

**Determination of
Potential Secondary Stickies
by Cationic Precipitation**

Introduction

Tacky contaminants are an important issue in producing and converting paper and board, mainly when using recovered paper as raw material. Secondary stickies – meaning stickies which are formed in the production process – are regarded as very critical.

Industrial processes normally show an anionic charge, unless moved into the cationic range by additives. In these anionic processes the potential secondary stickies can be measured by cationic precipitation.

There is a good correlation between the potential secondary stickies and problems arising from the secondary stickies, particularly when the gravimetric result is completed by a judgement of the shape and tackiness of the precipitate.

1 Scope

The test method covers the analysis of Potential Secondary Stickies by cationic precipitation. It is applicable for pulp and water samples in industrial processes for the production of paper and board. The consistency of the sample should not be higher than 5%.

2 Terms and definitions

Potential Secondary Stickies (PSS): Refer to the Zellcheming Technical Leaflet RECO 1, 1/2006 “Terminology of Stickies”

3 Principle

The pulp or water sample which should be analysed must be separated from coarse particles in order to ensure that the precipitation chemical is not consumed for the flocculation of fibres.

The dosage of the precipitation chemical is depending of the paper or board production process.

The result of the analyses is the PSS-Index. This Index is calculated by the amount of precipitate, its shape and its tackiness. The shape and the tackiness are assessed visually and factors are allocated. The amount of the precipitate is multiplied with these two factors.

4 Equipment and auxiliaries

- Plastic measuring jug 2,0 l
- One way syringes or pipettes 5 and 20 ml
- Household mixer
- Precision balance (accuracy 0,1 g)
- Analytical balance (accuracy 0,0001 g)
- Büchner funnel with suction bottle and vacuum pump
- Filter paper, e. g. Schleicher & Schüll Typ 589/2
- Exsiccator
- Precipitation chemical Nalco 74508
- Drainage wire of a Schopper-Riegler freeness tester (or corresponding device) wire wideness 150 µm
- Sheet dryer
- Drying cabinet
- Glass beaker 600 ml
- Potato press (optional)

5 Procedure

5.1 Sample and material preparation

5.1.1 Filter Paper

The filter paper is dried until the absolutely dry point. When cooling the filter papers in the exsiccator, the amount should be limited to 5 pieces in order to maintain a correct result of the weighing.

5.1.2 Precipitation chemical

The precipitation chemical is prepared as a solution with a concentration of 0,5 % of commercial product. The solution is stable and can be used for about eight hours. 497,5 g of tap water are provided in a glass beaker and 2,5 ml precipitation chemical are added by means of a syringe during stirring. Stirring is done by using a household mixer at highest speed for two minutes.

5.1.3 Pulp and water sample

One litre of sample is filtrated by a drainage wire of a Schopper-Riegler freeness tester in order to receive a "pulp free sample". It is recommended to place this screen onto a plastic jug of 2 litres volume; normally the diameters fit.

If the consistency is higher than 20 g/l the filtration can be supported by a potato press.

5.2 Test Procedure

5.2.1 Sample volume

The volume to be tested should be 2 ml/cm² of filter area. By using filters with a diameter of 125 mm, these are 250 ml.

REMARK:

If the water system is closed sometimes the filtration speed can be very slow. The problem can be solved by reducing the sample volume to 0,8 ml/cm² filtration area, these are 100 ml at a filter diameter of 125 mm.

5.2.2 Control

The pulp free sample is filtered in a Büchner funnel with the appropriate filter paper. When the filtration is finished, the filter must be folded in half. In order to facilitate unfolding after drying it is recommended not to fold exactly edge onto edge. The drying time is 5 min in the sheet dryer, after this time, the filter must dry in the drying cabinet to the absolutely dry point.

5.2.3 Precipitation

For different production processes different dosages of precipitation chemical are needed:

- 0,1 g/l for graphic papers
- 0,3 g/l for packaging papers with open water circle
- 0,5 g/l for packaging papers with closed water circle

Dosages are based on concentration of precipitation chemical are delivered. For other production processes the amount of precipitation chemical has to be chosen accordingly.

The filtrate must be mixed with the precipitation chemical in a beaker. The beaker must be swung for 30 seconds. During swinging the beaker the shape of the precipitate should be judged. The further procedure is the same as with the control.

The filter paper with the precipitation product is unfolded after drying and weighing. During unfolding the tackiness is assessed.

5.3 Evaluation

The difference between control and precipitated samples is the precipitate m_p . The amount of precipitate is given as mg/l filtrated sample.

The shape of the precipitation product is assessed visually in four steps. For those the factor f_s is allocated:

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Table 1: Shape of Precipitate

Shape	f_s
No precipitation visible	1
Milky	2
Flakes	10
Chunk	20

The tackiness of the precipitate is graduated visually in five steps. For those the factor f_T is allocated

Table 2: Tackiness of Precipitate

Tackiness	Abbreviation	f_T	Description
not tacky	n. t.	1	Halves of filter pad do not stick at all or only by electrostatics
slightly tacky	s. t.	50	Only little separation force required or single tacky spots; no damage of filter paper
tacky	t.	100	Some force required; no damage of filter paper
very tacky	v. t.	500	Separation needs force, small damages of filter paper
extremely tacky	e. t.	1000	No separation possible or large damages of filter paper

For the calculation of the PSS-Index the following formula is used:

$$\text{PSS-Index} = m_P * f_s * f_T * 10^6$$

For displaying the results graphically is it recommended to use a logarithmic ordinate

6 Report

The test report should contain:

- Identification and description of the samples
- Date and time of sampling
- The quantity of the precipitation chemical used
- The resulting PSS-Index and the results of m_P , f_s und f_T
- Any deviations from this test method

7 References

7.1 Cited standards and methods

- Zellcheming Technical Leaflet RECO 1, 1/2006 "Terminology of Stickies",
http://www.zellcheming.com/download/merkblaetter/merkblatt_stickys_eng.zip

7.2 Sources

The first version of this INGEDE Method has been derived from the INGEDE Project 38 94 PTS/IfP "Development of methods for quantitative analysis of micro and macro stickies".

A predecessor of the original INGEDE Method 6 and of this revised version was developed by Steinbeis Temming Papier (STP), today Steinbeis Papier Glückstadt. Further advancement of the "STP-Method" was done by PTC Paper Technology Consulting, thus leading to this version.

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