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Dirt in pulp (measured by transmitted light)

Scope

This method supplements TAPPI T 213 “Dirt in Pulp,” which measures dirt in mm²/m² (parts per million) as detected by reflected light by measuring dirt in actual dirt specks (above a given threshold value) as observed by transmitted light. This method is most often used on slush pulps, whereas T 213 is more often used on dry sheets. Either method, however, may be used with either type of pulp.

Safety precautions

There are no specific safety precautions for this method.

Definition

By definition, dirt is an extraneous matter in pulp, of such size, shape, color, or texture that it is readily visible when the pulp is inspected with the naked eye. Under this definition, therefore, pulp fibers themselves, if they differ in color, size, or texture from the main body of the pulp (e.g., shives, unbleached fibers in a bleached pulp, etc., are considered as dirt).
**Apparatus**

1. *Pulp disintegrator*, as described in TAPPI T 205 “Forming Handsheets for Physical Tests of Pulp,” or any other comparable piece of equipment. This equipment is not needed for testing slush pulps, but is needed for dry or sheet pulps.
2. *Viewing box*. Approximately 220 x 280 mm (8.5 x 11 in.) with a 22-W circular (circline) fluorescent tube under frosted glass, to give 4300 ± 540 lx of “cool white” at the surface of the box.
3. *Hydraulic press*, as described in T 205, or equivalent.
4. *Büchner funnel*, 150 mm I.D., filter flask, a source of vacuum, and a supply of 150-mm and 180 or 185-mm rapid draining qualitative filter papers.
5. *TAPPI Dirt Chart*, as described in TAPPI T 213, or a special chart showing only the 0.040-mm² size.

**Sampling and test specimen**

Obtain a sample of the pulp in accordance with a previously determined sampling plan. Care must be taken that additional dirt is not added in the sampling and handling. The test specimen used for the test is only 3 to 6 g in weight; however, a much larger sample ordinarily is taken and should be well mixed prior to the subsequent dilution. Prepare several liters of diluted stock with distilled water at approximately 0.3% consistency, i.e., 3 g per 1000 mL.

If dry, shredded pulp or sheet pulp is being tested, the sample must first be soaked for several hours in distilled water, a shorter time if the water is heated. The soaked pulp then is defibered in the disintegrator or blender, after which several liters are prepared at 0.3% consistency, similar to the procedure with slush pulp.

**Procedure**

1. Prepare two to four handsheet specimens from each pulp, each specimen shall contain 1.5 g in weight of moisture-free pulp diluted to approximately 500 mL (about 0.3% pulp) for each sheet. Form these sheets on the Büchner funnel, on a 150-mm filter paper. Be sure the filter funnel is level before pouring the stock so the sheet will be uniform in thickness. Suck the sheet dry, then blow it onto a 185-mm filter paper. Each sheet until then will consist of the handsheet sandwiched between a 150- and 185-mm filter paper. These units of pulp sheet, filter papers, and blotters may be stacked to any convenient height.
2. Place the above stack in the hydraulic press and press for 1 min at 1241 kPa (180 psig).

**REPORT**

If other than a TAPPI press is used, calculate the gauge pressure equivalent to 1241 kPa (180 psi) on the TAPPI press.

3. Place the sheets, one at a time, on the viewing box and inspect carefully. Count and circle each dirt speck of over 0.04 mm² in area using the dirt comparison chart for reference. Turn the sheet over and count any specks which may have been missed in the first count. Unlike T 213, however, where dirt is counted twice if it appears on both sides of the sheet, do not count any specks twice.

**Report**

Report dirt count as the total number of dirt specks of over 0.04 mm² size per gram of moisture-free pulp. Thus, if four sheets were counted, the total specks counted were 47, and the gross weight of the four sheets was 6.25 g, the dirt count reported will be 47 / 6.25, or 7.5. Report to the nearest 0.1 unit.

**Precision**

Tests using this procedure may vary as much as 50% from each other.
Keywords

Pulps, Dirt, Dirt count, Light, Transmittance

Additional information

Effective date of issue: April 1, 2015;

Additional information for the measurement of foreign materials in pulp by transmitted light can be found in the following paper: “Foreign Material in Pulp by Transmitted Light,” D.J. Anderson, 1968 TAPPI Testing Conference, TAPPI PRESS, Atlanta, GA.

Working Group: In 2010, a task force of the Quality and Standards Management Committee reviewed Useful Methods, and chose this UM as a method to retain in the new set of Useful Methods. Inclusion of this UM indicates that the Task Force deemed this method to meet the general requirements for a Useful Method as found in the newly published UM guidelines. No specific recommendation for its use for any specific testing application is meant or implied. This Useful Method originated prior to 1991. The original author(s) are unknown.

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Your comments and suggestions on this Useful Method are earnestly requested and should be sent to the TAPPI Standards Department.