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(JAPAN TAPPI/JSA)

**Pulps — Determination of drainability —
Part 2: “Canadian Standard” freeness
method**

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Foreword

This translation has been made based on the original Japanese Industrial Standard established by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee according to the proposal for establishment of Japanese Industrial Standard submitted by Japan Technical Association of the Pulp and Paper Industry (JAPAN TAPPI)/Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law.

Consequently **JIS P 8121:1995** has been withdrawn and partially replaced with this Standard.

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JIS P 8121 series consists of the following 2 parts under the general title “*Pulps — Determination of drainability*”:

Part 1: Schopper-Riegler method

Part 2: "Canadian Standard" freeness method

Pulps — Determination of drainability — Part 2 : “Canadian Standard” freeness method

Introduction

This Japanese Industrial Standard has been prepared based on the second edition of **ISO 5267-2** published in 2001 with some modifications of the technical contents.

The portions with dotted underlines are the matters in which the contents of the corresponding International Standard have been modified. A list of modifications with explanations is given in Annex JA.

1 Scope

This Standard specifies a method for determination of the drainability of a pulp suspension in water in terms of the “Canadian Standard” freeness in millilitres. In principle, this method is applicable to all kinds of pulp in aqueous suspension.

NOTE 1 Treatments which produce a large proportion of fines may induce an anomalous rise in freeness (false freeness), as a rule at values below 100 ml.

NOTE 2 The International Standard corresponding to this Standard and the symbol of degree of correspondence are as follows :

ISO 5267-2 : 2001 *Pulps — Determination of drainability — Part 2 : “Canadian Standard” freeness method* (MOD)

The symbols which denote the degree of correspondence in the contents between the relevant International Standard and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21-1**.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS P 8222 *Pulps — Preparation of laboratory sheets for physical testing*

NOTE : Corresponding International Standard : **ISO 5269-1** *Pulps — Preparation of laboratory sheets for physical testing — Part 1 : Conventional sheet-former method* (MOD)

JIS P 8225 *Pulps — Determination of stock concentration*

NOTE : Corresponding International Standard : **ISO 4119** *Pulps — Determination of stock concentration* (MOD)

ISO 14487 *Pulps — Standard water for physical testing*

3 Terms and definitions

For the purpose of this Standard, the following terms and definitions apply.

3.1 "Canadian Standard" freeness

volume, expressed in millilitres of the filtrate collected from the side orifice of the "Canadian Standard" freeness tester after correcting for the temperature and stock concentration of the sample under test

4 Principle

Draining, through a fibre mat formed during the test on a wire screen, of a given volume of pulp in aqueous suspension into a funnel provided with a bottom and a side orifice. Collection of the discharge from the side orifice in a measuring cylinder, expressed in millilitres, is taken as the "Canadian Standard" freeness of pulp.

5 Apparatus and water

Ordinary laboratory apparatus and water, and the following shall be used.

5.1 "Canadian Standard" freeness tester, as described in Annex A.

Instructions for maintenance of the apparatus are given in Annex B.

5.2 Measuring cylinders, calibrated in millilitres and capable of measuring volume with an error less than ± 1.0 ml for volumes up to and excluding 100 ml; an error less than ± 2.0 ml for volumes in the range of 100 ml to 250 ml; and an error less than ± 5.0 ml for volumes above 250 ml.

5.3 Balance, capable of reading accurately to 0.01 g.

NOTE : Although for the determination of the mass of the side orifice discharge a balance of 0.1 g accuracy is sufficient, for the determination of stock concentration the necessary accuracy of the balance is 0.01 g.

5.4 Standard water, for physical testing, as described in ISO 14487.

NOTE : In ISO 14487, the water purified so as to be not more than 0.25 mS/m in electrical conductivity at 25 °C is defined as the standard water.

6 Preparation of sample

As the drainage of a pulp suspension is affected considerably by dissolved solids and the pH of the water used in the determination, standard water in accordance with 5.4 shall be used throughout the test.

A sample of an aqueous suspension of the disintegrated pulp shall be taken. If the concentration is not known exactly, the suspension shall be thickened or diluted to approximately 0.32 % by mass using standard water, and the stock concentration determined in accordance with JIS P 8225. Then the suspension shall be diluted to a stock concentration of 0.30 % $\pm$ 0.01 % by mass and the temperature adjusted to 20.0 °C $\pm$ 0.5 °C (see NOTE 3). Throughout the preparation of the sample, care shall be taken to avoid the formation of air bubbles in the suspension.

NOTE 1 With time, an aqueous pulp suspension withdrawn from the stock preparation system or laboratory pulp evaluation equipment can undergo a change in freeness. To avoid the effect of this reversion phenomenon, pulp suspensions subjected to testing more than 30 min after sampling shall first be treated in the disintegration apparatus specified in JIS P 8220-1 for 6 000 revolutions of the propeller at 1.2 % to 1.5 % concentration.

NOTE 2 The test result is sensitive to the quantity of pulp fines, or "crill", in the suspension. Thickened pulp samples may lose some of this fibre fraction. To avoid such losses during the course of thickening, the filtrate shall be recirculated through the pulp pad until the filtrate is clear and the pulp redispersed by disintegration apparatus specified in JIS P 8220-1 as described in NOTE 1. This procedure shall be used to concentrate dilute pulp suspensions to the stock concentration required for the freeness test.

"Crill" refers to the fines which are produced when pulp is refined, and which include plenty of intercellular layer.

NOTE 3 Where necessary (e.g. process control), a temperature other than 20 °C may be used but it is not in accordance with this Standard and must be reported. The correlation tables presented in this Standard (Annexes C and D) were developed from groundwood freeness evaluation studies. The accuracy of the correction tables for chemical pulp freeness evaluation has not been determined.

When other pulp than ground wood pulp is tested, for the purpose of obtaining the accurate freeness, it is recommended that the concentration of solid content in stock is adjusted to 0.30 % $\pm$ 0.01 % and the temperature is adjusted to 20.0 °C $\pm$ 0.5 °C.

NOTE 4 In some applications (e.g. process control), it may be convenient to accept larger deviations than 0.01 % for stock concentration and $\pm$ 0.5 °C for temperature. The volume measured should be corrected with the aid of correction tables given in Annexes C and D. The result so obtained does not conform to this Standard.

7 Procedure

Clean the funnel and drainage chamber of the "Canadian Standard" freeness apparatus (see 5.1) thoroughly, and finally rinse with water. Place the drainage chamber in position. Adjust the temperature of the apparatus by rinsing with water at 20.0 °C $\pm$ 0.5 °C (see NOTE 3 in clause 6). Place the measuring cylinder (see 5.2) or a tared beaker (see NOTE in 5.3) in position to receive the discharge from the side orifice.

Whilst stirring, transfer 1 000 ml $\pm$ 5 ml of homogeneous pulp suspension to a clean measuring cylinder.

Close the bottom of the chamber of the freeness tester and open the top lid and the air-cock. Mix the sample by closing the top of the cylinder with the hand and invert the cylinder through 180° three times, without losing the stock. As much as possible, avoid introducing air into the stock at this stage.