



Rolls with Uniform Temperature Profile at 800°C ~First in the World~

Breaking through the 400°C maximum temperature barrier and achieving a maximum temperature of 800°C

We have developed and commercialized an Induction-Heated Jacket Roll[®] with a maximum roll surface temperature of 800°C and a uniform temperature performance. The key to the development was the successful use of metallic sodium as a thermal medium in the mechanism (jacket chamber) that equalizes the surface temperature.

Features/Applications

The maximum temperature of 800°C is much higher than the conventional maximum temperature of 400°C. Applications in production lines for steel plates, glass, ceramics, and other materials that require heat treatment at high temperatures and uniform temperatures are expected.



Exterior



At 800°C

(Taken through gap in insulation box)

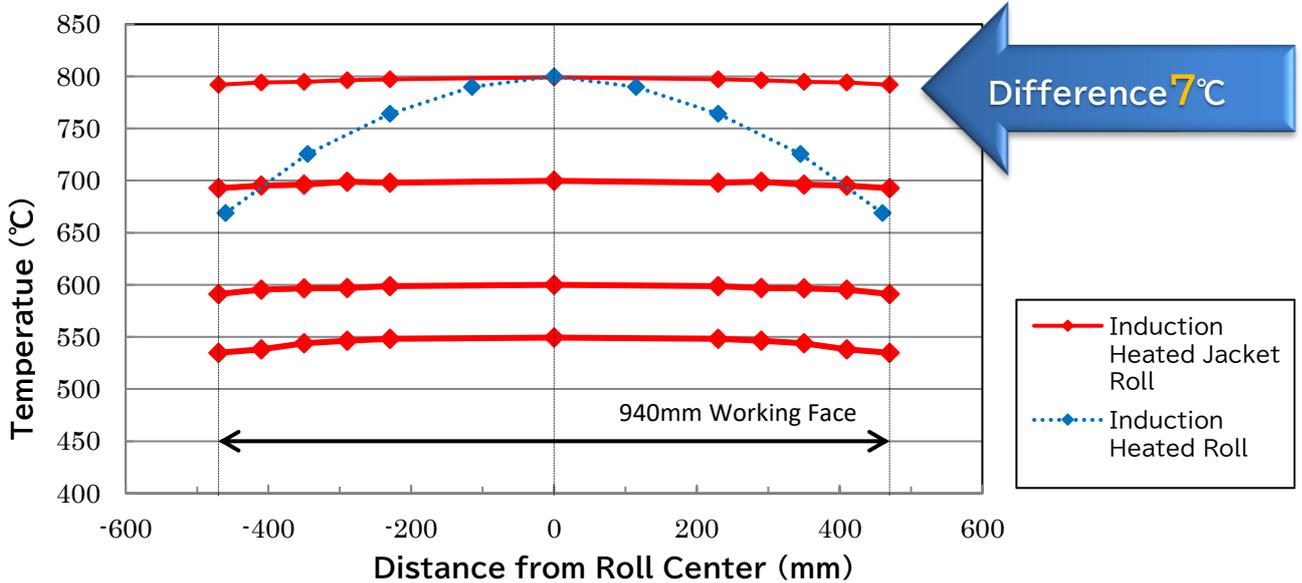
Background

For about 40 years, we have been working to meet the demand for high-temperature rolls with uniform temperature performance. However, we faced technical challenges in handling the metallic sodium used in the mechanism to equalize the roll surface temperature and were unable to achieve this for a long time.

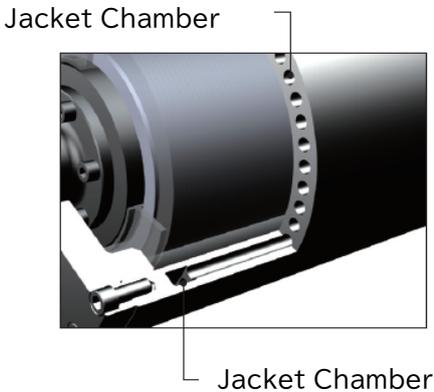
The challenge was to inject high-purity metallic sodium into the rolls without degrading its purity and to maintain the rolls in a gas-liquid bilayer state at high temperatures. With continuous efforts and a challenging spirit, we developed the first “Ultra-High-Temperature Roll” in the world by building on the Jacket Roll[®] manufacturing technology accumulated over many years and challenging new technologies, resulting in temperature distribution accuracy within 10 degrees Celsius.

Temperature Difference at 800°C is 7°C

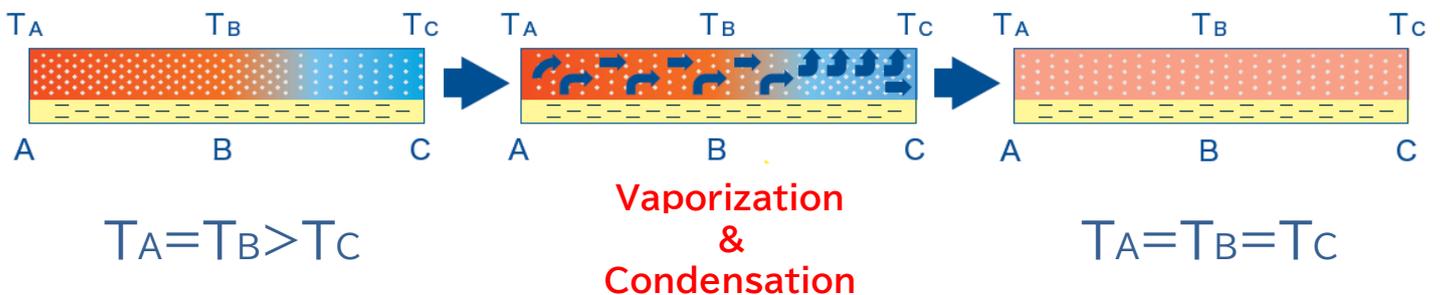
Roll dimensions: 460mm OD x 1200mm Face



Mechanism of Equalization - Function of the Jacket



Jacket chambers consist of numerous gun-drilled holes machined in the axial direction within the thickness of the roll shell. Thermal media is sealed inside the drilled holes under vacuum. As a mechanism to compensate for temperature differences on the roll surface due to heat generation on the roll and uneven heat input from the web, the enclosed thermal media evaporates and vaporizes in the high temperature section, flows to the low temperature section according to the pressure difference, and releases latent heat through condensation and liquefaction. This cycle continuously and automatically compensates the roll surface temperature for any thermal inhomogeneity. This is the so-called heat pipe effect.



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