AS/NZS 1301.206s:2015

Australian/New Zealand Standard™

# Methods of test for pulp and paper

# Part 206s: Freeness of pulp


This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee PK-019, Methods of Test for Pulp and Pulp. It was approved on behalf of the Council of Standards Australia on 30 March 2015 and on behalf of the Council of Standards New Zealand on 27 March 2015.
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Australian/New Zealand Standard™

# Methods of test for pulp and paper

# Part 206s: Freeness of pulp

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# PREFACE

This Standard was prepared by Joint Standards Australia/Standards New Zealand Committee PK-019, Methods of Test for Pulp and Paper, to supersede AS/NZS 1301.206s:2002.

This Standard prescribes one procedure for determining the drainage properties of pulp stock.

This revision has been made to align the Standard more closely with ISO 5267-2:2001, *Pulps—Determination of drainability*—Part 2: '*Canadian Standard*' *freeness method*. In particular, in the procedure, the extent of disintegration of the sample prior to measurement of freeness has been substantially reduced from the former 75 000 revolutions. Further, because several different designs of test equipment have been in common use, this revision permits either of two designs to be used, but requires that the test report specify which design was utilized for the test.

The terms 'normative' and 'informative' have been used in this Standard to define the application of the appendix to which they apply. A 'normative' appendix is an integral part of a Standard, whereas an 'informative' appendix is only for information and guidance.

# CONTENTS

*Page*

# FOREWORD

This Standard prescribes the procedure to be used in measuring the freeness of pulp, which is an arbitrary measure of the drainage properties of pulp stock.

The freeness test described in this Standard is designed to provide a measure of the rate at which a dilute suspension of pulp is dewatered under specified conditions. It has been shown that the drainability is related to the surface conditions and swelling of the fibres, and constitutes a useful index of the amount of mechanical treatment to which the pulp has been subjected.

In principle, this method is applicable to all kinds of pulp in aqueous suspension.

The design of the instrument is such that the result is strongly influenced by the drainage rate in the initial stages of drainage. The result of the freeness test depends mainly on the quantity of fines and debris present[1] and on the degree of fibrillation of fibres, their flexibility and their fineness.

The test was originally designed to yield information for the control of the manufacture of groundwood pulp, but it is also used in studies of the behaviour of various pulps during beating, and in the control of beaters and refiners. Freeness measurements do not necessarily correlate with drainage behaviour on the wire of a paper machine.

In this method stainless steel is listed as a preferred material of construction for some components of the freeness tester. Certain stocks will corrode bronze, and corrosion effects on screen plates, orifice pieces and side tubes change the performance of the instrument. In addition, some stocks readily give rise to deposits at these places, and it is convenient to be able to clean the parts by drastic chemical methods such as are permissible with a corrosion resistant material.

This Standard is similar to, but not identical with, ISO 5267-2:2001, *Pulps—Determination of drainability*—Part 2: *'Canadian Standard' freeness method*. A similar method is TAPPI T221cm–09, *Drainage Time of Pulp*.

Freeness is different from drainage time which is covered by TAPPI method T221cm-09om-93. Another method for measuring drainability is the Schopper-Riegler method. Schopper-Riegler freeness is different from Canadian Standard Freeness. There is no AS/NZS Standard for the Schopper-Riegler method. However, it is described in ISO 5267-1:1999, *Pulps—Determination of drainability*, Part 1: *Schopper-Riegler method.*

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# Australian/New Zealand Standard
# Methods of test for pulp and paper

## Part 206s: Freeness of pulp

## 1 SCOPE

This Standard specifies the procedure to be used in measuring the freeness of pulp.

## 2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard.

NOTE: Bibliographic references are indicated in the text by superscript reference numbers (e.g. [1]) and the documents are listed in Appendix E.

| | | |
|---|---|---|
| AS/NZS | | |
| 1301 | Methods of test for pulp and paper | |
| 1301.207s | Part 207s: | Determination of stock concentration |
| 1301.214s | Part 214s: | Equipment for preparation of handsheets |
| ISO | | |
| 5267 | Pulps—Determination of drainability | |
| 5267-2 | Part 2: | ‘Canadian Standard’ freeness method |

## 3 PRINCIPLE

A specified volume of stock drains from a cylindrical chamber into a cone with two orifices, one at the side and one at the bottom. The volume of water which passes through the side orifice is measured. This volume, measured in millimetres, and corrected if the temperature and concentration of the stock is different from that specified, is the freeness.

## 4 APPARATUS

### 4.1 Freeness tester

Consisting of a drainage chamber (cylinder) and a rate measuring funnel mounted on a vibration free support so that their axes of symmetry are vertical and coincide, and the top of the funnel is 180 ±15 mm below the bottom of the screen plate attached to the cylinder. Except where stated otherwise, the components of the tester may be fabricated from stainless steel or phosphor bronze or from metal wholly plated with nickel or hard chrome. The drainage chamber consists of a cylinder closed at the top with a rigid lid capable of providing an air-tight closure. The inside surface of the lid is fitted with a thick rubber gasket ring. An air-cock is provided in the centre of the lid as a means of admitting air to the cylinder. The bottom of the cylinder is fitted with a perforated screen plate, preferably fabricated from stainless steel, but brass may be used. Stainless steel shall conform in composition to AISI Type No 316 or similar. The screen plate is held in place by the flange of a ring which is screwed on to the bottom of the cylinder. The bottom of the cylinder is closed with a rigid bottom lid, which is covered with a thick soft rubber gasket which fits against the flange holding the screen plate in position.

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