Designation: F686 – 94 (Reapproved 2011)

Standard Practice for Evaluation of Image Quality Produced by Carbonless Copy Paper with an Electric or Electronic Typewriter[1]

This standard is issued under the fixed designation F686; 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 a method for the visual evaluation of the image quality formed by a carbonless copy paper in a business form when imaged with an electric or electronic typewriter.

NOTE 1—Electric or electronic typewriters covered by this procedure have a full-character type element. Examples of such elements are type bar, ball, and daisy wheel.

1.2 The evaluation is made by comparison of the sample carbonless copy to a control.

1.3 *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]

D585 Practice for Sampling and Accepting a Single Lot of Paper, Paperboard, Fiberboard, and Related Product (Withdrawn 2010)[3]

D685 Practice for Conditioning Paper and Paper Products for Testing (Withdrawn 2010)[3]

F221 Terminology Relating to Carbon Paper and Inked Ribbon Products and Images Made Therefrom

F497 Practice for Use of the Electric and Electronic Typewriter as a Test Instrument

F549 Terminology Relating to Carbonless Copy Products

3. Terminology

3.1 *Definitions*—For definitions relating to carbonless copy paper, see Terminologies F221 and F549.

4. Summary of Practice

4.1 A sample carbonless copy paper is positioned alongside a control carbonless copy paper with known image quality in a business form and imaged on an electric or electronic typewriter at a designated setting and pressure. A visual comparison is made of the typed images from both the sample and the control carbonless copy paper.

5. Significance and Use

5.1 This practice is used primarily to evaluate the image quality produced on an electric or electronic typewriter of a carbonless copy paper by comparison with a control carbonless copy paper with known performance qualities in a business form of a predetermined composition.

5.2 This practice can be used for the selection of a carbonless copy paper where no control is available.

5.3 This practice can be used to evaluate carbonless copy paper business forms by comparison to similar control form with known performance qualities.

5.4 This practice can be used to determine which surface (Coated Back (CB) or Coated Front (CF)) of a carbonless copy paper in a business form that has an unsatisfactory performance is defective by replacing each surface one at a time with control CB or CF surfaces with known satisfactory performance.

5.5 This practice can be used for production, quality control, and research and development.

6. Interferences

6.1 Pressure settings, durometer of platens, and typewriter will affect the image quality.

6.2 Weight, thickness, color, and finish of the carbonless copy paper or of the form as well as the number of parts in the form will affect the image quality.

6.3 Fluctuations of temperature and humidity will affect the image quality. Tests run on different days can show variation in the image quality. All tests should be dated with the temperature and relative humidity recorded.

6.4 Image density development does vary with time. All comparisons should be made with the same development time for the carbonless image.

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[1] This practice is under the jurisdiction of ASTM Committee F05 on Business Imaging Products and is the direct responsibility of Subcommittee F05.06 on Carbonless and Thermal 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] The last approved version of this historical standard is referenced on www.astm.org.

6.5 Carbonless copy papers from different manufacturers may not be compatible and must not be intermixed in the sample form used in the comparison tests.

6.6 Differences in image color and shade will affect the evaluation of the image quality.

7. Apparatus

7.1 *Electric or Electronic Typewriter* (see Practice F497).

8. Material

8.1 Control CB, CFB (Coated Front and Back), and CF carbonless copy papers in sheets or in a control form.

9. Sampling

9.1 Sample the rolls, sheets, or forms of carbonless copy paper in accordance with Practice D585.

10. Preparation of Apparatus

10.1 Prepare the electric or electronic typewriter in accordance with Practice F497.

11. Conditioning

11.1 Conduct the test in an environment with stable conditions of temperature and relative humidity. The test materials (carbonless paper or forms) should be conditioned for 24 h in the area in which the test will be conducted.

11.2 If available, condition the test materials in accordance with Practice D685.

12. Procedure

12.1 *Preparation of Forms with the Control Carbonless Copy Paper Already Inserted:*

12.1.1 Measure the width of the control carbonless copy paper in the form and remove the left half of the control by cutting with scissors parallel to the length of the form. The control may be the CB, CFB, or CF.

12.1.2 Cut the sample carbonless copy paper to the same dimensions as the half width of the control that was removed. The sample must be of the same type (CB, CFB, CF), color, and basis weight as the control. The sample should be cut in the same machine direction as the control.

12.1.3 Replace the half width of the control that was removed with the prepared sample. After the sample is identified, staple the sample to the form. To ensure that the CBs are mated to the CFs, mark an "X" on Part 1 of the form. Then check that the image has developed on all CF parts of the form. If not, take the appropriate corrective action. The form is now prepared for typing.

12.2 *Preparation of Forms from Control and Test Samples of CB, CFB, and CF Papers:*

12.2.1 On the paper cutter, cut both the sample and the control carbonless papers to half width of the test form with the machine direction parallel to length of the form. The sample and the control should be identified. The sample should be of the same type (CB, CFB, and CF), color, and basis weight as the control.

12.2.2 Collate the form with the CB as the first part, the CFBs as the internal parts, and the CF as the last part of the form. The carbonless manifold set frequently contains six parts consisting of one CB, four CFBs, and one CF. To ensure that the CBs are mated to the CFs, mark an "X" on Part 1 of the form. Then check that the image has developed on all CF parts of the form. If not, take the appropriate corrective action. Prepare the control in the same manner as the test sample. The form may be stapled together. The form is now prepared for typing.

12.3 *Identification:*

12.3.1 Identify control and sample carbonless paper or forms with appropriate information such as color, grade (basis weight and type CB, CFB, CF), manufacturer, roll numbers, and date of manufacture.

12.3.2 Record date, temperature, and relative humidity of the testing period.

12.4 *Procedure for Producing the Carbonless Copy Images with the Electric or Electronic Typewriter:*

12.4.1 Prepare the typewriter in accordance with Practice F497.

12.4.2 Release the gripper rolls tension to platen (to avoid the staples ruining the platen) and insert the test form containing both the test sample and the control at the stapled end and manually pull around the platen to the desired typing position.

12.4.3 Apply tension to the platen by returning the gripper rolls to the contact position.

12.4.4 Adjust the typing pressure and setting correctly for the form thickness used and the intensity of image required.

12.4.5 Type across the web the desired test pattern or using keys that are close to the center ("G" or "H").

12.4.6 Type the desired test pattern or each letter alternately in one line across the form with lower case type at a steady rate. Repeat with upper case type (capitals) to give a total of two lines across the form with single spacing.

12.4.7 Write or type the date above the lines of typing and below these lines type or write the identification of each test subject. The form is prepared for image evaluation.

13. Comparative Image Quality Evaluations

13.1 Visually compare the images produced from the sample and control on each CF part of form for image quality. For sample CB and control CB, evaluate the images on CF of Part 2. For sample CF and control CF, evaluate the images on this part. For sample CFB and control CFB, evaluate images on the CF side for CF evaluation and on the next CF side for CB evaluation. The image quality is a composite of the following:

13.1.1 Intensity,

13.1.2 Sharpness (edge),

13.1.3 Fill-in,

13.1.4 Granularity, and

13.1.5 Spread.

14. Report

14.1 Report the relative quality of the carbonless copy image from the test sample as equal to, greater than, or less than the quality of the image from the control carbonless copy

paper for the image characteristics listed in 13.1.1 to 13.1.5. These are all obtained by visual observations without use of optical devices.

15. Precision and Bias

15.1 Determination of ranking order is repeatable within a laboratory and reproducible between laboratories. The test is comparative and subjective, and no quantitative data are intended.

16. Keywords

16.1 carbonless copy paper; electric typewriter; electronic typewriter; image quality; typewriter image quality