FOSS

PROFOSS™ 2
## SOYBEAN MEAL PROCESS ANALYSIS

BETTER YIELD WITH LESS CLAIMS

It's proven: close and continuous monitoring of soybean meal production pays off by allowing you to meet protein targets spot on minute after minute and hour after hour. In this way, you can achieve great yield while limiting variation in protein content in final product that can lead to customer claims.

Such a proactive approach to process control fits with today's efficiency goals defined by the Industry 4.0 initiative. Protein targets can be met more closely and consistently. At the same time, the more consistent product deliveries build supplier reputation while continuous improvements ripple through different aspects of your process, including production safety, maintenance and quality. Not least, insight into the process helps you to optimise energy usage, for example, through tighter control in the drying step.

Built on proven analytical technology

Using in-line near infrared (NIR) analysis offers you a smart way to achieve such gains by understanding and controlling variations in key product parameters such as protein, moisture, oil and fibre. Benchtop NIR analysers provide one way to monitor the process, but the frequency of measurements is naturally limited by the need for your operators to source a sample and perform the test. That's why FOSS introduced the original ProFoss™ solution.

Installed directly in the process line, the ProFoss gave a new and more precise view on the process through continuous measurements on the finished meal. The ProFoss has helped soybean crushers around the world to improve efficiency at a number of key points in the production process while also improving quality and profit. Now the ProFoss™ 2 makes it simple for you to share in the success of in-line process control.
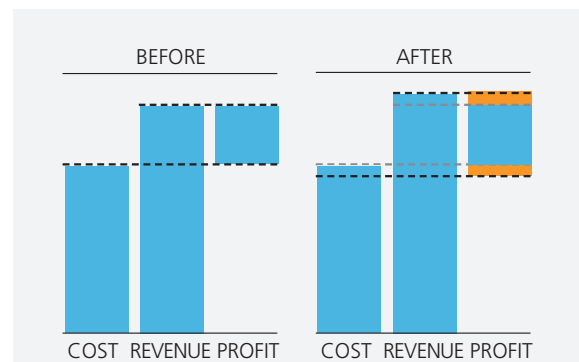
By moving protein closer to target by just 0.5%, soybean crushers can save USD 300,000 per year (based on an annual production of 100,000 tonnes and a soybean meal price of USD 400/tonne).

The continuous measurements of moisture content in soybean meal can also save USD 100,000 per year by helping soybean crushers to move moisture 0.25% on average closer to the limit without additional risk to claims, price penalties or rejection of shipments (based on an annual production of 100,000 tonnes and a soybean meal price of USD 400/tonne).

INTRODUCING PROFOSS™ 2:

YOUR PASSPORT TO IN-LINE PROCESS CONTROL

Building on the proven ProFoss™ in-line NIR concept, ProFoss™ 2 exploits the latest advances in analytical technology encompassing instrument calibration robustness and transferability, connectivity for product support, data visibility, data integration to process control systems and much more.


PUT YOUR PROCESS ON CRUISE CONTROL

Achieve complete control of your soybean meal production with the ProFoss™ 2 in-line sensor. ProFoss 2 gives a continuous flow of "real time" results after the desolventiser and toasting phase for the final soybean meal product. Optimise the use of raw materials, run production consistently closer to target specifications and make timely adjustments for protein standardisation.

The test data can also be easily integrated into control systems such as PLC, SCADA or statistical programmes such as LIMS.

In short, with ProFoss 2 you gain the ability to run production on cruise control, meeting protein targets consistently for increased profit with less risk of customer claims.

HOW TO CONTROL PROTEIN TARGETS MORE CONSISTENTLY

| NIR |
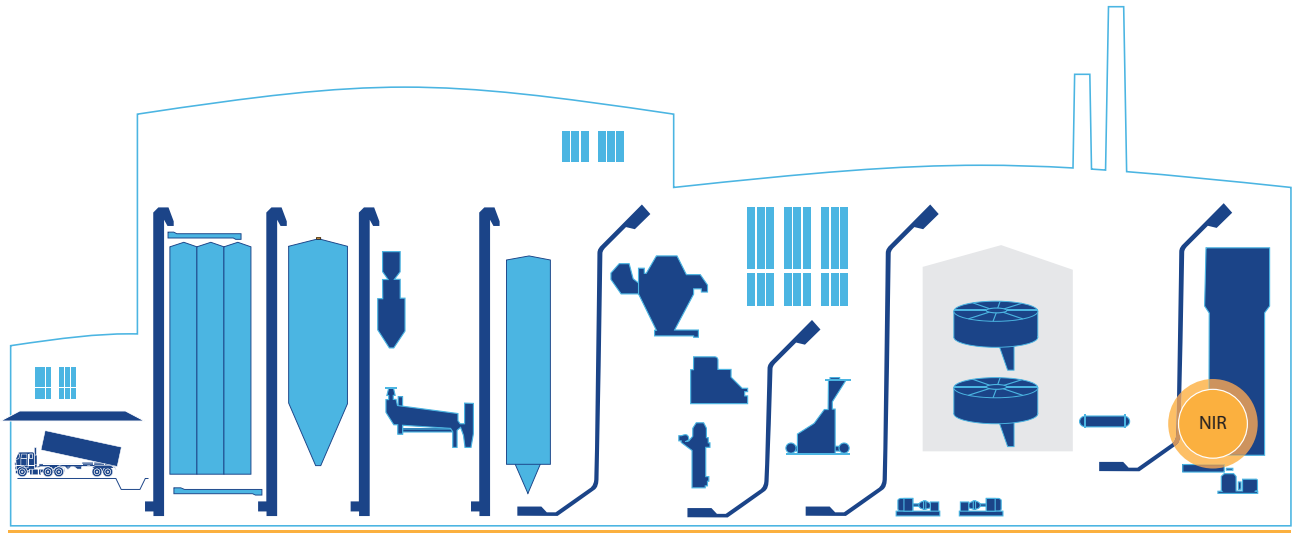
Soybean prep.
Processing
Rate and cleaning

Soybean prep.
Cracking and
dehulling

Soybean prep.
Conditioning and
flaking

Extraction.
Solvent extraction

Extraction.
Desolventiser
and toaster

Meal prep.
Dryer and cooler
Screening and grinding

MEASURING POINT

Installed after desolventiser and toasting phase in a pipe.

WHY HERE

Increase oil yield, get closer to the protein target and moisture set point and avoid out-of-spec delivery.

PARAMETERS

Protein, moisture, oil and fibre.

Link the real-time analytical data to an automatic control loop for increased yield and reduced risk of re-work or claims. The proven ProFoss™ software concept makes it easy to connect the analytical data to a process control system using ethernet, Bus or 4-20 mA communication.

WORRY-FREE PROCESS CONTROL WITH THE MOST ADVANCED IN-LINE NIR SOLUTION

ProFoss™ 2 makes it simple for you to gain from in-line process control. With FOSS, you can just get on with your production while we, as your partner in process control, give you the support you need to move into in-line process control quickly and with minimal impact on resources.

Reliable measurements

The reliability of measurements across all units and production lines is assured with standardised instruments that all measure the same. A standardised analyser with transferable calibrations significantly reduces the implementation and maintenance costs for in-line process control.

The high uniformity standards and robust design of the latest generation ProFoss 2 solution ensures that the same calibration can be used on multiple instruments which measure the same product. This also ensures that only minimal updates to calibrations are required during the instrument lifetime. In contrast, solutions with lower standards will require separate calibrations for each instrument and more frequent updates.

Administration concerns are further reduced due to the use of transferable calibrations based on the renowned NIRS™ DS2500 or NIRS™ DS3 benchtop analyser as a reference. ProFoss 2 provides facilities to evaluate measurements against this industry-benchmark analyser on a regular basis. The performance validation procedure is made simple and reliable with automatic data transfer.

The revolutionary ProFoss™ 2 performance evaluation procedure is used to match in-line results with those from reference benchtop instruments such as the NIRS™ DS3 or NIRS™ DS2500 bench top analyser. FossManager™ software gives a common view of sample identifications and results from both benchtop and in-line sources on one page. The overview facilitates efficient surveillance of calibration performance and any necessary adjustments through pre-planned FossAssure™ services.

UNDERSTAND PROCESS VARIATIONS WITH REAL-TIME MEASUREMENTS

The continuous flow of analysis data provided by ProFoss™ 2 offers critical insight into variations in key product parameters such as protein, moisture, oil and fibre. This enables you to shift production targets closer to protein specifications for immediate and lasting improvements to yield.

Each measurement is made up of high-frequency sub-scans. The frequency of measurement ensures that nothing gets missed and that you will always have a precise picture of any fluctuations in the process. ProFoss 2 measurements are based on the latest in NIR reflectance technology for process applications, including a robust sensor that does not interfere with the process flow and can be installed and maintained without interrupting operations.

A 'multipoint' approach gives you the option to position a ProFoss 2 unit and sensor at several points in a line or across different lines without compromising on speed of measurement, which occurs with a multiplex approach. Each point gives the same high frequency of measurements required for a true picture of fluctuations in the process, allowing for precise process adjustments according to production targets.

SAFE TO INSTALL, SIMPLE TO RUN

Take advantage of FOSS's experience in soybean meal protein standardisation with the ProFoss™ 2 offering a unique combination of proven hardware and digital and connectivity services to make in-line process control simpler than ever. The solution includes all the key elements of a modern in-line process control solution.

- Analyser unit
- Atex compliance
- Starter calibrations
- Data-sharing facilities
- Remote monitoring of instrument performance and calibration
- Dedicated support available online
- And not least, expertise and knowledge about making protein standardisation work across multiple lines and sites


NIR WINDOWS REFLECTANCE

Measurements are based on the latest in NIR reflectance technology for process applications, including a robust sensor with a double window system. The window into the process always remains in place while the second can be removed for service work on the sensor without interruption to the process operations.

LASTING PAYBACK ENSURED BY PREDICTABLE HIGH PERFORMANCE

The latest technology behind ProFoss™ 2 ensures that you can rely on consistent performance day in, day out and year after year.

Building on the reliable measurements delivered by each and every analyser unit, software and digital connectivity services help to maintain stable high performance across whole populations of instruments. Rapid implementation and payback can be achieved by using transferable calibrations in combination with connectivity software FossConnect™ and FossManager™. Calibrations can be installed, monitored and adjusted remotely from anywhere.

Advanced software and connectivity features help you to secure optimal uptime through automated system monitoring and alerts as well as performance reports to sustain confidence.
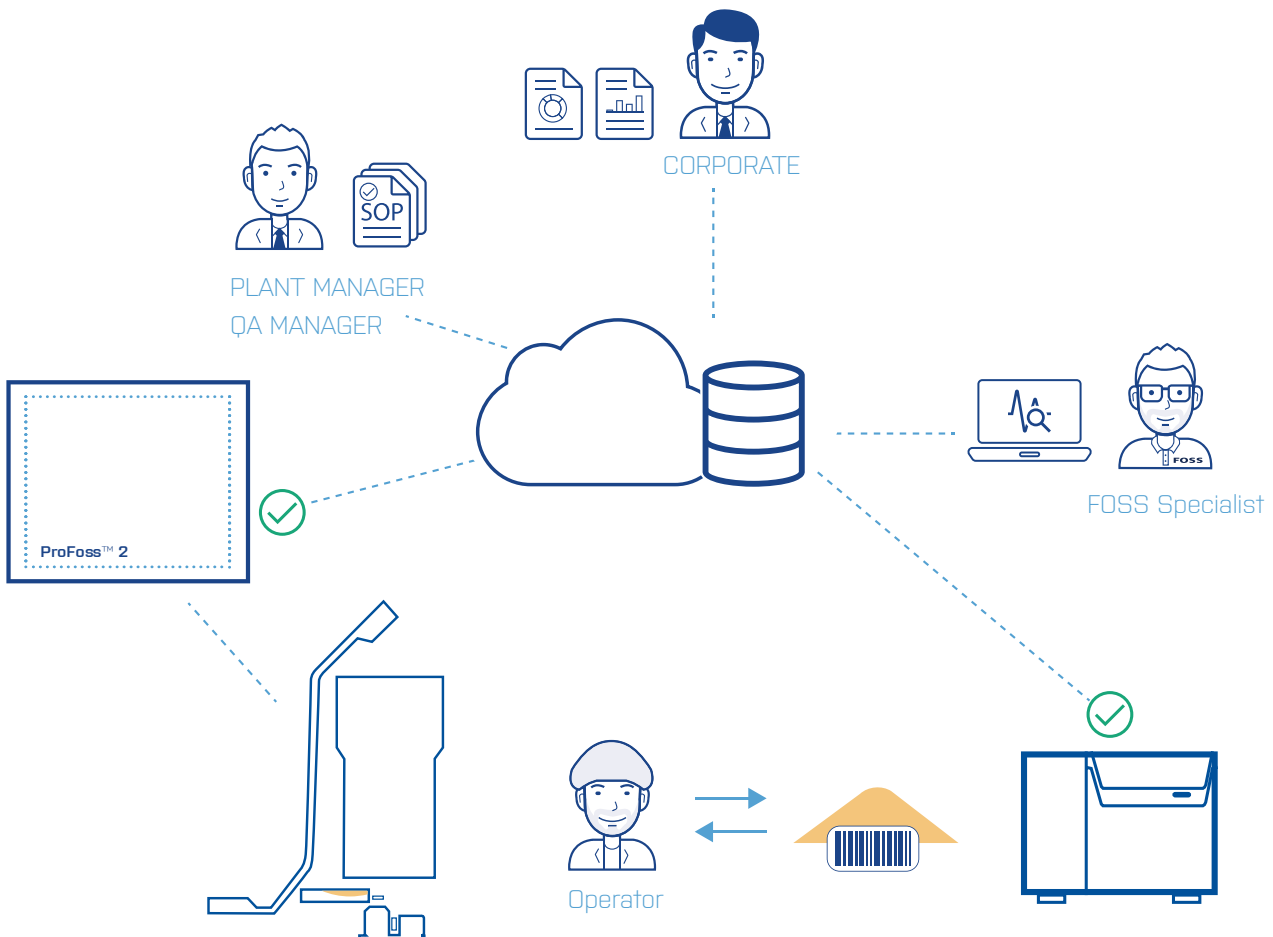
Software and digital connectivity services contribute to reliable performance across individual or whole populations of instruments. ProFoss 2 units can be monitored and managed from a single desktop, for example, when making calibration adjustments or proactively planning maintenance cycles for optimal uptime. This can be done from anywhere in the world from any PC.

HIGH-DEFINITION PROCESS CONTROL

Using ProFoss™ 2 can be summed up as process control in high definition due to the sharper picture you gain of fluctuations in your process. With this improved vision, you can improve customer relations, reduce claims and improve efficiency, for example through optimal use of energy in drying.

Grey areas and guesswork are out. Insight and clarity are in. Welcome to process control with ProFoss 2: your passport to in-line process control.

DEDICATED SAMPLE INTERFACE

WINDOW REFLECTANCE

In-line analysis of solid products in the soybean production process such as whole soybean intake control and final soybean meal moisture and protein standardisation.
The ProFoss™ 2 Window Reflectance process interface can easily be installed into any production line such as chain conveyor or screw conveyor in pipes/transport systems or the like.
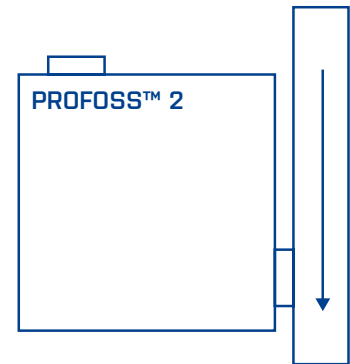
DIRECT LIGHT

On-line analysis of solid products such as soybean meal on open conveyor systems, where the products pass under the sensor of ProFoss™ 2. The direct-light sensor can easily be installed into the production line above the open conveyor.
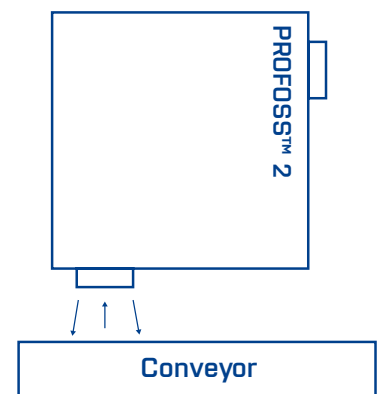
STANDARDS AND APPROVALS

ProFoss™ 2 is CE labeled and complies with the following directives:

- Low Voltage Directive 2014/35/EU
- EMC (Electro Magnetic Compatibility) Directive 2014/30/EU
- Packaging and Packaging Waste Directive 94/62/EC
- WEEE Directive 2012/19/EU
- RoHS directive 2011/65/EU
- REACH Regulation (EC) No. 1907/2006

Additional for ProFoss™ 2 Ex:

- ATEX & IECEx certified

TECHNICAL SPECIFICATIONS

Measuring technology: Reflectance	
Analysis frequency	Real time: Average analysis time per result 2 - 3 seconds
Wavelength range	1100 - 1650 nm
Detector	InGaAs Diode Array
Spectral dispersion InGaAs Diode Array detector	1.1 nm/pixel
Process line interface	Sapphire; Diameter 45 mm, thickness 12 mm, with food grade FFPM O-ring seal
Product temperature	Max 150 °C (302 °F)
Product pressure	Production pressure < 21 bar (< 305 PSI). Shock pressure < 50 bar (< 725 PSI)

Technology	NIR technology	
Software package	ISIscan NOVA™ for instrument control	
Wavelength accuracy	< 0.5 nm	
Wavelength precision	< 0.02 nm	
Wavelength temperature stability	< 0.01 nm/ °C	
Spectral noice	< 60 micro AU	
Vibrations - require optical fiber fixation	0.4 Grms	
Ambient operating temperature	ProFoss™ 2 -5°C to 40°C (23 °F to 104 °F), cooling with a compressed air line allows use up to 65°C (149 °F)	ProFoss™ 2 Ex 0°C to 50 °C (32 °F to 122 °F)
Pressurised air – cooling (Amb. Temp. 45 - 65°C)	Cooling 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	< 90% RH	
Dimensions (W x D x H)	w x h x d = 420 x 420 x 135 mm (16.5 x 16.5 x 5.3 inches) + brackets to hold the unit	
Weight	25 kg (20 kg)	
Power supply	1 phase, 100-240 VAC (max ±10% of the rated voltage), max. 40 VA, 50 - 60 Hx	
Cabinet / Housing materials	1.5 mm (lid 2.5mm) Stainless Steel EN 1.4301 (SS2333)	
Mechanical environment	Process control equipment	
Degree of protection	ProFoss™ 2: IP69*	ProFoss™ 2 Ex: IP6X
Approvals	ProFoss™ 2: CE	ProFoss™ 2 Ex: CE, ATEX, IECEx certified (Dust explosion approved)
Hygiene	3A hygiene certified	
Communication	KEPServerEX (Ethernet, Analogue Profibus/Profinet) to PLC/SCADA; FossManager™	
Network	High quality, shielded LAN cable; minimum category 5e. RJ 45 (IP 67) LAN connections	
Operation	Indoor use or outdoor shielded from rain and direct sunlight	

*IP69 is the highest protection for dust entering the unit. IP69 means protected against the effect of high-pressure water and/or steam cleaning high temperature.

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