NIRS Analyzer Pro

NIRS Analyzer Pro is a process analysis system based on high-resolution diode array technology. It provides nondestructive analysis of granules, powders, slurries or opaque samples directly in the process line without bypass – a true in-line system.

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Features and Benefits

- High resolution diode array technology for accurate and continuous analysis in reflectance or transmittance mode

- Built-in instrument factory standardisation for quick and simple implementation of one or several analysers

- Uptime protection systems for low maintenance

- Dedicated sample interfaces provides accuracy and rapid implementation

- Instant measurement of complete wavelength range for direct measurement of fast moving samples

- Quantitative and qualitative data for better in-line process control

- Dual lamp technology retaining accuracy when the backup lamp is activated providing consistent uninterrupted analytical accuracy

- Integrated intelligent Metrohm calibration tool, ISIcal^{TM} enables anyone to develop calibrations

- Metrohm standard OPC interface for integration to local control systems enables automatic regulation of the process

NIRS Analyzer Pro is a process analysis system based on high resolution diode array technology. It provides non destructive analysis of products such as flour, feeds, meals, ground meat and dairy products directly in the process line without bypass.

The analyser is housed in a robust cabinet mounted at the relevant location in the production area. Measurements are displayed in the control room and results can be fed into a regulation system for closed-loop automatic control.

The solution helps to optimise the use of raw materials and to consistently run production closer to target specifications.

Precise instrument matching enhances method development, minimises implementation efforts and ensures calibration model transferability between analysers.

System Description

The NIRS Analyzer Pro analyser is available with dedicated interfaces based on reflectance or transmittance technology whichever is best suited for each application area. Measurements are done directly on the moving sample in the process stream. A high-intensity dual-lamp light source illuminates the sample directly or through an optical fiber. The light interacts with the sample and the reflected or transmitted light is measured by the diode array sensor. The backup lamp in the dual lamp system secures uptime and analytical accuracy is unchanged even after switching to a new lamp.

The complete wavelength range is measured instantaneously enabling measurements also on fast moving samples with high accuracy. Calibrations are transferable between units ensuring easy expansion to other measurement points. Integration to process regulations systems can be done through the Metrohm OPC interface.

Dedicated sample interfaces

Window reflectance

In-line analysis of paste, granulates, powdered products etc in pipes or transport systems without bypass can be performed. The products pass over the interface window. The window reflection interface can easily be installed into the production line using standard GEA Tuchenhagen flowcells or welding an interface flange into the wall of the pipe/transport system.

Temperature	150 °C (302 °F)
Pressure	Vacuum > 1 torr, Pressure < 3'000 PSI
Lens	Sapphire; Diameter 45 mm, thickness 12 mm, with food grade EPDM O-ring seal
Hygiene	USDA, Dairy
Pipe flowcells	Fits directly into GEA Tuchenhagen Varinline Access units Type N (DN40 to DN150) with 68 mm opening
Transport system	Stainless steel welding flange

Direct light

In-line analysis of products where direct contact with the product is not a technically feasible solution i.e. product transported on a conveyer belt.

Lens	Sapphire; Diameter 45 mm, thickness 12 mm, with food grade EPDM O-ring seal
Hygiene	USDA, Dairy
Distance	100-250 mm to sample surface
Scanning area	20-85 mm Ø

Powder probe

In line analysis of fine powder like dairy powders etc. The powder probe interface can easily be installed into a hopper or pipe with free falling product. The probe has no moving parts. The probe is automatically cleaned with compressed air before each analysis.

Material	Teflon (PCTFE)
Diameter	1″
Length	7″
Fiber	Steel armoured fiber bundle (1, 3, 5 or 10 meters)
Air	Clean compressed air 43-72 PSI
Temperature	Max 120 °C
Installation	1″ Swagelok crimp fitting
Hygiene	USDA, Dairy
Cleaning	Clean with compressed air or wash in water, hot or cold depending on product

Lateral transmittance

In line analysis of slurries and viscous products such as WPC, Cream Cheese, Mozarella etc. The Lateral transmittance probe does not restrict the flow rate of the product and can easily be installed in the production line using a standard GEA Tuchenhagen flowcell for installation in a pipe or by welding an interface flange into the wall of a tank.

Materials	Stainless steel
Lens	Sapphire, 5 mm thick, with food grade EPDM O-ring seal
Temperature	Max 150 °C (302 °F)
Pressure	Max 200 PSI (13.79 bars) – Warning! Varinline access units higher number than DN 80 permit a maximum pressure of 145 PSI.
Hygiene	USDA, Dairy
Optical fiber	Steel armoured fiber bindle (1, 3, 5 or 10 meters)
Pipe flowcells	Fits directly into GEA Tuchenhagen Varinline Access units Type N (DN40 to DN150), 1½" to 6" with 68 mm opening or Type F (DN 25), 1" with 50 mm opening)

Standards and approvals

NIRS Analyzer Pro is CE labeled and complies with the following directives:

- Low Voltage Directive (LVD) (2006/95/EC)

- RoHS Directive (2002/95/EC)

- Packaging and packing and waste Directive (94/62/EC)

- WEEE Directive (2002/96/EC)

- ATEX Directive, (94/9/EC), Zone 20 (EN 61241-1-2004 – Explosion safety for DUST-Protection by enclosure tD)

- IECEx, Zone 20 (IEC 61241-1-2004 – Explosion safety for DUST-Protection by enclosure tD)

- REACH Directive (1907/2006/EC)

- Developed and produced according to Metrohm ISO approval ISO 9001

Technical Specifications

NIRS Analyzer Pro Reflection	
Analysis time	5 - 50 ms / integration time; Average time per result 3-15 seconds
Measurement mode	Reflectance (Window reflectance; Direct Light, Powder Probe)
Wavelength range	1'100-1'650 nm
Detector	InGaAs Diode array
Spectral dispersion	1.1 nm / pixel

NIRS Analyzer Pro Transmittance	
Analysis time	5 ms-60 sec / integration time; Average time per result 3-15 seconds
Measurement mode	Transmittance (Lateral transmittance, transmittance probe pair)
Wavelength range	850-1'050 nm
Detector	Si Diode array
Spectral dispersion	1.0 nm / pixel

General	
Light source lifetime	Dual lamp system MTBF = 17'500 h
Software package	ISIscan™ for instrument control; ISIcal™ for calibration development
Wavelength accuracy	0.5 nm
Wavelength precision	< 0.02 nm
Wavelength stability	< 0.01 nm/°C
Noise	< 60 micro AU
Random Vibrations	0.4 grms at 10-150 Hz according to IEC 60068-2-64
	0.4 grms at 10-1'250 Hz according to Metrohm internal standard
	(more information available on request)
Temperature	-5 to 40 °C (23-104 °F). With purge -5 to 65 °C (23-149 °F)
	Installation in ATEX zone: 0-40 °C (32-104 °F).
	With purge 0-65 °C (32-149 °F)
Purge air	Flow rate minimum 5 l/min,
	> 99.9% water free, > 99.9% free of oil and fine particles down to 0.3 µm
Ambient humidity	10-90% relative
Dimensions (w × h × d)	42 × 42 × 13.5 cm (16.5 × 16.5 × 5.3 inches) + brackets to hold the unit
Weight	25 kg / 55 lbs
Cabinet	1.5 mm (lid 2.5 mm) Stainless Steel EN 1.4301 (SS2333)
Protection	IP69K[1] according to IEC 60529 and DIN 40050 part 9, NT ELEC 023
Communication	Ethernet, OPC, RINA, FossCare™
Power supply	Recommended isolated or conditioned line power
	100-240 VAC, 50-60 Hz, 2.0 A, 150 W

[1] IP6x is the highest protection for dust entering the unit. IPx9K means protected against the effect of high-pressure water and/or steam cleaning at high temperature.

Ordering information

2.928.1110	NIRS Analyzer PRO – ContactReflection
2.928.1120	NIRS Analyzer PRO – FiberSystem
2.928.1130	NIRS Analyzer PRO – DirectLight/NonContact

Software
6.6069.102	Vision Software

Standards
6.7450.070	NIRS Certified Process Reflectance and Wavelength Standard (1")
6.7450.080	NIRS Certified Process Reflectance and Wavelength Standard (0.5")
6.7450.090	NIRS Certified Process Reflectance and Wavelength Standard (1", 45 degrees)
6.7450.100	NIRS Certified System2 Reflectance Standards (set of 7 pc.)
6.7450.110	NIRS Certified System2 Transmission Standards (set of 6 pc.)

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