



TECHNICAL C&A INFORMATION

Heat-Seal/Blister Waterbased Coating v1.1

Heat-Seal/Blister Waterbased Coating Use

Paperboard	<ul style="list-style-type: none"> - Special paperboard is recommended for heat-seal/blister applications which has a multi-grain direction to support the adhesion of the plastic shell/blister to the paperboard. Most paperboard suppliers offer a type of substrate specifically manufactured for heat-seal/blister applications with a typical thickness ranging from 0.016" to 0.024". Paperboard for heat-seal/blister applications are manufactured with a specialized clay coating on the board surface to allow for penetration of the adhesive coating. It is recommended to only use certified heat-seal/blister grade paperboard. - If a single-directional paperboard is used, caution should be taken with respect to the grain-direction of the paperboard and the hanging direction of the finished product as the package will exhibit directional fiber tear when the blister is removed. Paper fibers will exhibit positive fiber tear in the grain-direction of the paperboard and negative fiber tear in the perpendicular/cross-grain direction.
Blister Shells	<p>Blisters are thermo-formed plastic shells used to contain the product that will be heat-sealed to a blister-card or enclosed in a clam-shell/fold-over blister package. Types of films used to create blister shells include PVC, PETG, CAP, CAB, RPET, PET and APET. Attributes that are considered when selecting the type of plastic being used for a blister application include: transparency/clarity, flexibility/rigidity, heat sensitivity and adhesion. Heat-seal coating product compatibility should be confirmed/qualified for each plastic/film material type prior to use to avoid adhesion/sealing failures.</p>
Heat-Seal/Blister Coating	<p>CAC heat-seal/blister coating products are speciality waterbased coating formulations that use polyurethane polymers to create an adhesive bond between the blister shell and paperboard, or, paperboard to paperboard. The advantages of urethane heat-seal/blister coatings are a more durable adhesive/seal result with excellent aging characteristics, and is the current industry standard for running blister coatings in-line over inks. Certain heat-seal coatings may not be applicable for all film types and should be confirmed/qualified prior to use. For coating recommendations, please consult your CAC Technical Representative.</p>
Inks	<p>Wax and silicone-free inks are recommended for use with heat-seal/blister applications as any slip agents contained in the inks could negatively impact the adhesion performance of the blister coating. Heat exposure should also be a consideration of the ink characteristics during the sealing process. The ink supplier/manufacturer should be consulted and any ink system should be tested for performance prior to production use. Use of ink additives that can effect the drying rate of inks or impact the adhesion of coating such as reducers and anti-skin/stay-open sprays should be avoided. Metallic inks should be avoided in sealing areas of the package. If necessary, metallic inks containing non-leaving pigments should be used.</p>
Fountain Solution	<p>Glycol-free fountain solution chemistries suitable for use with non-absorbent substrates are recommended to improve ink drying performance and avoid adhesion issues that may contribute to adhesion failures resulting in a poor bond/fiber-tear being achieved. If possible, alcohol should be used in place of alcohol replacements containing glycol. It is recommended to re-batch fountain solution prior to producing heat-seal/blister jobs.</p>
Spray Powder	<p>Minimum spray powder application should be used to avoid sheet surface contamination that may contribute to adhesion failures resulting in a poor bond/fiber-tear being achieved. Coated spray powders are not recommended for this application. Powder application should be observed/monitored for jobs using a heat-seal/blister coating.</p>

Heat-Seal/Blister Waterbased Coating Use - *continued*

Viscosity	Viscosity is critical to ensure that the correct coat-weight and associated solids are applied to the sheet to create a sufficient bond/fiber-tear during the sealing process. Consult the CAC “Waterbased Viscosity Guide” for the viscosity measurement procedure and the coating product TDS for recommended viscosity range.
Drying	Good drying techniques/conditions should be employed to ensure that the inks/coating are properly set to avoid blocking/bricking and quality issues in the press delivery-pile. The use of infrared energy(IR), hot-air knives(HAK) and air-extraction(EXT) should be used to achieve a measured captive pile temperature of 90-95°F using a stem thermometer or pyrometer. Press speed and drying system settings should achieve adequate moisture removal from the coating film and stimulate proper ink setting/drying to optimize coating performance. Drying systems that are not in good operational condition or lack any of the previously mentioned capabilities is not recommended for use with heat-seal/blister coating products.
Drying-Time	To ensure successful results when using heat-seal/blister coating products, adequate drying time should always be allocated. A guide-line of >24 hours of drying-time is recommended to ensure sufficient coating film drying on printed/coated sheets prior to additional coating applications, second-side printing or finishing processes. However, other variables in the printing process may require additional drying-time beyond the recommended 24 hours, including: ink drying rate, fountain solution dissipation rate, substrate absorbency, press drying system condition/capabilities, drying system operation/exposure, press-load heat dissipation rate and ambient conditions for temp/RH. In cases where insufficient drying-time is allotted, quality issues such as offsetting, sticking, bricking/blocking, scratching/burnishment, coating transfer to machine parts on finishing equipment and heat-seal bond failures can occur. Based on all printing process variables, determination of proper drying-time should be identified and employed as part of a Standard Operating Procedure(SOP) when using heat-seal/blister coating products to ensure success.
Coat-Weight	Urethane waterbased coating products require a dry coat-weight of 1.5-2.5 dry/lb 3000 ft ² applied for paperboard. This amount is considerably more coating application than is required for a general purpose waterbased coating. Coat-weight testing is recommended to determine the ability of a press to apply and dry the necessary amount of coating for successful/repeatable results. Coat-weight tests are recommended for each printing job and during a production run to monitor that proper coating film thickness is being achieved. An insufficient amount of dry coating film being applied can result in unpredictable bond/fiber-tear results during the sealing process and potential failures being achieved. In circumstances where an adequate amount of coating cannot be applied in a single application, a second application/“hit” can be used to achieve the desired dry coat-weight results. In this case, it is recommended to allow the first application of heat-seal/blister coating to dry completely prior to the second application.
Anilox Roll Recommendations	Due to the required coat-weight to achieve successful results, the anilox roll engraving specifications will be much higher than a general use waterbased coating product. A typical anilox volume of 14-15 bcm/160-180 lpi is necessary to achieve the necessary coat-weight results.
Wet vs Dry-trap	Heat-seal/blister coatings can be applied in an in-line/wet-trap application or off-line/dry-trap application depending on the production requirements and available equipment. In cases where a single in-line application is unable to achieve the desired coat-weight, an additional dry-trap application can be used to improve the coat-weight results.
Coating Activation Temperature	Depending on the coating products being used, an interfacial coating temperature of 170-200°F is necessary to achieve adhesion of the desired surfaces. This is not the same as the die/platen temperatures which are generally >300°F. If additional processes are required for the heat-seal/blister coated sheets prior to the sealing process, temperature exposure should be taken into consideration with the activation temperature taken into account.

Heat-Seal Conditions

In addition to variables such as paperboard, ink and coat-weight, the variables of the sealing process include:

- Die/platen temperature
- Dwell time
- Pressure

Establishing sealing parameters in conjunction with press/printing conditions helps to ensure that the results become predictable and repeatable. Typical sealing conditions for waterbased heat-seal/blister coating products are 300-375°F/60-80psi/2-3 seconds. Sealing conditions are dependent on the package configuration, paperboard thickness/density, blister film heat sensitivity and coating activation temperature.

Heat-Seal/Blister Waterbased Coating Considerations

Contamination

Polyurethane coating products are not compatible with acrylic coating products and will congeal when cross-contaminated. This can result in contamination of coating hoses, pumps and anilox cells which can require significant clean-up. To avoid problems of cross-contamination, good cleaning procedures should be employed when switching to/from heat-seal/blister coating products.

THOROUGHLY clean the coating circuit of all coating residue with ammonia and water or CAC's 501 Cleaner. Acrylic coating chemistry is NOT COMPATIBLE with polyurethane coating chemistry. The conventional acrylic coating, when exposed to blister coating, may create severe contamination of the coating circuit requiring additional cleaning. Residual blister coating remaining in the coating circuit can impair the functionality of acrylic coatings when contamination occurs. This can cause the acrylic coating to become unusable.

Shelf-Life of Printed Sheets

Printed/coated sheets using a heat-seal/blister coating can have a shelf-life for sealing of 12 months or greater. This is dependent on the use of proper inks and paperboard as well as achieving the desired coat-weight during application. It is advisable to use a shelf-life of 3 months until your process is qualified and aged.