

Waterbased Coating: A guide to low grammage stocks

Summary

Many printers who work with low grammage papers of below 115gsm know that paper curl issues can be both problematic and difficult to solve easily. One day the job is working without any issues, the next paper jams and the like are observed, with no apparent change in printing parameters. One of the most significant variables in the drying process is the substrate and its ability to absorb water and how materials evaporate from it. Paper grades vary and just like any ink or coating have a specification to adhere to for parameters such as basis weight, density and porosity can have a big influence on the end result. The goal is to achieve “ideal” drying system balancing the coating absorption and evaporation using minimal hot air and maximum air flow. Choosing the right coating is also a vital component of minimizing issues with sheet curl, so very often specialist products are required (please consult our technical department for a guide to these). This guide is aimed at highlighting some of the variables that affect results and looks to offer potential solutions to help overcome these issues:

Causes:

- Paper not properly acclimatized to pressroom environment
- Insufficient ink film weight
- Waterbased coating film is too heavy
- Coating viscosity too high
- Coating is cold or inadequately mixed
- Coating appearance is non-uniform from edge-to-edge across the sheet
- Excessive IR heat: Stack temperatures in excess of 36°C
- Excessive fount solution transferred to the sheet through the units
- Incorrect coating formulation
- Poor air flow through the drier system
- Too much or too little hot air used.
- Overly absorbent paper stocks.
- Press speed too slow – dwell time too long through drier.

ECS setting the standards in pressroom solutions

Recommendations:

- Allow paper to acclimatize to pressroom temperature whilst still in its packaging. Industry recommendation is for 24-48 hours depending on temperature differential and volume of paper. Ideal pressroom conditions are 47-57% relative humidity @ 21°C for Europe and 40-50% @ 72°F for North America.
- Run heavy ink coverage first and/or run solid ink take-off bars on the corners and edges. Ink acts as a barrier and helps block excessive moisture absorption into the sheet minimizing the potential for corner and edge curl helping produce a flatter sheet.
- It is generally advisable to maintain a stack temperature of 30-36°C and reduce IR heat to a minimum. Excessive heat accentuates sheet curl, which is usually more pronounced where light ink coverage exposes the sheet to higher coating absorption. Since the primary function of IR heat is to dry the ink, light ink coverage work may allow for lower IR heat and stack temperatures.
- Adjust metering speed and/or roller nips to optimize coating film weight. Blade coaters have anilox rolls with BCM ratings within a definitive viscosity range. The lower the viscosity, the thinner the coat film.
- Check and ensure metering and transfer roll nip points are parallel and when overall coating, coat as close to sheet edges as possible. This consideration will result in consistent and uniform coat weight and moisture absorption across the sheet surface with less potential for an unstable tight edge condition.
- Check for recommended viscosity to the lower side of tolerance with a Din4 cup when coating is at optimum operating temperature, usually approx. 25° C. Check potential for ink back-trap with lighter coat films and viscosities.
- Temperature affects viscosity. The colder the coating, the higher the viscosity. Non-climate controlled pressrooms might consider an adjustable drum heater to wrap around the drums potentially with a slow-speed, bottom-up mixer to maintain optimum temperature of coating. Avoid over-agitation which may result in foaming.
- Consider paper substrates of above 115gsm. Lightweight stocks often demand “higher solids”, more flexible “low-curl” coating formulations. When coating lightweights, it may be beneficial to run the first side without coating. The coating can then be run in-line on the back-up with a third, coating only, pass back over the first side. Inks should be wax-free for effective dry-trap coating.
- Reduce fountain solution to the plate. This consideration, in addition to using inks with lower water pick-up, will further minimize moisture transfer to the sheet.
- Increase evaporation and minimize moisture retention by maximizing air flow through the dryer system. Incoming air-knife air volume over the sheet and moisturized hot-air evacuation should always be maintained at maximum flow capacity. This may necessitate running some newer, automated systems on manual control to avoid excessive heat and cycling variables that reduce air volume. In addition, high volume exhaust ducting with an up-tunnel exhaust fan will ensure adequate removal and replacement of the humid hot air from the drying system up to at least twice the volume of the incoming air.
- Paper has low moisture content. Web paper is manufactured to lower moisture content as compared to sheetfed paper but is often converted for sheetfed use. Paper with lower moisture content may demand special high solids, low-curl coating formulations as described above.
- If curl can be minimized enough to improve sheet delivery, higher press speed may further improve the condition. Higher press speeds decrease dwell time through the dryer which, in turn, will minimize moisture