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ISO 12625-11

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Tissue paper and tissue products —

Part 11: Determination of wet ball burst strength

Papier tissue et produits tissues —

Partie 11: Détermination de la résistance à l'éclatement à l'état humide, méthode à la balle

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 12625-11 was prepared by Technical Committee ISO/TC 6, *Paper, board and pulps*, Subcommittee SC 2, *Test methods and quality specifications for paper and board*.

ISO 12625-11 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 172, *Pulp, paper and board*, in collaboration with Technical Committee ISO/TC 6, *Paper, board and pulps*, Subcommittee SC 2, *Test methods for quality specifications for paper and board*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

ISO 12625 consists of the following parts, under the general title *Tissue paper and tissue products*:

— *Part 1: General guidance on terms;*

— *Part 3: Determination of thickness, bulking thickness and apparent bulk density;*

— *Part 4: Determination of tensile strength, stretch at break and tensile energy absorption;*

— *Part 5: Determination of wet tensile strength;*

— *Part 6: Determination of grammage;*

— *Part 7: Determination of optical properties – Measurement of brightness and colour;*

— *Part 8: Water-absorption time and water-absorption capacity; basket-immersion test method;*

— *Part 9: Determination of ball burst strength;*

— *Part 11: Determination of wet ball burst strength;*

— *Part 12: Determination of tensile strength of perforated lines – Calculation of perforation efficiency.*

Introduction

This part of ISO 12625 is applicable to tissue papers and tissue products. In principle, application to other types of paper is possible, but is not covered by this part of ISO 12625.

Tissue paper and tissue products —

Part 11:
Determination of wet ball burst strength

1 Scope

This part of ISO 12625 specifies a test method for the determination of the resistance to mechanical penetration (ball burst strength procedure) of tissue paper and tissue products after wetting.

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

ISO 7500-1, *Metallic materials — Verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Verification and calibration of the force-measuring system*

ISO 12625-1, *Tissue paper and tissue products — Part 1: General guidance on terms*

ISO 12625-9:2005, *Tissue paper and tissue products — Part 9: Determination of ball burst strength*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12625-1 and the following apply.

3.1
bursting force
F_D
maximum force, that a test piece of a tissue paper or tissue product can withstand under the test conditions, applied at a 90° angle to its surface

[ISO 12625-9:2005]

NOTE 1 The bursting force is expressed in millinewtons (mN).

NOTE 2 ISO 12625-9:2005 measures the bursting force of the test piece in the dry condition and uses an inner clamping diameter of 89 mm. At the next revision it is intended to change this inner diameter to 50 mm.

3.2
wet bursting force
F_W
maximum force, that a wetted test piece of a tissue paper or tissue product can withstand under the test conditions, applied at a 90° angle to its surface

NOTE The wet bursting force is expressed in millinewtons (mN).

3.3
wet burst index
X_W
wet bursting force of the tissue paper or tissue product divided by the grammage of the conditioned sample determined by the standard method of test

NOTE The wet burst index is expressed in millinewton square metre per gram ($mN \cdot m^2/g$).

3.4
wet burst retention
W_R
ratio, expressed as a percentage, of the burst strength of the wet tissue paper or wet tissue product to the burst strength of the same tissue paper or tissue product in the dry and conditioned state

NOTE This definition is similar to the definition of wet tensile strength retention; see ISO 12625-5:2005.

4 Principle

A test piece of tissue paper or tissue product is rigidly clamped at the periphery between two concentric annular rings, then wetted with deionized water and submitted to a perpendicular force until penetration, applied by a ball of a hard, non-deformable, material moving at a constant speed.

5 Reagents

5.1 Deionized water, with a conductivity ≤ 0,25 mS/m at 25°C, in accordance with ISO 14487. The water temperature should be maintained during the test at the temperature used for conditioning and testing.

6 Apparatus

6.1 General

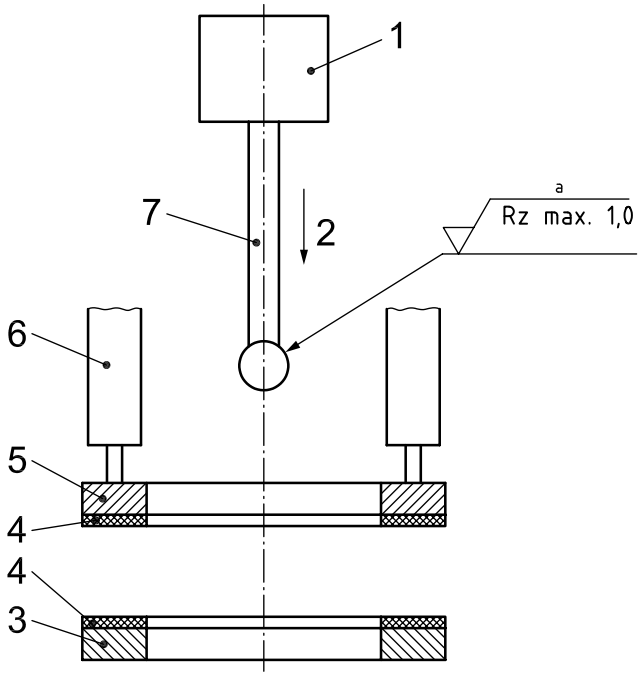
The apparatus shall be placed on a horizontal surface, free from externally induced vibrations.

6.2 Clamping system

The clamping system is designed to clamp the test piece firmly and uniformly between two concentric annular plane, parallel surfaces. The clamping rings can be activated mechanically or pneumatically.

The clamping pressure shall be sufficient to prevent slippage during the test, without damaging the test pieces.

The clamping surfaces of the clamping rings are coated with a commercial grade of a band made of rubber material, typically 1,0 mm to 2,0 mm thick, having an IRHD hardness (International Rubber Hardness Degree) of 70 IRHD to 85 IRHD. The inner edges of the coated band shall be coincident with the inner diameter of the clamping rings and be at least 12,5 mm wide. The internal diameter of the two concentric rings shall be (50,0 ± 0,2) mm. For an example of a pneumatic clamping system, see Figure 1.



Legend

1 load cell
2 travel
3 stationary ring
4 suitable band made of rubber (e.g. chloroprene rubber)
5 movable centre-ring
6 pneumatic cylinder
7 probe

a Polished ball.

Figure 1 — Principle of the clamping system, pneumatic fixture

6.3 Penetration system

The penetration (burst) system shall consist of a spherical ball attached to a rod designed to transmit the force applied to the ball. The penetration ball shall be made of highly polished stainless steel and shall have the following dimensions:

— diameter: (16 ± 0,2 mm);

— sphericity: better than 1 µm.

The penetration ball shall be centred with the annular clamps. It is permanently attached to the end of a solid hard rod designed to transmit the force applied to the ball.

6.4 Force measuring system

The force measuring system shall measure the loads with a class of machine range of 1 or better and shall be calibrated and verified in accordance with the requirements of ISO 7500-1.

The load cell system shall have a measuring range of 0,1 N to 15 N.

The readout system shall have a display that shows the maximum force at burst.