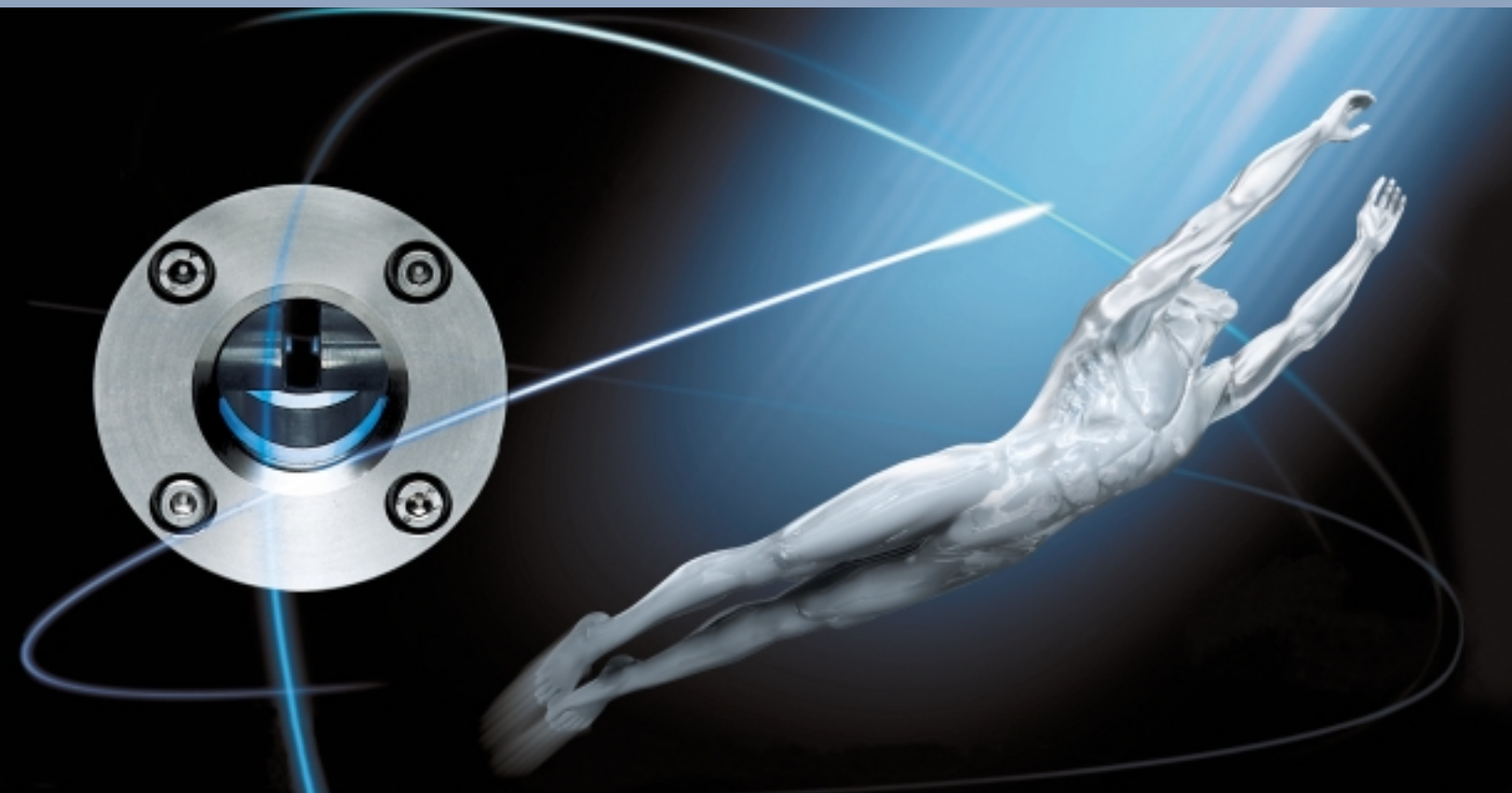


Fiberoptic Sapphire Probes – Outstanding, Robust, Extremely Stable



For the Highest Performance in Process Analysis Technology



Sapphire – the Superior Material for Your Most Challenging Demands

The use of spectroscopic procedures in process analysis technology has become an increasingly important part of process optimization. High-capacity spectrometers and fiberoptic process probes that can provide reliable analysis under the harshest conditions are required. As such, the material for all submersible parts of the probe must be carefully selected, with particular attention given to the choice of materials for the optical components.

Sapphire – the Superior Material

For all our fiberoptic immersion probes or flow cells we place our confidence in the optic material Sapphire. This confidence is based on Sapphire's crystalline structure and its superior

capacity to durably withstand corrosion and abrasion. Only when measuring in short-wave UV ranges do we employ quartz optics.

Solvias – Customized Solutions to Meet your Needs

In addition to our wide range of standard and customized products we also work with our customers to develop specialized process probes, such as those designed for use in high pressure and high temperature applications or in highly corrosive mediums. For the probe's exterior, we offer a wide range of materials from which to choose. To satisfy the greatest number of applications, the optic material Sapphire is the choice.

Solvias Sapphire Probes – Superior Performance for All Your Needs



For more than 15 years, fiberoptic probes from Solvias have been successfully used in transmission, transfection, reflection and ATR industrial applications.

Our Sapphire probes offer the clear advantages:

- Abrasion- and corrosion free Sapphire optic
- Chemical resistance
- Verifiable process capability
- Range of application from UV to NIR
- Wide variety of models
- Compatible with all types of spectrometers
- Complete range of accessories

Solvias – Experience Yields Quality

Solvias is certified in accordance with ISO 9001. All pressure-bearing casings are compliant with the Pressure Equipment Directive 97/23/EC.

We would be pleased to provide you with additional information about our fiberoptic probes with the outstanding Solvias Sapphire optic.

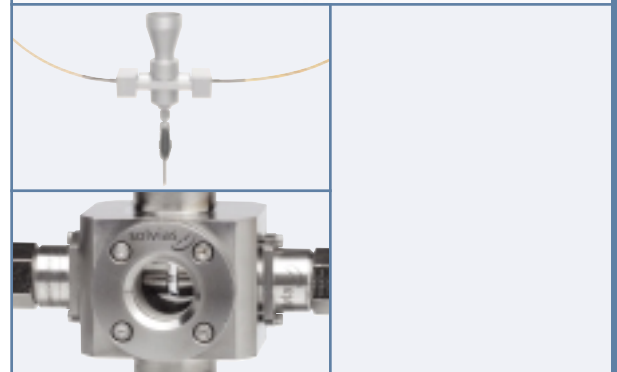
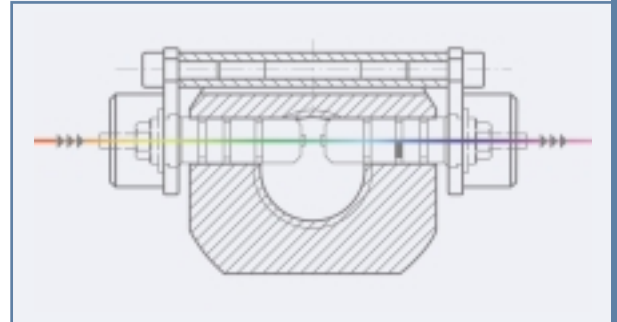
Transmission

For measuring the concentration of transparent liquids directly in the pipe, we use the **MONITOR**, **ARGUS**, **MINIPLANT** or **CALILAB** measuring cells, all with a patented optic.

For all model types you can choose from a variety of diameters, connectors, pressure limits, and materials. The optic material is the tried and true Sapphire. The optical path length can be varied from 1 to 20 mm with a simple change of the distance bolt.

Based on the heatable flow cell **CALILAB** we developed **SYSTEM CALILAB**. This is the ideal solution for method development and calibration in the laboratory. **CALILAB** also acts as the basis for probe design, enabling such applications as intermittent analysis.

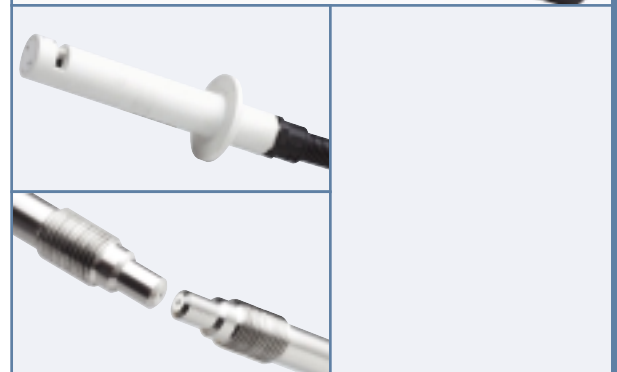
For gas measurement, we have developed measuring cells with optical path lengths starting at 50 mm.



Transmission-Immersion Probes

ZAFIRO transmission probes are designed for direct immersion into containers, reactors, and pipes. The probe diameter are a standard 12 and 18 mm, ensuring that all **ZAFIRO** probes easily fit into standard retractable probe housings.

A wide variety of **ZAFIRO** probes are available. Simply specify the immersion depth, the process connection, the probe material, and the optical path length. Naturally, the optic material is Sapphire.



Reflection

For the analysis of heterogeneous systems or solids we offer a complete range of reflection probes.

The names **TURBIDO**, **REFLECTOR** and **ALBEDO** represent an entire range of probes, primarily distinguished by their number of internally-used fibers. While **TURBIDO** is our classic two-fiber probe, the **REFLECTOR** and **ALBEDO** probes equipped with fiber bundles are also available. Within the probe classes, the individual models are distinguished by the choice of materials for the probe casing, immersion depth, and process connector.

All **TURBIDO** and **REFLECTOR** probes have a standard diameter of 12 mm, and are easily fit into standard retractable probe housings. Sapphire is the standard optic material.

Whereas the **TURBIDO** probe is extremely well suited for measuring turbidity, **REFLECTOR** and **ALBEDO** are used when spectral information from light-emitting substances is needed. Both types of probes are extremely well suited for the measurement or characterization of solids as well as for suspension or emulsion analysis.

REFLECTOR and **ALBEDO** reflection-immersion probes are designed for direct immersion into containers, dryers, or mixers.

To prevent unwanted residue from adhering to the optics, **REFLECTOR** probes can be fitted with flushing connectors.



Transflection

Solvias transflection probes have a multitude of applications – in multi-purpose plants, in fermentation, or in organic-chemical process development – and thereby provide the user with a high degree of flexibility.

For reaction monitoring in transmission mode, the optical path length must be easily and quickly adjustable, to rapidly respond to changing concentration conditions.

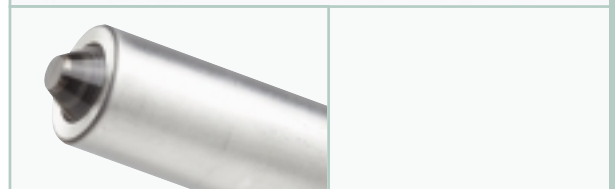
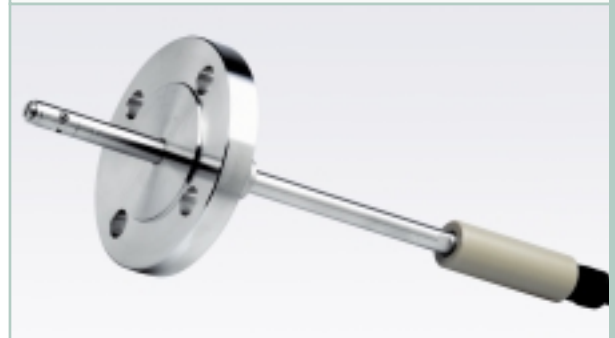
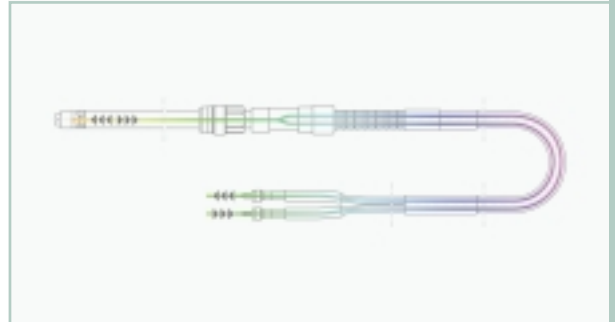
In addition, these probes must be resistant to chemicals, corrosion, and abrasion, and also have the capacity for use in high pressure and high temperature conditions.

The **FLEX** transflection probe has been developed explicitly to fulfill all these requirements.

ATR

ATR technology (attenuated total reflectance) allows us to take advantage of the total reflection of the light transmitted from an optically dense medium to a less dense medium. The light at the boundary layer (sapphire/liquid) penetrates approximately a quarter of the wavelength into the less optically dense medium, where it can be absorbed.

With our **ATTENUTO** probe, the optical path length is reported in the sub-micrometer range, allowing for the analysis of highly-concentrated solutions while eliminating the cumbersome dilution steps.



Complete Range of Accessories

In addition to our fiberoptic probes, we offer everything you need for connecting the probe to your spectrometer.

Our wide range of accessories include high-quality extension fibers for UV, VIS, and NIR ranges.

In conjunction with our REFLECTOR and ALBEDO reflection probes we offer application-specific, matched fiber bundles. Each of these probes can be equipped with fiber bundles consisting of 7+7, 3+4, or 1+6 single fibers with a core diameter of 600 µm.

We also offer process kits to protect the optical fibers at the point of installation. They consist, for example, of steel mesh tubing, including a solid casing in which the extension fibers are coupled.



Broad Spectrum

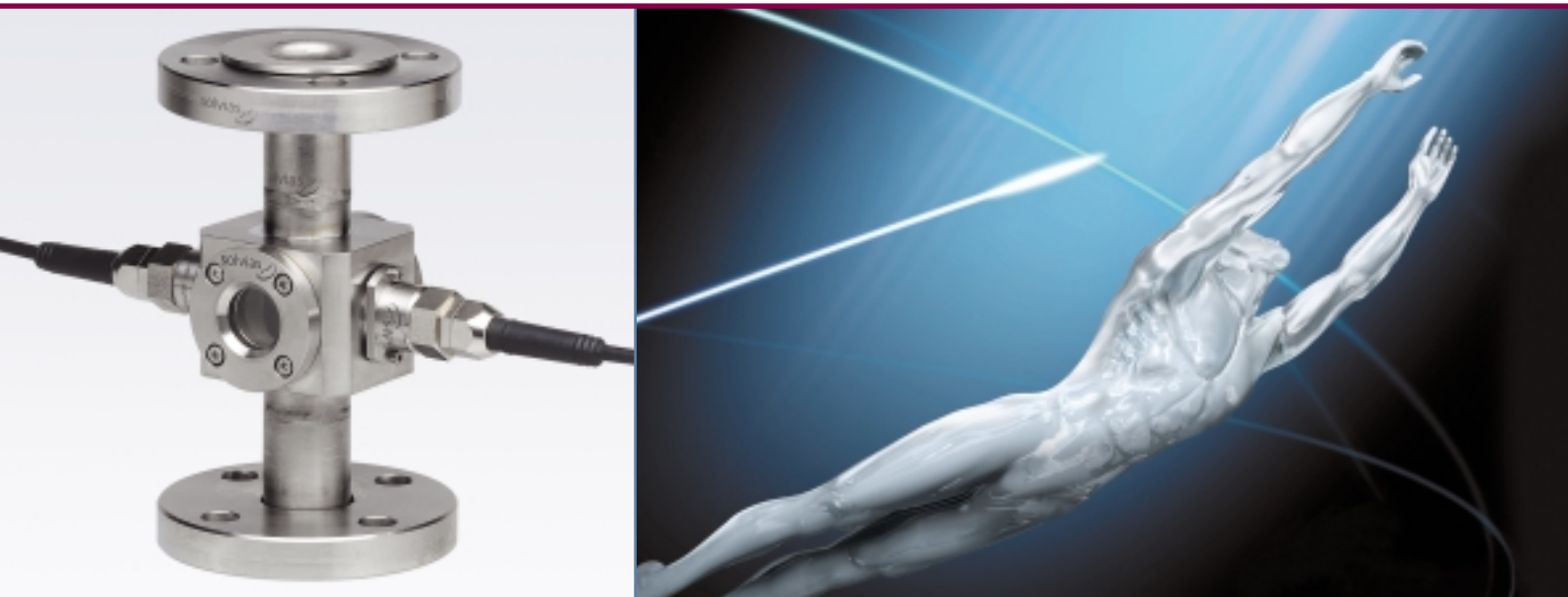
We offer robust, high performance solutions to meet your most challenging demands in process analytics technology – from the superior Solvias Sapphire optic in our fiberoptic probes to reliable coupling solutions for almost any type of spectrometer.

These companies have already placed their trust in our broad spectrum of products and services...



ARGUS

Fiberoptic Transmission-Flow Cells with the Superior Optic Material – Sapphire



ARGUS transmission-flow cells are remarkable for their robust design and unmatched selection of materials for all wetted parts. With the optic material Sapphire, ARGUS transmission cells are practically abrasion- and corrosion free, and thus stable in processes in which concentrated, strong acids and bases are used. Moreover, the probes will not be damaged by spikes in temperature or pressure.

ARGUS transmission-flow cells are ideally used when an additional visual control is necessary. ARGUS cells are designed for direct installation into pipes. They are manufactured in accordance with your selection from a wide range of materials, process connectors, pressure levels, diameters and temperature ranges or can be further customized to meet your individual needs.

ARGUS – the Clear Advantages at a Glance

- Abrasion- and corrosion free Sapphire optic
- Chemical resistance
- Verifiable process capability
- Range of applications from UV to NIR
- Wide variety of models and customized designs
- Compatible with all types of spectrometers
- Complete range of accessories



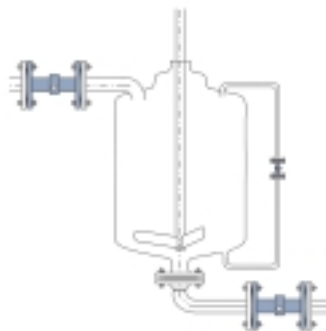
ARGUS Meets the Highest Demands in Process Analysis Technology

Applications

Determination of single parameters or multicomponent analysis in solutions or gases.

Standard Procedures

- Color number determination according to APHA, Hazen, Lovibond, EBC and Sayboldt
- Measurement of UV-VIS absorbing gases such as F₂, Cl₂, Br₂, I₂, NO_x, SO₂, Ozone and Hg
- Reaction monitoring in chemical synthesis from the UV to NIR range
- Control of membrane separation or process chromatography
- Solvent blending



Specifications

Optic

Optical path length (OPL) 1, 2, 3, 4, 5, 10 or 20 mm

Probe Design

Dimensions starting DN 25 resp. 1"

Standard materials Stainless steel DIN 1.4435/316L, Sapphire, borosilicate glass (side window)

Process connections DIN- or ANSI flanges
Additional process connections upon request

Process Conditions

Temperature Maximum 280°C (continuous use)

Pressure 0–25 bar

Options

Alternative materials Stainless steel DIN 1.4571/SS316Ti, titanium, hastelloy, PVDF, PP and PTFE

Other Additional designs, dimensions and specifications upon request

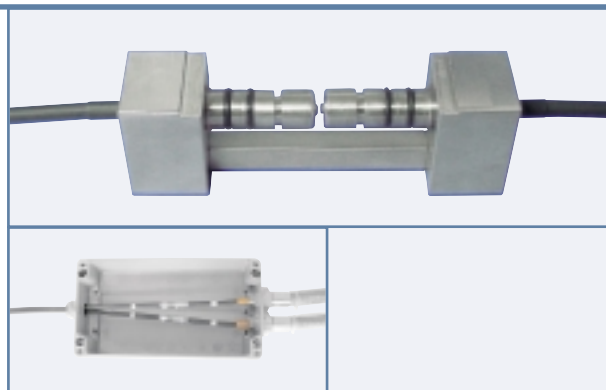
Declaration of Conformity

Certified in accordance with Pressure Equipment Directive 97/23/EC

Total Service – from Flow Cells to a Complete Range of Accessories

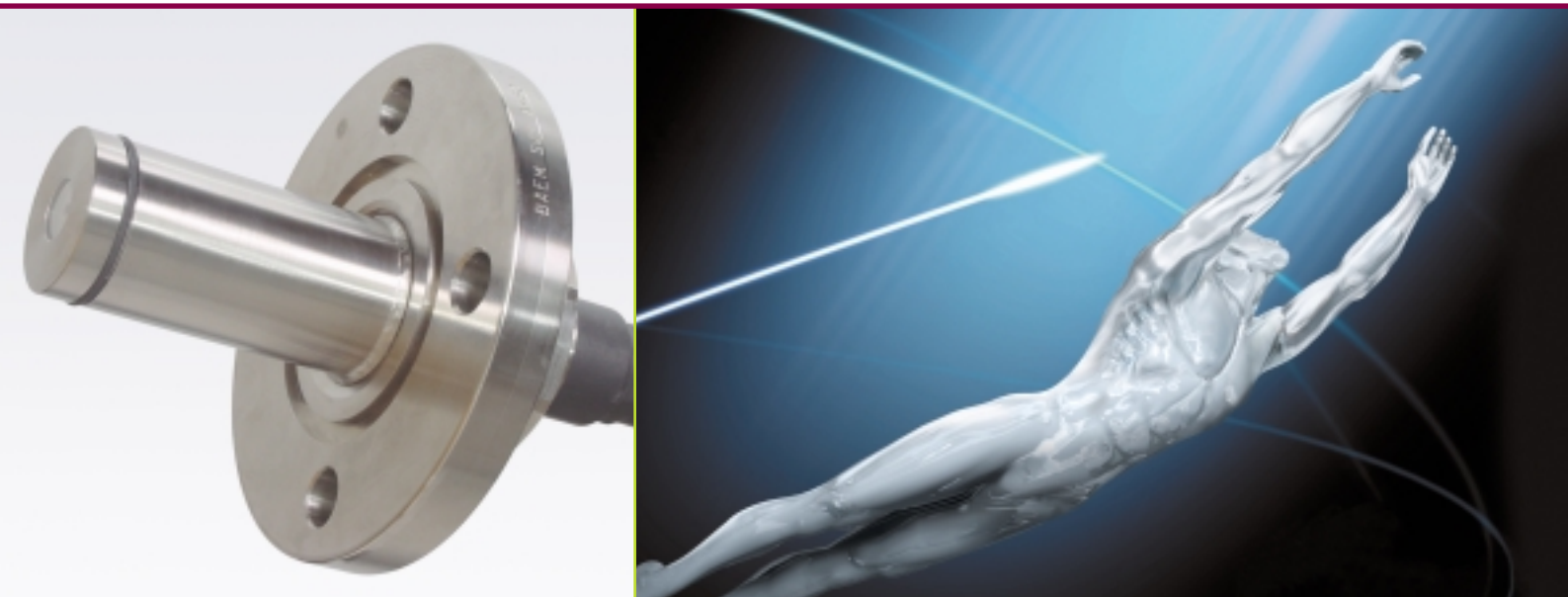
We offer much more than just fiberoptic flow cells. Our comprehensive accessory program includes everything you need for implementing our cells as well as reliable coupling solutions for almost any type of spectrometer.

Ask us about the optimal solution for you.



ALBEDO

Fiberoptic Reflection-Immersion Probes with the Superior Optic Material – Sapphire



ALBEDO reflection-immersion probes are remarkable for their robust design and unmatched selection of materials for all submersible components. With the optic material Sapphire, ALBEDO probes are practically abrasion- and corrosion free, and thus stable in concentrated, strong acids and bases. Moreover, the probes will not be damaged by spikes in temperature or pressure.

ALBEDO probes are distinguished by their remarkable signal-to-noise ratio. The probe's special construction allows for quantitative measurement in weak to extremely strong light-scattering substances. ALBEDO probes are designed for direct immersion into containers, dryers or mixers. The probes are manufactured in accordance with your selection from a wide range of materials, process connectors, diameters, pressure- and temperature ranges or can be further customized to meet your individual needs.

ALBEDO – the Clear Advantages at a Glance

- Abrasions and corrosion free Sapphire optic
- Chemical resistance
- Verifiable process capability
- Range of application from UV to NIR
- Wide variety of models and customized designs
- Compatible with all spectrometers
- Complete range of accessories



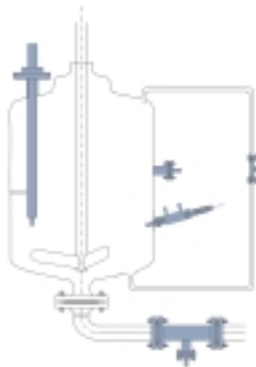
ALBEDO Meets the Highest Demands in Process Analysis Technology

Applications

Multicomponent analysis in heterogeneous systems and non invasive analysis of solids for identification and characterization.

Standard Procedures

- Reaction monitoring in heterogeneous systems in the NIR range
- Analysis of solids compositions directly in mixers
- Determination of residual solvents concentrations on solids directly in driers



Specifications

Optic

Illuminated spot Ø 3 mm

Probe Design

Dimensions Diameter 50 mm resp. 2"
Standard materials Stainless steel DIN 1.4435/316L, Sapphire
Process connectors DIN- or ANSI flanges
Additional connectors upon request

Process Conditions

Temperature Maximum 140°C (continuous use)
Pressure 0 – 40 bar

Options

Alternative materials Stainless steel DIN 1.4571/SS316Ti, titanium and hastelloy
Other Additional designs, dimensions and specifications upon request

Declaration of Conformity

Certified in accordance with Pressure Equipment Directive 97/23/EC

Total Service – from Probes to a Complete Range of Accessories

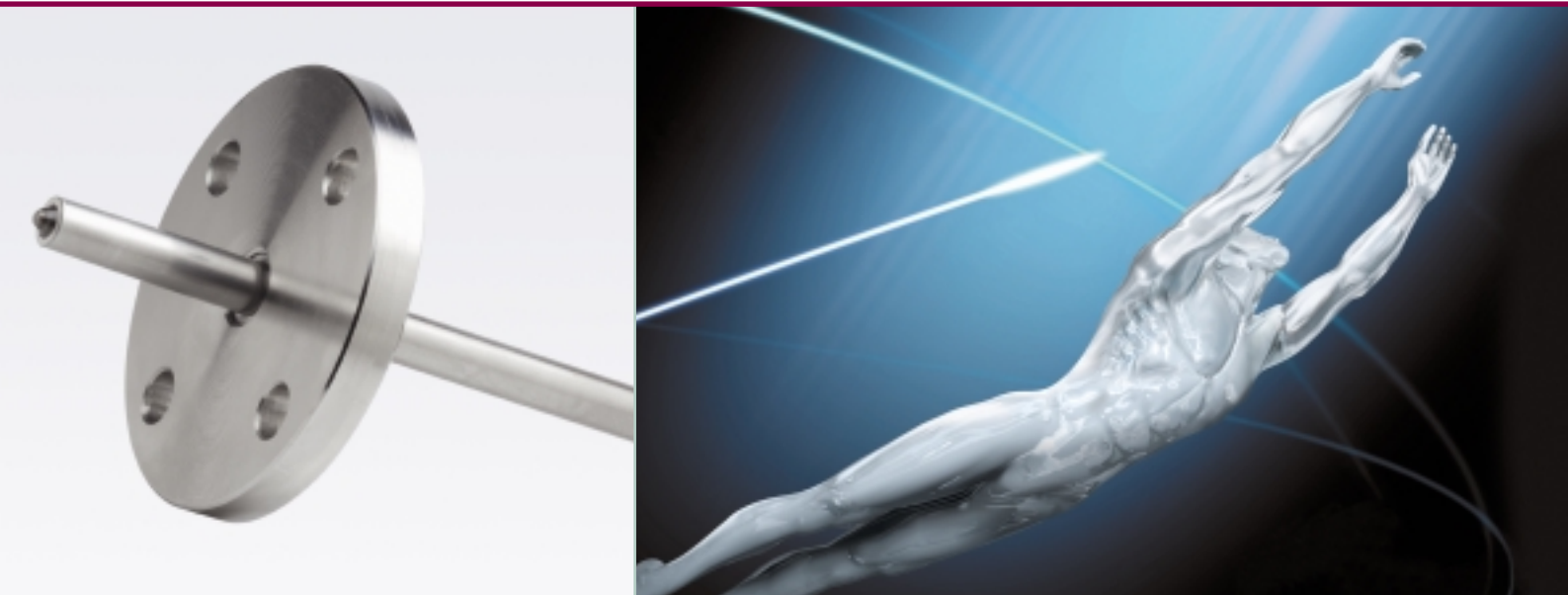
We offer much more than just fiberoptic probes. Our comprehensive accessory program includes everything you need for implementing our probes as well as reliable coupling solutions for almost any type of spectrometer.

Ask us about the optimal solution for you.



ATTENUTO

Fiberoptic ATR-Immersion Probes with the Superior Optic Material – Sapphire



ATTENUTO ATR-immersion probes are remarkable for their robust design and unmatched selection of materials for all submersible components. With the optic material Sapphire, ATTENUTO ATR-immersion probes are practically abrasion- and corrosion free, and thus stable in concentrated, strong acids and bases. Moreover, the probes will not be damaged by spikes in temperature or pressure.

With our ATTENUTO probes, the effective optical path length is reported in the sub-micrometer range, allowing for the online analysis in highly-concentrated solutions and eliminating the cumbersome dilution steps. ATTENUTO probes are designed for direct immersion into reactors and pipes. The probes are manufactured in accordance with your selection from a wide range of materials, process connections, pressure limits, diameters and temperature ranges or can be further customized to meet your individual needs.

ATTENUTO – the Clear Advantages at a Glance

- Abrasion- and corrosion free Sapphire optic
- Chemical resistance
- Verifiable process capability
- Range of application from UV to NIR
- Wide variety of models and customized designs
- Compatible with all types of spectrometers
- Complete range of accessories



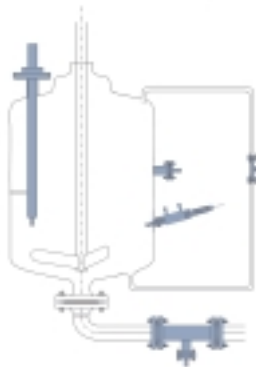
ATTENUTO Meets the Highest Demands in Process Analysis Technology

Applications

In organic-chemical synthesis and in the downstream processing of biotechnologically manufactured products.

Standard Procedures

- Reaction monitoring in heterogeneous catalyzed processes
- Online determination of concentrations in active ingredient- or color concentrates
- Control of membrane separation or process chromatography



Specifications

Optic

Optical path length (OPL) ~0.2 µm at 250 nm and with 3 reflections

Probe Design

Dimensions Diameter 18 mm
Immersion depth from 100 mm

Standard materials Stainless steel DIN 1.4435/316L,
Sapphire

Process connectors DIN- or ANSI flanges
Screw fittings (Swagelok)
Additional connectors upon request

Process Conditions

Temperature Maximum 180°C (continuous use)

Pressure 0–100 bar

Options

Alternative materials Stainless steel DIN 1.4571/SS316Ti,
titanium and hastelloy

Other Additional designs, dimensions
and specifications upon request

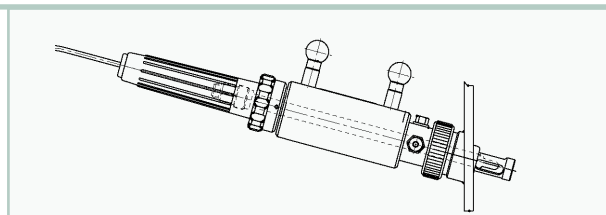
Declaration of Conformity

Certified in accordance with Pressure Equipment Directive 97/23/EC

Total Service – from Probes to a Complete Range of Accessories

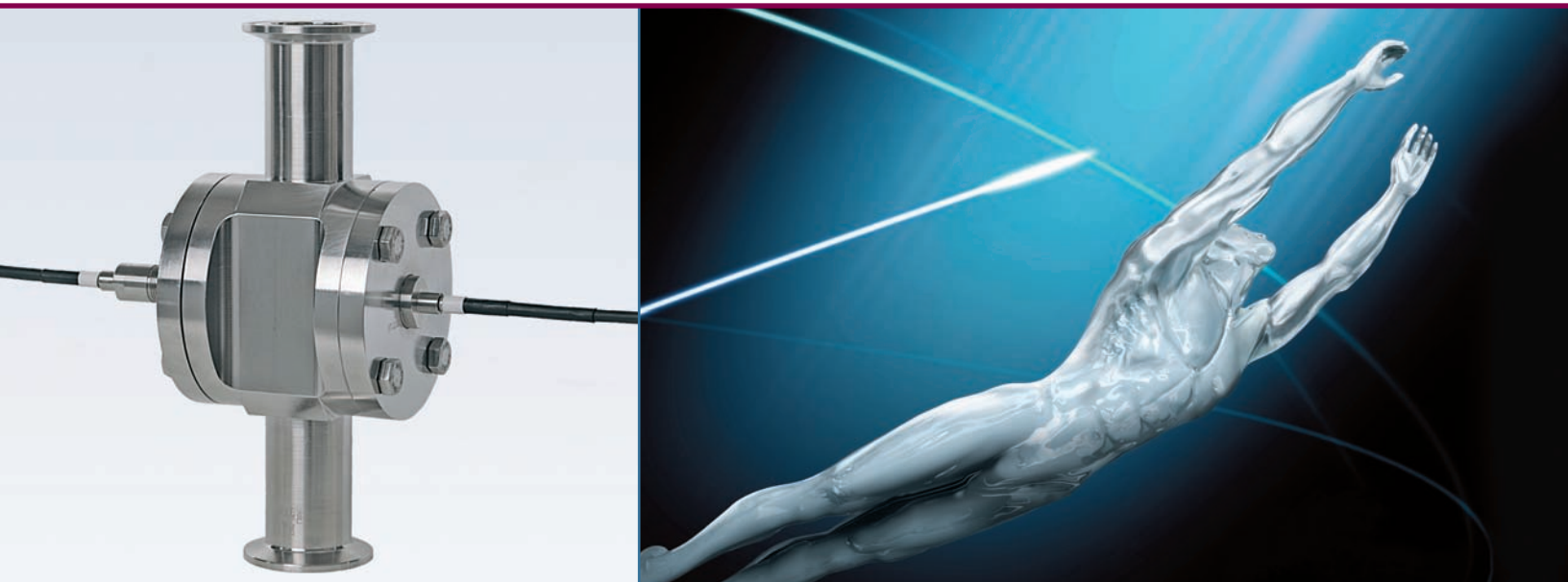
We offer much more than just fiberoptic probes. Our comprehensive accessory program includes everything you need for implementing our probes as well as reliable coupling solutions for almost any type of spectrometer.

Ask us about the optimal solution for you.



BIOPRO

Fiberoptic Transmission Flow Cells with the Superior Optic Material – Sapphire



BIOPRO transmission flow cells are remarkable for their robust design and unmatched selection of materials for all wetted parts. Their CIP/SIP-compliant design meets the most challenging demands for reliable application in sterile production. All metal surfaces that come into contact with the product are electropolished.

BIOPRO transmission flow cells are the first choice for inline analytical applications in food and biopharmaceutical production. BIOPRO cells are designed for direct installation into pipes. They are available in different diameters and can be combined with either clamp or flange connectors.

BIOPRO – the Clear Advantages at a Glance



- Abrasion- and corrosion-free sapphire optics
- Chemical resistance
- Verifiable process capability
- Range of applications from UV to NIR
- Compatible with all types of spectrometers
- Wide variety of models and customized designs
- Complete range of accessories and spectrometers

BIOPRO Meets the Highest Demands in Process Analysis Technology

Applications

Determination of single parameters or multicomponent analysis in solutions

Standard Procedures

- Control for membrane separation or process chromatography for the production of biopharmaceuticals
- Determination of identity and content for protein fractions
- Cleaning validation programs for API production
- Colometric characterization of liquids in food and beverage production



Specifications

Optics

Optical path length (OPL)	1, 2, 3, 4, 5 to 20 mm
Options	Infinitely variable from 0.2 to 20 nm

Process Conditions

Temperature	-10 / 100 °C
Pressure	Up to 16 bar

Declaration of Conformity

Certified in accordance with Equipment Directive 97/23/EG

Probe Design

Dimensions	DN 6 to DN 100
Standard materials	Stainless steel DIN 1.4435/316L, sapphire, quartz
Surface finish	$R_a < 0.8 \mu\text{m}$
Process connectors	TriClamp or flanges Additional connectors upon request

Options

Additional designs, dimensions, and specifications upon request

Total Service – from Flow Cells to a Complete Range of Accessories

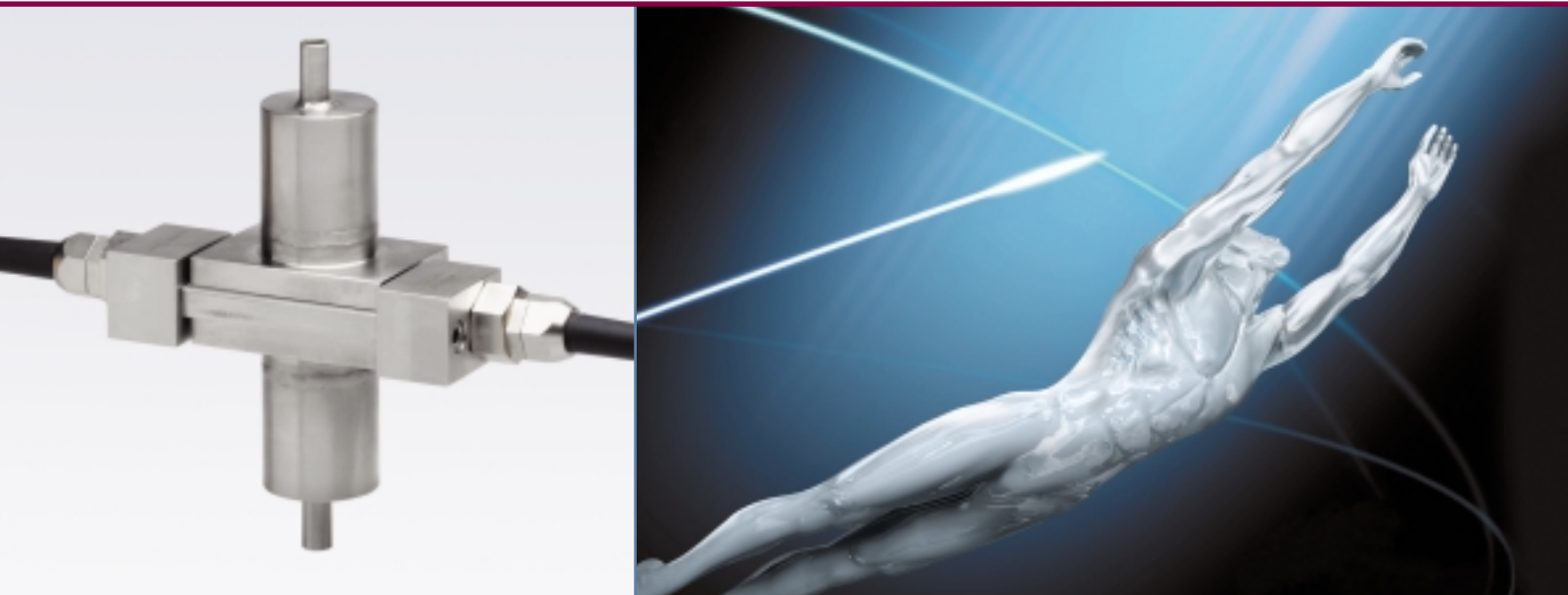
We offer much more than just fiberoptic flow cells. Our comprehensive accessory program includes everything you need for implementing our cells as well as reliable coupling solutions for almost any type of spectrometer.

Ask us about the optimal solution for you.



CALILAB / SYSTEM CALILAB

Fiberoptic Transmission-Flow Cells
with the Superior Optic Material – Sapphire



CALILAB transmission-flow cells are remarkable for their robust design and unmatched selection of materials for all wetted parts. They come standard with double coating for thermostatzation, and can also be equipped with up to four optical connectors. With the optic material Sapphire, CALILAB transmission cells are practically abrasion- and corrosion free, and thus stable in processes in which concentrated, strong acids and bases are used. Moreover, the probes will not be damaged by spikes in temperature or pressure.

Based on CALILAB, we now offer SYSTEM CALILAB. SYSTEM CALILAB is the ideal start kit for method development and calibration in the laboratory – particularly when evaluating the effect of temperature influences.

CALILAB – the Clear Advantages at a Glance

- Abrasion- and corrosion free Sapphire optic
- Chemical resistance
- Reliable calibration transfer
- Range of applications from UV to NIR
- Wide variety of models and customized designs
- Compatible with all types of spectrometers
- Complete range of accessories



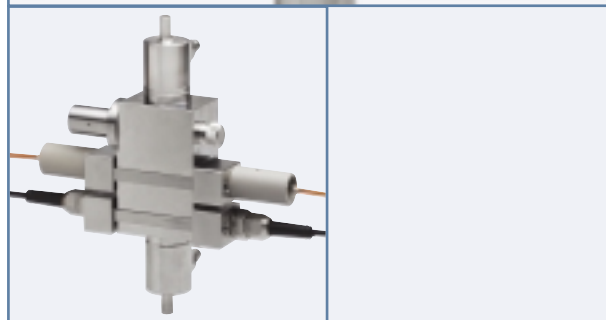
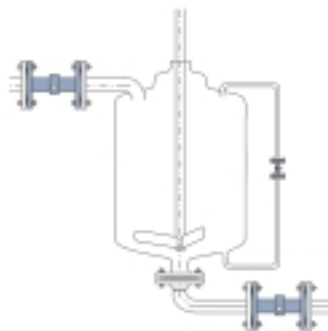
CALILAB / SYSTEM CALILAB Meet the Highest Demands in Process Analysis Technology

Applications

Determination of single parameters or multicomponent analysis in liquids.

Standard Procedures

- Method development for multicomponent analysis in transparent liquids
- Laboratory calibration for multicomponent analysis
- Determination of temperature influences on calibrations



Specifications

Optic

Optical path length (OPL) 1, 2, 3, 4, 5 or 10 mm

Probe Design

Dimensions W×H×D 120×40×35 mm

Standard material Stainless steel DIN 1.4435/316L, Sapphire

Process connectors Screw fittings (Swagelok) for pipe diameters from 6 to 12 mm (1/4" to 1/2")
Additional connectors upon request

Process Conditions

Temperature Maximum 280°C (continuous use)

Pressure 0–40 bar

Options

Alternative materials Stainless steel DIN 1.4571/SS316Ti, titanium and hastelloy

Other Additional designs, dimensions and specifications upon request

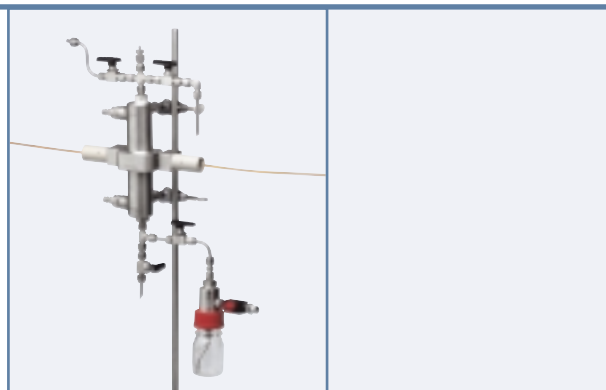
Declaration of Conformity

Certified in accordance with Pressure Equipment Directive 97/23/EC

Total Service – from Flow Cells to a Complete Range of Accessories

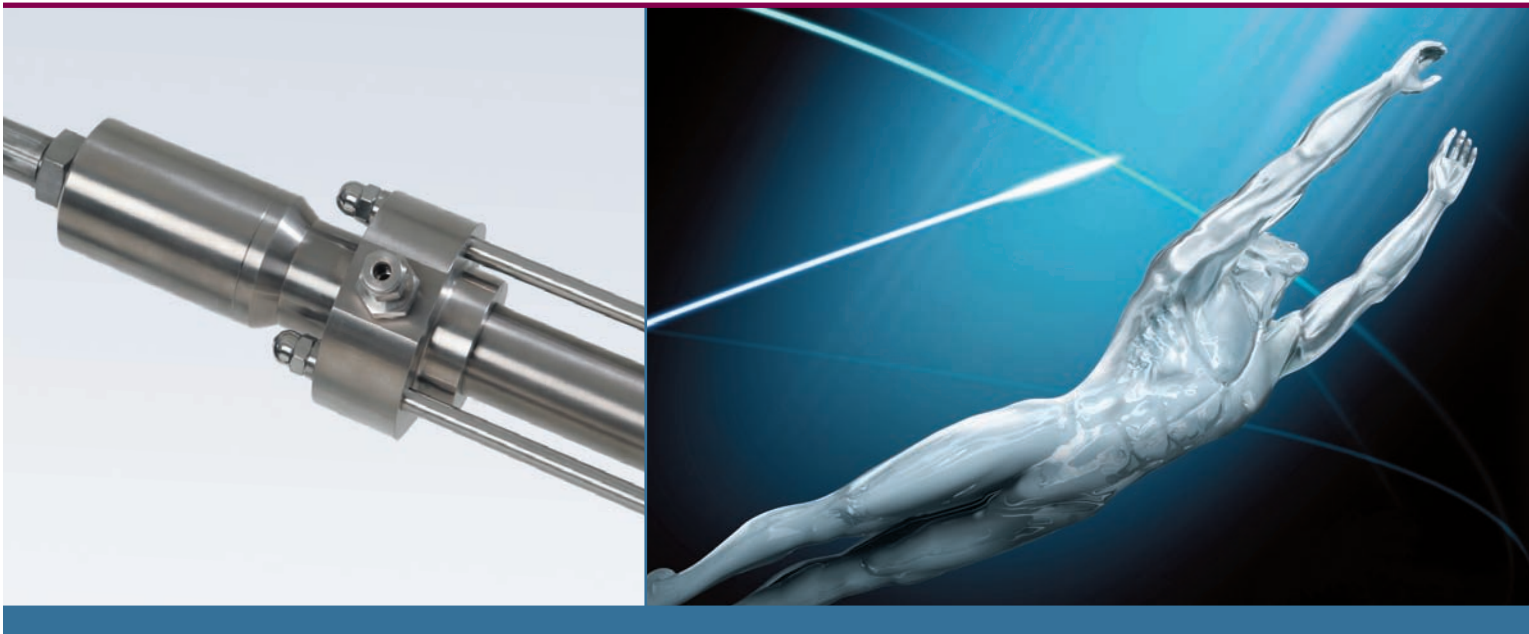
We offer much more than just fiberoptic flow cells. Our comprehensive accessory program includes everything you need for implementing our cells as well as reliable coupling solutions for almost any type of spectrometer.

Ask us about the optimal solution for you.



EXPANDO

Fiberoptic Transmission Flow Cells with the Superior Optic Material – Sapphire



EXPANDO transmission flow cells are remarkable for their robust design and unmatched selection of materials for all wetted surfaces. With the optic material sapphire, EXPANDO transmission flow cells are practically abrasion- and corrosion free, and thus stable in concentrated, strong acids and bases. Moreover, the probes will not be damaged by spikes in temperature or pressure.

EXPANDO transmission flow cells are ideally used where large optical path lengths are needed for determining concentration spectrometrically. Areas of application are gas analysis and trace analysis in liquids. EXPANDO transmission flow cells offer a selection of many different materials and process connections and can be flexibly adapted to individual requirements.

EXPANDO – the Clear Advantages at a Glance



- Abrasion- and corrosion-free sapphire optics
- Chemical resistance
- Verifiable process capability
- Range of applications from UV to NIR
- Compatible with all types of spectrometers
- Wide variety of models and customized designs
- Complete range of accessories and spectrometers

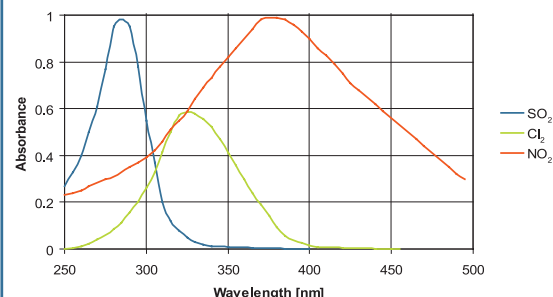
EXPANDO Meets the Highest Demands in Process Analysis Technology

Applications

Determination of single parameters or multicomponent analysis in liquids or gases.

Standard Procedures

- Measurement of UV-VIS-absorbing gases such as F_2 , Cl_2 , Br_2 , I_2 , NO_x , SO_2 , ozone and Hg
- Measurement of UV-VIS-absorbing substances in the gas phase such as benzene, chlorobenzene, phosgene and many others
- Cleaning Validation programs for API productions
- Determination of concentrations down to the sub-ppm range



Specifications

Optic

Optical path length (OPL) 100, 250, 500, 1000 mm

Process Conditions

Temperature - 10 / 130°C

Pressure up to 16 bar

Declaration of Conformity

Certified in accordance with Equipment Directive 97/23/EC

Probe Design

Standard materials

Stainless steel DIN 1.4435/316L, sapphire

Process connectors

Screw fittings such as Swagelok 1/4", further connectors upon request

Options

Heating jacket

to be used for different heat carriers

Alternative materials

Stainless steel DIN 1.4571/SS316Ti, titanium, hastelloy, monel etc.

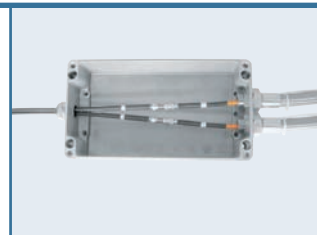
Other

Additional designs, dimensions and specifications upon request

Total Service – from Flow Cells to a Complete Range of Accessories

We offer much more than just fiberoptic flow cells. Our comprehensive accessory program includes everything you need for implementing our cells as well as reliable coupling solutions for almost any type of spectrometer.

Ask us about the optimal solution for you.

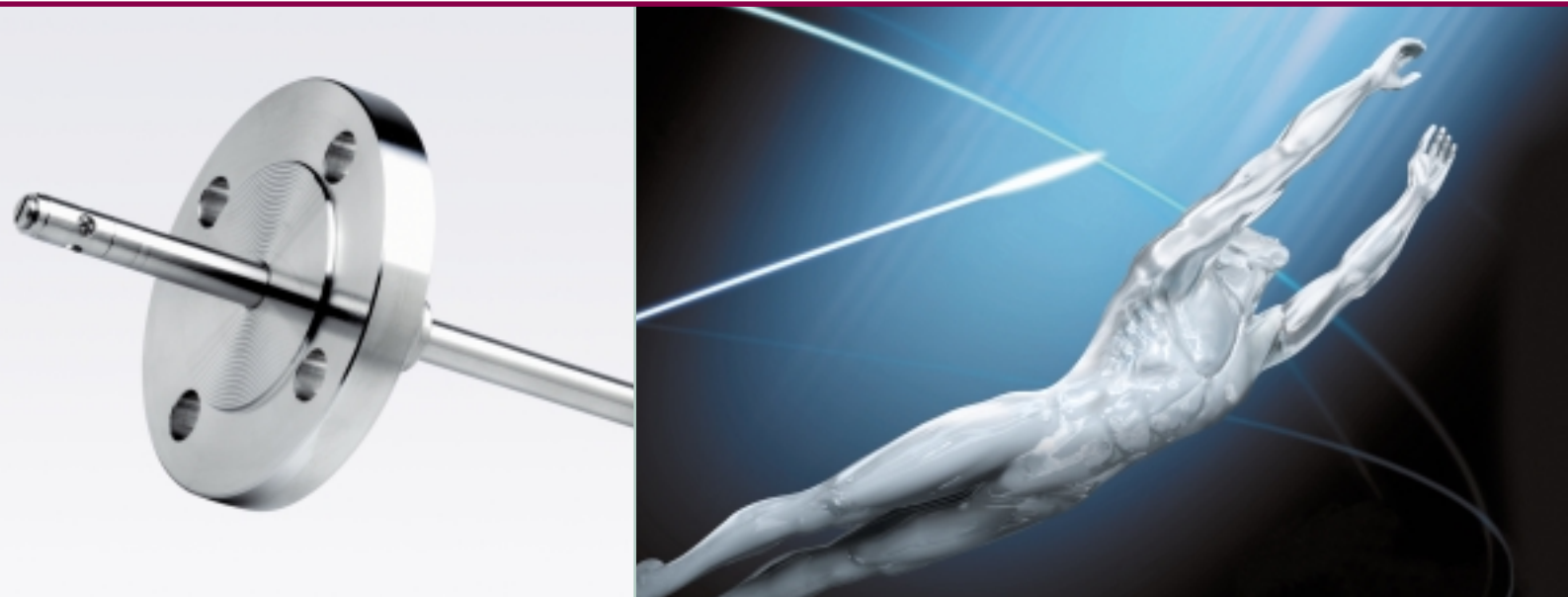


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FLEX

Fiberoptic Transflection-Immersion Probes with the Superior Optic Material – Sapphire



FLEX transflection-immersion probes are remarkable for their robust design and unmatched selection of materials for all submersible components. With the optic material Sapphire, FLEX transflection probes are practically abrasion- and corrosion free, and thus stable in concentrated, strong acids and bases. Moreover, the probes will not be damaged by spikes in temperature or pressure.

All FLEX probes feature an infinitely adjustable optical path length ranging from 0.2 to 10 mm, which provides maximum flexibility. This optical path length is easily and quickly adjustable, to rapidly respond to changing concentration conditions. The probe's casing is the standard material hastelloy C22, which is resistant to highly corrosive materials even at elevated temperatures.

FLEX – the Clear Advantages at a Glance

- Abrasions and corrosion free Sapphire optic
- Chemical resistance
- Verifiable process capability
- Range of application from UV to NIR
- Wide variety of models and customized designs
- Compatible with all types of spectrometers
- Complete range of accessories



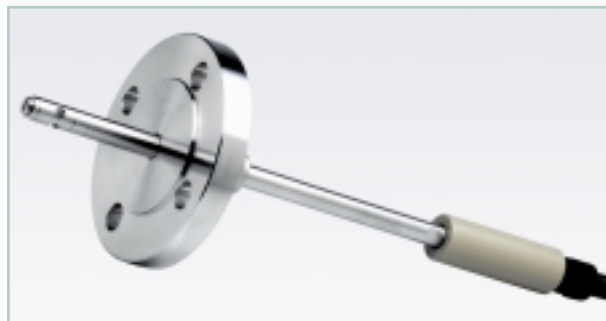
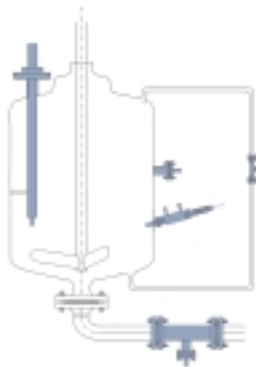
FLEX Meets the Highest Demands in Process Analysis Technology

Applications

Determination of single parameters or multicomponent analysis in clear liquids, suspensions or emulsions.

Standard Procedures

- Color number determination according to APHA, Hazen, Lovibond and Sayboldt
- Reaction monitoring in chemical synthesis from the UV to NIR range
- Control of membrane separation or process chromatography
- Concentration development monitoring in biotechnological fermentation processes



Specifications

Optic

Optical path length (OPL) Infinitely variable from 0.2 to 10 mm

Probe Design

Dimensions Diameters 6 and 12 mm

Standard materials Hastelloy C22, Sapphire

Process connectors DIN- or ANSI flanges
Screw fittings (Swagelok)
Additional connectors upon request

Process Conditions

Temperature Maximum 280°C (continuous use)

Pressure 0 – 40 bar

Options

Alternative materials Stainless steel DIN 1.4571/SS316Ti,
Stainless steel DIN 1.4435/316L,
titanium and quartz

Other Additional designs, dimensions
and specifications upon request

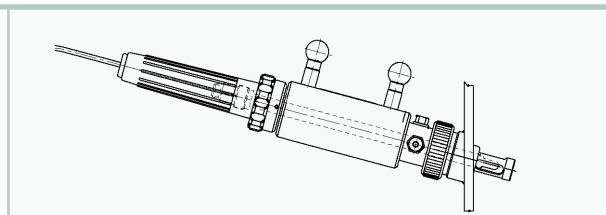
Declaration of Conformity

Certified in accordance with Pressure Equipment Directive 97/23/EC

Total Service – from Probes to a Complete Range of Accessories

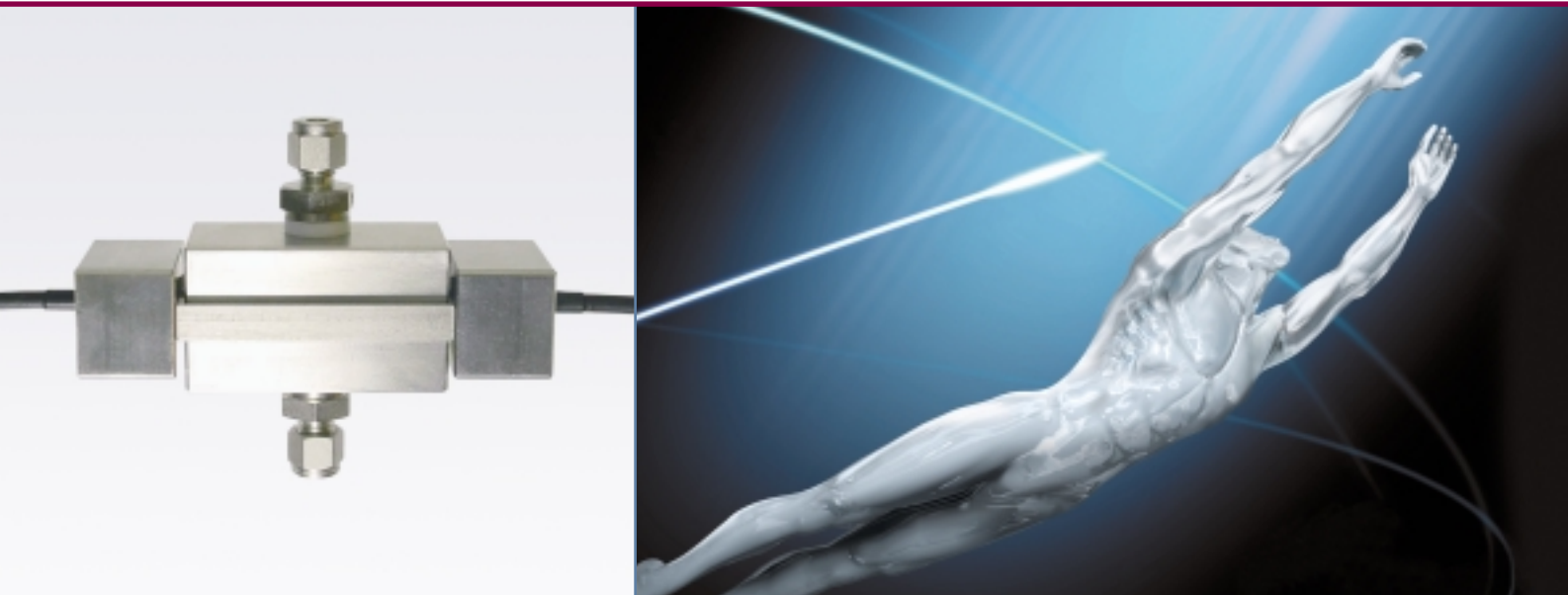
We offer much more than just fiberoptic probes. Our comprehensive accessory program includes everything you need for implementing our probes as well as reliable coupling solutions for almost any type of spectrometer.

Ask us about the optimal solution for you.



MINIPLANT

Fiberoptic Transmission-Flow Cells with the Superior Optic Material – Sapphire



MINIPLANT transmission-flow cells are remarkable for their robust design and unmatched selection of materials for all wetted parts. With the optic material Sapphire, MINIPLANT-transmission cells are practically abrasion- and corrosion free, and thus stable in applications in which concentrated, strong acids and bases are used. Moreover, the probes will not be damaged by spikes in temperature or pressure.

MINIPLANT transmission-flow cells are specifically designed for small diameters and small sample streams and fit directly into bypass- or sampling lines. The cells are manufactured in accordance with your selection from a wide range of materials, process connectors, diameters, pressure levels and temperature ranges or can be further customized to meet your individual needs.

MINIPLANT – the Clear Advantages at a Glance

- Abrasion- and corrosion free Sapphire optic
- Chemical resistance
- Verifiable process capability
- Range of application from UV to NIR
- Wide variety of models and customized designs
- Compatible with all types of spectrometers
- Complete range of accessories



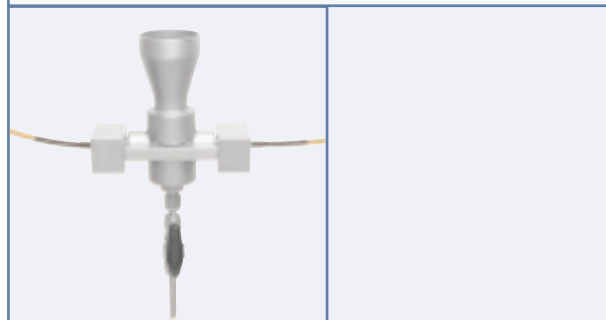
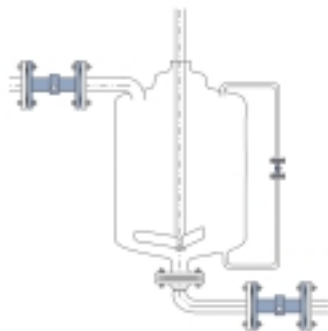
MINIPLANT Meets the Highest Demands in Process Analysis Technology

Applications

Determination of single parameters or multicomponent analysis in solutions or gases.

Standard Procedures

- Color number determination according to APHA, Hazen, Lovibond, EBC and Sayboldt
- Measurement of UV-VIS absorbing gases such as F₂, Cl₂, Br₂, I₂, NO_x, SO₂, Ozone and Hg
- Reaction monitoring in chemical synthesis from the UV to NIR range
- Control of membrane separation or process chromatography
- Solvent blending



Specifications

Optic

Optical path length (OPL) 1, 2, 3, 4, 5 or 10 mm

Probe Design

Dimensions W×H×D 120×40×35 mm

Standard materials Stainless steel DIN 1.4435/316L, Sapphire

Process connectors Screw fittings (Swagelok) for pipe diameters from 6 to 12mm (1/4" to 1/2")
Additional connectors upon request

Process Conditions

Temperature Maximum 280°C (continuous use)

Pressure 0–100 bar

Options

Alternative materials Stainless steel DIN 1.4571/SS316Ti, titanium, hastelloy and PTFE

Other Additional designs, dimensions and specifications upon request

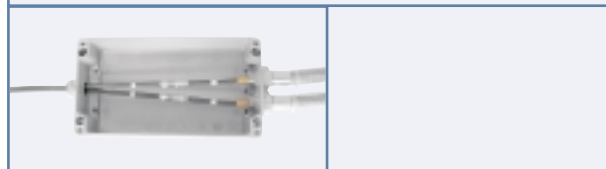
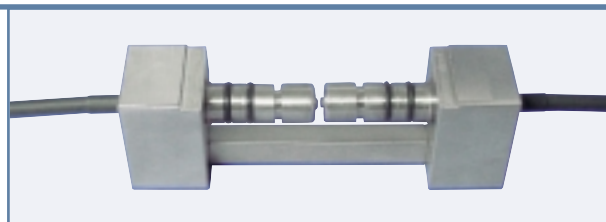
Declaration of Conformity

Certified in accordance with Pressure Equipment Directive 97/23/EC

Total Service – from Flow Cells to a Complete Range of Accessories

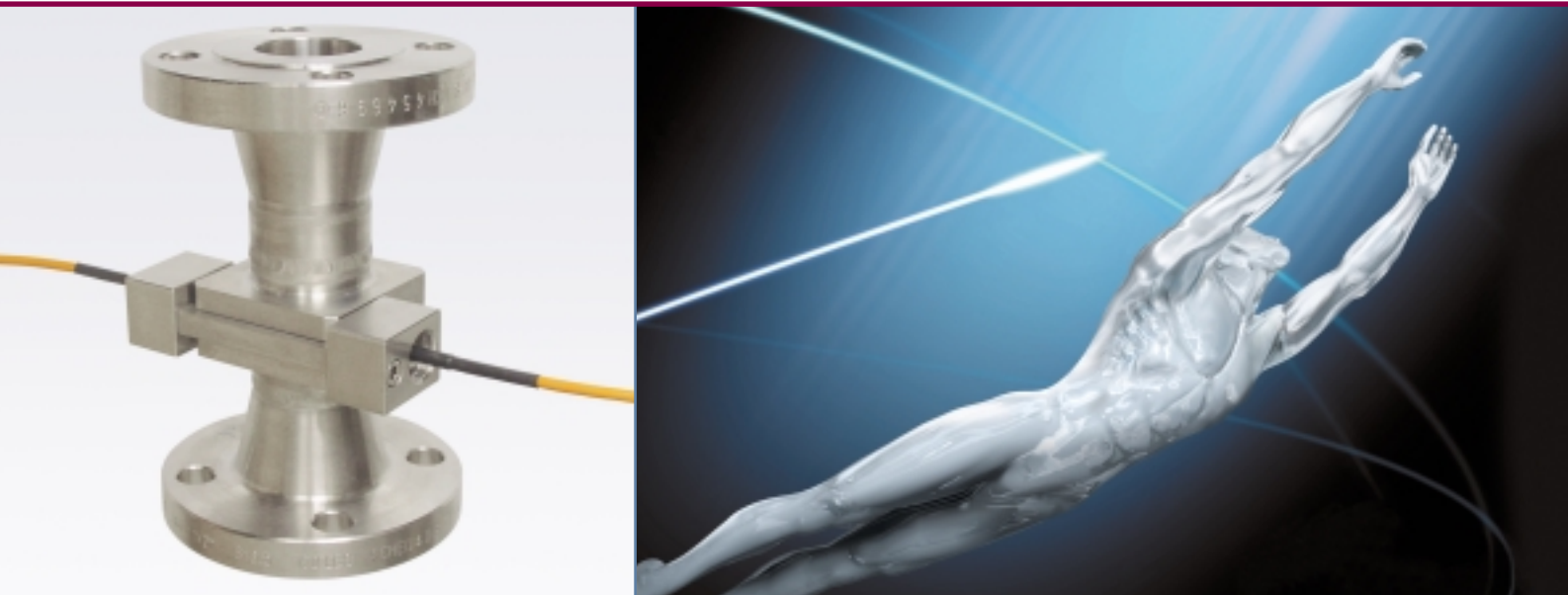
We offer much more than just fiberoptic flow cells. Our comprehensive accessory program includes everything you need for implementing our cells as well as reliable coupling solutions for almost any type of spectrometer.

Ask us about the optimal solution for you.



MONITOR

Fiberoptic Transmission-Flow Cells with the Superior Optic Material – Sapphire



MONITOR transmission-flow cells are remarkable for their robust design and unmatched selection of materials for all wetted parts. With the optic material Sapphire, MONITOR transmission cells are practically abrasion- and corrosion free, and thus stable in applications in which strong acids and bases are used. Moreover, the probes will not be damaged by spikes in temperature or pressure.

The MONITOR cells are the basis of all our transmission-flow cells. They are designed for direct installation into pipes. The transmission-flow cells are manufactured in accordance with your selection from a wide range of materials, process connectors, pressure levels, diameters and temperature ranges. All varieties are also available with double coating for thermostatzation. MONITOR transmission cells can also be further customized to meet your individual needs.

MONITOR – the Clear Advantages at a Glance

- Abrasion- and corrosion free Sapphire optic
- Chemical resistance
- Verifiable process capability
- Range of applications from UV to NIR
- Wide variety of models and customized designs
- Compatible with all types of spectrometers
- Complete range of accessories



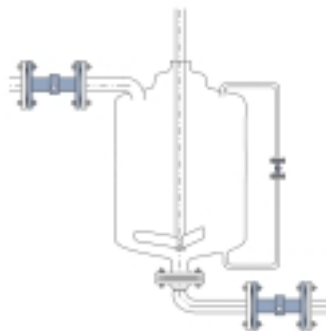
MONITOR Meets the Highest Demands in Process Analysis Technology

Applications

Determination of single parameters or multicomponent analysis in solutions or gases.

Standard Procedures

- Color number determination according to APHA, Hazen, Lovibond and Sayboldt
- Measurement of UV-VIS absorbing gases such as F₂, Cl₂, Br₂, I₂, NO_x, SO₂, Ozone and Hg
- Reaction monitoring in chemical synthesis from the UV to NIR range
- Control of membrane separation or process chromatography
- Solvent blending



Specifications

Optic

Optical path length (OPL) 1, 2, 3, 4, 5, 10 or 20 mm

Probe Design

Dimensions starting DN 25 resp. 1"
 Standard materials Stainless steel DIN 1.4435/316L, Sapphire
 Process connectors DIN- or ANSI flanges
 Additional connectors upon request

Process Conditions

Temperature Maximum 280°C (continuous use)
 Pressure 0–100 bar

Options

Alternative materials Stainless steel DIN 1.4571/SS316Ti, titanium, hastelloy, PVDF, PP and PTFE
 Other Additional designs, dimensions and specifications upon request

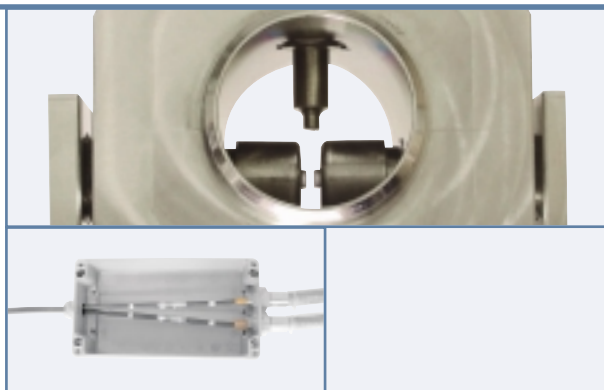
Declaration of Conformity

Certified in accordance with Pressure Equipment Directive 97/23/EC

Total Service – from Flow Cells to a Complete Range of Accessories

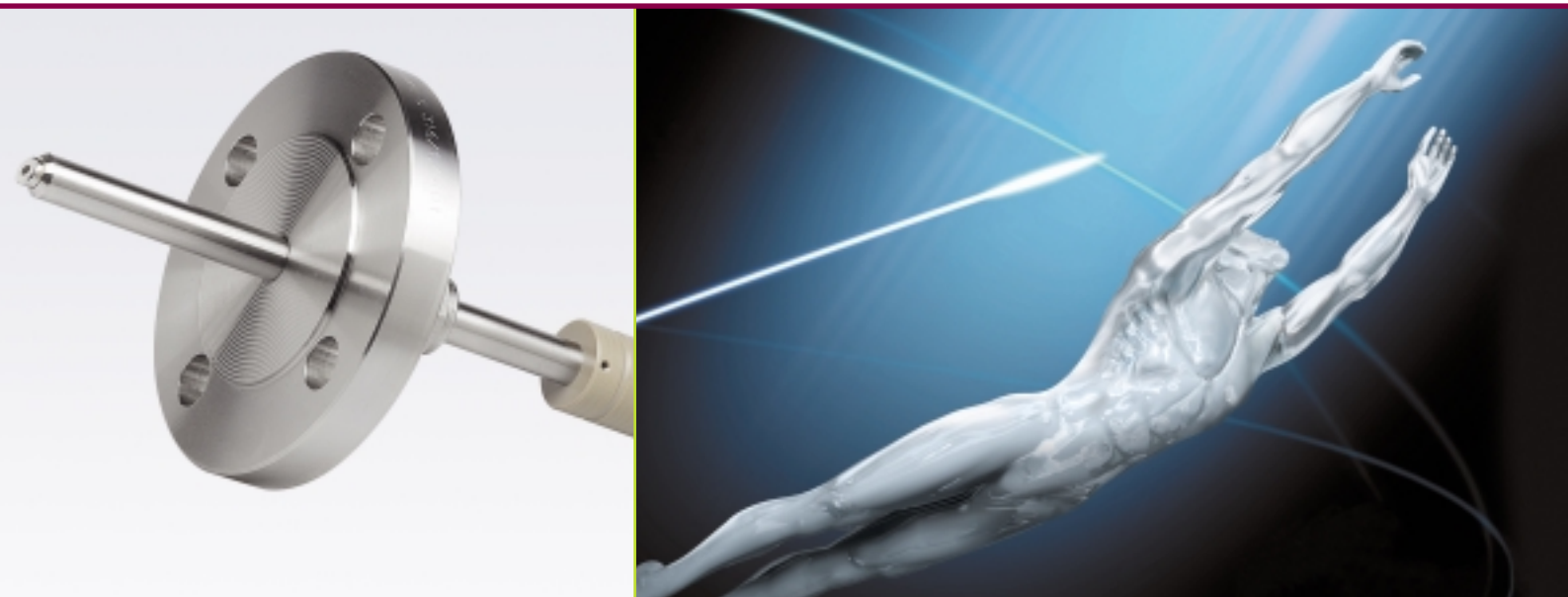
We offer much more than just fiberoptic flow cells. Our comprehensive accessory program includes everything you need for implementing our cells as well as reliable coupling solutions for almost any type of spectrometer.

Ask us about the optimal solution for you.



REFLECTOR

Fiberoptic Reflection-Immersion Probes with the Superior Optic Material – Sapphire



REFLECTOR immersion probes are remarkable for their robust design and unmatched selection of materials for all submersible components. With the optic material Sapphire, REFLECTOR immersion probes are practically abrasion- and corrosion free, and thus stable in concentrated, strong acids and bases. Moreover, the probes will not be damaged by spikes in temperature or pressure.

REFLECTOR probes are distinguished by their remarkable signal-to-noise ratio. The probe's special construction allows for quantitative measurement in weak to extremely strong light-scattering substances. REFLECTOR probes are manufactured for direct immersion into containers, dryers or mixers. The probes are manufactured in accordance with your selection from a wide range of materials, process connectors, diameters, pressure- and temperature ranges or can be further customized to meet your individual needs.

REFLECTOR – the Clear Advantages at a Glance

- Abrasions and corrosion free Sapphire optic
- Chemical resistance
- Verifiable process capability
- Range of application from UV to NIR
- Wide variety of models and customized designs
- Compatible with all spectrometers
- Complete range of accessories



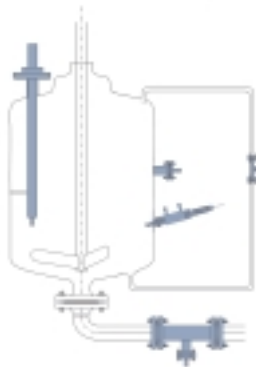
REFLECTOR Meets the Highest Demands in Process Analysis Technology

Applications

Multicomponent analysis in heterogeneous systems and non invasive analysis of solids for identification and characterization.

Standard Procedures

- Reaction monitoring in heterogeneous systems in the NIR range
- Analysis of solids compositions directly in mixers
- Determination of residual solvents concentrations on solids directly in driers
- Non invasive determination of residual solvents- or water concentrations on lyophilisates directly in vials



Specifications

Optic

Illuminated spot Ø 3 mm

Probe Design

Dimensions Diameter 12 mm
Immersion depth from 100 mm

Standard materials Stainless steel DIN 1.4435/316L,
Sapphire

Process connectors DIN- or ANSI flanges
Screw fittings (Swagelok)
Additional connectors upon request

Process Conditions

Temperature Maximum 260°C (continuous use)

Pressure 0 – 40 bar

Options

Alternative materials Stainless steel DIN 1.4571/SS316Ti,
titanium and hastelloy

Other Additional designs, dimensions
and specifications upon request

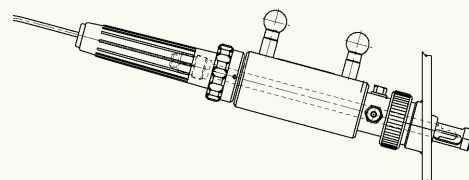
Declaration of Conformity

Certified in accordance with Pressure Equipment Directive 97/23/EC

Total Service – from Probes to a Complete Range of Accessories

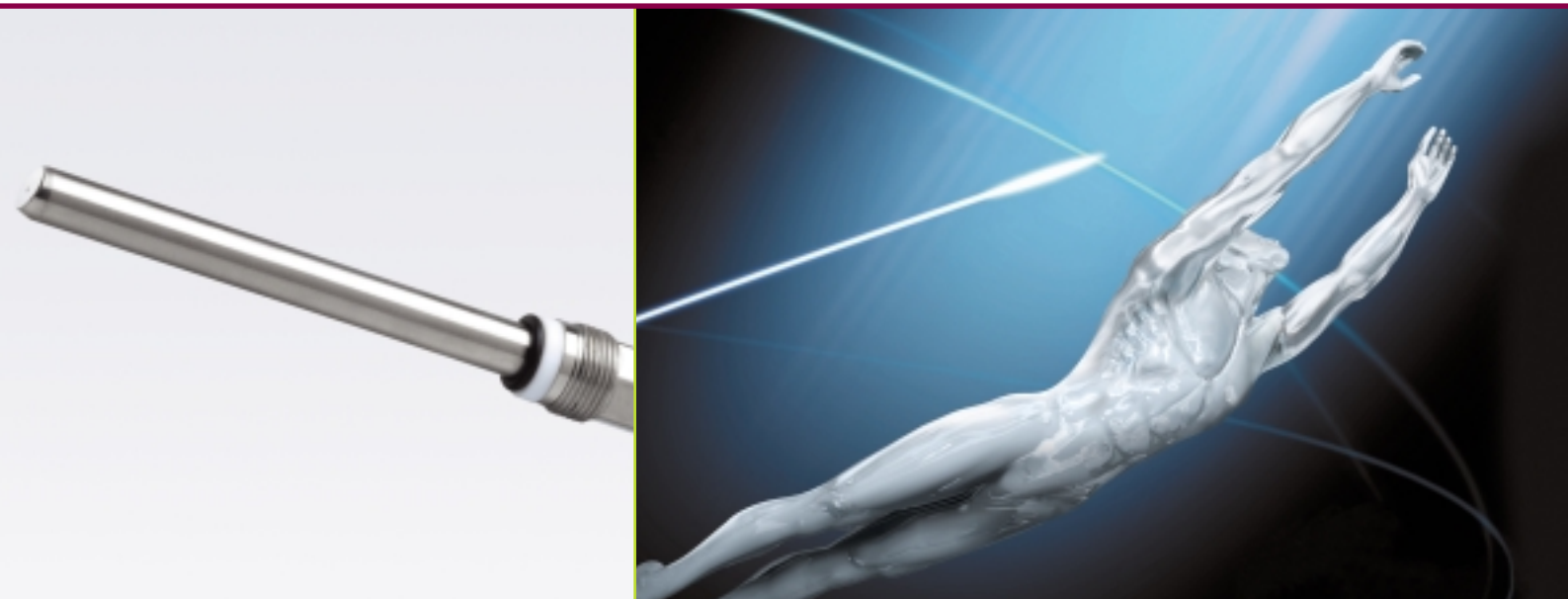
We offer much more than just fiberoptic probes. Our comprehensive accessory program includes everything you need for implementing our probes as well as reliable coupling solutions for almost any type of spectrometer.

Ask us about the optimal solution for you.



TURBIDO

Fiberoptic Reflection-Immersion Probes with the Superior Optic Material – Sapphire



TURBIDO reflection-immersion probes are remarkable for their robust design and unmatched selection of materials for all submersible components. With the optic material Sapphire, TURBIDO probes are practically abrasion- and corrosion free, and thus stable in concentrated, strong acids and bases. Moreover, the probes will not be damaged by spikes in temperature or pressure.

TURBIDO reflection-immersion probes can be used for the simple measurement of turbidity in liquids as well as for the identification of solids. All TURBIDO probes are designed for direct immersion into containers and pipes. The probes are manufactured in accordance with your selection from a wide range of materials, process connectors, diameters, pressure- and temperature ranges or can be further customized to meet your individual needs.

TURBIDO – the Clear Advantages at a Glance

- Abrasions and corrosion free Sapphire optic
- Chemical resistance
- Verifiable process capability
- Range of application from UV to NIR
- Wide variety of models and customized designs
- Compatible with all spectrometers
- Complete range of accessories



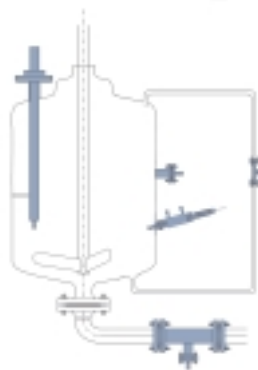
TURBIDO Meets the Highest Demands in Process Analysis Technology

Applications

From simple measurement of turbidity with the Mettler-Toledo fiberoptic turbidimeters to identification and characterization of solids.

Standard Procedures

- Reaction monitoring in heterogeneous systems in the NIR range
- Analysis of solids compositions directly in mixers
- Determination of residual solvents concentrations on solids directly in driers



Specifications

Optic

Illuminated spot Ø 1 mm

Probe Design

Dimensions Diameter 12 mm
Immersion depth from 100 mm

Standard materials Stainless steel DIN 1.4435/316L,
Sapphire

Process connectors DIN- or ANSI flanges
Screw fittings (Swagelok)
PG 13.5
Additional connectors upon request

Process Conditions

Temperature Maximum 280°C (continuous use)

Pressure 0–100 bar

Options

Alternative materials Stainless steel DIN 1.4571/SS316Ti,
titanium, hastelloy, PVDF, PP and PTFE

Other Additional designs, dimensions
and specifications upon request

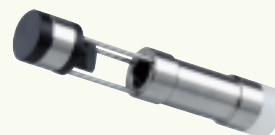
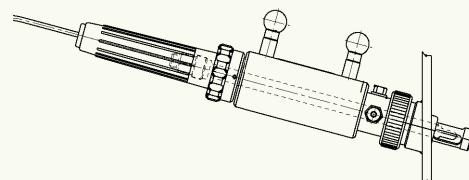
Declaration of Conformity

Certified in accordance with Pressure Equipment Directive 97/23/EC

Total Service – from Probes to a Complete Range of Accessories

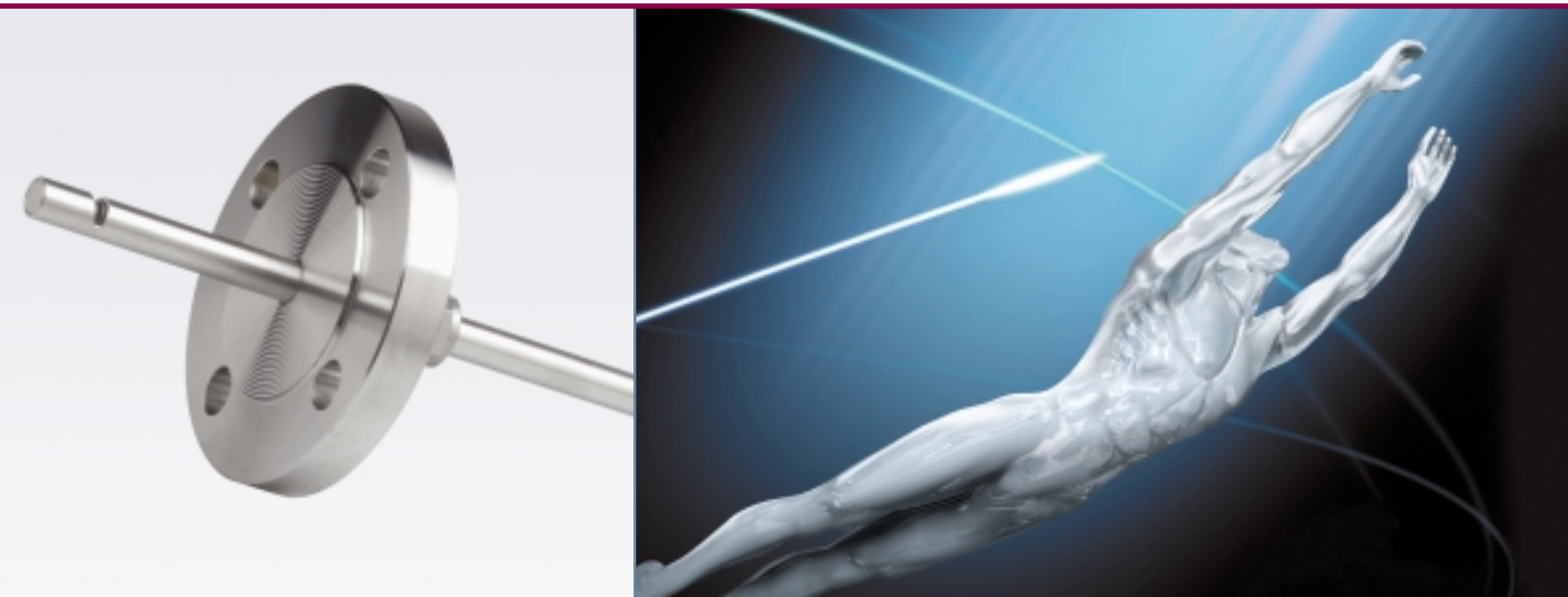
We offer much more than just fiberoptic probes. Our comprehensive accessory program includes everything you need for implementing our probes as well as reliable coupling solutions for almost any type of spectrometer.

Ask us about the optimal solution for you.



ZAFIRO

Fiberoptic Transmission-Immersion Probes with the Superior Optic Material – Sapphire



ZAFIRO transmission-immersion probes are remarkable for their robust design and unmatched selection of materials for all submersible components. With the optic material Sapphire, ZAFIRO transmission probes are practically abrasion- and corrosion free, and thus stable in concentrated, strong acids and bases. Moreover, the probes will not be damaged by spikes in temperature or pressure.

ZAFIRO probes are designed for direct immersion into containers, reactors and pipes. The Sapphire optic core is standard with optical path length of 1, 2, 5 or 10 mm. The probes' diameters are 12 and 18 mm, ideally sized for easy integration into standard retractable probe housings. ZAFIRO probes can also be further customized to meet your individual needs.

ZAFIRO – the Clear Advantages at a Glance

- Abrasion- and corrosion free Sapphire optic
- Chemical resistance
- Verifiable process capability
- Range of applications from UV to NIR
- Wide variety of models and customized designs
- Compatible with all types of spectrometers
- Complete range of accessories



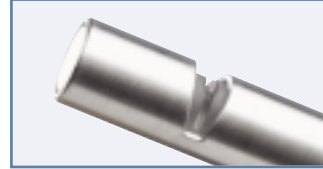
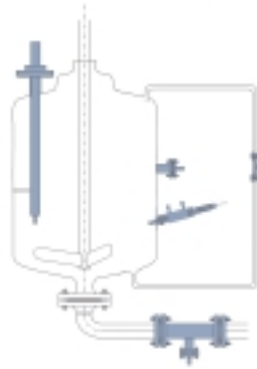
ZAFIRO Meets the Highest Demands in Process Analysis Technology

Applications

Determination of single parameters or multicomponent analysis in solutions or gases.

Standard Procedures

- Color number determination according to APHA, Hazen, Lovibond and Sayboldt
- Measurement of UV-VIS absorbing gases such as F₂, Cl₂, Br₂, I₂, NO_x, SO₂, Ozone and Hg
- Reaction monitoring in chemical synthesis from the UV to NIR range
- Control of membrane separation or process chromatography
- Solvent blending



Specifications

Optic

Optical path length (OPL) 1, 2, 5 or 10 mm

Probe Design

Dimensions Diameters 12 or 18 mm
Immersion depth from 100 mm

Standard materials Stainless steel DIN 1.4435/SS316L,
Sapphire

Process connectors DIN- or ANSI flanges
Screw fittings (Swagelok)
Tri-Clamp (ISO 2852-1974, 7.1)
Sanitary thread SC (DIN 11851)
Additional connectors upon request

Process Conditions

Temperature Maximum 275°C (continuous use)

Pressure 0–40 bar

Options

Alternative materials Stainless steel DIN 1.4571/SS316Ti,
titanium, hastelloy and PTFE

Other Additional designs, dimensions
and specifications upon request

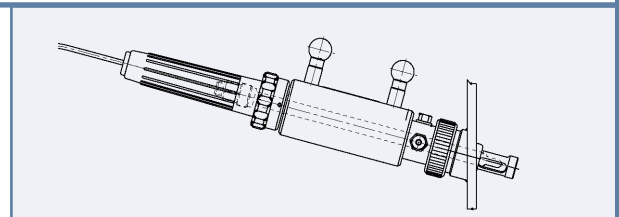
Declaration of Conformity

Certified in accordance with Pressure Equipment Directive 97/23/EC

Total Service – from Probes to a Complete Range of Accessories

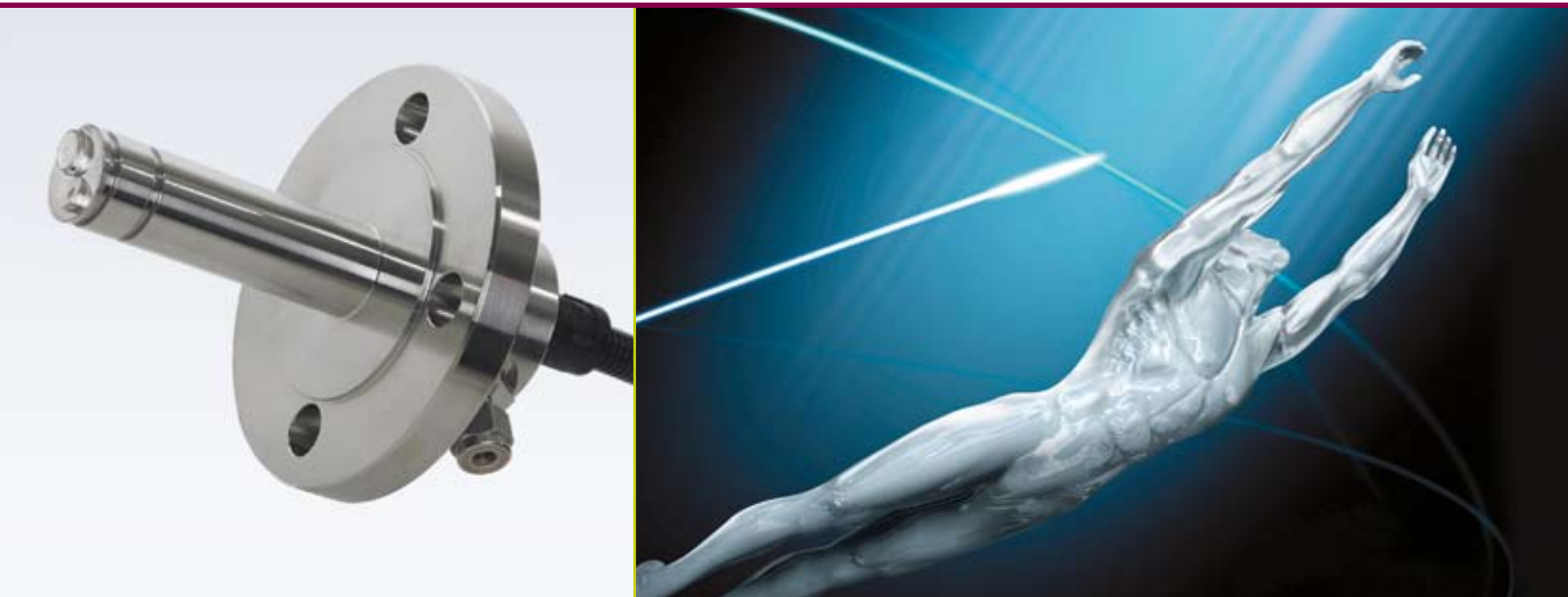
We offer much more than just fiberoptic probes. Our comprehensive accessory program includes everything you need for implementing our probes as well as reliable coupling solutions for almost any type of spectrometer.

Ask us about the optimal solution for you.



REFLECTOR FLUSH

Fiberoptic Reflection-Immersion Probes with Built-in Window Rinsing



REFLECTOR FLUSH immersion probes are equipped with a rinsing nozzle that enables cleaning of the optical Sapphire window (with gas or liquid) without removing the probe. With the optic material Sapphire, REFLECTOR FLUSH immersion probes are practically abrasion- and corrosion-free, and thus stable in concentrated strong acids and bases.

REFLECTOR FLUSH immersion probes are also distinguished by their exceptional signal-to-noise ratio. The special construction of the probe allows for quantitative measurement in weak extremely strong light-scattering substances. REFLECTOR FLUSH probes are manufactured for direct immersion into containers, dryers, or mixers. The probes are produced according to your selection from a wide range of materials, process connectors, diameters, pressure and temperature ranges and can be completely customized to meet your individual needs.

REFLECTOR FLUSH – the Clear Advantages at a Glance

- Window rinsing for cleaning when mounted
- Abrasion- and corrosion-free Sapphire optic
- Chemical resistance
- Verifiable process capability
- Range of application from UV to NIR
- Compatible with all spectrometers
- Wide variety of models and customized designs



REFLECTOR FLUSH Meets the Highest Demands in Process Analysis Technology

Applications

Multicomponent analysis in heterogeneous systems and non-invasive analysis for the identification and characterization of solids

Standard Procedures

- Reaction monitoring in heterogeneous systems in the NIR range
- Solid composition analysis performed directly in mixer
- Determination of residual solvent concentrations in solids performed directly in dryer



Specifications

Optic

Illuminated spot Ø 3 mm

Probe Design

Dimensions Diameter 25 mm
Immersion depth from 100 mm

Standard materials Stainless steel DIN 1.4435/316L,
Sapphire

Process connectors DIN or ANSI flanges
Screw fittings (Swagelok)
Additional connectors upon request

Process Conditions

Temperature Maximum 130°C (continuous use)

Pressure 0 – 6 bar

Options

Alternative materials Stainless steel DIN 1.4571/SS316Ti,
titanium and hastelloy C22

Other Additional designs, dimensions
and specifications upon request

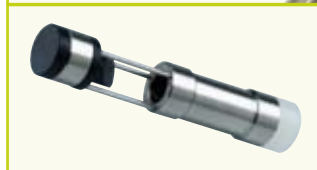
Declaration of Conformity

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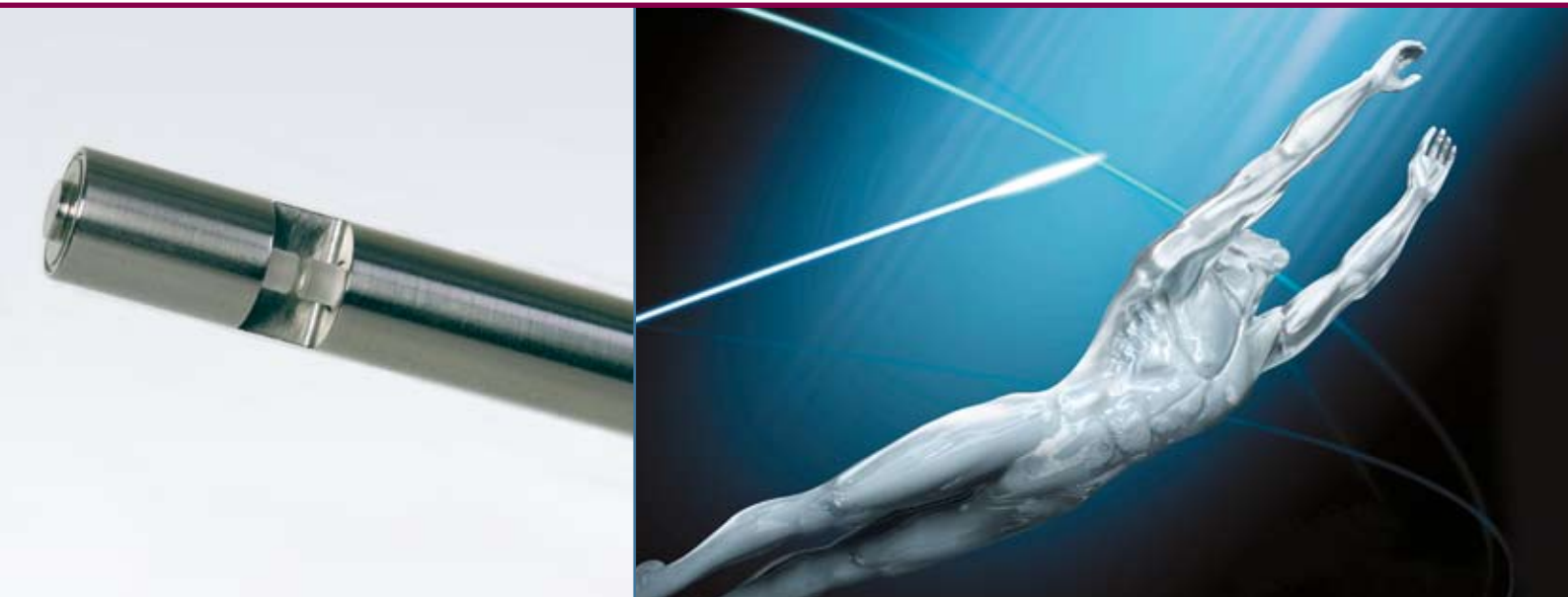
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Ask us about the optimal solution for you.



ZAFIRO BIOFIT

Fiberoptic Transmission Immersion Probes
with the Superior Optic Material – Sapphire



ZAFIRO BIOFIT Immersion Probes are remarkable for their robust design and unmatched selection of materials for all wetted parts. Their CIP/SIP-compliant design meets the most challenging demands for reliable application in sterile production. Only flawlessly polished metal surfaces come into contact with the product at the probe interface.

ZAFIRO BIOFIT Immersion Probes are the first choice for inline analytical applications in food and biopharmaceutical production. ZAFIRO BIOFIT Probes are designed for direct immersion into reactors and pipes. The Sapphire optic core is standard with optical path length of 1,2,5 or 10 mm. ZAFIRO BIOFIT probes can also be customized to meet your individual needs.

ZAFIRO BIOFIT – the Clear Advantages at a Glance

- Abrasion- and corrosion-free sapphire optics
- Chemical resistance
- Verifiable process capability
- Range of applications from UV to NIR
- Compatible with all types of spectrometers
- Wide variety of models and customized designs
- Complete range of accessories and spectrometers



ZAFIRO BIOFIT Meets the Highest Demands in Process Analysis Technology

Applications

Determination of single parameters or multicomponent analysis in solutions

Standard Procedures

- Control for membrane separation or process chromatography for the production of biopharmaceuticals
- Determination of identity and content for protein fractions
- Cleaning validation programs for API production
- Colometric characterization of liquids in food and beverage production



Specifications

Optic

Optical path length (OPL) 1, 2, 5 to 10 mm

Process Conditions

Temperature Maximum 140 °C (continuous use)

Pressure Up to 40 bar

Declaration of Conformity

Certified in accordance with Equipment Directive 97/23/EG

Probe Design

Dimensions Diameters 18 mm
Immersion depth from 100 mm

Standard materials Stainless steel DIN 1.4435/316L,
sapphire

Surface finish Ra < 0.8 µm

Process connectors DIN- or ANSI flanges
Screw fittings (Swagelok)
Tri-Clamp (ISO 2852-1974, 7.1)
Sanitary thread SC (DIN 11851)

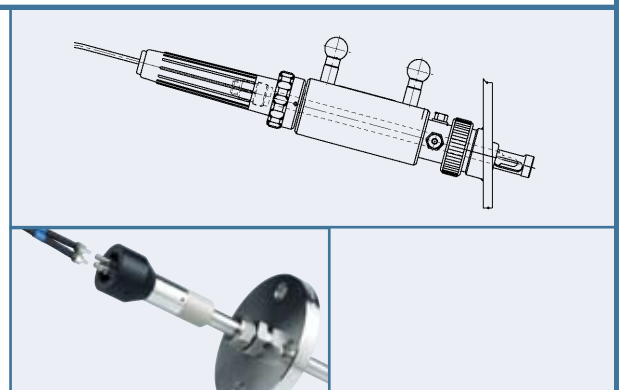
Options

Additional designs, dimensions, and specifications upon request

Total Service – from Probes to a Complete Range of Accessories

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Ask us about the optimal solution for you.



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