Designation: F2293 – 03 (Reapproved 2008)

Standard Practice for Determining the Stain Resistance of Images Produced by Ink Jet Printers[1]

This standard is issued under the fixed designation F2293; 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 practice covers methods that can be used to determine the stain resistance of an image produced by an ink jet printer. Stain resistance is determined by placing a staining agent on printed patches and visually observing a change to the patches after the staining agent has been removed.

1.2 This practice can be used to evaluate the primary print colors (cyan, magenta, yellow and black), the secondary colors (red, blue and green) and composite black (cyan plus magenta plus yellow).

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.4 *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]

F909 Terminology Relating to Printers

F1125 Terminology of Image Quality in Impact Printing Systems

F1174 Practice for Using a Personal Computer Printer as a Test Instrument

F1623 Terminology Relating to Thermal Imaging Products

F1857 Terminology Relating to Ink Jet Printers and Images Made Therefrom

3. Terminology

3.1 For definitions of terms, refer to Terminologies F909, F1125, F1623, and F1857.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *ink jet media, n*—recording elements used by ink jet printers to receive inks. The substrate may be paper, plastic, canvas, fabric, or other ink receptive material. The substrate may, or may not be, coated with one or more ink receptive layers.

4. Significance and Use

4.1 This procedure may be used to determine how staining agents will affect color images produced by ink jet printers.

4.2 Five different staining agents are used to determine stain resistance, mustard (yellow), coffee (black), cola, fruit punch, and water. Additional stains may be used as appropriate.

4.3 The effect of the staining agent on the print patches is determined visually.

4.4 Test results are useful for specification acceptance between producer and user, for quality control, and for research and product development.

5. Interferences

5.1 Ink jet media and ink sets may be purchased from a variety of sources and may affect the stain characteristics produced by a given printing system. A variety of media types and ink sets may be used depending on the purpose of the test. The side of the media that should be used for imaging is the one recommended by the manufacturer/supplier.

5.2 Interpretation of results should be made by one evaluator.

5.3 Prints should be dry prior to testing since inadequate drying time may affect the results. Twenty-four hours should be sufficient for most inks and media.

5.4 All comparative tests should be performed under the same environmental and viewing conditions.

5.5 The following evaluations utilize digital test originals that are created using personal computer software. Always use the same originals when comparing printers, ink sets and substrates.

5.6 Visual interpretations of results may vary from one individual to another.

[1] This practice is under the jurisdiction of ASTM Committee F05 on Business Imaging Products and is the direct responsibility of Subcommittee F05.07 on Ink Jet 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.

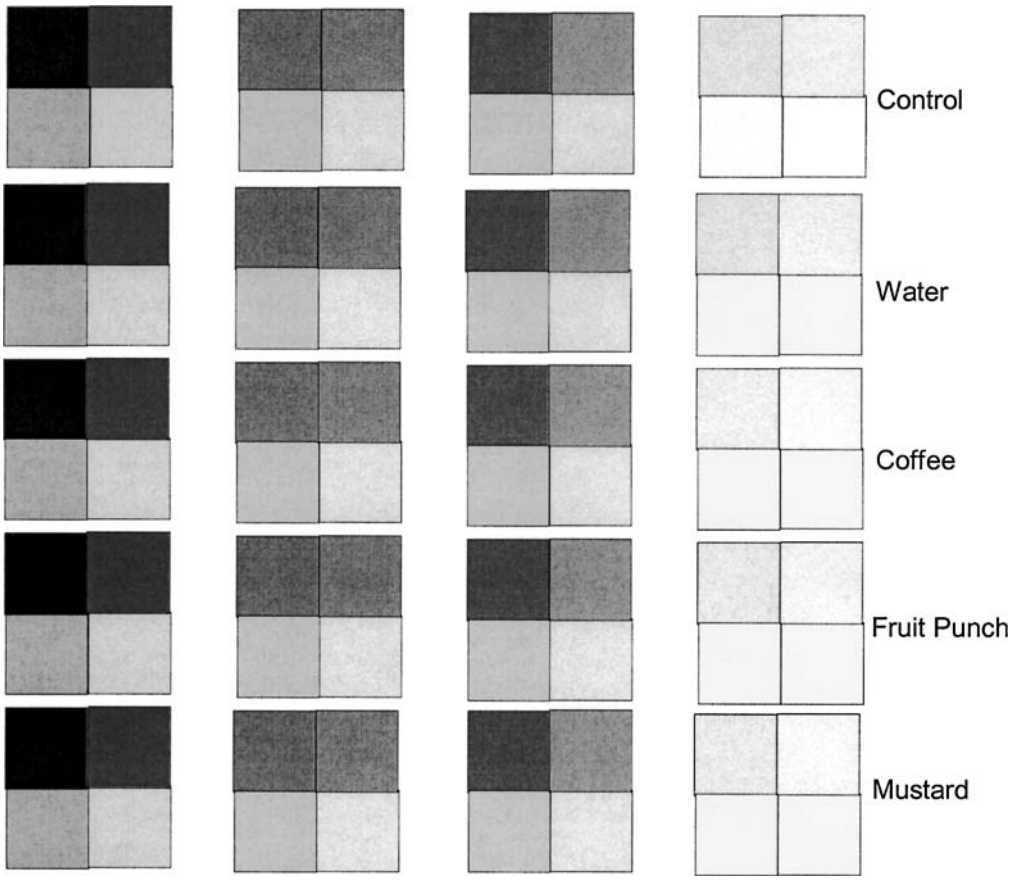

FIG. 1 Test Image

6. Apparatus

6.1 *Ink Jet Printer and a Personal Computer.*

6.2 *Personal Computer Word Processing, Drawing/Graphics, or Page Layout Software,* for creating the test page original.

6.3 *Distilled Water, Staining Agents.*

6.4 *Pipette.*

6.5 *Paper Towels.*

6.6 *Timer.*

7. Calibration

7.1 Adjust the printer used to conduct the test in accordance with the manufacturer's instructions or in accordance with Practice F1174.

8. Test Specimens

8.1 The test image (see Fig. 1) shall consist of a standardized arrangement of color patches printed using print files containing the appropriate printer setup specific for each application. Each color patch contains four variable density cells printed at 100 %, 75 %, 50 % and 25 % print density for each of the primary colors of cyan, magenta, yellow and pure black. Patches of secondary colors or a composite black (black made up of cyan, magenta, and yellow inks) may be added as desired.

8.2 The test image may be generated with personal computer word processing, drawing/graphics, or page layout software, saved as a print file for each printer/method of printing (contributing its unique ink and ink/receiver interactions that may impact on the image light stability), trial-printed, and evaluated for appropriate ink laydown (purity and amount) and ease of printing and testing. Each print file should have its filename, type, and version identified in the image area and a place for experimental notes (for example, time, printer, environmental conditions, operator). The printer settings and a trial print of each print file version should be archived.

8.3 An unprinted area should also be tested for water and stain resistance.

8.4 The size of the individual color patches shall be approximately 10 by 10 mm.

9. Conditioning

9.1 Condition the printer, supplies and test substrates 24 h in the same atmospheric conditions as those present where the test is to be conducted.

9.2 Stain resistance should be tested at least 24 h after printing to allow the prints to sufficiently dry.

10. Procedure

10.1 Lay the print out on a flat surface.

10.2 Place a 0.05 cc drop or a smear of the designated staining agent in the center of the appropriate patch so it wets all four variable density cells in the test image and in an unprinted area.

10.3 Let stand for approximately 15 min. The time of exposure may be varied as desired.

10.4 Blot excess with paper towel.

10.5 Using a moistened paper towel gently wipe the staining agent from the test image.

10.6 Document the results as follows:

10.6.1 No change.

10.6.2 Residual blemish.

10.6.3 Slight stain.

10.6.4 Significant stain.

10.6.5 Density change.

11. Report

11.1 Report the printer model, ink and substrate lot numbers, and the staining agents used in the test.

11.2 Report the temperature and relative humidity.

11.3 Report the time of exposure to the staining agent.

11.4 Report the results for each of the staining agents according to the scale in 10.6.