SCANDINAVIAN PULP, PAPER AND BOARD

TESTING COMMITTEE

Pigments

Brookfield viscosity of slurries

1 Scope

This SCAN-test Method specifies a procedure for the determination of the Brookfield viscosity of pigment slurries. It applies both to slurries used in papermaking as well as to similar slurries prepared in the laboratory. The Brookfield viscosity measured by this Method is an approximate value and should not be used as a measure of the dynamic viscosity.

2 Definitions

For the purpose of this Method, the following definition applies:

2.1 *Brookfield viscosity* – A measure of the rheological properties of a pigment slurry determined under the conditions specified in this Method.

3 Principle

The Brookfield viscosity of a pigment slurry is measured by a viscometer designed to determine the change in angular momentum (torque) required to maintain a specified rotational speed of a spindle when this is lowered into the slurry.

4 Apparatus

4.1 *Rotational-type viscometer* having an electric motor, a device with a scale showing the angular momentum in arbitrary units and a holder for the spindle. The motor shall give the spindle (100 ± 1) rotations/min.

If the viscometer has a guard leg to protect the spindle, this should be removed before measurements are made.

> *Note* – A suitable viscometer is available from Brookfield Engineering Laboratories Inc., 240 Cushing Street, Stoughton, Mass. USA.

4.2 *Set of spindles* for the viscometer, each marked to show the depth to which it should be dipped into the slurry.

4.3 *Water bath,* capable of maintaining a temperature of (23 ± 1) °C.

4.4 *Beaker,* of plastic, with an inner diameter exceeding that of the rotating spindle by at least 60 mm.

5 Preparation of sample

When storing the sample, protect it to avoid loss of moisture.

Mix the sample thoroughly, preferably with a mechanical stirrer, but make sure that no air is mixed into the slurry.

6 Procedure

Bring the water bath (4.3) to (23 ± 1) °C. Transfer a portion of the slurry to be tested into the beaker and place the beaker in the water bath.

Mount a suitable spindle in the viscometer. The spindle should be selected so that the reading of the viscometer is obtained near the upper limit of the scale, taking care not to exceed this limit.

When a temperature of (23 ± 1) °C has been attained, lower the spindle into the slurry to the depth indicated by the mark. Check that the rotational axis of the spindle is vertical and in the centre of the beaker.

Start the motor and let the spindle rotate. Read and record the value on the scale after 30 s, make three such determinations.

If the difference between the maximum and the minimum reading exceeds 3 % of the full scale, repeat the measurements.

7 Calculation

Calculate the mean of three readings and then calculate the Brookfield viscosity using the expression

$$X = 1000\, a\, f \qquad\qquad [1]$$

X = the Brookfield viscosity of the slurry, in millipascal seconds;
a = the mean reading obtained for the slurry;
f = the calibration factor for the spindle.

Note − The calibration factor is normally determined by the manufacturer of the viscometer. It can be checked by making measurements in liquids of known Brookfield viscosity.

8 Report

The report shall include reference to this SCAN-test Method and the following details:

(a) time and place of testing;
(b) identification mark of the sample;
(c) the type and make of viscometer and spindle used;
(d) the result, in millipascal seconds;
(e) any departure from the procedure described in this Method and any other circumstances that may have affected the result.