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T \_\_\_\_\_ 240 \_\_\_\_\_

BALLOT NO. \_\_\_\_\_ 2 - SARG \_\_\_\_\_

DRAFT NO. \_\_\_\_\_ 2 \_\_\_\_\_

DATE \_\_\_\_\_ October 22, 2024 \_\_\_\_\_

WORKING GROUP  
CHAIR \_\_\_\_\_ Don Guay \_\_\_\_\_

SUBJECT  
CATEGORY \_\_\_\_\_ Pulp Properties \_\_\_\_\_

RELATED  
METHODS \_\_\_\_\_ See "Additional Information" \_\_\_\_\_

**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 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.

## **Consistency (Concentration) of Pulp Suspensions** *(Five-year review of Official Method T 240 om-19)* (Changes from Draft 1 shown through strikethroughs/underlines)

### **1. Scope**

- 1.1 This method describes the measurement of pulp consistency (concentration) of aqueous fiber suspensions.
- 1.2 The method applies to most pulps sampled from different process points in a pulp or paper mill.
- 1.3 The method is applicable to pulps with up to 25% consistency.

### **2. Summary**

A known weight of pulp suspension is filtered in a Büchner funnel. Fibers and other suspended matter are retained on an oven dried, pre-weighed filter paper. After drying to constant weight at  $105 \pm 3^\circ\text{C}$ , the oven-dry weight of the retained matter is determined and calculated as the percentage of original pulp suspension weight.

### **3. Significance**

Determination of pulp consistency is the starting point for the quantitative analysis of many other pulp characteristics. Furthermore, it provides the basis for mass balance and yield evaluation in a pulp and paper mill.

#### 4. Definitions

4.1 Pulp suspension: aqueous fiber suspension that may contain fillers, additives, contaminants, and other non-fibrous components.

4.2 Pulp consistency: the weight percentage of oven-dry matter accounting for the total weight of the pulp suspension.

#### 5. Apparatus

5.1 *Sampling cup*, 200 mL, wide mouth with a smooth lip

5.2 *Beaker*, 600 mL

5.3 *Dilution container*, 10-40 L

5.4 *Mechanical stirrer for mixing*, [such as a stand/plate mounted, top entry mixer](#)

5.5 *Balances*, 40-kg capacity, accurate to 50 g; 2-kg capacity, accurate to 0.1 g; 100-g capacity, accurate to 0.005 g

5.6 *Büchner funnel*, 150-mm diameter, and filtration flask, 2000 mL

5.7 *Filter paper*, ashless, with coarse pore sizes, 150 mm in diameter.

5.8 *Drying oven*, with forced-air circulation, set at  $105 \pm 3^\circ\text{C}$

5.9 *Hot-plate type dryer*, set at  $150 \pm 5^\circ\text{C}$

#### 6. Sampling

6.1 When sampling according to the following procedure, always take the sample at the point of greatest agitation. For good sampling, a high degree of agitation is necessary as the uniformity of the pulp suspension is proportional to the degree of agitation. The accuracy of the method is very dependent on the sampling procedure.

6.2 When sampling from a mill stock line, chest, valve, or similar area, the number, frequency, and sampling technique should be representative of the process and source being sampled. When the representative sample of pulp suspension is obtained, store the sample in a cool area away from direct sunlight until the laboratory procedure is performed on the composite sample.

#### 7. Procedure

7.1 While rigorously mixing the sample, quickly withdraw three consecutive portions with a sampling cup and transfer the contents into a tared beaker. The total weight of the pulp suspension should be approximately 400 g, or a minimum of 1 gram oven-dry pulp. Clean the outside surface of the beaker if pulp has dripped on it. Weigh the pulp to the nearest 0.1 g.

7.2 If the pulp consistency is 1% or lower, go directly to the next step. If the pulp consistency is higher than 1%, dilution is required. Add the pulp suspension and a known amount of water to a dilution container. The amount of water added should be sufficient to dilute the pulp to less than 1% consistency. Mix the diluted pulp thoroughly. Then go back to 7.1 to take an aliquot from the diluted pulp.

7.3 Place a pre-weighed filter paper in the Büchner funnel and moisten it with water. Apply suction, then pour the pulp suspension into the Büchner funnel. Rinse the beaker with a small amount of water and add the rinsing to the funnel.

7.4 If the filtrate is cloudy, re-filter the filtrate until it becomes clear.

7.5 Remove the fiber pad along with the filter paper. Collect any fibers that stuck to the inner surface of the funnel. Dry the fiber pad and filter paper in an oven with forced-air circulation at  $105 \pm 3^\circ\text{C}$  for at least 2 hr to constant weight. Cool the pad in a desiccator. Weigh the pad to the nearest 0.01 g. If two successive readings, taken 30 minutes apart, do not differ by more 0.01 g, constant weight has been reached.

**NOTE 1:** For practical purposes, drying with a hot-plate type dryer to constant weight is often sufficiently accurate and it takes much less drying time.

**NOTE 2:** For pulps containing 10% or more filler, accuracy is affected due to filler loss. In addition, filtering is prolonged. In the case that filler content is so high that it is impossible to complete filtering within a reasonable amount of time, retention aids can be added. Alternatively, consistency can be measured with evaporation instead of filtering.

**8. Calculation**

8.1 For pulp suspension with 1% consistency or less,

$$C, \% = \frac{w-f}{b} \times 100$$

Deleted:  $C, \% = \frac{w-f}{g} \times 100$

in which,

$C$  = pulp consistency, %  
 $w$  = weight of the oven-dry pad and filter paper, g  
 $f$  = weight of the oven-dry filter paper, g  
 $b$  = weight of the original pulp, g

Deleted: g

8.2 For pulp suspension with higher than 1% consistency,

$$C, \% = \frac{w-f}{a} \times \frac{b+d}{b} \times 100$$

Deleted:  $C, \% = \frac{w-f}{a} \times \frac{g+d}{g} \times 100$

in which,

$C$  = pulp consistency, %  
 $w$  = weight of the oven-dry pad and filter paper, g  
 $f$  = weight of the oven-dry filter paper, g  
 $a$  = weight of aliquot of diluted pulp, g  
 $b$  = weight of the original pulp, g  
 $d$  = weight of the dilution water, g

Deleted: g

**9. Report**

Report the average pulp consistency of two determinations to three significant figures.

**10. Precision**

10.1 The following precision data is in accordance with the definition in TAPPI T 1200 "Interlaboratory Evaluation of Test Methods to Determine TAPPI Repeatability and Reproducibility."

10.2 Repeatability = 3%

10.3 Reproducibility = 7%

10.4 This precision data was derived from an interlaboratory evaluation by 6 laboratories on a 0.27% consistency bleached hardwood Kraft pulp. It is expected that these values would be larger for a higher consistency sample due to sampling difficulties.

**11. Keywords**

Pulp, Consistency, Concentration, Fibers, Dispersions

**12. Additional information**

12.1 Effective date of issue: **To Be Assigned.**

12.2 This method was first published in 1967 as a Suggested Method and became an Official Method in 1975; it was revised in 1981 and 1993. Minor editorial revisions explaining the reproducibility and the related methods were made in the 2012 version.

12.3 Related methods: ISO 4119 "Determination of Stock Concentration," International Organization for Standardization, Genève, Switzerland; PAPTAC D-16 "Consistency of Stocks," Pulp and Paper Technical Association of Canada, Montreal, Canada; SCAN C 17 "Stock Concentration," Scandinavian Pulp, Paper, and Board Testing Committee, Stockholm, Sweden.

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

