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AMERICAN SOCIETY FOR TESTING AND MATERIALS
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Standard Practice for Preparation of an Offset Duplicator for Use in Functional Testing of Lithographic Copy Products¹

This standard is issued under the fixed designation F 413; 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 is applicable to any commercially available offset lithographic duplicator.

1.2 The duplicator prepared in accordance with this practice may be used for functional testing of lithographic copy products.

1.3 This practice is intended for use by experienced operators.

1.4 *This standard does not purport to address all of the safety problems, 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:

D 3460 Specification for White Watermarked, Unwatermarked Bond, Mimeograph Duplicator, and Xerographic Cut-Sized Office Papers²

2.2 ANSI Standards:³

PH2.17 Density Measurements—Geometric Conditions for Reflection Density

PH2.18 Density Measurements—Spectral Conditions

3. Summary of Practice

3.1 The duplicator preparation procedure consists of three basic steps as follows:

3.1.1 Check for proper machine adjustments,

3.1.2 Begin the run with a special set up master and concurrently set the ink and fountain solution by trial and error until the ink and fountain solution appear to be in balance, and

3.1.3 Make a test run of 500 copies to confirm that the ink and fountain solution are in balance.

4. Materials

4.1 *Ink*, black.

NOTE 1—Use the product and preparation procedure recommended by the duplicator manufacturer for the supply system to be used in the method.

4.2 *Starting Solution or Etch* (Note 1).

4.3 *Fountain Solution* (Note 1).

4.4 *Blanket* (Note 1).

4.5 *Cleaning Solvent* (Note 1).

4.6 *Dampening Roller Cover(s)*, if required (Note 1).

4.7 *Paper*—Essentially, any white paper recommended by the supplier for use with an offset lithographic duplicator is satisfactory. One satisfactory type of paper is bond (see Specification D 3460 for typical specification).

4.8 *Set-up Masters*:

4.8.1 *Direct Image*—Any commercial-quality direct-image master preprinted in accordance with the master manufacturer's instructions with a reproducing image as described below:

4.8.1.1 Three solid horizontal bars measuring ¼ by 8 in. (6.4 by 203 mm) (38.1 mm) located 1½ in. down from the top and with a ¼-in. (6.4-mm) space between bars. The bars shall be substantially free of voids and pinholes.

4.8.1.2 Three ⅜-in. (9.5-mm) GATF star targets located on a horizontal line about 1 in. (25 mm) below the bottom bar and spaced from side to side so that one is centered and the other two are about 1¼ in. (35 mm) from the ends of the bars. The targets shall be substantially free of voids and pinholes with no plugging at the center.

4.8.2 *Photo Image*—Any commercial-quality photo image master imaged in accordance with the manufacturer's instruction with the same image and located in the same position as described in 4.8.1.

5. Duplicator Adjustments

5.1 Follow the manufacturer's instructions for rollers and cylinder pressures and all other adjustments, except those relating to ink and fountain solution.

5.2 *Ink*—Add fresh ink to the fountain and adjust the ink fountain blade and fountain roller to deliver a small but laterally uniform quantity of ink to the ink roller system with each printing cycle. The correct setting must be determined by trial and error until the printed image meets the quality requirement of Section 7.

5.3 *Fountain Solution*—Adjust the dampening system, which delivers fountain solution to the master, until the flow is close to the minimum that will keep non-image areas clean

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² *Annual Book of ASTM Standards*, Vol 15.09.

³ Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.



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when the image density is 1.3 ± 0.1 .

NOTE 2—For duplicators with separate dampening roller systems, the following procedure is recommended for estimating how close the fountain solution flow is to minimum:

(a) While duplicating copy, lift the dampening form roller out of contact with the master.

(b) Count the number of copies printed before a background tone first appears. Eight to fourteen copies indicate correct balance. Over 14 copies means the dampening roller is too wet.

(c) If too wet, turn off the flow of fountain solution to the form roller and continue printing with the roller in contact with the master.

(d) Repeat (a) and (c) every 100 copies until tone appears in 8 to 14 copies.

5.4 *Speed*—Adjust the speed to the maximum that is recommended.

6. Running the Set-Up Master

6.1 Pre-wet and start the master in accordance with the master manufacturer's directions. While the run is underway make adjustments to the ink and fountain solution systems until the printed image meets the quality requirement of Section 7 and the fountain solution setting is close to the minimum necessary to keep non-image areas clean.

6.2 Stop the run and restart a new set-up master as before.

6.3 Continue the run without making any changes for at least 500 copies, but take sample copies every 100 copies.

6.4 **Caution:** There is frequently enough difference between the two sides of the copy paper to affect the optical density of the printed image as measured in 7.1. Therefore, it is important to be consistent for best comparative results.

7. Quality Requirements

7.1 Optical Density of Bars:

7.1.1 *Method of Measurement*—Use a reflectometer or densitometer that is calibrated, set-up, and operated following the guidelines set forth in ANSI PH2.17 and PH2.18. The area of

the bar scanned by the instrument should be any convenient size that is within the bar and should be centered vertically on the bar.

7.1.2 Measurements:

7.1.2.1 Determine the density of a bar by taking the average of three readings, one in the center and one approximately 0.2 in. (5 mm) from each end.

7.1.2.2 Determine the density of a run by measuring the density of any one of the three bars on each sample copy taken from the run at 100 copy intervals. The average of all bar densities shall be the run density.

7.1.3 *Specification*—The optical density of the run shall be 1.3 ± 0.1 and the standard deviation shall not exceed 0.1.

7.2 Appearance:

7.2.1 *Bar*—The image shall be free of mottle, white specks, or white hair-like lines as from lint and shall appear uniform from side to side with sharp edges.

7.2.2 *Star Target*—All targets shall be free of ink in the non-image areas, except a central area of radius no greater than 0.06 in. (1.5 mm).

7.2.3 *Nonimage Areas*—Nonimage areas shall be free of background tone or specks visible to the unaided eye.

8. Precision and Bias

8.1 No statement is made about either the precision or bias of Practice F 413 since the intent is to provide a standard practice for preparing an offset duplicator for testing various components of the lithographic copy process. When set up in accordance with this practice, test results have been found to be repeatable within the laboratory. Because of the nature of offset duplicators, repeatability may not be experienced between laboratories.

9. Keywords

9.1 lithography; offset duplicator

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