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Technical Association of Pulp and Paper Industry
Standard Method T 462 Su 72
An American National Standard

Standard Test Method for Printing Ink Permeation of Paper (Castor Oil Test)[1]

This standard is issued under the fixed designation D 780; 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 the absorbancy rate of paper for printing inks having an oil vehicle but is normally used only for easily permeable papers such as news, book, and mimeograph.

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. Referenced Documents

2.1 *ASTM Standards:* [2]

D 585 Practice for Sampling and Accepting a Single Lot of Paper, Paperboard, Fiberboard, or Related Products

D 685 Practice for Conditioning Paper and Paper Products for Testing

3. Summary of Test Method

3.1 This test method is performed by measuring the time required for a drop of USP castor oil to produce a uniform translucent spot on the under side of the test specimen by permeation through the specimen.

4. Significance and Use

4.1 A correlation has been established between the results of this test and the printing of uncoated papers.

5. Apparatus and Materials

5.1 *Viewing Box* (Fig. 1), having an open front; a top of smooth sheet material, with a 20-mm diameter hole for observing the specimen; a ground-glass partition parallel with the front of the box to prevent excessive heat from affecting the test results; a 25-W electric bulb placed in back of the partition for illuminating the specimen; and an adjustable mirror near the bottom and centered on the observation hole in the top of the box.

5.2 *Separatory Funnel or Buret*, with a tip of such diameter that 25 drops of distilled water delivered at 21°C will have a volume of 1 mL. The funnel or buret is suspended with the end of the tip approximately 45 mm above the test specimen.

5.3 *Small Bottle Cap*, with black interior, having its diameter in excess of 20 mm.

5.4 *Timer*—Stopwatch or electric timer.

5.5 *Castor Oil, USP*, the temperature of which is maintained at 23 ± 1°C.

NOTE 1—The viscosity of USP castor oil has been found to vary somewhat. Accordingly, for particular tests, agreement should be reached regarding the specific sample of oil to be used.

6. Test Specimen

6.1 Obtain a sample of the paper in accordance with Practice D 585. From each test unit of the sample cut at least ten square test specimens each about 50 mm on a side. Identify five of the specimens on the wire side, and the other five on the top side.

7. Conditioning

7.1 Precondition, condition, and test the specimens in an atmosphere in accordance with Practice D 685.

8. Procedure

8.1 Place a specimen over the hole in the top of the box. Suspend the funnel with the end of the tip approximately 45 mm above the test specimen. Place a little castor oil in the funnel and slowly open the cock until a drop of castor oil falls from the funnel or buret upon the specimen. Close the cock. Cover the oil drop with a cap having a black interior to provide sharper determination of the end point. Observe the underside of the paper in the mirror and measure the time interval from the instant of contact until the spot of oil reaches a uniform and maximum translucency. (End point appearance will differ depending upon the amount of high refractive index pigment present in the paper being tested.)

8.2 Make five test determinations on each side of the paper.

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[1] This test method is under the jurisdiction of ASTM Committee D06 on Paper and Paper Products and is the direct responsibility of Subcommittee D06.92 on Test Methods.

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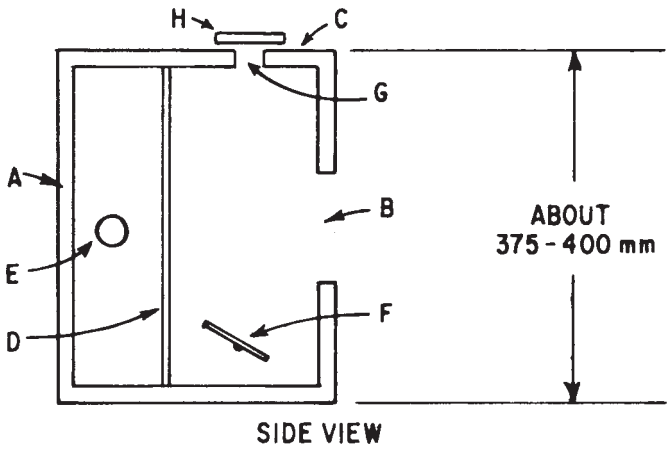
[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For Annual Book of ASTM Standards volume information, refer to the standard's Document Summary page on the ASTM website.



in.	mm.
12	305
15	381
18	257

A–box
B–open front in box
C–top, smooth sheet material
D–partition, ground-glass
E–electric bulb, 25 W
F–adjustable mirror
G–hole, 20-mm diameter, in top of box for observation of specimen
H–test specimen

FIG. 1 Apparatus for Printing Ink Permeation Test of Paper

9. Report

9.1 Report the following information:

9.1.1 Maximum, minimum, and average time of penetration for the five tests for each side of the paper, to the nearest second,

9.1.2 Average spot diameter at completion of the test, in millimetres, for each side of the paper, and

9.1.3 Specifics regarding the castor oil used (see 5.5).

10. Precision and Bias

10.1 *Precision*—It is not practicable to specify the precision of this test method because the precision is known to be highly dependent upon the type of the paper, its formation, and other factors. Should users of this test method develop precision data for some purpose, it should not be assumed that the precision measured with one type of paper will be applicable to others unless data to the contrary is generated. One laboratory has found repeatability on certain mimeograph papers to be 20 %, and on certain papers made from groundwood, 12 % of the result measured.

10.2 *Bias*—The procedure in this test method has no bias because printing ink permeation (castor oil test) is defined only in terms of this test method.