

Australian/New Zealand Standard™

Methods of test for pulp and paper

**Method 421: Determination of pH of
aqueous extracts—Cold extraction
method**



AS/NZS 1301.421:2008

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee PK-019, Methods of Test for Pulp and Paper to supersede AS/NZS 1301.421s:1998, *Methods of test for pulp and paper, Method 421s: Determination of the pH value of aqueous extracts of paper, board and pulp—Cold extraction method*.

The objective of this Standard is to specify a method for the determination of the pH-value defined by the electrolytes extractable by cold water from a sample of paper, board or pulp.

This Standard is identical with and has been reproduced from ISO 6588-1:2005, *Paper, board and pulps—Determination of pH of aqueous extracts—Part 1: Cold extraction*

The term ‘informative’ has been used in this Standard to define the application of the annex to which it applies. An ‘informative’ annex is only for information and guidance.

As this Standard is reproduced from an International Standard, the following applies:

- (a) Its number does not appear on each page of text and its identity is shown only on the cover and title page.
- (b) In the source text, ‘this part of ISO 6588’ should read ‘this Australian/New Zealand Standard’.
- (c) A full point should be substituted for a comma when referring to a decimal marker.

The references to International Standards should be replaced by references to the following Australian/New Zealand Standards.

<i>Reference to International Standard</i>		<i>Australian or Australian/New Zealand Standard</i>	
ISO		AS	
186	Paper and board—Sampling to determine average quality	1301	Methods of test for pulp and paper
		1301.417s	Method 417s: Sampling paper, board and pulp for testing
3696	Water for analytical laboratory use—Specification and test methods	—	
7213	Pulps—Sampling for testing	—	

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INTRODUCTION

Kraft fibre is well known to contain ionisable groups that are fixed to or in the fibre wall. In order to fulfil the electro-neutrality, these groups are balanced by an equivalent number of positive charges, which can be either protons or various metal ions. Especially in pulp suspensions at low ionic strengths, this can give rise to a marked uneven distribution of mobile ions between the volume held by the fibre wall and the bulk suspension liquor. This means that the fibre acts as an ion exchanger. These ion-exchange phenomena can be modelled very well with the Donnan theory [2, 3].

If a relatively clean pulp fibre sample, for example bleached dried pulp, is diluted in deionised water, the result will be a pulp suspension with a very low ionic strength. In such a system, most of the cations present, including protons, will be concentrated in the water volume held by the fibre wall. If the pH is measured, it will be measured in the bulk suspension liquor. By adding salt to this kind of system, the ion exchange phenomena will be decreased, and the concentration of different cations will be the same in the water held by the fibre wall and in the bulk suspension liquor. Since the process waters always contain a certain amount of ions, such a salt addition will give a more realistic environment when measuring the pH of relatively clean pulp samples.

It is necessary to be aware of these effects when interpreting the measured pH-values of highly purified pulps.

AUSTRALIAN/NEW ZEALAND STANDARD

Methods of test for pulp and paper

Method 421:

Determination of pH of aqueous extracts—Cold extraction method

1 Scope

This part of ISO 6588 specifies a method for the determination of the pH-value defined by the electrolytes extractable by cold water from a sample of paper, board or pulp.

This part of ISO 6588 is applicable to all types of paper, board and pulp.

As the quantity of extractable ionic material approaches zero, as in the case of highly purified pulps, the precision of the method becomes poor because of the difficulties encountered in making pH measurements on water containing little electrolytic material.

Since the extraction in this part of ISO 6588 is performed with distilled or deionised water, the pH-value measured will sometimes be different (e.g. for fully bleached pulp) from the pH-value measured under mill process conditions in which various types of process waters, e.g. chemically treated river water containing electrolytes, are used.

ISO 6588-2 differs from this this part of ISO 6588 only as regards the extraction conditions. No general guidance can be given as to which of the two procedures (hot or cold) is best suited in a particular situation.

For cellulosic papers used for electrical purposes, the method used should be that given in IEC 60554-2 (see [4] in the Bibliography).

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 186, *Paper and board — Sampling to determine average quality*

ISO 3696, *Water for analytical laboratory use — Specification and test methods*

ISO 7213, *Pulps — Sampling for testing*

3 Principle

Extraction of a sample of 2 g for 1 h with 100 ml of cold water of high purity. Filtration of the extract and addition of a salt solution. Measurement of the pH-value of the extract at a temperature between 20 °C and 25 °C.