

Heart of steel.

The Yankee dryer is considered the heart of a tissue machine. It is also one of the biggest cost factors in terms of manufacturing. Until recently, all Yankee dryers were made of cast iron. By replacing cast iron with steel, ANDRITZ not only found a way to reduce costs, but also to increase operational safety.



"The use of steel overcomes a major safety issue – the potential for an explosion due to a cast failure. The coating we use also reduces maintenance."

Klaus Gissing, Vice President of the Tissue Machines and Air Systems product groups

The first steps

Before it offered a steel Yankee to the market, ANDRITZ engineers built a test cylinder to demonstrate that the very close tolerances could be maintained and that the performance would be as specified. Potential customers were very interested in the results of the tests.

Then to start, the focus was on producing steel Yankees for narrow tissue machines (i.e. 100") – a growing segment of the market. The first four orders were received in 2009. A fifth order was for a medium-width machine. Now ANDRITZ is building steel Yankees for large machines (i.e. 200" width and up to 16 ft. diameter for tissue).

High precision in manufacturing

All the production steps – from engineering to packaging for transport – are done within ANDRITZ without any external sub-suppliers. Manufacturing of the PrimeDry

Steel Yankee is shared between workshops in Austria and Hungary. The Hungarian facility specializes in steel fabrication of the shell. The steel plate thickness is up to 80 mm and the plate must be perfectly shaped to form a cylinder. Then, the quality of the weld seam must be perfect.

The Austrian workshop manufactures the hollow shaft and mounts it in the dryer shell. The fully assembled Yankee is heated, coated, polished, tested, and then is packaged for transport.

High performance and energy savings

The performance of a PrimeDry Steel Yankee is better than an equally sized cast iron Yankee. The thermal conductivity of the steel is similar to cast iron, but the wall thickness is thinner due to the high strength of the steel. This reduces the weight of the Yankee and increases the amount of the heat transferred. Steel Yankees have an evaporation rate 15-20% higher than cast iron, which results in 8-10% better machine performance. This enables tissue producers to either increase production for the same energy input, or reduce energy consumption for the same production.

Safety is of top priority

Safety is the top priority in Yankee dryers as there is always the risk of an explosion due to the high pressure and high temperatures inside the dryer. As a result, the Yankee must meet very stringent testing requirements. Each Yankee undergoes a pressure test conducted by a third-party technical inspection authority before being shipped. The PrimeDry Steel Yankee has an advantage over cast iron models, because of the higher elasticity of steel, which reduces the risk of explosion.

Covering the complete range

ANDRITZ offers three standard diameters of the PrimeDry Steel Yankee for tissue production: 12 ft. (3,658 mm), 15 ft. (4,572 mm) and 16 ft. (4,877 mm). Paper width on the Yankee can be up to 5,600 mm. ANDRITZ also offers steel Yankees for paper and board, MG, and tobacco machines. Cast iron Yankees, manufactured in Germany, are still part of the ANDRITZ portfolio. This enables the company to provide individual solutions for each and every application.

Cost-efficient head insulation

Rising energy costs and the desire to reduce CO₂ emissions are the drivers for new technical solutions. Conventional Yankee cylinders exhibit significant heat loss at the head. In response, ANDRITZ developed head insulation for Yankee cylinders – cast iron or steel. This insulation is effective for any Yankee installation, not just tissue.

Savings, expressed as a reduction in steam consumption, is in the range of 2-5%. For tissue producers, a major advantage is that the insulation covers the head screws – eliminating disturbing airflows and enabling a better sheet run. PrimeDry Yankee head insulation can be easily retrofitted to existing Yankee cylinders from any OEM.

Record breaking orders

Since 2009, ANDRITZ has received 10 orders for PrimeDry Steel Yankees from China, Germany, Indonesia, Russia, and Vietnam. The largest in terms of face length – 7.4 m with a 15 ft diameter – is a world record. It is being delivered to a large P&P producer in Indonesia for MG. Another world record was broken by the world's first 18 ft diameter PrimeDry Steel Yankee ordered by a Chinese manufacturer.



▲ New PrimeDry Steel Yankees packaged and ready for transport.

Assembly in the ANDRITZ workshop in Graz: lifting the hollow shaft into the dryer shell. ▼

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YANKEE CYLINDERS STEEL VS. CAST

The high-strength properties of steel enable a PrimeDry Steel Yankee to deliver higher performance than a cast iron model:

- The wall thickness of steel is less, permitting a more efficient heat transfer (evaporation rate).
- The elasticity of steel is higher, allowing for higher pressures and giving a margin of safety against thermal shocks, mechanical mistreatment (accidents), or potential explosions.
- Steel Yankees perform from day one. There is no run-in period required and no degrading of performance over time.
- Steel requires less grinding and polishing during shutdowns.
- The steel Yankee is not subject to de-rating due to thinning of the wall thickness or loss of metallic coating over its lifespan.
- The metallic coating of the steel enhances chemical coating and creping processes.
- Sheet stability is improved in the steel Yankee since there are no head bolt disturbances.

