

TIP 0304-14

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TIP Category: Data and Calculations
TAPPI

Statistical process control of starch gelatinization temperature

Scope

The gelatinization temperature, or point at which the adhesive begins to increase in viscosity to start the bond formation process, is an important quality parameter. Consistent gel temperatures in fresh batches day after day indicate that raw materials and makeup procedures are holding constant. To obtain a true picture of the state of control over the starch making process, statistical process control techniques should be employed. It should be noted that the intent of this Technical Information Paper is to discuss the benefits of the use of SPC techniques and the application of these techniques to starch-based corrugating adhesives. TIP 0304-05 provides detailed information about gel temperature measurement equipment and procedures. TIP 0304-08 reviews numerous common questions and answers concerning gel temperature.

Safety precautions

There are no safety precautions.

Content

There are many ways to set up an SPC Program on starch gel temperature. The sampling procedures and SPC techniques suggested below are examples of how you might start.

Test methods

Several gel temperature test methods can be found in "Preparation of Corrugating Adhesives," a TAPPI PRESS publication (1977). A recommended method for use in the box plant production environment can be found in TIP 0304-05. Necessary equipment and the test procedures are explained in detail.

Sampling

To properly control the gel temperature of the starch slurry, the adhesive preparation process should be monitored. It is recommended that each batch of adhesive be sampled immediately after the batch mixing is completed (i.e., 20 minutes after the "drop" is completed or the final ingredients are added), and before it is pumped to storage. The test should be run by the person responsible for operating the starch system. It is also important to control the gel temperature of the starch at the point of application. This sampling should be

done at the corrugator adhesive pan overflow lines. A beginning sampling frequency of once per shift from at least one adhesive pan per starch supply line is recommended. After historical data is obtained, this frequency could be increased or decreased according to need. When possible, the person responsible for operating the starch system should also be