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# Buildings and civil engineering works — Sealants — Determination of tear resistance

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**National foreword**

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**Buildings and civil engineering  
works — Sealants — Determination of  
tear resistance**

*Bâtiments et ouvrages de génie civil — Mastics — Détermination de  
la résistance au déchirement*



Reference number  
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## Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 59, *Buildings and civil engineering works*, Subcommittee SC 8, *Sealants*.

# Buildings and civil engineering works — Sealants — Determination of tear resistance

## 1 Scope

This international standard specifies a method for the determination of the tear resistance of sealants used in joints in building construction.

## 2 Normative reference

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 6927, *Buildings and civil engineering works — Sealants — Vocabulary*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 6927 apply.

## 4 Principle

Test specimens are prepared such that the sealant to be tested adheres to two parallel contact surfaces. An incision is realized in the sealant to a defined length. The test specimens are extended to a defined width and this extension is maintained under defined conditions. Any tear propagation is noted.

## 5 Apparatus

**5.1 Substrate materials**, used for the preparation of test specimens as defined in ISO 13640. Other substrate materials may be used as agreed by the parties concerned.

For each test specimen, two substrate pieces of the same material are required with a cross section of dimensions as shown in [Figure 1](#). Test substrates of other dimensions may be used, but then the dimensions of the sealant bead and the area of adhesion shall be the same as those shown in [Figure 1](#).

**5.2 Spacers**, cross section (12 mm × 12 mm) with anti-adherent surface. For the preparation of test specimens see [Figure 1](#).

**5.3 Anti-adherent substrate**, which is for the preparation of the test specimens, for example, polyethylene (PE) film, preferably according to the advice of the sealant manufacturer.

**5.4 Tensile test machine**, capable of extending the test specimens at a rate of  $(5,5 \pm 0,7)$  mm/min.

**5.5 Ventilated convection-type oven**, capable of being maintained at  $(70 \pm 2)$  °C for conditioning according to method B (see [7.3](#)).

**5.6 Container**, immersing test specimens in distilled water for conditioning according to method B (see [7.3](#)).

**5.7 Knife blade**, the width is 6 mm or 9 mm and a minimum length is 12 mm.

**5.8 Separators**, of appropriate dimensions to hold the test specimens extended to 25 %, 40 %, or 50 % of the original width or any other width agreed between the parties concerned.

**5.9 Measuring device**, scaled to 0,5 mm.

## 6 Preparation of test specimens

The sealant and test substrates shall be brought to  $(23 \pm 2)$  °C. Three test specimens shall be prepared. For each specimen two substrates (5.1) and two spacers (5.2) shall be assembled (see Figure 1) and set on the anti-adherent substrate (5.3).

The instructions of the sealant manufacturer concerning, for instance, whether a primer is to be used and the mixing procedure for multi-component sealants shall be followed. The hollow volume formed by the substrates and the spacers shall be filled with the sealant.

The following precautions shall be taken:

- a) formation of air bubbles shall be avoided;
- b) sealant shall be pressed on the inner surfaces of the substrates;
- c) sealant surface shall be tooled so that it is flushed with the faces of the substrates and spacers.

The test specimens shall be set on the edge of one of the supports. The anti-adherent substrate shall be removed as soon as possible. The specimens shall be placed in this position to allow curing or optimum drying of the sealant. The spacers shall be maintained in place during conditioning.

## 7 Conditioning of test specimens

### 7.1 General

The test specimens shall be conditioned either in accordance with method A (see 7.2) or method B (see 7.3), as agreed between the parties concerned.

### 7.2 Method A

The test specimens shall be conditioned for 28 d at  $(23 \pm 2)$  °C and  $(50 \pm 10)$  % relative humidity.

### 7.3 Method B

The test specimens shall be conditioned according to method A and shall then be subjected three times to the following storage cycle:

- a) three days in the oven (5.5) at  $(70 \pm 2)$  °C;
- b) one day in distilled water (5.6) at  $(23 \pm 2)$  °C;
- c) two days in the oven (5.5) at  $(70 \pm 2)$  °C;
- d) one day in distilled water (5.6) at  $(23 \pm 2)$  °C.

Alternatively, this cycle may be carried out in the order c), d), a), b).



After conditioning according to method B, the test specimens shall be stored for 24 h at  $(23 \pm 2) ^\circ\text{C}$  and  $(50 \pm 10) \%$  relative humidity before testing.

NOTE Method B is a normal conditioning procedure using the influence of heat and water. It is not suitable for giving information on the durability of the sealant.

## 8 Test procedure

The test procedure shall be carried out at a temperature of  $(23 \pm 2) ^\circ\text{C}$ .

The spacers (5.2) for the preparation of the test specimens shall be removed.

An incision in the sealant of the test specimens shall be created with either the 6 mm or 9 mm knife blade (5.7) through the complete thickness of the sealant (12 mm). Figure 2 indicates the position of the incision, in the sealant.

The test specimens shall be placed in the tensile test machine (5.4) and extended at a rate of  $(5,5 \pm 0,7) \text{ mm/min}$  by 25 % or 40 %, or 50 % of the original width (to 15 mm, 16,8 mm, and 18 mm respectively), or to any other width as agreed between the parties concerned (see Figure 3). The default defined width is twice the movement capability tested in ISO 9047 for qualification in ISO 11600 and ISO 11618. The initial length of the incision shall be measured and recorded to the nearest 0,5 mm.

The separators (5.8) shall be used to maintain the elongation for 24 h.

The final length of the incision shall be measured using a suitable measuring device capable of reading to 0,5 mm with the separators maintained in position after 24 hours or a suitable time as agreed amongst the parties (5.9). Measure and record the maximum length of the incision with the separators remaining in place.

## 9 Expression of results

For each test specimen, the tear propagation shall be calculated using the formula:

$$\text{Tear propagation (mm)} = \text{final length of the incision (mm)} - \text{initial length of the incision (mm)}$$

The results shall be expressed to the nearest 0,5mm.

The mean of the three results shall be calculated and expressed to the nearest 0,5mm.

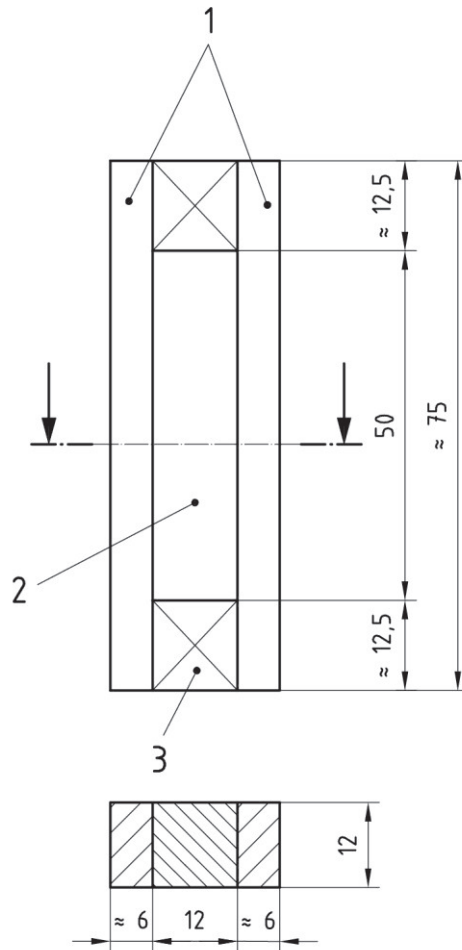
## 10 Test report

The test report shall contain the following information:

- a) test laboratory's name and date of test;
- b) a reference to this International Standard, ISO 19863;
- c) name, type (chemical family) and colour of sealant;
- d) batch of sealant from which the test specimens were produced;
- e) substrate used (see 5.1);
- f) primer used, if applicable;
- g) method of conditioning used (see Clause 7);
- h) elongation (%) (see Clause 8);
- i) the duration in hours of the test;

- j) width of the initial incision into the sealant, and tear propagation, in millimetres, for each test specimen;
- k) the mean of the three tear propagations, in millimetres;
- l) any deviations from this International Standard.

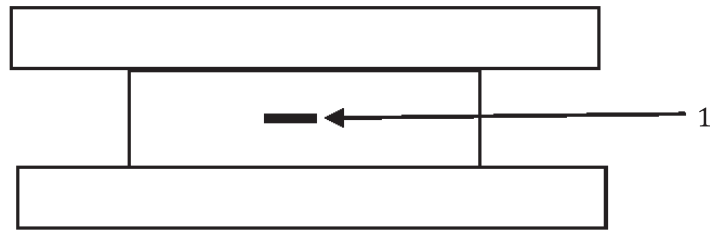
Dimensions in millimetres



**Key**

- 1 mortar substrates
- 2 sealant
- 3 spacer

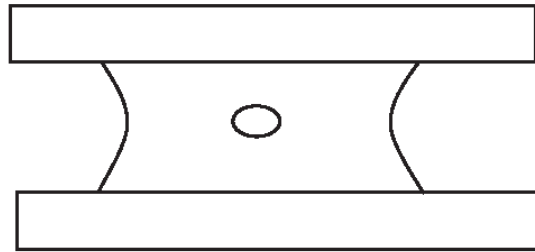
**Figure 1 — Test specimen with mortar or anodized aluminium or glass substrates**



**Key**

1 incision

**Figure 2 — Position of the incision in the sealant**



**Figure 3 — Extended test specimen with cut**

## Bibliography

- [1] ISO 9047, *Building construction — Jointing products — Determination of adhesion/cohesion properties of sealants at variable temperatures*
- [2] ISO 11600, *Building construction — Jointing products — Classification and requirements for sealants*
- [3] ISO 11618, *Buildings and Civil Engineering Works — Sealants — Classification and requirements for pedestrian walkway sealants*
- [4] ISO 13640, *Building construction — Jointing products — Specifications for test substrates*







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## BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

