



Standard Test Method for Fiber Analysis of Paper and Paperboard¹

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This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This test method covers the identification of the kinds of fibers present in a sample of paper and their quantitative estimation.

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 Products²

D 586 Test Method for Ash in Paper²

D 1193 Specification for Reagent Water³

2.2 TAPPI Standards:

T 8 Identification of wood and fibers from conifers⁴

T 10 Species identification of nonwoody vegetable fibers⁴

3. Summary of Test Method

3.1 Details are presented for the disintegration of grades of paper, staining, preparation of slides, and identification by specific staining techniques. Provision is made for both qualitative and quantitative analysis of furnishes.

4. Significance and Use

4.1 Many types of paper, particularly bonds, ledgers, index, and book papers are bought on the basis of fiber composition. This test method is used to evaluate the fibers in the paper and to assure the purchaser that the composition and types of fibers are in accordance with the specifications. It will also show whether the composition is free of inferior fibers which the

specifications particularly prohibit. It is also significant as to the structure and quality of the paper. In order that the examination may be interpreted into practical significance, it is important that the analyst should be experienced in the field of pulp and paper microscopy.

4.2 For accurate results, considerable training and experience are necessary. The analyst should make frequent use of standard samples of known composition or of authentic fiber samples and should become thoroughly familiar with the appearance of the different fibers and their behavior when treated with the various stains.

4.3 Morphological characteristics identify special fibers such as straw, flax, esparto, and certain types of wood, such as southern pine, Douglas fir, western hemlock, and various species of hardwoods, so that the correct weight factors may be applied. A knowledge of morphological characteristics of the different fibers is helpful and, in some cases, essential for their identification. Some information on this subject is given in the Appendixes.

5. Apparatus and Materials

5.1 *Microscope*, compound, preferably of the binocular type, equipped with a mechanical stage and Abbe condenser. A magnification of approximately 100 diameters is recommended for observation of fiber colors, although a higher magnification may be desirable for studying morphological characteristics. If an apochromatic objective is used, it is desirable to have a compensating eye piece and an achromatic condenser. The eyepiece shall be provided with a cross hair, pointer, or dot for counting the fibers passing under it. Such an eyepiece can be supplied by the manufacturers, or it may be prepared by the technician, positioning the point in the eyepiece so as to obtain its image in focus.

5.2 *Slides and Cover Glasses*—Standard slides 25 by 74-mm (1 by 3-in.) of clear, colorless glass, and No. 2 cover glasses (25-mm square).

5.3 *Dropper*—A glass tube approximately 100 mm (4 in.) long and 8 mm ($\frac{5}{16}$ in.) inside diameter, with one end carefully smoothed, but not constricted, and the other end fitted with a rubber bulb. The tube is graduated to deliver 0.5 mL.

¹ This test method is under the jurisdiction of ASTM Committee D-6 on Paper and Paper Products and is the direct responsibility of Subcommittee D06.92 on Test Methods.

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

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

⁴ Available from the Technical Association of the Pulp and Paper Industry, Technology Park/Atlanta, P.O. Box 105113, Atlanta, GA 30348.