

Test Procedure Guidelines

Test Method: **ACTIVATION TEMPERATURE RANGE**

PURPOSE OF PROCEDURE:

To determine the in-mold label adhesive activation temperature.

To determine the temperature range over which the sealant layer on a specific substrate will activate.

DEFINITION OF TERMS:

Activation: The adhesive is said to be “activated” if

- (a) it can form a bond with a substrate and/or
- (b) on cooling down and reactivating, its subsequent performance is impeded.

Activation of the adhesive of in-mold labels in a stack can cause them to block.

Softening: An adhesive that is neither hard nor dry to the touch and which cannot form a bond with a substrate is said to be “softened”. Softening does not necessarily affect the subsequent performance of the adhesive but extended periods of softening could cause blocking with the presence of pressure.

EQUIPMENT/MATERIALS NEEDED: METHOD 1

1. Hot plate apparatus with temperature control accurate to $\pm 1^{\circ}\text{F}$ or $\pm 1^{\circ}\text{C}$.
2. A smooth, flat block of metal at least 4in x 4in (10cm x 10cm).
3. 4 pound (2 kg) weight with a 2in x 2in (5cm x 5cm) cross section.
4. Label substrate sample to be tested (measure 2in x 2in or 5cm x 5cm).
5. Label panel of the bottle (or) a flat piece of the plastic comprising the bottle, larger than the label substrate sample.

TEST PROCEDURE:

1. Place the block of metal on the hot plate.
2. Turn the hot plate on and let it stabilize to 140°F (60°C).
3. When the temperature of the metal block is uniform, place the label panel on the hot plate.
4. Allow one minute for the plastic to warm up.
5. Place the label adhesive side down on the plastic and immediately place the weight on the label.
6. Remove the plastic and the label after a fixed time (3 - 5 seconds). If the label is stuck to the plastic, the activation temperature is too low.

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7. Repeat steps 1 through 6 at 10°F (5°C) increments until activation is realized. This time, if the label does not stick, then the activation temperature is too high.

Note: Temperatures and times mentioned above may be changed on a case by case basis.

EQUIPMENT/MATERIALS NEEDED: METHOD 2

1. Sentinel heat sealer or equivalent.
2. Label sample with adhesive.
3. Label panel of the bottle or a flat piece of the plastic comprising the bottle, larger than the label substrate sample.

TEST PROCEDURE:

1. Determine the activation temperature of the adhesive from the adhesive supplier.
2. Set sealer temperature at 50°F (30°C) below the supplier specification for adhesive.
3. Test sample of label by placing label sample with adhesive against bottle material into sealer, situating the label closest to heat source.
4. Bring sealer together for two seconds at 90 PSI (620 kPa).
5. Remove sample and check adhesion. If the label is stuck to the plastic, the activation temperature is too low.
6. If label is not stuck, repeat steps 1 through 5 increasing temperature by 20°F (10°C) each time until activation temperature is achieved.

DOCUMENTATION:

The allowable tolerance that is agreed upon by the customer should be in written specifications provided by the customer.

The frequency of the test to be performed must also be agreed upon by the customer. That is to say that the customer should provide in the specification how often the test is to be done and by what form of sampling method, (random or non-random). These will be used to record results.

Many customers will require representative samples and/or data to be kept in inventory to reference in the event that the customer finds a defect in the provided order. This frequency of these retains should also be specified to ensure compliance.

REFERENCES: