Designation: F 935 – 00 (Reapproved 2004)

Standard Test Method for Comparing Cover-Up Correction Media[1]

This standard is issued under the fixed designation F 935; 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 information and procedures for evaluating several performance qualities of typewriter cover-up correction tapes and tabs on a comparative basis for general office use.

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]

D 685 Practice for Conditioning Paper and Paper Products for Testing

D 3460 Specification for White Watermarked and Unwatermarked Bond, Mimeo, Spirit Duplicator, Reprographic, and Laser Printer Cut-Sized Office Papers

E 97 Test Method for Directional Reflectance Factor, 45° 0° of Opaque Specimens by Broad-Band Filter Reflectrometry[3]

F 221 Terminology Relating to Carbon Paper and Inked Ribbon Products and Images Made Therefrom

F 497 Practice for Use of the Electric and Electronic Typewriter as a Test Instrument

2.2 *ANSI Standard:*

PH2.17 Density Measurements—Geometric Conditons for Reflection Density[4]

PH2.18 Density Measurements—Spectral Conditions[4]

3. Terminology

3.1 For definitions of terms used in this test method, refer to Terminology F 221.

4. Summary of Test Method

4.1 This test method consists of testing typewriter cover-up correction tapes and tabs under actual and simulated use conditions, using several techniques generally accepted in the inked ribbon industry. All tests should be performed under the same conditions so that comparative results may be obtained.

5. Significance and Use

5.1 This test method may be used to evaluate several performance characteristics of typewriter cover-up correction media on a comparative basis.

5.2 This test method is suitable for manufacturing control on a limited basis, due to the length of time required for some tests.

6. Apparatus and Materials

6.1 *Electric or Electronic Typewriter*— Calibrate and adjust in accordance with the manufacturer's suggestions and Practice F 497.

6.2 *Reflectometer*—Meeting the geometric conditions of PH2.17 and the spectral conditions of PH2.18.

6.3 *Environmental Chamber*—Capable of maintaining 120 ± 2°F (49 ±1°C) at 40 %± 5 % relative humidity for 48 h.

6.4 *Magnifier*—3× to 5×.

6.5 *Paper*—Grade 4, Type I (20 lb – 17 × 22-500; SI equivalent 75 g/m^2) in accordance with Specification D 3460. The felt side of the paper shall be used for the test. All tests shall be made along the machine direction of the paper.

6.6 *Control Ribbon*—A single strike film, multistrike film, or fabric ribbon of known quality and performance.

6.7 *Cover-up Tape or Tab*—Since this test procedure is comparative, two or more specimens of tape or tab should be selected for evaluation.

7. Test Specimens

7.1 The test specimens shall be a cover-up tape or tab or portion thereof not previously used or marred by handling.

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[1] This test method is under the jurisdiction of ASTM Committee F05 on Business Imaging Products and is the direct responsibility of Subcommittee F05.02 on Inked Transfer 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] Withdrawn.

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

8. Calibration

8.1 Calibrate the electric typewriter or printer in accordance with manufacturer's instructions and Practice F 497.

8.2 Calibrate and standardize the reflectometer in accordance with PH2.17 and PH2.18.

9. Conditioning

9.1 Testing should be conducted in an environment with stable conditions of temperature and humidity. Papers, control ribbon, and test samples should be conditioned for 24 h in the area in which the test will be conducted. If possible, standard conditions meeting Method D 685 should be used. These are 73 ± 1.8°F (23 ± 1°C) and 50 ± 2 % relative humidity.

10. Procedure

10.1 *Creating Test Patterns*:

NOTE 1—Great care should be taken to produce accurate test patterns. The results of calculations and observations depend upon carefully made test patterns that avoid slippage of paper, mistypings, and misalignments of character strikes. If possible, the test typewriter should be programmed to produce the test pattern thus reducing human error.

10.1.1 *Standard Test Pattern*—Each test pattern consists of a box 15 characters long and 15 lines deep. The advancement between lines should be ½ line (1/12 in.). The preferred character for producing the standard test pattern is an OCR-B 10 pitch type font using an asterisk "*" character. Other commonly used characters which may be selected are "M", "#", or "W".

10.1.2 *Producing Six Test Patterns*—The following paragraphs explain how to produce A, B, C, D, E, and F test patterns as illustrated in Fig. 1.

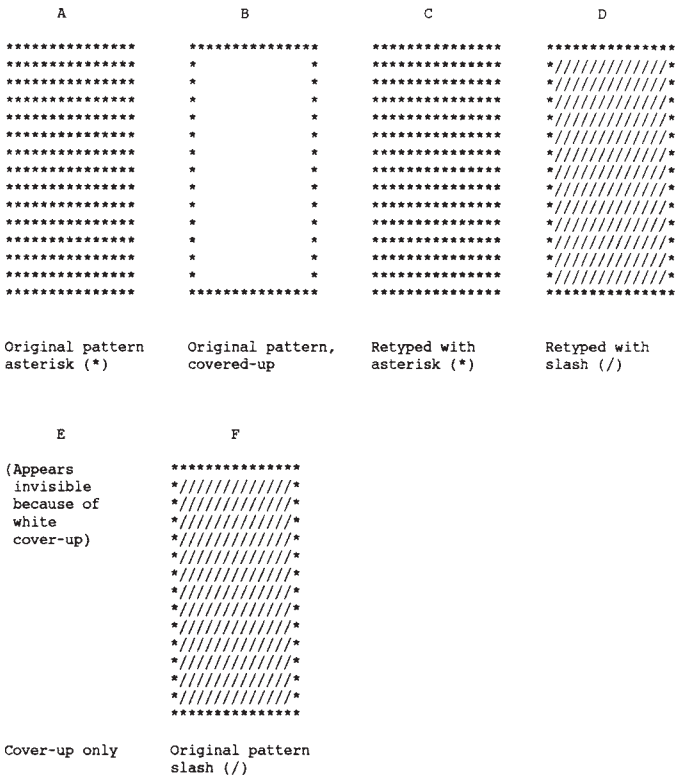

FIG. 1 Test Pattern for Measuring Cover-Up Media

10.1.2.1 Place the paper as described in 6.5 in the typewriter.

10.1.2.2 Produce the first line of the four patterns by typing the chosen character as follows: Type 15 characters, follow with three spaces, next, a second row of 15 characters, three spaces, and so forth until a series of four rows have been produced.

10.1.2.3 Perform the following typing pattern for lines 2 through 14. Type 15 characters, space three spaces, type a second set of 15 characters, space three spaces and continue until four new rows have been created as above. *Do not advance line.* Backspace to the second pattern (B). Place typewriter in correction mode, and cover-up characters 2 through 14 (13 characters) with the same character chosen to produce the test pattern. Repeat this cover-up procedure for patterns (C) and (D). Next backspace to row three (C). Overtype with the chosen character producing a row of characters similar to pattern A (overtype characters 2 through 14). Overtype pattern (D) with a different character—a slash is suggested (/). Test pattern D thus become a retyped pattern with a different over typed character. Continue typing lines following the above procedure until reaching line 15.

10.1.2.4 Type line 15 the same as the first line. (See 10.1.2.2.) The result of typing in accordance with 10.1.2.2, 10.1.2.3, and 10.1.2.4 will be a series of four boxes as shown in Fig. 1 and now defined as:

Test Pattern A—Original image of ribbon.
Test Pattern B—Covered-up image of ribbon—no correction.
Test Pattern C—Retyped image—standard character.
Test Pattern D—Retyped image—nonstandard character.

10.1.2.5 Test pattern for cover-up brightness measurement and overtype reference. Advance the paper and type beneath the series of four test patterns a fifth and sixth test pattern E and F as follows:

10.1.2.6 Place the typewriter in the correction, cover-up mode. Type a series of 15 characters using only the cover-up. Advance three spaces and type a row of 15 asterisk (*) characters.

NOTE 2—If cover-up tabs are being evaluated, produce patterns E and F by typing with cover-up tab inserted between ribbon and paper. Be sure to move tab after each strike to avoid restriking same position.

10.1.2.7 Perform the following typing pattern for lines 2 through 14. Type 15 characters (*) with correction cover-up mode engaged. Advance three spaces. Type one asterisk (*) and then 13 characters as used to overtype in pattern D, without the correction function engaged. Type one asterisk (*) as the 15th character. Advance ½ line and repeat the above until two blocks of impressions 15 by 14 are produced.

10.1.2.8 Type line 15 the same as line 1—see 10.1.2.6. The results of typing according to 10.1.2.5, 10.1.2.6, 10.1.2.7, and 10.1.2.8 will be two additional boxes as shown in Fig. 1, defined as:

Test Pattern E—Cover-up image only.
Test Pattern F—Original image nonstandard/character.

10.2 *Measurements and Evaluation*:

10.2.1 Measure the reflectance of the base paper and boxes A, B, C, D, E, and F according to Test Method E 97, and record results. Record the average reflectance of the base paper as *R*

and the other measurements A through F. Take a minimum of four readings per box.

10.2.2 Visually examine boxes B, C, and D with and without aid of a 3× to 5× magnifier, for evidence of incomplete cover-up transfer, incomplete rewrite transfer, voids, extraneous particles, bleed-through, practical color match of cover-up to paper, and consistency of rewrite intensity.

10.3 *Cover-Up Tape Flake Test*:

10.3.1 Clean the typewriter thoroughly (feed rolls, tape and ribbon guides, aligning scales, segments, body, etc.)

10.3.2 Load an unused test specimen of tape into the typewriter transport mechanism, and advance to just beyond the leader.

10.3.3 Using a robot device or programmed test pattern, type a standard series of lines incorporating corrections and rewrites until the tape is exhausted.

10.3.4 Examine the typewriter for evidence of flake on feed rolls, tape and ribbon guides, aligning scale, segments body, etc., and rank according to severity (1 = best to 5 = worst). Record results.

10.4 *General Quality*—Simultaneously perform evaluations for salient characteristics of splices, holes, voids, or tears in the base film or coating (to back of tape or tab), and transfer to fingers.

10.5 *Oven Test (Effects of High Temperatures)*:

10.5.1 Place a test specimen of the cover-up tapes in a preset environmental chamber 120 ± 2°F (49 ± 1°C) at 40 ± 5 % relative humidity (as described in 6.3) for 48 h.

10.5.2 Remove the test specimen from the oven and stabilize for at least 6 h to the original conditions of Section 9. Examine sample for blocking or fusion.

10.5.3 Repeat 10.1 through 10.3, noting in particular any differences from original observation. Record results.

10.6 Repeat 10.1 through 10.5 for each cover-up tape or tab to be evaluated. (In 10.1 use the same lot of paper for all tests.)

NOTE 3—Different typewriters and type fonts may give different results in 10.1 and 10.2. For general, wide-acceptance testing, the use of different typewriters and type fonts will increase the reliability and applicability of the conclusions of this test method.

11. Identification

11.1 For identification purposes, the following is suggested:

11.1.1 Tape or tab (name),

11.1.2 Manufacturer's name and address,

11.1.3 Base material (substrate),

11.1.4 Color of coating,

11.1.5 Nominal length, width, and thickness,

11.1.6 Actual length, width, and thickness,

11.1.7 Core, outside and inside diameters,

11.1.8 Tape diameter (supply core),

11.1.9 Leader material, seal, and length,

11.1.10 End warning, nature, and length,

11.1.11 Trailer material, seal, and length, and

11.1.12 Package description (configuration, box, identifications).

12. Calculation

12.1 The variables used in these calculations are the reflectance readings taken in 10.2. For convenience, they are summarized here and shown in Fig. 1:

A = Pattern typed on clean paper.
B = Pattern, like A, covered up.
C = Pattern, like B, overtyped with the same character as used in A.
D = Pattern, like B, overtyped with a character other than that used in A.
E = The cover-up typed on clean paper using the same character as in A.
F = Pattern, typed on clean paper using the same character as used to produce pattern D.
R = The reflectance of the clean paper.

All the above values range from zero for black to one for white.

12.1.1 *Cover-Up Coefficient*—The cover-up coefficient compares the whiteness of the cover-up material on plain paper with its whiteness when covering an image. If the cover-up is optimum the cover-up coefficient will be 100. Incomplete or inadequate cover-up will generate coefficients of less than 100.

$$\text{Percent cover}-\text{up} = [1 - (E - B)] \times 100 \quad (1)$$

Optimum: 100.

12.1.2 *Rewrite Coefficient*—Three rewrite coefficient equations are given here as follows:

12.1.2.1 Compare the original pattern typed on clean paper with the same pattern overtyped on a covered-up sample using the same character throughout. In the ideal situation, the rewrite coefficient is 100. Poorer quality is usually less than 100. However values over 100 are possible. Their meaning will depend on interpretation of the other coefficients found in Section 12.

$$\text{Percent rewrite} = \frac{\text{corrected pattern}}{\text{original pattern}} = \frac{(C)}{(A)} \times 100 \quad (2)$$

12.1.2.2 Compare the original pattern typed on clean paper with the same pattern overtyped on a covered-up sample. This coefficient is useful in comparing different cover-up products. Poorer quality usually has a lesser coefficient.

$$\text{Percent rewrite} = \left[\frac{(E - C)R}{(R - A)E}\right] \times 100 \quad (3)$$

12.1.2.3 Compare a different pattern typed on clean paper with the same pattern overtyped on a covered-up sample. In the ideal situation the rewrite coefficient is 100. Poorer quality is usually less than 100. However values over 100 are possible. Their meaning will depend on interpretation of the other coefficients found in Section 12.

$$\text{Percent rewrite} = \frac{(E - D)}{(R - F)}\frac{R}{E} \times 100 \quad (4)$$

Optimum = 100.

12.1.3 *Correction Contrast Coefficient*— The cover-up contrast coefficient compares the whiteness of the paper with the whiteness of the cover-up material. Ideal is 100, less than 100 implies the paper is whiter than the cover-up, while over 100 implies the cover-up material is whiter than the paper.

$$\text{Correction contrast coefficient} = \frac{E}{R} \times 100 \quad (5)$$

Optimum = 100.

12.1.4 *Aging Coefficients*—The aging coefficient compares the fresh values as taken above with a similar set of reflectance values taken on samples which have been aged as described in 10.5. Ideally, all aging coefficients should be 100. Any departure from 100 not associated with experimental variance, either up or down, implies change.

12.1.4.1 The aging coefficient is calculated using the results of measurements and computations described in 12.1.1, 12.1.2, and 12.1.3.

$$\text{Aging coefficient} = \frac{\%(\text{original})}{\%\ (\text{aged})} \times 100 \quad (6)$$

Optimum = 100.

13. Report

13.1 Due to the subjective nature of the tests involved, with the exception of the units obtained in Section 12, only comparative results can be reported.

14. Precision and Bias

14.1 Repeatable ranking order results or a repeatable relationship to a control can be obtained with this test method provided that:

14.1.1 The same printer or typewriter in the same condition is operated with constant voltages,

14.1.2 Sample conditioning procedures are similar, and

14.1.3 Ambient conditions are similar.

14.2 Repeatable ranking order between laboratories is possible with proper correlation of test equipment and procedures.

15. Keywords

15.1 correction media; correction tapes; cover-up correction; typewriter