

The information and data contained in this document were prepared by a technical committee of the Association. The committee and the Association assume no liability or responsibility in connection with the use of such information or data, including but not limited to any liability under patent, copyright, or trade secret laws. The user is responsible for determining that this document is the most recent edition published.

CAUTION:

This Test Method may include safety precautions which are believed to be appropriate at the time of publication of the method. The intent of these is to alert the user of the method to safety issues related to such use. The user is responsible for determining that the safety precautions are complete and are appropriate to their use of the method, and for ensuring that suitable safety practices have not changed since publication of the method. This method may require the use, disposal, or both, of chemicals which may present serious health hazards to humans. Procedures for the handling of such substances are set forth on Material Safety Data Sheets which must be developed by all manufacturers and importers of potentially hazardous chemicals and maintained by all distributors of potentially hazardous chemicals. Prior to the use of this method, the user must determine whether any of the chemicals to be used or disposed of are potentially hazardous and, if so, must follow strictly the procedures specified by both the manufacturer, as well as local, state, and federal authorities for safe use and disposal of these chemicals.

Coarseness of pulp fibers

1. Scope

1.1 This is a method by which the coarseness (weight per unit length) of the fibers in a pulp may be ascertained by counting the crossings of a known weight of fibers per unit area on a prepared slide over lines of known length. The crossings are counted with a microscope and mechanical stage, by traversing the slide over a series of 5-cm distances.

1.2 If it is also required to determine the length of the fibers in a sample in accordance with TAPPI T 232 “Fiber Length of Pulp by Projection,” instead of using a microscope, the fiber crossings over lines of known equivalent length may be counted when the images of the fibers are projected on a screen as described in T 232.

2. Summary

Coarseness is defined as the weight per unit length of fiber expressed as milligrams per 100 m (or decigrams per 10 km) and called a decigrex, abbreviated to “dg.” Numerically it is 11.1 times larger than the value of the common “denier” used for textile fibers. These units and the “weight factors” of various fibers as described in TAPPI T 401 “Fiber Analysis of Paper and Paperboard” should be proportional.

3. Significance

3.1 The coarseness of fibers has an important effect on many properties of paper. For example, if other factors are equal, a finer pulp will give a stronger, smoother and better folding paper (*I*). In the past, the average width of the fibers has been used for measuring this characteristic. Measuring the decigrex has several advantages over measuring widths since it is not only much easier and quicker but also includes the effects of fiber thickness, the size of the central canal (or lumen), and the density of the cellulosic material composing the fibers.

3.2 The coarseness expressed in decigrex decreases as the fibers are split with beating and may be used as a measure of the splitting effect of beating or refining equipment. Wood fibers, however, do not easily split apart lengthwise so that their increase in fineness with beating is minor and not nearly so marked as with cotton or, especially, with linen fibers.

Approved by the Standard Specific Interest Group for this Test Method



Documents

Document Sharing Hub

4. Apparatus

4.1 *Microscope*, with crosshair or pointer in the eye piece and equipped with a mechanical stage, and magnification of 50 × or greater. (Alternatively, a projector, as described in T 232, may be used.)

4.2 *Sheet machine* with a suction device. The sheet machine described in Appendix A.2 of TAPPI T 205 “Forming Handsheets for Physical Tests of Pulp” is suitable. Since the normal suction of the drainage leg is inadequate to draw the water in the diluted specimen through a filter paper covering the forming wire, as is required, the upper part of the drainage leg of the sheet machine is connected with suction tubing from the petcock to the top of a large (2-4 L) suction flask, which serves as a trap. The large suction flask is placed on a bench or support level with or above the wire.

NOTE 1: The connection to the drainage leg is made preferably as follows: Unscrew the needle from the valve and file off the little delivery spout on the body of the valve. If desired, remove the valve and slightly turn down the body in a lathe so as better to accommodate the tubing.

4.3 *Classifier*, with 150-mesh screen. If unavailable, a small 150-mesh sieve may be used.

4.4 *Filter paper*, a smooth, toughened paper, 18.5-cm diameter.

4.5 *Spade stirrer* (see Fig. 1) for the sheet machine, having the top edge of its blade high enough above the 5-cm (2-in.) depth of the liquid in the sheet machine to prevent long fibers from being picked up over its top edge when it is withdrawn.

4.6 *Microscope slides*, preferably large size, 3.8 × 7.6 cm (1.5 × 3 in.).

4.7 *Bowl*, domestic type, stainless steel or polyethylene, about 25-cm (10-in.) diameter.

4.8 *Dipper*, a stainless steel ladle with smooth rim, 25-50 mL capacity.

4.9 *Büchner funnel*, about 9 cm (3.5 in.) diameter and suction flask.

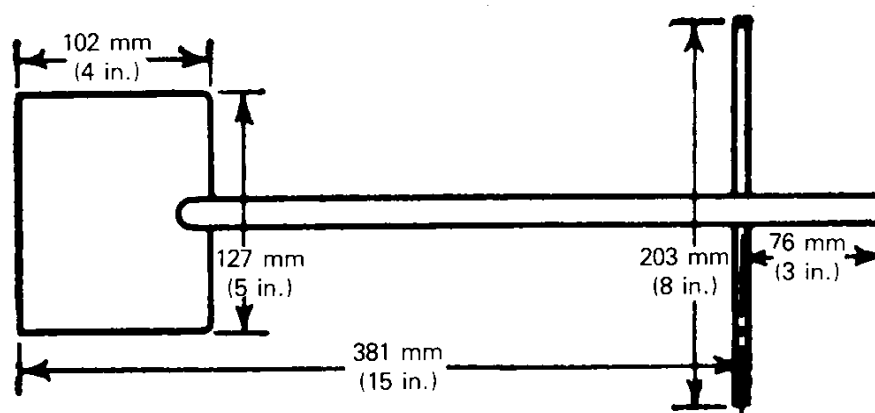


Fig. 1. Spade stirrer.

4.10 *Gooch-type crucible*, about 8-mL capacity with coarse, fritted glass disc.

4.11 *Adapter*, rubber, for Gooch crucible and suction flask.

4.12 *Evaporating dish*, 120 or 150 mL (or a 150-mL crystallizing dish or beaker).

4.13 *Graduated cylinders*, two each, 500 and 1000 mL; one 1000-mL cylinder, preferably stoppered.

4.14 *Other equipment*: 20 × 150 mm test tube with No. 3 rubber stopper; 1-L Erlenmeyer flask; microscope needle (steel); small weighing bottle (30 mL); wide-mouth china or plastic cup.

5. Materials

5.1 *Dye*, 1 or 2% solution of a red direct dye, such as Direct Red 23 (Color Index No. 29160).

5.2 *Salt*, 5% solution of NaCl.

5.3 *Cellophane adhesive tape*, 19 mm (3/4 in.) wide.

5.4 *Blotting paper*, e.g., squares for TAPPI T 205.