
**Building and civil engineering
sealants — Determination of
adhesion/cohesion properties at
constant temperature**

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ISO/PRF 9046

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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.

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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 59, *Buildings and civil engineering works*, Subcommittee SC 8, *Sealants*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/SS B02, *Structures*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and replaces the second edition (ISO 9046:2002), which has been technically revised.

The main changes compared to the previous edition are as follows:

- modified the title;
- modified the rate of test machine;
- modified the requirement of relative humidity;
- modified the anti-adherent substrate.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Building and civil engineering sealants — Determination of adhesion/cohesion properties at constant temperature

1 Scope

The document specifies a method for the determination of the adhesion/cohesion properties of sealants with predominantly plastic behaviour which are used in buildings and civil engineering works.

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.

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

ISO 13640, *Buildings and civil engineering works — Sealants — Specifications for test substrates*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 6927 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>
- IEC Electropedia: available at <http://www.electropedia.org/>

4 Principle

Test specimens are prepared in which the sealant to be tested adheres to two parallel surfaces. After submission to cycles of compression and extension, the test specimens are examined for evidence of loss of adhesion or cohesion.

5 Apparatus

5.1 Substrate material

The mortar or anodized aluminium or glass, used for the preparation of test specimens shall be 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 dimensions as shown in [Figures 1](#) and [2](#). Test substrates of other dimensions may be used, but 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

For the preparation of the test specimens, the spacers shall be of dimensions 12 mm × 12 mm × 12,5 mm with anti-adherent surface (see [Figures 1](#) and [2](#)).

5.3 Anti-adherent substrate

For the preparation of test specimens, the anti-adherent substrate can be, for example, polyethylene (PE) film, PTFE or microporous PTFE, preferably according to the advice of the sealant manufacturer.

5.4 Ventilated convection-type oven

The oven shall be capable of being maintained at $(70 \pm 2) ^\circ\text{C}$.

5.5 Container for water immersion

The container shall be suitable for immersing the specimens according to conditioning method B.

5.6 Test machine

The machine shall be capable of carrying out extension/compression cycles at a rate of $(1 \pm 0,2) \text{ mm/min}$.

5.7 Measuring device

The measuring device shall be scaled in 0,5 mm.

6 Preparation of test specimens

The sealant and the substrate shall be brought to $(23 \pm 2) ^\circ\text{C}$. For each substrate material selected, three test specimens shall be prepared.

For each test specimen, two substrates (5.1) and two spacers (5.2) shall be assembled (see Figures 1 and 2) and set up on the anti-adherent substrate (5.3).

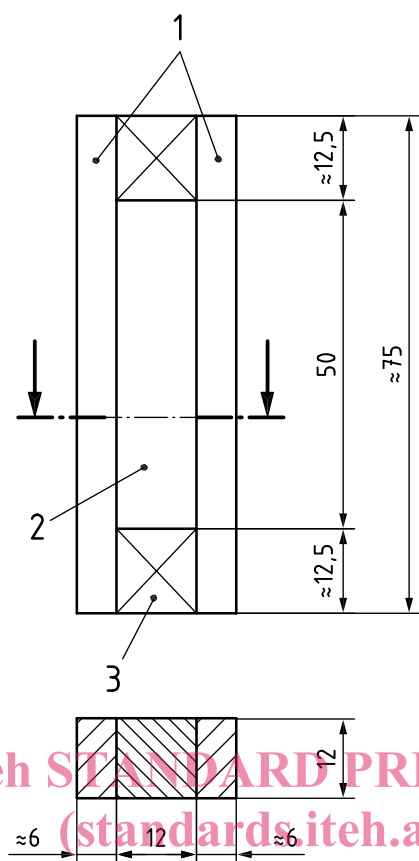
The instructions of the sealant manufacturer concerning, for instance, whether a primer shall be used and the mixing procedure for multi-component sealants shall be followed. The hollow formed by the substrates shall be filled with the sealant.



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Figure 1 — Test specimen with mortar substrates

**Key**

- 1 anodized aluminium or glass substrate
- 2 sealant
- 3 spacer

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iTeh STANDARD PREVIEW
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The following precautions shall be taken:

- a) the formation of air bubbles shall be avoided;
- b) the sealant shall be pressed to the contact surfaces of the substrates;
- c) the sealant surface shall be trimmed so that it is flush with the faces of the substrates and the spacers.

The specimens shall be set on the edge of one of the substrates. The anti-adherent substrate shall be removed as soon as possible. The specimens shall rest 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 Preconditioning**

After preparation, the test specimens shall be preconditioned for 28 days at $(23 \pm 2) ^\circ\text{C}$ and $(50 \pm 10) \%$ relative humidity.

7.2 Specific conditioning

After preconditioning according to 7.1, all test specimens shall be conditioned for 14 days in the oven (5.4) at $(70 \pm 2)^\circ\text{C}$ plus one day at $(23 \pm 2)^\circ\text{C}$ and $(50 \pm 10)\%$ relative humidity.

8 Procedure

Following the conditioning according to Clause 7, the spacers shall be removed; and the test specimens shall be subjected to extension/compression cycles by use of the test machine (5.6) at a test temperature of $(23 \pm 2)^\circ\text{C}$. The number of cycles shall be 100, carried out at a speed of $(1 \pm 0,2)$ mm/min.

The extension/compression amplitude shall be $\pm 12,5\%$ or $\pm 7,5\%$, or any amplitude agreed by the parties concerned.

Table 1 gives the correspondence between the percent of elongation and the final width after extension/compression for a test specimen of an initial width of 12 mm.

Table 1 — Correspondence of amplitude and width values

Amplitude %	Width after extension mm ^a	Width after compression mm ^a
$\pm 12,5$	13,5	10,5
$\pm 7,5$	12,9	11,1
^a The initial width is 12 mm.		

After the test specimens have been submitted to cycling, they shall be allowed to relax for one hour, before being examined for loss of adhesion and/or cohesion. The depth of adhesive or cohesive failures shall be measured using a suitable measuring device capable of reading to 0,5 mm.

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9 Test report

The test report shall contain the following information:

- name of laboratory and date of test;
- a reference to this document;
- name, type (chemical family) and colour of sealant;
- batch of sealant from which the test specimens were produced;
- the substrates used (see 5.1);
- the primer(s) used, if applicable;
- the mix proportion used for multi-component sealants, if applicable;
- the amplitude of the extension/compression cycling (see Clause 8);
- the depth and location of the loss of adhesion and/or cohesion for each test specimen;
- any deviation from this document.