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Techniques for running “WRA” (water resistant starch adhesive)

Scope

Guidelines are suggested for maximizing the performance of water resistant resin additives in starch based corrugating adhesives.

Safety precautions

Observe all personal safety rules pertaining to the use of all chemicals used to make starch based corrugating adhesive. This includes the use of Personal Protective Equipment (PPE) when handling ingredients such as Caustic Soda. The correct PPE will include a face mask, chemical resistant apron, rubber boots and long sleeved rubber gloves. Breathing protection may be necessary in certain applications.

Content

Producing water resistant corrugated board is more complicated than merely adding a water resistant resin additive to the starch adhesive formulation. The most common resin additives in use today are of the chemical families known as ketone-aldehydes and melamine-aldehydes. These along with modified resorcinol comprise the great majority of resin additives used in today’s boxplants. The most important feature of all of these additives is that they are “thermosetting”. This means that they function most effectively when given sufficient heat and time to crosslink with the starch in the corrugating process. In order for the crosslinking feature of these additives to perform to their maximum ability, the following guidelines are suggested:

Guidelines for using water resistant additives

1. Use the proper amount of additive. For most resins using 0.75 – 1.5% of resin based on the batch weight is the desired amount of resin to use. This would be a range of 22.5 pounds to 45 pounds (10.22 kg – 20.45kg) for a batch that weights 3000 pounds (1363.63 kg). Contact your starch additive supplier for the optimum addition level for your specific formulation.
2. Use the corrugating starch adhesive as soon as possible after the water resistant additive is introduced. Studies show that as much as 50% of the effectiveness of the resin additive is lost within 8 hours. Additive dosing systems may virtually eliminate this reduction in performance.
3. Apply more starch adhesive to the flute tips. By increasing the amount of starch adhesive, the bond line will cover a larger area of the flute tip and shoulder, thus affording increased resistance to moisture. This is particularly important for obtaining optimum performance on the single facer. A 50-75% increase (or more) in starch adhesive application when running water resistant board is not unusual.

4. Control the amount of heat applied to the combined board. Keep in mind that you are dealing with a thermosetting resin system. Since in many cases we are applying more adhesive than normal we may need to increase our wraps and/or use more ballast pressure to manufacture WRA board at acceptable running speeds. Allowing the combined board to cure in the stack is strongly suggested. A cure time of 4-6 hours will greatly improve the water resistance of the corrugated board. Stack cure times over 8-10 hours are better while 24 hours is considered optimum.

5. Higher solids starch adhesives are suggested. Solids levels of from 27-29% are generally agreed to outperform lower solids formulations in water resistance.

Summary

By following the guidelines above, and adhering to all of the rules for producing quality, defect-free domestic board, you will be creating the optimum conditions for maximizing the performance of your water resistant starch.

Remember:

- 1) Use fresh starch adhesive and proper additive levels.
- 2) Increase starch adhesive application.
- 3) Provide adequate stack cure.

Keywords

Additives, Water resistance, Adhesives, Starch

Additional information

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