

ProFoss™ for in-line process analysis of dairy powder



ProFoss™ provides non destructive analysis of dairy powder directly in the 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, for example, after the secondary drying stage (i.e. fluid bed) to check final moisture content. 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
Skim Milk Powder, Whole Milk Powder, Whey Powder, WPC powder or Caseinate Powder	Moisture, protein & fat



Streamline your production with High Resolution in-line analysis

Achieve complete control of your dairy powder production with ProFoss™ in-line sensor. Follow product composition more closely with a continuous flow of “real time” results using high resolution diode array technology. Installing ProFoss™ after the secondary drying stage enables you to validate the moisture content and make timely adjustments to meet specified final product quality.

Improve your business with accurate control

Profit opportunities are waiting to be found in your dairy powder process, regardless of whether you are producing Skim Milk Powder, Whole Milk Powder, Whey Powder, WPC or Caseinate Powder. For instance, more accurate control of moisture in the final dairy powder provides increased yield. 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 dairy powder process control include improved yield and profit based on:

- Optimised moisture content
- Run production closer to specified targets
- Consistent product quality
- Higher value products for your customers
- Increased energy efficiency
- 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.

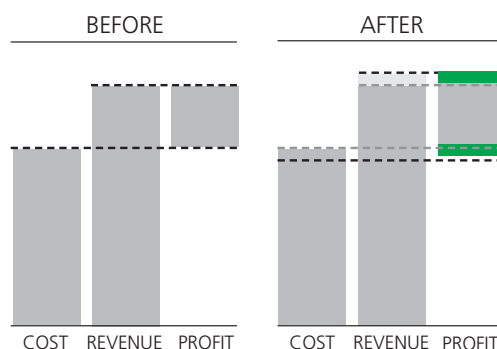
Anyone in the plant can contribute to process control. Easy-to-use calibration software options such as IScal™ allow non-experts to develop or expand existing calibration with automatic sample synchronization. Once calibrations have been made, there is no need for further adjustments.

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

A powder production with an output of 70,000 tons per year moves moisture closer to target by 0.1 % leading to a yield increase worth euro 147,000.



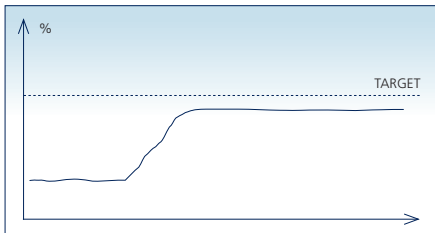
Stretch your profit zone: Production costs can be decreased and the higher product consistency will increase your competitiveness.

How to improve your dairy powder production

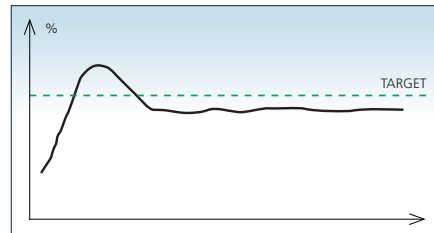
Process analysis advantages

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

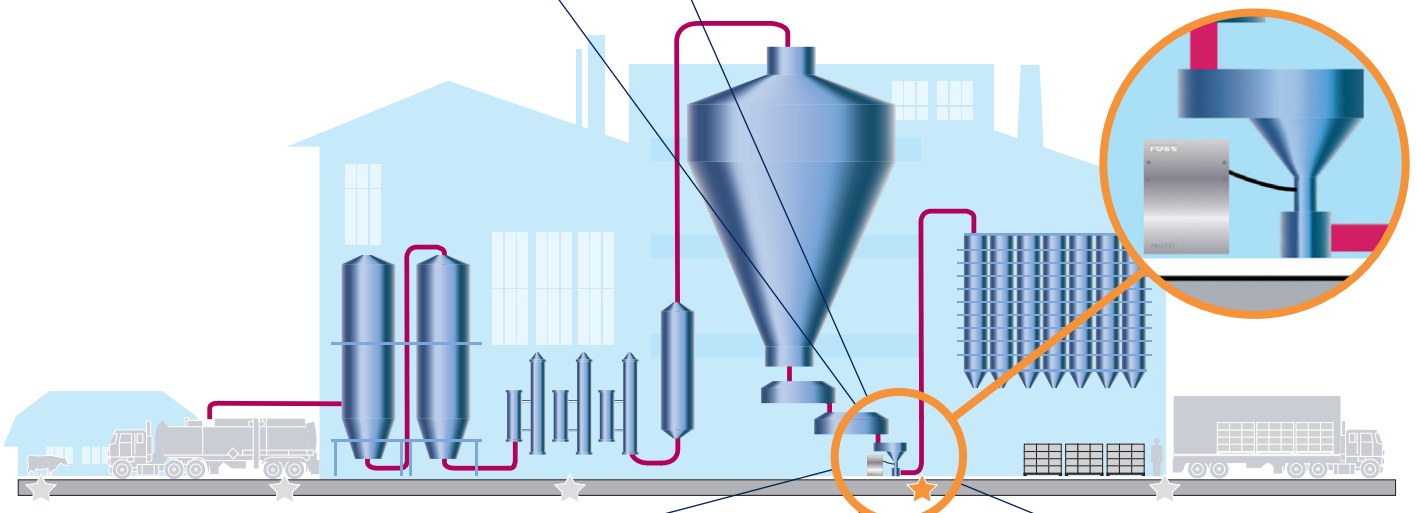
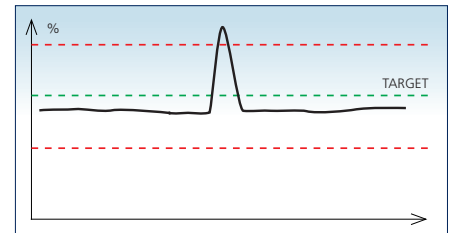
Production closer to target



Reduce start up variation



Alarms you when production is out of spec



Parameters

- Moisture
- Protein
- Fat

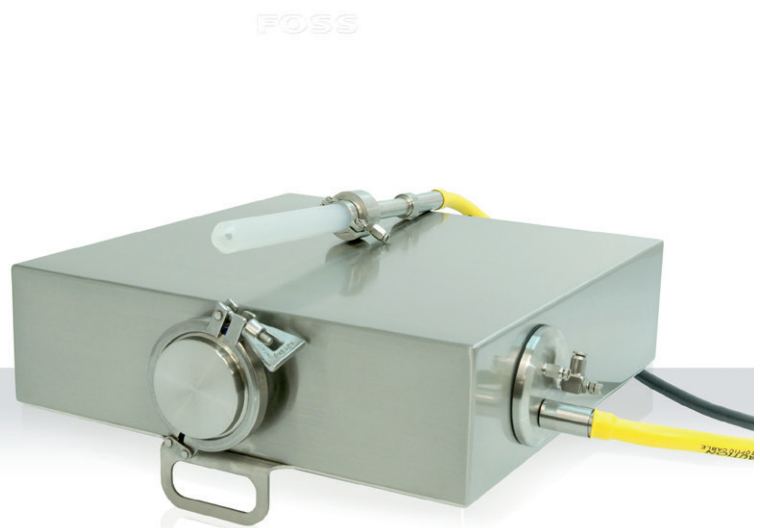
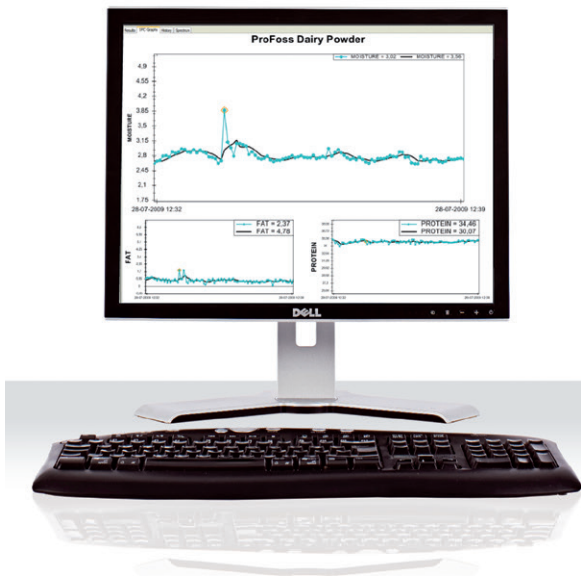
In final dairy powder, the primary profit driver is to optimise the moisture level to increase yield and thereby revenue. Protein and fat are secondary parameters, typically used for validation of the final product quality.

Typical analyzer Installation point

- Installation after the secondary drying stage (e.g. fluid bed) in order to validate and adjust final moisture content
- Explosion certified according to IECEx (ATEX)
- Hygiene certified according to EHEDG and USDA

Dedicated sample interface

- Spoon probe connected to analyser via fiber optics
- 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 dairy powder 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 reflectance technology

The ProFoss™ analyser for milk powder is available with dedicated interfaces based on reflectance technology. Measurements are done directly on the moving sample out of the fluid bed. A high-intensity dual-lamp light source illuminates the sample directly. The light interacts with the sample and the reflected 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 sample.

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.



Remote Monitoring and diagnostics

RINA is a remote instrument monitoring and diagnostics software that makes it easy for an internal or external expert to precisely configure, monitor and diagnose FOSS instruments from a remote location. Calibration updates and bias corrections are easily handled through the network and the system can be monitored on a daily basis, allowing you to focus on optimizing your production.

Investing in a process analysis solution

With any process analysis solution you are effectively putting your production in the hands of technology. FOSS is the right partner to provide a reliable solution that will run day in, day out and year after year.

ProFoss™ is simple to install directly in the production line and comes with a total service solution to help protect your investment. FossCare™ support plans offer the option of preventative maintenance for maximum uptime and minimized repair costs

FOSS solutions offer:

- Proven technology for precision and trouble-free operations
- User-friendly interfaces allowing anyone in the plant to contribute to process control
- Service programs offering a range of options to suit your business
- Get your service in a timely manner by fully trained local staff onsite and/or remotely through internet

FOSS Total Service Solutions

- FOSS is committed to providing complete and fully integrated solutions to our customers
- Our relationship with you is a continuous partnership, not a time-limited occurrence
- FossCare™ Total Service Solutions are available at multiple levels according to your needs

Technical Specifications

ProFoss Reflection:	
Analysis time:	Average time per result 15 - 30 seconds
Measurement mode:	Reflectance
Wavelength range:	1100 – 1650 nm
Detector:	InGaAs Diode array
Spectral dispersion:	1.1 nm / pixel

General:	
Light source lifetime:	Dual lamp system = 17500 h
Software package:	ISlscan™ for instrument control; ISlcal™ 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)
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 0.3µm
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

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:	PCTFE
Diameter:	1"
Length:	7"
Fiber:	Steel armoured fibre 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 and EHEDG, Dairy
Cleaning:	Wash in water, hot or cold depending on product or compressed air



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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