Designation: F 1782 – 97 (Reapproved 2002)

Standard Practice for Amount of Ink Deposit on Fabric Type Ribbons[1]

This standard is issued under the fixed designation F 1782; 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 the determination of the amount of ink deposit, sometimes known as ink content, on inked fabric ribbons.

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.* See 6.1 and 9.4 for specific precautionary statements.

2. Referenced Documents

2.1 *ASTM Standards:*

D 685 Practice for Conditioning Paper and Paper Products for Testing[2]

F 221 Terminology Relating to Carbon Paper and Inked Ribbon Products and Images Made Therefrom[2]

3. Terminology

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

4. Summary of Practice

4.1 The amount of ink deposit is gravimetrically determined by analytically weighing a conditioned test specimen. The ink deposit is removed by the use of a suitable solvent(s) in an ultrasonic cleaner. The de-inked fabric sample is conditioned and reweighed. The amount of ink deposit is calculated.

5. Apparatus

5.1 *Analytical Balance*, with a sensitivity to 0.1 mg.

5.2 *Ultrasonic Bath*, with or without heater.

6. Reagents

6.1 Care should be taken to select the extraction solvent(s) so that only the ink is removed from substrates. **Warning**—Vapors from solvents can be toxic when inhaled over prolonged periods. Some solvents commonly used may be listed as carcinogenic. Others are flammable and suitable precautions should be taken. Handle with care and use only in properly ventilated areas to avoid breathing vapors. A fume hood is recommended.

7. Conditioning

7.1 Allow the test specimen to stabilize under room conditions for 15 min for routine testing.

7.2 Allow the test specimen to condition 1 h at 23.0± 2.0°C and 50 ± 2 % relative humidity for a more precise determination (see Practice D 685).

8. Test Specimen

8.1 Cut a representative test sample of the desired size from the conditioned specimen.

9. Procedure

9.1 From a sample that has been conditioned in accordance with 7.1 or 7.2, discard at least two outer wraps of ribbon material if from a reel of inked fabric prior to sampling. If the sample to be checked is from a ribbon cartridge, pull out some of the ribbon in order to check the ink inside the cartridge.

9.2 For a narrow fabric ribbon sample, typically 1 in. or less in width, cut a 10 to 15 in. long section for ink percentage calculation. For wide fabric ribbons, typically 14 in. or greater in width, cut a 2 by 3 in. portion from the right and left sides for ink percentage calculation. This helps to determine if the fabric is inked evenly across the width of the fabric. For grams per square metre calculation, a popular scaling factor for the sample is 1/200 of a square metre for ribbons ½ in. (12.7 mm) or less and 1/100 of a square metre for ribbons above ½ in. (12.7 mm). Care should be taken to avoid contact of sample with ink absorbing surfaces. (Example: Cardboard, paper towel, etc.) Sheet mylar or similar surfaces are acceptable.

9.3 Weigh the sample in accordance with acceptable analytical procedure. Weigh to the nearest 0.1 mg. Record as inked weight (*A*).

9.4 Set up the ultrasonic bath by first filling the tank with a transfer medium (for example, warm tap water plus a wetting agent/detergent). Place two glass beakers (400 or 600 mL) of the desired solvent(s) in a beaker positioning cover to suspend the beakers in the bath. Plug in the ultrasonic bath and turn power on. If using a bath with a heater, turn the heat switch to on and allow the bath to stabilize to the desired temperature. **Warning**—The temperature of the bath should not exceed the boiling point of the solvent.

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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 F05.02 on Inked Transfer Imaging Products.

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

9.5 Using tongs, remove the sample from the balance. Immerse the sample into the first beaker containing the solvent for 1 min, longer if desired.

9.6 Using tongs, remove the sample from the first beaker and transfer it to the second beaker containing the solvent for 1 min, longer if desired.

9.7 Remove the sample from the bath and waft it in the air to remove excess solvent. (To further remove solvent, a warmed oven may be needed to remove residual solvent.) Place on a clean surface and allow to dry and humidity stabilize for 10 min.

9.8 Reweigh on an analytical balance to the nearest 0.1 mg. If drifting on balance occurs, allow to stabilize until drift is less than 1 mg/min. Record as de-inked weight (*B*).

10. Calculation

10.1 Calculate the percent of ink as follows:

$$\frac{\text{inked weight } (A) - \text{de-inked weight } (B)}{\text{inked weight } (A)}(100) = \%\ \text{ink} \qquad (1)$$

10.2 Alternatively, calculate grams per square meter as follows:

$$\text{inked weight } (A) - \text{de-inked weight } (B) = \text{grams ink} \qquad (2)$$

Multiply grams ink times the scaling factor for the template used to determine grams per square meter of ink.

NOTE 1—Cotton and silk edgings may be partially or totally removed by this process. For accuracy on these narrow fabrics when edging is included in the sample, a blank (uninked) sample should be run. Percentage loss on the blank subtracted from the sample percentage will equal the true ink percentage.

11. Report

11.1 Report the amount of ink deposit as percent ink content.

11.2 Report the amount of ink as grams per square meter.

11.3 Report the solvent(s) used.

APPENDIX

(Nonmandatory Information)

X1. BASIS FOR ESTABLISHMENT OF PRACTICE

X1.1 The current practice is designed to measure the amount of ink on an inked length of fabric using a single solvent or a combination of solvents.

X1.2 The solvent used for years in the ribbon industry has been 1,1,1-trichloroethane. Since this solvent is considered an Ozone Depleting Substance (ODS), production of this material ceased at the end of 1995. Another solvent used, but not on the ODS list, is 1,1,1-trichloroethylene. This material, however, is considered more toxic than 1,1,1-trichloroethane.

X1.3 Due to the demand for solvents to replace ODS and other solvents considered hazardous, many alternate solvents have been developed. In order to check the effectiveness of alternate solvents on an inked piece of fabric, 1,1,1-trichloroethane if still available, or 1,1,1-trichloroethylene would need to be used as the standard solvent.

X1.4 *Suggested List of Alternate Solvent(s)*:

X1.4.1 The following list of solvents is not an attempt to list solvents that are considered non-hazardous but solvents that have been found to remove ink to a degree from the fabric individually or by using a solvent in one beaker and a different solvent in a second beaker.

methyl ethyl ketone
2-Pyrrolidinone-1-methyl
mineral spirits
isopropyl alcohol
alcohol and glycol ether

X1.4.2 It is recommended that the extraction solvent selected be agreed to by interested parties when applicable.