Quick Reference Guide
Mid-Infrared Products

Hellma Analytics
Axiom Technology

ATR IMMERSION PROBES

Hellma Analytics ATR probes with Axiom Technology employ gold-coated internal lightguides so as to maximize optical transmission while insuring broad spectral response and long term reliability. These probes fall into two families, dual lightguide probes having the highest transmission and single lightguide probes featuring reduced diameter. The chart on page 2 will help you to determine the best probe for your application.

DUAL LIGHTGUIDE PROBES

The use of two lightguides, one each for the incoming and return signals, provides the maximum possible transmission. This facilitates the use of these probes with spectrometers employing room temperature DTGS detectors.

- High sensitivity without requiring a cooled detector
- Diamond element for excellent chemical resistance (DMD-370)
- Interchangeable ATR elements to meet diverse needs (DPR-210 and 212)
- Resistant to high temperatures and thermal shock
- Mid-IR 400 - 4000 cm^{-1} spectral coverage

DPR-210 Articulated Probe

The inclusion of a right angle bend allows this probe to be mounted in an FTIR sample compartment while dipping into an open vessel or reaction flask.

DPR-212 Straight Lab Probe

This probe is similar to the DPR-210 except for the elimination of the right angle bend. The resultant increased transmission makes it ideal for use with use with small spectrometers, such as the Bruker Alpha and Thermo iS Series.

DMD-370 Process Diamond Probe

Features excellent transmission throughout the Mid-IR fingerprint region (400 – 1800 cm^{-1}) while providing the chemical resistance made possible through the use of a diamond ATR element.

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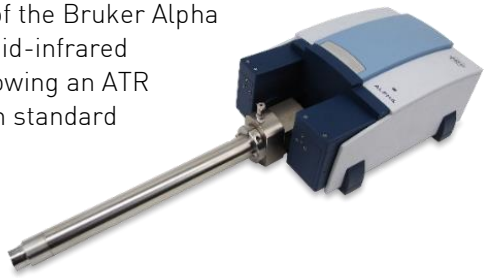
ATR Sampling Capabilities for the Bruker Alpha FTIR Spectrometer

Model SM-Alpha1 is an interface module designed to optimize the performance of the Bruker Alpha FTIR spectrometer when using with our Dual Lightguide ATR probes and other mid-infrared sampling equipment. Its unique optical design maximizes transmission while allowing an ATR probe to rotate to any desired orientation. The SM-Alpha1 is interchangeable with standard Bruker QuickSnap™ sampling modules.

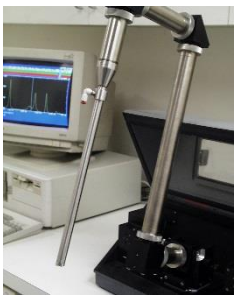


SINGLE LIGHTGUIDE PROBES

The use of a single lightguide for both the incoming and return signals results in a substantial reduction of the probe diameter, allowing these probes to be used with a wide range of laboratory reaction vessels. However, this also leads to reduced transmission. As a result, these probes are best used with a liquid nitrogen cooled MCT detector.

- Reduced diameter enables compatibility with most lab reaction vessels
- Sample compartment or outboard mounting
- Interchangeable ATR elements to meet diverse requirements (DPR–207)
- High photometric accuracy and precision

DPR-207 Conventional ATR probe



The DPR-207 is suitable for mounting in a spectrometer sample compartment or in an outboard location such as a fume hood. In the latter case, it can be coupled to the spectrometer by means of the Axiot System of transfer optics. Its 16 mm diameter and 30 cm immersion length make it ideal for laboratory chemical analysis and process development applications.

ATR PROBE SPECIFICATIONS

	SINGLE LIGHTGUIDE PROBES	DUAL LIGHTGUIDE PROBES		
SPECIFICATIONS	**DPR-207**	**DPR-210**	**DPR-212**	**DMD-370**
Diameter	16 mm	25 mm	25 mm	32 mm
Maximum Immersion Depth	30 cm	16.5 cm	30 cm	30 cm
ATR Material	See Table Below	See Table Below	See Table Below	Diamond
ATR Reflections	2	2	2	3
Nominal Transmission	2 – 4 %	> 12 %	20 %	18 %
Operating Temperature	-20 to 275°C	-20 to 250°C	-20 to 250°C	-100 to 170°C
Maximum Pressure	ATR material dependent	5 bar	5 bar	30 bar
Wetted Metal	316L Stainless Steel	316L Stainless Steel	316L Stainless Steel	Hastelloy C-276
Seal Type	Kalrez® O-ring	Kalrez® O-ring	Kalrez® O-ring	Energized PTFE

ATR FLOW CELLS

The TNL Series

Our TNL Series "TUNNEL" ATR flow cells set the standard for highly accurate, yet economical, mid–IR liquid analysis. The proprietary design of these cells results in a very high degree of photometric accuracy and repeatability. In addition, the helical flow design insures rapid sample exchange and cleanout.

- Rugged, adjustment–free design
- Cylindrical elements for optimum flow characteristics
- High absorbance sensitivity
- Rapid sample clean out
- High transmission
- Pressure ratings to 20 bar and temperature ratings to 260 °C
- 316L stainless steel standard

AVAILABLE ATR ELEMENT MATERIALS:

MATERIAL	SPECTRAL CUTOFF (CM^{-1})	HARDNESS (KNOOP)	ATTACKED BY	MAX. PRESSURE (BAR)	
				DPR-207	DPR-240
ZnSe	600	120	Acids, oxidizers	60	30
ZnS	950	250	Strong oxidizers, some acids	60	30
AMTIR-1	850	170	Strong alkalis	20	10
Ge*	700	780	Hot sulphuric acid. Aqua regia	50	25
Silicon	1150	1500	HF, HNO_3. NaOH	60	30

** 100°C max*

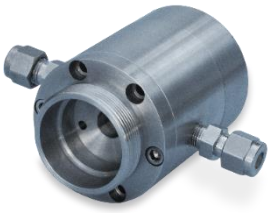
GAS AND LIQUID TRANSMISSION

LFT Low Volume Gas Cells

LFT Series cells can be mounted either in a spectrometer's sample compartment or outboard by means of the Axiot System of optical transfer assemblies. The extremely low volume, fast response, and fixed optical paths of these cells make them ideal for the dynamic analysis of rapidly changing gas concentrations.

- Convenient sample compartment mounting
- Very low volume
- Fast response with negligible sample carryover
- Path lengths of 0.5, 1, and 2 meters
- Easy maintenance

Short Path Process Cells

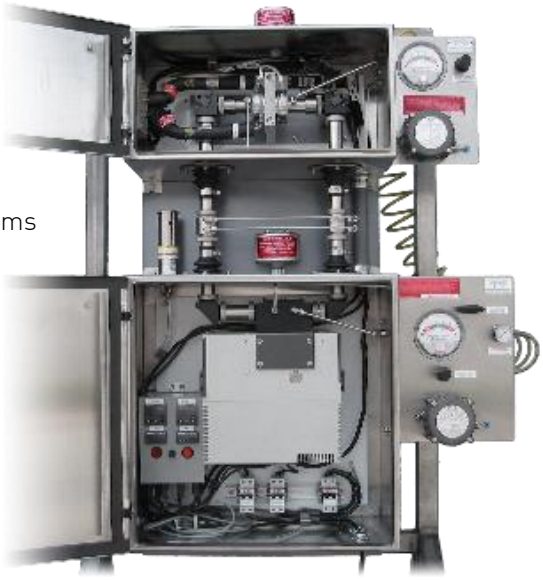


Extremely rugged and reliable LFV Series transmission cells are appropriate for the analysis of high pressure gasses as well as weakly–absorbing condensed phase materials such as liquid Chlorine. These cells are available in both sample compartment and outboard configurations and are suitable for both research and process applications.

- Suitable for inboard or outboard use
- Pressure ratings to 50 bar and temperature ratings to 250 °C
- Pathlengths from 0.2 mm to 50 mm
- 316L stainless steel standard

AXIOT OPTICAL TRANSFER & INTEGRATED SYSTEMS

Axiot Optical Transfer



The Axiot System is a family of optical transfer and sampling modules which can greatly expand the sampling flexibility of virtually any infrared spectrometer. By removing the sampling task from the confines of the conventional sample compartment, the Axiot System eliminates performance compromise while allowing an analysis to be carried out at the most desirable location such as in a fume hood or on a process line. In addition, the modular components of the Axiot System can be used to configure custom sampling systems to meet the requirements of almost any analysis.

- Interfaces spectrometers to separated sampling equipment
- Facilitates system integration
- High transmission efficiency
- Eliminates the risk of instrument damage due to sample spill
- Allows analysis to remain set–up while freeing up the FTIR sample compartment for other tasks

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