Designation: F 1151 – 88 (Reapproved 2003)

Standard Test Method for Determining Variations in Hardness of Film Ribbon Pancakes[1]

This standard is issued under the fixed designation F 1151; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers the determination of variations in hardness of film ribbon pancakes.

1.2 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Definitions

2.1 *pancake*—a section of ribbon usually wound on a core in such a manner to allow it to be inserted in an individual ribbon cartridge.

2.2 *hardness*—the ability of the pancake to resist vertical deflection when a load is applied axially to its core.

2.3 *core*—usually a cylindrical plastic tube on which a ribbon is wound.

2.4 *slitter*—a piece of machinery designed to slit the width of large ink-coated film rolls and wind the narrow film into individual pancakes.

3. Summary of Test Method

3.1 On rewinding an inked ribbon, each layer of inked film should be rewound with an equal force resulting in a uniform hardness of a pancake. However, the hardness nearer to the core is usually higher than nearer to the periphery.

3.2 To determine the variations in hardness, a pancake is put under a known vertical load until a part of it is telescoped. The loading is continued as other portions of the pancake telescope. The load and position, that is, diameter of telescoping, at each load level is noted. Load testing continues until the third telescoping is observed.

3.3 All tests must be performed in duplicate under the same conditions in order to compare results.

4. Significance and Use

4.1 This test method enables a comparison of variation in hardness between pancakes and allows slitter operators to adjust and maintain the desired rewinding force.

5. Interferences

5.1 Wide variations in environmental conditions (temperature, relative humidity) could affect the pancake hardness.

5.2 Pancake hardness will be affected by changes in pancake diameter, width, coating formulation, base film thickness, and base film composition. Hardness will also be affected by the physical characteristics of the core used for the pancake.

6. Apparatus and Materials

6.1 *Pancake Tester*[2]—See Fig. 1.

6.2 *Any Special Thrust Pads* required for the pancakes being tested.

6.3 *Pancakes* to be tested.

7. Test Specimen

7.1 The test specimen shall be an entire pancake which has not been physically distorted in the direction perpendicular to the axis of the core after it was produced on the slitter.

8. Conditioning

8.1 Although no special conditioning of pancakes is required, compare only tests run under the same relative environmental and lapsed time from rewinding.

9. Procedure

9.1 Shift the manual sliding valve (Fig. 1, Item 1) to the "OFF'' position.

9.2 Push the piston rod (Fig. 1, Item 2) vertically upwards to the stop.

9.3 Shift the manual sliding valve to the "ON'' position.

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[1] This test method is under the jurisdiction of ASTM Committee F05 on Business Imaging Products and is the direct responsibility of Subcommittee F05.02 on Inked-Transfer Imaging Products.

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[2] The WEY Universal Pancake Tester, Type UPT 125/50 (with Instruction Manual), has been found satisfactory for this purpose. Available from S. M. Engineering, A. G., Roosstrasse 49, CH-8832, Woller AU, Switzerland.

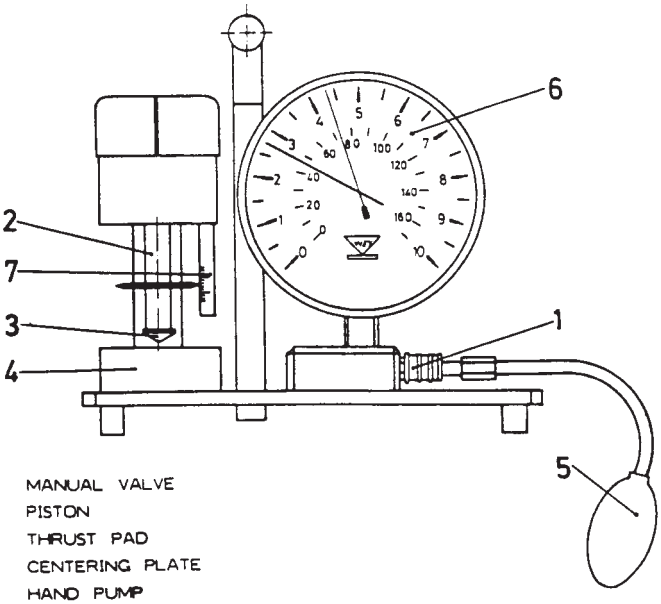

FIG. 1 Pancake Tester (see Footnote 2)

9.4 Mount thrust pad (Fig. 1, Item 3) by screwing it into the piston rod. Note that this step is only applicable if a special thrust pad is needed for the pancake to be tested. Normally, a standard thrust pad is part of the basic test apparatus.

9.5 Place the pancake on the center plate (Fig. 1, Item 4). See that the core of the pancake is approximately on the center of the centering plate.

9.6 Pump the hand pump (Fig. 1, Item 5), to lower the piston rod slowly until the thrust pad is centered as illustrated in Fig. 2. The cone of the thrust pad should lightly touch the core by pumping carefully and lightly. Set the hand on the dial (Fig. 1, Item 6) on zero by turning the red maximum indicator counter clockwise.

9.7 Increase the pressure by pumping slowly until a certain section of the pancake is telescoped vertically 1.5 to 2 mm as illustrated in Fig. 3. This depth can be determined by the graduated millimetre scale (Fig. 1, Item 7). The load needed for this displacement is shown on the dial (Fig. 1, Item 6) in WEY and newton units.

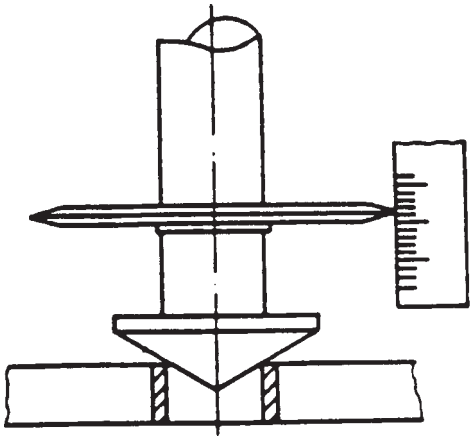

FIG. 2 Thrust Pad Centered

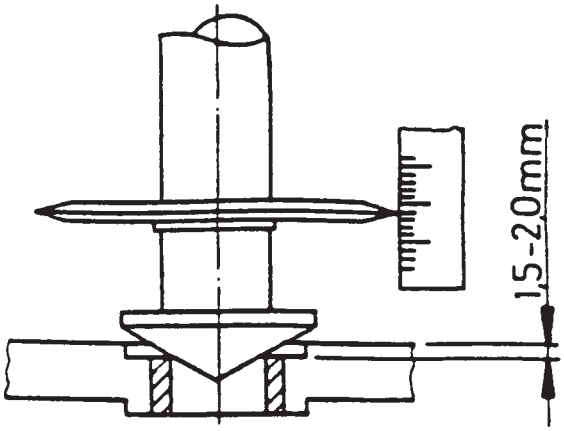

FIG. 3 Pancake Telescoped

9.8 To determine hardness in various sections of the pancake, the force should be increased by slowly pumping, until the second and third telescoping take place (see Fig. 4). In some cases, increased force will merely push the core out of the pancake without the stairstep telescoping shown in Fig. 4.

9.9 To remove the pancake, shift the slide valve to the" OFF'' position and push the piston rod up vertically.

10. Identification

10.1 For the identification of pancakes, the following is suggested:

10.1.1 Coated jumbo roll number,

10.1.2 Arbor position, and

10.1.3 Date and time.

11. Report

11.1 Report the diameter and force required for the first, second, and third telescoping in WEY or Newton units, or both. This procedure is best suited for a product control purposes where minimum and maximum hardness target values are used to maintain uniform acceptable pancake hardness. These minimum and maximum values should correlate to the proper functional performance of the finished ribbon.

12. Precision and Bias

12.1 Since the test is destructive it is only possible to obtain comparative values when evaluating multiple samples. If the same result is reached with another pancake under the same conditions, both of these would be considered to exhibit the same degree of variation in hardness.

12.2 Bias may be incurred by the use of different operators and different test instruments.

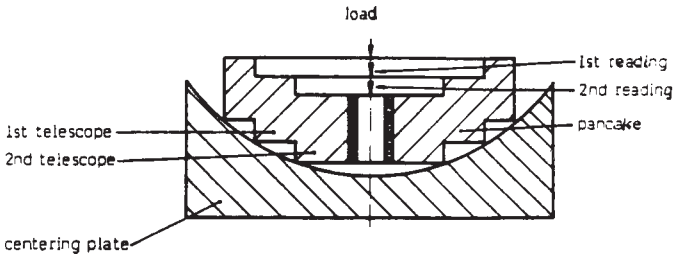

FIG. 4 Second and Third Telescoping

13. Keywords

13.1 fiber ribbon pancake; hardness; slitter winding tension.