



**Fiber Probes for Process
Spectroscopy Catalog 2022 v.2.2**



Intelligent solutions for optical analytics and process control

About us

Founded in 1998, art photonics GmbH is the global provider of intelligent solutions for a diverse range of applications, including process monitoring and spectroscopy for both industrial and medical applications.

Due to the unique technology used in the production of our Polycrystalline Mid Infrared (PIR) fibers, art photonics GmbH is a world leader in the development and production of special fiber products.

With our Research & Development department's expertise and experience, we are able to tailor innovative solutions to successfully meet your specific needs.

Services range from the manufacturing of simple cables to the development and conception of new technologies and solutions.

With our consultancy and product design services, prototype manufacturing, the mass production of OEM fiber products and fiber optic systems, art photonics GmbH is the ideal partner to develop and produce the advanced fiber solutions for your applications.

Our core competence

- R&D of customized Fiber Optic Systems in a broad spectral range from 190 nm to 17 μm , including feasibility tests
- R&D of customized fiber delivery systems for Diode, Solid State, CO- and CO₂-lasers used in medical and industrial applications, including fiber bundle combiners
- R&D of customized spectroscopic fiber probes for all key spectroscopy methods: ATR-absorption, UV-Vis-NIR Transmission & Diffuse Reflection, Raman and Fluorescence, including customized combi-probes for multi-spectral applications and probe couplers to match various spectrometers

Technological capabilities

- Development & production of customized Mid-IR fiber cables, probes and bundles for scientific, medical, industrial and space applications in the range from 2 to 17 μm range

Services

- Spectroscopy analysis of customer samples in our spectral lab or at customer site
- Spectroscopy fiber probes / couplers installation and calibration at the customers site
- Service of fiber optic products
- Rental and leasing of standard spectroscopy fiber probes and probe couplers
- Training on professional use of our fiber products in our company or at customer site

Optical Fiber Probes for optical analytics and process control

Mid-Infrared (MIR) Probes

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- **Chemical and Petrochemical Industry**
- **Pharmacy and Life Science**
- **Food Industry**
- **Polymers**

art photonics offers 30 years of experience with special fiber technologies and applications

FlexiSpec® product line presents Fiber Optic Probes for the wide spectral range:

The latest generation of Attenuated Total Reflection **Mid-IR ATR-Probes** work with any type of FT-IR and other IR-spectrometers, photometers and IR-LED or QCL spectral sensors.

ATR immersion fiber optic probes with patented design are suitable for reaction monitoring in lab, pilot plant and for full automated process control - see P. 3-7.

High sensitivity **Transflection Probes** with collimated beam design are used with any fiber optic spectrometer or photometer for UV-Vis or Vis-NIR range - see P. 10.

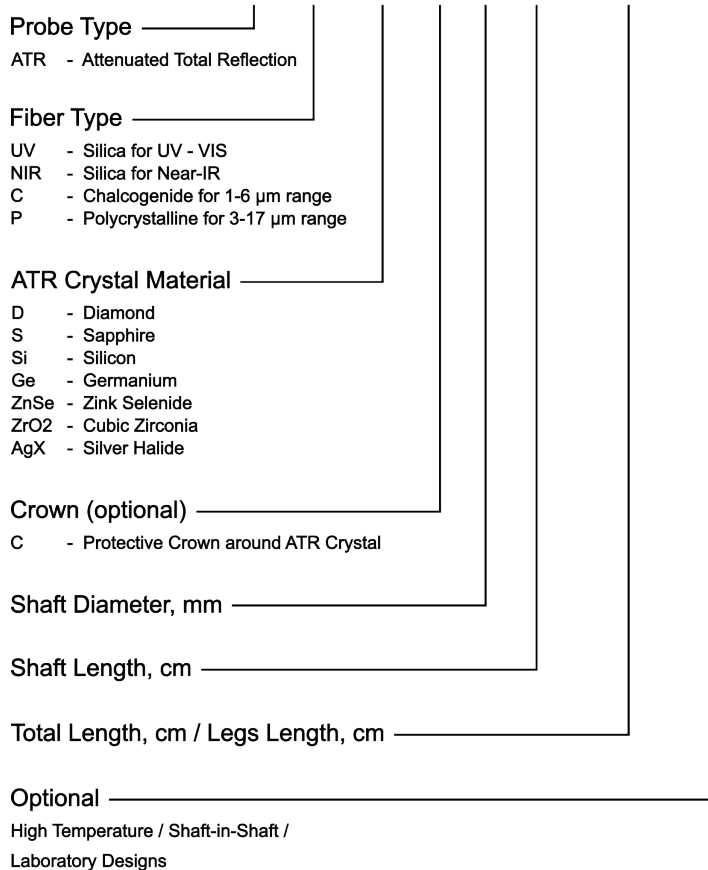
Raman Probes are available in two options – multi-wavelength excitation (630-785 nm) and single-wavelength excitation (532 and 785 nm) - see P. 9.

Reflection & Diffuse Reflection probes are available for any spectral range from UV to mid-IR - see P. 11-12.

Building of Product Codes

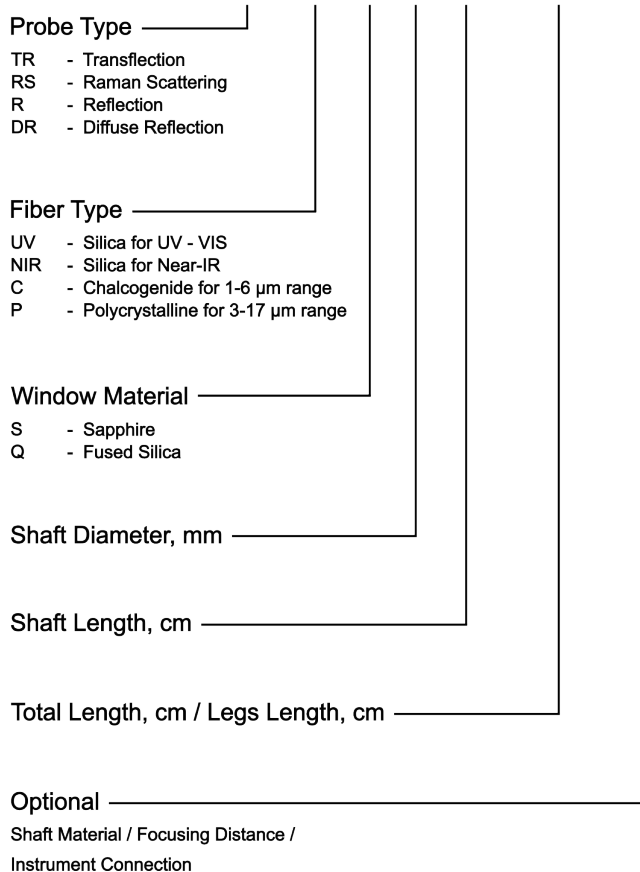
Building Blocks for ATR Probes

ATR-P-ZnSeC-12-30-150/50-HT



Building Blocks for Probes

TR-NIR-S-12-30-150/50-SS

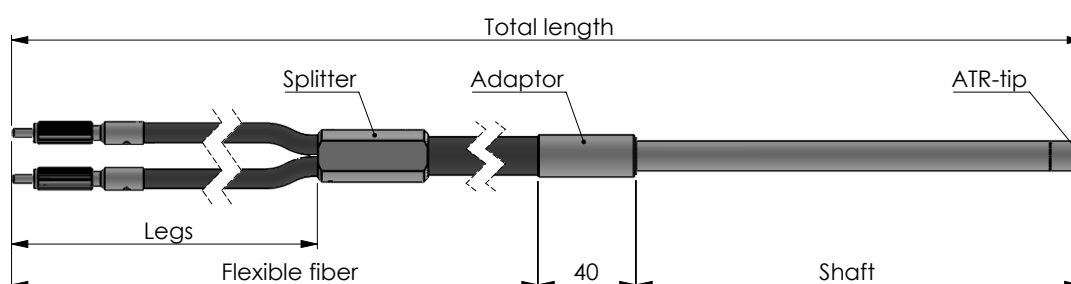


Standard ATR-Fiber Probes

Probe Type	Attenuated Total Reflection Probe
Tip Protection	crown sized (optional)
Probe Shaft	L = 300 ± 5 mm
Shaft Material	Hastelloy C22
Total Length	1.5 ± 0.05 m
Flexible fiber	1.2 m, 2 legs of 0.5 m length each
Terminations	2 x SMA905
Protection tubing	Liquid Tight Protection (LTP)



Product Code	Article-No.	Tip Material	Shaft OD	Spectral Range	Sealing	Fiber Type	Pressure, Temperature
ATR-P-D-6-30-150/50	AP10232	Diamond	6.3 mm	600 - 1900 cm ⁻¹	PEEK	PIR 900/1000	200 Bar, -150 - +140 °C
ATR-P-DC-6-30-150/50	AP10705	Diamond	6.3 mm	600 - 1900 cm ⁻¹	PEEK	PIR 900/1000	200 Bar, -150 - +140 °C
ATR-P-Si-6-30-150/50	AP10551	Silicon	6.3 mm	600 - 3100 cm ⁻¹	PEEK	PIR 900/1000	100 Bar, -150 - +140 °C
ATR-P-SiC-6-30-150/50	AP11100	Silicon	6.3 mm	600 - 3100 cm ⁻¹	PEEK	PIR 900/1000	100 Bar, -150 - +140 °C
ATR-P-Ge-6-30-150/50	AP10929	Germanium	6.3 mm	600 - 3100 cm ⁻¹	PTFE	PIR 900/1000	10 Bar, -150 - +90 °C
ATR-P-GeC-6-30-150/50	AP11101	Germanium	6.3 mm	600 - 3100 cm ⁻¹	PTFE	PIR 900/1000	10 Bar, -150 - +90 °C
ATR-C-ZrO2-6-30-150/50	AP10423	Cubic Zirconia	6.3 mm	1550 - 9000 cm ⁻¹	PEEK	CIR 500/550	100 Bar, -150 - +90 °C
ATR-C-ZrO2C-6-30-150/50	AP11102	Cubic Zirconia	6.3 mm	1550 - 9000 cm ⁻¹	PEEK	CIR 500/550	100 Bar, -150 - +90 °C
ATR-NIR-ZrO2-6-30-150/50	AP12xxx	Cubic Zirconia	6.3 mm	400 - 2200 nm	PEEK	NIR 600/660	100 Bar, -150 - +200 °C
ATR-NIR-ZrO2C-6-30-150/50	AP12xxx	Cubic Zirconia	6.3 mm	400 - 2200 nm	PEEK	NIR 600/660	100 Bar, -150 - +200 °C
ATR-UV-S-6-30-150/50	AP12xxx	Sapphire	6.3 mm	260 - 1300 nm	PEEK	UV 600/660	100 Bar, -150 - +200 °C
ATR-UV-SC-6-30-150/50	AP12xxx	Sapphire	6.3 mm	260 - 1300 nm	PEEK	UV 600/660	100 Bar, -150 - +200 °C
Product Code	Article-No.	Tip Material	Shaft OD	Spectral Range	Sealing	Fiber Type	Pressure, Temperature
ATR-P-D-12-30-150/50	AP10241	Diamond	12 mm	600 - 1900 cm ⁻¹	PEEK	PIR 900/1000	200 Bar, -150 - +140 °C
ATR-P-DC-12-30-150/50	AP10323	Diamond	12 mm	600 - 1900 cm ⁻¹	PEEK	PIR 900/1000	200 Bar, -150 - +140 °C
ATR-P-Si-12-30-150/50	AP10920	Silicon	12 mm	600 - 3100 cm ⁻¹	PEEK	PIR 900/1000	100 Bar, -150 - +140 °C
ATR-P-SiC-12-30-150/50	AP10916	Silicon	12 mm	600 - 3100 cm ⁻¹	PEEK	PIR 900/1000	100 Bar, -150 - +140 °C
ATR-P-Ge-12-30-150/50	AP10930	Germanium	12 mm	600 - 3100 cm ⁻¹	PTFE	PIR 900/1000	10 Bar, -150 - +90 °C
ATR-P-GeC-12-30-150/50	AP10931	Germanium	12 mm	600 - 3100 cm ⁻¹	PTFE	PIR 900/1000	10 Bar, -150 - +90 °C
ATR-P-ZnSe-12-30-150/50	AP10399	Zinc Selenide	12 mm	600 - 3100 cm ⁻¹	PTFE	PIR 900/1000	10 Bar, -150 - +140 °C
ATR-P-Z-SeC-12-30-150/50	AP10425	Zinc Selenide	12 mm	600 - 3100 cm ⁻¹	PTFE	PIR 900/1000	10 Bar, -150 - +140 °C
ATR-C-ZrO2-12-30-150/50	AP10400	Cubic Zirconia	12 mm	1550 - 9000 cm ⁻¹	PEEK	CIR 500/550	100 Bar, -150 - +90 °C
ATR-C-ZrO2C-12-30-150/50	AP10424	Cubic Zirconia	12 mm	1550 - 9000 cm ⁻¹	PEEK	CIR 500/550	100 Bar, -150 - +90 °C
ATR-NIR-ZrO2-12-30-150/50	AP12xxx	Cubic Zirconia	12 mm	400 - 2200 nm	PEEK	NIR 600/660	100 Bar, -150 - +200 °C
ATR-NIR-ZrO2C-12-30-150/50	AP12xxx	Cubic Zirconia	12 mm	400 - 2200 nm	PEEK	NIR 600/660	100 Bar, -150 - +200 °C
ATR-UV-S-12-30-150/50	AP12xxx	Sapphire	12 mm	260 - 1300 nm	PEEK	UV 600/660	100 Bar, -150 - +200 °C
ATR-UV-SC-12-30-150/50	AP12xxx	Sapphire	12 mm	260 - 1300 nm	PEEK	UV 600/660	100 Bar, -150 - +200 °C
ATR-S-Al2O3C-12-30-150/50	AP12xxx	Sapphire	12mm	260-1300 nm	PEEK	UV 600/660	

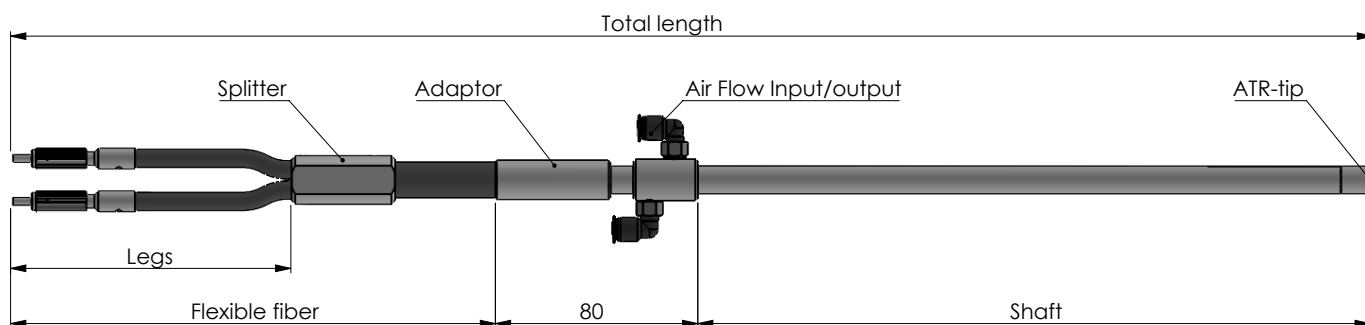


High Temperature ATR-Probe

Probe Type	ATR-probe with gas cooling design
Sealing Material	PEEK
Tip Protection	crown sized (optional)
Probe Shaft	L = 300 ± 5 mm
Shaft Material	Hastelloy C22
Total Length	2 ± 0.05 m
Flexible fiber	1.7 m, 2 legs of 0.5 m length each
Terminations	2 x SMA905
Protection tubing	Liquid Tight Protection (LTP)

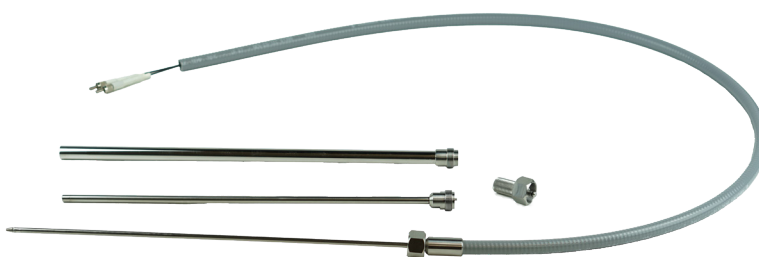


Product Code	Article-No.	Tip Material	Shaft OD	Spectral Range	Fiber Type	Pressure	Temperature
ATR-P-D-6-30-200/50-HT	AP12114	Diamond	6.3mm	600 - 1900cm-1	PIR 900/1000	200 Bar	-150 - +230°C
ATR-P-DC-6-30-200/50-HT	AP12xxx	Diamond	6.3mm	600 - 1900cm-1	PIR 900/1000	200 Bar	-150 - +230°C
ATR-P-Si-6-30-200/50-HT	AP12129	Silicon	6.3mm	600 - 3100cm-1	PIR 900/1000	100 Bar	-150° - +230°C
ATR-P-SiC-6-30-200/50-HT	AP12xxx	Silicon	6.3mm	600 - 3100cm-1	PIR 900/1000	100 Bar	-150° - +230°C
ATR-C-ZrO2-6-30-200/50-HT	AP12xxx	Cubic Zirconia	6.3mm	1550 - 9000cm-1	CIR 500/550	100 Bar	-150° - +180°C
ATR-C-ZrO2C-6-30-200/50-HT	AP12xxx	Cubic Zirconia	6.3mm	1550 - 9000cm-1	CIR 500/550	100 Bar	-150° - +180°C
Product Code	Article-No.	Tip Material	Shaft OD	Spectral Range	Fiber Type	Pressure	Temperature
ATR-P-D-12-30-200/50-HT	AP10344	Diamond	12mm	600 - 1900cm-1	PIR 900/1000	200 Bar	-150 - +250°C
ATR-P-DC-12-30-200/50-HT	AP10928	Diamond	12mm	600 - 1900cm-1	PIR 900/1000	200 Bar	-150 - +250°C
ATR-P-Si-12-30-200/50-HT	AP10932	Silicon	12mm	600 - 3100cm-1	PIR 900/1000	100 Bar	-150 - +250°C
ATR-P-SiC-12-30-200/50-HT	AP10512	Silicon	12mm	600 - 3100cm-1	PIR 900/1000	100 Bar	-150 - +250°C
ATR-C-ZrO2-12-30-200/50-HT	AP10935	Cubic Zirconia	12mm	1550 - 9000cm-1	CIR 500/550	100 Bar	-150 - +200°C
ATR-C-ZrO2C-12-30-200/50-HT	AP10936	Cubic Zirconia	12mm	1550 - 9000cm-1	CIR 500/550	100 Bar	-150 - +200°C

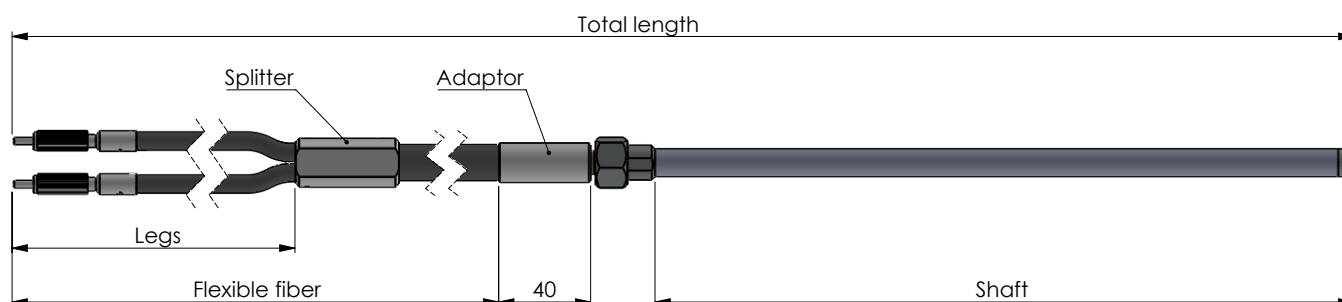


Sterilizable ATR-Fiber-Probes

Probe Type	sterilizable ATR-probe with Shaft-in-Shaft-Design
Sealing Material	PEEK
Tip Protection	crown sized (optional)
Probe Shaft	L = 300 ± 5 mm
Shaft Material	Hastelloy C22
Total Length	1.5 ± 0.05 m
Flexible fiber	1.2 m, 2 legs of 0.5 m length each
Terminations	2 x SMA905
Protection tubing	Liquid Tight Protection (LTP)



Product Code	Article-No.	Tip Material	Shaft OD	Spectral Range	Sealing	Fiber Type	Pressure, Temperature
ATR-P-D-6-30-150/50-SiS	AP10937	Diamond	6.3 mm	600 - 1900 cm-1	PEEK	PIR 900/1000	200 Bar, -150 - +140 °C
ATR-P-DC-6-30-150/50-SiS	AP12xxx	Diamond	6.3 mm	600 - 1900 cm-1	PEEK	PIR 900/1000	200 Bar, -150 - +140 °C
ATR-P-Si-6-30-150/50-SiS	AP10938	Silicon	6.3 mm	600 - 3100 cm-1	PEEK	PIR 900/1000	100 Bar, -150 - +140 °C
ATR-P-SiC-6-30-150/50-SiS	AP12xxx	Silicon	6.3 mm	600 - 3100 cm-1	PEEK	PIR 900/1000	100 Bar, -150 - +140 °C
ATR-P-Ge-6-30-150/50-SiS	AP10939	Germanium	6.3 mm	600 - 3100 cm-1	PTFE	PIR 900/1000	10 Bar, -150 - +90 °C
ATR-P-GeC-6-30-150/50-SiS	AP12xxx	Germanium	6.3 mm	600 - 3100 cm-1	PTFE	PIR 900/1000	10 Bar, -150 - +90 °C
ATR-C-ZrO2-6-30-150/50-SiS	AP10940	Cubic Zirconia	6.3 mm	1550 - 9000 cm-1	PEEK	CIR 500/550	100 Bar, -150 - +90 °C
ATR-C-ZrO2C-6-30-150/50-SiS	AP12xxx	Cubic Zirconia	6.3 mm	1550 - 9000 cm-1	PEEK	CIR 500/550	100 Bar, -150 - +90 °C
Product Code	Article-No.	Tip Material	Shaft OD	Spectral Range	Sealing	Fiber Type	Pressure, Temperature
ATR-P-D-12-30-150/50-SiS	AP10798	Diamond	12 mm	600 - 1900 cm-1	PEEK	PIR 900/1000	200 Bar, -150 - +140 °C
ATR-P-DC-12-30-150/50-SiS	AP12xxx	Diamond	12 mm	600 - 1900 cm-1	PEEK	PIR 900/1000	200 Bar, -150 - +140 °C
ATR-P-Si-12-30-150/50-SiS	AP10727	Silicon	12 mm	600 - 3100 cm-1	PEEK	PIR 900/1000	100 Bar, -150 - +140 °C
ATR-P-SiC-12-30-150/50-SiS	AP12xxx	Silicon	12 mm	600 - 3100 cm-1	PEEK	PIR 900/1000	100 Bar, -150 - +140 °C
ATR-P-Ge-12-30-150/50-SiS	AP10941	Germanium	12 mm	600 - 3100 cm-1	PTFE	PIR 900/1000	10 Bar, -150 - +90 °C
ATR-P-GeC-12-30-150/50-SiS	AP12xxx	Germanium	12 mm	600 - 3100 cm-1	PTFE	PIR 900/1000	10 Bar, -150 - +90 °C
ATR-C-ZrO2-12-30-150/50-SiS	AP10942	Cubic Zirconia	12 mm	1550 - 9000 cm-1	PEEK	CIR 500/550	100 Bar, -150 - +90 °C
ATR-C-ZrO2C-12-30-150/50-SiS	AP12xxx	Cubic Zirconia	12 mm	1550 - 9000 cm-1	PEEK	CIR 500/550	100 Bar, -150 - +90 °C



Flat Tip Diamond ATR-Fiber Probe

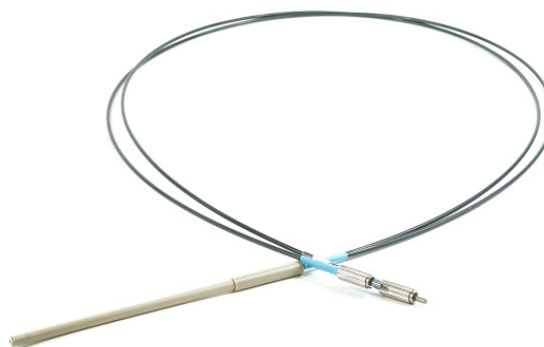
Probe Type	ATR-probe
Sealing Material	Gold
Probe Shaft	OD = 6.3 mm
Shaft Material	Hastalloy C22
Total Length	1.5 ± 0.05 m
Flexible fiber	1.2 m, legs of 0.5 m length each
Terminations	2 x SMA905
Protection tubing	Liquid Tight Protection (LTP)



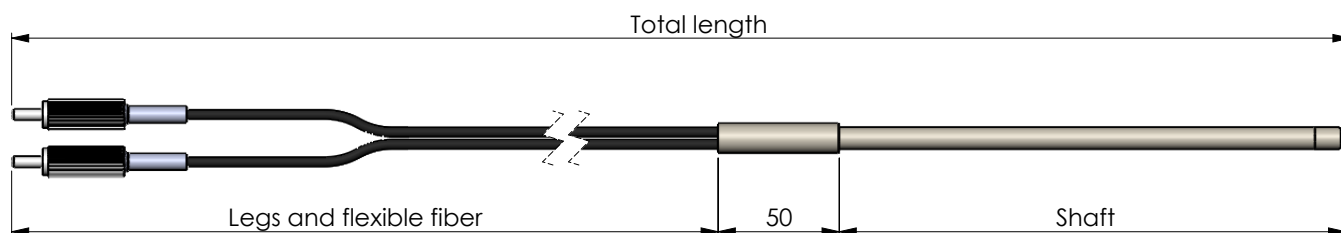
Product Code	Article-No.	Tip Material	Shaft OD	Spectral Range	Sealing	Fiber Type	Pressure, Temperature
ATR-P-DF-6-30-150/50	AP11938	Diamond	6.3 mm	600 - 1900 cm ⁻¹	Gold	PIR 900/1000	100 Bar, -150 - +140 °C

Standard Lab ATR-Probe

Probe Type	ATR-probe for Laboratory
Sealing Material	PTFE
Probe Shaft	OD = 6.3 mm, L = 150 ± 5 mm
Shaft Material	PEEK
Total Length	1.5 ± 0.05 m
Flexible fiber	2 legs of 1.35 m length each
Terminations	2 x SMA905
Protection tubing	PEEK



Product Code	Article-No.	Tip Material	Shaft OD	Spectral Range	Fiber Type	Pressure, Temperature
ATR-P-D-6-15-150/135-Lab	AP10xxx	Diamond	6.3 mm	600 - 1900 cm ⁻¹	PIR 900/1000	10 Bar, -100 - +140 °C
ATR-P-Si-6-15-150/135-Lab	AP10906	Silicon	6.3 mm	600 - 3000 cm ⁻¹	PIR 900/1000	10 Bar, -100 - +140 °C
ATR-P-Ge-6-15-150/135-Lab	AP10917	Germanium	6.3 mm	600 - 3100 cm ⁻¹	PIR 900/1000	10 Bar, -100 - +80 °C
ATR-P-ZnSe-6-15-150/135-Lab	AP10812	Zinc Selenide	6.3 mm	600 - 3100 cm ⁻¹	PIR 900/1000	10 Bar, -100 - +140 °C
ATR-C-ZrO2-6-15-150/135-Lab	AP10799	Cubic Zirconia	6.3 mm	1550 - 9000 cm ⁻¹	CIR 500/550	10 Bar, -100 - +90 °C
ATR-NIR-ZrO2-6-15-150/135-Lab	AP11679	Cubic Zirconia	6.3 mm	400 - 2200 nm	NIR 600/660	10 Bar, -100 - +140 °C
ATR-UV-S-6-15-150/135-Lab	AP12xxx	Sapphire	6.3 mm	260 - 1300 nm	UV 600/660	10 Bar, -100 - +140 °C

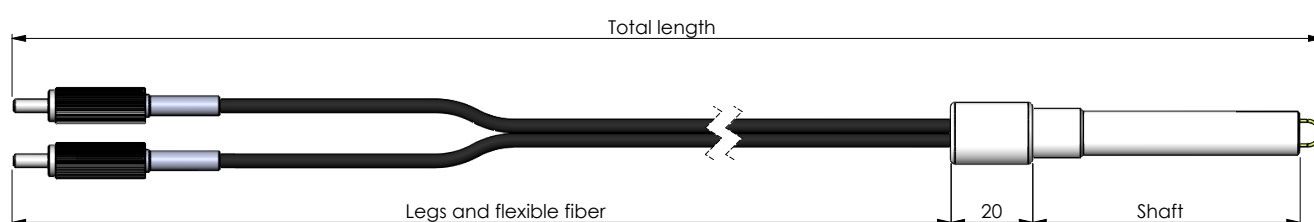


Standard ATR-Detachable Loop Probes

Probe Type	ATR for Detachable-PIR-Loops
Probe Shaft	OD = 10 mm, L = 80 mm
Shaft Material	PEEK
Total Length	1.1 ± 0.05 m
Flexible fiber	2 legs of 1.0 m length each
Terminations	2 x Ti-SMA905
Protection tubing	PEEK
Temperature	0 - +80°C
Pressure	0 - 3 Bar



Product Code	Article-No.	Tip Material	Spectral Range	Fiber Type
ATR-P-AgX-10-8-110/100	AP10100	PIR-fiber loop	600 - 3100 cm ⁻¹	PIR 900/1000
ATR-C-AgX-10-8-110/100	AP10106	PIR-fiber loop	1550 - 5000 cm ⁻¹	CIR 500/550



Detachable Loops



Product Code	Quantity	Article-No.	Fiber Type	Loop length
Detachable Single PIR-Loops for DL-Probe	5 pcs	AP10109	PIR 700	5 ± 0,5 mm
Detachable Single PIR-Loops for DL-Probe	10 pcs	AP10031	PIR 700	5 ± 0,5 mm
Detachable Dual PIR-Loops for DL-Probe	5 pcs	AP10110	PIR 700	7 ± 0,5 mm
Detachable Dual PIR-Loops for DL-Probe	10 pcs	AP10111	PIR 700	7 ± 0,5 mm
Detachable Triple PIR-Loops for DL-Probe	5 pcs	AP10191	PIR 700	7 ± 0,5 mm
Detachable Triple PIR-Loops for DL-Probe	10 pcs	AP10238	PIR 700	7 ± 0,5 mm

Chemical compatibility of ATR crystals

Material	Properties	Comments
Diamond	stable in any liquid	check limitation of using PEEK (sealing material) prior to operating
Silizium	pH = 1÷10	
Germanium	pH= 1÷14	without oxidizing agents in alkalies
ZnSe	pH = 5÷9	some complexing agents can damage the crystal
ZrO ₂	any medium except concentrated alkalies	check limitation of using PEEK (sealing material) prior to operating
Al ₂ O ₃ sapphire	any medium except concentrated alkalies	check limitation of using PEEK (sealing material) prior to operating
AgHal detachable loops	pH = 5÷9 no metal no S2O3 ⁻ and Br ⁻ groups	some complexing agents can damage the crystal

Check the chemical compatibility of ATR crystals with medium if you have any doubts.

We are always ready to answer your questions.

Fiber Probe Couplers

Fiber Probe Couplers are designed to connect Fiber Optic Probes with FTIR spectrometers and to perform the remote analysis and reaction monitoring. Mirror design of FlexiSpec® Fiber Probe Couplers provides high coupling efficiency for any probe used for process-spectroscopy in broad spectral range 1.5 - 17 μm .

Product Code	Article-No.	Connectors	Compatible with	
Fiber Probe Coupler FPC-2M for iS5	AP10285	SMA 905	<ul style="list-style-type: none"> •Nicolet Summit FTIR •Nicolet iS 5 FTIR 	
Fiber Probe Coupler FPC-2M for iS5N	AP11394	SMA 905	<ul style="list-style-type: none"> •Nicolet iS 5N FTIR 	
Fiber Probe Coupler FPC-6M	AP10307	SMA 905	<ul style="list-style-type: none"> •Nicolet iS 10 FT-IR •Nicolet iS 20 FT-IR •Nicolet iS 50 FT-IR •Nicolet 5700/6700 •Nexus 670 (ThermoFischer Scientific) •Nexus 360 (ThermoFischer Scientific) •Equinox 55 (Bruker)* •Vector 22 (Bruker)* •IFS 25, 55, 66, 66V, 88 (Bruker)* 	
Fiber Probe Universal Coupler	AP11380	SMA 905	<ul style="list-style-type: none"> any FTIR spectrometer •VERTEX 70v (Bruker) •Tensor 27, 37 (Bruker) •FP-8600 (JASCO) •IRSpirit (Schimadzu) •Agilent 600 Serie 	
Fiber Probe Coupler for Cary 630			Agilent Cary 630	
Fiber Probe Coupler for Spectrum Two			Perkin Elmer Spectrum Two	

Reference Cables

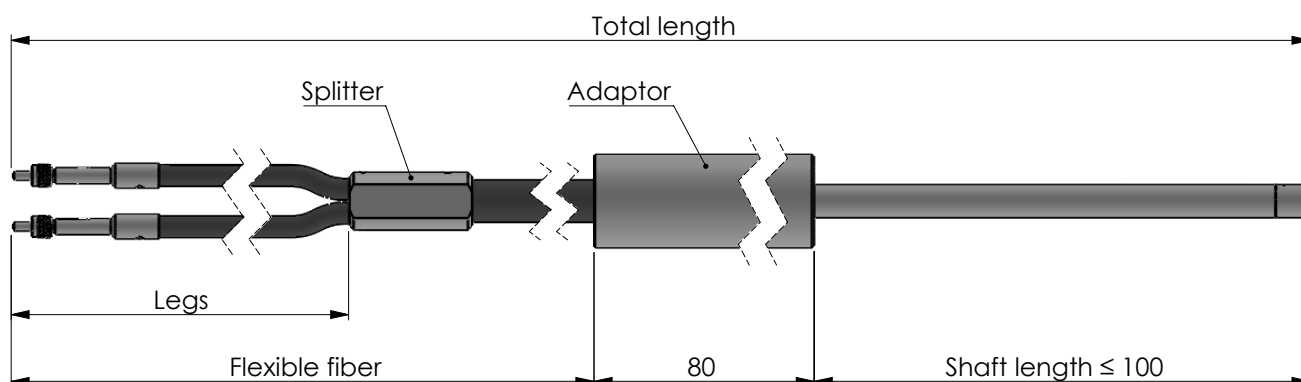
Product Code	Article No.	Termination	Fiber
Fiber Cable PIR400/500-50-TI/SMA-TI/SMA-MP37	AP10680	2 x SMA 905 connector, titanium ferrule	PIR 400/500, NA = 0,30 \pm 0.03
Fiber Cable CIR250/300-50-SMA-SMA-MP37	AP11124	2 x SMA 905 connector	CIR 250/300, NA = 0,30 \pm 0.03
Fiber Cable NIR200/220-50-SMA-SMA-MP37	AP11140	2 x SMA 905 connector	NIR 200/220, NA = 0,22 \pm 0,02

Raman Scattering probe

Probe Type	Raman
Window Sealing Material	Epoxy glue/PTFE, PEEK
Window	Sapphire, AR coated (600 - 1050 nm)
Laser Wavelengths	621 - 787 nm
Detection Range	from 805 nm (300 cm ⁻¹ @ 785 nm)
Filter Efficiency	OD > 8 for Laser Rejection
Illumination (Laser) Fiber	NIR/AL 105/125, NA = 0.22
Collection (Detector) Fiber	NIR200/220, NA = 0.22
Shaft Material	Stainless Steel 1.4301
Shaft Sealing Material	FPM
Total Length	2 ± 0.05 m
Flexible fiber	1.2 m, legs of 0.5 m length each
Protection tubing	Liquid Tight Protection (LTP)
Terminations	Laser: FC/PC; Detector: SMA905
Temperature	0 - +120 °C
Pressure	0 - 20 Bar



Product Code	Article-No.	Shaft OD	Shaft Length	Laser Spot
RS-NIR-S-12-20-200/50-FS	AP11815	12 mm	200 ± 5 mm	~0.2mm at 2-3 mm from the tip
RS-NIR-S-12-20-200/50-CL	AP11813	12 mm	200 ± 5 mm	collimated beam 3 mm OD
RS-NIR-S-6-10-200/50-FS	AP11819	6.3 mm	100 ± 5 mm	~0.2mm at 2-3 mm from the tip
RS-NIR-S-6-10-200/50-CL	AP11818	6.3 mm	100 ± 5 mm	collimated beam 3 mm OD

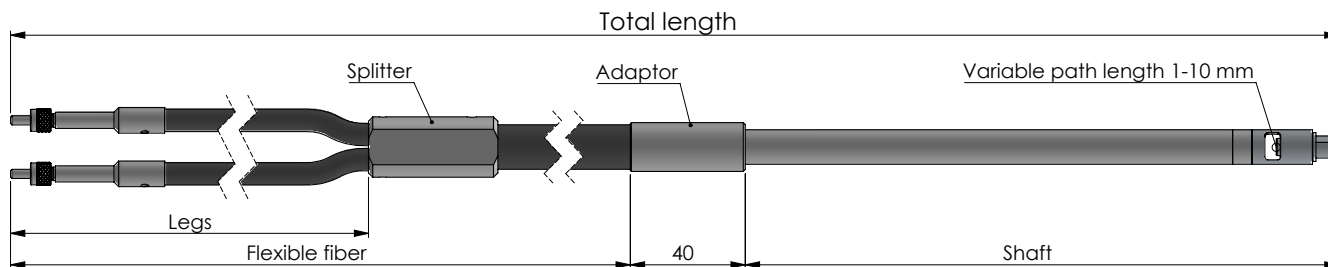


Transflection Probes

Probe Type	Transflection
Sealing Material	PTFE
Window	Sapphire
Optical Path	Variable 0 - 10 mm
Total Length	2 ± 0.05 m
Flexible fiber	1.3 m, legs of 0.5 m length each
Terminations	2 x SMA905
Protection tubing	Metal, PVC coated
Temperature	0 - +200 °C
Pressure	0 - 50 Bar



Product Code	Article-No.	Shaft OD	Shaft Length	Shaft Material	Spectral Range	Fiber Type
TF-UV-S-12-20-200/50-SS	AP12xxx	12 mm	200 ± 5 mm	Stainless Steel 316L	260 - 1200 nm	UV-VIS 600/660
TF-UV-S-12-20-200/50-H	AP12xxx	12 mm	200 ± 5 mm	Hastelloy C22	260 - 1200 nm	UV-VIS 600/660
TF-NIR-S-12-20-200/50-SS	AP12406	12 mm	200 ± 5 mm	Stainless Steel 316L	400 - 2200 nm	NIR 600/660
TF-NIR-S-12-20-200/50-H	AP12279	12 mm	200 ± 5 mm	Hastelloy C22	400 - 2200 nm	NIR 600/660
TF-UV-S-25-40-200/50-SS	AP12xxx	25.4 mm	400 ± 5 mm	Stainless Steel 316L	260 - 1200 nm	UV-VIS 600/660
TF-UV-S-25-40-200/50-H	AP12xxx	25.4 mm	400 ± 5 mm	Hastelloy C22	260 - 1200 nm	UV-VIS 600/660
TF-NIR-S-25-40-200/50-SS	AP12213	25.4 mm	400 ± 5 mm	Stainless Steel 316L	400 - 2200 nm	NIR 600/660
TF-NIR-S-25-40-200/50-H	AP12xxx	25.4 mm	400 ± 5 mm	Hastelloy C22	400 - 2200 nm	NIR 600/660

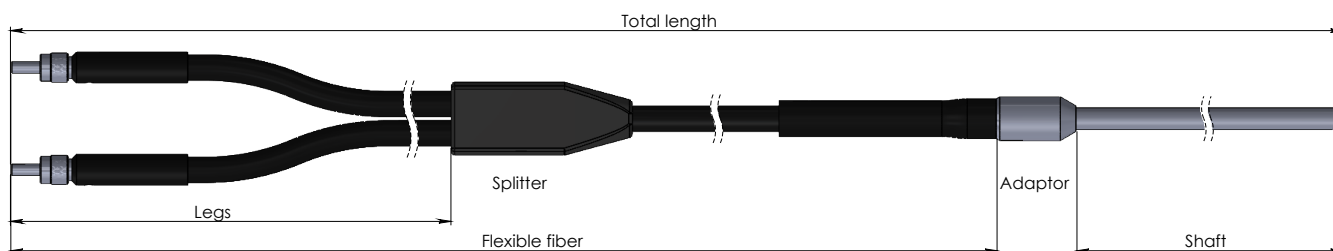


Reflection Probes

Probe Type	Reflection
Sealing Material	Glue EPOTEK 353 ND
Window	Sapphire, 20° angle
Probe Shaft	OD = 6 mm, L = 150 mm
Shaft Material	Stainless Steel 316L
Total Length	2 ± 0.05 m
Flexible fiber	1.35 m, legs of 0.5 m length each
Terminations	2 x SMA905
Protection tubing	Metal, PVC coated
Temperature	0 - +150 °C
Pressure	0 - 10 Bar

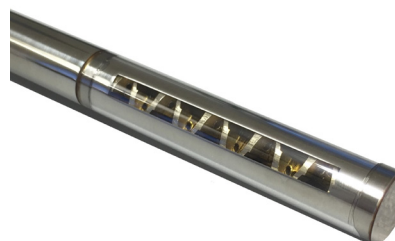


Product Code	Spectrometer Type	Article-No.	Bundle Arrangement	Spectral Range	Fiber Type
R-NIR-S-6-15-200/50-FT	FTIR (FT)	AP12488	3 + 4	380 - 2500 nm	NIR 600/660
R-NIR-S-6-15-200/50-DG	Diffraction Grating (DG)	AP12490	6 + 1	380 - 2500 nm	NIR 400/440
R-UV-S-6-15-200/50-DG	Diffraction Grating (DG)	AP12xxx	6 + 1	200 - 1200 nm	UV 400/440



Diffuse Reflection Probes

Probe Type	Reflection
Window	Sapphire
Sealing Material	PTFE
Probe Shaft	OD = 12 mm, L = 200 mm
Shaft Material	Hastealloy C22
Total Length	2 ± 0.05 m
Flexible fiber	1.3 m, legs of 0.5 m length each
Fiber Type	NIR 400/440
Bundle Arrangement	19 around 1
Terminations	2 x SMA905
Protection tubing	Metal, PVC coated
Temperature	0 - +200 °C
Pressure	0 - 50 Bar



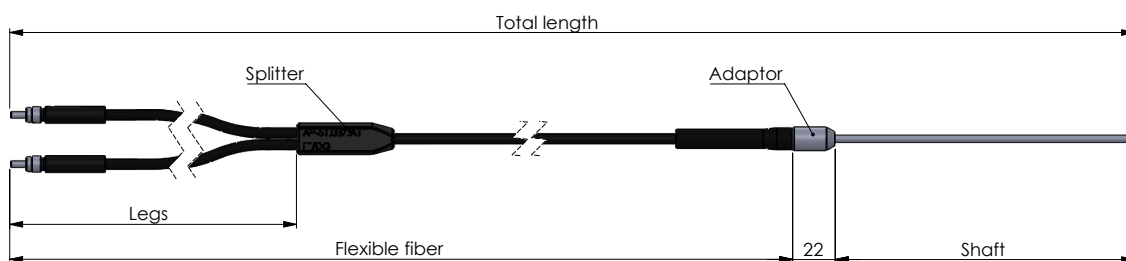
Product Code	Article-No.	Spectral Range
DR-NIR-S-12-20-200/50	AP12353	400 - 2200 nm
Side Line Reflection Probe 12-20-200/50	AP11049	400 - 2200 nm
Side Reflection Probe 12-20-200/50	AP10017	400 - 2200 nm

Reflection Fluo Probes

Probe Type	Reflection
Sealing Material	Glue EPOTEK 353 ND
Window	No
Probe Shaft	OD = 3.5 mm, L = 150 mm
Shaft Material	Stainless Steel 316L
Total Length	2 ± 0.05 m
Flexible fiber	1.55 m, legs of 0.3 m length each
Terminations	2 x SMA905
Protection tubing	KSP-4N, OD = 7 mm
Temperature	0 - +150 °C
Pressure	0 - 10 Bar



Product Code	Article-No.	Bundle Arrangement	Spectral Range	Detection Fiber Type	Illumination Fiber Type
R-NIR-3-15-200/30	AP10773	1 + 7	380 - 2500 nm	1 x NIR400/440	7 x NIR 400/440
R-UV-3-15-200/30	AP12xxx	1 + 7	200 - 1200 nm	1 x UV-VIS/AL 400/440	7 x UV-VIS400/440

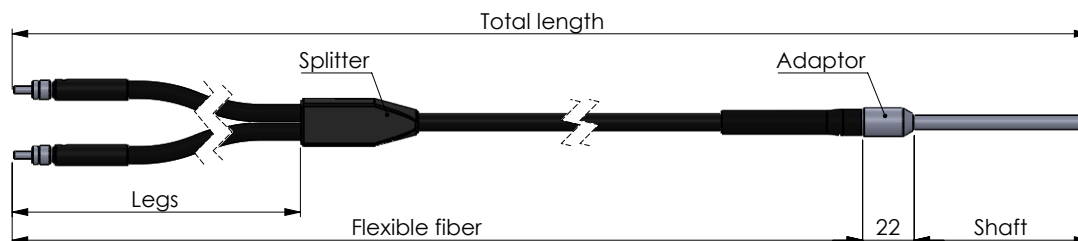


Reflection Mid-IR Probes

Probe Type	Mid-IR Reflection
Sealing Material	No
Probe Shaft	OD = 6.3 mm, L = 75 mm
Shaft Material	Stainless Steel 316L
Total Length	1.5 ± 0.05 m
Flexible fiber	0.9 m, legs of 0.5 m length each
Terminations	2 x SMA905
Protection tubing	Stainless Steel, OD = 7 mm
Temperature	0 - +80 °C
Pressure	1 Bar



Product Code	Article-No.	Bundle Arrangement	Spectral Range	Detection Fiber Type	Illumination Fiber Type
R-C55-6-7-150/50	AP12194	1 + 6	1600 - 7000 cm-1	1 x CIR 500/550	6 x CIR 500/550
R-C34-6-7-150/50	AP11789	1 + 7	1600 - 7000 cm-1	1 x CIR 500/550	7 x CIR 340/400
R-P67-6-7-150/50	AP12xxx	1 + 7	600 - 2500 cm-1	1 x PIR 900/1000	7 x PIR 600/700
R-P45-6-7-150/50	AP12317	1 + 7	600 - 2500 cm-1	1 x PIR 900/1000	7x PIR 400/500

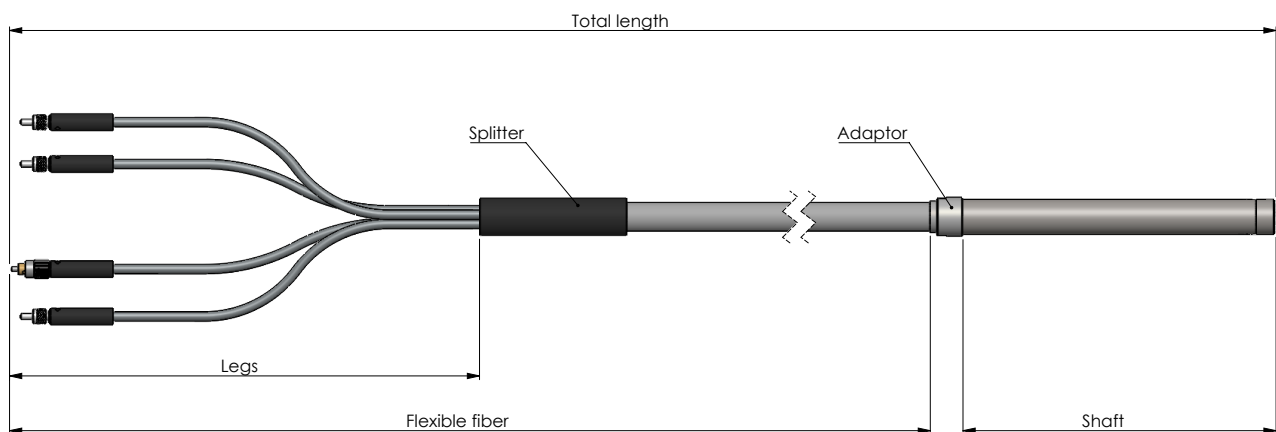


NIRaman Combi Probes

Probe Shaft	
Sealing Material	Glue EPOTEK 353 ND
Window	Sapphire
Probe Shaft	OD = 19 +/-0.1 mm, L = 170 mm
Shaft Material	Stainless Steel 316L
Total Length	3 ± 0.05 m
Protection tubing	Liquid Tight Protection (LTP)
Temperature	0 - +150 °C
Pressure	0 - 10 Bar
NIR Diffuse Reflectance Channel	
Illumination Bundle	19 x NIR400/440, NA=0.22 ± 0.02
Detection Fiber	1 x NIR400/440, NA=0.22 ± 0.02
Terminations	20 x SMA905
Raman Channel	
Laser Wavelength	785 nm
Excitation Fiber	1 x NIR105/125, NA=0.22 ± 0.02
Detection Fiber	1 x NIR200/220, NA=0.22 ± 0.02
Terminations	FC/PC, SMA905



Product Code	Article-No.	Spectral Range
NIRaman Combi Probe	AP12242	400 - 2200 nm



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