

T 526 cm-04

SUGGESTED METHOD – 1972
CLASSICAL METHOD – 1985
REVISED – 2004
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Blister resistance of coated paper in heatset printing

1. Scope and significance

This method is used to measure the resistance of coated paper and coated board to blistering in the ovens of web-fed heatset printing presses. This objective is accomplished by applying lacquer to both sides of the paper to simulate printed ink films and placing the lacquered samples in a blister tester in which both temperature and exposure time can be varied widely and reproducibly. The heat exposure simulates the action of the heatset oven. End points obtained may be compared with other test results.

2. Summary

Lacquer is applied to both sides of a paper sample from which specimen strips are cut. The strips are mounted in holders, one to each holder, and passed between the heating elements of the tester. As temperature level and/or specimen exposure time is increased, the forces of vapor pressure within the paper increase until blistering occurs. A blister resistance level is determined.

3. Definition

Blister resistance is that property of paper which withstands the vapor pressure generated internally in rapid heating of paper and allows that pressure to leak away through the combined coating and ink layers.

4. Apparatus

4.1 *Lacquer drawdown apparatus*, consisting of the following:

4.1.1 *Drawdown block*, a piece of plate glass or the equivalent approximately 250 × 30 × 13 mm (approximately 10 × 12 × 0.5 in.) with a flat top surface.

4.1.2 *Holding device*, a weight, approximately 1000 g, or a clamp to hold the sample in place on the drawdown block.

4.1.3 *Drawdown rod*, a No. 8 Mayer wire-wound rod 6.35 mm (0.25 in.) diameter.

4.1.4 *Drawdown rod cleaning and soaking bath*, a piece of glass tubing about 13 mm (about 0.5 in.) diameter, sealed and padded at the bottom end, clamped in an upright position and of sufficient height to allow total immersion of the wound portion of the drawdown rod in solvent.

4.2 *Heat exposure apparatus (blister tester).*¹ The tester (see Fig. 1, which shows the door open for clarity) is operated with the door closed and consists of the following major components:

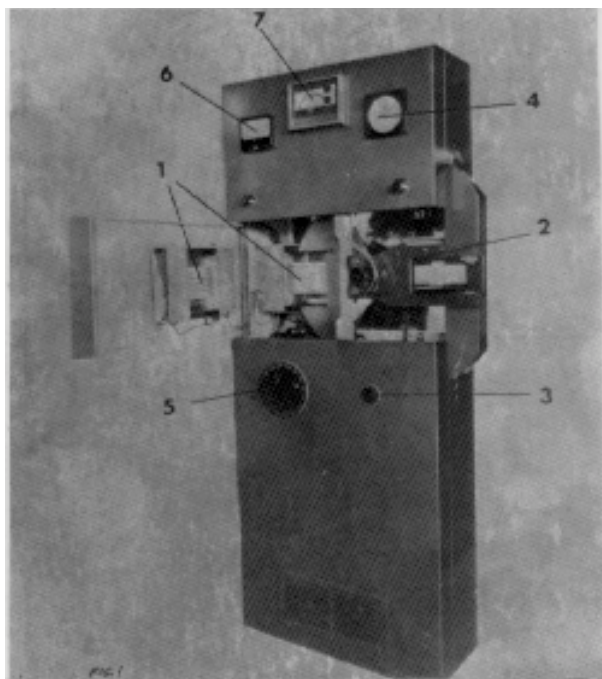


Fig. 1. Blister tester: 1, oven; 2, specimen transporter; 3, variable direct current supply; 4, millisecond timer; 5, variable transformer; 6, alternating current voltmeter; 7, temperature controller.

4.2.1 *Oven*, two banks of quartz tubes mounted in reflectors and facing each other across a vertical gap.

4.2.2 *Specimen transporter*, a three-layer metal fabrication with a slot to receive specimen holders and a window to permit exposure of both sides to oven heat. The transporter is mounted on a horizontal shaft, about which it revolves, passing through the oven gap.

4.2.3 *Transporter drive*, a direct current gear motor, supplied by a solid-state variable direct current supply for controlling motor speed.

4.2.4 *Millisecond timer*, an instrument which senses and indicates actual oven dwell time for each movement of the transporter with an accuracy of ± 0.02 s.

4.2.5 *Variable transformer*, a 7200-W auto-transformer which can adjust oven heater voltage between zero and 240 V. Oven voltage is indicated by a voltmeter.

4.2.6 *Temperature controller*, a solid-state controller with two set points adapted to switch on the oven heater when the gap has cooled to the lower set point and to start transporter movement when the gap has warmed to the higher set point.

5. Materials

5.1 *Blister testing drawdown lacquer*, comprised of 55 parts lacquer and 45 parts technical grade ethyl acetate by volume. It is contained in a squeeze bottle with a small diameter delivery tube which is sealed with a rubber policeman.

5.2 *Cleaning solvent for lacquer*, ethyl acetate is suitable.

5.3 *Lint free rags or paper towels*, for cleanup.

NOTE 1: Because of flammability, ethyl acetate should be used only in a well ventilated room and should be kept away from open flame.

¹Names of suppliers of testing equipment and materials for this method may be found on the Test Equipment Suppliers list in the set of TAPPI Test Methods, or may be available from the TAPPI Quality and Standards Department.