

Curtain coating with optimum coating color air removal

The AirEx AT-V lets the air out of coating colors

Curtain coating has been drawing more and more attention over the last few years. It has become clear that perfect coating quality can only be achieved with a completely deaerated coating color. At the Paper Technology Center (PTC) in Heidenheim (Germany), a new air removal system for high-viscosity coating colors has been developed. The AirEx AT-V achieves a residual air content of less than 0.1 vol.%.

The excellent quality of the curtain coating is primarily due to its outstanding uniformity. However, nearly every air bubble in the coating color leads to a defect in the paper coating.

If the air contents are compared before and after air removal for the classic film and blade coating processes and the curtain process (Fig. 1), the higher air contents, even after air removal, are found for the film and blade processes. This is mainly due to the equalization elements, including the blade and the rod, under which air bubbles are squashed. Whereas cyclone deaerators with efficiencies of 50% to 70% are fully adequate in

the classic processes, the curtain coater requires more efficient air removal systems to achieve gas contents of less than 0.1 vol.%. The state of the art in specialty paper production, which is currently the main application area for the curtain coater, is a vacuum deaerator used in the chemical and food industries. For pigment coating colors with higher solids contents and viscosities, these deaerators quickly reach their limits. However, air removal is the key to the success of the curtain coater in the graphic paper segment. For this reason, Voith decided to take the development of an air removal system for the specific requirements of the paper

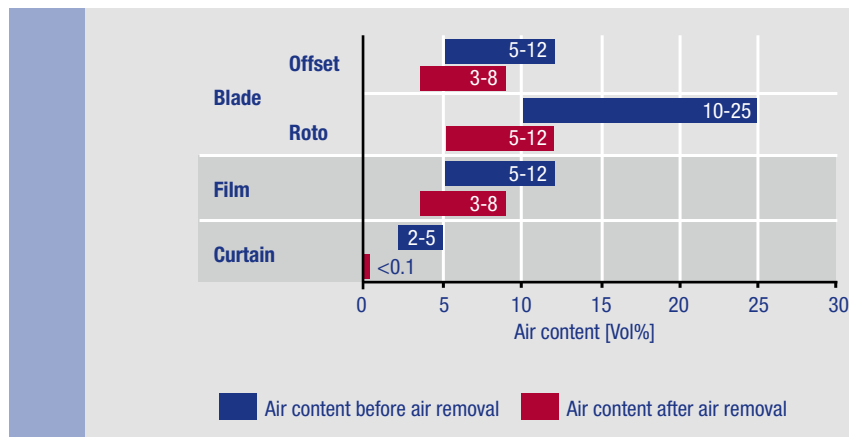


Fig. 1: Comparison of air contents before and after air removal for blade, film, and curtain processes.

industry “into its own hands.” The AirEX AT-V was designed and already drew the interest of a customer in early 2007 during the development phase. The prototype of the air removal system was tested at the PTC in the summer of 2007, and two units were already successfully put into operation for the customer in December, resulting in a development time of just twelve months!

Advantages of the cascade principle

A key feature of the AirEx AT-V is the cascade principle, which, in comparison with the vacuum deaerators from the competition, generates three times more surface for the same outer dimensions (Fig. 2). The coating color supply to the air removal system was optimized to distribute even high-viscosity coating colors completely uniformly in the system. This has a positive effect on the air removal result. Besides the air removal performance, the ability to be cleaned quickly during a grade change is a

key requirement of the air removal system. This problem was solved through use of an automated cleaning device in combination with the smart construction of the cascade elements. Cleaning can be performed by one person and requires approx. 70% less time than for other vacuum deaerators.

Compact design

The compact design of the AirEx AT-V is important for rebuilds in tight spaces. With the multilayer curtain coater, a separate supply line with air removal system is required for each coating layer. This clearly illustrates how important a space-saving air removal installation is.

Visual evaluation impressively demonstrates the results of air removal: When applied to a glass plate and viewed in transmitted light, the coating color has run out of air in the AirEx AT-V (Fig. 3).

Improvements extending beyond the pure mechanical development of the

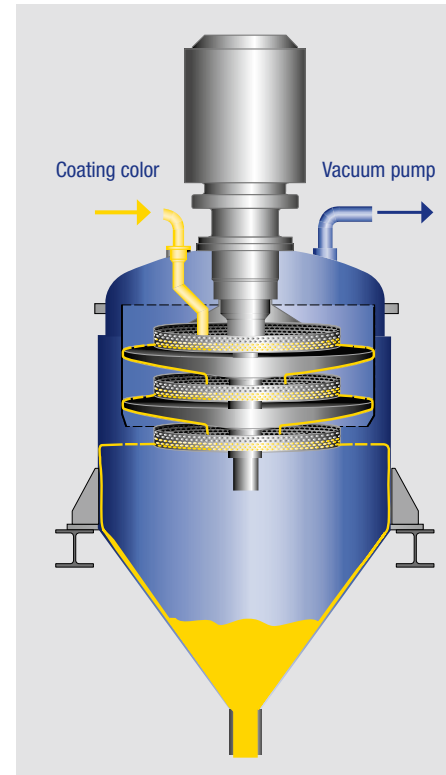


Fig. 2: The cascade principle of the AirEx AT-V provides for three times the surface.

application unit are being made to the curtain coating process. Removal of air from the coating color is a key element in the generation of optimum paper properties in the overall process. With the right components, the curtain coater will become in the paper industry what it has always been in other industries: the easiest and thus most efficient coating process.

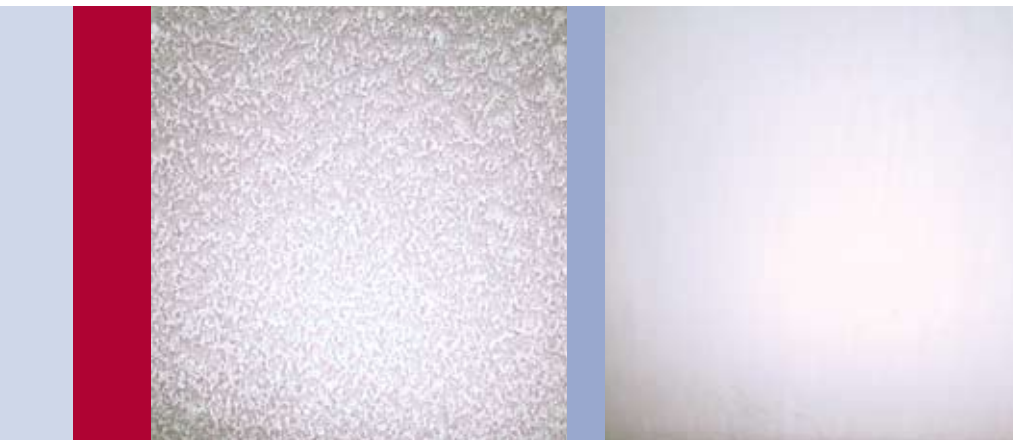


Fig. 3: Glass plate test before ...

... and after air removal.

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