

ANDRITZ RECOVERY BOILERS

ANDRITZ is the leading supplier of recovery boilers to the worldwide pulp and paper industry with hundreds of units delivered since the 1950's. Each boiler has been individually designed for specific customer needs with a capacity range from the smallest, up to 20,000 tds/day in the future.

"Our recovery boilers are always engineered to meet exactly what our customers require," says Elina Suomalainen, Sales Director, Recovery Boilers at ANDRITZ. "With our numerous references and satisfied customers worldwide, we have gained a reputation for delivering the very best solutions when it comes to safety, smart operation, and sustainability."

"In particular, our customers are very pleased with the reliability and uptime of our recovery boilers - when we guarantee a performance value, we deliver what we promise."

SAFETY- NO. 1

The recovery boiler is one of the most hazardous areas in a pulp mill. To enhance safety and reduce operator involvement, ANDRITZ has introduced advanced monitoring systems and automated controls. These innovations minimize manual intervention, ensuring safer, more efficient, and reliable recovery boiler operation through increased automation and process oversight.

ANDRITZ has developed robot-based technologies especially designed to ease the daily work of recovery boiler operators and increase safety in hazardous and time-consuming tasks. One example is the Smart Smelt Spout Robot, an ingenious solution that automates the cleaning of the smelt spout.

Again, with the safety of the operator in mind, ANDRITZ supplies solutions that increase safety around black liquor burners. A new modular liquor burner rack, Modirack, enhances safety when working with the liquor burners. Modirack with a safety gate, quick burner ejection, and automatic burner cleaner results in less exposure to the risks arising from black liquor burner openings.

ANDRITZ also supplies smart measurements for smelt flow and char bed measurement to ensure safe operation of the furnace. Leakage detection is enabled by ANDRITZ Smart Water Leakage Advisor, where operators can be assured that the very smallest leakage can be detected.

As the world's leading supplier of large recovery boilers with capacities over 8,000 tds/d, ANDRITZ has introduced an increased tube size diameter for furnace walls to improve circulation and avoid leakages. The larger diameter of the tubes cre-

ates less pressure drop and allows the water to circulate better, thus cooling down the tubes more effectively.

"Due to the greater size of the boiler furnaces, ANDRITZ considers larger diameter tubes as the only safe solution to avoid leakages and possible explosions," says Rodrigo Tavares, Technology Director, Recovery Boilers at ANDRITZ.

Furthermore, for added safety, a smelt spout cooling system has been designed with a vacuum to ensure good water circulation so there is no contact with the smelt. The system also requires less manual interaction from operators.

SMART, INTELLIGENT DESIGN AND EASE OF OPERATION

Smart operation of recovery boilers is not only limited to digital solutions; it starts with the basic design of the recovery boiler, as well as the materials used for reliable operation.

Modern mills now target continuous operation for up to 24 months, making boiler cleanability critical. The boiler bank is particularly susceptible to plugging. A key design priority is controlling flue gas temperature before it reaches the generating bank. To address this, ANDRITZ has developed an innovative solution: the pre-boiler bank.

"ANDRITZ pays extra attention to the optimized location of the sootblowers in the boiler bank, which ensures the boiler is kept clean for maximum uptime," explains Tavares. "For larger recovery boilers, a boiler bank with two sootblower cavities is supplied to ensure the range covers all areas."

Effective combustion air systems have an impact on reduction rate, carry-over, and emissions and ANDRITZ incorporates more room for optimizing and adjusting air flows according to different capacities or black liquor characteristics. As an example, primary and secondary air openings can now be controlled one by one.

Material selection of the superheater requires special attention. Tavares says, "It is essential to select exactly the right superheater materials as they have a big impact on capital and operational costs. To serve this purpose, ANDRITZ has devel-



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oped a tool to calculate the material temperatures in each part of the superheater and thus make the precise material selection."

Demand for shorter shutdown times is increasing as maximizing the pulp mill availability and production is essential. With ANDRITZ's lower furnace design that has a refractory-free floor, customers are able to shorten the shutdown time by 24-48 hours.

While design features are vital, operator ease-of-use and effective training are equally critical. ANDRITZ supports this with e-learning modules that complement classroom sessions. Advanced simulators, ranging from theoretical scenarios to full-scale recovery boiler models, accelerate operator learning and enhance preparedness for abnormal situations, thus benefiting both operators and supporting personnel.

SUSTAINABILITY - THE FULL RANGE OF SOLUTIONS

ANDRITZ recovery boilers cover the full range of sustainability demands for the 21st century customer.

Energy production is maximized from the recovery process and achieves a high steam-to-liquor ratio, which not only enhances the overall efficiency of the boiler, it also contributes to the production of green energy and often eliminates the need for fossil fuels.

With ANDRITZ recovery boilers, atmospheric emissions of harmful pollutants such as sulfur oxides (SOx) and nitrogen oxides (NOx) can be reduced to below regulatory demands according to customer requirements. Combustion air systems serve as a primary method for NOx emission reduction.

Tavares adds, "Further reduction of emissions is made possible by secondary flue gas treatment methods such as selective catalytic reduction (SCR). ANDRITZ experts have configured a set-up where an SCR is used in combination with an Electrostatic Precipitator (ESP) and fabric filter. This system also contributes to SOx and dust reduction to a minimum. One of the added benefits of the technology is that no water is used so it reduces costs and environmental impact."

Suomalainen concludes, "We are able to design and tailor-make our recovery boilers specifically for individual circumstances, and are able to reach even the highest of stringent environmental permits and regulations. Our customers are assured of receiving safe, smart, and sustainable solutions for all their needs."

CONTACT
Elina Suomalainen
elina.suomalainen@andritz.com

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SAFE SMART SUSTAINABLE