



## Surface effects

The goal of this white paper is to explain some of the most common surface effects from our products due to the manufacturing processes.

**Humidity and roll effects** – In another informational paper regarding storage, I described the humidity effects on paper causing cockling (Fig.1). The product that is attached to the paper will also take on this pattern (Fig.2) and this especially occurs on the most outside wrap which has significant air exposure. As the material unwinds, the paper becomes flatter (Fig.3) and the surface effects disappear along with some of the surface variation in the product from the foam manufacturing process {e.g. just like a cake, the top surface of the free rising foam isn't as smooth as the bottom side (Fig.4)}.



Fig. 1 – Humidity cockles Fig. 2 – Effect on foam Fig. 3 – Smooth inner wind Fig. 4 – Free rise surface

**Last wind tension effects** – While we have a continuous manufacturing process, each roll has a finish, which also serves as the start to the next roll. During the winding process, the machine controls the web tension and the tightness of the winding. However, when the web is cut to start the next roll, the last portion of the previous roll is no longer under tension and gently falls against the underneath wind. The machine operator presses their hands on that web for a second or so but is quickly busy connecting the newly cut web to a new core for the start of the next roll. The point of this explanation is to understand that the last wrap is never as consistent in winding as the rest of the roll because of the loss of tension across the web and thus contains entrapped air, resulting in minor gaps (Fig.5) which also show up as minor whitish surface variations on adhesive coated material at the loss of contact points (Fig.6) as well as at loose roll ends (Fig.7). Since the low tension on the last wind also doesn't have as strong a release bond to the underlying wind, narrow roll converters often use silicone tape or stretch wrap to hold down the finished edge when converting so that the revolving roll doesn't accidentally unwind during processing.



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Fig. 5 – Slight outside gap

Fig. 6 – Gap effect on foam

Fig. 7 – Loose end

**Other surface effects** – Width yield losses due to cast thickness and edge drop off are addressed in our manufacturing tolerances information. I have included pictures of a thick foam which also shows the surface effects of adhesive width and contact of the next wind in (Fig. 8) and another where air has entered from the side due to loss of contact with the release liner (Fig.9). While many of these effects are reduced further in the roll and even though the product is well within thickness tolerances and has good liner contact, not all the entrapped air between the product and liner can be removed (Fig.10) (especially evident in high density foams and solid films where the material resists compression).



Fig. 8 – Foam drop off effects

Fig. 9 – Liner edge effect

Fig. 10 – Air bubbles in HD foam

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