Metris
ANDRITZ Digital Solutions

BATCH COATING CONTROL

EFFICIENT, AUTOMATED FEED COATING SYSTEMS

ANDRITZ

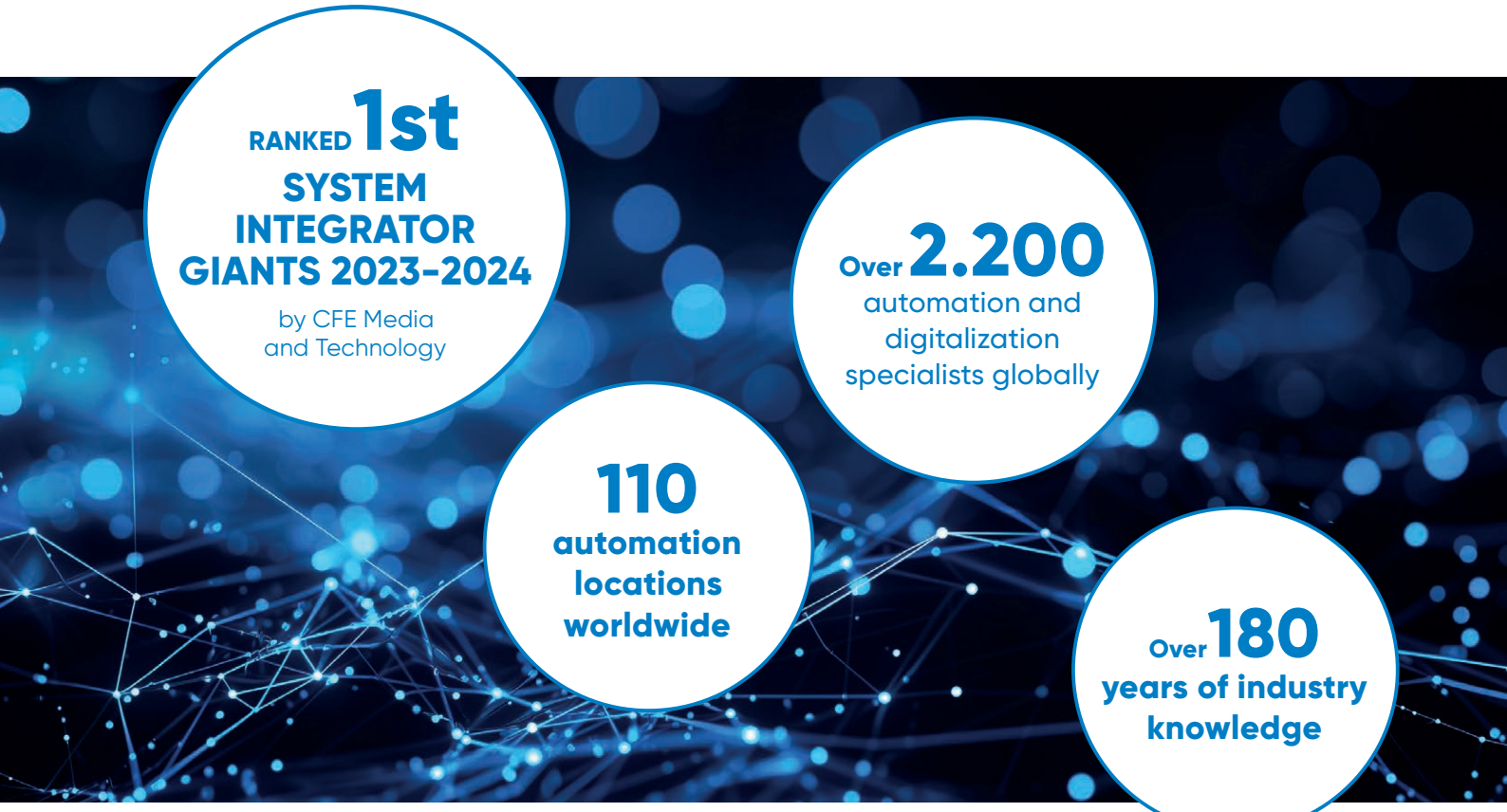
NEVER STAND STILL

At ANDRITZ, we understand the challenges the feed and biofuel industry faces today. With volatile raw material prices, emerging outbreaks, and a competitive marketplace, the need for innovative solutions has never been greater. Our Automation & Digitalization solutions, powered by the Metris Digital Platform, are designed to upgrade your operations, ensuring profitability, reducing total cost of ownership, and enhancing operational excellence.

Leveraging 40 years of cross-sector success, our platform blends human and digital intelligence to enhance processing efficiency and support growth, while delivering 7 - 16% throughput increases.

Our solutions encompass an evolving, vendor-neutral solution supported by state-of-the-art automation and digitalization technology.

ANDRITZ supports you every step of the way on your digitalization journey, ensuring your plant and your business **NEVER STAND STILL.**



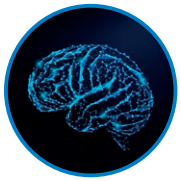
FOUR PILLARS OF SUCCESS

Through our global industry-specific expertise and deep understanding of the challenges our customers face, we deliver automation and digitalization solutions based on four key pillars.

AUTOMATION
The 'Muscle'

Achieve peak performance over the entire lifetime of your lines

The automation suite encompasses a broad spectrum of control solutions ranging from basic to fully automated systems, including production management, real-time plant simulation, condition monitoring, process optimization, and life cycle management.
These components maximize plant throughput, simplify maintenance, and optimize resource use.



DIGITALIZATION
The 'Brain'

Maximize your plant's potential while minimizing investment risk

The digitalization suite offers a holistic digital infrastructure for process optimization, asset management, operator training and knowledge management, ensuring a turnkey approach to feed and biofuel processing operations.
Our digitalization platform transforms operational data into robust, actionable analytics, maximizing your plant's potential while minimizing investment risk.

DEEP INDUSTRY EXPERTISE
The 'Heart'

Over 180 years of industry expertise and a global footprint ensure our solutions are adaptable and regionally attuned.
We preconfigure solutions based on our deep process knowledge, giving you immediate access to our know-how, our portfolio, and our service infrastructure all in one place.

AUTONOMOUS OPERATIONS
The 'Vision'

We strongly believe that the journey to autonomous operations is paved with bold steps by those who embrace every facet of automation and digitalization, turning challenges into opportunities for growth.
By taking that initial leap, you can unlock a world of possibilities. We can help you achieve a fully autonomous feed plant by 2027.

BATCH COATING CONTROL

This document is intended as a comprehensive introduction to Andritz's automation and control solutions for industrial dryers. It provides essential insights into production control and automation and the extensive capabilities of Andritz's solutions. The emphasis is on the practical features of these solutions in various scenarios.

Batch Coating System

User-friendly solution, designed to monitor and control all the parts and processes for feed coating lines including both vacuum-coating and non-vacuum coating solutions. It seamlessly integrates state-of-the-art machinery and complex processes with an intuitive, easy-to-use interface, simplifying operations and enhancing planning and decision-making capabilities.

Market-proven automated control solutions trusted worldwide

OVER 145 BATCH COATING CONTROL SYSTEMS INSTALLED GLOBALLY

CUSTOMERS IN OVER 40 COUNTRIES, enhancing their operational efficiency and reliability with us

- **Unmatched Expertise:** In-depth knowledge of process automation.
- **Tested Excellence:** High-quality, industry proven solutions.
- **Plug & Play Preconfigured Solutions:** Delivering adaptable solutions for your exact needs.
- **Global Support Structure:** Prompt and effective assistance for any challenges.
- **Secure Compliance:** Upholding industry cybersecurity standards.

Effortlessly integrates into existing systems

Easy-to-use, intuitive interface

Simplifies operations

Enhances planning and decision-making capabilities

5

Control Options

The vacuum coating controls are supported by the Management System.
This network-based, modular solution is capable of controlling up to four processes. It supports multiple control stations, offering enhanced operational flexibility and is designed with future scalability in mind. The system is designed with a focus on operational success, offering control, flexibility, and growth potential.

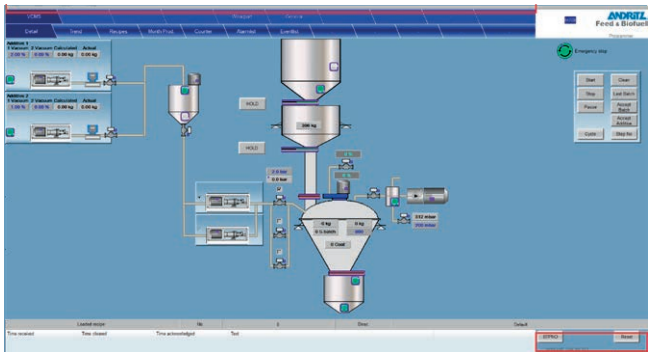
Management system

Management System

Management System is a modular system specifically designed to manage ANDRITZ Feed & Biofuel production machines or parts of a production line. It can also be configured to interface with third-party machines. This system enables remote monitoring and control of the entire process from a control room. Furthermore, it provides additional control options and configurable parameters directly from the interface. This makes it an excellent choice for comprehensive operation and maintenance insights.

SYSTEM DESCRIPTION

Management system, centered around a PLC based system, manages all machine electrical signals, and communicates with a computer running the Scada system via Ethernet. Scada allows process monitoring, management, and data storage for future access. It's network-based, allowing multiple clients to connect to the same server, enabling multiple control stations.



FEATURES

- **Extensive Human-Machine Interface:** Management System's Overview tab offers an intuitive, comprehensive graphical interface. It provides a color-coded visual representation of the entire installation and all its components, allowing for real-time status monitoring. The interface is designed for direct, real-time control, with fields for adjusting Recipe parameters and displaying current values.
- **Efficient Control:** Auto Start and Auto Stop execute preprogrammed steps to make sure the machines start in the correct order. Step Start and Step Stop offer granular control, initiating or halting individual steps as needed.
- **Flexible Management Options:** The system provides three user levels - Operator, Maintenance, and Programmer, each with unique access for efficient operation, configuration, and testing.
- **Real-Time Connection Monitoring:** The system provides instant visual feedback on the PLC connection, ensuring seamless operation and immediate fault detection.
- **Detailed Component Insights:** Clickable objects on the overview screen open pop-up windows, providing in-depth information about motors, valves, and controllers. This feature allows for manual control of the individual components.
- **Dynamic Trend Analysis:** Management System provides configurable trend curves and graphs for numerous variables, offering insights like temperature, speed, and retention time. This feature aids in monitoring system performance and making informed decisions.
- **Event logger:** The system logs its events, enabling backtracking and comparison of current process parameters with past ones for comprehensive process review and analysis.

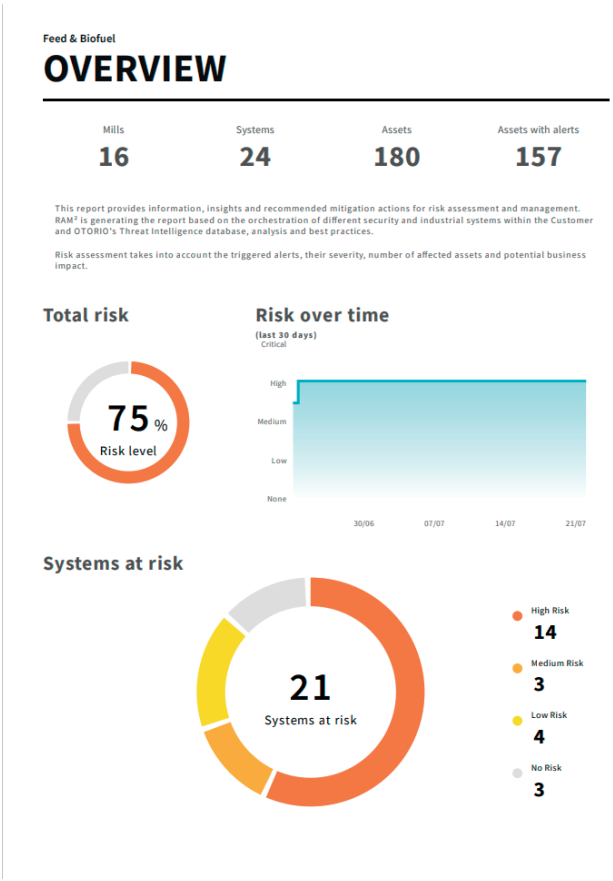
Cybersecurity Offerings

THE CYBERSECURITY PROBLEM

The digital revolution has boosted operational efficiency but also heightened cyber-attack risks. Such attacks, now common across sectors including feed and biofuel, pose significant threats.

IMPACT OF CYBERATTACKS

Cyberattacks are highly destructive. These attacks disrupt supply chains, halt production, and affect operations, leading to significant losses. On average, a cyber-attack causes a 5-day production halt, costing approximately $4.47 million.



OUR SOLUTION

ANDRITZ helps its global customers minimize digital and cyber risks through its partnership with leading OT security provider OTORIO. ANDRITZ provides combined, advanced cybersecurity and automation options integrated into its systems, safeguarding operations against cyber threats and disruptions, ensuring smooth, uninterrupted production.

STANDARD PLATFORM - OTORIO spOT™

ANDRITZ utilizes spOT™, a unique technology developed by its OT security partner OTORIO. spOT™ is an integral part of the machine delivery and quality procedures, supporting system hardening. By checking the full machine against the relevant IEC62443 / NIST / NERC standards or additional standards required by customers, spOT creates a cyber security "machine fingerprint" and automatically generates machine-specific IEC compliance letters.

FEATURES

- ANDRITZ conducts factory acceptance tests for all equipment. With Otorio spOT integration, these processes become less time-consuming and more cost-effective, ensuring that products meet all required standards before shipment.
- All equipment delivered by ANDRITZ, including Windows PCs and servers, is IEC62443 compliant helping organizations understand and mitigate system risks.
- Comprehensive complaint reports are provided for all Windows PCs and servers, keeping you informed about your system's security state.

OPTIONAL FEATURES:

- **Updating the equipment with new patches:** Regular updates are crucial for maintaining the security and functionality of your equipment. They help to fix vulnerabilities, improve performance, and add new features.
- **Implementing additional hardening, per spOT's security overview and compliance reports:** dening your systems can significantly enhance your security posture. It helps to reduce system vulnerabilities and protect against potential threats.

ADDITIONAL OPTION - OTORIO RAM²

Otorio RAM² is a distinct, advanced OT cybersecurity platform for organizations looking to further invest in their cybersecurity governance. It integrates seamlessly with existing systems, serving as an overlay or standalone solution for industrial control systems (ICS) and cyber-physical systems (CPS). Please note that the platform requires a separate acquisition by the customer.

FEATURES

Unparalleled Visibility: RAM² orchestrates data from cross-domain sources, providing a consolidated view of your entire operational network. This feature makes monitoring and risk management more efficient and proactive.

- **Correlated insights:** RAM² correlates data from various sources, reducing noise and providing actionable "insights". This enhances focus and effectiveness in threat response.
- **Non-intrusive attack simulations:** With the help of cyber digital twin technology, RAM² forms a virtual duplicate of your OT network. This allows security teams to simulate potential breaches and attacks, helping to anticipate and prepare for possible threat.
- **Integrated overlay:** RAM² can be used as an overlay or a standalone OT security solution, maximizing ROI from your existing operational security stack. This feature prevents downtime and financial losses.
- **Powerful noise reduction:** RAM² reduces unimportant and irrelevant alerts by up to 80%, eliminating alert fatigue and making sure that genuine threats are not obscured.

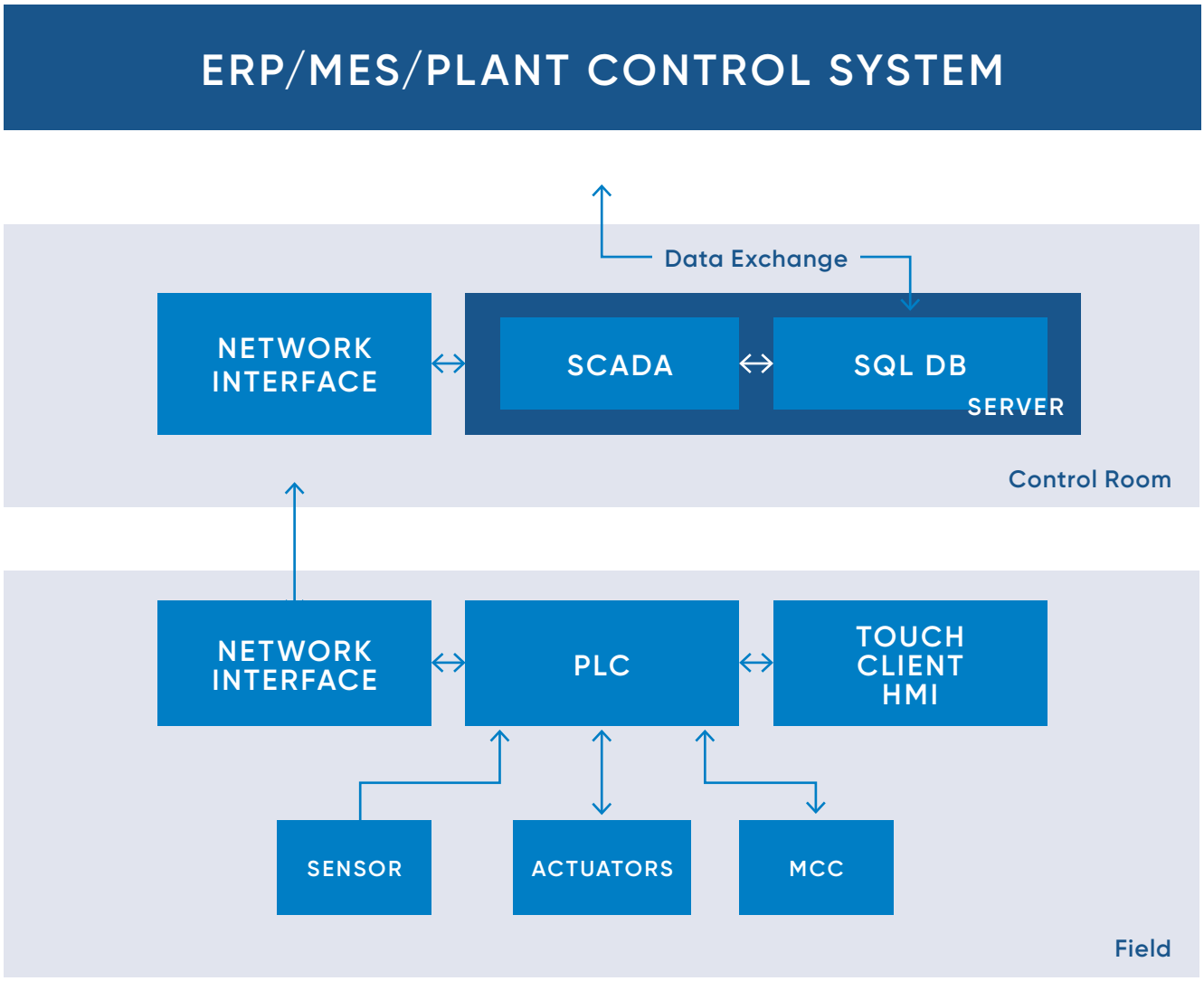
WHAT IS THE RIGHT CHOICE FOR YOU?

- **Otorio spOT:** for a strong security foundation in your operation. Otorio spOT ensures essential protection, provides on-demand reports, and is a cost-effective solution offered by Andritz.

- **Otorio RAM²:** if you wish to create an enterprise-wide security strategy, have preexisting cybersecurity options that can be integrated, and desire total and comprehensive control and monitoring of your cybersecurity., Otorio RAM² is ideal. It integrates with existing systems, maximizing return on investment.

Remember, the right choice is the one that best fits your specific needs and objectives, and we're here to help you make that choice.

Control System Architecture



Management System Architecture

Vacuum Coating Control

GENERAL OVERVIEW

Vacuum Coating Control System is designed to address common challenges in the vacuum coating process. It simplifies the operation of complex coating lines and ensures a consistent spray, even with variations in pellet flow, discharge surges, and changes in pellet capacity. The system provides precise control over vacuum pressure, liquid addition, and cycle time, enabling flexibility and repeatability in achieving the desired level of absorption and liquid penetration in the pellets.

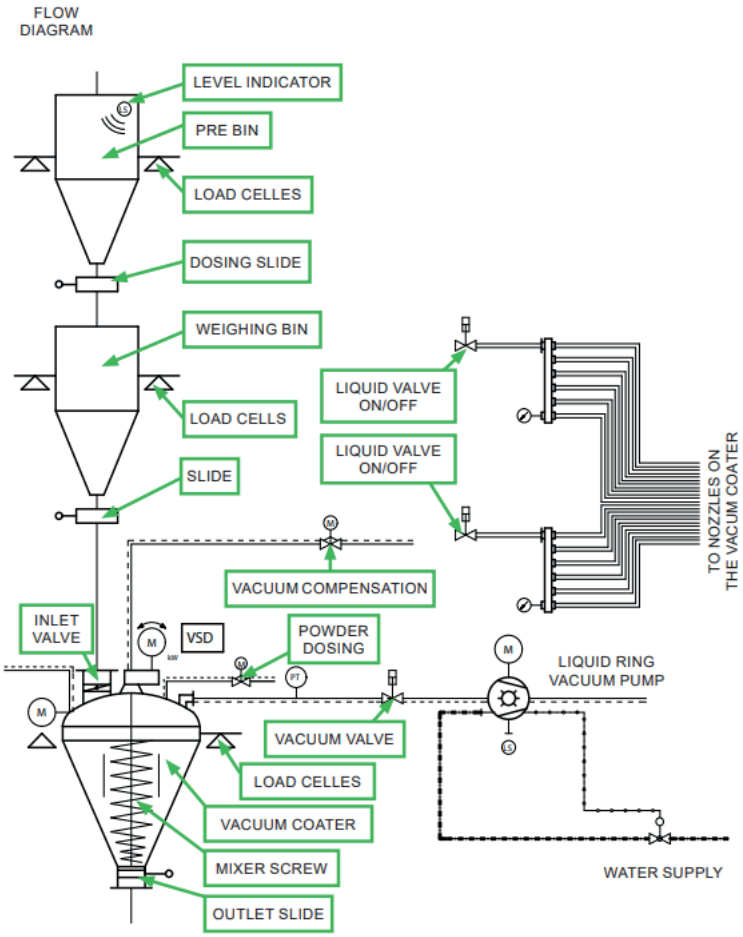
THE VACUUM COATING CONTROL SYSTEM CONSISTS OF THE FOLLOWING PROCESS UNITS:

- **Pre-bin (optional)**
- **Weighting bin (optional)**
- **Vacuum coater**
- **Vacuum system (optional)**
- **Liquid mixer (optional)**
- **Batch Liquid & Powder dosing units.**

PROCESS DESCRIPTION

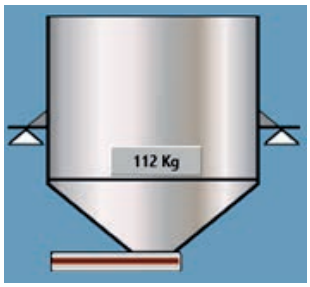
The material intake occurs via a dosing slide through the flexible connection and the inlet valve. The vacuum build-up is facilitated through the vacuum connection with the vacuum pump. Powder is added through the connection and is shut off from the coater by the butterfly valve below. During powder addition, the equalization fan runs.

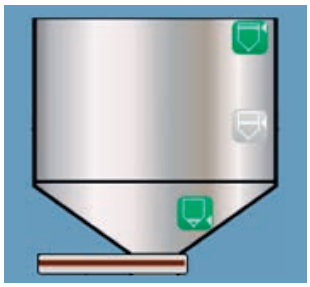
The mixer screw, operated by a frequency-controlled geared motor, ensures optimal circulation of the product from the bottom valve slide up to the spray systems. These systems allow the addition of up to five different liquids or large quantities in a very short time through a combination of systems. Vacuum compensation is adjusted using control valves. Inside the coater, the vacuum is compensated through the mixer screw shaft and through shaft holes both at the top and bottom of the coater. The bottom valve is opened to empty the coater, and the product passes through a flexible connection, continuing through the process line.



PRE-BIN

The pre-bin is used to level capacity fluctuations at a pellet mill start/stop, at varying cooler discharge speeds, and at sudden cooler emptying processes. These capacity fluctuations have to be leveled to make the weigher system work correctly and to avoid inaccurate dosing quantities per ton of feed. The pre-bin has 2 options for quantity measurement: load cells and level indicators.



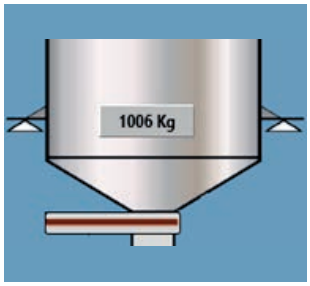


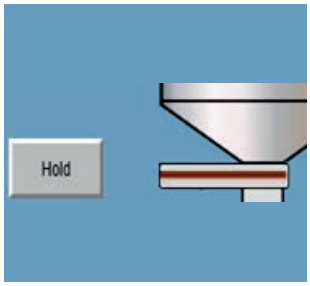
PRE-BIN UNIT COMPONENTS:

- **Load cells for quantity indication:** Load cells in the prebin measure the quantity of the dry material. The value is then displayed on the control interface.
- **Digital level indication:** Low-level, high-level, and full-batch level switches are used to indicate the quantity of raw material. The status of the switches is displayed on the interface.
- **Dosing gate:** Fully opens the gate until the dosing reaches the coarse/fine range. At this point, the gate begins to close, stopping at a mid-position. When the filling reaches the tailing range, the gate closes completely. These setpoints can be defined from the recipe page.

WEIGHTING BIN

The weighting bin receives the product/batch that needs to be dosed to the coater. The liquid dosing to mix bin starts when the weigh bin is ready. If the liquid dosing is performed in a batch process using tanks on load cells the weighing bin may be applied to increase coating capacity. If the liquid dosing is a continuous process using flow meters, the weighing bin may be excluded. It may however still be included to prevent spending valuable time dosing pellet into the coater.



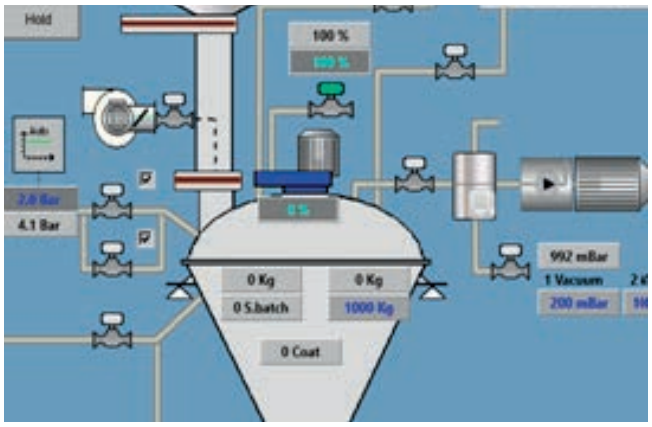


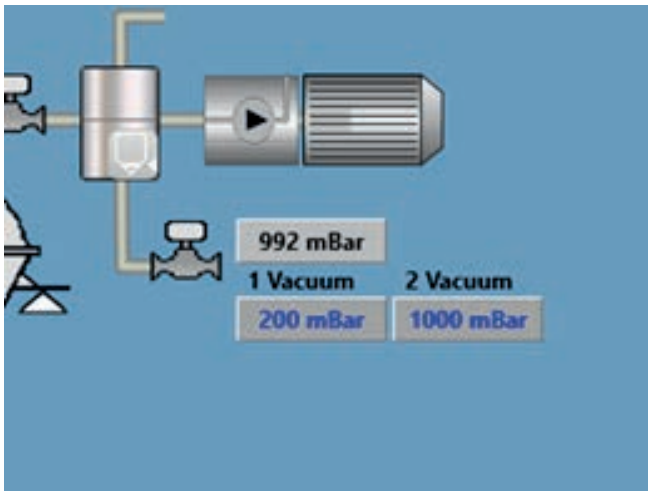
WEIGHTING BIN UNIT COMPONENTS:

- **Load cells:** Used to measure the amount of material in the weighting bin.
- **Slide gate:** Controllable slide gate. Used to adjust the quantity of material flowing into the coater. Pressing the hold button in the interface will temporarily prevent product release from the bin.

VACUUM COATER

The vacuum coater unit manages the dosing, liquid and powder addition within the coater, and the emptying process at the end. The vacuum coating control system is designed to monitor and control these operations, ensuring that the process is both efficient and safe.





VACUUM COATER UNIT COMPONENTS:

- **Mixer screw motor:** The mixer motor speed is variable and adjusts to the load on the coater. Maximum and minimum speed setpoints can be configured.
- **Mixer screw motor reverse:** Once a weight set point is reached during emptying, the mixer motor can reverse to dislodge remaining material and prevent blockages.
- **Equalization fan:** Controls the airflow in the coater for more efficient powder distribution.
- **Inlet and outlet slide gates:** Control of the inlet and outlet slide gates ensures optimal product flow, prevents overfilling, and facilitates efficient removal of the coated product.
- **Weight indicator and transmitter:** The weight measured in the vacuum coater is continually tracked and relayed to the control system, which triggers an alarm if overload occurs.

VACUUM SYSTEM UNIT COMPONENTS:

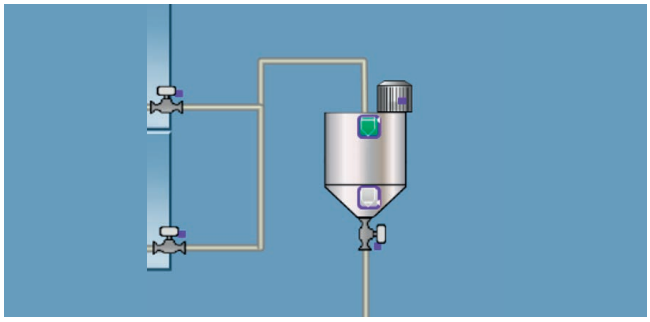
- **Vacuum pump and water level control:** A water ring vacuum pump is used to control the vacuum inside the coater.
- **Coater vacuum configuration and vacuum release control:** The vacuum system allows precise adjustments over parameters such as the desired vacuum setpoint, the maximum deviations allowed, and the control of the release valve.

LIQUID MANIFOLDS:

- **Pressure indication and adjustment:** The liquid addition supply speed increases to reach the pressure set point in the manifold, ensuring the correct amount of liquid flow. The actual pressure is also displayed on the interface.
- **Manifold valves:** Controllable on-off valves allow for fine control over the flow of the additive and the amount injected.

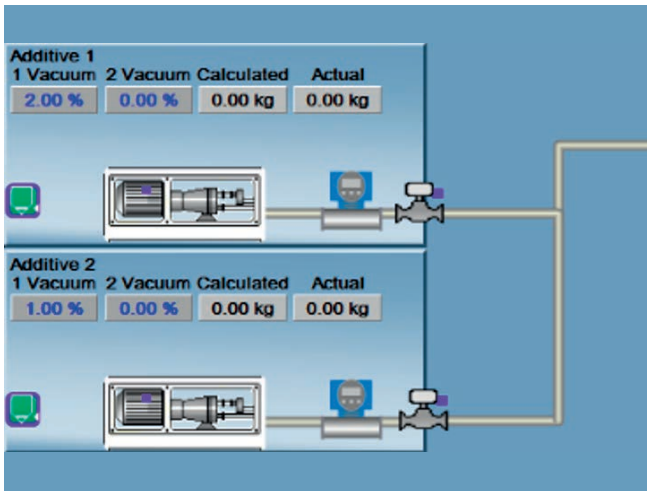
LIQUID MIXING

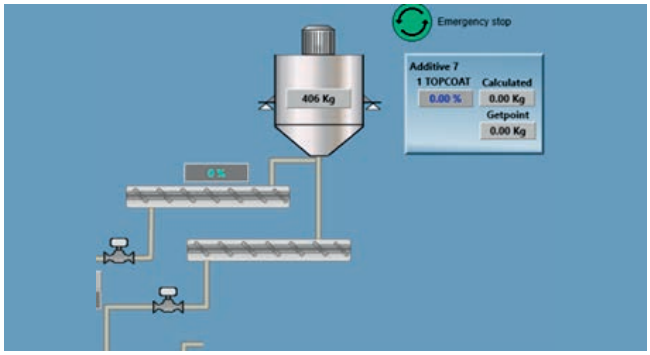
The correct blending of liquid additives is crucial for attaining the desired characteristics of the final product. The system offers precise controls for both the mixing and stirring bins, ensuring a high-quality, consistent outcome.



ADDITIVE DOSING UNIT:

The selection of both liquid and powder additives is pivotal in the batch coating process. Often, a combination of multiple additives is required to produce the ideal product. At ANDRITZ, we recognize the ever-evolving demand for innovative recipes. The Batch Coating Control system can manage the inclusion of up to nine additives. This ensures that the system can meet the requirements of any feed production line, even as they expand in the future.





MIXING/STIRRING UNIT COMPONENTS:

Additive mixing/stirring control: Two speed settings, high and low, can be configured to adjust the speed of the process.

- **On/Off valves:** 2 On/Off valves are used to control the flow of the material into the bin.

MIXING BIN:

- **Liquid pump:** Allows the speed control of either 1 or 2 pumps to adjust the flow amount into the mixing bin.
- Load cells: Load cells are used to monitor the amount of product dosed in order to avoid overfilling the bin and overloading it.

BATCH LIQUID UNIT:

- **Batch dosing according to product batch size:** The dosing process is precise and delivers the exact amount of liquid necessary, reducing resource-waste and improving the cost-efficiency of the operation.
- **Pump speed control:** The speed of the pump is variable and adjusts based on the required flow amount.
- **Flow measurement:** Accurate and real-time flow monitoring ensures that the proper quantity of liquid is dosed.

POWDER DOSING UNIT:

- **Powder dosing according to batch size:** The dosing process is precise, delivering the exact amount of powder needed, reducing resource waste and enhancing cost efficiency.
- **Variable speed of dosing screw:** The speed of the dosing screws is adjusted based on the require dosing quantity.
- **Bypass with reverse function:** The reverse setup provides an easy solution for powder substituti-on, enabling quick removal of the existing powder when a different one is needed.
- **Loss-in weight capacity calculation:** Measures the quantity of dosed powder.
- **Aspiration fan:** Safely removes excess dust in order to prevent cross-contamination and keep the system clean.
- **Live-bin scraper motor:** Controls the direction and speed of the bin scraper, ensuring that blockages are prevented and the powder flows evenly.
- **Inlet valve control:** Controls powder flow accurately.

BATCH COATING CONTROL

FUNCTIONAL SCOPE

Functional Unit	Unit Type	Functional description	Management System
Batch dosing	Pre-bin w/load cells	• Quantity indication by weight measurement of the pre-bin	★
	Pre-bin w/3 level switches	• Quantity indication by digital indication of level in the pre- bin: low level, full batch level and high level	★
Product pre-batch weighing	Weighing Bin	• Pre-batch dosing of product before vacuum coater • Control of extra slide gate	★
Vacuum Coating	VAC1000-1500 and Vacuum pump	**General** • Variable speed and reverse control of mixer motor • Start/stop of equalization fan • Control of inlet and outlet slide gates • Transmitter and Indication of weight of load cells **Vacuum system** • Vacuum pump control incl. water level • Coater vacuum according to pressure set point and vacuum release control **2 Liquid manifolds** • Pressure indication of manifold 1 and 2 • On/Off valves for manifold 1 and 2	●
Liquid mixing	Mixing bin	• Mixing of additives in mixing bin with 2 steps for speed of the motor • Weight dosing with load cells • 2x On/off valves • Variable speed of 1 or 2 pumps	★
	Mixing & Stirring bins	**Mixing bin** • Mixing of additives in mixing bin with 2 steps speed of the motor • Weight dosing with load cells • 2x On/off valves • Variable speed of 1 or 2 pumps **Stirring bin** • Stirring of additives • 1x On/off valve	★
Additive 1	Batch Liquid Unit	• Batch dosing according to product batch size • Variable speed of pump • Flow measured by pulses	●
Additive 2	Batch Liquid Unit	• Batch dosing according to product batch size • Variable speed of pump • Flow measured by pulses	★
Additive 3	Batch Liquid Unit	• Batch dosing according to product batch size • Variable speed of pump • Flow measured by pulses	★
Additive 4	Batch Liquid Unit	• Batch dosing according to product batch size • Variable speed of pump • Flow measured by pulses	★
Additive 5	Batch Liquid Unit	• Batch dosing according to product batch size • Variable speed of pump • Flow measured by pulses	★
Additive 6	Batch Liquid Unit	• Batch dosing according to product batch size • Variable speed of pump • Flow measured by pulses	★
	Powder dosing Unit	• Powder dosing according to product batch size • Variable speed of 2 dosing screws • Reverse function for bypass • Loss-in-weight capacity calculation • Aspiration fan • Live-bin scraper motor • Control of 2 inlet valve in coater	★
Additive 7	Batch Liquid Unit	• Batch dosing according to product batch size • Variable speed of pump • Flow measured by pulses	★
	Powder dosing Unit	• Powder dosing according to product batch size • Variable speed of 2 dosing screws • Reverse function for bypass • Loss-in-weight capacity calculation • Aspiration fan • Live-bin scraper motor • Control of 2 inlet valve in coater	★
Additive 8	Batch Liquid Unit	• Batch dosing according to product batch size • Variable speed of pump • Flow measured by pulses	★
Additive 9	Batch Liquid Unit	• Batch dosing according to product batch size • Variable speed of pump • Flow measured by pulses	★

● included

★ optional addition

GLOBAL SUPPLIER – LOCAL PRESENCE

ANDRITZ Feed & Biofuel is truly a global organization – with local presence. We are represented all over the world. The global market is served from five main locations in Denmark, China, Netherlands, USA, and Slovakia.

In addition, ANDRITZ Feed & Biofuel operates from several strategic regional sales, engineering, and service locations in Australia, Bangladesh, Brazil, Canada, Chile, Dubai, France, Germany, India, Italy, Mexico, Poland, South Africa, Thailand, Turkey, the UK and Vietnam – and is also represented locally by agents and distributors in many other markets.

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