



SLOVENSKI STANDARD

SIST ENV 12936:2000

01-december-2000

Feather and down - Determination of the permanent deformation after dynamic fatigue stress under constant load

Feather and down - Determination of the permanent deformation after dynamic fatigue stress under constant load

Federn und Daunen - Bestimmung der bleibenden Verformung nach dynamischer Ermüdungsbeanspruchung bei konstanter Belastung

Plumes et duvets - Détermination de la déformation permanente après un essai de fatigue dynamique sous charge constante

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Ta slovenski standard je istoveten z: ENV 12936:1998

ICS:

59.040 Pomožni materiali za tekstilije Textile auxiliary materials

SIST ENV 12936:2000

en

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EUROPEAN PRESTANDARD
PRÉNORME EUROPÉENNE
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ENV 12936

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ICS 59.040

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English version

Feather and down - Determination of the permanent deformation
after dynamic fatigue stress under constant load

Plumes et duvets - Détermination de la déformation
permanente après un essai de fatigue dynamique sous
charge constante

Federn und Daunen - Bestimmung der bleibenden
Verformung nach dynamischer Ermüdungsbeanspruchung
bei konstanter Belastung

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Foreword

This European Prestandard has been prepared by Technical Committee CEN/TC 222 "Feather and down as filling material for any article, as well as finished articles filled with feather and down", the secretariat of which is held by UNI.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this European Prestandard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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1 Scope

This European Prestandard describes the procedure for determining the permanent deformation of filling material after dynamic fatigue stress under constant load. This method is applicable to finished feathers and/or mixtures, fit for or constituting filled manufactured articles, which, when used, are submitted to repeated compression cycles.

2 Normative references

This European Prestandard 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 Prestandard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 20139 Textiles-Standard atmospheres for conditioning and testing (ISO 139:1973)

3 Definitions

For the purposes of this Prestandard the following definitions apply:

3.1 dynamic fatigue stress: repeated compression cycles under a pressure of 2500 Pa

3.2 permanent deformation: difference, in percent, between the initial height of the test specimen under the pressure of 15 Pa, and its height measured under a pressure of 15 Pa, after carrying out a determined number of dynamic fatigue stress cycles under a pressure of 2500 Pa.

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4 Principle

Measure the height of the test specimen, suitably prepared in a cylinder of predetermined dimensions, under the pressure of 15 Pa. Submit the test specimen to at least 5000 compression cycles under a pressure of 2500 Pa; at the end of the dynamic fatigue stress test measure again the height of the test specimen under a pressure of 15 Pa and calculate the permanent deformation on the basis of the difference between the two heights.

5. Apparatus

5.1 Apparatus to measure the height of the test specimen constituted by (see Figure 1):

5.1.1 Cylinder with flat bottom stood on a base capable of being levelled by adjustable legs, with internal diameter of (289 ± 1) mm and (500 ± 5) mm high. The cylinder shall be made from smooth, antistatic and transparent material (e.g. acrylic)

5.1.2 Plunger and measuring rod of mass giving a pressure $(15 \pm 0,2)$ Pa. The plunger, suspended by measuring rod, with diameter (282 ± 3) mm should have its underside flat and smooth and made of a rigid material, so that it does not become deformed in use. The measuring rod, marked in millimetres, shall be at zero when the plunger is standing on the bottom of the cylinder.

NOTE: Instead of the measuring rod it is possible to use any kind of device on condition that the pressure exerted on the material is of $(15 \pm 0,2)$ Pa.

5.1.3 Engine making the plunger (5.1.2) to rise and to descend at a speed of (520 ± 20) mm/min

5.1.4 Device to read the height of the measuring rod with the approximation to 0,5 mm

5.1.5 Frame to centre the cylinder (5.1.1) as regards the plunger (5.1.2)

5.2 Apparatus to carry out the series of dynamic fatigue stress cycles under constant load (see Figure 2 a)) constituted by:

5.2.1 Perforated disk (see Figure 2b)) having a mass of $(94,25 \pm 1)$ g, its underside flat and smooth and made of a rigid material, so that it does not become deformed in use, with a diameter of (285 ± 2) mm.

NOTE: This disk has the function to avoid any loss of material during the test.

5.2.2 Plunger with a diameter of (280 ± 2) mm, its underside flat and smooth and made of a rigid material, so that it does not become deformed in use; it shall be connected with a device able to exert on the test specimen a total pressure of (2500 ± 25) Pa, taken also into account the mass of the perforated disk (5.2.1).

5.2.3 Device to programme the complete compression cycle in 3 s with stay time of the plunger of 1 s under a pressure of 2500 Pa.

5.2.4 Automatic meter to record the number of compression cycles.

5.2.5 Frame to centre the cylinder (5.1.1) as regards the plunger (5.1.2).

5.3 Balance, with an accuracy of 0,05 g

5.4 Filling device made of antistatic material (see Figure 3) to introduce the test specimen into the cylinder (5.1.1).

5.5 Rod, made of wood or of any other antielectrostatic material to level the surface of the test specimen, when introduced into the cylinder and to loose the material during the test.

6 Preparation and conditioning of the test specimens

6.1 The laboratory bulk sample, either of the material fit for filling the manufactured article or the filling material drawn from the manufactured article, is conditioned in the atmosphere as defined in EN 20139 by storing it loose to a maximum height of 150 mm in sample preparation box for at least three days.

6.2 Draw two test specimens, each of them of $(40 \pm 0,5)$ g, from the laboratory bulk sample.

7 Procedure

7.1 The tests shall be carried out in a conditioned room according to EN 20139.

7.2 The apparatus to measure the height of the test specimen (5.1) shall be placed on a frame without any vibrations.

7.3 Place the filling device (5.4) on the cylinder (5.1.1) and, through the opening of the diaphragm, let the test specimen freely fall into the cylinder: levelling the surface of the test specimen with the help of a wooden rod (5.5), taking care to trouble as little as possible the test specimen itself.

7.4 Place the cylinder under the plunger (5.1.2)

7.5 Lower the plunger mechanically or manually towards the test specimen at a constant speed of (520 ± 20) mm/min until the plunger is standing horizontally or almost horizontally on the test specimen.

7.6 Read off on the measuring rod the height of the material in millimetres (H_0), under a pressure of 15 Pa, after a period of (60 ± 2) s.

7.7 Bring the plunger back to the initial position.

7.8 Place the cylinder, under the plunger of the apparatus for the dynamic fatigue stress (5.2.2) and lean the perforated disk (5.2.1) on the test specimen without causing impact effect.

7.9 Programme the number of compression cycles agreed between the parties, and start the dynamic fatigue stress test, as described at 5.2.3. Excepting different agreement between the parties the material constituting the test specimens shall be loosened every about 2500 cycles.

7.10 The test ended, remove the perforated disk (5.2.1) and place the cylinder under the apparatus to measure the height (5.1).

7.11 $180 \text{ s} \pm 5 \text{ s}$ after the end of the dynamic fatigue stress test, loose the material by stirring with the rod (5.5) and then immediately measure the height of the test specimen in millimeters (H_1) under a pressure of 15 Pa.

7.12 Repeat the test from 7.3 to 7.11 on the other test specimen.

8 Calculation and expression of results

8.1 The permanent deformation (PD), in percent, is calculated with the formula:

$$100 \frac{H_0 - H_1}{H_0}$$

where:

- H_0 is the initial height in millimetres of the test specimen
 under a pressure of 15 Pa;
 H_1 is the height in millimetres of the test specimen measured
 under a pressure of 15 Pa, after dynamic fatigue stress test

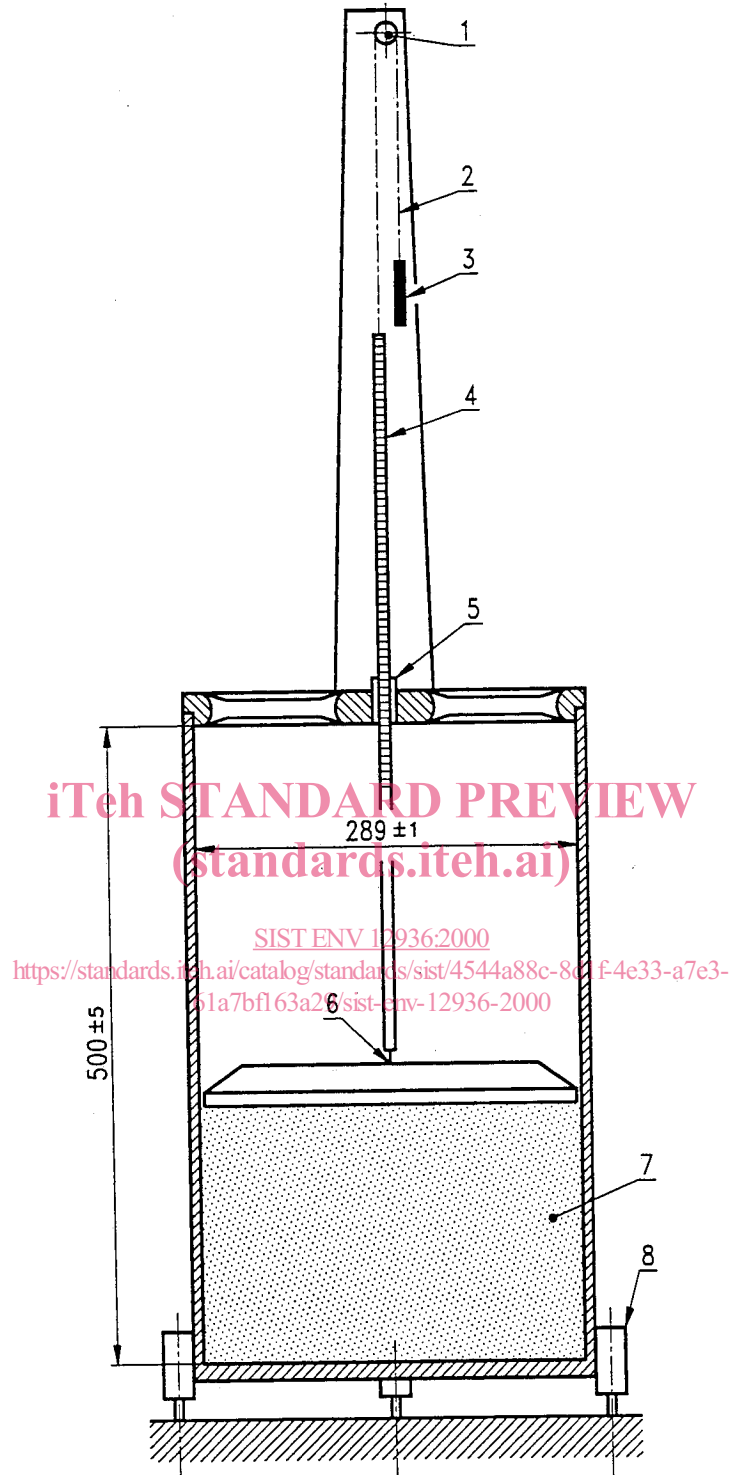
8.2 Calculate the mean of the two determinations with the approximation to the first decimal

9. Test report

The test report shall include at least the following information:

- the reference to this prestandard;
- the description of the test material;
- the number of fatigue cycles carried out;
- the times that the material constituting the test specimens was loosened;
- the permanent deformation, in percent, of the single tests and the mean of the two tests;
- any deviation from the standard procedure and any other circumstances that can have affected the result.

Dimensions in millimetres



- 1 Chain wheel driven by synchronous motor with friction coupling
- 2 Chain
- 3 Counterpoise
- 4 Measuring rod
- 5 Index
- 6 Guidable plunger end
- 7 Test specimen
- 8 Adjustable leg

Figure 1: Apparatus to measure the height of the test specimen