Designation: F605 – 88 (Reapproved 2011)

Standard Practice for Determining Compatibility of One-Time Carbon Paper with Carbonless Copy Papers When Interleaved into the Same Manifold Set[1]

This standard is issued under the fixed designation F605; 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 procedure for determining the compatibility of one-time carbon paper with carbonless copy papers, interleaved into the same manifold set by forced aging.

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]

D585 Practice for Sampling and Accepting a Single Lot of Paper, Paperboard, Fiberboard, and Related Product (Withdrawn 2010)[3]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

3.1 Refer to Terminology F221 and F549.

4. Summary of Practice

4.1 An evaluation is made by comparing the quality of carbonless copy images obtained with and without carbon interleaved and force-aged at elevated temperature and pressure conditions. One-time carbon paper samples are interleaved into the upper half of a business forms set. The set is force-aged at elevated conditions of temperature and pressure for three days on both the upper and lower halves. After aging, the carbon samples are removed and the manifold set is imaged at the top where carbon was interleaved and at the bottom where there was no carbon paper. The aged images are compared for intensity, clarity, and cleanliness.

5. Significance and Use

5.1 This practice is used primarily to determine the compatibility of carbon paper samples with carbonless copy paper in the same manifold set. That is, to observe if the carbon paper has or has not had an adverse effect on the carbonless paper image quality.

5.2 This practice can be used as an aid in predicting the field performance of a specific carbon paper grade in an actual carbonless form of designated composition.

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

6. Interferences

6.1 Different typewriters can affect the carbonless image quality.

6.2 Different pressures and settings on the same typewriter can affect the image quality.

6.3 Platens of varying durometer in the same typewriter can affect the image quality.

6.4 Pressure, temperature, and time during forced-aging can affect image quality.

6.5 Different carbon coatings can affect image quality and compatibility.

7. Apparatus

7.1 *Commercial Electric Typewriter* (see Practice F497).

7.2 *Paper Cutter* (bench model), any size suitable for cutting carbonless copy paper and carbon samples.

7.3 *Paper Knife,* suitable for sampling roll carbon paper.

[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.

Current edition approved Oct. 1, 2011. Published March 2012. Originally approved in 1978. Last previous edition approved in 2006 as F605–88 (2006). DOI: 10.1520/F0605-88R11.

[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.

7.4 *Parallel Weight Fixtures* (see Fig. 1), used to apply uniform pressure to the manifold set at the interleaved and noninterleaved areas.

7.5 *Template* (see Fig. 2), used for drawing squares to aid in positioning the parallel weight fixtures.

7.6 *Drying Oven* (constant temperature), equipped with means for ensuring adequate temperature and air circulation.

7.7 *Weights,* two 16-lb (7.26-kg), used to apply pressure to the parallel weight fixtures. They shall be compact enough to fit into the drying oven.

8. Materials

8.1 *Carbonless Copy Paper Sheets* (CF, CFB, and CB Sheets).

8.2 *One-Time Carbon Paper Samples.*

8.3 *Forms Bond Paper,* 12 lb (17 by 22 by 500) (45.12 g/m^2).

9. Sampling

9.1 Sample the roll or sheet carbon in accordance with Methods D585.

10. Test Specimen and Sample

10.1 Cut the carbonless sheets to 8½ by 11 in. (216 by 279 mm). The length should be in the machine direction, if possible.

10.2 Cut the carbon paper samples to 8½ by 4½ in. (216 by 114 mm), with the 4½-in. dimension in the machine direction. The number of carbon paper samples will be one less than the number of parts in the manifold set.

11. Sample Preparation

11.1 *Type I Manifold Set Composition (Regular Configuration):*

11.1.1 Assemble a form set consisting of a CB sheet on top (CB side down); two CFB sheets directly below the CB sheet (CF sides up); a CF sheet below the last CFB sheet (CF side up); 12-lb bond paper directly below the CF sheet (felt side up).

11.1.2 Staple the test set along the 8½-in. (216-mm) width.

11.1.3 Using the template, trace squares onto the first sheet of the forms set.

11.1.4 On top of the form, clear of the test area, record the color, grade, weight, manufacturer, and other pertinent data relating to the carbon sample and carbonless paper. Also include date for start of test.

11.1.5 Interleave the carbon sample, coated side down, between the CF and bond papers on the top half of the form set only (Note 1).

NOTE 1—If several manifold sets or carbon grades are to be tested simultaneously, repeat steps 11.1.1 through 11.1.4 for each form set.

11.2 *Type II Manifold Set Composition (Upside Down Configuration):*

11.2.1 Assemble a manifold set similar to 11.1.1 but omitting the bond paper.

11.2.2 Staple and trace squares on the top sheet as described in 11.1.2, 11.1.3, also record information described in 11.1.4.

11.2.3 Interleave the carbon sample coated side up between the CB sheet and the CFB sheet so the carbon coating is next to the CB coating on the CB sheet (Note 2).

NOTE 2—If several manifold sets or carbon grades are to be tested simultaneously, repeat 11.2.1 through 11.2.3.

12. Procedure

12.1 Place two sheets of forms bond paper between each test set to ensure no interaction.

12.2 Place four sheets of forms bond paper at the top and bottom of the test pack.

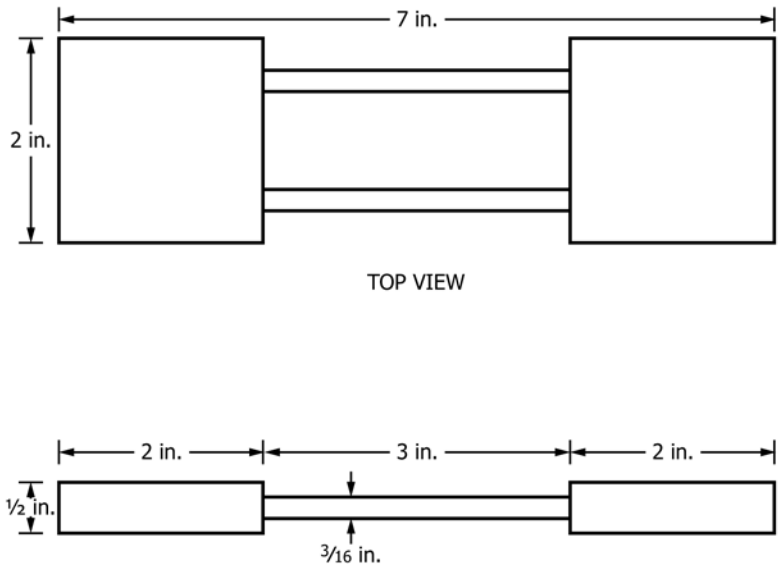

FIG. 1 Parallel Weight Fixtures

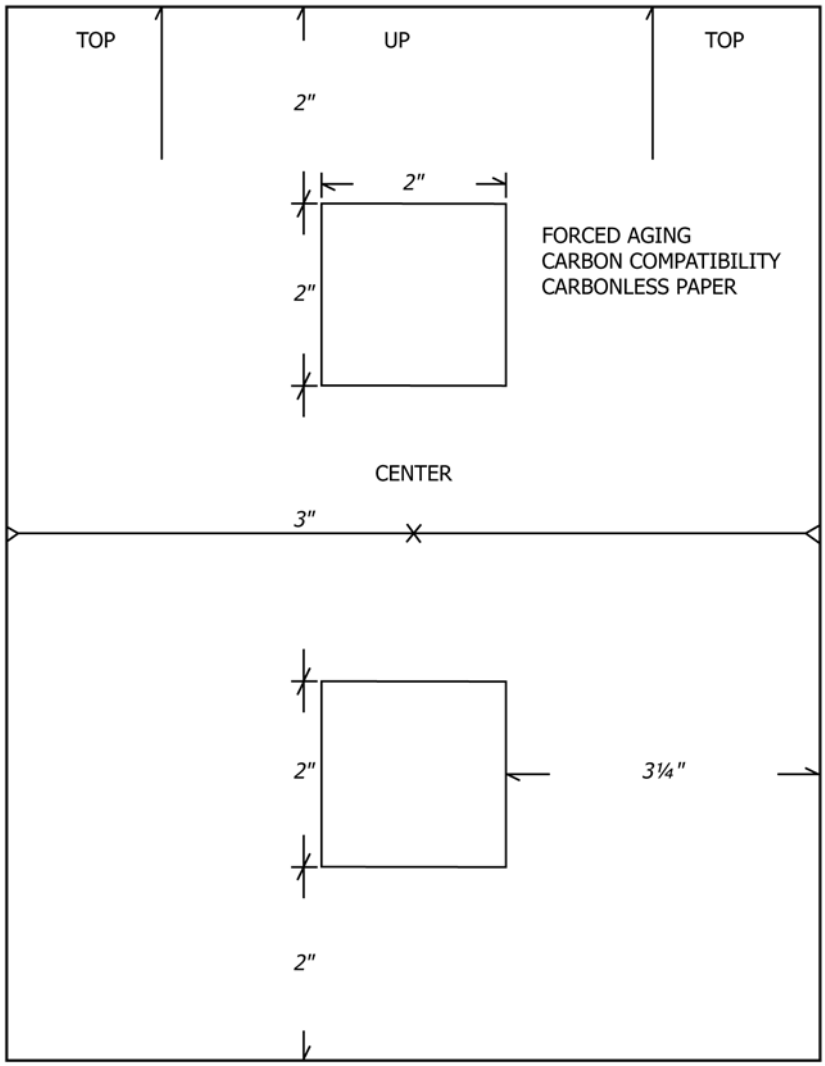

FIG. 2 Template

12.3 Using the template, trace squares onto the top and bottom sheets of the pack. Make sure the squares are superimposed when the top and bottom sheets are in position.

12.4 Place one parallel weight fixture into the center of the drying oven.

12.5 Insert the test pack into the drying oven, placing the traced squares on the bottom of the pack directly over the parallel weight fixture.

12.6 Place the second parallel fixture on top of the traced squares on the top sheet, thus superimposing both fixtures. Check for alignment.

12.7 Place the two 16-lb weights in position on the top two weight fixtures.

12.8 Commence forced aging for 3 days, at 120°F.

12.9 After aging is completed, remove the weights, weight fixtures and test pack from the oven, and allow the aged forms to come to equilibrium at room temperature (1 to 2 h) with weights removed.

12.10 Remove the unattached bond papers from between the copysets and discard.

12.11 Remove the interleaved carbon paper samples from the copysets and discard.

12.12 Type a designated pattern through the center of each 2-in. traced square. Record the date, pressure, and setting control as well as manufacturer's model of typewriter. Allow approximately 1 h before comparing images.

12.13 Visually compare the post-aging images at top and bottom with each other. Note any differences in intensity, shade difference, granularity, sharpness, oil bleed, background discoloration, etc.

12.14 Repeat 12.11 through 12.13 for each test set aged simultaneously.

13. Interpretation of Results

13.1 Performing the test with and without carbon paper in the same manifold set eliminates the effect of differences

between the carbonless papers. Any difference in image quality where the carbon paper was interleaved is due to the effect of the carbon coating. This is a "go-no-go" test and a control carbon or carbonless paper is not necessary.

14. Precision and Bias

14.1 Repeatable ranking order is obtained that is reproducible within a laboratory and between laboratories. The test is a comparative test, is subjective, and no quantitative data are intended.

15. Keywords

15.1 carbonless copy paper; carbonless paper; carbon paper; compatibility; interleaved set; manifold set