



Designation: F1442 – 92(Reapproved 2009)

Standard Practice for Using a Copier or Printer as a Test Instrument for Evaluating Paper Performance¹

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1. Scope

1.1 This practice covers a standardized procedure for utilizing a copier or printer as an imaging device when performance properties of paper are to be determined.

1.2 Copiers and printers are limited to those using the indirect electrophotographic process.

1.3 The paper is limited to cut-sized office papers.

1.4 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.5 *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.* Specific precautionary statements are given in Appendix X1.1.

2. Referenced Documents

2.1 *ASTM Standards:*²

D3460 Specification for White Watermarked and Unwatermarked Bond, Reprographic, and Laser Printer Cut-Sized Office Papers

D4825 Test Method for Measurement of Curl in Cut-Sized Office Paper (Withdrawn 2010)³

D5039 Test Methods for Identification of Wire Side of Paper (Withdrawn 2009)³

F335 Terminology Relating to Electrostatic Imaging

F360 Practice for Image Evaluation of Electrostatic Business Copies

F807 Practice for Determining Resolution Capability of Office Copiers

F875 Test Method for Evaluation of Large Area Density and Background on Office Copiers

F909 Terminology Relating to Printers

F995 Practice for Estimating Toner Usage in Copiers Utilizing Dry Two-Component Developer

F1125 Terminology of Image Quality in Impact Printing Systems

3. Terminology

3.1 For definitions used in this practice, see Terminology F335 and F909.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *after image curl*—the amount, direction, and axis of curl after imaging in a copier or printer, as determined by Test Method D4825.

3.2.1.1 *Discussion*—The direction of curl is described as to whether it is toward the felt or wire side. This description as well as the relationship to the image should be recorded, that is, toward or away from the image side. In the case of duplexing, the side imaged first should be recorded.

3.2.2 *before image curl*—the amount, direction, and axis of curl before imaging as determined by Test Method D4825.

3.2.3 *stickie*—a material, usually in the form of a small speck or spot, that because of its adhesive nature, can be transferred from the paper to the photoconductor where it attracts toner. This toner is subsequently transferred as unwanted image to the paper.

4. Summary of Practice

4.1 This practice describes the use of an electrophotographic copier or printer as a test instrument to evaluate the performance characteristics of cut sized office paper.

4.2 Several image quality characteristics may be evaluated through the use of the following applicable ASTM standards: Practice F360, Practice F807, Test Method F875, and Practice F995, Terminology F1125, or both.

¹ This practice is under the jurisdiction of ASTM Committee F05 on Business Imaging Products and is the direct responsibility of Subcommittee F05.03 on Research.

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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 The last approved version of this historical standard is referenced on www.astm.org.

5. Significance and Use

5.1 This practice may be used to satisfy the requirements of Specification **D3460** when performance in the intended use in a printer or copier is required.

5.2 Describing physical parameters of paper alone is not sufficient to ensure performance in a copier or printer.

5.3 Curl, both before and after imaging, may effect copier or printer performance.

5.4 The presence of contaminants in the paper that are tacky or thermoplastic, or both, may be transferred to the photoconductor or fuser rolls. They may cause an unwanted image. These are referred to as “stickies.” Some papers, especially those containing recycled fiber, have exhibited this problem.

5.5 Transfer of ream sealing adhesive or ream wrapper laminant to the photoconductor or fuser rolls can cause problems similar to those described in **5.4**.

6. Interferences

6.1 Many printers and copiers are subject to imaging system variations due to fluctuations in line voltage. Those problems can be avoided by the use of a voltage stabilizing device or conducting the tests during the periods when line load is low or stabilized.

6.2 In manufacturing cut-sized papers, it is common practice to convert several rolls to sheets in a continuous operation. This results in possible variations from sheet to sheet within a ream. A sufficient number of samples should be evaluated to determine that the performance is representative of the lot. It is not always possible to determine the number of rolls used in the cut-sized processing operation.

6.3 Temperature and humidity have an effect on paper properties as well as equipment performance. Tests should be conducted in a stable environment consistent with normal equipment operation (see **10.1**). See **X1.5**.

6.4 The photoconductor in a copier or printer may be in the form of a cylinder or a continuous belt. The circumference of the cylinder or length of the belt may be a multiple of the length of the copies normally produced. For example, a 17 in. (432 mm) circumference drum would produce one 11 by 17 in. (279 by 432 mm) or two 8-½ by 11 in. (216 by 279 mm) documents feeding with the 11 in. edge leading. This multiple copy feature must be taken into consideration when examining copies for extraneous image. The length or circumference may not be an even multiple of the document size. See **X1.2**.

7. Apparatus

7.1 A copier or printer should be adjusted according to the manufacturer's specifications.

7.1.1 If possible, the operator should be capable of examining, cleaning, or changing the photoconductor, or combination thereof. See **X1.3** and **X1.4**.

8. Materials

8.1 Supplies sufficient to complete all tests without changing source, lot, etc., should be provided.

8.2 Test Target:

8.2.1 *Copier*—A test target of known overall quality such as described in Practice **F995** may be used. If other test targets are used, they should be consistent with normal job flow for the copier.

8.2.2 *Printer*—A built in test target commonly available in the printer software may be used. As an alternate, a full page text similar to that described in Practice **F995** may be used. The text should be consistent with the normal use of the printer.

8.2.3 *Clean Test Paper*—A sufficient quantity of virgin fiber paper known to be free of potential stickies that has been examined for cleanliness shall be used to map or designate any extraneous images before and after each procedure.

9. Calibration and Standardization

9.1 Adjust the copier or printer according to the manufacturer's recommendations.

9.2 Inspect or clean the photoconductor, or both, recording any defects that may be present. See **X1.1**.

9.3 Determine the circumference of the photoconductor in the case of a drum or the length in the case of a belt.

10. Conditioning and Preparation

10.1 Place the paper to be tested in unopened reams in the room where the test is to be conducted for sufficient length of time to bring the temperature of the paper into equilibrium with room conditions.

10.2 Unwrap the paper just prior to loading into the machine.

10.3 Determine which side of the paper the manufacturer indicates should be imaged or imaged first if duplexed. If information is not provided by a manufacturer, be consistent as to the side imaged for the entire test.

10.4 Determine whether the imaging is conducted on the felt or wire side of the paper.

11. Procedure

11.1 Before Imaging:

11.1.1 Determine size and squareness with conventional measuring instruments.

11.1.2 Determine curl using Test Method **D4825**.

11.1.3 Determine wire side using Method **D5039**.

NOTE 1—On papers produced on a twin wire paper machine, the wire side is not always apparent. In those instances where the wire side cannot be established, arbitrarily designate the side next to the body seal on the ream wrapper as the wire side.

11.1.4 Visually evaluate the ream edges for lint, fuzz, dust, extraneous material, quality of cut edge, etc.

11.1.5 Examine the top and bottom sheet and ends of the ream for presence of glue or laminant from the ream wrapper. Remove if present.

11.1.6 Examine the top and bottom sheets for turned over edges or other defects. Remove if present.

11.2 Loading Copier or Printer:

11.2.1 Load the copier or printer with paper so that the image is produced on the side designated by the paper or