INTERNATIONAL STANDARD

ISO 8339

Second edition
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Building construction — Sealants — Determination of tensile properties (Extension to break)

Construction immobilière — Mastics — Détermination des propriétés de traction (Allongement jusqu'à rupture)

Reference number
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Contents

Page

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

ISO 8339 was prepared by Technical Committee ISO/TC 59, *Building construction*, Subcommittee SC 8, *Jointing products*.

This second edition cancels and replaces the first edition (ISO 8339:1984), which has been technically revised.

Building construction — Sealants — Determination of tensile properties (Extension to break)

1 Scope

This International Standard specifies a method for the determination of the tensile properties of sealants used in joints in building construction.

NOTE A method for the determination of tensile properties at maintained extension is specified in ISO 8340.

2 Normative references

The following referenced documents are indispensable for the application 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.

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

ISO 8340, *Building construction — Sealants — Determination of tensile properties at maintained extension*

ISO 13640, *Building construction — Jointing products — Specifications for test substrates*

3 Terms and definitions

For the purpose of this document, the 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. The test specimens are extended to break and the tensile properties are recorded on a force/extension diagram. The test results are used to calculate the secant modulus and the extension to break

5 Apparatus

5.1 Substrate materials, used for the preparation of test specimens as defined in ISO 13640. The substrate materials shall be selected from mortar and/or anodized aluminium and/or glass. 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 Figures 1 and 2. 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 Figures 1 and 2.

5.2 Spacers, of cross section (12 mm × 12 mm) with anti-adherent surface. For the preparation of test specimens see Figures 1 and 2.

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

5.4 Tensile test machine, with recording device, capable of extending the test specimens at a rate of (5,5 ± 0,7) mm/min.

5.5 Refrigerated enclosure, capable of holding the test specimens whilst extended at a temperature of (– 20 ± 2) °C.

5.6 Ventilated convection-type oven, capable of being maintained at (70 ± 2) °C for conditioning according to method B (see 7.3).

5.7 Container, for immersing test specimens in distilled water for conditioning according to method B (see 7.3).

6 Preparation of test specimens

The sealant and test substrates shall be brought to (23 ± 2) °C. For each substrate type and each test temperature (see Clause 8) 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) The formation of air bubbles shall be avoided.

b) The sealant shall be pressed on the inner surfaces of the substrates.

c) The sealant surface shall be trimmed so that it is flush 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 days at (23 ± 2) °C and (50 ± 5) % 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 (5.6) at (70 ± 2) °C;

b) one day in distilled water (5.7) at (23 ± 2) °C;

c) two days in the oven (5.6) at (70 ± 2) °C;

d) one day in distilled water (5.7) at (23 ± 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 ± 2) °C and (50 ± 5) % 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

8.1 General

The test procedure shall be carried out at temperatures of (23 ± 2) °C and (– 20 ± 2) °C. Three test specimens shall be tested at each temperature.

8.2 Test procedure at (23 ± 2) °C

The spacers (5.2) for the preparation of the test specimens shall be removed and the test specimen placed in the tensile test machine (5.4) and extended at (23 ± 2) °C at a rate of (5,5 ± 0,7) mm/min until rupture occurs. The force/extension diagram shall be recorded.

8.3 Test procedure at (– 20 ± 2) °C

The test specimens shall be stored (5.5) at (– 20 ± 2) °C for at least 4 h before the start of the test. The spacers (5.2) for the preparation of the test specimens shall be removed and the test specimen placed in the tensile test machine (5.4) and extended at (– 20 ± 2) °C at a rate of (5,5 ± 0,7) mm/min until rupture occurs. The force/extension diagram shall be recorded.

9 Expression of results

9.1 Secant modulus

For each test specimen, the secant modulus (σ) at the chosen elongation shall be calculated using the equation rounded to 0,01 N/mm^2:

$$\sigma = F/s$$

where

σ is the secant modulus, expressed in newtons per square millimetre;

F is the force at chosen elongation, expressed in newtons;

s is the initial cross section area of test specimen, expressed in square millimetres.

9.2 Elongation at break

For each test specimen the elongation at break shall be calculated using the equation:

$$\text{Elongation \%} = [(\text{final width} - \text{original width})/(\text{original width})] \times 100$$

The results shall be expressed to the nearest 5 %.

10 Test report

The test report shall contain the following information:

a) test laboratory's name and date of test;

b) reference to this International Standard;

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) secant modulus for each test specimen at the chosen elongation (100 % or 60 %, or any other elongation as decided by the parties concerned);

i) arithmetic mean of the three secant moduli;

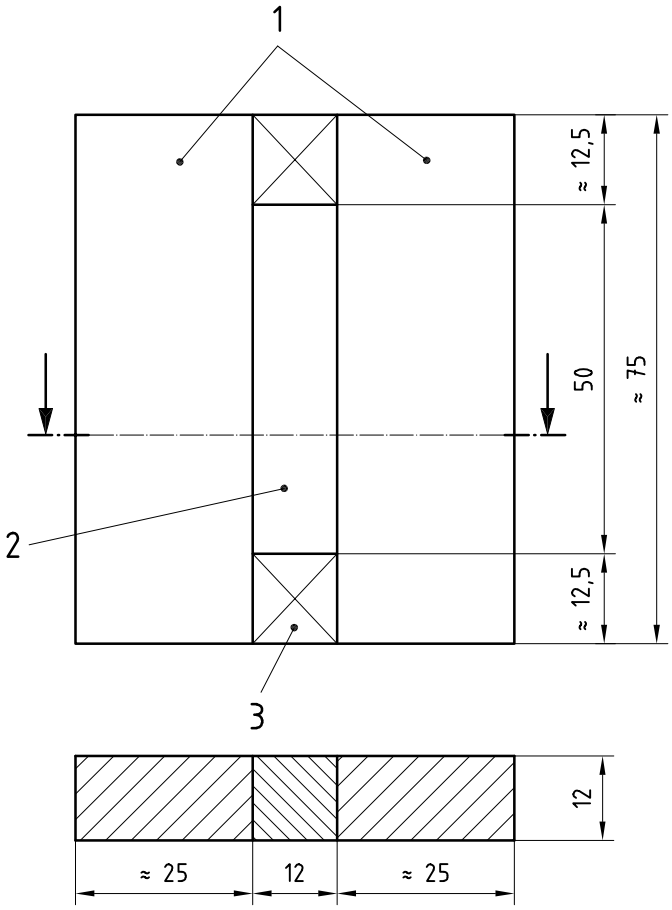
j) elongation at break for each test specimen;

k) arithmetic mean of the three elongations at break;

l) type of break (adhesion and/or cohesion) observed for each test specimen;

m) any deviations from this International Standard.

Dimensions in millimetres

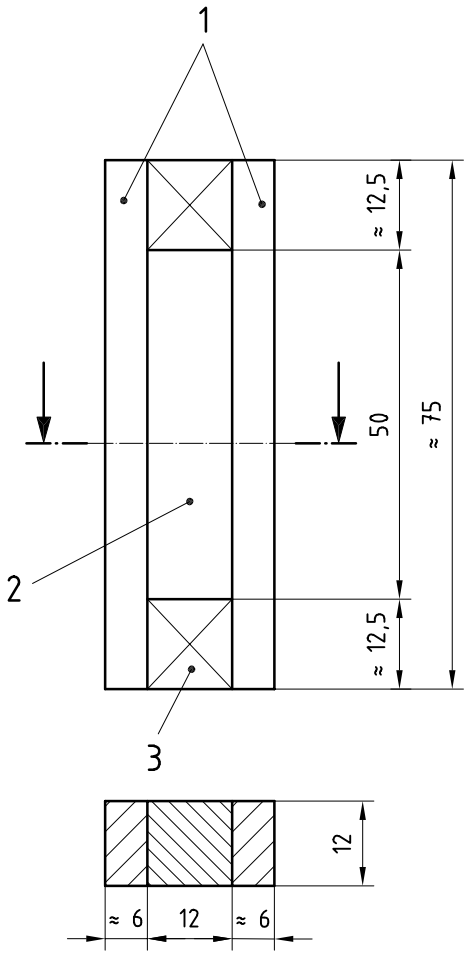


Key

1 mortar substrates
2 sealant
3 spacer (5.2)

Figure 1 — Test specimen with mortar substrates

Dimensions in millimetres



Key

1 anodized aluminium or glass substrates
2 sealant
3 spacer (5.2)

Figure 2 — Test specimen with anodized aluminium or glass substrates

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