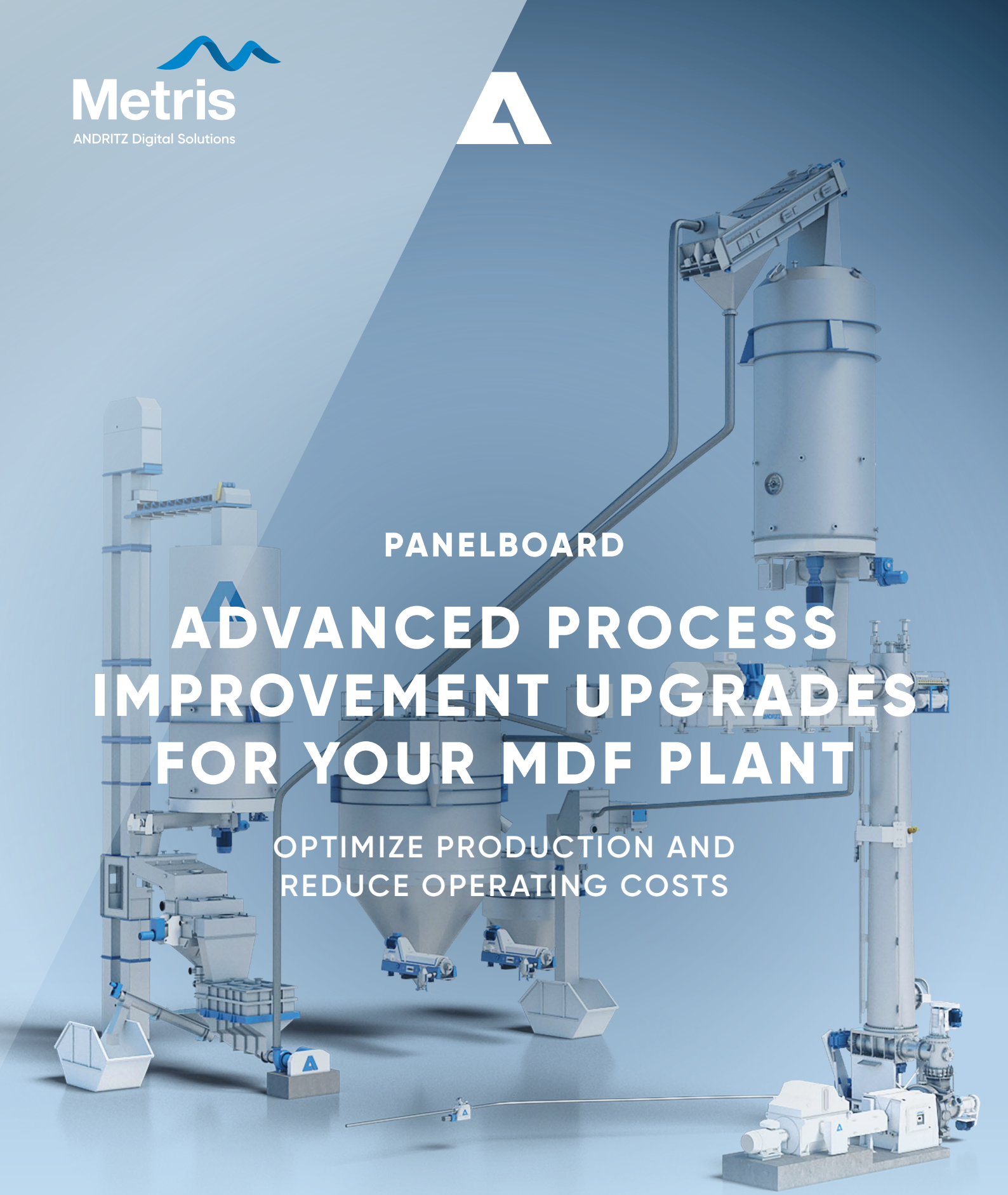
Metris
ANDRITZ Digital Solutions



PANELBOARD

ADVANCED PROCESS IMPROVEMENT UPGRADES FOR YOUR MDF PLANT

OPTIMIZE PRODUCTION AND REDUCE OPERATING COSTS

ANDRITZ

ENGINEERED SUCCESS

Numerous upgrades for advanced process improvement

Due to increasing production requirements, all refining systems of MDF plants are subject to high process expectations that constantly demand time-consuming and expensive improvement work.

For this reason, ANDRITZ has developed new and innovative concepts for advanced process improvement at the most critical areas. These upgrades are designed to both modernize and automate plant operation, and also to help operators with easy and efficient production.

Process and automation upgrades

1. WOODYARD
2. CHIP STORAGE
3. CHIP WASHING
4. PRESSURIZED REFINING SYSTEM
5. WASTEWATER EVAPORATION

Process, mechanical, and electrical/automation audits

Detailed on-site plant inspections by ANDRITZ specialists covering both production and maintenance

- Technical/process verifications and support, both on site and remote
- Troubleshooting and suggestions for cost-efficient capacity increase
- Stay up to date on the latest equipment, developments, and technology within the industry
- Find the best solutions for plant-specific challenges
- Identify blind spots and optimize processes
- Remove production bottlenecks
- Improvements to maintenance activities and spare parts management
- Detailed technical reports for the customer
- Identification of potential upgrades and preparation of upgrade concepts

Digital wood & digital twin

R&D

Innovative concept to control the process in the whole refining system specifically for wood

- Dedicated devices and software to digitalize and accurately monitor the wood entering the process
- Simulation software to elaborate on the wood data and make comparisons to find correlations for optimizing and continuously improving the MDF process
- Industry 4.0 approach for autonomous process regulation according to the production requirements and for more stable and efficient operation
- Better process monitoring and control lead to reduced production costs and more effective pricing

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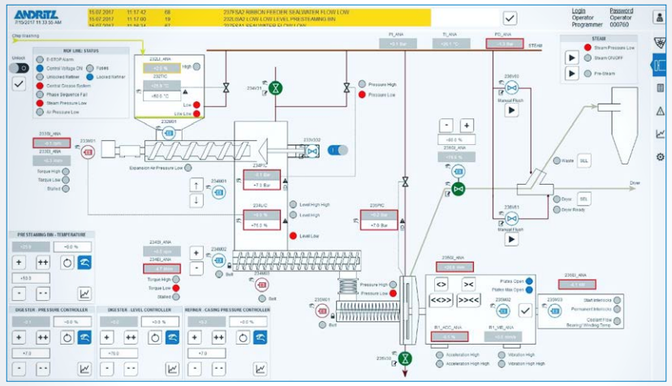


Classic Automation & Advanced Metris Digital Solutions

Modernization of older software systems, including S5-S7 upgrade, with new visualizations and sequences for operators

- New PLC, hardware, and software with improved visualizations
- New cleaning and safety sequences, also compliant with SIL2 regulations
- New production sequences to reduce set-up times and improve the whole process, thus saving time and energy, for example:
  - automatic refiner heating and pressurizing
  - automatic plant start
  - automatic production throughput regulation
  - specific energy control of refiner (sec)
  - automatic blow valve control
  - automatic cooking time control
- Integration of refiner control with different fiber quality measurement devices
- Replacement of analogic sensors with modern, digital versions
- New, easier visualization and touchscreen operation for plug screw feeder hydraulic expansion system
- Motor upgrades for greater installed power, including mechanical verifications and support
- DC-AC motor upgrades
- State-of-the-art automation solutions, including preparation of the systems for Industry 4.0 innovations
- All automation solutions from one ANDRITZ source to guarantee best reliability and no issue for the plant

Metris - ANDRITZ Digital Solutions

- **Metris All-In-One Platform** - IIOT digitalization platform provides full digital support for industrial plants throughout their entire life cycle
- **Dryer Optimization** - Advanced process control to stabilize the final moisture and optimize the steam consumption
- **Panelboard Quality Control** - Advanced process control to stabilize and control the quality in panel boards
- **Fiber Analysis** - Online MDF fiber measuring device for analyzing the desired fiber quality
- **Condition Monitoring** - Metris application to process and monitor vibration measurements
- **OT Cyber Security** - Comprehensive risk management solution to secure production networks in a proactive way

Additional solutions are currently under development and will come up soon:

- **CO2 Footprint** - Calculates the carbon footprint of manufacturing processes and products
- **Internal Bond Soft Sensor** - A real time model which predicts the internal bond strength of panel board
- **Autonomous Production** - A solution that decreases the amount of human intervention required to operate a process

AdvaCon

Advanced condition monitoring and protection system

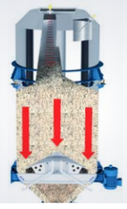
- Refiner plate protection
- Condition monitoring of refiner bearing
- Inclusion of any rotating element in modular form, extending condition monitoring to other machines beyond the refiner
- Advanced condition monitoring of bearings with detection of failure frequencies at a very early stage
- On-demand reporting of the bearing conditions via e-mail and with software visualization
- 24/7 condition monitoring

MDFEye

The new way to measure fiber quality in the MDF industry

- Fiber measurement in water suspension
- Analysis of fiber properties through machine vision technology and mathematical analysis tools
- Detailed reports on each sample for production monitoring
- Claim management via historical records
- Information ensuring cost-effective operation

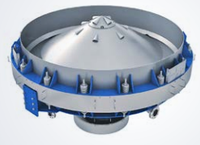
Pre-steaming bin



Radar level control – for pre-steaming bin

Radar level control sensor on top of the pre-steaming bin for exact level measurement

- Optimized utilization of the pre-steaming bin
- Easy to retrofit on existing equipment
- Better pre-steaming results

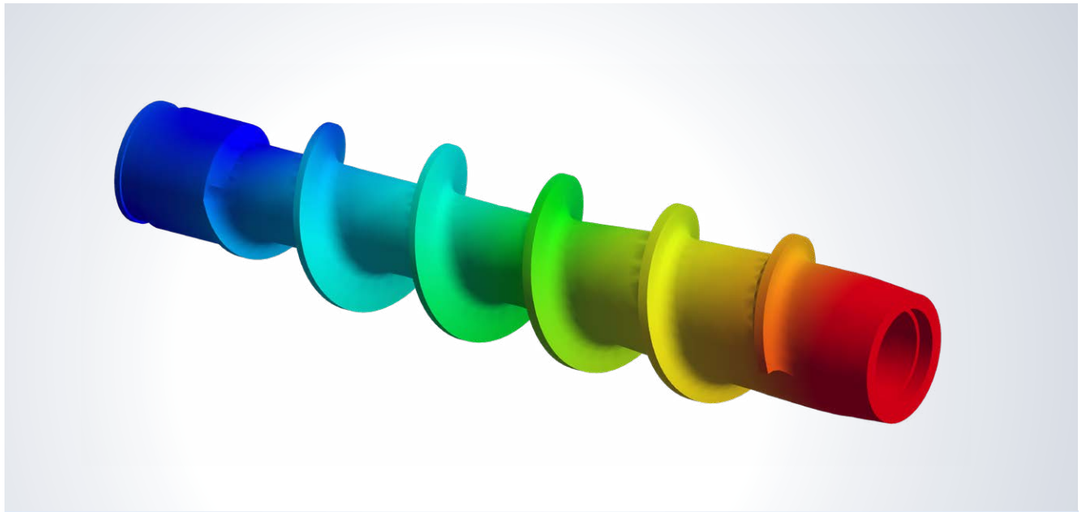


Vibrating discharger with center steaming – for pre-steaming bin

Addition of center steaming to help to control the temperature over the entire diameter of the pre-steaming bin

- Unique vibrating cone design ensures continuous discharge of wood chips thanks to the "first in, first out" principle
- Even temperature and moisture distribution thanks to elimination of blind spots and areas not reached by steam
- Optimized efficiency due to flexible steam supply at edge and center

Plug screw feeder



Plug screw feeder components with customized geometry & set-up – for plug screw feeder

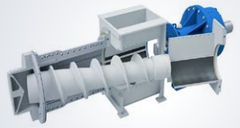
Tailored solutions for each plant according to process/maintenance needs

- High-capacity plug screw design for increased throughput
- High or low-compression plug screw design according to production needs
- Customized designs for screw, compression housing, and spool piece for optimized dewatering or throughput and maximized wear protection
- Upgrades with dewatering unit or new, innovative designs like AdvaProtect Segments/AdvaDrain Multiple System for maximized dewatering and flexible processes
- Switch from conical to cylindrical screw design for highest dewatering performance
- Wide range of design possibilities for easy and economical refurbishment activities thanks to smart exchange of wear parts

Cylindrical plug screw – for plug screw feeder

Innovative solution for highest dewatering performance

- Maximum number of dewatering holes in the housing and thinner wood pad between screw and housing to boost the dewatering effect
- Easy to retrofit on conical screw designs with installation of new cylindrical components
- Flexible set-up possibilities according to production needs
- Highest dewatering performance



Inlet housing with swing door – for plug screw feeder

Innovative design for new smart screw replacement

- Side opening (swing door) for fast and easy screw replacement
- Reduction of maintenance activities, with less required manpower, as there is no need to remove other components (both inlet housing and bearing unit remain in position)
- Operation can be restarted more quickly than with the conventional screw replacements (especially for cylindrical screws)

ANDRITZ Bearing Unit (ABU) upgrade – for plug screw feeder

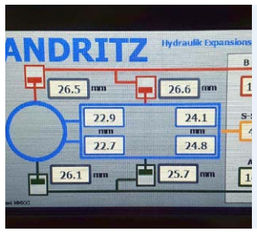
New ABU bearing concept

- The screw shaft is bolted to the drive shaft via flange connection
- No relative movement and no wear between drive shaft of bearing unit and screw shaft
- Less risk of drive shaft breakage
- Existing screws can be easily reworked to the ABU concept

Adjustable plug screw – for plug screw feeder

Innovative solution for automatic compression rate adjustment

- Adjustment of compression curve during operation in relation to the incoming wood type softwood/hardwood/mixture (no spaces around the slashes) and moisture content (moist/dry wood)
- Optimized compression and thus optimized dewatering according to the raw material needs
- Easier utilization of recycled wood thanks to high flexibility for chip compression and chip feeding
- Elimination of production bottlenecks due to waste water and dryer limits



New hydraulic expansion system – for plug screw feeder

Upgrade of older system with new, easier visualization and touchscreen operation

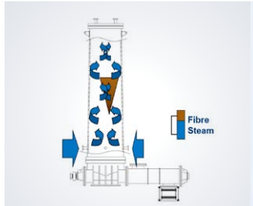
- User-friendly visualization with values
- Operation via touchscreen
- Easy to retrofit on existing equipment

ANDRITZ BBV Commander – for blow back valve

Automatic valve pressure control

- Contact pressure of the valve head on the plug screw feeder based on the chip output, as well as different production rates.
- The pressure in the hydraulic cylinder is automatically adapted to the performance of the plug screw feeder.

Discharger



Steam Regulation Module (SRM) – for digester

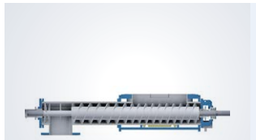
Maximization of your steam utilization

- Counter-flow steam management bringing fresh steam at the hottest point
- Temperature control to optimize steam regulation
- Better cooking result, especially in the center of the chips

Digester fill level measurement device – for digester

New height adjustment via chain hoist

- Rebuild kit including laser distance measuring device
- Easy to retrofit on existing equipment
- Modification of the visualization program for manual level adjustment or automatic control of cooking time



New geometry and high-capacity screw design – for discharge screw

Tailored solutions for each plant according to process/maintenance needs

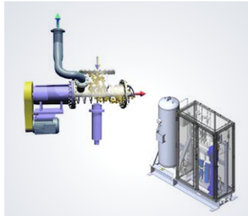
- Modern, improved discharge screw geometry for more regular feeding
- High-capacity discharge screw design for increased throughput

ANDRITZ C-feeder (Constant feeder) – for digester

Stable and efficient feeding system

- More constant feeding of chips to the ribbon feeder
- Solid construction
- Energy-efficient and maintenance-friendly
- Retrofittable

Ribbon feeder



Low flow seal – for ribbon feeder

Replacement of the conventional mechanical seal to reduce the operating and energy costs of the whole system

- Intercheangeble with conventional mechanical seal types
- Operation with very little seal water
- Easy to retrofit on existing seal water supply with installation of new flow meter and new flow switch

Refiner

Refiner instrumentation panel – for refiner

Upgrade of older dial panels to new, easier visualization and touchscreen operation

- More relevant data and limits are available
- Big-data capable
- Values can be implemented in the DCS visualization system
- Individual adjustment of limits and alarms

Refiner seal water panel – for refiner

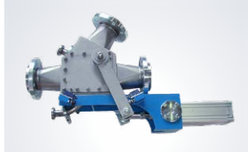
New panel generations with additional features

- Instrumentation located in a tidy and dust-free cabinet
- Set of flow, pressure, and temperature transmitters instead of switches
- With integrated Seal Water Recooling Unit
- New emergency tank as option
- Detection of seal water quality (turbidity, pH-value, conductivity)

Refiner lube oil panel – for refiner

New panel generations with additional features

- Combined level/temperature transmitter at oil tank
- Temperature regulation via oil mixing valve (instead of cooling water regulation valve – available as option)
- Temperature transmitter for lubrication oil to refiner
- Detection of active filter of double-filter station
- Oil quality sensor detecting contamination by solids and water content
- Oil quality sensor detecting temperature and electricity of the lube oil



Fiber diverter valve – for refiner

Modern and highly reliable diverter valve, “flap design”

- Small and compact design with flanges for easy installation and dismounting
- Simple construction for high reliability and no sticking
- Less wear and easy exchange of wear parts

TO DISCOVER THE BEST SOLUTIONS FOR YOUR NEEDS, PLEASE CONTACT YOUR RESPECTIVE KEY ACCOUNT MANAGER

We also want to take up your challenges! For more information about ANDRITZ's services, please visit andritz.com/refiner-service for details.

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