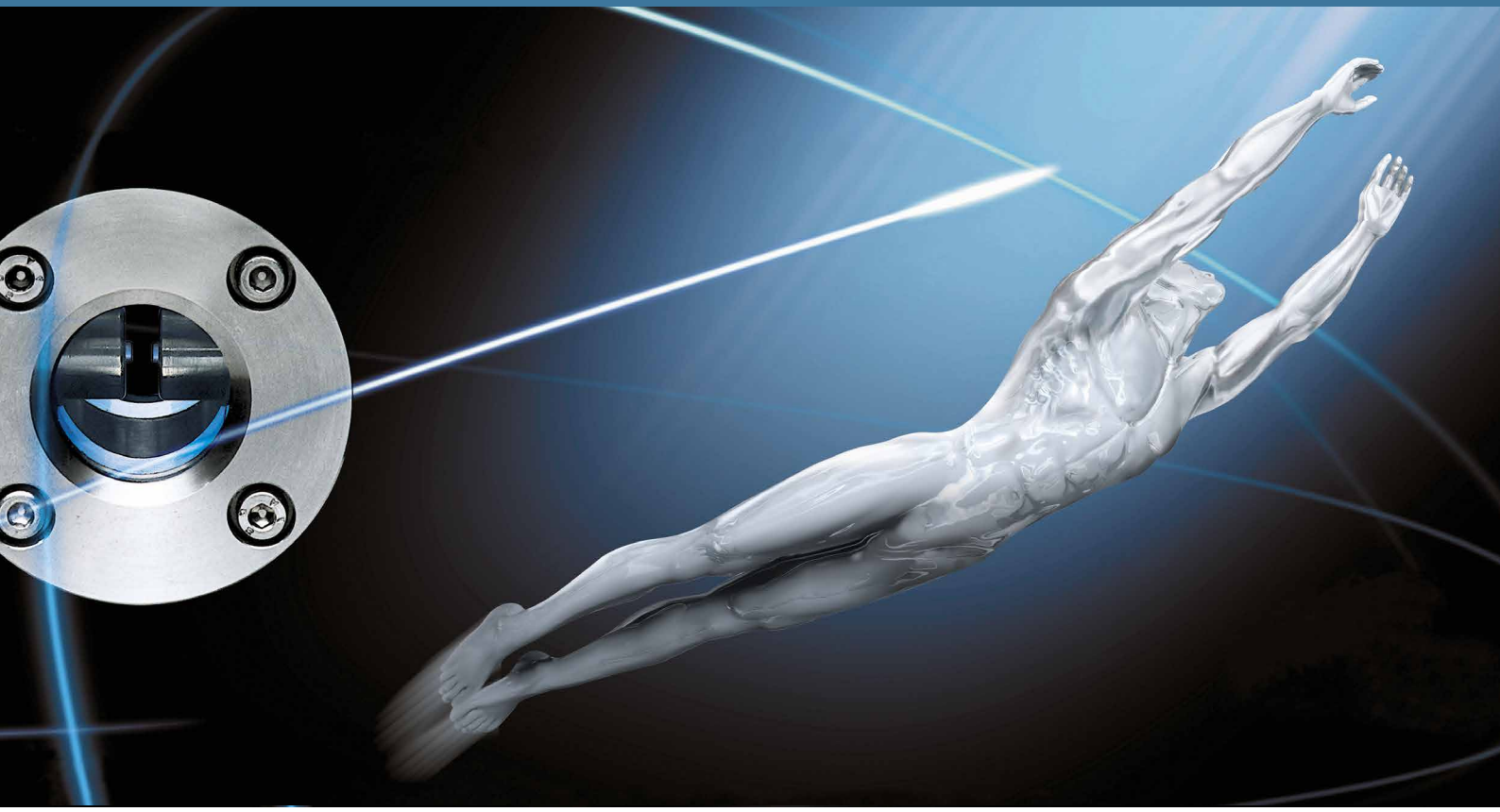
solvias

Process Analytical Technology



Powerful Solutions to Support Your PAT/QbD Strategies

Amazing where you can go

Our (PAT)-Services

Innovative solutions in process analytical technology (PAT) can provide you with a wealth of information that can give you more accurate information throughout the manufacturing process and help you improve your quality control.

Pharmaceuticals

Monitoring of Continuous Processes

Monitoring of Production

Chemicals

Process Analytical Technology

Batch Reaction Monitoring

Multicomponent Analysis

End-point Determination of Reactions

Food & Beverage

Oil

Computer System Validations

Detection of Hazardous Substances

Monitoring of Pharmaceutical Unit Operations

Monitoring of Crystallization

Dissolution Testing

Chemical Hazards Monitoring

Ambient Air Monitoring

Dissolution Screening

Fiberoptic Probes

For more than 30 years Solvias offers a wide variety of probes that operate in transmission, transflection, reflection and ATR equipment for online analysis of liquids, gases and solids.

Our extremely robust fiberoptic probes est highest standards of performance in NIR, Raman and UV-VIS spectroscopy.

In addition to our wide range of standard and customized products, we also work closely with our customers to develop specialized immersion probes or flow cells, such as those designed for use in high-pressure and high-temperature applications or in highly corrosive environments. For the probe's exterior, we offer a wide choice of materials like stainless steel, Hastelloy, titanium and PTFE.

- Abrasion- and corrosion-free sapphire optics
- 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
- Custom-designed probes

The Right Probe for Your Application

Measuring Principle	Fiberoptic Probes	Liquids/Suspensions/Emulsions				Solids		Gas
		Clear	Slightly turbit	Turbit	Highly turbit	Powders/ Granules	Lumps	
Transmission	ARGUS	●	●					○
	BIOPRO	●	●					
	CALILAB	●	●					
	EXPANDO							●
	MINIPLANT	●	●					○
	MONITOR	●	●					○
	ZAFIRO	●	●					
Reflection	ALBEDO			●	●	●		
	POLYPRO			●	●	●		
	REFLECTOR		○	●	●	●	●	
	REFLECTORFLUSH		○	●	●	●		
	TURBIDO		●	●	●	●	●	
ATR	ATTENUTO	●	●	●	●			
Transflection	FLEX	●	●	●				
	POLYPRO	●	●	●				

	Material					Double Jacket Available	Optics	Measurement Range		Sealings		Temperature Range		
	SS316L	SS316Ti	Hastelloy C22	Plastics	Titanium		Sapphire	NIR	UV/VIS	O-Ring	Epoxy	130°C	180°C	280°C
ALBEDO	●	●	●		●		●	●	●	●	●	●	●	
ARGUS	●	●	●		●		●	●	●	●	●	●	●	●
ATTENUTO	●	●	●	●	●		●		●	●	●	●	●	
BIOPRO	●	●	●		●		●	●	●	●	●	●	●	
CALILAB	●	●	●		●	●	●	●	●	●	●	●	●	●
EXPANDO	●	●	●		●	●	●	●	●	●		●	●	●
FLEX	●	●	●		●		●	●	●	●	●	●	●	●
MINIPLANT	●	●	●	●	●		●	●	●	●	●	●	●	●
POLYPRO	●	●	●		●		●	●	●	●				●
MONITOR	●	●	●	●	●	●	●	●	●	●	●	●	●	●
REFLECTOR	●	●	●	●	●		●	●	●	●	●	●	●	
REFLECTORFLUSH	●	●	●		●		●	●	●	●	●	●	●	
TURBIDO	●	●	●	●	●		●	●	●	●	●	●	●	●
ZAFIRO	●	●	●	●	●		●	●	●	●	●	●	●	●

● Standard
● Option
○ Limited
○ Full size sapphire optics

- Measuring the concentration of transparent liquids directly in the pipe
- Solution for method development and calibration in the laboratory
- Enable intermittent analysis
- For direct immersion into containers, reactors and pipes
- Capable for high temperature and high pressure

Transmission

For measuring the concentration of transparent liquids directly in the pipe, we use the MONITOR, ARGUS, MINIPLANT or CALILAB measuring cells (all have patented optics). The optical path length can be varied from 1 to 20 mm with a simple change of the distance bolt.

EXPANDO transmission flow cells are used where large optical path lengths are needed for determining concentration spectrometrically, like gas analysis and trace analysis in liquids. Custom designs, a wide range of highly resistant materials and optical path lengths up to 1,000mm make the EXPANDO flow cells easily adapted to individual requirements.

BIOPRO flow cells are the first choice for inline analytical applications in food and biopharmaceutical production environments. Their CIP-compliant design together with the use of FDA-approved materials for the wetted surfaces make the BIOPRO flow cells the number one choice for installations in sterile production areas.

For extremely rough process conditions special high-temperature and high-pressure versions of our transmission flow cells are available.

Immersion probes

ZAFIRO transmission probes are designed for direct immersion into containers, reactors and pipes. The optical path length varies from 1, 2, 5, 10 to 15 mm. The probe diameters are 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.

- Analysis of heterogeneous systems or solids
- Measuring turbidity
- Identity control of pharmaceutical ingredients
- Direct measurement of tablet-coating processes
- Measuring or characterizing of solids and for suspension or emulsion analysis
- For direct immersion into containers, dryers or mixers

Reflection

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

TURBIDO is our classic two-fiber probe, REFLECTOR and ALBEDO probes are equipped with fiber bundles. 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 optical 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.

Using the integrated remote-control feature of the Solvias REFLECTOR REMOTE probe it is possible to trigger the measurement directly from the sample location, regardless of the location of the spectrometer.

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.

To prevent the optical window of the probe from the risk of window fouling, 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.

- Direct measurement of strongly absorbing solutions
- Real-time and in- situ reaction monitoring
- Sapphire crystal for direct immersion into the sample
- Variable optical path length
- For organic-chemical process development
- Analysis of milk and dairy products

Transflexion/ATR

Transflection

Solvias transflection probes have a multitude of applications in laboratory, development and production environments. To provide the user with highest degree of flexibility, the optical path length can be easily and continuously adjusted between 0 to 10 mm and locked in the desired position.

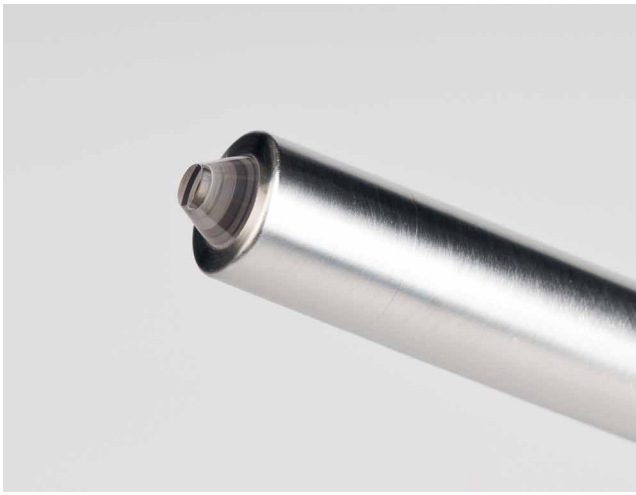
In addition, these probes are resistant to chemicals, corrosion and abrasion, and have the capacity for use in high-pressure and high-temperature conditions.

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 (normally 3 bounces).

With our ATTENUTO laboratory and process probe, the optical path length is reported in the submicrometer range, allowing for the analysis of highly-concentrated solutions while eliminating the cumbersome dilution steps.



Accessories/Specialties

Combine our full range of accessories with our fiberoptic probes to get the right solution for your application.

Our 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.

Specialties

The POLYPRO extruder probes with Dynisco thread are easily inserted in a pressure port in most dies and are designed for high temperatures and pressures. The probes are available as transmission, transflexion and reflection probes to address a wide range of applications.

The full sapphire version of our OPTIC 2000 transmission probe is the first choice for the measurement of aggressive and corrosive liquids, gases and volatile substances.

Chemical Hazards Monitoring

For more safety in the workplace

The SAM GC-600 Chemical Hazards Monitor is a high-performance analyzer that is based on gas chromatography technology. It was developed specifically for continuous chemical hazards monitoring and is used where highly toxic or carcinogenic substances may be present in plant air or in the workplace. Based on its high level of selectivity and sensitivity, as well as its low detection and alarm limits, the SAM GC-600 is a reliable, robust monitor for hazardous-substance exposures in the ppb to ppt range.

How does the monitoring work?

The critical process areas are monitored via 10 separate measurement points. The results are continuously processed by software and displayed. The data are also fed to the process control system via an interface so that we can permanently monitor production. If the limit is exceeded, a light flashes or an acoustic alarm sounds.

GC-600 Chemical Hazards Monitor plays an integral role in the safety concept at numerous chemical and pharmaceutical companies.

This is what our customers say

Easy manageable solution
Providing reliable measurements continuously and quickly
A small and compact device that is easy to install and operate

Early alarm triggering signals exposure to hazardous substances

Highly selective and interference-free measurement

Individual customized method development in the laboratory plus implementation and optimization on site

Wide bandwidth – nearly all substances having a boiling point of <250°C or a vapor pressure of >0.000001 mbar can be analyzed

List of Detectable Substances

Substance	Exposure limit[1] [ppm]	Detection limit[2] [ppm]
Acrylnitrile	2.0	0.03
Benzene	2.5	0.01
Bis(chlormethyl)ether BCME	0.001	0.00001
Diethyl sulfate DES	0.03	0.001
Dimethyl sulfate DMS	0.02	0.001
Epichlorhydrin	2.0	0.01
Ethylenoxide	1.0	0.01
Methyliodide	0.3	0.003
Propylenoxide	2.5	0.01
Styroloxide	1.0	0.02
Methylchloroformiate	0.2	0.01
Methyl bromide	1.0	0.3
HCN	1.9	0.07
Methyl vinyl ketone MVK	0.17	0.02

- The list depicts a selection of chemical hazards and is expendable on request

[1] The values of exposure limit are based on German and Swiss guidelines (MAK, TRGS)

[2] The values of detection limit are achieved by GC methods in the monitor labs at Solvias AG

Accurate Automatic Dilution

The micamix is a sample injector with a patented online dilution principle (US patent 4,333,356). Contrary to conventional multistep methods of dilution it produces a homogenous flow of diluted sample in one single step.

With its adoptable software interface it can be integrated into systems for high-performance analysis technology.

Benefits

- Rugged stainless-steel housing, excellent material selection of all wetted parts
- Low maintenance cost
- Small laboratory footprint

Typical applications include dilution and derivatization with direct injection into a measuring device like HPLC, AAS and UV/VIS spectrophotometer. Solvias also provides integrated solutions which are compatible with most spectrophotometers and XYZ Autosamplers on the market.

Fiberoptic Probe for Laboratory Use

With the right tools in place fiberoptic measurement is an excellent alternative to traditional laboratory workflows.

The basic requirement for a successful setup is a probe with an excellent through flow of the measuring gap.

With its 3 cut-outs the LABOFLEX transflection immersion probe has been designed for an optimal through flow. The tip can be easily disassembled for cleaning or changing the optical path length. A selection of high-quality material for all wetted parts guarantees a long life and unchanging reproducibility of the light signal.

Typical applications are dissolution testing, content determination (UV/VIS) and feasibility studies (NIR).

Solvias offers complete packages to adopt fiberoptic technologies in the laboratory (ARGUS/Dissolution, ARGUS/Process).

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