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Starch adhesive trial

Scope

This Technical Information Paper describes basic steps to follow when conducting a starch adhesive trial.

Safety precautions

Observe all corrugator and starch mix safety rules.

Content

What is a starch adhesive trial?

1. An attempt by a trained technician to achieve certain production and/or quality goals through the implementation of a new formulation or adhesive product.
2. The trial could be conducted by a starch adhesive professional and/or boxplant personnel.

How can a boxmaker best prepare for a starch adhesive trial?

A. Set Goals- Establish Methods

1. If corrugator overall production is the issue, have accurate records available to demonstrate production history.
2. Establish current comfort zone speed levels for most common grades of board produced.
3. Establish board quality as a function of a qualitative test such as pin adhesion, flat crush, short column, etc.
4. Establish a sampling method for board to be tested. Equivalent conditioning should always be employed for comparisons to be considered valid.
5. If adhesive consistency is the issue, have Statistical Process Control (SPC) records updated prior to the trial. This would include dated profiles of adhesives viscosity/temperature and gel point of finished batches and storage tanks under running conditions.

B. Provide Adequate Coverage

1. Have the best operators and supervisors available during the trial period.
2. Brief all personnel on the corrugator that a starch adhesive trial is going to occur. Explain fully how they can participate and what the goals are.
3. Allot sufficient time for major changes to occur.

C. Provide Well-Maintained Starch Adhesive Equipment

1. Since the measurement of water, temperature, chemicals and raw starch are paramount to a consistent adhesive formulation, the tools of measurement must be reliable:
 - a. Water volumes are measured automatically through a water meter, manually by a gal/in. calculation or weighed directly and calculated by dividing pounds of water by 8.34 lbs./gal. Mixing tank volume charts are necessary for manual measurement and/or calibration of automatic devices. Contact your equipment supplier for the proper charts.
 - b. Temperature gauges are typically inaccurate. The purchase of a hand-held glass or electronic thermometer is required for mixing tank and storage tank temperature gauge calibration. Replacement of out-of spec mixer tank gauges is recommended.
 - c. Chemical weight scales need to be calibrated on a regular basis. Having the technician who checks the baled waste scale also check the chemical weight scale is the easiest procedure. A quick check can be obtained by using a bag of cornstarch of known weight or alternate.
 - d. Those plants relying on a bulk handling system for the carrier portion of the adhesive need to have the weigh hopper calibrated on a regular schedule. This can be accomplished by the scale supplier or the baled waste weigh scale technician. A 5- or 10-lb (2.3- or 4.5-kg.) variance in carrier solids can have a profound effect on the viscosity window of the adhesive. Eliminating delivered starch variances will greatly assist overall adhesion consistency and potentially economize in the case of overages.
2. Starch mixing tank efficiency is a key ingredient in a successful trial. Trying to get by with inadequate or under powered mixing vessels will limit the formulator's ability to be creative or aggressive as needs dictate. Consider requests for additional horsepower motors, as they will allow more work to occur in a shorter amount of time.
3. Starch adhesive supply loops and storage systems very often have problems associated with faulty valves, clogged pipes and/or lack of temperature viscosity control (TVC). Some of these problems exist for years without repair. Encourage your starch adhesive supplier to assist in maintaining this necessary portion of your adhesive system. Discuss a regular cleaning schedule and a TVC maintenance program.

D. Provide and Adequate Trial Time Period

1. "Look-see" trials are often the results of a specialty chemical supplier trying to grab additional business or a boxplant trying to quick-fix a chronic problem. Certain trends can be noted in the short term. But valid reproducible improvements are best achieved in a longer trial period which can be two weeks to two months, depending upon the needs and/or goals established. This will allow a settling-in period of the new product or formulation and will also help provide a running history across a wider range of boards grades and boxplant conditions.
2. For production speed improvement trials, a new confidence level needs to be established among the corrugator crews to raise their level of expectation. A starch adhesive reported to increase the speed of a corrugator may be regarded in a negative fashion if previous trials have resulted in high speed waste. Even if no previous negative trial history exists, the concern of running bad board will often hinder early increases in overall production averages. This enhanced confidence level needs to be earned by a starch adhesive and rewarded by positive management/supplier input.