INTERNATIONAL STANDARD

ISO 13638

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Building construction — Sealants — Determination of resistance to prolonged exposure to water

Construction immobilière — Mastics — Détermination de la résistance à une immersion prolongée dans l'eau

Reference number
ISO 13638:1996(E)

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.

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.

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Building construction — Sealants — Determination of resistance to prolonged exposure to water

1 Scope

This International Standard specifies a method for the determination of the ability of sealants to resist differing degrees of exposure to water under conditions of service.

The method assesses the effects of water immersion, for specified durations of time, on the ability of the sealant to fulfil its essential functions, principally to withstand joint movements.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revisions, and parties to agreement based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 6927:1981, *Building construction — Jointing products — Sealants — Vocabulary.*

ISO 9046:1987, *Building construction — Sealants — Determination of adhesion/cohesion properties at constant temperature.*

ISO 9047:1989, *Building construction — Sealants — Determination of adhesion/cohesion properties at variable temperatures.*

ISO 11600:1993, *Building construction — Sealants — Classification and requirements.*

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 6927 apply.

4 Principle

Test specimens are prepared in which the sealant to be tested adheres to two parallel contact surfaces. After immersion of the test specimens in water under defined conditions, they are subjected to repeated extension and compression movements in a suitable device, at an amplitude which is 50 % of that used in the test to assess the respective movement accomodation factor. This procedure is repeated a number of times, or until failure of one or more test specimens is observed. The number of repetitions of water immersion followed by extension/compression movement is related to the expected water resistance in service.

Water immersion may be carried out either at ambient temperature (23 °C), or at elevated temperature (40 °C or 50 °C) to accelerate the influence of the exposure to water.

5 Apparatus

5.1 Concrete and/or aluminium and/or float glass supports, for the preparation of test specimens of dimensions as shown in figures 1 and 2. Two supports are required for each test specimen.

5.2 Spacers, of dimensions 12 mm × 12 mm × 12,5 mm, with non-adherent surfaces, for the preparation of the test specimens (see figures 1 and 2).

If the spacers are made of a material to which the sealant adheres, their surfaces shall be made non-adherent, for example by application of a thin wax coating.

5.3 Non-adherent substrate, for the preparation of test specimens [e.g. polytetrafluoroethylene (PTFE) film or vellum paper, preferably according to the advice of the sealant manufacturer].

5.4 Convection-type oven, with ventilation, capable of being maintained at (70 ± 2) °C.

5.5 Container with heating device, of not less than 10 litre capacity, for immersing the test specimens in water maintained at (23 ± 2) °C, (40 ± 2) °C or (50 ± 2) °C.

5.6 Test machine with a recording device, capable of executing extension/compression cycles and extension at a rate of (5,5 ± 0,5) mm/min.

Dimensions in millimetres

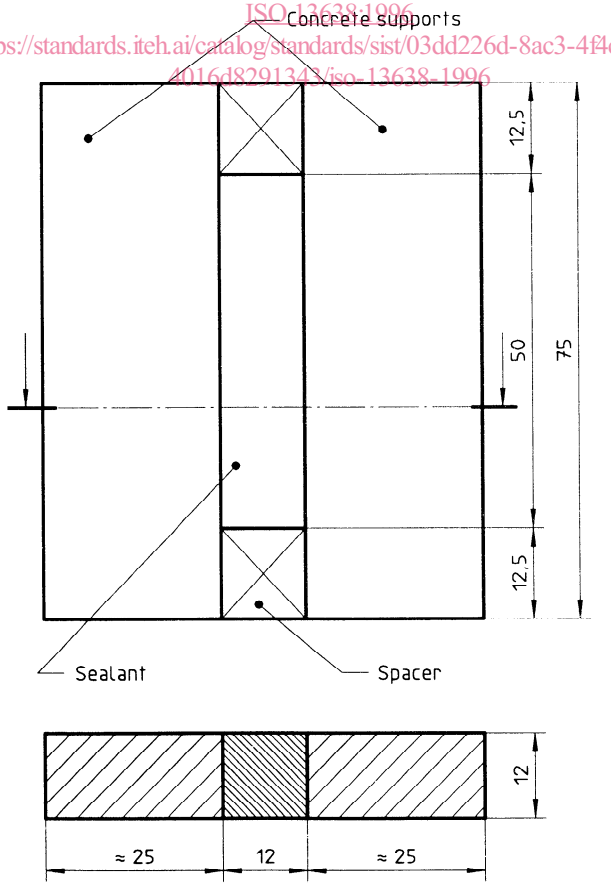

Figure 1 — Test specimen with concrete supports

Dimensions in millimetres

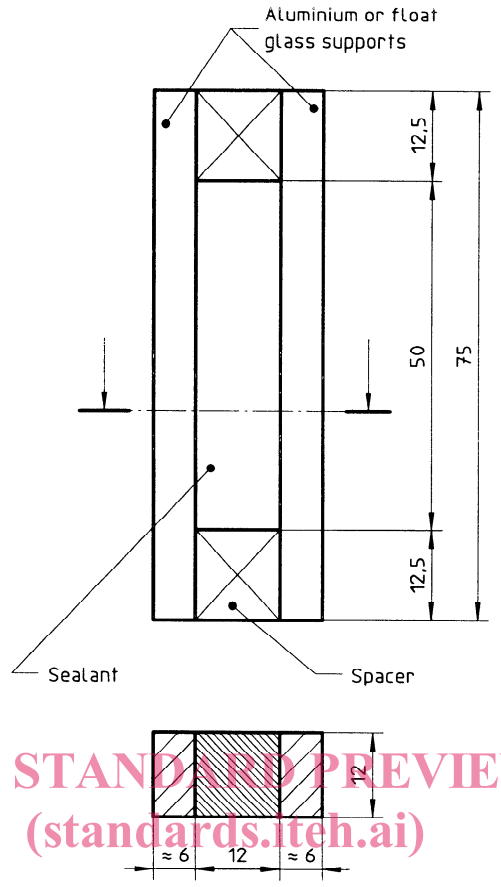

Figure 2 — Test specimen with aluminium or float glass supports

6 Preparation of test specimens

Prepare five test specimens for each support material to be used at the same time.

Assemble for each test specimen, two supports (5.1) and two spacers (5.2) according to figures 1 and 2 and place them on the non-adherent substrate (5.3), which should be wetted by water with the addition of detergents to facilitate later removal of the test specimens.

Follow the instructions of the sealant manufacturer, for instance as to whether a primer is to be used.

Fill the hollow volume formed by the supports and spacers with the sealant which has been previously conditioned for 24 h at (23 ± 2) °C. Take the following precautions:

a) avoid the formation of air bubbles;

b) press the sealant on the inner surfaces of the supports;

c) trim the sealant surface so that it is flush with the faces of the supports and spacers.

Set the test specimens on the edge of one of the supports and remove the non-adherent substrate as soon as possible. Let the specimens rest in this position to allow curing or optimum drying of the sealant. Maintain the spacers in place during conditioning.

7 Conditioning

Condition the test specimens in accordance with either method A or method B, as agreed between the parties concerned.

7.1 Method A

Condition the test specimens for 28 days at (23 ± 2) °C and (50 ± 5) % relative humidity.

7.2 Method B

Condition the test specimens according to method A and then subject them three times to the following storage cycle:

a) 3 days in the oven (5.4) set at 70 °C;

b) 1 day in the container (5.5) filled with distilled water maintained at 23 °C;

c) 2 days in the oven (5.4) set at 70 °C;

d) 1 day in the container (5.5) filled with distilled water maintained at 23 °C.

Alternatively, this cycle may be performed in the order c), d), a) then b).

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

8 Procedure

8.1 Water immersion

After conditioning, remove the spacers and store the test specimens for 3 weeks in the container (5.5) filled with distilled water maintained at 23 °C, 40 °C or 50 °C. At the end of the period of immersion, remove the test specimens from the water and store them for 1 h at (23 ± 2) °C and (50 ± 5) % relative humidity.

8.2 Cyclic movement

The movement accomodation factor for the sealant shall be determined by the method of ISO 9046 or ISO 9047, as appropriate by reference to ISO 11600.

The amplitude of the extension/compression cycle in the test machine (5.6) shall be 50 % of that used in the movement capability determination by which the sealant is classified (see ISO 11600:1993, table 1 and subclause 4.2).

The speed of extension and compression used in the cyclic test procedure shall be (5,5 ± 0,5) mm/min and the amplitude ± 6,25 % or ± 12,5 % of the nominal width, or as required. The procedure shall be carried out at (23 ± 2) °C and (50 ± 5) % relative humidity.

First extend the test specimens by the requisite amount and maintain this extension for 24 h. Then release the extension and compress the test specimens to the requisite amount. Maintain this compression for 24 h.

Repeat this extension/compression procedure twice. At the conclusion of the third cycle, release the compression and allow the specimens to recover for 1 h in air at (23 ± 2) °C.

8.3 Visual inspection

Carrefully examine the test specimens for any loss of cohesion or adhesion. An estimate shall be made for each specimen of the total area over which a loss of cohesion and/or adhesion has occurred.

8.4 Repeat of water immersion and cyclic movement

If none, or only one, of the five specimens shows visible cohesive and/or adhesive failure over a total of not more than 10 % of the area of the substrate to which the sealant is adhered, all the specimens shall be returned to storage in distilled water at the same temperature as for the first immersion. Then repeat the procedures described in 8.1 to 8.3 and record the results of the visual inspection.

This procedure shall be repeated as many times as agreed between the parties concerned, or until two or more specimens show visible loss of cohesion and/or adhesion, amounting in total to 10 % or more of the area of cross-section of both specimens, after repetition of the water immersion and cyclic movement procedures.

9 Test report

The test report shall make reference to this International Standard and shall include the following information:

a) name and type of sealant;

b) batch of sealant from which the test specimens were prepared, if known;

c) nature of the supports (5.1);

d) the primer used, if applicable;

e) the method of conditioning used (see clause 7);

f) the temperature of the water used for immersion of the test specimens (see 8.1);

g) the amplitude of extension/compression used (see 8.2);

h) the total number of cycles of water immersion followed by extension/compression to which the test specimens were subjected;

i) the results of the visual inspection of all the test specimens tested at the end of each of the test cycles carried out; i.e. whether any breaks in the sealant occurred and, if so, the type of failure (adhesion or cohesion);

j) any deviations from the specified test conditions.

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