

The giant on its way:  
26 ft. steel Yankee –  
manufactured in two halves –  
for special paper production  
at Zellstoff Pöls, Austria

## The Growth of the ANDRITZ

# STEEL YANKEE

ANDRITZ has developed a worldwide reputation as a leader in the production of steel Yankees for a variety of paper grades and even tobacco machines. The utilization of Yankees generally offers paper producers greater drying performance, and in the case of steel Yankees, even better heat transfer as well as increased safety due to the properties of the fine-grained pressure vessel steel.

ANDRITZ first started investigations into the viability of making steel Yankees in 2007. By 2009, it had already manufactured its first one, a small, 12 ft. diameter Yankee which was sold to Saigon My Xuan Paper, Vietnam. Next was a delivery to APP's mill in Perawang, Indonesia, which was also 12 ft. in diameter.

By 2010, interest was gathering in the installation of ANDRITZ steel Yankees based on the success of the first installations, and the company began manufacturing double wide and larger Yankees, moving up to 16 ft. and then 18 ft. in diameter and, by 2012, it had produced a 22 ft. version.

Fast forward to 2021 and ANDRITZ had now supplied more than 90 steel Yankees around the globe, including the installation of the world's largest steel Yankee – 24 ft. in diameter – at Heinzl Pöls in Austria. Since the first delivery in 2009, not one of the installed Yankees has had to be replaced, illustrating the durability and reliability of ANDRITZ steel Yankees.

Yankee service: when analyzing measurement results, the ability to see the bigger picture, meaning the production system and mill as a whole, is of utmost importance.

Nowadays the main part of new tissue machines is equipped with a steel Yankee.

Following is an interview with ANDRITZ Yankee experts, explaining the advantages of the technology for various applications in the paper-making industry. ANDRITZ experts interviewed are: Franz Harrer, Head of Technology Tissue; Riccardo Pierini, Steel Yankee Product and Customer Care Manager; and Robert Schloffer, Director Paper Machine Service.

### What paper products are Yankees ideally suited for?

**HARRER:** In general, steel Yankees are mostly used for new tissue machines and rebuilds, including dry-crepe tissue but also advanced technologies such as textured and structured (TAD). It's a matter of fact that the Yankee is not only the heart of the tissue machine but one of the main cost drivers of the tissue production process, and because of its advantages compared to cast iron Yankees, the steel Yankee is the preferred solution.

Step by step, the steel Yankee technology has entered other business areas; for instance, ANDRITZ is an established supplier for Yankees for MG (machine glazed) machines and tobacco paper machines. And this is not the end of the story: drying cylinders of the pre- and after dryer section of paper and board machines can be fully made of steel as well – delivering the same benefits like the larger, single steel Yankees.

Additionally, ANDRITZ supplies Yankees to other industries, including the food manufacturing industry for special drying purposes.

### Is the installation of steel Yankees a growing trend?

**HARRER:** As a Yankee is still a mandatory component for conventional tissue machines, the number of installations is growing. We believe that steel Yankees, in particular, are showing even more significant growth as cast Yankees have their disadvantages and sustainable, energy-efficient, and safe production is nowadays of utmost importance.

### What are the main advantages of steel Yankees, either in new machines or in retrofitting one on an existing machine?

**HARRER:** For new machines, steel Yankees are state-of-the-art technologies based on a number of advantages, for example, better drying per-

formance and more sustainable production than cast-iron models: Steel Yankees with their higher efficiency and steam pressure, together with a shoe press that operates at high press loads offer a remarkable potential for energy reduction. Up to 24% compared to other machine configurations are possible! In combination with steam-heated hoods, the saving potential is even higher.

For Yankee replacements, steel Yankees are the technology of choice. Multiple cast Yankees have a limited lifetime expectancy and therefore must be replaced. When doing such a replacement (steel instead of cast iron), one big advantage is that the new Yankee can be operated at higher pressure, thus providing enhanced performance. This performance increase can be achieved without any changes in the length of the existing dryer section.

However, one of the biggest advantages of steel Yankees is the safety aspects. The ductile material is safer in case of imperfections in the material than the brittle cast iron. Cast iron has the big disadvantage that it could explode without any indications beforehand. In addition, the steel Yankees need less maintenance than cast Yankees.

*"With a steel Yankee, consumption will be reduced, or the production increased, which finally ends up in lower CO<sub>2</sub> emissions per ton of paper."*

**Riccardo Pierini**  
Steel Yankee Product and  
Customer Care Manager  
ANDRITZ





*“Because of the unique and patented logistic concept, ANDRITZ is able to provide Yankees up to 26 ft. diameter and with a length up to 8.4 m.”*

**Franz Harrer**  
Head of Technology Tissue  
ANDRITZ



**Are there any limitations when it comes to size of Yankee ANDRITZ can produce, either width or diameter?**

**HARRER:** Up to now, ANDRITZ holds the record for the largest installed steel Yankee worldwide. Because of the unique and patented logistic concept, ANDRITZ is able to provide Yankees up to 26 ft. diameter and with a length up to 8.4 m.

ANDRITZ's aim in sizing and dimensioning is to find the most efficient solution for our customers. Depending on the customers' demand taking economic and ecological factors into consideration, the best Yankee size and design is chosen. To guarantee best performance, every Yankee is customized.

**How about final quality of the Yankee; how is its performance assessed?**

**PIERINI:** In terms of quality ANDRITZ focuses on the whole lifecycle. At the beginning a full understanding of the material, operating conditions, and inspections through the whole lifecycle was necessary. Because of this ANDRITZ collaborated with industrial partners and universities performing detailed studies to get an overall understanding of the materials' behaviour at high temperatures and under challenging operating conditions. The outcome of this study was a comprehensive product quality and inspection plan. Actual valid pressure vessel regulations manage static pressure vessels. As the steel Yankee is dynamically loaded, more strict acceptance criteria have been introduced by ANDRITZ that also consider the fatigue cycles (mechanic fracture mechanism) and not only the static loads.

ANDRITZ is proud to be the leading supplier for steel Yankees and has all technologies, manufacturing and metallizing and, of course, services in house. The huge benefit for the customer is to get everything from one supplier and having a partner they can trust by their side with a comprehensive understanding of papermaking, designing, sizing, manufacturing, inspection, service, and operation.

**How do Yankees stack up when it comes to the environmental footprint and CO<sub>2</sub> emissions?**

**PIERINI:** Compared to cast Yankees, steel Yankees can be manufactured with lower wall thickness thanks to the material properties of steel compared to cast iron. This provides a better heat transfer and more economic use of the steam. All in all, the consumption will be reduced, or the production increased, which finally ends up in lower CO<sub>2</sub> emissions per ton of paper.

SERVICE	EXAMPLES
<b>Mechanical on-site services</b>	Grinding, metalizing, spot-repair, upgrade and repair of internal parts, etc.
<b>Diagnostics and analysis</b>	On-the-run measurement, performance measurement, coating measurements, etc.
<b>Logistics and engineering</b>	Customized rebuild solutions, on-site services, etc.
<b>Performance and consulting</b>	Drying-limit calculation, runnability and energy consumption evaluation, etc.
<b>Troubleshooting</b>	Steam leaking, vibrations, reduced drying performance, wear on doctor blades, soda straws plugging, etc.
<b>Safety and risk management</b>	Lifetime calculation, NDT inspection like ultrasonic, metallurgical, and acoustic sound emission test, etc.

**What is special about ANDRITZ Yankees and the way they are manufactured?**

**PIERINI:** ANDRITZ has all technologies around steel Yankees and their whole lifecycle in house, including:

- Full understanding of the papermaking process and technologies
- Dimensioning and sizing of Yankees
- Design, mechanical, and fracture mechanic calculation
- Manufacturing technology
- Metallizing technologies
- NDT (non-destructive testing) inspections at workshop and on site
- Yankee service, audit, and optimization
- Yankee repairs
- Yankee replacements with the new ANDRITZ *PrimeDry* Steel Yankee
- OTR (on-the-run) measurement and troubleshooting
- Full understanding of steam and condensate system

**Can you tell us about the service and maintenance ANDRITZ offers to Yankee customers?**

**SCHLOFFER:** A well-maintained Yankee offers a high potential for improved runnability and efficient production – a remarkable competitive advantage for the customer. With our Yankee lifecycle management, we focus on the overall added value of Yankees: from calculation, to manufacturing, metallizing (*PrimeCoat* Stratos), operation, and optimization; no matter if the Yankee is used for tissue, paper, or tobacco production.



Manufacturing takes place at the workshops in Europe and Asia



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**Robert Schloffer**  
Director Paper Machine Service  
ANDRITZ

## DIAGNOSTIC

### For a high operation level

- Measurement of crown and wear
- Visual inspection internal and surface
- Chemical/organic coating
- On the run measurement
- Boiler water steam & condensate measurements and recommendations
- Steam and condensate rotary joint check
- Doctor alignment and adjustment
- Yankee performance check

### For safety

- Eddy current measurement
- Non-destructive examination (like Ultrasonic single beam, TOFD, Phased Array, Magnetic Particles, Penetrant Liquid, etc.)
- Visual check/measurements

## CONSULTING

- Yankee performance check
- Analysis of OTR-measurement and recommendation
- Crown optimization
- Optimization of the steam and condensate system
- Contact drying vs. impingement drying