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Paper and pulp — Deinkability test for printed paper product mixtures containing woodfree printed paper

Papier et carton — Essai de désencrabilité de mélanges de produits en papier imprimés contenant du papier imprimé sans bois

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Contents

Page

Foreword ..... **v**
Introduction ..... **vi**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **1**
4 Principle **2**
5 Equipment **3**
5.1 General equipment 3
5.2 Equipment for preparation and flotation 3
5.3 Equipment for specimen preparation 3
5.4 Equipment for analysis 4
6 Chemicals **4**
7 Procedure **5**
7.1 General 5
7.2 Sampling and sample preparation 6
7.2.1 General 6
7.2.2 Identification 7
7.2.3 Non-paper material/loose and glued inserts/insertions 7
7.2.4 Adhesive applications 7
7.2.5 Accelerated ageing 7
7.2.6 Breaking up of samples 7
7.2.7 Measurement of moisture 8
7.2.8 Measurement of ash content 8
7.2.9 Determination of the required amount of sample 8
7.3 Preparation of dilution water and chemicals 8
7.3.1 General 8
7.3.2 Preparation of dilution water 8
7.3.3 Preparation of chemicals 9
7.4 Pulp preparation 10
7.4.1 Pulping 10
7.4.2 pH requirement 10
7.4.3 Storage 11
7.4.4 Dilution 12
7.5 Flotation 12
7.6 Yield 12
8 Specimen preparation **13**
8.1 General 13
8.2 Filter pads 13
8.3 Membrane filters 14
8.4 Handsheets 14
9 Analysis **15**
9.1 General 15
9.2 Reflectance measurements 15
9.2.1 General 15
9.2.2 Reflectance factors 15
9.3 Filtrate darkening 15
9.4 Dirt particle measurement 15
9.4.1 Scanner 15
9.4.2 Procedure for dirt particle measurement 16
10 Test report **16**

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Annex A (normative) **Pulping devices** **18**
Annex B (informative) **Examples of flotation cells** **19**
Annex C (normative) **Testing the filtration time of filter papers** **20**
Annex D (informative) **Testing the pH of smaller sample amount** **21**
Annex E (normative) **Threshold value determination and size classification** **22**
Bibliography **23**

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Foreword

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

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

The types and sources of paper for recycling are manifold. The most significant grades by volume are packaging products from industry, trade and households, followed by graphic papers from households and to a lesser extent from offices. These printed papers are blends of a variety of individual products. Typical blends of graphic paper for recycling recovered from households contain a high content of mechanical-pulp based fibres and a minor amount of woodfree pulp fibres. Graphic paper for recycling originating from printing and converting operations is typically rather pure and may contain just one type of paper (mechanical-pulp based or woodfree). However, paper for recycling from printing and converting, as well as special grades, constitute only a minor share of the total volume of paper for recycling. Special grades (e.g. liquid packaging or label stock release liners) often require specific treatments during recycling and/or repulping.

When the blends of paper for recycling are predominantly mechanical-pulp based offset printed papers, a simple single-loop alkaline flotation deinking step can sufficiently remove the ink colorants from the paper fibres. ISO 21993 describes a simplified test method that can be used to predict the deinkability of printed paper products under alkaline conditions. However, ISO 21993 specifies testing 100 % of a printed paper product of interest, whether mechanical-pulp based or woodfree, even though the proportion of woodfree paper in a deinking mill using alkaline conditions is typically small. This can possibly lead to misleading results in that a poor assessment by ISO 21993, and any related scorecard associated with it, does not necessarily mean that a particular print product cannot be deinked when present in a mixture of post-consumer papers for recycling[1].

There is currently no test method which looks specifically at the case of woodfree printed paper as a small portion of the total blend, where the majority of the paper is mechanical-pulp based fibre[2][3][4][5]. An alternative test method, which uses a specific mixture of mechanical-pulp based and woodfree printed paper grades, can help differentiate between inks, printed papers and ink/paper combinations.

As an adjunct to the method in ISO 21993, this document describes a method for testing the deinkability of woodfree printed papers when incorporated as a small amount in a blend with mechanical pulp based printed papers. A mixture of woodfree and mechanical pulp based printed papers is more representative of typical post-consumer recycled paper streams. This approach can also support recycled paper collection from pre-consumer sources, where the amount of different grades can be controlled in the mill recipe, e.g., if woodfree printed paper is blended in at a small amount. The method described in this document, which uses a specified blend of mechanical pulp based and woodfree printed papers, has been developed to simulate the principal process steps for ink detachment and ink removal under standardised alkaline conditions at a laboratory scale. It gives an indication on how print product mixtures will perform in an industrial deinking operation where a high percentage of the printed paper for recycling comprises mechanical pulp-based fibres.

The method described in this document is not designed to model additional or alternative process steps, such as dispersing, post-flotation, washing and bleaching. Cleaning and screening stages, which are designed to remove impurities and unwanted materials in the industrial process, are also not included in this method. An alternative deinking test method with near-neutral or neutral flotation conditions can be more representative for printed papers consisting of mostly woodfree pulp fibres. However, the near-neutral or neutral flotation conditions are not within the scope of this document.

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Paper and pulp — Deinkability test for printed paper product mixtures containing woodfree printed paper

1 Scope

This document specifies a basic laboratory test method for deinkability of woodfree printed paper products as a mixture under alkaline conditions by means of single stage flotation deinking and fatty acid-based collector chemistry. The woodfree printed paper product of interest is tested as a mixture containing 10 % by weight of the woodfree printed paper with the balance comprising a mixture of printed wood-containing paper.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 187, *Paper, board and pulps — Standard atmosphere for conditioning and testing and procedure for monitoring the atmosphere and conditioning of samples*

ISO 638 (all parts), *Paper, board, pulps and cellulosic nanomaterials — Determination of dry matter content by oven-drying method*

ISO 1762, *Paper, board, pulps and cellulose nanomaterials — Determination of residue (ash content) on ignition at 525 °C*

ISO 2469:2024, *Paper, board and pulps — Measurement of diffuse radiance factor (diffuse reflectance factor)*

ISO 2470-1, *Paper, board and pulps — Measurement of diffuse blue reflectance factor — Part 1: Indoor daylight conditions (ISO brightness)*

ISO 3689, *Paper and board — Determination of bursting strength after immersion in water*

ISO 4119, *Pulps — Determination of stock concentration*

ISO 5269-1, *Pulps — Preparation of laboratory sheets for physical testing — Part 1: Conventional sheet-former method*

ISO 5269-2, *Pulps — Preparation of laboratory sheets for physical testing — Part 2: Rapid-Köthen method*

ISO 5631-1, *Paper and board — Determination of colour by diffuse reflectance — Part 1: Indoor daylight conditions (C/2°)*

ISO 12641-1:2016, *Graphic technology — Prepress digital data exchange — Colour targets for input scanner calibration — Part 1: Colour targets for input scanner calibration*

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/

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