

Lairton Cardoso

Folding Board

Smoothness versus Bulk

Every board producer knows how important it is to get the highest bulk possible for its folding board. This is because the strength depends very much on this property, but smoothness, which determines the quality of the printing surface, is just as important as bulk.

In most cases the solution is a compromise between smoothness and bulk. Smoothness is obtained in the process by a hard nip calender. While the calender gives the smoothness required, it often reduces the bulk.

Another very important factor for achieving good smoothness is the moisture level of the board when it enters the calender. This moisture level is another factor that can reduce the thickness in the calender nip.

Consequently, the question is: How can we improve the smoothness without losing thickness? Or: How can we improve the smoothness and at the same time reduce the pressure of the calender to get better thickness?

The answer to these questions is to get the correct moisture on the surface of the board you want to treat. It is well known that increasing the moisture content of fiber material lowers the glass transition temperature of the wood polymers. This allows the calender to develop a smoother surface.

What we normally see is that board makers know that the moisture level is important, however the machine-direction control of this variable is difficult. In clearer terms, the board producers know the optimum moisture level entering the calender to obtain the best smoothness specification. But moisture content means average moisture through the board. This is normally

low moisture on the surface and higher moisture in the center of the board. So when the board producers found the right average moisture, they found ideal surface moisture. However the higher moisture in the center results in greater compression through the calender and results in a bulk reduction. This gives rise to the following question: How do you get the correct surface moisture without increasing the internal moisture? The answer to this question is to remoisture the surface just before the calender.

This remoisturizing process must form an even layer and stay on the surface layer of board because we want a fine and uniform layer of water only on the surface. Moisturizing in this way, we get the very best treatment of the surface with lower calender pressure.

VIB Systems Inc, the leading supplier of moisture profile actuators for paper and board machines, has developed a new family of spraydampening systems. The new SprayTech systems have been applied in special paper applications when surface remoisture and calendaring for smoothness are required. A very stable spray pattern with water particle sizes equal to or less than 20 microns and droplet velocities of approximately 15 meters per second guarantees a fine and uniform water layer application. The SprayTech spraydampening system achieves this by Particle Size Management (PSM). The application of water needs to be done after the last dryer cylinder and immediately before the calender to avoid water penetration in the board's body.

To apply this new water spray technology in a board machine close to the calender, mechanical solutions needed to be found. This is an area where water

drops, condensation and mist are not permitted. A combination of different technologies such as water spray, suction devices, heated pan and enclosed spray area assure that the water is applied on the paper without affecting the process area.

With the new SprayTech technology you can apply the right amount of water, calibrating the flow for your specific case. Also, you can profile the flow in cross-machine direction to correct any variation in CD smoothness.

The proper amount of water on the surface of the board upstream of the calender can improve smoothness by 20%. This has been demonstrated in recent applications.

In conclusion, the technology for better smoothness exists, and offers the right tools to control the amount of water required on the surface of your board upstream of the calender. This technology makes it possible to maintain the internal board moisture at the required level and measurably prevent bulk reduction.