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**Karakterizacija enokomponentnih pen (OCF) - 2. del: Razširitev**

Characterization of One Component Foam (OCF) - Part 2: Expansion

Charakterisierung von Einkomponentenschäumen - Teil 2: Ausdehnung

Caractérisation des mousses monocomposants - Partie 2 : Foisonnement

**Ta slovenski standard je istoveten z: prEN 17333-2**

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83.180            Lepila    Adhesives

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## Characterization of One Component Foam (OCF) - Part 2: Expansion

Charakterisierung von Einkomponentenschäumen -  
Teil 2: Ausdehnung

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 193.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

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## European foreword

This document (prEN 17333-2:2018) has been prepared by Technical Committee CEN/TC 193 “Adhesives”, the secretariat of which is held by UNE.

This document is currently submitted to the CEN Enquiry.

This document is one of the product European Standards within the framework series of EN 17333 on Characterization of *One Component Foam (OCF)*, as follows:

- *Part 1: Yield*
- *Part 2: Expansion* (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).

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**prEN 17333-2:2018 (E)****1 Scope**

This document specifies test methods for the evaluation of the expansion properties for moisture curing, self-curing or water drying foams dispensed from single pressurized 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 standard to establish appropriate safety and health practices and determine the applicability of regulatory requirements prior to use.

The following test methods are described:

- Dimensional Stability: This test method describes how to determine the dimensional stability (shrinkage or expansion) of cured foam under typical and extreme conditions.
- Curing Pressure: This method describes how to determine the generation of pressure during the curing process of an OCF.
- Post Expansion: This method describes how to measure the expansion of a freshly dispensed liquid foam (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*

**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:

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

**3.1  
one component foam  
(OCF)**

moisture curing or water drying foam as well as self-curing activatable foam dispensed from single pressurized containers

**3.2  
dimensional stability**

shrinkage or expansion of cured foam under extreme and typical conditions

**3.3  
jig dwell time**

fixation period- time between foaming and removing clamps

**3.4  
cured foam**

fully cross-linked foam which reaches its final properties

### 3.5

#### **froth**

uncured, freshly dispensed foam

### 3.6

#### **curing pressure**

pressure build-up of the dispensed froth during curing phase

### 3.7

#### **post expansion**

expansion of a freshly dispensed liquid froth during the curing phase

## 4 Test methods

### 4.1 Dimensional stability

#### 4.1.1 Principle

The foam is dispensed in the gap between two boards. After full curing, 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 like humidity.

#### 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. PE, PTFE, on which polyurethane does not adhere, thickness 20 mm, length 90 mm).

4.1.2.3 2 screw clamps.

Further tools:

4.1.2.4 Knife.

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

4.1.2.6 Conditioning chamber capable of being controlled at  $(23 \pm 2)$  °C and  $(50 \pm 5)$  % RH.

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.

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The particleboards should be stored at standard conditions  $[(23 \pm 2)^{\circ}\text{C}$  and  $(50 \pm 5) \% \text{RH}]$  for at least 1 week.

**4.1.3.2 Test pieces preparation**

One setup consists of two plates and two spacers. Marks are put on the boards (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**

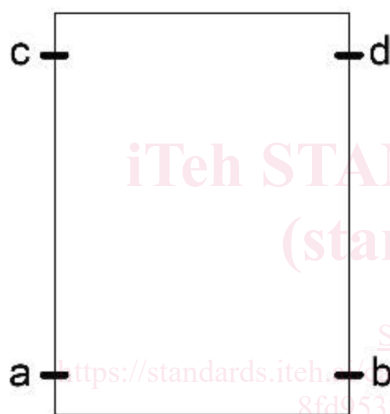
It is necessary to carry out at least three measurements to obtain a statistically relevant mean value.

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

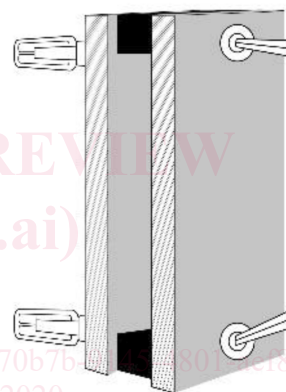
Self curing foams don't require moisturized substrates (see 4.1.4.4).

**4.1.4.2 Assembling**

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



**Figure 1 — Marking of measurement points**



**Figure 2 — Assembly of test plates**

The spacers are placed at least 5 mm from the side of the boards to be able to put the Vernier caliper between the 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 boards.

If pre-moistened, the clamped boards are immersed in water for 20 s, taken out and stored horizontally for 2 min, until excess water drips off (Figure 3). The foaming shall be started within the next 30 s.

**NOTE** Dry and pre-wetted joints are never put together in one and the same stack.



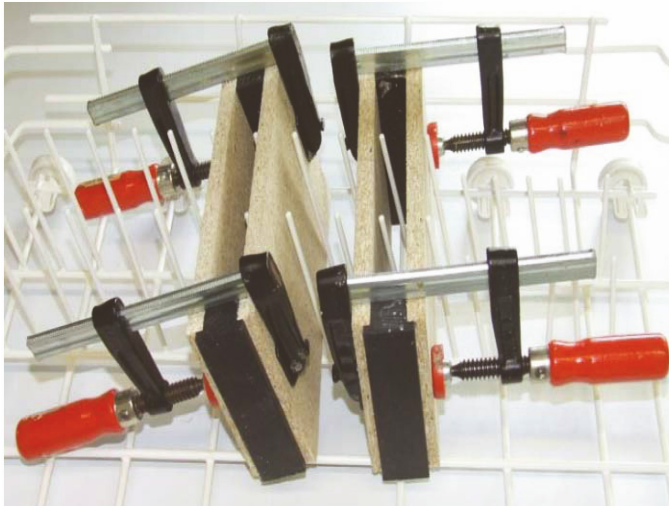


Figure 3 — Water drip off

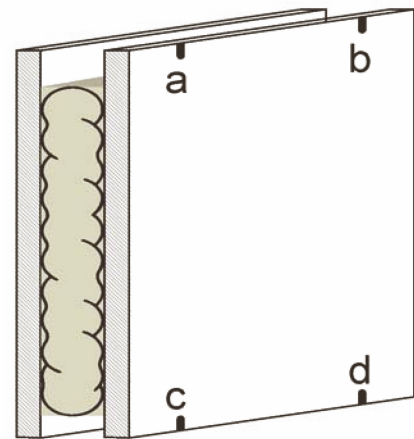


Figure 4 — Ready specimen

#### 4.1.4.2 Foaming

- a) Shake an unused foam container vigorously 20 times. Discard the first  $40 \text{ g} \pm 10 \text{ g}$  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 70 % to 80 %, straw foam 40 % to 50 % of joint width).
- c) The stacks are kept upright (Figure 4) at normal condition [ $(23 \pm 2) ^\circ\text{C}$  and  $(50 \pm 5) \% \text{RH}$ ] during the curing period.

#### 4.1.4.3 Measurement

The standard fixation period (time between foaming and removing clamps) for moisture curing foam is 24 h. For other foams the jig dwell time is as recommended by the manufacturers. In case no fixation time is indicated, a standard period of 24 h shall be used.

After the fixation period the excess foam is cut away. Before the fixation is removed from the stack, the width of each joint is measured between the boards (inside) at the four corners, using the Vernier caliper. The initial value serves as reference value  $A_0$  for the future measurements. In an ideal manner  $A_0$  is identical to the width of the spacers and their dimension can be taken over without further measurement.

The clamps and spacers are removed and the samples are put into the required climate for further storage (Figure 4). Further measurements are taken after 1 day, 2 days, 3 days, 7 days and 14 days. If the values measured after 14 days still point to significant changes in dimensions, further measurements after 3 weeks and/or 4 weeks may be necessary. Usually the relevant values are received within the first few days as the shrinkage reaches its maximum.

NOTE Before the measurements are taken, the stacks are removed from the climate chamber and acclimatized for two hours at normal climate (if stored at different conditions).

#### 4.1.4.4 Storage conditions

The specimens are stored upright all the time.

Storage conditions should reflect actual end use conditions. The conditions below are provided only as a guideline for extreme results (shrinkage/expansion):

**Table 1 — Storage conditions for moisture curing foam**

Pre-moistening	Fixation time	Storage conditions
yes	24 h	(23 ± 2) °C/ (50 ± 5) % RH
		(5 ± 2) °C or (-10 ± 2) °C
no		(40 ± 2) °C/ (90 ± 5) % RH
		(30 ± 2) °C/ (80 ± 5) % RH

**Table 2 — Storage conditions for other foams**

Pre-moistening	Fixation time	Storage conditions
no	24 h or manufacturer's recommendations	(23 ± 2) °C/ (50 ± 5) % RH
		(10 ± 2) °C
		(40 ± 2) °C/ (90 ± 5) % RH
		(30 ± 2) °C/ (80 ± 5) % RH

#### 4.1.5 Expression of Results

After each measurement at time  $n$  the mean values are calculated ( $A_n$ ) and the dimensional stability is determined in reference to  $A_0$  as follows:

$$DS_n = \frac{A_n - A_0}{A_0} \cdot 100 \% \quad (1)$$

where

$DS_n$

is the dimensional stability at time  $n$ ;

$A_0$

is the initial value (with clamps still on the stack);

$A_n$

is the value of the measurement at time  $n$ .

From all DS-values per joint, the average minimum and maximum value per condition is taken for reporting. Please note, that a statistical relevant number of measurements, at least of 3 joints, shall be available to get informative results.

#### 4.1.6 Test report

The test report shall include the following information:

- a) reference to this European Standard;
- b) the name and address of the testing laboratory;
- c) the number and date of the test report;
- d) the name and signature of the operator or signatory of the report;
- e) product identification given by the test sponsor:
  - 1) product name, manufacturer or supplier,