Australian/New Zealand Standard™

Methods of test for pulp and paper

Method 209s: Laboratory processing of pulp—PFI mill method

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The following are represented on Committee PK-019:

Appita Inc.
Australian Paper Industry Council
CSIRO Forestry and Forest Products
Forest Research (New Zealand)
National Association of Forest Industries
New Zealand Pulp and Paper Industry Association

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Foreword

This standard was prepared by Joint Technical Committee PK-019, Methods of Test for Pulp and Paper, as a part of AS/NZS 1301, *Methods of test for pulp and paper*.

This edition cancels and replaces AS 1301.209rp—1989.

Introduction

The PFI mill is a laboratory beater suitable for processing both hardwood and softwood chemical pulps. The mill can be used for processing other types of pulp but such processing may cause changes to the beating surfaces which are difficult to correct and which may affect the beating characteristics of the mill. Processing of pulp in the mill is a preliminary step in the preparation of test sheets for testing the physical properties of pulp. The number of charges of pulp beaten and the number of revolutions applied in each beating depend on the characteristics of the pulp and the information required from the evaluation.

The procedure is based on investigations in Australia[1] and on the practices and procedures existing in other countries.

This Standard when applied using an oven dry pulp charge of 30 ±0.5 g conforms to ISO 5264-2:1979. However the ISO Standard does not recognise the possibility of different patterns of usage for stainless steel mills.

Similar standards are: TAPPI T248 sp-00, PAPTAC Standard C.7 (1996).

Laboratory processing of pulp—PFI mill method

1 Scope

This standard sets out a procedure for the use of the PFI mill. Information on care and maintenance of the mill is given in annex A.

2 Normative references

The following standard contains provisions which, through references in this text, constitute provisions of AS/NZS 1301.209rp. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on AS/NZS 1301.209rp are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below.

AS/NZS
1301.214s:1993, Equipment for preparation of handsheets.

1301.457s:1992, Determination of moisture content in paper, board and pulps.

3 Principle

A measured amount of pulp of specified stock concentration is beaten between a roll with bars and a smooth beater housing, both rotating in the same direction, but at different peripheral speeds.

4 Apparatus

4.1 PFI mill, which consists of a roll, a beater housing and a loading device to provide the beating load. The roll and housing, which may be either phosphor bronze or stainless steel, rotate on vertical shafts.[2] The roll has 33 bars, each 50 ±0.1 mm long and 5.0 ±0.1 mm wide. The bars are arranged radially and are parallel to the roll axis. The diameter of the roll, measured across the bars, is 201 ±1 mm and the depth of the cavities between the bars is 30 ±1 mm. The roll is driven by an electric motor of about 1 kW and the rotational frequency when no pressure is applied must be 24.3 ±0.5 s^{-1}. The number of revolutions of the roll is indicated by a counter.

The beater housing has an inner diameter of 250 ±0.5 mm and an internal height of 52.1 ±0.1 mm. The housing is driven by a motor of not less than 400 W at a speed such that the difference in peripheral speed between the beating elements at zero load is 6.0 ±0.2 m/s. For example, at a rotational frequency of the roll of 24.3 s^{-1}, the rotational frequency of the beater housing must be 11.8 ±0.3 s^{-1}. Both the roll and the beater housing are driven by means of belt transmissions.

The beating load is produced by weights or by means of a PLC (‘programmable logic controller’) using pneumatic and electronic components applied to a lever which presses the roll against the pulp layer on the wall of the beater housing. The mill is equipped with a device, which includes a vernier adjusting screw, for regulating the distance between the roll and the housing.

NOTE 1 — The device for regulating the clearance between the roll and housing can be used for processing pulp, under non-standard conditions, when a fixed minimum clearance between roll and beater housing is required. It is also used when grinding in and conditioning the mill as described in annex A.

4.2 British disintegrator, fitted with a lid, as prescribed in AS 1301.214s.

4.3 Balance, of not less than 1 kg capacity and capable of weighing 1 kg with an accuracy of ±0.2 g.