SLOVENSKI STANDARD
SIST EN 12130:2000

01-december-2000

Feather and down - Test methods - Determination of the filling power (massic volume)

Feather and down - Test methods - Determination of the filling power (massic volume)

Federn und Daunen - Prüfverfahren - Bestimmung der Füllkraft (Füllvolumen)

Plumes et duvets - Méthodes d'essais - Détermination du pouvoir gonflant (volume massique)

Ta slovenski standard je istoveten z: EN 12130:1998

ICS:

59.040 Pomožni materiali za tekstilije Textile auxiliary materials

SIST EN 12130:2000 **en**

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 12130

April 1998

ICS 59.040

Descriptors: stuffings, feathers, tests, determination, density (mass/volume), testing conditions

English version

Feather and down - Test methods - Determination of the filling power (massic volume)

Plumes et duvets - Méthodes d'essais - Détermination du pouvoir gonflant (volume massique)

Federn und Daunen - Prüfverfahren - Bestimmung der Füllkraft (Füllvolumen)

This European Standard was approved by CEN on 23 March 1998.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

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

Foreword

This European Standard 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.

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 October 1998, and conflicting national standards shall be withdrawn at the latest by October 1998.

Annex A is informative.

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

1 Scope

This European Standard specifies the procedure for determining the filling power (massic volume).
This method is applicable to finished down and/or feather, fit for or constituting filled manufactured articles (e.g. anoraks, quilts, etc.)

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 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.

prEN 1883 Feather and down - Sampling in view of tests

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

EN 20187 Paper, board and pulps - Standard atmosphere for conditioning and testing and procedure for monitoring the atmosphere and conditioning of samples (ISO 187:1990)

3 Definitions

For the purposes of this standard the following definitions apply:

3.1 filling power (*fp*): height of the volume occupied by filling material subjected to a specific pressure, expressed in millimetres.

NOTE: The volume comprises internal pores of elements and pore spaces between elements.

3.2 massic volume: volume occupied by a given mass of filling material when subjected to a specific pressure; it is expressed in cubic centimetres per gram.

4 Principle

A test specimen, suitably prepared, having a specified mass is placed in a cylinder and the material is aerated by blowing for a set period. Pressure by way of a platen is then applied to the filling material at a constant speed and after a stipulated time the level of the platen is noted. The massic volume is calculated with regard to the height and the known diameter of the graduated cylinder.

5. Apparatus

It is allowed to use any kind of apparatus on condition that it gives the same results, within experimental error, like the one described below. These alternative apparatus should be of such design to give satisfactory performance, particularly for a good air blowing of the test specimen.

5.1 Tester (see Figure 1) which consists of:

5.1.1 Cylinder with flat bottom standing 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 of (14,8 ± 0,2) Pa. The plunger, suspended by measuring rod, with diameter (282 ± 3) mm shall 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 resting on the bottom of the cylinder.
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 (14,8±0,2) Pa.

NOTE: A vacuum cleaner can be used as a suitable blower.

5.1.3 Cover, mounted in a frame which fits over the cylinder, consists of a wire screen of nominal aperture size 180µm and a wire diameter 125µm (see ISO 3310-1). In the center of the cover is inserted a blow nozzle (5.1.4).

5.1.4 Blow nozzle (see Figure 2) equipped with an adjustable valve in order to regulate the amount of the air injected.

5.1.5 Device regulating the descent of the plunger and mesuring rod at (520±20) mm/min.

5.2 Blower, with a suitable tube connected to its exhaust vent and capable of guaranteeing an air flow, measured at a distance of 400 mm from the inlet nozzle, of (310±50) l/min.

5.3 Stop watch

5.4 Balance, sensitive to 0,05 g

5.5 Sample preparation box of wire net, having dimensions which will contain a sample up to at least 50 g with the height of material less than 150 mm.

6. Preparation and conditioning of sample and equipment

6.1 A mass of at least 50 g is obtained from the material to be tested in accordance with the procedure described in prEN 1883.
The sample is placed in an adequate container (substituting for the cylinder in 5.1.1) and the cover is applied. With the valve aperture set for maximum air flow, air is blown into the container for (60±5) s.

6.2 The sample is then removed from the container and conditioned in the atmosphere as defined in EN 20139 and controlling the relative humidity in accordance with EN 20187 by storing it loose to a maximum height of 150 mm in sample preparation box (5.5) for at least 48 h.

6.3 It is necessary to wash the cylinder after 30 measurements (15 test specimens) with warm water prepared with anionic-active detergent (concentration: 0,4 ml/l) followed by two rinses with cold distilled water.
To ensure reliability of the procedure, and if doubtful of the influence of static electricity on the result, proceed as follows.
Record the height of the plunger at the end of the first test and leave the plunger in place for at least two hours. Measure again the height of the plunger. If the new measurement differs from the first by more than 2 cm, repeat the procedure starting at 6.2

7. Procedure

7.1 Conditioning is carried out according to EN 20139 and the temperature and relative humidity are measured according to EN 20187

.

7.2 Ensure that the cylinder is vertical by adjusting the legs and that the measuring rod is at zero when the plunger is standing on the bottom of the cylinder.

7.3 Weigh out (20,0±0,1)g of two test specimens each extracted from the sample (6.1) and place the first test specimen in the cylinder and apply the cover.

7.4 The test specimen is loosened by blowing for(60±5) s. It is essential that blowing is halted immediately.

7.5 Insert the plunger and measuring rod into the top of cylinder and lower 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. If not repeat the blowing on the same test specimen.

7.6 Read from on the measuring rod the height of the material after a period of (60±2) s. As far as possible position the plunger in the centre of the cylinder for the whole test.

7.7 Repeat steps 7.4, 7.5 and 7.6 using the same test specimen which is loosened by blowing for (7±3) s as described above prior to each reading. Note the average of the values, in millimetres.

7.8 Repeat steps 7.3 to 7.7 for the duplicate test specimen.

8. Calculation and expression of results

8.1 Filling power:
Recorded in millimetres.
Calculate the mean of the results obtained on the two test specimens and report them with the symbol *fp*.

8.2 Massic volume

8.2.1 From the mean results of *fp* obtained for each test specimen calculate the massic volume (V) in cubic centimetres per gram with the approximation to the first decimal with the formula:

$$V = \frac{H \cdot a}{m \cdot 1000}$$

where:

H is the mean height of two determinations (7.7),obtained on one test specimen, expressed in millimetres;
a is the test surface area of the cylinder expressed in square millimetres;
m is the mass of the test specimen, in grams

8.2.2 Calculate the average of the bulk density obtained for the two test specimens.

9 Precision of the method

Based on data from one interlaboratory test carried out by eleven laboratories on five different samples and two determinations for sample and from another interlaboratory test carried out by ten laboratories on nine samples and two determinations for a sample, the following precision data were found for the filling power:

Repeatability

The 95% probability of the repeatability limit (r) for the difference between two test results within a single laboratory was about 3 mm for different filling samples

Reproducibility

The 95% probability of the reproducibility limit (R) for the difference between two test results from different laboratories was about 15 mm for different filling samples

10 Test report

The test report shall include at least the following information:

- the reference to this standard;
- the description of the test material;
- the mass of the test specimen in grams;
- the filling power in millimetres;
- the massic volume, in cubic centimetres per grams, if required;
- any deviation from the standard procedure and any other circumstances that may have affected the result.

Dimensions in millimetres

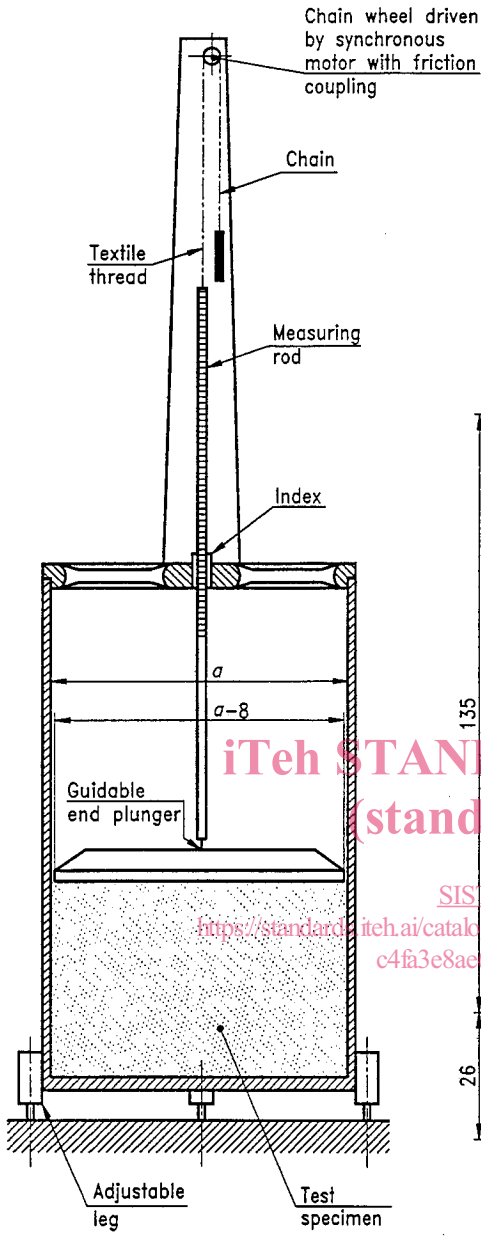
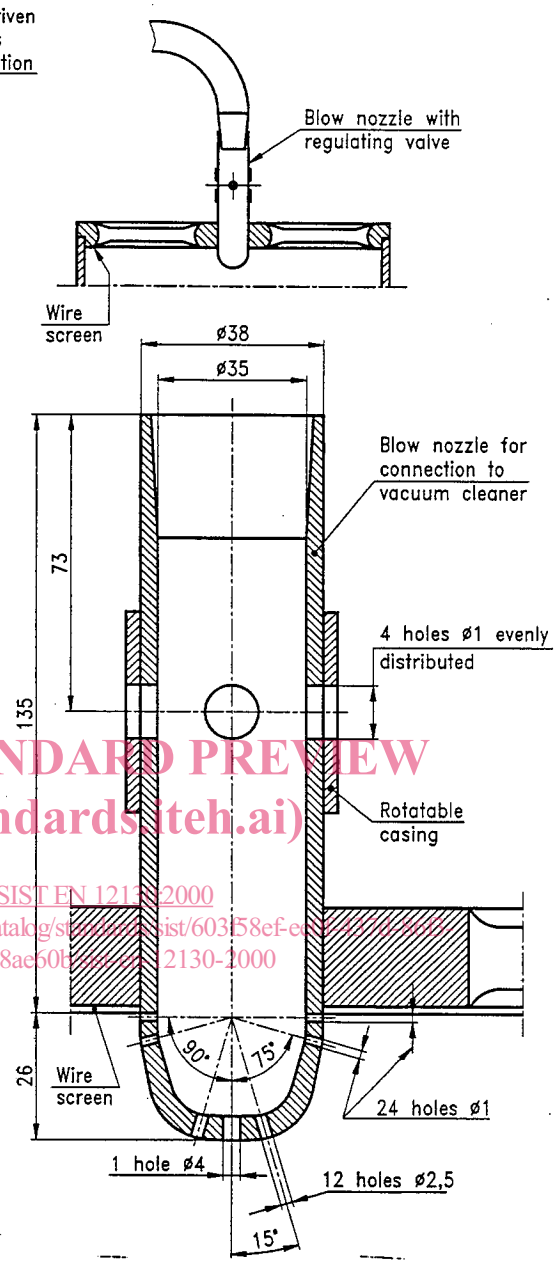


Figure 1: Filling power tester

Dimensions in millimetres



All holes evenly distributed around one nozzle

Figure 2: Blow nozzle