SLOVENSKI STANDARD
SIST-TS CEN/TS 18345-3:2027

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Papir, karton in lepenka - Laboratorijska preskusna metoda za oceno sposobnosti recikliranja materialov in izdelkov iz papirja, kartona in lepenke - 3. del: Specializirani postopek recikliranja

Paper and board - Laboratory test method for recyclability assessment of paper and board-based materials and products - Part 3: Specialized recycling process

Papier und Pappe - Laborprüfverfahren zur Bewertung der Rezyklierbarkeit von Materialien und Produkten auf der Basis von Papier und Pappe - Teil 3: Spezielles Recyclingverfahren

Papier et carton - Méthode d'essai en laboratoire pour l'évaluation de la recyclabilité des matériaux et produits à base de papier et carton - Partie 3 : Procédé de recyclage spécialisé

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ICS:

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85.020	Postopki v proizvodnji papirja	Paper production processes

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Papier et carton - Méthode d'essai en laboratoire pour l'évaluation de la recyclabilité des matériaux et produits à base de papier et carton - Partie 3 : Procédé de recyclage spécialisé

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European foreword

This document (CEN/TS 18345-3:2026) has been prepared by Technical Committee CEN/TC 172 “Pulp, paper and board”, the secretariat of which is held by DIN.

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Introduction

The paper and paper board value chain is an example of circularity, displaying very high recycling rates.

Moreover, technical innovation is creating new products from paper and board-based materials which are intended to become paper and board for recycling after their use.

To maintain and further increase the sustainability and circularity of the paper and board value chain and to help EU Member States and other European countries meet high recycling targets[1], it is important to ensure that paper and board-based products are recyclable by the paper industry. A laboratory test method is needed for assessing the technical recyclability of these materials and products.

The test method in this document emulates the most common phases of the industrial processes to measure the main parameters of recyclability of paper and board-based products based on current knowledge and technology.

This makes it possible to:

— supplement the evaluation of recyclability required by EN 13430 with regard to paper and board-based products that are sent for recycling in the paper industry;

— guide eco-design, in terms of recyclability, of paper and board-based products currently in use, as well as new materials under development and new additives that can affect the recyclability of the final product;

— support declarations related to the recyclability of materials or products based on grading systems developed by third-party organizations and regulation.

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[1] Directives 2018/851/EU, 2018/852/EU set high recycling targets for municipal waste and paper-based packaging (85% by 2025, 90% by 2030).

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1 Scope

This document describes a laboratory test method for determining the key parameters for evaluating the level of technical recyclability of a paper-based material and product, emulating the relevant phases of paper and board mills with specialized recycling processes. This method applies to several specialized processes where different key parameters are determined depending on the type of a paper-based material and product (e.g. liquid packaging cartons).

The assessment of the technical recyclability is out of the scope of this document.

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.

EN ISO 187, *Paper, board and pulps — Standard atmosphere for conditioning and testing and procedure for monitoring the atmosphere and conditioning of samples (ISO 187)*

EN ISO 536, *Paper and board — Determination of grammage (ISO 536)*

EN ISO 638-1:2022, *Paper, board, pulps and cellulosic nanomaterials — Determination of dry matter content by oven-drying method — Part 1: Materials in solid form (ISO 638-1:2022)*

EN ISO 1924-3, *Paper and board — Determination of tensile properties — Part 3: Constant rate of elongation method (100 mm/min)*

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

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EN ISO 13130, *Laboratory glassware — Desiccators (ISO 13130)*

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

ISO 3310-1, *Test sieves — Technical requirements and testing — Part 1: Test sieves of metal wire cloth*

TAPPI/ANSI T275, *Pulps — Screening of pulp (Somerville-type equipment)*

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
paper
generic term for a range of materials in the form of a coherent sheet or web, excluding sheets or laps of pulp as commonly understood for paper making or dissolving purposes and non-woven products, made by deposition of vegetable, mineral, animal or synthetic fibres, or their mixtures, from a fluid suspension onto a suitable forming device, with or without the addition of other substances

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Note 1 to entry: Papers may be coated, impregnated or otherwise converted, during or after their manufacture, without necessarily losing their identity as paper. In conventional papermaking processes, the fluid medium is water; new developments, however, include the use of air and other fluids.

Note 2 to entry: In the generic sense, the term “paper” may be used to describe both paper and board as defined in this part of ISO 4046. The primary distinction between paper and board is normally based upon thickness or grammage, though in some instances the distinction will be based on the characteristics and/or end-use. For example, some materials of lower grammage, such as certain grades of folding boxboard and corrugating raw materials, are generally referred to as “board”, while other materials of higher grammage, such as certain grades of blotting paper, felt paper and drawing paper, are generally referred to as “paper”.

[SOURCE: ISO 4046-3:2016, 3.95]

3.2
board
cardboard
paperboard
generic term applied to certain types of paper frequently characterized by their relatively high rigidity

Note 1 to entry: In the generic sense, the term “paper” may be used to describe both paper and board as defined in this part of ISO 4046. The primary distinction between paper and board is normally based upon thickness or grammage, though in some instances the distinction will be based on the characteristics and/or end-use. For example, some materials of lower grammage, such as certain grades of folding boxboard and corrugating raw materials, are generally referred to as “board”, while other materials of higher grammage, such as certain grades of blotting paper, felt paper and drawing paper, are generally referred to as “paper”.

[SOURCE: ISO 4046-3:2016, 3.16]

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3.3
paper-based product
article, predominantly consisting of paper or board

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Note to entry: Moulded products are included.

3.4
semi-finished product
manufactured article ready for assembly for an end-use application

[SOURCE: ISO/TS 15791-2:2022, 3.8]

3.5
finished product
manufactured article ready for end-use

[SOURCE: ISO/TS 15791-2:2022, 3.2]

3.6
integrated components
packaging component, whether or not of the same material as, or distinct from, the main body of the packaging unit, that is integral to the packaging unit and its functioning, that does not need to be separated from the main body of the packaging unit in order to ensure the functionality of the packaging unit and that is typically discarded at the same time as the main body of the packaging unit, although not necessarily via the same disposal route

[SOURCE: REGULATION (EU) 2025/40]

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3.7
separate components
packaging component, whether or not from the same material as the main body of the packaging unit, that is distinct from the main body of the packaging unit, that needs to be disassembled completely and permanently from the main body of the packaging unit and that is typically discarded prior to and separately from the main body of the packaging unit, including packaging components that can be separated from each other simply through mechanical stress during transportation or sorting

[SOURCE: REGULATION (EU) 2025/40]

3.8
paper and board-based composite
material made of two or more components with different properties of which paper or board is the major one and which cannot be separated easily

3.9
recyclability
ability of a paper or board product to be recycled into new paper and board

3.10
technical recyclability
ability of a paper and board product to be recycled into new paper and board by means of an established recycling process

Note 1 to entry: The assessment of the technical recyclability is typically done by mimicking the recycling process by a suitable laboratory method and an appropriate assessment scheme.

Note 2 to entry: The term recyclability can also mean recyclability at scale.

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3.11
stock concentration
ratio of the oven-dry organic and inorganic mass of material that can be filtered from a stock sample to the mass of the unfiltered sample

Note to entry: The stock concentration is expressed as a percentage by mass [% (m/m)]

[SOURCE: EN ISO 4119:1995, 3.2]

3.12
polyAl
mixed polymer and aluminium fraction obtained after the LPC recycling process and typically recycled in a dedicated secondary step

Note to entry: PolyAl consists of a mixture of plastics (and plastics with aluminium) used as functional barrier materials, caps and closures in the liquid packaging carton

3.13
constant mass
mass of the test piece determined at the equilibrium condition after drying until the difference between two successive dryings and weighings, separated in time by at least half the initial drying period, does not exceed 0,1 % mass fraction of the test piece before drying

[SOURCE: EN ISO 638-1:2022, 3.2]

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3.14
paper and board mill with specialized recycling processes
mill equipped to treat special grades of paper and board for recycling

Note 1 to entry: Examples for such additional dedicated equipment are a horizontal high consistency drum pulper, a separate batch pulper with longer repulping time, flotation deinking cells, fine cleaners, hot dispersion, or special process- and waste-water systems.

Note 2 to entry: These processes can treat paper-based materials which cannot be handled in a conventional or flotation deinking process.

3.15
constituent
part from which a material or its components are made and which cannot be separated by hand or by using simple physical means

[SOURCE: ISO 18601:2013, 3.12 - modified by deleting “packaging” from the term and “packaging constituent” and by replacing “packaging” by “material” in the definition]

3.16
oven-dry mass
mass obtained on drying pulp at 105 °C ± 2 °C, until constant mass is reached

[SOURCE: ISO 801-3:1994]

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4 Principle

A sample of paper-based material or product is submitted to disintegration and screening in defined conditions. Amounts of reject are determined. Laboratory sheets are produced with the screening accept and certain quality parameters are determined. Filtrate from the stock after disintegration is analysed for dry content by determining the evaporation residue.

The complete process is described in a simplified manner in Annex A and Figure A.1.

5 Apparatus

The usual apparatus and, in particular, the following shall be used:

5.1 Analytical balance, with an accuracy of at least ±0,001 g.

5.2 Standard disintegrator, compliant with ISO 5263-1**.**

5.3 pH meter.

5.4 Filter paper grade 388, with diameter of 150 mm (basis weight 84 g/m^2, filtration speed 10 s/10 ml, deposition range 12 µm to 15 µm).

5.5 Büchner funnel, diameter 125 mm and 150 mm equipped with suction flask.

5.6 Refrigerator (optional), to store the filtrate**.**

5.7 Aluminium trays, for the determination of the evaporation residue.

5.8 Forced air convection oven, able to maintain the required temperatures (60 °C, 105 °C and 130 °C) with accuracy of ±2 °C.

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5.9 Somerville fractionator, compliant with TAPPI/ANSI T275**.**

5.10 Perforated screen plate, with 5mm hole diameter (for details see Annex B).

5.11 Stopwatch/timer.

5.12 Sample containers, beakers, buckets or barrels.

5.13 Filter paper grade 388, with a diameter of 125 mm (basis weight 84 g/m^2, filtration speed 10 s/10 ml, deposition range 12 µm to 15 µm).

5.14 Carrier boards and cover sheets, compliant with EN ISO 5269-2**.**

5.15 Desiccator, compliant with ISO 13130.

The desiccator should be filled with desiccant to such an extent that there is at least a 10 mm gap between the desiccant and the perforated plate, sieve or grid. The use of a drying cabinet is possible, but ensure that the results are the same.

The temperature and relative humidity in the desiccator shall be measured regularly before and after each test with a suitable measuring device. Each laboratory should maintain a constant value, otherwise the desiccant shall be regenerated.

No specific value is set for the temperature and relative humidity. The values are rather for checking the correct functioning of the desiccator and the desiccant and should be recorded and checked regularly before, during and after each test.

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5.16 Thickener, as described in Annex C, with a test sieve compliant to ISO 3310-1**.**

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5.17 Rapid Köthen sheet former, compliant with EN ISO 5269-2**.**

5.18 Metal plates (brass or steel), for adhesiveness test, weighing (3,7 ± 0,1) kg and with a diameter of 20 cm (corresponding to a pressure of 1,18 kPa).

5.19 LED light box, with a recommended LED light source of 5 500 K to 6 500 K (daylight range) and illuminance of at least 5 000 lx.

5.20 Glass bottle (optional), to store the filtrate**.**

5.21 Cutting mat, for photo documentation.

5.22 Balance, up to 2 kg with an accuracy of at least ±0,1 g.

5.23 Balance, up to 30 kg with an accuracy of ±5 g.

5.24 Digital thermometer, with an accuracy of ±0,1 °C.

5.25 Vacuum device, with a pressure difference ≥ 60 000 Pa.

5.26 Vacuum filtration unit, with 39 mm bottom inner diameter of the funnel.

5.27 Couching roller, compliant with EN ISO 5269-2**.**

5.28 Slotted screen plate, with 0,15 mm wide slots (for details see TAPPI/ANSI T275).

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