

# International Standard



# 7389

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

## ● Building construction — Jointing products — Determination of elastic recovery

*Construction immobilière — Produits pour joints — Détermination de la reprise élastique*

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## Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 7389 was developed by Technical Committee ISO/TC 59, *Building construction*, and was circulated to the member bodies in November 1981.

It has been approved by the member bodies of the following countries :

|                     |                |                       |
|---------------------|----------------|-----------------------|
| Australia           | Germany, F. R. | Portugal              |
| Belgium             | Hungary        | Romania               |
| Brazil              | India          | South Africa, Rep. of |
| Canada              | Iraq           | Spain                 |
| Czechoslovakia      | Ireland        | Sweden                |
| Egypt, Arab Rep. of | Israel         | Thailand              |
| Ethiopia            | Japan          | United Kingdom        |
| Finland             | Korea, Rep. of | USSR                  |
| France              | Poland         |                       |

The member bodies of the following countries expressed disapproval of the document on technical grounds :

Denmark  
Italy  
Norway

# Building construction — Jointing products — Determination of elastic recovery

## 1 Scope and field of application

This International Standard specifies a conventional method for the determination of the elastic recovery of sealants after extension and applies to sealants used in joints in building construction.

## 2 Reference

ISO 6927, *Building construction — Jointing products — Sealants — Vocabulary*.

## 3 Test method

### 3.1 Principle

Specimens of the sealant to be tested which adhere at two parallel contact surfaces shall be extended to a defined width, maintained under extension and released under defined conditions. The decrease in extension after releasing is the elastic recovery expressed as a percentage (see clause 4).

### 3.2 Apparatus

**3.2.1 U-profiles** of non-anodized aluminium alloy, with a cross-section of dimensions 12 mm × 12 mm × 2 mm and a length of 70 mm.

**3.2.2 Spacers**, not in contact with sealant, for the preparation of the test specimens of dimensions 12 mm × 12 mm × 10 mm.

**3.2.3 Spacers** of appropriate dimensions to hold the test specimens extended by 125, 160 or 200 % of the original width (see the table);

**3.2.4 Polyethylene sheet.**

**3.2.5 Glass plate**, dusted with talc.

**3.2.6 Convection type oven**, capable of operating at  $70 \pm 2$  °C.

**3.2.7 Extension machine**, capable of pulling at a rate of 5 to 6 mm/min.

**3.2.8 Vernier inside caliper**, accurate to 0,1 mm.

**3.2.9 Container** for water immersion of the specimen.

### 3.3 Preparation of test specimens

The two U-profiles<sup>1)</sup> (3.2.1) and the two spacers (3.2.2) are assembled according to the figure and set up on a polyethylene sheet (3.2.4). The delimited volume is filled with sealant, previously conditioned for 24 h at  $23 \pm 2$  °C.

The following precautions shall be taken :

- avoid the formation of air bubbles;
- press the sealant on the inner profile surfaces;
- trim the sealant surface so that it is flush with the face and the ends of the U-profile.

### 3.4 Conditioning of test specimens

The test specimens shall be conditioned either according to method A (see 3.4.1) or according to method B (see 3.4.2).

After conditioning according to one of these methods, the test specimens shall be stored for a further period of at least 24 h at  $23 \pm 2$  °C and  $50 \pm 5$  % relative humidity before testing.

#### 3.4.1 Conditioning method A

The test specimens shall be conditioned for 28 days at  $23 \pm 2$  °C and  $50 \pm 5$  % relative humidity.

1) The U-profiles shall be first cleaned with methyl ethyl ketone or similar solvent, then cleaned with a detergent solution and finally rinsed with distilled water and air dried.

3.4.2 Conditioning method B

The test specimens shall first be conditioned according to method A and subsequently subjected three times to the following storing cycle :

- a) 3 days in the oven (3.2.6) at  $70 \pm 2\text{ }^{\circ}\text{C}$ ;
- b) 1 day in distilled water at  $23 \pm 2\text{ }^{\circ}\text{C}$ ;
- c) 2 days in the oven at  $70 \pm 2\text{ }^{\circ}\text{C}$ ;
- d) 1 day in distilled water at  $23 \pm 2\text{ }^{\circ}\text{C}$ .

This cycle may be carried out alternatively in the sequence : c) — d) — a) — b).

NOTE — Conditioning method B is a normal conditioning procedure using the influence of heat and water. It is not intended to give information on the durability of the sealant.

3.5 Procedure

The test shall be carried out at  $23 \pm 2\text{ }^{\circ}\text{C}$  and  $50 \pm 5\text{ }\%$  relative humidity and all measurements shall be taken with the vernier inside caliper (3.2.8).

The spacers for the preparation of the test specimens shall be removed and the initial width,  $l_0$ , shall be measured at both ends of each test specimen. The test specimens shall than be placed in the extension machine (3.2.7) and extended to 125, 160 or 200 % of the initial width, at a rate of 5 to 6 mm/min.

$l_1$  is the width after extension.

The following table gives the correspondence in millimetres of the extension percentage for a test specimen of 12 mm initial width.

Table — Correspondence of extension values

| Initial width 12 mm  |                       |
|----------------------|-----------------------|
| Extension percentage | Width after extension |
| %                    | mm                    |
| 125                  | 15                    |
| 160                  | 19,2                  |
| 200                  | 24                    |

The extension shall be maintained for 24 h using the appropriate spacers. After this time the spacers shall be removed and the test specimens shall be placed on the talc dusted glass plate (3.2.5). After 1 h, the width after elastic recovery  $l_2$  shall be measured at both ends of each test specimen.

For  $l_0$ ,  $l_1$ ,  $l_2$ , calculate the arithmetic mean of the respective measurements at both ends of the test specimen.

4 Expression of results

Calculate the elastic recovery of each test specimen, by the equation

$$R_e = \frac{l_1 - l_2}{l_1 - l_0} \times 100$$

where

$R_e$  is the elastic recovery, in percent;

$l_0$  is the initial width, in millimetres, between the contact surfaces after conditioning;

$l_1$  is the width, in millimetres, between the contact surfaces under extension;

$l_2$  is the width, in millimetres, between the contact surfaces after elastic recovery.

For  $l_0$ ,  $l_1$  and  $l_2$ , the mean elastic recovery is the arithmetic mean of the elastic recovery of each test specimen.

5 Test report

The test report shall contain the following information :

- a) reference to this International Standard;
- b) name and type of sealant;
- c) batch of sealant from which the test specimens were produced, if possible;
- d) the primer used, if applicable;
- e) the method of conditioning (see 3.4);
- f) the applied value or values of extension in percent (see 3.5);
- g) the elastic recovery of each test specimen, in percent rounded to the nearest 1 % (see clause 4);
- h) values of the mean elastic recovery for each extension value;
- j) any operations not specified in this International Standard which might have affected the results.