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Evaluating glue lap adhesive properties

Scope

The scope of this technical information paper is to outline the various tests one can use in evaluating the glue lap adhesives used in the corrugated box plants for the container's manufacturer's joint.

These methods could be used to monitor the batch-to-batch quality of an adhesive or to evaluate a new proposal from an adhesive supplier and compare it to the grade used until then.

Safety precautions

No special safety precautions are applicable.

Test methods

Tests that have been found useful are:

Viscosity of the adhesive: As per TAPPI T 666 "Viscosity of Adhesive Using a Low-Shear Rotating Apparatus."

Ash content: As per TAPPI T 211 "Ash in Wood and Pulp." This test enables one to detect the presence of mineral fillers in the adhesive. An ash content of more than 2% is generally a positive indication of fillers. Mineral fillers are abrasive and can wear or clog application equipment.

pH of the adhesive: Determined in accordance with TAPPI T 667 "pH of Filler and Pigment Slurries" but using a 100 ml sample of the adhesive instead of the mentioned slurry.

Solids content: Using a forced air oven to dry a small sample of adhesive, the amount of solids is determined gravimetrically. There are also some electronic moisture balances offered on the market that simplify and speed up the process.

Water resistance: A useful feature if a corrugated container is submitted to high humidity conditions.

A quick test is to spread a known thickness of an adhesive on an inert and flat surface (like a melamine board), preferably matte finish and dark colored. The film is oven-dried and conditioned as per TAPPI T 402 "Standard Conditioning and Testing Atmospheres for Paper, Board, Pulp Handsheets, and Related Products" and immersed in water. To pass the test, the adhesive film should not dissolve or disintegrate within 4 hours.

Guidelines

Glue lap adhesives have been found to work satisfactorily when they meet the following criteria:

Set time: Values to be established by plant, values dependent upon machine requirements.

Solids content: Minimum 45%.

Viscosity (Brookfield @ 20 rpm): Following ranges have been found to be reasonable in number of plants surveyed:

600-900 cp for wheel applicators
1000-1500 cp for extrusion applicators

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Ash content: Below 2% (no fillers).

pH: Between 4.0 and 8.0.

Water resistance: Pass test specified in UFC Rule 41, Section 11, Paragraph (C) (3).

These guidelines are by no means exclusive as every box plant should try to adapt them to their particular processing conditions.

Keywords

Glue, Adhesive, Manufacturers joints

Additional information

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