



Standard Test Method for Silver Tarnishing by Paper¹

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1. Scope

1.1 This test method covers the qualitative identification of the presence or absence of materials in paper that will tarnish or stain silver which comes in contact with the paper. This test method is chiefly intended for testing tissue papers that are in direct contact with silver. The test results indicate the type of tarnish or stain and the relative distribution of the materials causing such tarnishing or staining.

NOTE 1—The main material in paper causing silver to tarnish or stain is reducible sulfur, which may be determined in accordance with Test Method D 984.

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:

- D 585 Practice for Sampling and Accepting a Single Lot of Paper, Paperboard, Fiberboard, and Related Product²
- D 984 Test Methods for Reducible Sulfur in Paper²
- D 1193 Specification for Reagent Water³

3. Summary of Test Method

3.1 A specimen of the sample is saturated with water and placed between two polished silver plates. The specimen is allowed to dry in contact with the plates at a temperature of 70°C for at least 3 h. At the end of the drying period, the plates are examined for evidence of tarnish or stain.

3.2 Water repellent or parchmented papers and metal-coated papers will require certain modifications of the test procedure. In most cases, they may be tested without wetting the test specimen and by prolonging the time in contact with the silver to at least 24 h.

3.3 The principles involved in this test method are also suggested for use where wrapping paper is to be tested for its

staining or corrosion properties with respect to other metals, such as steel, copper, nickel, etc. In such cases, plates or forms of the particular metal or alloy in question shall be used in place of silver plates. Other modifications may be required for a specific purpose. For example, in the case of a metal that would rust, such as steel, the paper obviously could not be wetted; it would be necessary instead to heat in an atmosphere of high humidity.

3.4 Modifications to accommodate paperboard are also possible. One such modification is described in the Appendix.

4. Significance and Use

4.1 This test method covers the determination of the presence or absence of materials that will tarnish or stain silver in paper used for wrapping silverware. Freedom from tarnishing silver is an important end user requirement of such papers.

4.2 Possible modifications to other metals have specialized applications in metal plating, graphic arts, and related areas.

5. Apparatus

5.1 *Metal Surface*,⁴ solid silver or silver plated brass flat plates, approximately 15 by 15 cm (6 by 6 in.). Two plates are needed for each test and are probably sufficient for occasional tests of paper. Several sets are necessary where frequent testing is desired.

5.1.1 *Solid Silver Plates*, approximately 15 by 15 cm (6 by 6 in.).

5.1.2 *Metal Plates*—Flat plates approximately 15 by 15 cm (6 by 6 in.) from commercial rolled sheet brass 0.25 in. (6.35 mm) thick. One face of each plate should be buffed smooth and as free as possible from tool marks, then plated with pure silver to a thickness of about 0.125 mm, buffed again, and plated with another 0.125 mm of silver. In this way, a smooth continuous layer of pure silver about 0.25 mm thick will be obtained that can be cleaned and polished repeatedly. It is advisable to check the amount of silver by weighing the brass plates before and after plating. A layer of silver 0.25 mm thick should weigh

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

³ *Annual Book of ASTM Standards*, Vol 11.01.

⁴ The metal surface required is not a stock item in many laboratory supply organizations, however the solid silver plates in 5.1.1 may be obtained upon order from some dealers in fine and precious metals. One such source is Hagstoz & Son, 709 Sampson St., Philadelphia, PA 19106, who can supply the plates in 5.1.1 in several thicknesses. There are other similar sources. The plates in 5.1.2 can be obtained by purchasing the brass plates as described and having them plated with silver to the specification in 5.1.2 by a commercial silver-plater.