

T 218 sp-11

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Forming handsheets for reflectance testing of pulp (Büchner funnel procedure)

1. Scope

1.1 This practice describes the procedure using a Büchner funnel for preparing specimen sheets for reflectance testing of bleached or unbleached pulp whose fibers are readily dispersed in water. The sheets are made at a pH of 6.5 ± 0.5 . This practice permits the preparation of sheets having a smooth and reproducible surface for reflectance measurements with a minimum of washing or contamination of the sample.

1.2 This TAPPI Standard Practice differs from other practices used in world trade in the manner in which sheets are pressed and dried. See Appendix.

1.3 TAPPI Standard Practice T 272 describes a procedure for using the sheet machine for making handsheets for the application. The purpose for having two methods is discussed in sections 4.3 and 4.4.

1.4 See Appendix for consideration of slow draining pulps and recycled pulps.

2. Applicable documents

2.1 TAPPI Official Test Methods referred to for parts of this procedure include: T 400 "Sampling and Accepting a Single Lot of Paper, Paperboard, Containerboard, or Related Product;" T 205 "Forming Handsheets for Physical Tests of Pulp;" and T 402 "Standard Conditioning and Testing Atmospheres for Paper, Board, Pulp Handsheets, and Related Products."

2.2 Reflectance testing on handsheets prepared by this method can be performed using TAPPI T 452 "Brightness of Pulp, Paper, and Paperboard (Directional Reflectance at 457 nm)," or TAPPI T 525 "Diffuse Blue Reflectance Factor of Pulp (Diffuse Brightness)."

2.3 TAPPI Standard Practice T 272 "Forming Handsheets for Reflectance Testing of Pulp (Sheet Machine Procedure)" differs from this method in the manner in which the sheets are made.

Approved by the Standard Specific Interest Group for this Test Method

3. Summary

A properly selected specimen of the pulp to be evaluated is dispersed in a small volume of water, the pH of the slurry is adjusted to 6.5 ± 0.5 , and the slurry formed into a sheet in a Büchner funnel. The sheet is pressed and dried under controlled conditions to produce a reproducible surface for reflectance testing.

4. Significance

4.1 The reflectance of a sheet composed of fibers is dependent on the structure of the surface and orientation of the fibers. Industrially made pulp sheets have a variety of structures and surface textures and may contain impurities removable in water. The dispersion of the pulp and the forming of a uniform sheet in a repeatable manner are therefore necessary for accurate testing (1).

4.2 It is well established that the reflectance of pulps, particularly unbleached, is affected by pH (2). Accordingly, this practice establishes a pH which will be an optimum for most pulps. If, however, reflectance must be measured at a specific pH, all water used in preparation of the sheets shall be appropriately adjusted and the deviation from the practice reported.

4.3 The procedure described in this practice for forming the sheets and the sheet machine described in Standard Practice T 272 may not produce equivalent results. The 150 mesh stainless steel wire screen of the sheet machine may result in the loss of fines which are frequently defined as being able to pass a 200 mesh screen. Stone groundwood, which contains a large percentage of fines, is particularly affected by the sheet machine. Dilution factors are different between the two procedures, and opposite sides of the sheets are tested depending upon how the sheet is formed. Contamination could occur if the sheet machine were not made of stainless steel. This method includes precautions to prevent contamination of the pulp with color-causing materials during preparation of the sheets.

4.4 In selecting which of the Standard Practices to use, (T 218 or T 272), consider the drainage characteristics of the pulp. For example, recycled or low freeness pulps may require an unreasonable time to remove the excess water from the funnel (T 218) and the fibers may not be distributed evenly. In that case, the sheet machine practice (T 272) would be preferred.

4.5 The reflectance of a sheet prepared according to this procedure may not be the same as that of a sheet made from the same pulp under industrial papermaking conditions since pulp fines retention is different and no heat is used to dry the sheet.

5. Apparatus and reagents

5.1 *Disintegrator*¹, as described in TAPPI T 205, or a *high-speed mixer*¹ with two fixed ripple-edge stainless steel mixing blades on a stainless steel shaft and fitted with a square-shaped 1000-mL stainless steel canister¹.

NOTE 1: A disintegrator with a stainless steel paddle and shaft and canister made of stainless steel or plastic is preferred. It is essential, if an old model bronze disintegrator is used, that the interior of the canister, the paddle, and the shaft be chromium-plated or plastic-coated to prevent discoloration of the pulp.

NOTE 2: The high-speed mixer recommended is of the “malted-milk” type, not the “blender” type. For ease of cleaning, it should have fixed, ripple-edged blades rather than hinged blades. The canister is specially made to fit the mixer but is square because this shape is more efficient than the common round “malted-milk” can (Fig. 1).

5.2 *Balance*, capable of weighing to the nearest 0.2 g.

5.3 *Graduated vessels*, two calibrated 1000-mL glass cylinders or stainless steel cups.

5.4 *Filter paper*, sheets of smooth, rapid-draining, 150-mm white filter paper, free from soluble impurities; and any type of 185-mm white filter paper so long as it is free from water soluble impurities.

5.5 *Büchner funnel*, nominally 150 mm inside diameter with a smooth, coarse, fritted glass filtering disk.

NOTE 3: The use of a Büchner funnel with a perforated plate should be avoided because it can result in thin spots or pinholes, especially with fast-draining pulps.

¹ Names of suppliers of testing equipment and materials for this method may be found on the Test Equipment Suppliers list, available as part of the CD or printed set of Standards, or on the TAPPI website general Standards page.