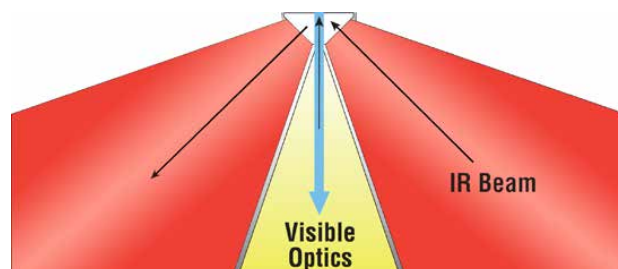
The GladiATR Vision™ diamond ATR is a novel sampling tool that couples small area infrared analysis with simultaneous viewing.

Samples are placed face down and positioned on the diamond crystal while its image is projected in real-time on the LCD screen. Finding and optimizing the sample placement for specific analysis areas is easy and fast. Analysis of thick or non-transparent samples is simple because viewing is through the diamond crystal.

WHAT YOU SEE IS WHAT YOU SAMPLE

The GladiATR Vision accessory utilizes an innovative optical design with IR beam and visible optical image converging at the sample position—ensuring that “what you see is what you sample.”

The viewing specular reflection plate transforms the GladiATR Vision into a 45° specular reflection accessory, uniquely allowing the sampling spot, such as a defect, to be easily located. With the small spot size of 3 mm, you can be confident of your sampling point.



Diamond crystal plate of the GladiATR Vision accessory.
IR beam and visible illumination meet at the sample position.

POWERFUL MAGNIFICATION

The 110X magnification enables the positioning of relatively small samples—as small as 50 microns—into the center of the diamond crystal for optimized analysis. Visible image is displayed on an LED screen and can also be viewed on the computer.

WIDE SPECTRAL RANGE

The GladiATR Vision optical design is all reflective, preserving the full spectral range inherent to diamond, 4000-400 cm^{-1} . For FTIR spectrometers equipped with far-IR optics, the spectral range is extended to less than 50 cm^{-1} .

TEMPERATURE CONTROL

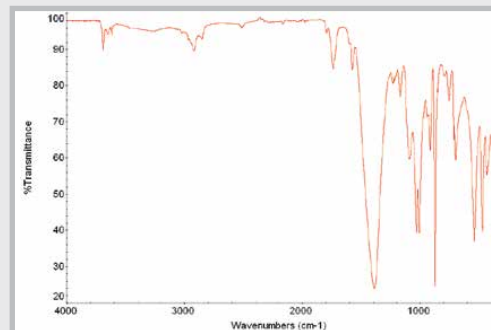
Temperature controlled crystal plates are available for thermal studies. The resistively heated diamond plate has a temperature range from ambient to 210 °C. The Digital Temperature Controller offers touch-screen operation, and may be used with TempPRO software. Data collection may be initiated as a function of time or temperature with most FTIR spectrometers. For applications requiring sub-ambient temperatures, liquid jacketed plates are available.

SPECIFICATIONS

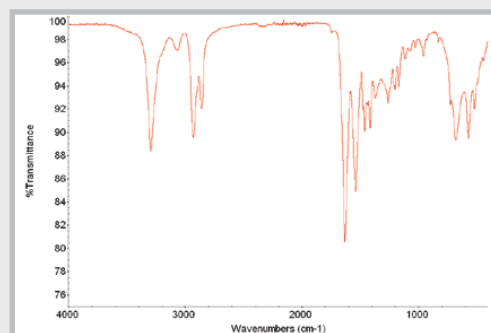
ATR Crystal Choices	Diamond, Ge (non-viewing)
Crystal Plate Mounting	User changeable plates
Crystal Type	Monolithic
Diamond Mounting	Brazed
Crystal Plate Housing	Stainless steel
Angle Of Incidence	45 degrees, nominal
Crystal Dimensions (surface)	3.0 mm diameter
Optics	All reflective
Pressure Device	Rotating, continuously variable pressure; click stop at maximum
Digital Force Adapter (option)	Load cell sensor for precise and reproducible pressure control. Attaches directly to GladiATR clamp. Digital readout. For ambient temperature measurements only.
Maximum Pressure	30,000 psi
Sample Access	80 mm, ATR crystal to pressure mount
Spectral Range, Diamond	4000 to 30 cm^{-1} (IR optics dependent)
Viewing	Integrated 4" LCD
Magnification	110X magnification
View Area	770 x 590 microns
Optional Image Save	USB image capture
Viewing Mode	Through diamond crystal
Input Power Supply	100–240 V, auto setting, external
Output	1.5A/12 VDC, 18 W maximum
Heating Options	Diamond, 210 $^{\circ}\text{C}$ maximum Ge, 130 $^{\circ}\text{C}$ maximum
Accuracy	+/- 0.5 $^{\circ}$ up to 100 $^{\circ}\text{C}$ +/- 0.5% of set point > 100 $^{\circ}\text{C}$
Sensor Type	3 wire Pt RTD (low drift, high stability)
Temperature Control	Touch-panel display with USB interface. PIKE TempPRO software for PC control with unlimited ramps and automated data collection.
Input	100–240 VAC, auto setting, external power supply
Output	4A/24 VDC 100 W maximum
Specular Reflection Option	Viewing, 45 degree nominal angle of incidence
Purge Sealing	Purge tubes and purge line connector included
Accessory Dimensions (W X D X H)	140 x 225 x 340 mm (excludes FTIR baseplate and mount)
FTIR Compatibility	Most, specify model and type

APPLICATION

The GladiATR Vision diamond ATR integrates a camera positioned underneath the diamond ATR crystal. This allows you to see the FTIR measuring area. Temperature control options available.



Print-on-paper spectrum run on GladiATR Vision with diamond crystal. Image of the analysis area is shown above. Spectral range is 4000–400 cm^{-1} with standard FTIR optics.



200-micron compressed fiber spectrum collected with the GladiATR Vision with diamond crystal.

PART NUMBER	DESCRIPTION
Base Optics (<i>must select one</i>)	
026-19XX	GladiATR Vision Base Optics
	Notes: Replace XX with your spectrometer's Instrument Code listed in the back of the catalog. GladiATR Vision Base Optics versions include purge tubes, illumination power supply, purge kit and spectrometer base mount. USB interface software included enables image capture on your PC.
GladiATR Stainless Top (<i>must select one</i>)	
026-2004	GladiATR Vision Stainless Top
	Note: Stainless top is not required for temperature controlled plates.
Crystal Plates for GladiATR Vision (<i>must select one or more</i>)	
026-2102	GladiATR Vision Diamond Crystal Plate
026-2050	Ge Crystal Plate (non-viewing)
026-2202	Specular Reflection Plate (viewing)
	Notes: GladiATR Crystal Plates are pinned-in-place. Changing crystal plates is easy and fast to optimize sampling results. Only the GladiATR Vision Diamond Crystal Plate and viewing Specular Reflection Plate are compatible with sample viewing.
High-Pressure Clamp for GladiATR Vision (<i>must select for solid or powdered samples</i>)	
026-3020	High-Pressure Clamp
076-6026	Digital Force Adapter for High-Pressure Clamp
	Notes: The High-Pressure Clamp is required for analysis of solids, powders and for use of liquids retainer and/or Digital Force Adapter (Digital Force Adapter may be used with samples at ambient temperature only). Pressure clamp includes a flat tip, a swivel tip and a concave tip.

PART NUMBER	DESCRIPTION
GladiATR Vision Temperature Controlled Crystal Plate	
026-4101	Heated Diamond Crystal Plate, 210 °C (viewing)
026-4121	Heated Ge Crystal Plate, 130 °C (non-viewing)
026-4129	Liquid Jacketed Diamond Crystal Plate, 210 °C max (viewing)
076-1610	Digital Temperature Control Module
007-0207	PIKE TempPRO Software
	Notes: For heated diamond crystal plates, maximum crystal temperature is 210 °C. Ge becomes optically opaque at 150 °C. Maximum recommended temperature for this crystal is 130 °C. Temperature controller is required for heated crystal plates. If PC control is desired, TempPRO software must be purchased (sold separately from Temperature Control Module). Liquid jacketed crystal plates require customer-provided circulator.
GladiATR Vision Sampling Options	
026-5014	Flow-Through Attachment, 100 µL
026-5013	Liquids Retainer and Volatiles Cover Set
026-3051	Volatiles Cover
026-5010	Liquids Retainer
	Note: Flow-Through Attachment and Liquids Retainer are compatible with all crystal offerings (High-Pressure Clamp required).



Rotating, continuous variable pressure clamp. Click-stop at maximum pressure.

View-through diamond crystal makes it easy to find sample point.

Image is projected in real-time on an integrated 4" LCD screen.

GladiATR Illuminate

AT A GLANCE

- ▶ UV/Vis light introduced from under the diamond ATR prism
- ▶ Diamond crystal design – will not scratch or fracture
- ▶ Full spectral range for the analysis in the mid-IR and far-IR regions
- ▶ Temperature-controlled options available
- ▶ Compatible with most FTIR spectrometers



TEMPERATURE CONTROL
OPTIONS AVAILABLE

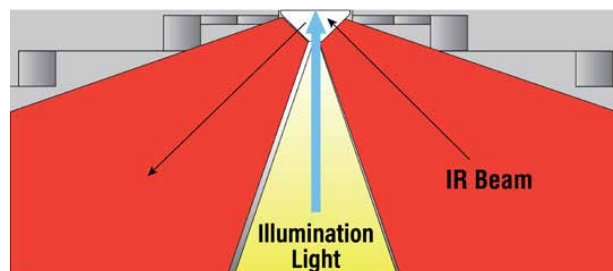


The GladiATR Illuminate is an ATR accessory designed for the analysis of photocuring or the solidification of liquid resins upon exposure to light.

The GladiATR Illuminate uses a liquid light guide to introduce UV/VIS light to the sample. The light is projected from underneath the diamond ATR element, allowing you to monitor solidification in real-time by tracking changes in chemical functionality. By observing this process, reaction kinetics may be determined, and resin formulations optimized. Applications include evaluating dental coatings and sealants, medical adhesives, photoresists, and 3D printing.

MECHANICAL AND OPTICAL DESIGN

Conventional photochemical setups irradiate samples from top-down, while IR measurements presented are being taken from the bottom-up. This disparity results in a difference in light intensity throughout the depth of the sample due to absorption and sample thickness nonuniformity, and limits the accuracy of analysis and mitigates characterization of opaque resins. The GladiATR Illuminate overcomes these challenges by illuminating from beneath the sample. This accessory design feature aligns the absorption cross section of the sample with the evanescent wave of the IR beam for characterization. To maximize the light introduced to the ATR crystal and sample, an optical lens is incorporated at the light guide tip.



Diamond crystal plate of the GladiATR Illuminate accessory; IR beam and illumination meet at the sample position.

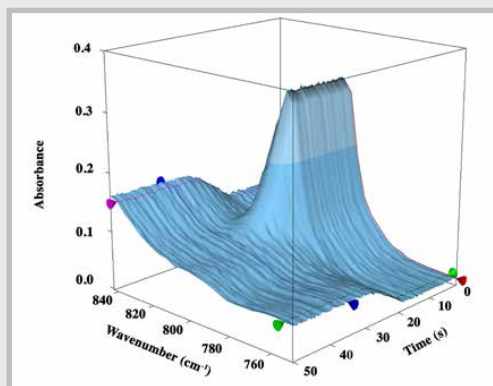
The GladiATR Illuminate optical design is all reflective, preserving the full spectral range inherent to diamond. For standard mid-IR FTIR spectrometers, the spectral range available with the GladiATR Illuminate is 4000–400 cm^{-1} . For FTIR spectrometers equipped with far-IR optics, the spectral range is extended to less than 50 cm^{-1} .

TEMPERATURE CONTROL

Temperature controlled crystal plates are available for thermal studies. The resistively heated diamond plate has a temperature range from ambient to 210 °C. The Digital Temperature Controller offers touch-screen operation, and may be used with TempPRO software. Data collection may be initiated as a function of time or temperature with most FTIR spectrometers. For applications requiring sub-ambient temperatures, liquid jacketed plates are available.

APPLICATION

The GladiATR Illuminate diamond ATR is an innovative accessory for monitoring photocuring reactions.



Acrylate photopolymerization spectrum, using 405 nm light. Waterfall plot showing the band change over time. Irradiation began at 19 seconds.

SPECIFICATIONS

ATR Crystal Choices	Diamond
Crystal Plate Mounting	User changeable plates
Crystal Type	Monolithic
Diamond Mounting	Brazed
Crystal Plate Housing	Stainless steel
Angle Of Incidence	45 degrees, nominal
Crystal Dimensions	3.0 mm diameter
Optics	All reflective
Pressure Device	Rotating, continuously variable pressure; click stop at maximum
Digital Force Adapter (option)	Load cell sensor for precise and reproducible pressure control. Attaches directly to GladiATR clamp. Digital readout.
Maximum Pressure	30,000 psi
Sample Access	80 mm, ATR crystal to pressure mount
Spectral Range, Diamond	4000 to 30 cm ⁻¹ (IR optics dependent)
Liquid Light Guides	Core: 3 mm; Length: 1.2 m
Heating Options	Diamond, 210 °C maximum
Accuracy	+/- 0.5% of set point > 100 °C +/- 0.5° up to 100 °C
Sensor Type	3 wire Pt RTD (low drift, high stability)
Temperature Control	Touch-panel display. PIKE TempPRO software for PC control with unlimited ramps and automated data collection.
  	
Input	100-240 VAC, auto setting, external power supply
Output	4A/24 VDC 100 W maximum
Accessory Dimensions (W X D X H)	140 x 225 x 340 mm (excludes FTIR baseplate and mount)
FTIR Compatibility	Most, specify model and type

PART NUMBER	DESCRIPTION
Base Optics	
026-16XX	GladiATR Illuminate Base Optics Notes: Replace XX with your spectrometer's Instrument Code listed in the back of the catalog. GladiATR Illuminate Base Optics include purge tubes, purge kit and spectrometer base mount. Liquid light guide sold separately.
GladiATR Stainless Top (<i>must select one</i>)	
026-2001	GladiATR Stainless Top Note: Stainless top is not required for temperature controlled plates.
Crystal Plates for GladiATR and Temperature Controller (<i>must select one or more</i>)	
026-2103	Illuminate Diamond Crystal Plate
026-4123	Illuminate Heated Diamond Crystal Plate, 210 °C
026-4125	Illuminate Liquid Jacketed Diamond Crystal Plate, 210 °C
076-1610	Digital Temperature Control Module
007-0207	PIKE TempPRO Software Notes: GladiATR Crystal Plates are pinned-in-place. Changing crystal plates is easy and fast to optimize sampling results. Temperature controller is required for heated crystal plates. If PC control is desired, TempPRO software must be purchased separately. Liquid jacketed crystal plates require customer-provided circulator.
High-Pressure Clamp for GladiATR Illuminate (<i>must select for solid or powdered samples</i>)	
026-3020	High-Pressure Clamp
076-6026	Digital Force Adapter for High-Pressure Clamp Notes: The High-Pressure Clamp is required for analysis of solids, powders and for use of liquids retainer and/or Digital Force Adapter (Digital Force Adapter may be used with samples at ambient temperature only). Pressure clamp includes a flat tip, a swivel tip and a concave tip.
GladiATR Illuminate Liquid Light Guides	
162-4920	Liquid Light Guide 340-800 nm
162-4922	Liquid Light Guide 420-2000 nm Notes: Liquid light guides are 1.2 m long, and have a 3 mm core. Contact us for alternative lengths or light guides themselves.
GladiATR Sampling Options	
026-5014	Flow-Through Attachment, 100 µL
026-5013	Liquids Retainer and Volatiles Cover Set
026-3051	Volatiles Cover
026-5010	Liquids Retainer Note: Flow-Through Attachment and Liquids Retainer are compatible with all crystal offerings (High-Pressure Clamp required).

GladiATR 300 UV

AT A GLANCE

- ▶ UV/Vis light introduced from under the diamond ATR prism
- ▶ Heating up to 300 °C
- ▶ Accommodate a range of probe sizes
- ▶ Full spectral range for the analysis in the mid-IR and far-IR regions



TEMPERATURE CONTROL
OPTIONS AVAILABLE



The GladiATR 300 UV is an ATR accessory designed for the analysis of photocuring or the solidification of liquid resins upon exposure to light.

Conventional photochemical setups irradiate samples from top-down, while IR measurements presented are being taken from the bottom-up. This disparity results in a difference in light intensity throughout the depth of the sample due to absorption and sample thickness nonuniformity, and limits the accuracy of analysis and mitigates characterization of opaque resins. The GladiATR 300 UV and its sister ATR, the GladiATR Illuminate, overcome these challenges by illuminating from beneath the sample, which aligns the absorption cross section of the sample with the evanescent wave of the IR beam for characterization.

The GladiATR 300 UV offers flexibility to be configured with a variety of fiber optic probes or liquid light guides and UV sources. The probe is mounted on the front of the GladiATR base and a mirror embedded in the cavity of the GladiATR 300 UV base directs the light to illuminate the sample from underneath.

OPTICAL DESIGN

The GladiATR optical design is all reflective, preserving the full spectral range inherent to diamond. For standard mid-IR FTIR spectrometers, the spectral range available with the GladiATR Illuminate is 4000–400 cm^{-1} . For FTIR spectrometers equipped with far-IR optics, the spectral range is extended to less than 50 cm^{-1} .

TEMPERATURE CONTROL

Temperature controlled crystal plates are available for thermal study of materials. The resistively heated diamond plate has a temperature range from ambient to 300 °C. PIKE Technologies offers digital temperature controller. Using TempPRO software, temperature profiles are easily programmable, allowing unattended data collection with most FTIR software platforms.

For subambient measurements, the GladiATR UV 300 may be configured with liquid jacketing/heated diamond plate.



Liquid jacketed/heated
GladiATR 300 UV.

SPECIFICATIONS

ATR Crystal Choices	Diamond
Crystal Plate Mounting	User changeable plates
Crystal Type	Monolithic
Diamond Mounting	Brazed
Crystal Plate Housing	Stainless steel
Angle Of Incidence	45 degrees, nominal
Crystal Dimensions	3.0 mm diameter
Optics	All reflective
Pressure Device	Rotating, continuously variable pressure; click stop at maximum
Maximum Pressure	30,000 psi
Sample Access	80 mm, ATR crystal to pressure mount
Spectral Range, Diamond	4000 to 10 cm ⁻¹ (IR optics dependent)
Heating Options	Diamond, 300 °C maximum
Accuracy	+/- 0.5° up to 100 °C +/- 0.5% of set point > 100 °C
Sensor Type	3 wire Pt RTD (low drift, high stability)
Temperature Control	Touch-panel display. PIKE TempPRO software for PC control with unlimited ramps and automated data collection.
	  
Input	100–240 VAC, auto setting, external power supply
Output	4A/24 VDC 100 W maximum
Accessory Dimensions (W X D X H)	140 x 225 x 340 mm (excludes FTIR baseplate and mount)
FTIR Compatibility	Most, specify model and type

PART NUMBER	DESCRIPTION
Base Optics	
026-15xx	GladiATR 300 UV Base Optics
Notes: Replace XX with your spectrometer's Instrument Code listed in the back of the catalog. GladiATR 300 UV Base Optics include purge tubes, purge kit and spectrometer base mount.	
Crystal Plates for GladiATR and Temperature Controller (<i>must select one or more</i>)	
026-4107	GladiATR 300 UV Heated Diamond Plate, 300 °C
026-4122	GladiATR 300 UV Heated Liquid Jacketed Diamond, 300 °C
076-1610	Digital Temperature Control Module
007-0207	PIKE TempPRO Software
Note: Temperature controller is required for heated crystal plates. If PC control is desired, TempPRO software must be purchased separately.	
High-Pressure Clamp for GladiATR 300 UV (<i>must select for solid or powdered samples</i>)	
026-3020	High-Pressure Clamp
Notes: The High-Pressure Clamp is required for analysis of solids, powders and for use of liquids retainer and/or pressure clamp includes a flat tip, a swivel tip and a concave tip.	
Probe Holder (<i>must select one or more</i>)	
026-1501	6mm UV probe holder
026-1502	7mm UV probe holder
026-1503	8mm UV probe holder
026-1504	9mm UV probe holder
026-1505	10mm UV probe holder
026-1506	11mm UV probe holder
Notes: Dimensions listed are the outside probe diameter. For sizes not listed here, contact PIKE Technologies.	
GladiATR Sampling Options	
026-5014	Flow-Through Attachment, 100 µL
026-5013	Liquids Retainer and Volatiles Cover Set
026-3051	Volatiles Cover
026-5010	Liquids Retainer
Note: Flow-Through Attachment and Liquids Retainer are compatible with all crystal offerings (High-Pressure Clamp required).	

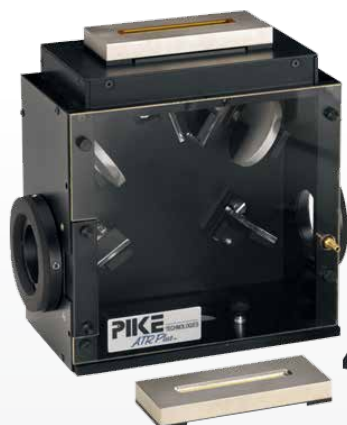
HATR

AT A GLANCE

- ▶ Excellent energy throughput
- ▶ Up to 20 internal reflections
- ▶ Interchangeable crystal plates
- ▶ Trough, flat and flow-through plates
- ▶ ZnSe, KRS-5, Ge, AMTIR or Si ATR elements



TEMPERATURE CONTROL
OPTIONS AVAILABLE



HATRPlus™
Accessory: out-of-compartment
HATR for liquid
and extra
large solid samples.



Horizontal Attenuated Total Reflection (HATR) accessories are multiple reflection ATRs. These are ideal for the IR measurement of liquids, semi-solids, solids and films when additional sensitivity is required.

HATRs feature a constant and reproducible effective pathlength and are well suited for both qualitative and quantitative applications. Typically, sampling is achieved by placing the sample onto the HATR crystal, often eliminating sample preparation. To optimize spectral measurements, a selection of crystal materials, plate formats and temperature control options are available.

HATR AND HATRPLUS

HATR products are available in two base optic configurations. The HATR is an in-compartment design for samples that fit into the FTIR sample compartment. The HATRPlus is an out-of-compartment design where the sampling surface extends above the FTIR cover, thereby permitting analysis of very large samples. Applications using the HATRPlus include coatings on large manufactured components, layered composition analysis on large objects, and skin analysis in the health and personal care industries.

Both HATRs are high-performance accessories, carefully designed to provide excellent results with minimum effort. They are easily installed in the sample compartment, locking into position on the sample compartment baseplate. Stable alignment provides excellent analytical precision.

HATR CRYSTAL PLATES

There are several high-quality crystal materials covering a full spectrum of applications. The most popular crystals are 4-mm thick and generate 10 reflections on the sample (45° face angle). The 2-mm thick crystals (Ge, ZnSe) result in 20 reflections. Trough and sealed flat crystal plates are sealed using metallic gaskets, eliminating premature failure and the risk of cross-contamination associated with inferior, epoxy-bonded systems.

All ATR plates are pin-mounted to the HATR base with no alignment required. Crystal plate changeover is rapid, allowing a wide range of samples to be analyzed with maximum convenience. The HATRs have been optimized for maximum optical throughput and excellent quality spectra can be obtained from demanding samples.

FLAT PLATE

The flat plate is used for the analysis of solid materials, including polymer and film samples. The crystal is mounted slightly above the surface of the metal plate, which helps to achieve good crystal/sample contact when the flat plate press is used. The ZnSe and Ge 45-degree flat plates are available in a sealed version, which is ideal for sampling of oils and other types of low surface tension, non-volatile liquids.



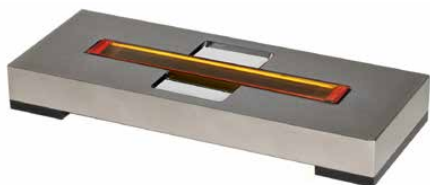
TROUGH PLATE

The trough plate is designed for easy sampling, with a large, recessed crystal to accommodate the sample – generally a liquid, powder, or paste. Typically, only a thin layer of the sample needs to be applied onto the crystal surface. For fast evaporating samples, a volatiles cover should be used to cover the sampling area. By using the optional powder press, soft powders often produce quality spectra when analyzed by HATR, assuming that they can be put in intimate contact with the crystal.



RCPLATE™

The RCPlate is designed for special applications, such as measurements of coatings, mono-molecular layers, or bio-films deposited directly upon the HATR crystal. The plate allows easy removal and reinsertion of the ATR crystal.



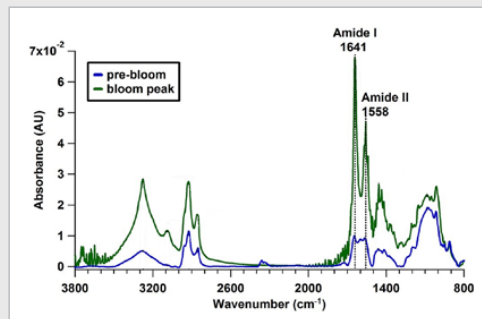
FLOW-THROUGH CELL

Flow-through cells are a versatile option for the dynamic laboratory. The ATR crystal is sealed in with O-rings, which allows for user-changeable crystals. The sample may be introduced by syringe or through tubing connected to a 1/16-inch compression fitting. Flow-through cells may be configured for temperature control and with PTFE coating.

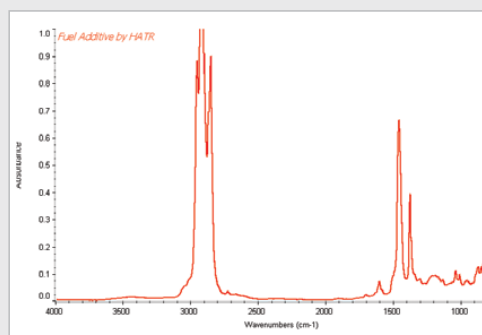


APPLICATION

The HATR is an ideal accessory when requiring added sensitivity. Flat, trough and flow cells make it possible to fully configure this accessory to meet your sampling requirements.



Dehydrated sea water spectra, collected before and after phytoplankton bloom using the ZnSe 20-reflection HATR trough plate.



Fuel additive spectrum, collected using a trough plate with ZnSe crystal.

PHOTOCATALYTIC FLOW-THROUGH CELL

PIKE offers a flow-through cell with a quartz window, integrated into the cell lid for photocatalytic studies. Due to UV-induced degradation of ZnSe caused by the external source probe, we recommend using an AMTIR crystal.



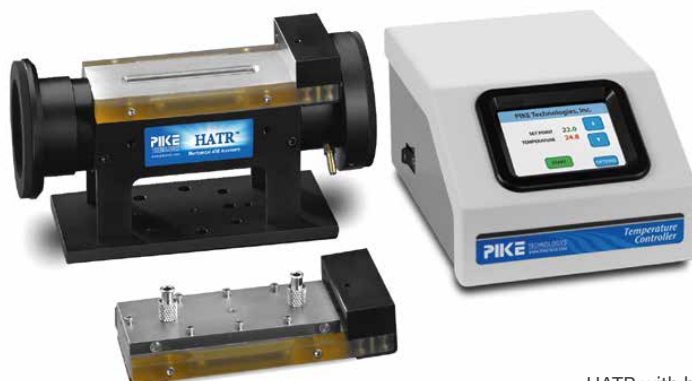
TEMPERATURE CONTROL

Resistive heating and liquid jacketed plates are available for thermal studies. The maximum temperature is 120 °C for all crystal types. The Digital Temperature Controller offers touch-screen operation, and may be used with TempPRO software. Ramps and hold times are easily programmed through TempPRO software. Data collection may be initiated as a function of time or temperature with most FTIR spectrometers.

PART NUMBER	DESCRIPTION
	Complete HATR Systems
022-10XX	HATR Trough Plate System with 45° ZnSe Crystal Includes Trough Plate, Volatiles Cover and Powder Press
022-11XX	HATR Flat Plate System with 45° ZnSe Crystal Includes Flat Plate and HATR Pressure Clamp
022-12XX	HATR Combined Trough and Flat Plate System with 45° ZnSe Crystals Includes Trough Plate, Flat Plate, Volatiles Cover, Powder Press and Pressure Clamp
024-11XX	HATRPlus Flat Plate System with 45° ZnSe Crystal Includes Flat Plate and HATR Pressure Clamp
	Notes: Replace XX with your spectrometer's Instrument Code listed in the back of the catalog. HATR and HATRPlus systems may be purchased with other crystal plates; just add -Ge for germanium, -KR for KRS-5, -AM for AMTIR, or -Si for silicon to the part number. Additional plates can be added to an order for any system above. Other configurations may be selected from the options below.

RESISTIVELY HEATED PLATES SPECIFICATIONS

Temperature Range	Ambient to 120 °C
Accuracy	+/- 0.5° up to 100 °C +/- 0.5% of set point > 100 °C
Sensor Type	3 wire Pt RTD (low drift, high stability)
Temperature Control	Touch-panel display with USB interface. PIKE TempPRO software for PC control with unlimited ramps and automated data collection.
	  
Input	100-240 VDC, auto setting, external power supply



HATR with heated trough plate and temperature control module—foreground shows heated flow-through cell.

PART NUMBER	DESCRIPTION
	Configurable HATR Systems - HATR Base Optics
022-19XX	HATR Platform Optics Assembly
024-19XX	HATRPlus Platform Optics Assembly
	Notes: Replace XX with your spectrometer's Instrument Code listed in the back of the catalog. HATR and HATRPlus Platform Optics Assemblies include purge tubes, purge kit and spectrometer base mount.
	Pressure Clamp for HATR and HATRPlus
022-3050	HATR (pivoting) Pressure Clamp
022-3054	HATR High-Pressure Clamp
024-3050	HATRPlus (pivoting) Pressure Clamp
024-3053	HATRPlus High-Pressure Clamp
	Notes: The pressure clamp is required for solids, films, coatings and powdered samples. Maximum force for (pivoting) Pressure Clamp and High-Pressure Clamp is 13 lbf and 30 lbf, respectively.
	Crystal Plates 45° (must select 1 or more)
	ZnSe
022-2010-45	Trough
022-2020-45	Flat
022-2024-45	Sealed Flat
022-2012-45	Trough, 2 mm
022-2022-45	Flat, 2 mm
	Ge
022-2050-45	Trough
022-2060-45	Flat
022-2064-45	Sealed Flat
022-2052-45	Trough, 2 mm
022-2062-45	Flat, 2 mm
	KRS-5
022-2030-45	Trough
022-2040-45	Flat
	AMTIR
022-2070-45	Trough
022-2080-45	Flat
	Si
022-2090-45	Trough
022-2100-45	Flat
	Notes: Crystal Plates are pre-aligned and pinned-in-place. For most HATR crystal plates, 60 degree face angle is also available. Where not noted, crystals are 4-mm thick and generate 10 reflections on the sample (45° cut). 2-mm thick crystals result in 20 reflections (45° cut). If you need a crystal not listed here, please contact us. Reconditioning service is available.

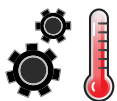
PART NUMBER	DESCRIPTION
Heated Crystal Trough Plates 45°	
022-5110	ZnSe
022-5120	AMTIR
022-5130	KRS-5
022-5140	Si
022-5150	Ge
Heated Flow-Through Cells 45°	
022-5210	ZnSe
022-5212	ZnSe, 2 mm
022-5220	AMTIR
022-5230	KRS-5
022-5240	Si
022-5250	Ge
022-5252	Ge, 2 mm
022-5225	AMTIR with UV Port
076-1610	Digital Temperature Control Module
007-0207	PIKE TempPRO Software
Notes: Temperature is adjustable from ambient to 120 °C for heated trough plates and flow-through cells. Ge becomes opaque near 100 °C. Resistance heated plates require selection of a PIKE Technologies Temperature Control Module. PIKE TempPRO software (sold separately) can be used for graphical setup and automated data collection for thermal experiments. PTFE-coated flow-through cells available – contact us for more information.	
Flow-Through Cells 45°	
022-4010	ZnSe
022-4012	ZnSe, 2 mm
022-4020	AMTIR
022-4030	KRS-5
022-4040	Si
022-4050	Ge
022-4052	Ge, 2 mm
022-5228	AMTIR with UV Port
Notes: HATR flow-through cells include Luer-Lok® fittings for easy connection with a syringe. A set of 1/16" Swagelok® fittings are also included. Cell volume is 500 µL. PTFE-coated flow-through cells available – contact us for more information.	
Liquid Jacketed Crystal Plates 45°	
022-5310	ZnSe
022-5320	AMTIR
022-5330	KRS-5
022-5340	Si
022-5350	Ge
Notes: Liquid jacketed crystal plates require customer-provided liquid circulator. Liquid jacketed crystal plates enable heating to 120 °C and cooling. Ge becomes opaque near 100 °C.	

PART NUMBER	DESCRIPTION
Liquid Jacketed, Flow-Through Crystal Plates 45°	
022-5410	ZnSe
022-5412	ZnSe, 2 mm
022-5420	AMTIR
022-5430	KRS-5
022-5440	Si
022-5450	Ge
022-5452	Ge, 2 mm
Notes: Liquid jacketed flow-through crystal plates require customer-provided liquid circulator to enable heating to 120 °C and cooling. HATR flow cells include Luer-Lok fittings for easy connection with a syringe and 1/16" Swagelok fittings. PTFE coated flow-through cells available – contact us for more information.	
HATR RC Plate	
022-2300	RCPlate for HATR (for 45° crystals, 4 mm)
Note: Requires a selection of HATR Crystal – see below	
Replacement Parts	
022-3051	HATR Volatiles Cover
022-3052	HATR Powder Press
Crystal Traps 45° 80 x 10 x 4 or 2mm	
160-5554	ZnSe, 4 mm
160-5559	ZnSe, 2 mm
160-5555	KRS-5, 4 mm
160-5556	Ge, 4 mm
160-5560	Ge, 2 mm
160-5557	AMTIR, 4 mm
160-5558	Si, 4 mm
160-5561	ZnSe, 4 mm
160-5562	Ge, 4 mm
Flow Cell Parts	
022-3032	Spacer, 2 mm
022-3033	Spacer, 4 mm
022-3040	Viton O-Ring, upper (6 ea.)
022-3045	Viton O-Ring, lower (6 ea.)
022-3041	Perfluoroelastomer O-Ring, upper (1 ea.)
022-3046	Perfluoroelastomer O-Ring, lower (1 ea.)
Notes: Reconditioning service for used HATR crystal plates is available. Contact PIKE Technologies for items not described in this list.	

ATRMMax II

AT A GLANCE

- ▶ Selectable angle of incidence from 25° to 65° in one-degree increments
- ▶ 0.5 to 10-micron depth of penetration
- ▶ 3 to 12 reflections of IR beam
- ▶ Flat and trough crystal plates for solids, films, powders and liquid samples
- ▶ Automated option with electronic control module and AutoPRO™ software
- ▶ Sealed and purgeable optical design to eliminate water vapor and carbon dioxide interferences



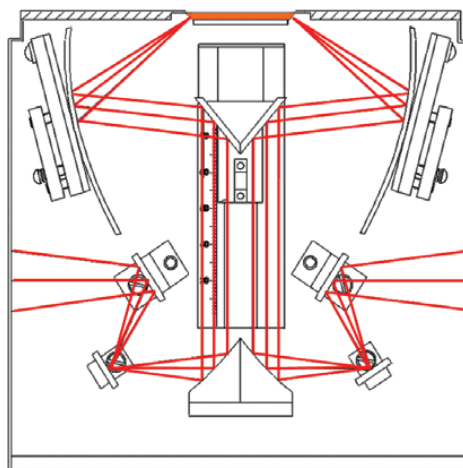
AUTOMATION OPTION
TEMPERATURE CONTROL



The ATRMax II is a high throughput, variable angle horizontal ATR accessory. Its adjustable angle of incidence allows for easy optimization of spectral measurements and execution of depth profiling studies.

VARIABLE ANGLE

The ATRMax II design employs a unique optical layout (U.S. patent 5,105,196) which enables samples to be analyzed over a range of incident angles, 25° to 65°, providing experimental control over the depth of penetration of an IR beam into the sample and the number of beam reflections in the ATR crystal.



Proprietary beam path within the ATRMax II FTIR sampling accessory.

ATR CRYSTALS

The ATR crystals for the ATRMax II are of trapezoidal shape and 56-mm long, 10-mm wide and 4-mm thick. Standard bevel angles at each end of the crystal are available in 30-, 45-, and 60-degree versions, and are available in ZnSe, Ge, AMTIR and KRS-5. Coupling the variable angle of incidence of the ATRMax II with the different crystal face angles, the number of reflections may be changed from 3 to 12.

FLAT PLATES

Flat crystal plates are used for the analysis of coatings, films and non-particulate solids. Typical applications include depth profiling studies and optimization of ATR spectral data. A sample clamp is required to provide intimate contact between the sample and crystal surface.

TROUGH PLATES

The trough crystal plate is recommended for use with liquids, pastes and powdered samples. Typical applications include the analysis of oils, detergents, and other liquid samples.

FLOW THROUGH CELLS

A variety of flow-through cells that feature removable crystals are available. This enables replacement of the crystals and facilitates cleaning of "sticky" samples. Flow cells may be configured for ambient measurements and heating and liquid jacketed temperature control. With the liquid jacketed version, samples may be measured at heated or cooled temperatures using a liquid circulator. PTFE coating of the cell is an option.

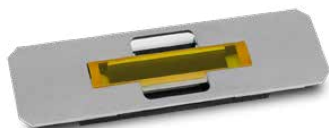
HEATED CRYSTAL PLATES

Optional resistively heated crystal plates are available for the ATRMax II trough, flat and flow-through cell versions. These heated crystal plates are driven using the PIKE Technologies' temperature control module. PIKE TempPRO software is available for graphical temperature profile set up, and interfaces with most FTIR software packages for data collection.



SPECIAL APPLICATIONS

The RCPlate is designed for special applications, such as measurements of coatings, mono-molecular layers, or bio-films deposited directly upon the ATRMax crystal. The plate allows easy removal and reinsertion of the ATR crystal.



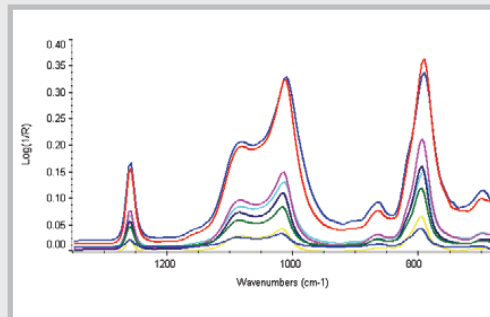
AUTOMATION

The Automated ATRMax II model offers motorized control of the accessory's angle selector through AutoPRO software. With automation, the collection of spectra from multiple angles of incidence may be streamlined by programming and executing the experiment through the computer. Advantages of the automated ATRMax II system include:

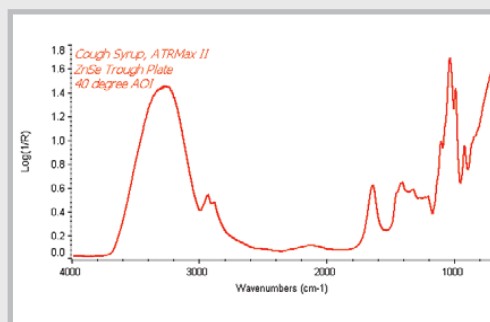
- ▶ Computer controlled precision, accuracy and repeatability
- ▶ Synchronization of mirror position changes with collection of sample spectra
- ▶ Full integration of the AutoPRO software with most FTIR spectrometer programs
- ▶ Tailor-made, predefined experiments

APPLICATION

With a variety of ATR crystal materials, crystal face angles, and plate options (through, flat and flow cell), the ATRMax II offers the flexibility to optimize spectral measurements.



Silicon release agent spectra for depth profiling investigation collected at angles ranging from 25 to 65 degrees using a Ge flat plate.



Cough syrup spectrum collected using the ZnSe trough plate and a 40-degree angle of incidence.

RESISTIVELY HEATED PLATES SPECIFICATIONS

Temperature Range	Ambient to 120 °C
Accuracy	+/- 0.5° up to 100 °C +/- 0.5% of set point > 100 °C
Sensor Type	3 wire Pt RTD (low drift, high stability)
Temperature Control	Touch-panel display with USB interface. PIKE TempPRO software for PC control with unlimited ramps and automated data collection.
Input	100–240 VDC, auto setting, external power supply



PART NUMBER	DESCRIPTION
Complete ATRMax II Systems	
023-10XX	ATRMax II Trough Plate System with 45° ZnSe Includes Trough Plate, Volatiles Cover and Powder Press
023-11XX	ATRMax II Flat Plate System with 45° ZnSe Includes Flat Plate and Pressure Clamp
023-12XX	ATRMax II Combined Trough and Flat Plate System with 45° ZnSe Includes Trough Plate, Flat Plate, Volatiles Cover, Powder Press and Pressure Clamp Notes: Replace XX with your spectrometer's Instrument Code listed in the back of the catalog. ATRMax II Systems may be purchased with plates other than ZnSe. Just add -Ge for germanium, -KR for KRS-5, -AM for AMTIR, or -Si for Silicon. Additional plates can be added to an order for any system. Other configurations may be selected from the options below.
ATRMax II Base Optics (<i>must select</i>)	
023-19XX	ATRMax II Variable Angle HATR Notes: Replace XX with your spectrometer's Instrument Code listed in the back of the catalog. ATRMax II Base Optics includes purge tubes, purge kit and spectrometer base mount.
Plates for ATRMax II (<i>must select 1 or more</i>)	
Flat Plate	
023-2031	ZnSe, 30°
023-2011	ZnSe, 45°
023-2051	ZnSe, 60°
023-2033	Ge, 30°
023-2013	Ge, 45°
023-2053	Ge, 60°
023-2032	KRS-5, 30°
023-2012	KRS-5, 45°
023-2052	KRS-5, 60°
023-2045	Si, 45°
023-2047	AMTIR, 45°
Trough Plate	
023-2021	ZnSe, 30°
023-2001	ZnSe, 45°
023-2041	ZnSe, 60°
023-2023	Ge, 30°
023-2003	Ge, 45°
023-2043	Ge, 60°
023-2022	KRS-5, 30°
023-2002	KRS-5, 45°
023-2042	KRS-5, 60°
023-2044	Si, 45°
023-2046	AMTIR, 45°
Notes: ATRMax plates are pre-aligned and pinned-in-place. Changing plates to optimize sampling results is easy and fast. If you need a plate not listed here, please contact us.	

PART NUMBER	DESCRIPTION
Pressure Clamp for ATRMax II	
023-3050	ATRMax Pressure Clamp Note: The pressure clamp is required for solids, films, coatings and powdered samples.
ATRMax II Sampling Options	
023-2800	Automated Upgrade for ATRMax II
023-2850	Automated Option for ATRMax II
023-2300	RCPlate for ATRMax II
023-4000	ATRMax Flow Cell Assembly (order crystal separately)
023-4100	ATRMax Liquid-Jacketed Flow-Through Cell Assembly (order crystal separately)
023-4200	ATRMax Heated Flow-Through Cell Assembly (order crystal separately)
023-4300	ATRMax Heated Trough Plate Assembly (order crystal separately)
023-4400	ATRMax Heated Flat Plate Assembly (order crystal separately)
013-4200	ATR Variable Angle Heating Conversion Plate
076-1610	Digital Temperature Control Module
007-0207	PIKE TempPRO Software Notes: Automated option includes PIKE AutoPRO software and controller. The ATR Variable Angle Heating Conversion Plate must be selected with temperature controlled plates. Resistively heated plates require selection of the Temperature Control Module. Maximum temperature is 120 °C. PIKE TempPRO software (sold separately) can be used for graphical setup and automated data collection with most FTIR spectrometers for thermal experiments.
Trapezoid Crystals for ATRMax II, 56 x 10 x 4 mm	
160-5563	ZnSe, 45°
160-5571	ZnSe, 60°
160-5569	Ge, 30°
160-5565	Ge, 45°
160-5573	Ge, 60°
160-5570	Si, 30°
160-5567	Si, 45°
160-5575	Si, 60°
160-5566	AMTIR, 45°
160-5574	AMTIR, 60°
Note: Please contact PIKE Technologies for crystals not on this list.	
ATRMax II Replacement Parts	
023-3051	ATRMax II Volatiles Cover
023-3052	ATRMax II Powder Press Notes: Please contact PIKE Technologies for items not described in this list. Reconditioning service for used ATRMax plates is available.



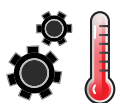
ATRMax II with
flow cell plate.



ReactorMAX

AT A GLANCE

- ▶ Temperature control up to 215 °C
- ▶ Sealed sample chamber for pressures up to 55 bar
- ▶ Optional in-chamber stirrer
- ▶ Automated angle of incidence selection
- ▶ 0.5 to 10-micron depth of penetration
- ▶ Multiple reflection ATR from 3 to 9 reflections



AUTOMATION OPTION
TEMPERATURE CONTROL



ReactorMAX is a research-grade, variable angle ATR, designed for demanding applications that require high temperature and pressure. With automated control of the variable angle, spectral data may be easily optimized.

TEMPERATURE-CONTROLLED PRESSURE VESSEL

The ReactorMAX is equipped with a temperature-controlled pressure vessel that may be heated up to 215 °C and operated up to 55 bar. Optional stirring is available. The material of the pressure vessel is Hastelloy, capable of withstanding extremely harsh chemicals under pressure/temperature conditions. Integrated into the bottom of the vessel is a multiple reflection AMTIR ATR crystal.

ATR ELEMENT

With a pH tolerance between 1-9, AMTIR offers a robust ATR crystal for a wide range of applications. ReactorMAX ATR element is a trapezoidal shape and 56-mm long, 10-mm wide and 4-mm thick. Standard bevel angles at each end of the AMTIR crystal are available in 45- and 60-degree versions. Coupling the variable angle of incidence of the ReactorMAX with the variable crystal face angles, one can select effective angle of incidence ranging from 35 to 65 degrees and the range in number of reflections from 3 to 9. Contact PIKE for other ATR crystal material options.

AUTOMATION

The control of angle selection, temperature and stirring speed is automated and integrated into PIKE software. Automation streamlines experimental protocols; the entire experiment can be programmed and executed by the computer. Advantages of the automated features include:

- ▶ Computer controlled precision, accuracy and repeatability
- ▶ Synchronization of mirror position changes with collection of sample spectra
- ▶ Full integration of the PIKE Technologies software with most FTIR spectrometer programs for data collection
- ▶ Tailor-made, predefined experiments
- ▶ "Hands-free" operation

SPECIFICATIONS

Max. Operating Pressure	55 bar
Max. Operating Temperature	215 °C
Spectral Range	4000 - 800 cm ⁻¹
Pathlength Range	5 - 20 µm with sample refractive index approx. 1.3 - 1.6
Reaction Chamber Construction	Hastelloy C276
Sealing O-rings	Kalrez
Dimensions (W X D X H)	229 x 152 x 610 mm
Total Weight	15.65 kg
Note: Contact PIKE Technologies for other crystal options.	

PART NUMBER	DESCRIPTION
023-13XX	ReactorMAX with Stirring Includes base optics, reactor vessel with stirring, 45-degree AMTIR ATR crystal, controller, cabling, and software.
023-14XX	ReactorMAX Includes base optics, reactor vessel, 45-degree AMTIR ATR crystal, controller, cabling, and software.

Notes: replace XX with your spectrometer's Instrument Code listed in the back of the catalog.

Replacement Parts

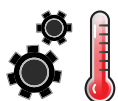
160-5566	Crystal 45°, Trap. 56 x 10 x 4 mm, AMTIR
160-5574	Crystal 60°, Trap. 56 x 10 x 4 mm, AMTIR



VeeMAX III

AT A GLANCE

- ▶ 0.4 to 46-micron depth of penetration
- ▶ High throughput for excellent quality spectra
- ▶ Integrated position for manual or automated polarizer
- ▶ Can be used as a variable angle of incidence specular reflection accessory
- ▶ Configurable for monolayer studies and spectroelectrochemistry
- ▶ Sealed and purgeable optical design to eliminate water vapor and carbon dioxide interferences

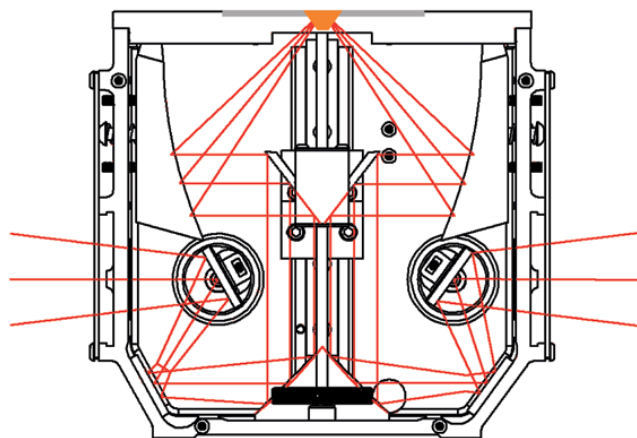


AUTOMATION OPTION
TEMPERATURE CONTROL



The VeeMAX III with ATR offers continuous variable angle of incidence and a variety of crystal plates to selectively control the depth of penetration of the IR beam into the sample. ATR applications include the study of layered samples, coatings, release agents, monolayers on silicon and spectroelectrochemistry.

The VeeMAX III with ATR accessory provides exceptionally high throughput (over 50% with 45 degree ZnSe crystal) to minimize sampling time and enable detection of low concentration components in samples of complex composition. The crystal flat plates offered for the VeeMAX are ideal for solid and layered samples and are designed for use with the optional pressure clamp. The combination of large crystal diameter (20 mm) and slip-clutch pressure clamp provides sample-to-crystal contact without altering layered sample composition. The optional liquids retainer may be added to the crystal plate.



VeeMAX III with ATR optical layout.

TEMPERATURE CONTROL

Temperature controlled crystal flat plates are available for thermal studies. The maximum temperature is 130 °C for all crystal types. PIKE Technologies' temperature controller allows unlimited ramps to be easily programmed using PIKE TempPRO software. Data collection as a function of time or temperature may be prescribed for most FTIR spectrometers.



Heated crystal plate.

AUTOMATED VEEMAX

Motorized control of angle of incidence via personal computer is available for the accessory. The Automated VeeMAX III is ideal for depth of profiling studies as it greatly speeds and improves the precision and reproducibility of the data collection process. AutoPRO software interfaces with most FTIR software packages for automated data collection.

MONOLAYERS APPLICATIONS

Monolayers and ultra-thin films absorbed on silicon or gold substrate are easily sampled using the VeeMAX when equipped with a high refractive index ATR crystal. Compared to specular reflection sampling for monolayer analysis, an increase in sensitivity of up to 1–2 orders of magnitude may be realized via ATR sampling. For these applications, the VeeMAX III accessory is configured to include a high-angle Ge flat plate (60 or 65 degrees), the high-pressure clamp with a 7.8-mm pressure tip, and a polarizer.

SPECTROELECTROCHEMICAL CELLS

The Jackfish Electrochemical Cells (SEC) are fully compatible with the VeeMAX, and offer a complete solution for spectroelectrochemical experiments via ATR-SEIRAS technique. The Jackfish cells, designed for organic and aqueous environments, may be configured for use with VeeMAX ATR face-angled crystals, or micromachined silicon ATR wafers.



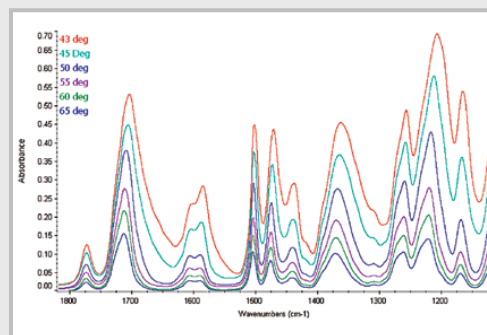
The Jackfish J2 spectroelectrochemical cell.

In addition to the Jackfish SEC, PIKE offers a customizable electrochemical cell for the VeeMAX. The PIKE electrochemistry cell is equipped with a precision micrometer for electrode positioning, and is ideal for external reflection experiments.

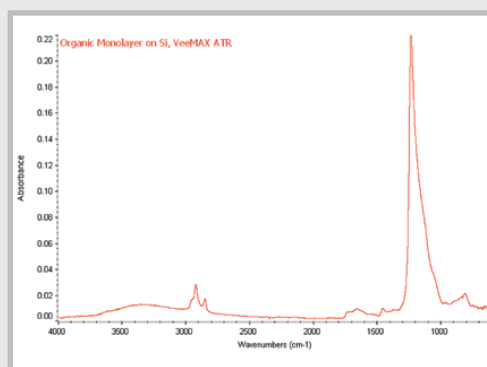


PIKE spectroelectrochemical cell.

APPLICATION



Depth profiling spectra of layered polymer film, collected using ZnSe crystal at angles of incidence from 43 to 65 degrees. IR absorbance band at 1591 cm^{-1} clearly increases relative to other bands as we probe deeper into the sample.



Monomolecular layer on silicon spectrum, collected with VeeMAX III with 60 degree Ge crystal, pressure clamp with 7.8-mm tip and p-polarization.



Automated VeeMAX III with polarizer option for automated depth profiling studies. Angle of incidence and polarization angle can be set independently.

SPECIFICATIONS

ATR Crystal Choice	ZnSe, Ge, Si, ZnS
Crystal Plate Mounting	User-changeable plates
Crystal Plate Housing	Stainless Steel
Crystal Dimension (surface)	20-mm diameter
Optics	All reflective
Pressure Device	Rotating, continuous variable pressure; click stop at maximum
Heating Options	130 °C
Accuracy	+/- 0.5° up to 100 °C +/- 0.5% of set point > 100 °C
Sensor Type	3 wire Pt RTD (low drift, high stability)
Temperature Control	Touch-panel display with USB interface. PIKE TempPRO software for PC control with unlimited ramps and automated data collection.
  	
Input	100–240 VAC, auto setting, external power supply
Output	24 VDC/50 W maximum
Purge Sealing	Purge tubes and purge barb included
Accessory Dimensions (W X D X H)	177 x 92 x 162 mm (excludes clamp height and baseplate)
Jackfish Spectroelectrochemical	
J1 Vessel Volume	20 mL
J2 Vessel Volume	10 mL
Jackfish Spectroelectrochemical	
Vessel Material	Polytetrafluoroethylene or PEEK
Spectroelectrochemical	
Vessel Volume	7.5 mL
Vessel Dimensions	25 mm tall, 25 mm dia tapering to 19 mm
Spectroelectrochemical	
Vessel Material	Polytetrafluoroethylene or PEEK
FTIR Compatibility	Most, specify model and type

PART NUMBER	DESCRIPTION
013-11XX	VeeMAX III Variable Angle Specular Reflectance Accessory Includes specular reflectance masks (2, 5/8 and 3/8"), gold substrate alignment mirror, purge tubes, purge kit and spectrometer base mount.
013-12XX	Automated VeeMAX III Includes controller, cabling, sample masks (2", 5/8" and 3/8"), gold substrate alignment mirror, FTIR base mount, and purge tubes
Note: Replace XX with your spectrometer's Instrument Code listed in the back of the catalog. Automated VeeMAX III includes PIKE Technologies AutoPRO software and controller.	
Crystal Plates for VeeMAX III ATR (must select 1 or more for ATR)	
013-4021	Flat Plate, ZnSe, 45°
013-4031	Flat Plate, ZnSe, 60°
013-4041	Flat Plate, Ge, 45°
013-4051	Flat Plate, Ge, 60°
013-4061	Flat Plate, Ge, 65°
013-4081	Flat Plate, Si, 45°
013-4071	Flat Plate, Si, 60°
013-4091	Flat Plate, ZnS, 45°
013-4096	Flat Plate, ZnS, 60°
013-3401	Liquids Retainer for VeeMAX III ATR crystals
013-3501	VeeMAX III ATR Flow Cell
Notes: VeeMAX III Crystal Plates are pre-aligned and pinned-in-place. Changing crystal plates is easy and fast to optimize sampling results. ZnS crystal plate is excellent for deepest penetration of IR beam. If you need a crystal not listed here, please contact us. Flow cell and Liquids Retainer require High-Pressure Clamp. Reconditioning service for used VeeMAX crystal plates is available. Optional Crystal Plates for Heated VeeMAX III ATR.	
Pressure Clamp for VeeMAX III (must select for solids, films or powder analysis)	
013-3101	VeeMAX III ATR Pressure Clamp
025-3094	7.8-mm ATR Pressure Tip

PART NUMBER	DESCRIPTION
	Notes: The pressure clamp is required for solids, films, coatings and powdered samples. The pressure clamp is supplied with 20-mm tip for solid samples. The 7.8-mm pressure tip is required for monolayers on silicon or small samples.
Heated Plates	
013-4121	Heated Flat Plate, ZnSe, 45°
013-4131	Heated Flat Plate, ZnSe, 60°
013-4141	Heated Flat Plate, Ge, 45°
013-4151	Heated Flat Plate, Ge, 60°
013-4161	Heated Flat Plate, Ge, 65°
013-4171	Heated Flat Plate, Si, 60°
013-4181	Heated Flat Plate, Si, 45°
013-4191	Heated Flat Plate, ZnS, 45°
013-4196	Heated Flat Plate, ZnS, 60°
076-1610	Digital Temperature Control Module
007-0207	PIKE TempPRO Software
	Notes: Heated VeeMAX III crystal plates may be heated to 130 °C. Temperature control module selection is required for heated crystal plates. If PC control is desired TempPRO software must be purchased separately.
VeeMAX III Sampling Options	
090-1000	Manual Polarizer, ZnSe
090-1200	Manual Polarizer, KRS-5
090-3000	Precision Manual Polarizer, ZnSe
090-3200	Precision Manual Polarizer, KRS-5
090-5000	Precision Automated Polarizer, ZnSe, USB
090-5100	Precision Automated Polarizer, KRS-5, USB
007-0300	PIKECalc Software
	Notes: PIKECalc software provides easy calculations of depth of penetration, effective angle of incidence and critical angle for ATR measurements. Other polarizer options are found in the polarization section of this catalog. Automated VeeMAX III and automated polarizer interface simultaneously.

PART NUMBER	DESCRIPTION
Replacement Parts	
013-4010	Mask Set for VeeMAX
300-0002	Gold Substrate Alignment Mirror, 1.25 x 3.0"
Spectroelectrochemical Configuration	
162-4709	Jackfish SEC Cell J1F
162-4714	Jackfish SEC Cell J1W
162-4719	Jackfish SEC Combination Cell J1
162-4701	Jackfish SEC Cell J2F
162-4702	Jackfish SEC Cell J2W
162-4703	Jackfish SEC Combination Cell J2
162-4814	J1W, J2W Universal ATR Si elements (2)
162-4816	J1W, J2W ATR-SEIRAS Optimized Si elements (2)
160-5546	ZnSe Crystal, 45°
160-5550	ZnSe Crystal, 60°
160-5547	Ge Crystal, 45°
160-5551	Ge Crystal, 60°
160-5548	Si Crystal, 45°
160-5552	Si Crystal, 60°
160-5549	ZnS Crystal, 45°
160-5553	ZnS Crystal, 60°
160-5527	CaF ₂ Crystal, 60°
160-1144	CaF ₂ Flat Window, 20-mm diameter
160-1304	ZnSe Flat Window, 20-mm diameter
013-3300	Electrochemical Cell, PTFE
013-3370	Electrochemical Cell, PEEK
013-3402	Heated Electrochemical Cell, PTFE
013-3320	Flat Window Holder, Delrin™
013-3345	45° Crystal Holder, Delrin
013-3360	60° Crystal Holder, Delrin
013-3374	45° Crystal Holder, PEEK
013-3376	60° Crystal Holder, PEEK
013-3445	Heated 45° Crystal Holder
013-3460	Heated 60° Crystal Holder

Notes: The Jackfish SEC requires selection of the cell and a ATR crystal; for a full selection of Jackfish options including electrodes, see the Jackfish product datasheet. The PIKE electrochemical configuration requires electrochemical cell, crystal or window holder and VeeMAX III accessory. Must select one or more crystal or flat window. Choose a crystal holder to match the crystal angle. A flat window or CaF₂ crystal are used for specular reflectance sampling. Other window types for specular reflectance measurements may be found in our listing of transmission windows, 20 mm x 2 mm. The heated electrochemical cell requires the selection of a Digital Temperature Control Module. If PC control is desired TempPRO software must be purchased separately. Electrodes for the PIKE electrochemical cell are supplied by the end-user.