INTERNATIONAL STANDARD

ISO 17695

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Footwear — Test methods for uppers — Deformability

Chaussures — Méthodes d'essai des tiges — Déformabilités

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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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.

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 17695 was prepared by the European Committee for Standardization as EN 13513:2001. This International Standard includes corrigendum EN 13513:2001/AC:2003 and was adopted under a special "fast-track procedure" by Technical Committee ISO/TC 216, *Footwear*, in parallel with its approval by the ISO member bodies.

Figure 2 has been changed from that published in EN 13513:2001.

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

1 Scope

This European Standard specifies a test method for determining deformability of uppers or complete upper assembly, irrespective of the material, in order to assess the suitability for the end use.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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

prEN ISO 2418, *Leather - Chemical, physical, mechanical and fastness tests – Sampling.*

3 Terms and definitions

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

3.1
deformability
multidirectional modulus characteristics of an upper material

3.2
upper
materials forming the outer face of the footwear which is attached to the sole assembly and covers the upper dorsal surface of the foot. In the case of boots this also includes the outer face of the material covering the leg. Only the materials that are visible are included, no account should be taken of underlying materials

3.3
complete upper assembly
finished upper, fully seamed, joined or laminated together as appropriate, comprising the centre material and any lining(s) together with all components such as interlinings, adhesives, membranes, foams or reinforcements, but excluding toe puffs and stiffeners

NOTE The complete upper assembly can be flat, 2- dimensional or comprise lasted upper in the final footwear.

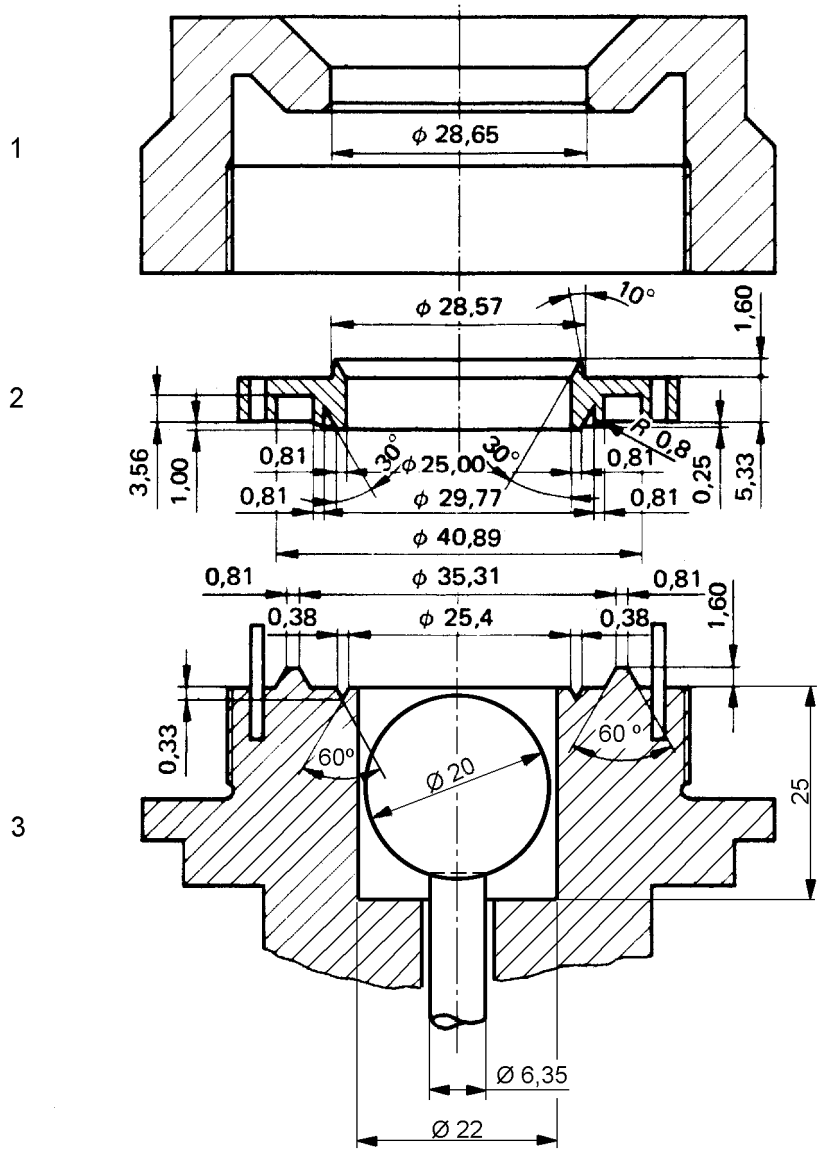
4 Apparatus and material

The following apparatus and material shall be used:

4.1 Test machine (see Figures 1 and 2), including the following:

4.1.1 Means of clamping the test specimen round its edge leaving a central circular free area of diameter 25,0 mm ± 0,5 mm. The design of the clamping system of the machine shall ensure that the test specimen does not slip during the test, and shall neither stretch nor compress the central area of the test specimen as it is clamped.

Dimensions in millimetres



Key

1 Cap

2 Clamp ring

3 Head (spherical or hemi-spherical cap)

Figure 1 – Details of clamp and head

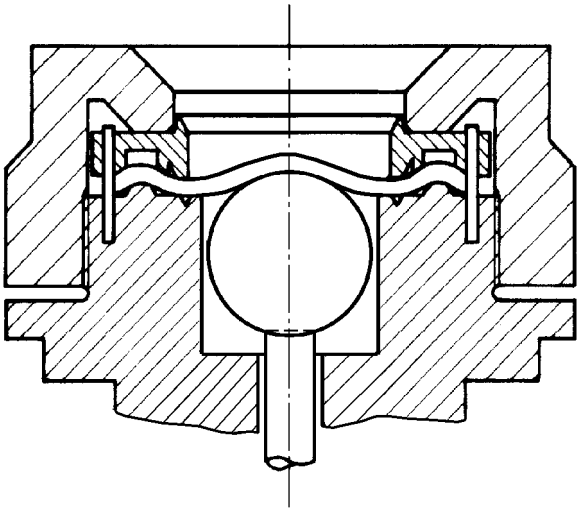


Figure 2 – Cross section of clamping head with test piece in position

4.1.2 Moveable plunger with a 20,0 mm ± 0,2 mm diameter spherical ball on the end.

4.1.3 Means of moving the plunger relative to the test specimen clamp at a speed of 0,20 mm/s ± 0,05 mm/s.

4.1.4 Means of continuously recording the travel of the plunger to an accuracy of ± 0,05mm.

4.1.5 Means of continuously recording the force on the plunger within the range 0 N to 800 N to an accuracy of ± 10 N.

4.2 **Press knife** or similar means for cutting test specimens.

5 Sampling and conditioning

5.1 Cut three test specimens of a sufficient size to allow them to be clamped firmly on the test machine, so that they do not slip during the test.

In the case of leather use prEN ISO 2418 to select the sampling position from the butt region of the skin or side.

For non-leather materials, cut test specimens from a range of positions across the full usable width and length of the sheet material. For a material with a woven structure this shall prevent any two test specimens containing the same warp or weft threads.

5.2 For test specimens from footwear uppers, they shall not be cut from any areas containing seams or perforations and any other design features which mean that the test specimen will not be of uniform thickness across its entire surface area. Furthermore, no test specimens shall be cut from areas of finished shoe uppers which are subjected to large strains during lasting especially the toe and backpart. Test specimens shall be prepared from complete upper assemblies when the lining material is permanently attached to the upper material.

It can be that it is impossible to cut a test specimen of sufficient size from certain types of footwear especially children's and the test specimen size shall not be reduced. If it is not possible to cut the correct size test specimen from a shoe upper the materials themselves shall be tested.

5.3 Place the test specimens in a conditioned standard atmosphere as specified in EN 12222 for 24 h prior to test and carry out the test in this atmosphere.

6 Test method

6.1 Principle

A circular test specimen is clamped round its edge and is gradually distended by forcing a metal ball attached to a plunger against the reverse of the test specimen. The travel of and force required to move the ball are continuously recorded throughout the test.

6.2 Procedure

6.2.1 Ensure the test machine is set with the central plunger retracted to zero or minimum distension.

6.2.2 Tightly clamp the test specimen into the test machine so that the ball ended plunger acts on the reverse side of the test specimen (i.e. when testing grain leathers, the ball ended plunger will press against the flesh side of the leather) and the test specimen is flat.

6.2.3 For some thick test specimens a very high clamping force may be necessary whereas with thin test specimens care is required to avoid cutting into the test specimen.

6.2.4 Force the plunger into the test specimen at a rate of 0,20 mm/s ± 0,05 mm/s.

6.2.5 Continuously record the force required to move the plunger against the distance it has moved.

6.2.6 Stop the test when the plunger has travelled a total distance of 10 mm (from the point of contact with the reverse of the test specimen) or the test specimen is damaged.

6.2.7 Retract the plunger and remove the test specimen.

6.2.8 Inspect the marks on the top of the test specimen left by the clamps. If there are signs of slippage occurring during the test, for example evident by a blurring of clamping rings, or of tearing of the clamped edges; reject the results and repeat the procedure with a new test specimen.

6.2.9 Repeat the procedure for the remaining test specimens.

6.2.10 From the plot of force against distance travelled by the plunger record the force at intervals of 2 mm travel from the point where the plunger makes contact with the reverse of the sample.

7 Expression of results

Calculate the arithmetic mean of the force measurements for the three test specimens, to the nearest 10 N.

8 Test report

The test report shall include the following information :

a) the arithmetic mean of the three results of force calculated in clause 7 at each of the distances travelled by the plunger;

b) if testing finished footwear or uppers, a description of the style of shoe tested including commercial style codes;

c) a description of the material, including commercial reference if known;

d) a description of the test piece (upper or complete upper assemblies);

e) reference to the method of test;

f) date of testing;

g) any deviations from this test method.

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