FOSS

ProFoss™ for in-line process analysis of WPC MPC

ProFoss™ ultra filtration process analysis system is based on NIR high resolution diode array technology, providing non destructive analysis, directly in the process line without bypass. The analyser is housed in a robust cabinet installed after the final ultra filtration in order to validate and adjust final Protein-Total Solids ratio. Results can be fed into your production/SCADA system and/or be presented on a screen in the production area for rapid adjustments of your process. Precise instrument matching enhances method development, minimises implementation efforts and ensures calibration model transferability between analysers.

Sample	Parameters
WPC & MPC after the filtration stage	Total Solids, Protein & Protein-Total Solids ratio

Streamline your production with High Resolution in-line analysis

Achieve complete control of your WPC & MPC production with ProFoss™ in-line sensor, using high resolution diode array technology. Installed in-line, the ProFoss™ gives a continuous flow of "real time" results of the WPC & MPC quality out of the ultra filtration unit. Based on the results the operator or the automatic process regulation system can immediately react to changes in the process. The ProFoss helps you to reduce production variation, produce closer to specifications and streamline your manufacturing process.

Improve your business with accurate control

Profit opportunities are waiting to be found in your ultra filtration process. In WPC & MPC production the primary profit driver is to optimize the Protein-Total Solids level to increase yield and thereby revenue. At the same time, improved product consistency can provide new pricing options.

Users of such solutions report a rapid return on investment with a typical payback time of less than twelve months. Advantages of ultra filtration process control include improved yield and profit based on:

- Optimised Protein-Total Solids ratio content
- Consistent product quality
- Higher value products for your customers
- Reduced rework

Anyone can use it

With its user-friendly and low maintenance features, ProFoss™ gives your production staff the perfect tool to maintain process control for increased yield and improved consistency. Near infrared, high resolution technology ensures a high level of accuracy that you can rely on day in day out.

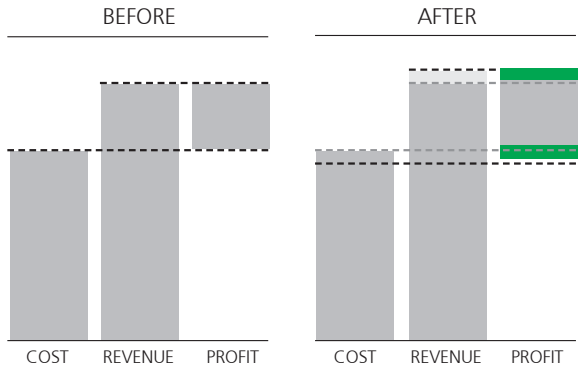
Anyone in the plant can contribute to process control. Easy-to-use calibration software options such as ISIcal™ allow non-experts to develop or expand existing calibration with automatic sample synchronization. Once calibrations have been made, there is no need for further adjustments.

Quick and simple to implement

The High Resolution technology behind the accuracy of the ProFoss system also has benefits when implementing the system. Because measurements can be relied on to be the same across individual instruments and are highly stable over time, you can reduce the time and money spent on installation of individual analysers. The standardisation and stability of the solution, as well as the intelligent FOSS calibration tool ISIcal™, makes it fast and easy for non-experts to develop or expand calibrations and transfer them across units.

Profit improvement

Moving closer to target by a decrease in Protein/Total Solids ratio of 0.5%, gives 44,000 per year for a plant with an annual production of 6,000 tons.



Stretch your profit zone: Production costs can be decreased and the higher product consistency will increase your competitiveness.

How to improve your whey production

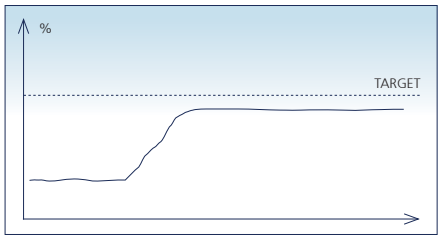
ProFoss™ – the optimal solution for ultra filtration process analysis

- Robust, process solution withstands water and vibration and complies with hygiene regulations
- Reliable and low maintenance – keeps on running for maximum uptime
- Results can be fed into your production/SCADA system and/or be presented on a screen in the production area for rapid adjustments of your process
- Full technical support and preventative maintenance options

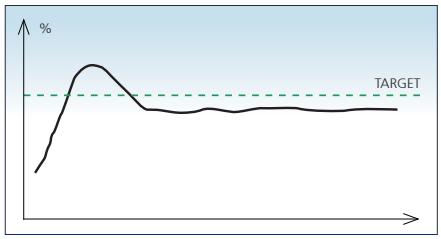
Process analysis advantages

- Production close to target specifications
- Increased yield
- Less rework and start up variation
- Optimized mass-balance

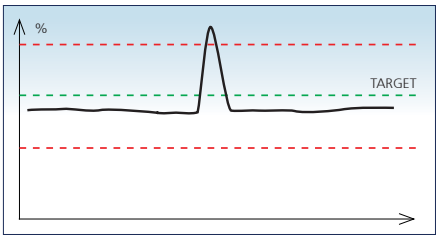
Production closer to target

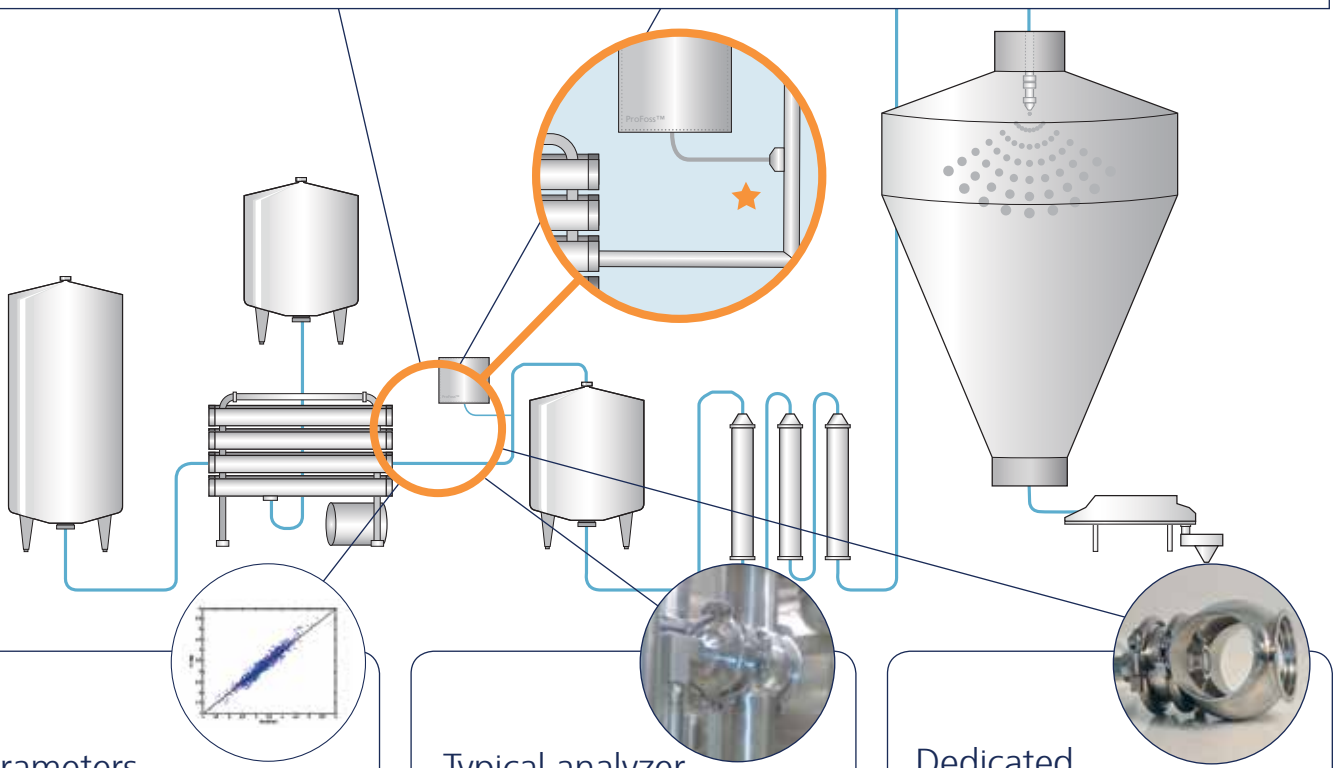


Reduce start up variation



Alarms you when production is out of spec





Parameters

- Total Solids
- Protein
- Protein-Total Solids ratio

In WPC & MPC production the primary profit driver is to optimise the Protein - Total Solids level to increase yield and thereby revenue

Typical analyzer Installation point

- Installation after the final ultra filtration in order to validate and adjust final Protein - Total Solids ration
- Hygiene certified according to USDA

Dedicated sample interface

- Lateral transmittance interface connected directly to the pipe
- True in-line – no bypass – no waste
- No moving parts
- No hygiene compromises

ProFoss™ – High Resolution NIR technology

ProFoss™ is unique in employing a near infrared-based analysis technology known as High Resolution diode array analysis. The High Resolution technology ensures accuracy and reliability with measurements based on a high density of data points.

Accurate and continuous results

Measurement accuracy is in line with traditional laboratory analysis. However, results are presented continuously rather than a few times per day giving the opportunity for immediate adjustments to production. This together with the dedicated WPC & MPC sample interface ensures you a total solution optimal for your process.

ProFoss™ streamlines your manufacturing process with:

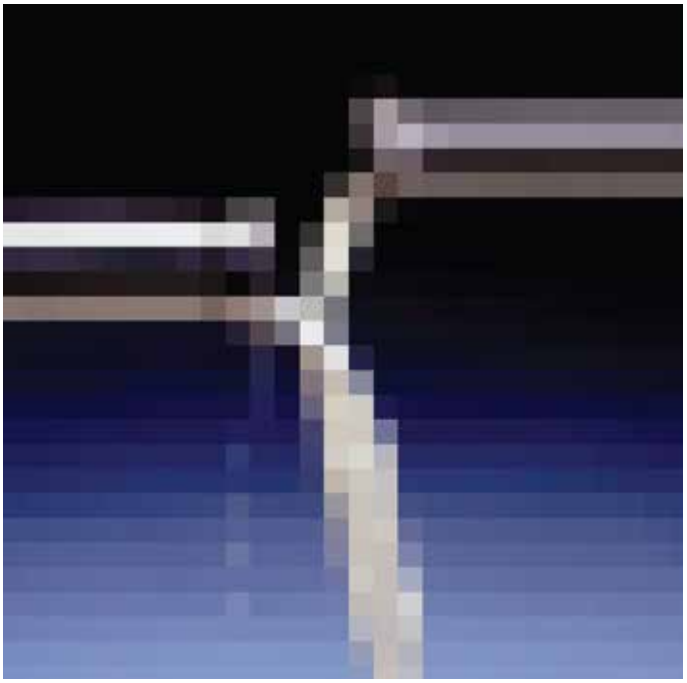
- High resolution diode array technology for accurate and continuous analysis
- Built-in instrument standardisation for quick and simple implementation
- Dedicated sample interfaces providing accuracy and rapid implementation
- Instant measurement of complete wavelength range for direct measurement of fast moving samples
- Quantitative and qualitative data for better in-line process control
- Consistent and uninterrupted analytical accuracy with Dual lamp backup technology
- Integrated intelligent FOSS calibration tool, ISIcal™ enables anyone to develop calibrations
- Interface for integration to local control systems enables automatic regulation (OPC, 4-20mA, Profibus etc communication).

Robust and low maintenance operation

The ProFoss system keeps on running to ensure high uptime and minimal impact on daily production. Once calibrated, there is no need for constant adjustments caused by drift or other weaknesses. The high stability of the High Resolution technology ensures the same accuracy day in and day out without hidden operational costs.

Intelligent calibration tool - ISIcal™

Calibration is done either through WinISI™ or by using the intelligent calibration tool, ISIcal™. ISIcal requires a minimum of user experience. Each time a reference sample is collected from the process, a button is pressed on the analyzer to synchronize the scan with the collected sample. Reference data is added and a calibration is automatically developed (or an existing calibration expanded with the new data). The ISIcal tool automatically optimizes the calibration algorithms by selecting the most reliable model for future use.



High Resolution near infrared technology gives you a clearer picture of your process. A high number of pixels (diode sensors) in the spectrum secures a more detailed (accurate) and uniform (repeatable) analysis result.
High Resolution also enables manufacturing of "identical" (standardized) analyzers which stay the same over time (no drift).

Dedicated interfaces based on transmittance technology

The ProFoss™ analyser for WPC & MPC is available with dedicated interfaces based on transmittance technology. Measurements are done directly on the moving sample in the process system. A high-intensity dual-lamp light source illuminates the sample directly or through an optical fibre. The light interacts with the sample and the transmitted light is measured by the diode array sensor. The backup lamp in the dual lamp system secures uptime and analytical precision is unchanged even after switching to a new lamp.

The complete wavelength range is measured instantaneously enabling measurements to be accurately carried out even on fast moving samples. Calibrations are transferable between units ensuring easy expansion to other measurement points. Interface for integration to local control systems enables automatic regulation (OPC, 4-20mA, Profibus etc communication).

A standardised High Resolution analyser

A standardised analyser with transferable calibrations significantly reduces the implementation and maintenance costs. Transferability is the solid foundation required for rapid implementation of an analyser into a complex process environment. Furthermore, once a calibration has been developed, it can be reused on other analysers. The key to achieving this is the resolution of the analysers wavelength scale. The FOSS High Resolution technology has one sensor for each nm measured, securing 100% stability of the wavelength scale. In contrast, with lower wavelength resolution, shifts of up to 7 – 8 nm in the wavelength scale can occur, which will require major updates of existing calibrations for each new analyser installed.

Technical Specifications

ProFoss Transmittance	
Analysis time:	Average time per result 15 - 30 seconds
Measurement mode:	Transmittance (Lateral transmittance)
Wavelength range:	850 – 1050 nm
Detector:	Si Diode array
Spectral dispersion:	1.0 nm / pixel

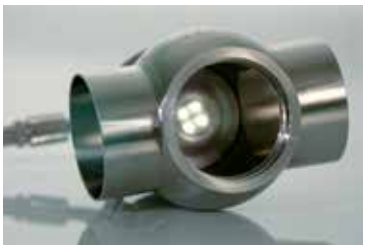
General:	
Light source lifetime:	Dual lamp system = 17500 h
Software package:	ISIscan™ for instrument control; ISIcal™ for calibration development
Wavelength accuracy:	0.5 nm
Wavelength precision:	< 0.02 nm
Wavelength stability:	< 0.01 nm/°C
Noise:	< 60 micro AU
Random Vibrations:	0.4 grms at 10 – 150 Hz according to IEC 60068-2-64 0.4 grms at 10 – 1250 Hz according to FOSS internal standard (more information available on request)
Temperature:	-5 – 40°C (23 – 104°F). With purge -5 – 65°C (23 – 149°F)
Purge air:	Flow rate minimum 5 l/min, > 99.9% water free, > 99.9% free of oil and fine particles down to 0.3µm
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 2.5mm) Stainless Steel EN 1.4301 (SS2333)
Protection:	IP69K[1] according to IEC 60529 and DIN 40050 part 9, NT ELEC 023
Communication:	Ethernet, OPC "4 - 20 mA, Profibus, RINA
Power supply:	Recommended isolated or conditioned line power 100 – 240 VAC, 50 – 60 Hz, 2.0 A, 150W

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.

Dedicated sample interface

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 flow-cell 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 FFPM O-ring seal
Temperature:	Max 150˚C (302˚F)
Pressure pressure:	< 30 bar (< 435 PSI)
Shock pressure:	< 75 bar (< 1088 PSI)
	Warning! Varinline access units higher than DN 80 permit a maximum pressure of 10 bar (145 PSI).
Hygiene:	USDA, Dairy
Optical fiber:	Steel armoured fibre bindle (1, 3, 5 or 10 meters)
Pipe flowcells:	Fits directly into GEA Tuchenhagen Varinline Access units
	Type N (DN40 to DN150), with 68 mm opening or Type F (DN 25), with 50 mm opening)
Tank:	Stainless steel welding flange.

Standards and approvals

ProFoss™ is CE labeled and complies with the following directives:

- EMC Directive (2004/108/EC)
- 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)
- EN 60079-0:2009 - Explosive atmospheres - Part 0: Equipment - General requirements
- EN 60079-31:2009 - Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure ‘t’
- REACH Directive (1907/2006/EC)
- Developed and produced according to FOSS ISO approval ISO 9001

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