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BSI Standards Publication

Pulps — Guidelines for using laboratory refiners to simulate industrial low consistency refining

bsi.

National foreword

This Published Document is the UK implementation of ISO/TS 11371:2023. It supersedes PD ISO/TR 11371:2013, which is withdrawn.

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A list of organizations represented on this committee can be obtained on request to its committee manager.

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Pâtes — Lignes directrices relatives à l'utilisation de raffineurs de laboratoire pour simuler le raffinage basse consistance industriel

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 6, *Paper, board and pulps*.

This first edition of ISO/TS 11371 cancels and replaces ISO/TR 11371:2013, which has been technically revised.

The main changes are as follows:

— the focus lies exclusively on simulating industrial refining with laboratory refining;

— the basics of refining are further elaborated;

— Clause 3 has been updated;

— the refining procedures have been reviewed and detailed;

— the clause on pulp preparation and the two annexes have been removed.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

It is well known that the current standardized method (PFI mill method) for beating has only limited value in the evaluation of pulps. It was originally developed for quality control purposes and has no counterpart in real mill operations since the fibre property development is based on a different principle.

The biggest shortcomings are the following:

— The refining principle is different from mill-scale refining processes (controlled by energy consumption, refining intensity);

— No possibility to adjust refining parameters for specific pulps;

— No direct measure for specific energy consumption;

— Not consistent and correct usage of terms.

This well-known standardized method has good reproducibility and repeatability and the equipment is easy to handle. Nevertheless, many laboratories have replaced this method by the use of refiners enabling them to simulate industrial refining and to allow the evaluation of pulps for various mill-scale refining applications.

The objective of this document is to address the related topics by providing a common basis with regard to refining parameters, definitions, and procedures.

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Pulps — Guidelines for using laboratory refiners to simulate industrial low consistency refining

1 Scope

This document provides guidelines for the laboratory refining of various pulps intended for paper production including:

— Harmonization of terms and parameters for the simulation of industrial refining processes by laboratory refiners;

— Treatment of pulp samples in a (semi) continuous operation in contrast to the batch operation of laboratory beating equipment such as the PFI mill;

— Evaluation of fibres for papermaking, in particular chemical market pulps, under close-to-reality conditions in terms of refining intensity and refining energy consumption.

This document only considers refiners operating at low stock concentration, i.e. 3 % to 5 %.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1 Machine parameters

3.1.1
total load power
P_{tot}
power provided to the refiner during refining of a fibre suspension to modify fibre properties and overcome friction and the pumping effect

Note 1 to entry: It is expressed in kW.

3.1.2
no-load power
P_0
power required to overcome friction and the pumping effect measured in water or fibre suspension (at refining stock concentration) in defined conditions for flow and open gap

Note 1 to entry: It is expressed in kW.

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