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**Karakterizacija enokomponentnih pen - 2. del: Razširitvene značilnosti**

Characterisation of one component foam - Part 2: Expansion characteristics

Charakterisierung von Einkomponentenschäumen - Teil 2: Ausdehnung

Caractérisation des mousses monocomposants - Partie 2: Foisonnement

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83.180

Lepila

Adhesives

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 17333-2**

March 2020

ICS 83.180

English Version

**Characterisation of one component foam - Part 2:  
Expansion characteristics**

Caractérisation des mousses monocomposants - Partie  
2 : Caractéristiques d'expansion

Charakterisierung von Einkomponentenschäumen -  
Teil 2: Ausdehnung

This European Standard was approved by CEN on 1 December 2019.

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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

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

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

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## European foreword

This document (EN 17333-2:2020) has been prepared by Technical Committee CEN/TC 193 “Adhesives”, the secretariat of which is held by UNE.

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of an identical text or by endorsement, at the latest by September 2020, and conflicting national standards shall be withdrawn at the latest by September 2020.

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

This document is one of the product European Standards within the framework series of EN 17333 on Characterization of one component foam, as follows:

- *Part 1: Foam yield characteristics;*
- *Part 2: Expansion characteristics (this document);*
- *Part 3: Application;*
- *Part 4: Mechanical strength;*
- *Part 5: Insulation.*

This document is one of a series of standards which specify test methods for determining the properties of one component foams (OCFs).

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

## EN 17333-2:2020 (E)

## 1 Scope

This document specifies test methods for the evaluation of the expansion properties for moisture curing, self-curing activatable or water drying foams dispensed from single pressurized foam containers.

This document does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this document to establish appropriate safety and health practices and determine the applicability of regulatory requirements prior to use.

The following test methods are described:

- Method 1 – Dimensional stability: This test method describes how to determine the dimensional stability (shrinkage or expansion) of cured foam under typical and extreme conditions.
- Method 2 – Curing pressure: This method describes how to determine the generation of pressure during the curing process of an OCF.
- Method 3 – Post expansion: This method describes how to measure the expansion of a dispensed froth during the curing phase.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 312, *Particleboards - Specifications*

EN 923, *Adhesives - Terms and definitions* SIST EN 17333-2:2020

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EN 15006, *Metal aerosol containers - Aluminium containers - Dimensions of the 25,4 mm aperture*

EN 14847, *Aerosol containers - Tinplate containers - Dimensions of the 25,4 mm aperture*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 923 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp/ui>
- IEC Electropedia: available at <http://www.electropedia.org/>

### 3.1 one component foam (OCF)

moisture curing or water drying foam as well as self-curing activatable foam dispensed from a single pressurised foam container

### 3.2 pressurised foam container

pressurised can according to EN 14847 and EN 15006

**3.3****test container**

pressurised can according to EN 14847 and EN 15006 used for testing purposes

**3.4****dimensional stability**

ability of cured foam to retain its dimensions

**3.5****jig dwell time****fixation period**

time period between foaming and removing clamps

**3.6****fully cured or dried foam**

cross-linked foam which reaches its serviceable properties as claimed by the manufacturer

**3.7****froth**

uncured, freshly dispensed foam

**3.8****curing pressure**

pressure build-up within the dispensed froth during curing phase

**3.9****post expansion**

increase of the dispensed froth volume during the curing phase

**3.10****straw foam**

one component or two component foam for the extrusion with an adapter tube

**3.11****gun foam**

one component foam for the extrusion with a foam application gun

**4 Test methods****4.1 Method 1 – Dimensional stability****4.1.1 Principle**

The foam is dispensed in the gap between two particle boards. When foam is fully cured, the dimensional stability of the foam is determined by measurement of the distance between the panels over several days and weeks.

**NOTE** Typically OCFs tend to shrink within the first few days after curing due to gas release from the closed cells. The vanishing propellant leaves an under-pressure in the cells resulting in a shrinking of cell size, therefore the whole foam shrinks. This effect is usually compensated over several days by the slower permeation of air.

Shrinking foam can affect the sealing of joints by separation from the surfaces or deformation of the joints. The degree of shrinkage depends not only on the OCF formulation, but also on the environmental conditions e.g. humidity and/or temperature.

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## 4.1.2 Equipment

For each measurement:

**4.1.2.1 Two P3 or P5 particle boards** (compliant with EN 312) with dimensions of 200 mm × 100 mm × 10 mm (length × width × thickness).

**4.1.2.2 2 spacers**, not water absorbing, not adherent (e.g. polyethylene (PE), polytetrafluoroethylene (PTFE), on which polyurethane (PU) does not adhere), thickness 20 mm, length 90 mm.

**4.1.2.3 2 screw clamps.**

Further tools:

**4.1.2.4 Sharp and clean knife blade.**

**4.1.2.5 Vernier caliper**, with an accuracy of 0,1 mm.

**4.1.2.6 Conditioning chamber** capable of being controlled at the required temperature and relative humidity (RH) given in Table 1 and Table 2.

**4.1.2.7 Water bath.**

## 4.1.3 Sampling

## 4.1.3.1 Conditioning

Bring the test container to the test temperature for at least 24 h.

The particle boards shall be stored at test conditions [(23 ± 2) °C and (50 ± 5) % RH] for at least 1 week.

## 4.1.3.2 Test pieces

One setup consists of two plates and two spacers (see Figure 2). Marks are put on the particle boards (see Figure 1). At these marks the width will be measured (four reading points per joint).

## 4.1.4 Test procedure

## 4.1.4.1 General

It is necessary to carry out at least three measurements to obtain a statistically relevant mean value.

When pre-moistening is required, the particle boards are wetted abundantly (see 4.1.4.2).

Self-curing activatable foams don't require moistened substrates (see 4.1.4.5).

## 4.1.4.2 Assembling

The particle board pieces and spacers are put together as follows:

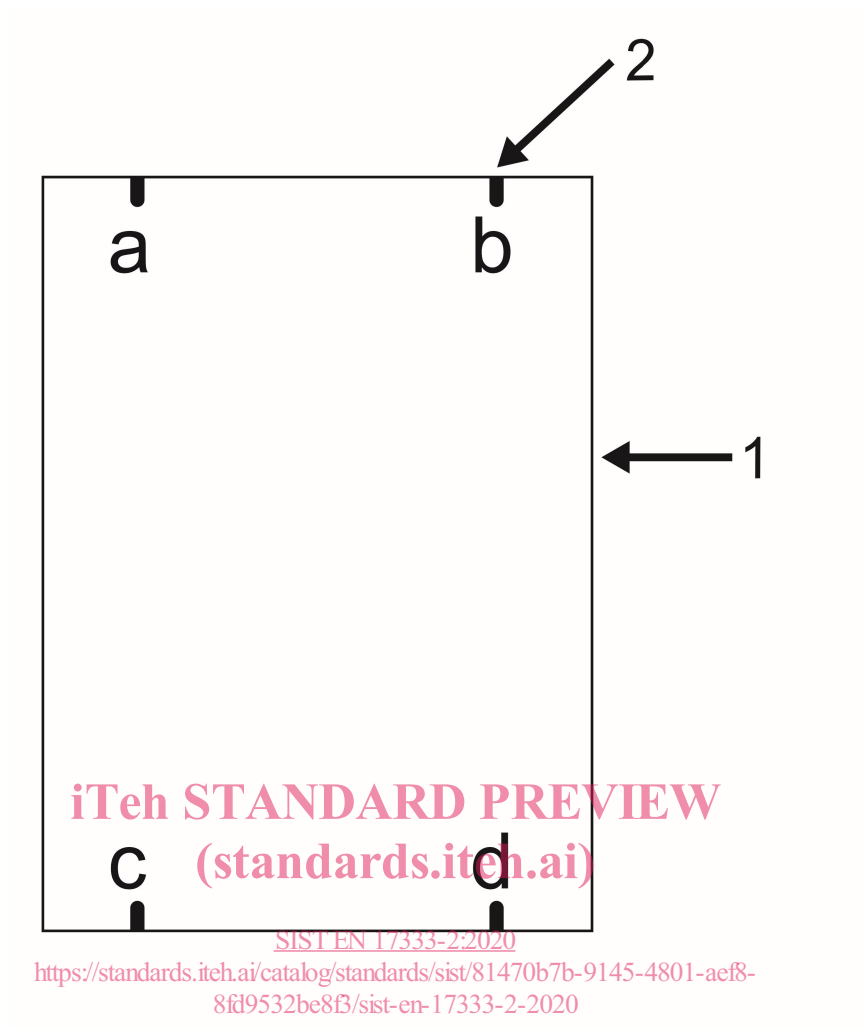
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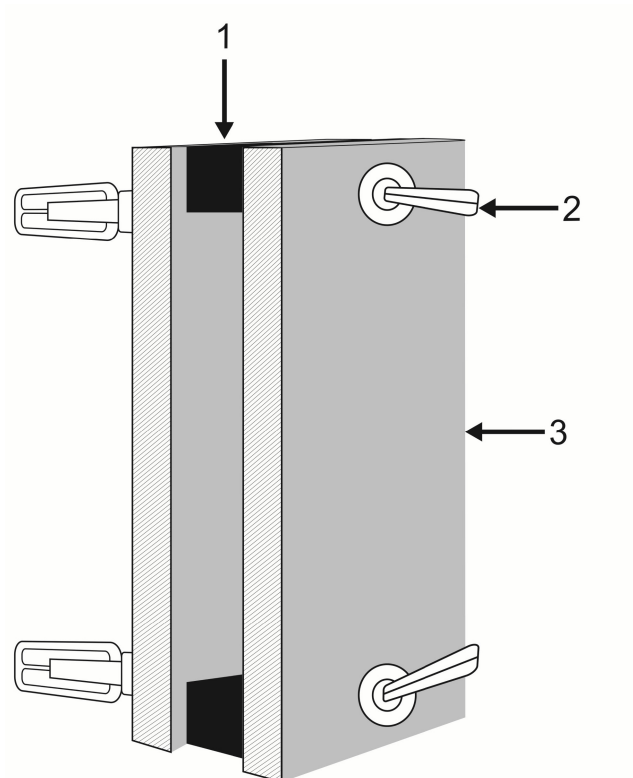
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**Key**

- 1 particle board
- 2 measuring point

**Figure 1 — Marking of measurement points**



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**Key**

- 1 spacer
- 2 screw clamp
- 3 particle board

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**Figure 2 — Assembly of test plates**

The spacers are placed at least 5 mm from the side of the particle boards to be able to put the Vernier caliper between the particle boards. The clamps are used to fix the joints (positioned at each corner or in line of the spacers).

Fasten the clamps with moderate force to avoid deformation of the particle boards.

If pre-moistened, the clamped particle boards are immersed in water for 20 s, taken out and stored horizontally for two minutes, until excess water drips off (see Figure 3). The foaming shall be started within the next 30 s.

Dry and pre-wetted joints shall not be put together in one and the same stack.

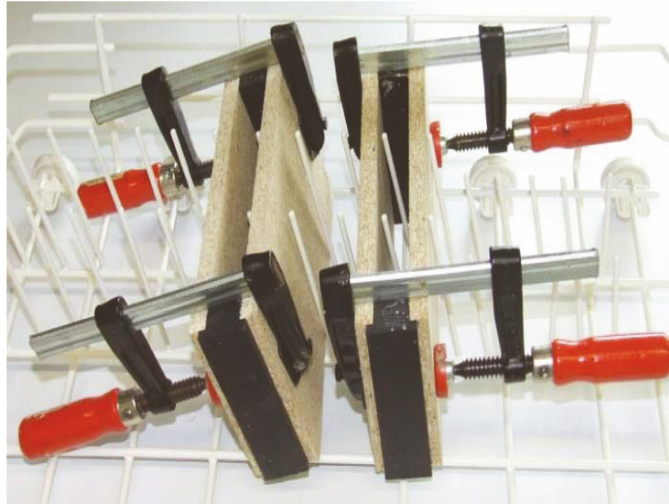
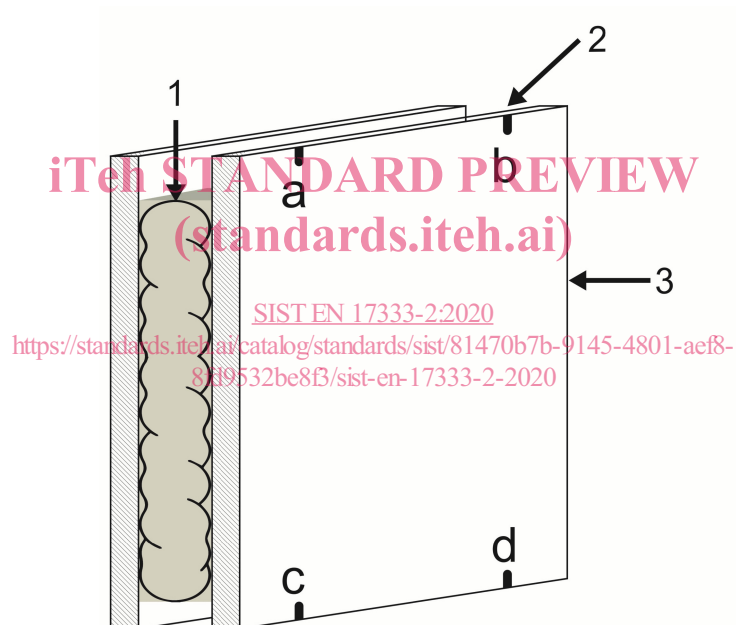


Figure 3 — Water drip off

**Key**

- 1 PU foam
- 2 measuring point
- 3 particle board

Figure 4 — Ready test piece

**4.1.4.3 Foaming**

- a) Shake an unused test container vigorously 20 times. Discard the first  $(40 \pm 10)$  g of foam.
- b) The joints are standing in upright position and are filled without voids from both sides. Avoid overexpansion of cured foam and fill according to the manufacturer's instructions (typical: gun foam  $(80 \pm 10)$  %, straw foam  $(60 \pm 10)$  % of joint width).