Metris
ANDRITZ Digital Solutions

FEED & BIOFUEL

DRYING CONTROL

ADVANCED AND VERSATILE DRYING CONTROL SYSTEMS

EFFORTLESS AUTOMATION.
TOTAL PEACE OF MIND

ANDRITZ

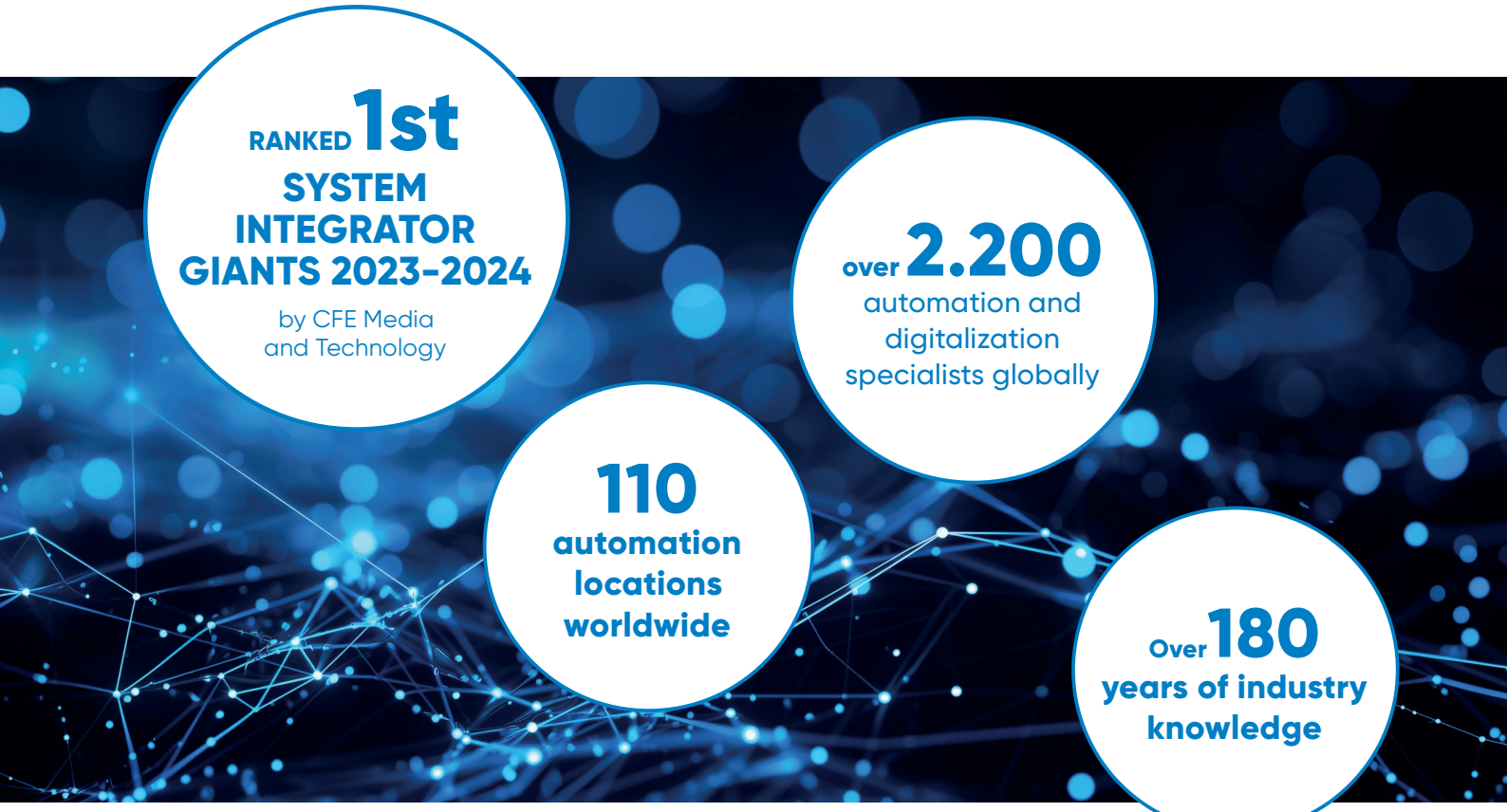
NEVER STAND STILL

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 our 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 will be with you every step of the way in your digitalization journey, ensuring your plant and your business **NEVER STAND STILL.**



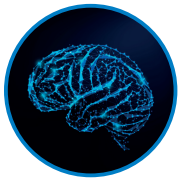
FOUR PILLARS OF SUCCESS

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.

FLOW 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.

Drying Control System

User-friendly solution designed to facilitate the control and automation of industrial dryers. 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 140 DRYING 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

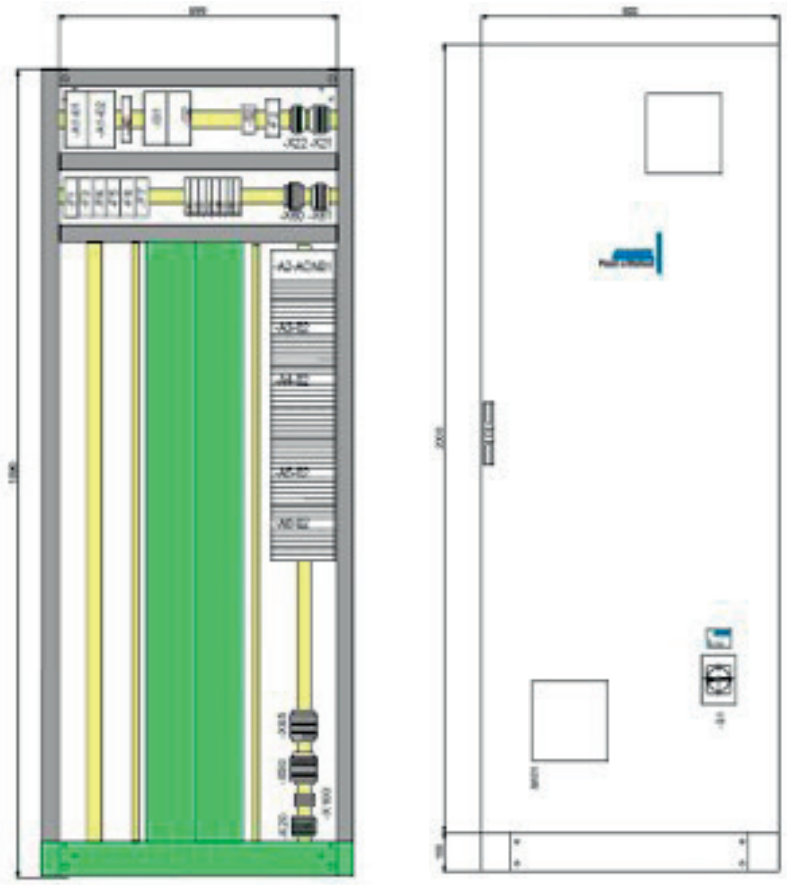
Control Options

Two distinct control systems are available to meet diverse needs: Management System and Panel System.

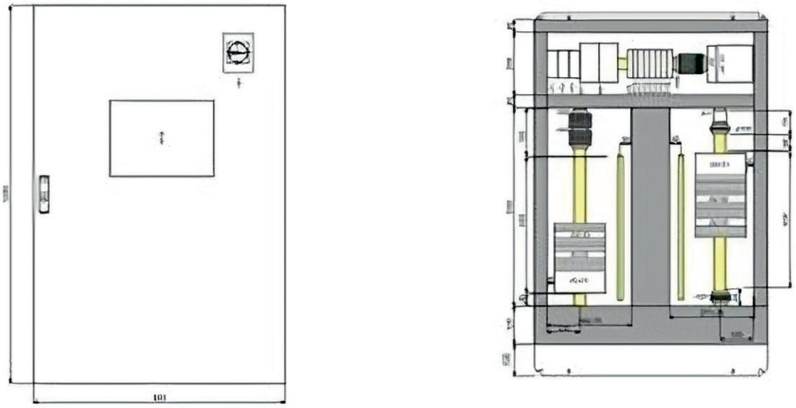
Management System is a network-based, modular solution capable of controlling up to four processes.
It supports multiple control stations, offering enhanced operational flexibility, and is designed with future scalability in mind.

Alternatively, **Panel System** is a cost-effective choice that provides an optimal balance between performance and expenditure. It includes an ergonomic user interface that displays relevant information, enabling direct monitoring and control of manufacturing operations. It also supports add-ons, offering flexibility to adapt to evolving needs.

Both systems are designed with a focus on operational success, offering control, flexibility, and growth potential.



Management system



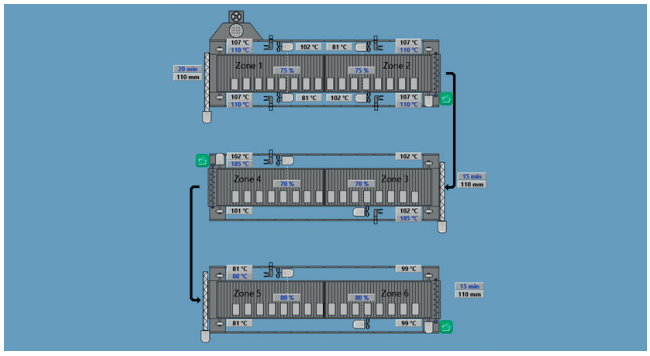
Panel system

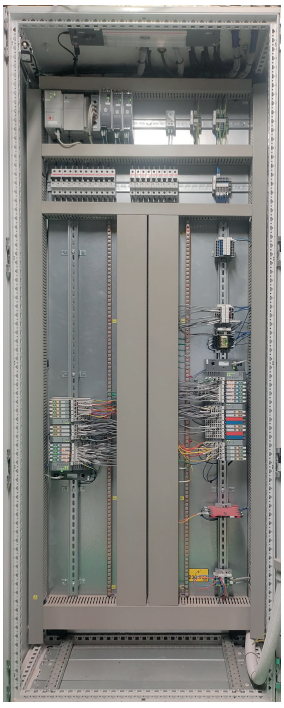
Management system

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

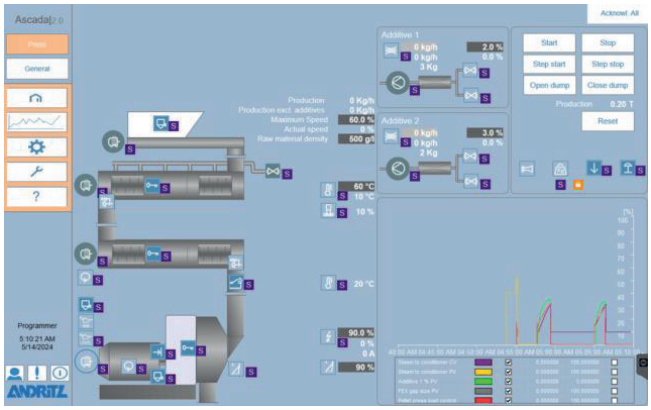
- **Extensive Human-Machine Interface:** Management System's Overview tab offers an intuitive, comprehensive graphical interface. It provides a color-coded visual representation of the entire installation and all its components, allowing for real-time status monitoring. The interface is designed for 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. The historical data is also valuable for demonstrating compliance with various standards and regulations.

Panel System

Panel System is a standalone, cost-effective solution that is installed in the field near the machines. The system includes a PLC, a panel PC and this approach reduces costs and complexity. It doesn't offer remote control, but instead prioritizes direct, localized control. The system is adaptable, allowing for future additions. It's designed for smaller operations, providing real-time control and data collection from process functions.

SYSTEM DESCRIPTION

Panel System consists of a wall mounted panel with a 12" touchscreen computer and a PLC with input and outputs. It is Ethernet-based and has a 5-port switch where all network units are connected.



FEATURES

- **Interactive Display:** This feature offers a graphical representation of your setup. It includes a control section for line operation and an alarm bar. It allows access to pop-ups for adjustments via touchscreen inputs. The display aligns with your system configuration, mirroring the actual installation managed by the Panel System.
- **Function-Based Control System:** The system utilizes a function block-based approach, enhancing process visibility and allowing more granular control. It supports various functions and allows simulations, for testing the functionality of the program.
- **Interactive Function Pop-ups:** Clickable functions open configurable pop-ups, providing detailed information and allowing parameter adjustments. Color coding offers immediate visual feedback, enhancing user control and system understanding.
- **Trend Displays:** The system features trend displays, showing parameter development over time. This powerful tool aids in tuning PID controllers and analyzing process issues, enabling efficient problem-solving and system optimization.
- **Historic Alarm List:** Tracks all past alarms, aiding in process analysis and understanding system behavior.
- **Analytics indicator:** Showcases key metrics such as work hours, production quantity, and software version.

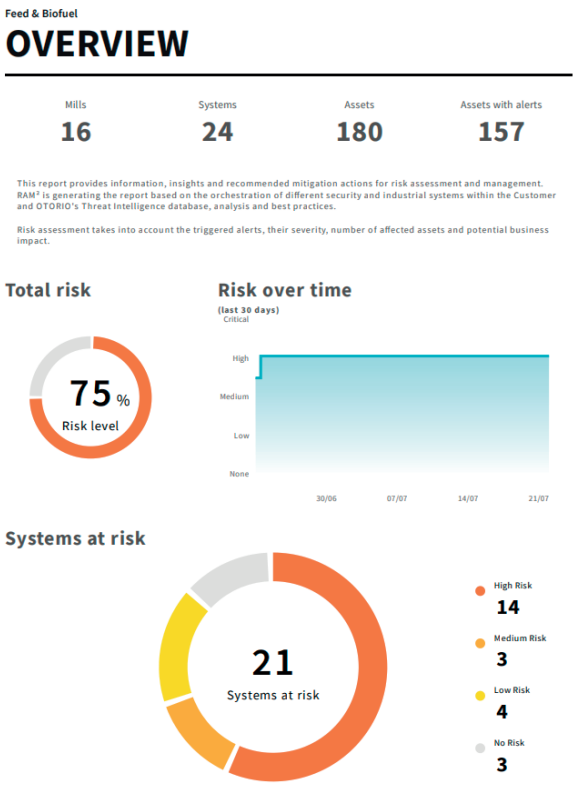
Cybersecurity Offerings

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.

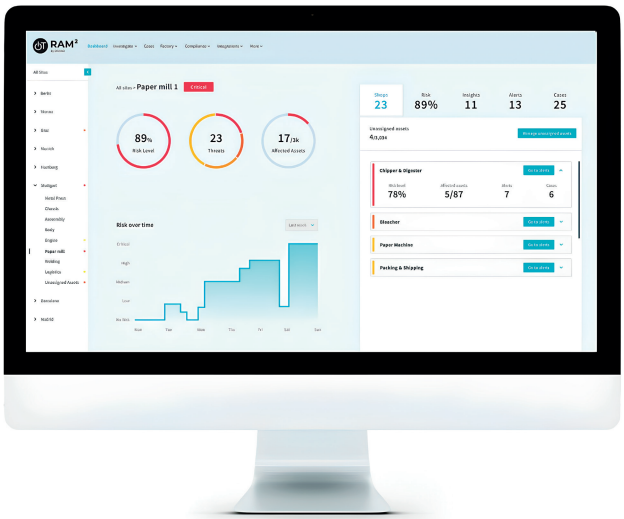
ADDITIONAL OPTION - OTORIO RAM²

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 would be a separate acquisition on the part of 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 foresee and prepare for possible threat paths.
- **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.



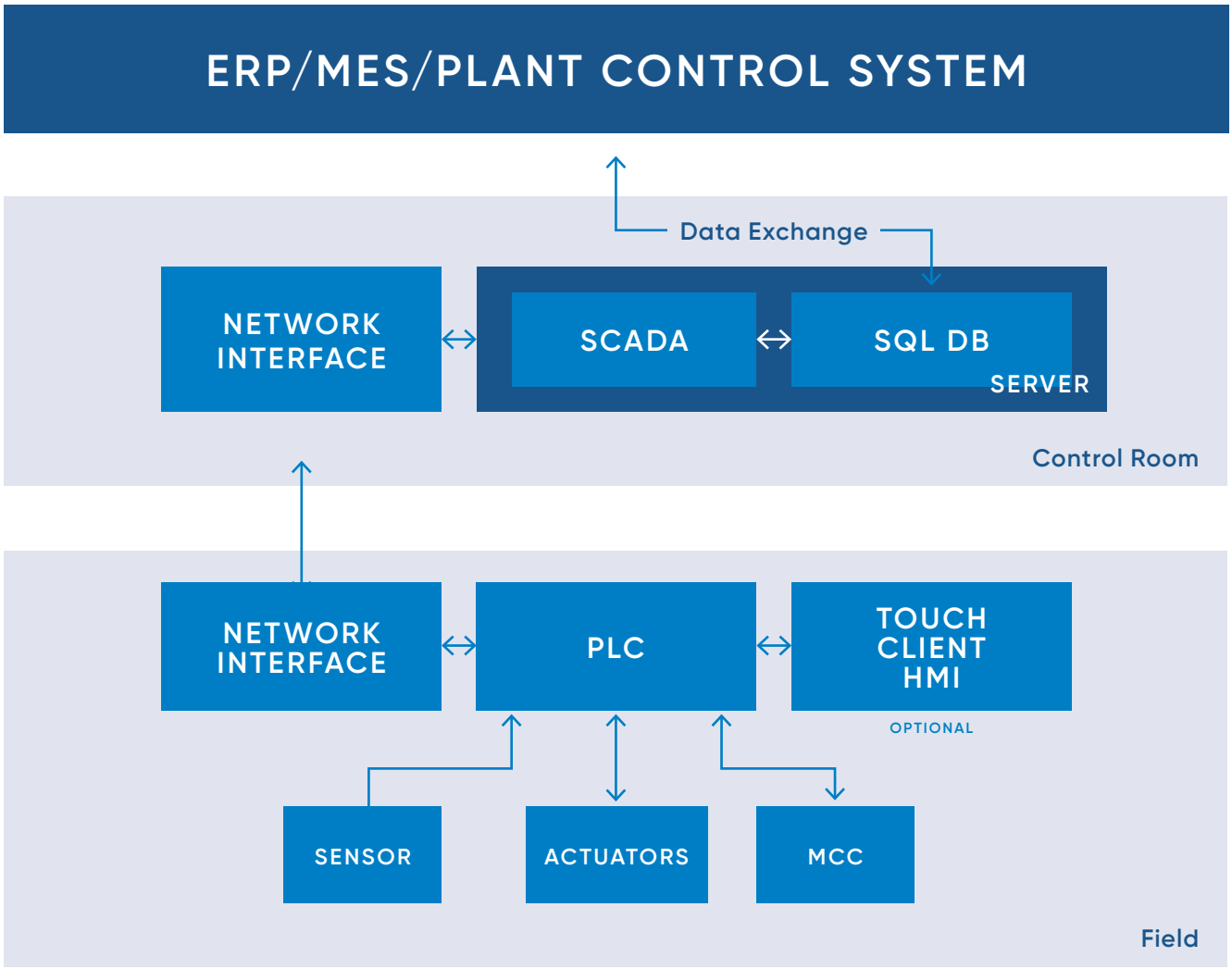
WHAT IS THE RIGHT CHOICE FOR YOU?

- **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. Additional, bonus features can be acquired if you wish to further strengthen your operation's security.

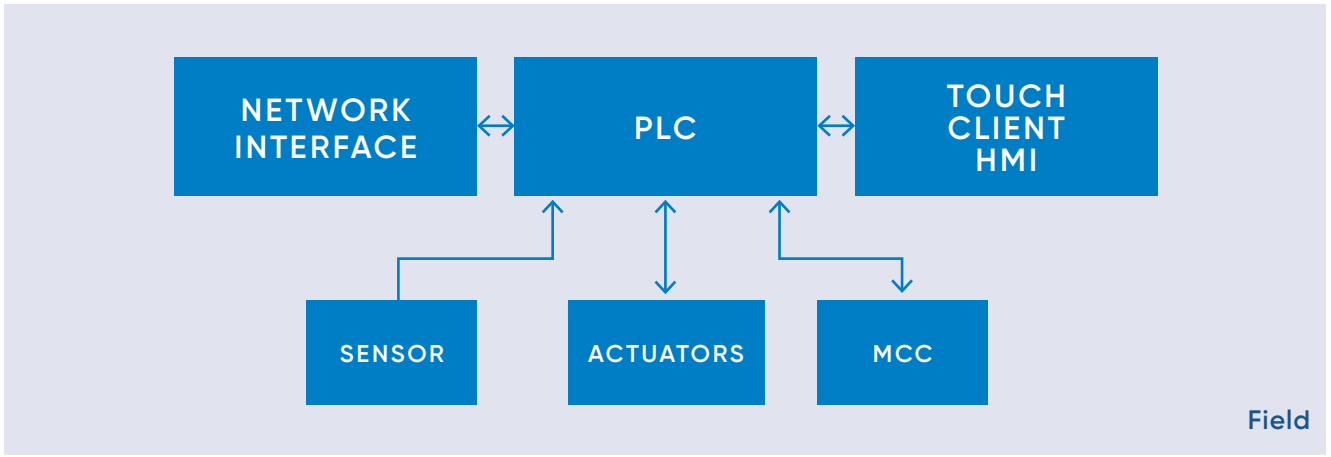
- **Otorio RAM²:** if you wish to create an enterprise-wide security strategy, have preexisting cybersecurity options that can be integrated, and desire total and comprehensive control and monitoring of your cybersecurity., Otorio RAM² is ideal. It integrates with existing systems, maximizing return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



Panel System Architecture

Dryer Control Functions

GENERAL OVERVIEW

The drying control system is designed to efficiently manage and monitor every aspect of dryer lines. Tailored specifically for feed production, it ensures the drying process achieves optimal moisture levels while maintaining consistent product quality. The system enhances production efficiency, reduces energy consumption, and allows for the handling of multiple recipes. It provides a clear overview of the entire operation with fine control over each part, ensuring safe and reliable drying throughout the process.

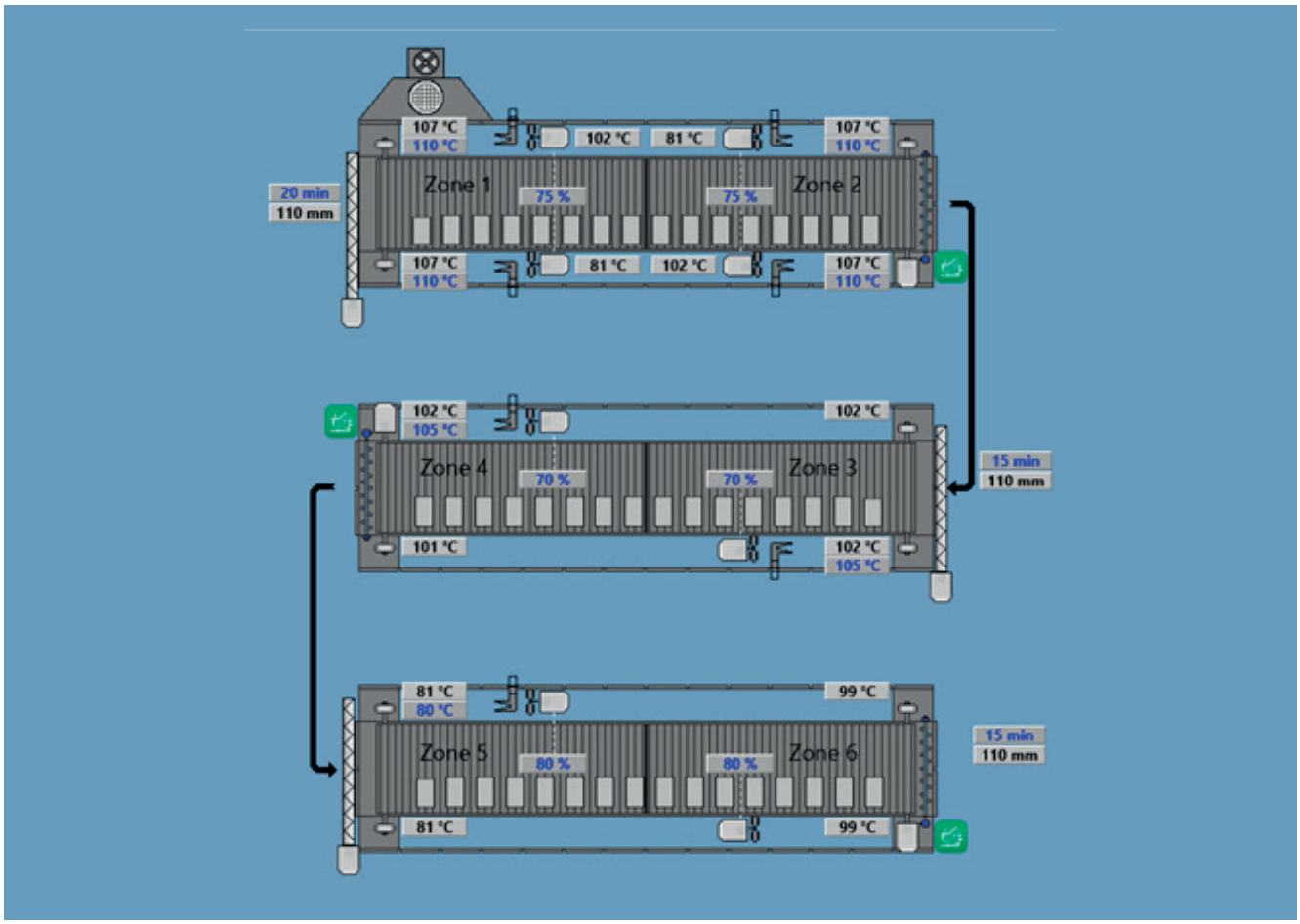
THE DRYING CONTROL SYSTEM CONSISTS OF THE FOLLOWING UNITS:

1. **Product supply (inlet)**
2. **Dryer zones**
3. **Air system**
4. **Outlet transport**

PROCESS DESCRIPTION

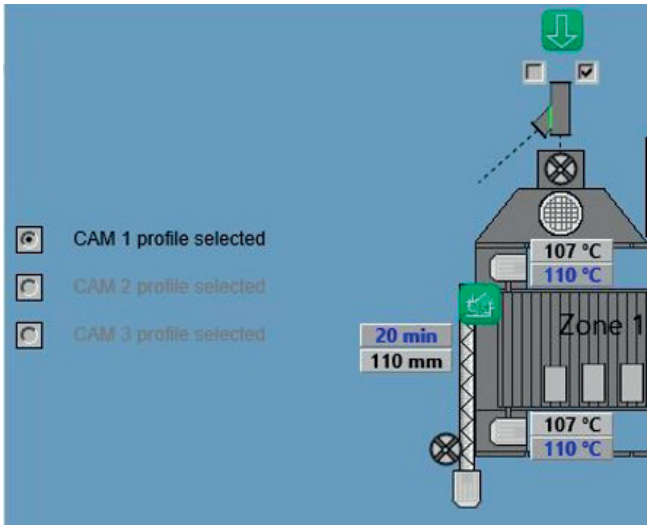
The extruded material enters the dryer at the material distributor located at the top of one end. From there, it is evenly distributed across a wide, centrally placed perforated belt conveyor. The belt transports the material to the opposite end of the dryer, where it is either discharged or moved to the next deck below, where it is transported in the opposite direction. This process repeats for each deck until the material exits the dryer.

As the material moves through the dryer, it passes through several zones where hot air dries the pellets by passing through the material layer, carrying away evaporated water. The heating energy comes from either steam heat exchangers or gas burners. Fine dust that passes through the perforated belt is collected by a fines screw and transported to an outlet at the bottom of the dryer.



PRODUCT SUPPLY CONTROL

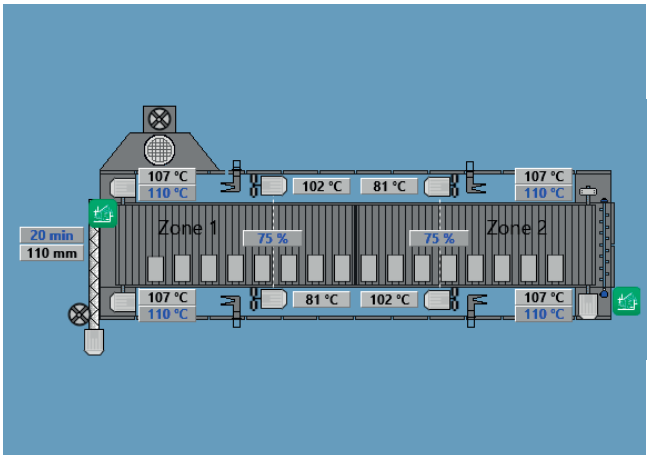
The product supply unit is designed to efficiently distribute the product into the dryer while maintaining a closed system. Ensuring even distribution is crucial, as uneven distribution can lead to inefficient and insufficient drying.



PRODUCTION INLET CONTROLS

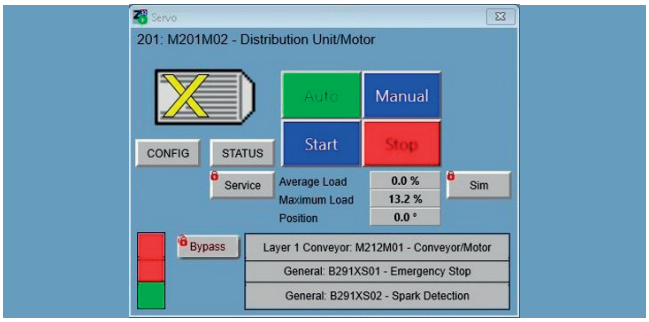
LAYER CONTROL

The drying control system is designed for flexibility and precision, offering modular control over multiple drying zones to adapt to the specific needs of each recipe and provide the adequate retention time and temperature. As the material moves through the dryer, it passes through several individual zones on each deck, where internal fans recirculate air and heating sources manage temperature. The system allows for efficient air recirculation on both sides of the belt conveyor, ensuring uniform drying. Additionally, it includes comprehensive monitoring and control features, with layer tracking features to optimize performance throughout the process.



PRODUCT SUPPLY UNIT COMPONENTS

- **Airlock control:** Ensures the dryer itself is a closed system, so that good air tightness is maintained and prevents disturbance of the process conditions in dryer.
- **Material distributor:** Evenly distributes the pellets across the entire belt width.
- **Servo motor with servo drive cabinet:** The servo motor controls the distributor and has a special pop up, where it can be controlled.
- **CAM profiles:** Option for 3 separate CAM profiles which are set during commissioning for fast and precise swapping of recipes.



DRYER UNIT COMPONENTS

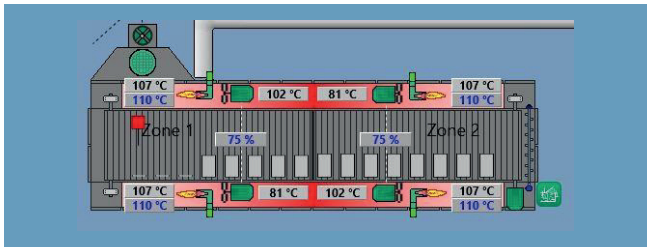
- **Inclination sensor:** Measures the product level in the layers. The product flow between the layers is displayed by the black bars in the interface.
- **Dryer belt:** The speed of the dryer belt can be changed to adjust the retention tike. When pellet size, oil content, or density changes, the retention time has to be changed.
- **Clogging detector:** Detects when the material stops moving between the dryer layers.
- **Recirculation fans:** Ensure the recirculation of air in each layer. Fans are synchronized between layers for equivalent air conditions and have overheat protection.
- **Optional cleaning system:** Internal cleaning system removes ~90% of dust on bottom plates in the air ducts.
- **Overflow control:** Prevents the dryer from getting damaged if a blockage occurs at the end of the belt.

Heat sources:

- Gas burner: An external burner management system controls the gas burner.
- Steam heat exchanger: The steam flow is controlled by a motorized steam valve.

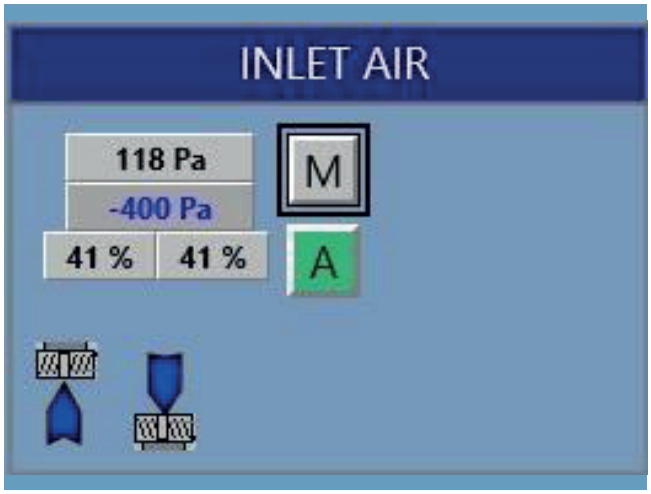
LAYER TRACKER

The tracking of product inside of the dryer can be done using the flag. The dryer has option to set different flags, with each flag has its own purpose.



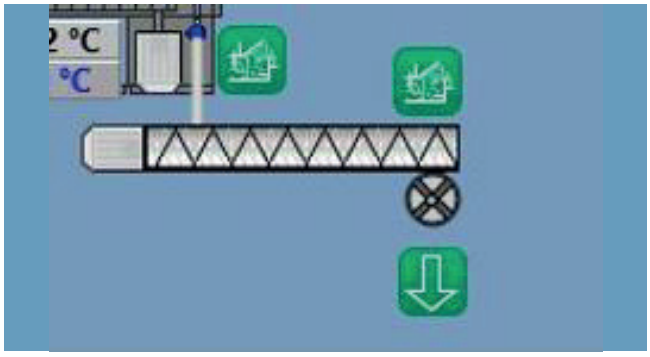
AIR SYSTEM CONTROL

A steady flow of ambient air continuously runs through the dryer, entering from the bottom and exiting through the top. Additionally, the system controls pressure to prevent dust leakage and lower the boiling point of water, increasing drying efficiency.



OUTLET TRANSPORT CONTROL

The dried product is removed from the outlet and sent to an elevator or to another machine, such as a coater. Another screw removes the fines and transports it to the dryer outlet, from where the fines can be reused in the production.



FLAG OPTIONS

- **Info flag:** Can be set at any point in the dryer. It moves with the product and can be configured to do different tests such as moisture content or density.
- **Alarm flag:** Creates an alarm when the flagged product leaves the dryer.
- **Stop flag:** Stops the dryer in zones when there is still product inside the dryer.
- **Recipe flag:** Changes recipe parameters by zone.

AIR SYSTEM UNIT COMPONENTS

- **Air inlet/outlet:** Air to the drying process is consumed in the bottom of the dryer. The outlet of air is located at the top of the dryer. Repeated air recirculation helps in evaporating the moisture from the product.
- **Exhaust fan:** The speed of the exhaust fan is regulated by an air humidity setpoint in the exhaust air. When the temperature of the exhaust air goes over a set limit the dryer is stopped to prevent fires.
- **Inlet air valves:** The position of the inlet air valves is regulated by a negative air pressure setpoint inside the dryer. A slight negative pressure is needed to prevent dust leaking out of the dryer.
- **Inlet dampers:** Two synchronized dampers control the inlet air and the differential pressure at the outlet.

OUTLET TRANSPORT UNIT COMPONENTS

- **Airlock control:** Ensures the dryer itself is a closed system, so that good air tightness is maintained and prevents disturbance of the process conditions in dryer.
- **Screw conveyor:** The conveyor speed is variable and can be adjusted based on the amount of product that needs to be removed.

DRYING CONTROL

FUNCTIONAL SCOPE

Functional Unit	Unit Type	Functional description	Panel System	Management System
Product supply	Servo driven distributor & airlock	• Airlock control • 3 different CAM profiles for distribution of product • Including servo drive built into separate cabinet	●	●
Drying/Cooling control	1 layer	**Layer control of 1 layer** • Retention time control • Layer level indication		
		Drying/cooling control of up to 4 units • Heating or cooling zones • PID controlled temperature for each energy source Synchronized speed between fans in each zone Interval controlled cleaning of air vents (CIP)	●	●
	2 layers	**Layer control of 2 layers** • Retention time control • Layer level indication		
		Drying/cooling control of up to 4 units • Heating or cooling zones • PID controlled temperature for each energy source Synchronized speed between fans in each zone Interval controlled cleaning of air vents (CIP)	●	●
	3 Layers	**Layer control of 3 layers** • Retention time control • Layer level indication		
		Drying/cooling control of up to 4 units • Heating or cooling zones • PID controlled temperature for each energy source Synchronized speed between fans in each zone Interval controlled cleaning of air vents (CIP)	–	●
	4 Layers	**Layer control of 4 layers** • Retention time control • Layer level indication		
		Drying/cooling control of up to 4 units • Heating or cooling zones • PID controlled temperature for each energy source Synchronized speed between fans in each zone Interval controlled cleaning of air vents (CIP)	–	●
Air flow	Exhaust air flow control	• Flowmeter indication • Fan control	●	●
Air temperature and humidity control	Exhaust air temperature indication & humidity control	• Temperature indication in exhaust air • Humidity control according to fan speed	●	●
Overpressure control	Air-vacuum control	• Control of up to 4 inlet dampers according to pressure	●	●
Production outlet	Transport	• Control of Screw conveyor & airlock	–	●

● included

– not included

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.

AUSTRALIA
ANDRITZ Feed & Biofuel
p: +61 3 8773 4888
andritz-fb.au@andritz.com

BANGLADESH
ANDRITZ Feed & Biofuel
p: +880 22 222 64 800
andritz-fb.bd@andritz.com

BRAZIL
ANDRITZ Feed & Biofuel
p: +55 47 3387 9146
andritz-fb.br@andritz.com

CANADA
ANDRITZ Feed & Biofuel
p: +1 519 676 7057
anbosales@andritz.com

CHILE
ANDRITZ Feed & Biofuel
p: +56 2 2246 24 600
andritz-fb.cl@andritz.com

CHINA
ANDRITZ Feed & Biofuel
p: +86 21 5774 5781
andritz-fb.cn@andritz.com

DUBAI
ANDRITZ Feed & Biofuel
p: +971 4 214 6546
andritz-fb.uae@andritz.com

FRANCE
ANDRITZ Feed & Biofuel
p: +33 24 75 06 364
andritz-fb.fr@andritz.com

GERMANY
ANDRITZ Feed & Biofuel
p: +49 2104 91970
andritz-fb.de@andritz.com

INDIA
ANDRITZ Feed & Biofuel
p: +91 87544 15287
andritz-fb.india@andritz.com

ITALY
ANDRITZ Feed & Biofuel
p: +39 025 743 01 30
andritz-fb.it@andritz.com

MEXICO
ANDRITZ Feed & Biofuel
p: +52 229 178 38 45
andritz-fb.mx@andritz.com

NETHERLANDS
ANDRITZ Feed & Biofuel
p: +31 40 262 7777
andritz-fb.nl@andritz.com

POLAND
ANDRITZ Feed & Biofuel
p: +48 60 906 1037
andritz-fb.pl@andritz.com

SOUTH AFRICA
ANDRITZ Feed & Biofuel
p: +27 82 781 0808
andritz-fb.dk@andritz.com

THAILAND
ANDRITZ Feed & Biofuel
p: +66 2258 5528
andritz-fb.dk@andritz.com

TURKEY
ANDRITZ Feed & Biofuel
p: +90 232 570 38 00
andritz-fb.tr@andritz.com

UK
ANDRITZ Feed & Biofuel
p: +44 1482 825 119
andritz-fb.uk@andritz.com

USA
ANDRITZ Feed & Biofuel
p: +1 570 546 1253
andritz-fb.us@andritz.com

VIETNAM
ANDRITZ Feed & Biofuel
p: +84 28 6253 9434
andritz-fb.vi@andritz.com

ANDRITZ.COM/FT

ANDRITZ Feed & Biofuel A/S
Glentevej 5–7
6705 Esbjerg, Denmark
p: +45 72 160 300
andritz-fb.dk@andritz.com

B 1024
1251 GB