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Sampling and testing wood pulp shipments for moisture

1. Scope

Most woodpulp is shipped sheeted or baled. Some pulp is shipped in rolls or as wet lap. Sampling and testing for moisture content and determination of air-dry weight of pulp shipped in these forms is described. This method is unsuitable for determining moisture content of flash-dried baled pulp.

2. Definitions

Woodpulp is sold on an “air-dry” basis, which is defined as pulp containing 90% oven dry fiber and 10% moisture. Regardless of the moisture content of any pulp shipment, the weight of air-dry pulp is calculated and the shipment invoiced on this air-dry basis.

3. Significance

Buyers and sellers of woodpulp require an effective official method of determining the total air-dry weight of pulp shipments. In the event of dispute, an independent analyst would use this official procedure to test the shipment.

Approved by the Standard Specific Interest Group for this Test Method



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4. Apparatus

4.1 *Sampling tool*¹. A boring tool which cuts into a bale or roll to a depth of 75 mm (3 in.), cutting disks about 100 mm (4 in.) in diameter.

4.2 *Template*. For the wedge method, a template is desirable with an apex angle of 24°. This is preferably made of brass and should have a length of about 460 mm (18 in.).

4.3 *Laboratory scale*. The scale used for weighing the pulp sample shall show a sensitivity of 0.1%. For example, if 1 kg (2.2 lb) of pulp is taken, the scale must show a decided deflection by the addition of 1 gram to the load.

4.4 *Mill scale*. The scale for weighing pulp bales will be accepted as accurate: (1) when verified by standard test-weights; or (2) when verified by weighing a measured volume of water.

4.4.1 The scale for weighing bales shall be provided with 0.5-kg divisions, and shall have such accuracy that after having been balanced, it shows a variation of not more than 0.5 kg when a 500 kg reference weight is upon it and the load manually increased and decreased temporarily.

4.4.2 Railroad scale, tested for accuracy.

4.4.3 Truck scale, tested for accuracy.

4.5 *Drying oven*. Any suitable laboratory drying oven with good ventilation may be used for drying the sample to constant weight. A temperature recorder is recommended to measure the temperature throughout the test. The temperature throughout the oven shall not exceed 108°C at any time during the test, and shall be maintained at $105 \pm 2^\circ\text{C}$ during the last two hours of drying time.

4.6 *Sample can(s)*. Metal can(s) with tightly fitting cover(s). The tare weight of each can shall be determined if used in weighing the sample, or portion of the sample.

5. Sampling

5.1 No one method of sampling is suitable for all the different forms of pulp. However, select bales or rolls to be sampled at random throughout the shipment being tested. A full description of each sampling method and its application is included under the procedure to which it applies.

5.1.1 *Boring method*. The boring method, while well adapted to the sampling of baled pulp and roll pulp, is not suited to the sampling of wet-lap pulp or pulp below 80% air-dry.

5.1.2 *Wedge method*. The wedge method is particularly suitable for sampling wet lap pulp. However, the wedge method, or any other method which involves the breaking open of bales, is not well suited for referee sampling of pulp at dock, since transportation companies decline to handle broken bales, and re-baling with an ordinary handpress is not practical.

5.2 *Sample size*. Sufficient and representative test specimens must be taken to insure a fair average of the shipment. Number to be taken is described later under 6.2.1.1, 6.2.2.1, and 6.3.1.1. Representative sampling becomes difficult and more test specimens may have to be taken if bales or rolls from lots of different moisture levels are combined in a shipment. (Pulp shippers typically avoid combining lots of widely different air-dry percentages.)

5.3 *Bale or roll condition*. Do not make tests on pulp which has been unduly exposed to the weather or other unusual conditions of moisture or heat, except by special agreement between shipper and consignee. In all cases of dispute, keep the shipment intact if possible and in no case present less than 50% of the shipment for test.

6. Procedure

6.1 *Determination of gross weight of pulp*.

6.1.1 Rules for determination of the total gross weight of pulp shipments are just as important as the rules for sampling and testing to determine average moisture content. Determine the gross weight by one of the following methods:

6.1.1.1 *Railroad weight*. Determine railroad weight of an entire car by uncoupling it and weighing it separately. Similarly determine the tare of the empty car. Do not use the routine bill of lading railroad weight, but an actual weighing upon a railroad scale properly supervised. (Weight of an entire car lot as certified by official weighmaster's

¹ Names of suppliers of testing equipment and materials for this method may be found on the Test Equipment Suppliers list in the bound set of TAPPI Test Methods, or may be available from the TAPPI Quality and Standards Department.