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SCANDINAVIAN PULP, PAPER AND BOARD
TESTING COMMITTEE

Fillers and Pigments

Coarse particle content

Wet-sieving method

1 Scope

This SCAN-test Method specifies a method for determining the residue after wet sieving of fillers and pigments to be used in the manufacture or coating of paper. The sieve residue consists of undesirable coarse particles which may be the result of defective grinding of the material during manufacture or of contamination during storage and transport.

The Method is intended primarily for clay, dry or as a slurry , but it can be applied to other fillers or pigments.

The sampling procedure is not covered by this Method.

2 Reference

SCAN-P 39 Fillers and pigments – Dry matter content

3 Principle

The sample is dispersed in water and sieved through a 45 μm sieve. The sieving is assisted by a stream of cold water and a brush. The residue is collected and weighed. The dry matter content is determined separately.

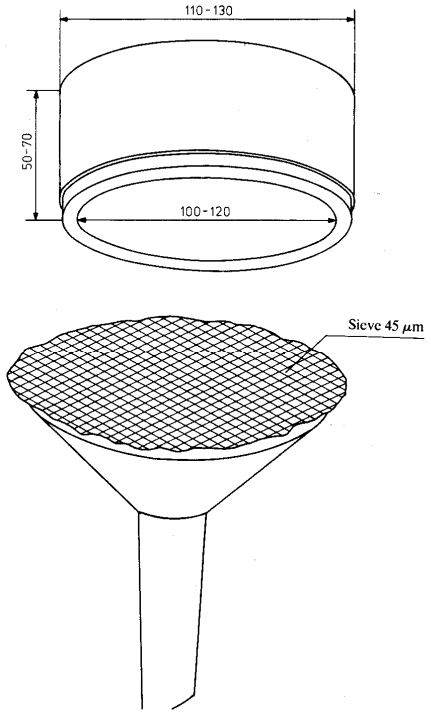

Fig. 1 An example of a suitable sieving device

4 Apparatus

4.1 *A plastic Buchner funnel* with separate upper and lower parts. The base of the upper part is cut away leaving a narrow lip at the bottom. The sieve is fastened between the upper and lower parts of the funnel by pushing the two parts together, *Fig. 1*.

> *Note* – Suitable funnels may be obtained from Kartell Co, Via delle Industrie, 20082 Naviglio, Milano, Italy.

4.2 *Metal sieve,* circular, somewhat larger than the funnel, aperture 45 μm.

4.3 *Brush,* width 10 mm–20 mm of the flat type commonly used for painting.

4.4 *Rubber tube,* soft, connected to a water tap.

4.5 *High speed laboratory mixer,* for example a Waring blender or a Top Drive Macerator. In most cases, when the pigment is free from hard lumps, an efficient kitchen mixer can be used.

5 Reagents

5.1 *Sodium hydroxide solution*, about 1 mol/l.

5.2 *Dispersing solution*. A suitable dispersing agent is the sodium salt of a polycarbonic acid. For clay it is also possible to use a 10 % solution of sodium hexametaphosphate.

5.3 *Defoaming agent* (only required for testing of talc).

6 Preparation of sample

Perform at least two parallel determinations. Weigh out a sample of pigment equivalent to about 200 g of dry substance. At the same time, weigh out another sample for a dry matter determination in accordance with SCAN-P 39.

Add the pigment gradually, while stirring by hand, to 500 ml of water, and then add sodium hydroxide solution (5.1) drop wise until the pH of the slurry exceeds 7. Add an optimal amount of dispersing agent (5.2) (usually equivalent to 0,3 % by weight of dry pigment). Start the mixer and continue to disperse until the pigments is fully dispersed – at least 3 minutes. If persistent lumps are evident on visual inspection of the dispersion, prepare new dispersions with a higher consistency.

When testing a slurry, adjust the pH to a value greater than 7, add dispersing agent if needed and proceed as above.

7 Procedure

Weigh the sieve (4.2) to the nearest 0,1 mg and fit it into the funnel (4.1). Mix and dilute the dispersion with 500 ml of water. Pour the dispersion in small portions through the centre of the sieve. Rinse the vessel used for the dispersion with water into the sieve and wash the residue on the sieve with the assistance of the brush (4.3) and a low velocity water jet (obtained by pinching the tip of the rubber tube between the fingers). Continue washing until the filtrate runs clear and free from any particles. Finally rinse the brush over the sieve and check that no particles adhere to the bristles. Remove the upper part of the funnel and carefully wash away any particles which may have remained under the bottom lip of the funnel.

> *Note 1* – If foaming occurs add a few drops of defoaming agent (5.3) during the dispersion. When testing talc, always add defoamer before dispersing.

Dry the sieve and the residue in an oven at 105 °C. Place the sieve in a desiccator and allow it to cool to room temperature. Weigh the sieve and the residue to the nearest 0,1 mg.

> *Note 2* – Wash the sieve carefully after use. Immerse it in warm water to which detergent has been added. Rinse it from both sides with a stream of water. The sieve must be checked with the aid of a magnifying glass after every determination and renewed when it gets plugged.

If the residue is intended for microscopic examination, do not let it dry on the sieve. In this case, wash the residue from the sieve onto a watch glass before drying, and let the water evaporate in the oven at 105 °C. Weigh the watch glass and the residue.

8 Calculation

Calculate the content of coarse particles from the expression:

$$x = \frac{100a}{f\ m} \qquad [1]$$

where
a = the mass of the residue on the sieve, in milligrams;
m = the mass of the sample, in grams;
f = the dry matter content of the sample, in per cent;
x = the coarse material content, in grams per kilograms.

Calculate the mean. Report the result to the nearest 0,1 g/kg.

9 Report

The test report should include reference to this SCAN-test Method and the following particulars:

(a) date and place of testing;
(b) identification mark of the material tested;
(c) the results;
(d) any departure from the procedure described in this Method or any other circumstances that may have affected the results.

10 Additional information

This Method corresponds in principle to the method Merkblatt V /27.4/77 *Prüfung von Füllstoffen und Pigmenten fur Papier, Karton und Pappe. Bestimmung des Nassiebrückstandes*, except that in the latter method the sieve is caused to vibrate. This Method deviates from TAPPI T 681-71 *Screen residue of paper coating clays and related pigments (High-speed mixer method)*, where no attempt is made to disperse agglomerates remaining on the sieve. It also deviates from ISO R 787 (1968) *General method of test for pigments. Part VII. Determination of residue on sieve (water method)*, in which a *63* μm sieve is used.

SCAN-test Methods are issued and recommended by KCL, PFI and STFI-Packforsk for the pulp, paper and board industries in Finland, Norway and Sweden.
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