Designation: F1478 – 06 (Reapproved 2011)

Standard Test Method for Determination of Abrasion Resistance of Images Produced from Copiers and Printers (Taber Method)[1]

This standard is issued under the fixed designation F1478; 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 a procedure for determining the amount of image abraded from the surface of a document.

1.2 This test method may be used to evaluate the abrasion resistance of images produced by business imaging products, including nonimpact printers, thermal transfer printers, and copiers. The machine shall be capable of producing the specified image.

1.3 Testing focuses on determining the amount of imaged material removed, resulting from forces which impart a rubbing or grinding action principally on the top surface of the image.

1.4 Comparison may be made between various imaging devices or the image-producing components of an individual machine.

1.5 Other test methods employing the Crockmeter (Test Method F1319), Sutherland Rub Tester, and Gavarti GA-CAT may be employed to evaluate the smudge and abrasion characteristics. Results by these test methods are not necessarily equivalent to those obtained by this test method.

1.6 *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]

F335 Terminology Relating to Electrostatic Imaging

F1319 Test Method for Determination of Abrasion and Smudge Resistance of Images Produced from Business Copy Products (Crockmeter Method)

2.2 *ANSI Standards:*

PH2.17 Density Measurements—Geometric Conditions for Reflection Density[3]

PH2.18 Density Measurements—Spectral Conditions[3]

2.3 *ASTM Adjuncts:*

Abrasion Test Target[4]

3. Terminology

3.1 *Definitions*—General definitions related to electrostatic copying may be found in Terminology F335.

3.2 *abrasion resistance*—the ability of an image to withstand the frictional forces attempting to remove the surface material.

3.3 *smudge*—the tendency of an image to smear or streak onto the adjacent area when rubbed, involving the redeposition of abraded material.

3.4 *smudge resistance*—the ability of an image to withstand smudging.

4. Summary of Test Method

4.1 Test specimens are generated of an image described in this test method. Suitable hard copy targets for use in copiers and computer program diskettes for use in computer printers are available from ASTM. The specimens are abraded with a specified instrument and evaluated by visual comparison or reflectance measurements, or both.

5. Significance and Use

5.1 The degree of image abraded from a copy or printed image may be affected by various factors, including the type of machine, condition of the machine, supplies employed, time since imaging, and environmental conditions. As many as possible of these variables should be controlled during the test. If available, a control sample with known characteristics should be run along with the test samples.

[1] This test method is under the jurisdiction of ASTM Committee F05 on Business Imaging Products and is the direct responsibility of Subcommittee F05.04 on Electrostatic Imaging Products.

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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.

[3] Available from American National Standards Institute, 25 W. 43rd St., 4th Floor, New York, NY 10036.

[4] Available from ASTM International Headquarters. Order Adjunct No. ADJF1478.

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5.2 This test method may be used to determine image resistance to damage or deterioration as a result of exposure to abrasive forces, such as automated document handling devices.

5.3 This test method may be used for control of product quality, comparative analysis of machines, comparative analysis of imaging components, as well as a research and development tool.

5.4 This test method is adaptable to images produced from most nonimpact printers and copiers. The printers shall be capable of utilizing the available program to produce the specified image.

5.5 If the user wishes to simulate the type of damage or smudge resulting from paper rubbing against the printed image or from normal handling, consideration should be given to using either the Crockmeter Method (Test Method F1319), the Sutherland Rub Method, or the Gavarti GA-CAT Method.

6. Interferences

6.1 The degree of image fixing is an integral factor in the resistance of the image to damage or deterioration due to abrasion. The image fixing capabilities of copiers and printers may be significantly influenced by the choice of supplies. To obtain an accurate representation of the capabilities of any given machine, the manufacturer's recommendations for toner, fusers, fuser oils, other imaging supplies, and paper should be followed.

6.2 Due to the temperature cycling of some copier and printer fuser systems, the degree of image fixing may vary as a function of the length of time the machine has been turned on or as a function of the number of copies or prints in a given run.

NOTE 1—For example, the degree of image fixing may be different for the first few copies made right after the machine is turned on than it will be for the copies made several hours later. Also, the fiftieth copy of a run may have a different degree of fixing than the second or third copy of that same run.

6.3 Unusual environmental conditions, such as extremes of temperature and humidity may affect both the degree of image fixing and the copy quality. For this reason, it is recommended that the environmental conditions be noted when conducting comparison tests between machines or supplies. For the most accurate comparisons, the environment should be kept as constant as reasonably possible during the entire test.

7. Apparatus and Materials

7.1 *Abrasion Tester*— Taber Model 503, 5130, or equivalent.[5]

7.2 *Abrasion Wheels*— Taber Calibrase CS-10F abrasion wheels.[6]

7.3 *Auxiliary Weights*—500 g.[7]

7.4 *Specimen Holder*— Model E100 having 125 4¼-in. (10.80-cm) outside diameter with Model E100–101 Clamp Ring.[8]

7.5 *Silicon Carbide Paper*—150 grit cut into discs and hole-punched in the center to fit specimen holder (Taber S11 Abrasive Disc).[9]

7.6 *Taber Model 200 Diamond Wheel Refacer.* [10]

7.7 *Source of Vacuum,* for removing particles wastes from abrasion surface, either separate or built into the tester.

7.8 *Compressed Air Source*—35 to 60 psi (240 to 413 KPa).

7.9 *Test Copier or Printer,* adjusted and equipped with appropriate toner, fuser oil, paper, and other supplies as required. If a copier or printer is to be used to evaluate a supply item, all other supply items should be unchanged during the duration of the comparison test.

7.10 If comparison tests are being made between copiers or printers, all supply items should be as specified by the manufacturer. Unless otherwise specified by the manufacturer, the same paper should be used in each of the machines.

7.11 *Copier Test Target*—A printed Abrasion Test Target is available as an ASTM adjunct. Fig. 1 shows a printed example of the target.

[5] The sole source of supply of the apparatus (Taber Model 503, 5130) known to the committee at this time is Taber Industries, 455 Bryant St., North Towanda, NY 14120. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,[1] which you may attend.

[6] The sole source of supply of the apparatus (Taber Calibrase CS-10F Abrasion Wheels) known to the committee at this time is Taber Industries, 455 Bryant St., North Towanda, NY 14120. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,[1] which you may attend.

[7] The sole source of supply of the apparatus (Taber Auxiliary Weights) known to the committee at this time is Taber Industries, 455 Bryant St., North Towanda, NY 14120. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,[1] which you may attend.

[8] The sole source of supply of the apparatus (Model E100–125 Specimen Holder and Model E100–101 Clamp Ring) known to the committee at this time is Taber Industries, 455 Bryant St., North Towanda, NY 14120. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,[1] which you may attend.

[9] The sole source of supply of the apparatus (Taber S-11 Abrasive Disc) known to the committee at this time is Taber Industries, 455 Bryant St., North Towanda, NY 14120. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,[1] which you may attend.

[10] The sole source of supply of the apparatus (Taber Model 200 Diamond Wheel Refacer) known to the committee at this time is Taber Industries, 455 Bryant St., North Towanda, NY 14120. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,[1] which you may attend.

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