

ProFoss™ for in-line process analysis of butter



ProFoss™ provides continuous non-destructive analysis, directly in the butter process line without bypass. A dedicated sample interface feeds data to an analyser 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. Precise instrument matching enhances method development, minimises implementation efforts and ensures calibration model transferability between analysers.

Sample	Parameters
Butter	Moisture, SNF, fat & salt



Streamline your production with High Resolution in-line analysis

Achieve complete control of your butter production with ProFoss™ in-line sensor. ProFoss™ gives a continuous flow of “real time” results of the butter quality out of the butter churn, using high resolution diode array technology. Optimise the use of raw materials, run production consistently closer to target specifications and make timely adjustments to your butter with ProFoss™ integrated High Resolution process analysis solution from FOSS.

Improve your business with accurate control

Profit opportunities are waiting to be found in your butter process. For instance, more accurate control of the Moisture and SNF content can increase earnings significantly. 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 fresh butter process control include improved yield and profit based on:

- Optimised Moisture and SNF 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 IScal™ allow

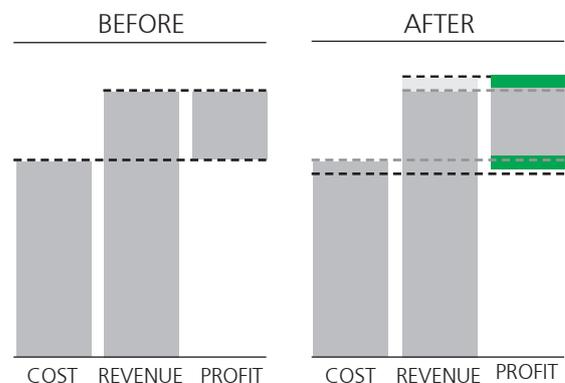
non-experts to develop or expand existing calibration with automatic sample synchronization. Once calibrations have been made, there is no need for further adjustments.

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 IScal™, makes it fast and easy for non-experts to develop or expand calibrations and transfer them across units.

Profit improvement

With a butter price of Euro 3.10 and a yearly production of 4,500 tons, a moisture increase of 0.3% yields Euro 50,000 per year.

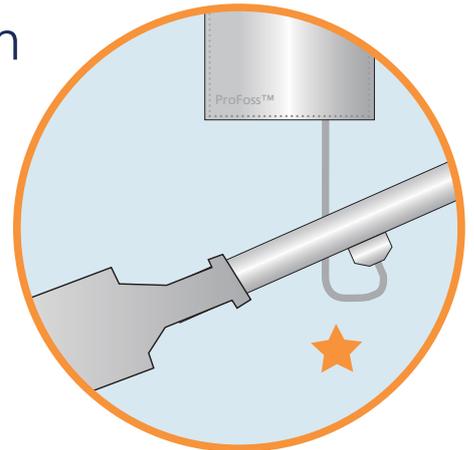


Stretch your profit zone: Production costs can be decreased and the higher product consistency will increase your competitiveness.

How to improve your butter production

Process analysis advantages

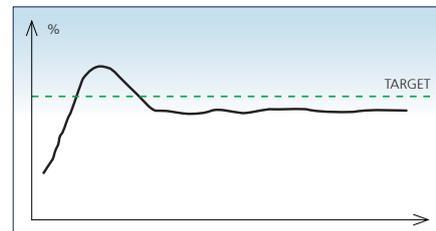
- Production close to target specifications
- Increased yield
- Less rework and start up variation
- Optimized mass-balance



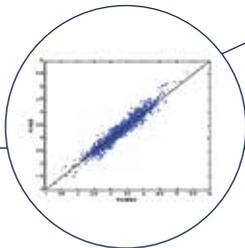
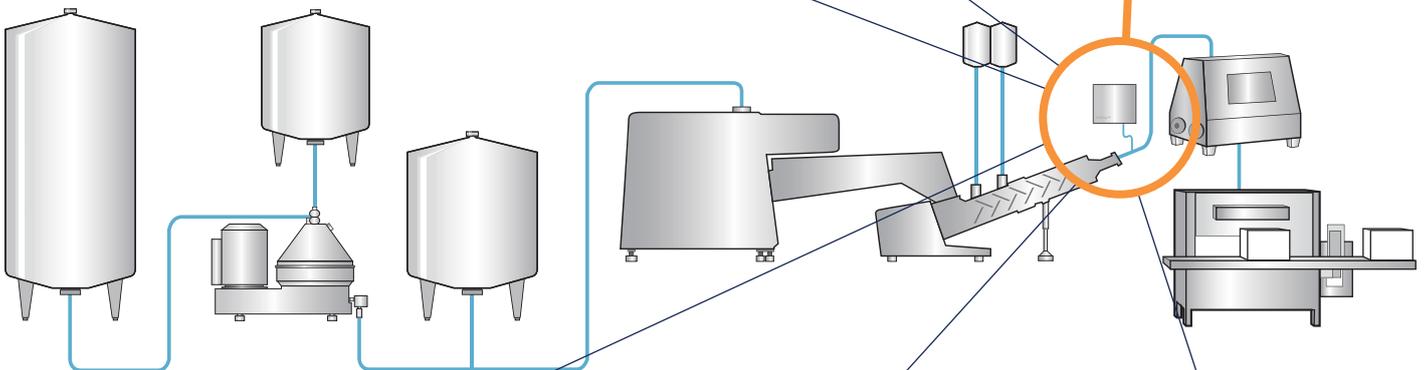
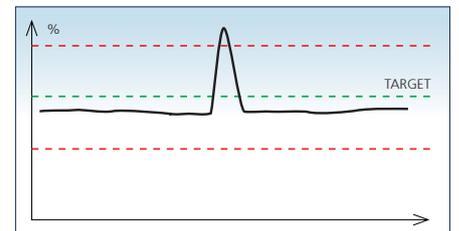
Production closer to target



Reduce start up variation



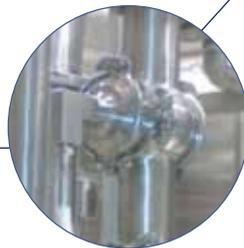
Alerts you when production is out of spec



Parameters

- Moisture
- SNF
- Fat
- Salt

In butter production the primary profit driver is to optimize the moisture level to increase yield and thus revenue.



Typical analyzer Installation point

- Installation after the butter churn in order to validate and adjust final moisture content
- Hygiene certified according to USDA



Dedicated sample interface

- Lateral transmittance interface connected directly to the pipe
- True in-line solution – no bypass – means 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.

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, ISlcal™ 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 - ISlcal™

Calibration is done either through WinISI™ or by using the intelligent calibration tool, ISlcal™. ISlcal 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 ISlcal 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) analysers which stay the same over time (no drift).

Dedicated interfaces based on transmittance technology

The ProFoss™ analyser for butter 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 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. Integration to process regulations systems can be done through interfacing via 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 x h x d): 42 x 42 x 13.5 cm (16.5 x 16.5 x 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, Mozzarella 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 bundle (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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