



# Standard Practice for Use of the Electric and Electronic Typewriter as a Test Instrument<sup>1</sup>

This standard is issued under the fixed designation F 497; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This practice covers standardized procedures utilizing the electric or electronic typewriter as an imaging device for measuring the performance properties of carbonless paper, carbon paper, inked ribbon, and similar image producing products.

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

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:<sup>2</sup>

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 284 Terminology of Appearance

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

F 549 Terminology Relating to Carbonless Copy Products

F 909 Terminology Relating to Printers

F 1125 Terminology of Image Quality in Impact Printing Systems

### 2.2 ANSI Standard:

PH 2.36 Terms, Symbols, and Notation for Optical Transmission and Reflections Measurements<sup>3</sup>

PH2.17 Density Measurements—Geometric Conditions for Reflection Density<sup>3</sup>

PH2.18 Density Measurements—Spectral Conditions<sup>3</sup>

## 3. Terminology

### 3.1 Definitions:

3.1.1 For definitions of terms used in this practice, refer to Terminology E 284, F 221, F 549, and F 909.

## 4. Summary of Practice

4.1 This practice consists of using an electric or electronic typewriter under specified conditions to produce images for the evaluation of carbon paper, carbonless paper, inked ribbon, and paper manifold sets on a comparative basis.

## 5. Significance and Use

5.1 This practice is intended to provide a means of rapid evaluation of comparative image quality relative to carbon paper, carbonless paper, inked ribbons, and similar image-producing products.

## 6. Interferences

6.1 Many electric and electronic typewriters are subject to type impact variations due to fluctuations of line voltage. Voltage stabilizing devices, recommended by the typewriter manufacturer, can be used. If a stabilizing device is not used, tests should be run at periods when the line load is low or stabilized.

6.2 The densitometer readings will also vary with voltage fluctuations. The same precautions as in 6.1 should be taken.

6.3 In densitometer readings care should be taken not to confuse width of line with intensity.

6.4 Fluctuations of temperature and humidity will affect the paper used for image reception. Tests run on different days

<sup>1</sup> This practice 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.

Current edition approved Dec. 1, 2004. Published December 2004. Originally approved in 1985. Last previous edition approved in 2000 as F 497 – 00.

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> Available from American National Standards Institute, 25 W. 43rd St., 4th Floor, New York, NY 10036.

could show variations in results. All tests should be dated and temperature and relative humidity during the tests recorded.

## 7. Apparatus

7.1 *Typewriters*, to be used to prepare images. An electric or electronic typewriter in normal use for the application and adjusted to the manufacturer's specifications.

7.2 *Reflection Densitometer*, meeting the geometric conditions of PH2.17 and the spectral conditions of PH2.18, and measuring reflection density as defined in ANSI PH 2.36. The aperture diameter of the instrument shall not be less than the line spacing of the typewriter.

## 8. Materials

8.1 White bond paper, conforming to Specification D 3460, Grade Number 4, unwatermarked, basis weight 20 lb (75 g/m<sup>2</sup> g).

## 9. Calibration and Standardization of Typewriter

9.1 Select upper case "6," "B," or "&" characters. Clean the type face of the characters selected for the test. Adjust the impact pressure, if possible, until slight embossment is produced on the back of a single sheet of 20 lb (75 g/m<sup>2</sup> g) bond paper. Reduce impact pressure until embossment just disappears. If impact pressure cannot be so adjusted due to the typewriter design, use a nominal impact setting.

9.2 For reflection density test, a specially fitted two or three-line grid may be used in some typewriters.

## 10. Conditioning

10.1 Conduct testing in an environment with stable conditions of temperature and relative humidity. It is suggested that the test material (white paper, carbon paper, ribbons, and manifold sets) be conditioned for 24 h in the area in which the test will be conducted. If available, standard conditions 50.0 ± 2.0 % relative humidity and 23.0 ± 1.0°C (73.4 ± 1.8°F) should be used, as given in Practice D 685.

## 11. Procedure for Preparing Image

11.1 Insert the test ribbon (fabric or film) in the typewriter in the normal manner. For one time single-strike ribbons, each character type face must strike each time on an unused portion of the ribbon (no overstrike). Test and control ribbons must feed in the same direction.

11.2 Insert the paper or manifold set in the normal manner, but avoid typing on watermarks or imperfections in the paper.

11.3 Adjust the bail rolls to hold the paper against the platen, one on each side of the paper, but away from the area where the pattern is to be produced.

11.4 Operate the typewriter at a constant speed to produce the desired test pattern. If no test pattern is otherwise specified, a general purpose one consists of ten lines of ten or more characters each typed in a block, centered on the paper or other test material.

11.5 Remove the test paper, carbon paper, or paper sets upon which the test pattern has been produced, being careful to avoid any smudging of the pattern.

11.6 For control purposes, produce identical image and test patterns in accordance with 11.1-11.5 with control materials. When ribbons are being tested, produce identical images and test patterns in accordance with 11.1-11.5 with a fresh control ribbon on the same test sheet. When paper or forms are being evaluated, retain the same ribbon and replace the test paper or forms with control materials.

## 12. Procedure for Rapid Evaluation for Comparative Image Quality

### 12.1 Visual Means:

12.1.1 Visually compare the test and control product images. Use Terminology F 1125 as a guide in identifying and describing the following defects:

12.1.1.1 Character spread,

12.1.1.2 Edge definition,

12.1.1.3 Extraneous ink and spatter,

12.1.1.4 Fill-in,

12.1.1.5 Over-strike,

12.1.1.6 Visual density,

12.1.1.7 Voids or broken characters, and

12.1.1.8 *Manifolding Performance*—Comparative quality of images on corresponding copies of multipart forms.

### 12.2 Reflection Density:

12.2.1 *Calibration*—The densitometer should be calibrated in accordance with PH2.17 and PH2.18.

12.2.2 Place the image test specimen on a backing such as a stack of paper of the same color, weight, and reflectance as the test specimen. This backing should be opaque and the addition of more sheets or thickness to the backing should not change its reflection density.

12.2.3 Place the test specimen (on the backing) under the viewing head of the instrument and read the reflection density obtained on the specimen. Readings should be taken randomly from five or more different areas of the imaged material. Record the readings and compute the average density.

## 13. Report

13.1 Report the visual observations of the test product images as compared to the control product images for the properties in 12.1.1.1-12.1.1.8.

13.2 Reflection density if determined in 12.2.

## 14. Precision

14.1 This practice will provide repeatable ranking order results of repeatable relationship to a control within a laboratory.

14.2 Ranking order and comparative results may not necessarily be reproduced between laboratories because of differences in operators, typewriters, typewriter actions, and ambient conditions.

## 15. Keywords

15.1 electric typewriter; electronic typewriter; image quality

*ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.*

*This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.*

*This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or [service@astm.org](mailto:service@astm.org) (e-mail); or through the ASTM website ([www.astm.org](http://www.astm.org)).*