VALMET'S NOVEL SLEEVE ROLL TECHNOLOGY TRANSFORMS FORMING SECTION

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ABSTRACT

The forming section is the single biggest user of vacuum energy in a paper and board machine lines. Until now the forming section drainage has been relying on gravitation and dragging vacuum elements set along the forming fabric travel. Sleeve roll technology does not require vacuum energy, and the power loss due to drag is minimal. Therefore, the Sleeve roll technology will save energy on both vacuum system and drives of forming section. To increase energy efficiency of the paper or board production process was the starting point for Valmet to develop this new forming technology.

The idea of the Sleeve roll technology is to compress a web between two forming fabrics against a small radius shoe. Depending on the values of the forming fabric tension and the small radius shoe is possible to achieve a very high dewatering pressure level of up to 150 kPa. Dewatering pressure with conventional forming section technologies is typically around 15 to 40 kPa, and with couch roll or HiVac typically around 60 to 70 kPa. With the basic circle of the Sleeve roll, the pressure created by the fabric tension is moderate. When going over the variable radius shoe, the dewatering pressure increases steadily towards the maximum compressing pressure. The steadily increasing dewatering-pressure over the Sleeve roll shoe does not break the web even with very low ingoing consistency. With the Sleeve roll technology, the web strength properties are at a good level and the web dryness profile is even.

The Sleeve roll technology removes water from the web very effectively. Depending on the forming concept, the Sleeve roll has very low ingoing consistency about 4 to 6% and the outgoing consistency from the Sleeve roll is high 12 to 14%. The Sleeve roll does not need vacuum or high pulsation to remove water from the web. Water comes out from the web with high increasing compression pressure and centrifugal force. The water jet is collected in a water save all pan after the Sleeve roll. The Sleeve roll technology significantly reduces the need for vacuum on forming section and when there are few friction components the power consumption of the drives can decreases 10 to 20 %. That means also less CO2 emissions.

The Sleeve roll structure consists of a static beam, the small radius dewatering element called shoe, rotating heads and lubrication feeding and evacuation systems. The Sleeve roll is also equipped with a lubricated polyurethane belt rotating around it. This Valmet Sleeve Roll Belt responds to the strict requirements (e.g., hardness, roughness, elasticity) for both belt oil side and paper or board side surfaces.

The Sleeve roll technology is already established technology in hybrid and board gap concepts on production scale. The first Sleeve roll former started up in April 2021 in South Korea and the second in July 2021 in Germany. Valmet has tested the Sleeve roll technology on many concepts and positions on pilot trials successfully. Position of the Sleeve roll shoe can be in almost any compass direction.

So why leave pressing only on Press section? Pressing is significantly more efficient way to remove water from the web on forming section than creating a high vacuum.

Keywords: dewatering, energy efficiency, forming, new former technology, quality