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Footwear — Test methods for stiffeners and toepuffs — Bondability

*Chaussures — Méthodes d'essai pour contreforts et renforts —
Aptitude au collage*

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Foreword

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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.

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ISO 20863 was prepared by the European Committee for Standardization (CEN) in collaboration with Technical Committee ISO/TC 216, *Footwear*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Throughout the text of this document, read “...this European Standard...” to mean “...this International Standard...”.

Annex ZA provides a list of corresponding International and European Standards for which equivalents are not given in the text.

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Foreword

This document (EN ISO 20863:2004) has been prepared by Technical Committee CEN/TC 309 "Footwear", the secretariat of which is held by AENOR, in collaboration with Technical Committee ISO/TC 216 "Footwear".

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2005, and conflicting national standards shall be withdrawn at the latest by June 2005.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

1 Scope

This document specifies a method for the determination of the bondability of heat activated and solvent activated stiffeners and toepuffs to upper and lining materials.

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.

EN 12222, *Footwear — Standard atmospheres for conditioning and testing of footwear and components for footwear*.

EN ISO 3696, *Water for analytical laboratory use — Specification and test methods* (ISO 3696:1987).

EN ISO 4048, *Leather — Determination of matter soluble in dichloromethane* (ISO 4048:1977).

EN 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 7500-1:2004).

3 Terms and definitions

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

bondability

aptitude of a material to be bonded to it self or to other material by applying pressure and/or heat and eventually adhesive.

4 Apparatus and materials

4.1 General

The following apparatus and materials shall be used.

4.2 Tensile testing machine with a jaw separation rate of 100 mm/min $\pm$ 10 mm/min, an appropriate force range (this will usually be less than 100 N), capable of measuring the force to an accuracy of better than 2 % as specified by class 2 in EN ISO 7500-1, which registers the force applied in terms of the displacement.

4.3 Press knife or other means of cutting rectangular test specimens of (150 mm $\pm$ 10mm) $\times$ (30 mm $\pm$ 2 mm).

4.4 Press with the following characteristics.

4.4.1 Heated plates which can maintain a pre-established temperature with a precision of $\pm$ 5 °C.

4.4.2 Operating pressure of 245 kPa $\pm$ 5 kPa (245 kPa are 2,5 kg/cm²).

4.5 Reference leather, full chrome splits (thickness of 1,5 mm to 1,7 mm) with a grease content of 4 % in total fat and 1 % in fatty acid (see EN ISO 4048).

4.6 Non-woven fabric, 150 g $\pm$ 20 g per square metre.

4.7 Water distilled or deionised complying with grade 3 of EN ISO 3696.

5 Sampling and conditioning

5.1 Method 1: Heat activated materials

5.1.1 Cut sufficient strips of $(150 \text{ mm} \pm 10 \text{ mm}) \times (30 \text{ mm} \pm 2 \text{ mm})$ from the sample and the corresponding strips of the same size from the non-woven fabric and the reference leather (4.5) or the material to be used.

5.1.2 Make a "compound test piece" of leather-sample-non-woven fabric. A strip of paper is placed on one of the short sides between the leather and the sample, so that 20 mm remain unstuck and so that the ends can be held in the jaws of the tensile testing machine.

NOTE The side of the material to be tested should be that in contact with the standard leather, i.e. the side that in the shoe will be in contact with the upper leather.

5.1.3 Unless the manufacture establishes the application conditions, follow the Clauses 5.1.4 and 5.1.5.

5.1.4 Place the compound test piece between both press plates heated to $70 \text{ }^{\circ}\text{C} \pm 5 \text{ }^{\circ}\text{C}$, and apply a pressure of $245 \text{ kPa} \pm 5 \text{ kPa}$ for 10 s.

5.1.5 Repeat the procedure described in sections 5.1.2 and 5.1.4 with the other test pieces and both press plates heated to $90 \text{ }^{\circ}\text{C} \pm 5 \text{ }^{\circ}\text{C}$, $110 \text{ }^{\circ}\text{C} \pm 5 \text{ }^{\circ}\text{C}$, $130 \text{ }^{\circ}\text{C} \pm 5 \text{ }^{\circ}\text{C}$ and $150 \text{ }^{\circ}\text{C} \pm 5 \text{ }^{\circ}\text{C}$, respectively.

5.1.6 Condition the set test pieces in a conditioned environment as specified in EN 12222 for 24 h.

5.2 Method 2: Solvent activated materials

5.2.1 Cut at least two strips of $(150 \text{ mm} \pm 10 \text{ mm}) \times (30 \text{ mm} \pm 2 \text{ mm})$ from the sample and two strips of the same size from the non-woven fabric and the reference leather (4.5) or the material to be used.

5.2.2 Activate the test specimen by applying acetone or other solvent (4.7) to it until it is uniformly wetted, then leave it for $2,5 \text{ min} \pm 0,5 \text{ min}$.

5.2.3 Make a "compound test piece" of leather-sample-non-woven fabric. A strip of paper is placed on one of the short sides between the leather and the sample, so that 20 mm remain unstuck and so that the ends can be held in the jaws of the tensile testing machine.

5.2.4 Unless the manufacturer establishes the application conditions, place the compound test piece between both press plates heated to $50 \text{ }^{\circ}\text{C} \pm 5 \text{ }^{\circ}\text{C}$, and apply a pressure of $245 \text{ kPa} \pm 5 \text{ kPa}$ for 10 s (245 kPa are $2,5 \text{ kg/cm}^2$).

5.2.5 Condition the set test pieces in a conditioned environment as specified in EN 12222 for 24 h.

6 Procedure

6.1 Fix the reference leather of the compound test piece in one of the jaws of the tensile testing machine and the end of the sample and the non-woven fabric in the other jaw.

6.2 Operate the tensile testing machine so that the jaw separates at a speed of $100 \text{ mm/min} \pm 10 \text{ mm/min}$.

6.3 Stop the tensile testing machine when half the length of the test piece has been unbonded.

6.4 Repeat the procedure described in 6.1, 6.2 and 6.3 with the other test pieces.

6.5 Submerge the part of the test pieces which are still bonded, in distilled water for 16 h.

6.6 Remove a test piece from the water, hold the free ends of the wet test piece in the jaws of the tensile testing machine and unbond the rest of the test piece.

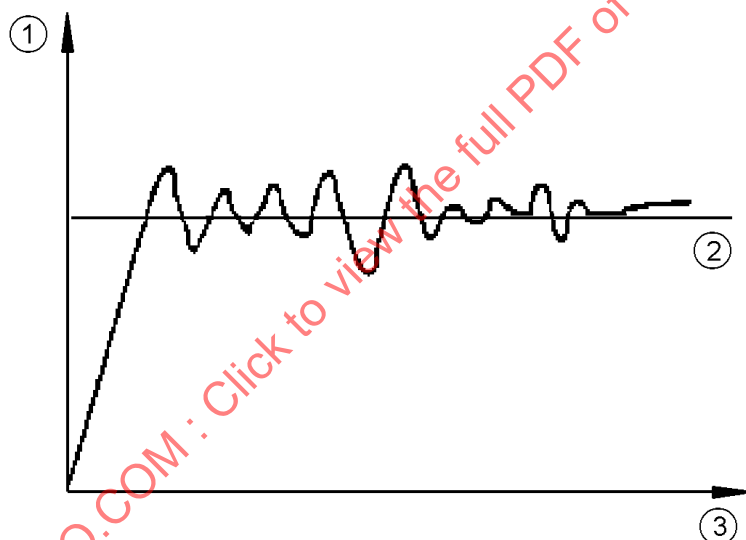
6.7 Repeat the procedure described in 6.6 with the other test pieces.

7 Expression of results

7.1 Dry bondability

7.1.1 Calculate the average value of force (see Figure 1) obtained for 6.3 and 6.4 for each one of the test pieces, in newtons.

7.1.2 Divide the average value of force obtained for each one of the test pieces by the width of the test piece, measured in millimetres, and express the dry bondability, in newtons per millimetre.



Key

- 1 Force, in N
- 2 Average
- 3 Deformation

Figure 1 — Example of diagram force/deformation

7.2 Wet bondability

7.2.1 Calculate the average value of force obtained for 6.6 and 6.7 for each one of the wet test pieces, in newtons.

7.2.2 Divide the average value of force obtained in each one of the test pieces by the width of the test pieces, measured in millimetres, and express the wet bondability in newtons per millimetre.