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Building construction — Sealants — Classification and requirements

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Foreword

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International Organization for Standardization
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Building construction — Sealants — Classification and requirements

1 Scope

This International Standard specifies the types and classes of sealant used in building construction according to their applications and performance characteristics. Furthermore, the requirements and respective test methods for the different classes are stipulated.

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 revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

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

ISO 7389:1987, *Building construction — Jointing products — Determination of elastic recovery*.

ISO 7390:1987, *Building construction — Jointing products — Determination of resistance to flow*.

ISO 8339:1984, *Building construction — Jointing products — Sealants — Determination of tensile properties*.

ISO 8340:1984, *Building construction — Jointing products — Sealants — Determination of tensile properties at maintained extension*.

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 10563:1991, *Building construction — Sealants for joints — Determination of change in mass and volume*.

ISO 10590:1991, *Building construction — Sealants — Determination of adhesion/cohesion properties at maintained extension after immersion in water*.

ISO 10591:1991, *Building construction — Sealants — Determination of adhesion/cohesion properties after immersion in water*.

ISO 11431:1993, *Building construction — Sealants — Determination of adhesion/cohesion properties after exposure to artificial light through glass*.

ISO 11432:1993, *Building construction — Sealants — Determination of resistance to compression*.

3 Definitions

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

4 Classification

4.1 Types

According to their applications, sealants are separated into two types:

- type G glazing sealants for use in glazing joints
- type F construction sealants for use in building joints other than glazing

4.2 Classes

Sealants are classified according to their capability to fulfil sealing functions in joints with movement parameters as given in table 1.

Table 1 — Sealant classes

Class	Test amplitude %	Movement capability %
25	± 25	25
20	± 20	20
12,5	± 12,5	12,5
7,5	± 7,5	7,5

Classes 25 and 20 apply to both types of sealant G and F, while classes 12,5 and 7,5 apply to sealants of type F only.

4.3 Sub-classes

4.3.1 Sealants of class 25 or class 20 are additionally sub-classified according to their secant tensile modulus (see ISO 6927):

- low modulus code LM
- high modulus code HM

If the measured secant tensile modulus value exceeds the values specified below for either or both test temperatures, the sealant shall be classified as "high modulus". Specified values (see tables 2 and 3, second line) are as follows:

0,4 N/mm² at + 23 °C

0,6 N/mm² at – 20 °C

4.3.2 Sealants of class 12,5 are additionally sub-classified according to their elastic recovery:

- elastic recovery equal to or more than 40 % code E (elastic)
- elastic recovery less than 40 % code P (plastic)

Sealants of classes 25, 20 and 12,5E are called "elastic sealants"; sealants of classes 12,5P and 7,5 are called "plastic sealants".

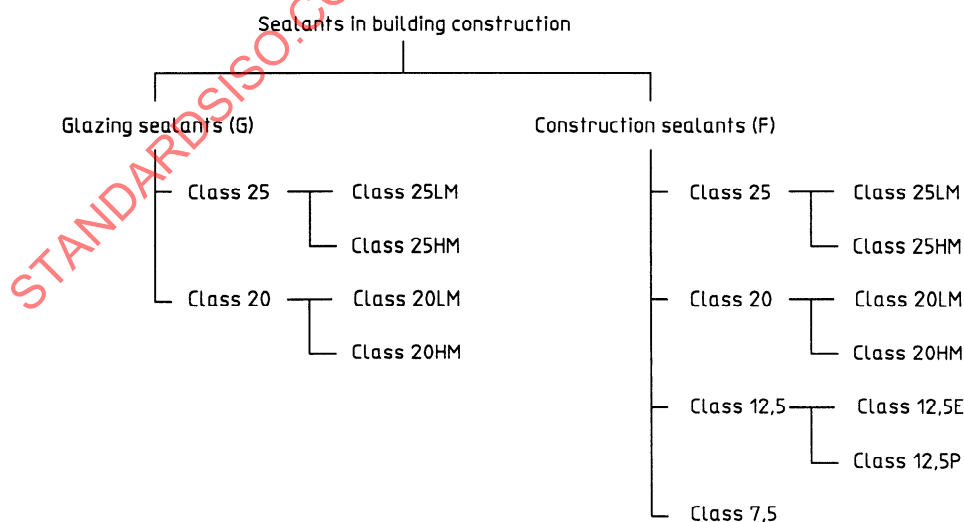


Figure 1 — Diagram of classification of sealants in building construction

5 Designation

Sealants shall be designated by the symbols for the type, class and, if applicable, the sub-class in accordance with clause 4.

EXAMPLE

A construction sealant (F) having a movement capability of at least 12,5 % and an elastic recovery of less than 40 % (12,5P) shall be designated as follows:

Sealant ISO 11600 - F - 12,5P

6 Requirements and test methods

All sealants independent of type and class shall have a maximum flow of 3 mm in accordance with ISO 7390. Test conditions are specified in 7.2.

Further requirements and test methods are tabulated

- for type G sealants, in table 2,
- for type F sealants, in table 3.

7 Specified test conditions

7.1 General

For testing a sealant product, a uniform method of conditioning (A or B) shall be applied for test procedures where these two methods are stipulated by choice.

For each test method, three test specimens shall be tested.

A test specimen is said to have failed if, after the first extension, the sum of adhesive and cohesive failures exceeds 5 %. Test specimens which pass the first extension are said to fail in subsequent extensions if the sum of additional adhesive or cohesive failures exceeds 10 %.

If one of the three test specimens fails, the test shall be repeated once. If more than one test specimens fail, the sample shall be reported as failing that test.

Table 2 — Requirements for glazing sealants (G)

Properties	Classes				Test methods
	25LM	25HM	20LM	20HM	
Elastic recovery (%)	≥ 60	≥ 60	≥ 60	≥ 60	ISO 7389 ¹⁾
Tensile properties, secant tensile modulus at 23 °C (N/mm ²)	≤ 0,4	> 0,4	≤ 0,4	> 0,4	ISO 8339
at – 20 °C (N/mm ²)	and	or	and	or	
at an extension of 2 ²⁾ (%)	≤ 0,6	> 0,6	≤ 0,6	> 0,6	
	200	200	160	160	
Tensile properties at maintained extension	nf	nf	nf	nf	ISO 8340 ¹⁾
Adhesion/cohesion properties at variable temperatures	nf	nf	nf	nf	ISO 9047 ¹⁾
Adhesion/cohesion properties after exposure to artificial light	nf	nf	nf	nf	ISO 11431 ¹⁾
Adhesion/cohesion properties at maintained extension after water immersion	nf	nf	nf	nf	ISO 10590 ¹⁾
Resistance to compression (N/mm ²)	3)	3)	3)	3)	ISO 11432 ¹⁾
Loss of volume (%)	≤ 10	≤ 10	≤ 10	≤ 10	ISO 10563

nf = no failure

1) Under specified test conditions; see clause 7.

2) The value of the extension is on the basis that the original width is 100 %.

3) The value of the compression stress shall be recorded.

Table 3 — Requirements for construction sealants (F)

Properties	Classes							Test methods
	25LM	25HM	20LM	20HM	12,5E	12,5P	7,5	
Elastic recovery (%)	≥ 70	≥ 70	≥ 60	≥ 60	≥ 40	—	—	ISO 7389 ¹⁾
Tensile properties								ISO 8339
a) secant tensile modulus at 23 °C (N/mm ²)	≤ 0,4	> 0,4	≤ 0,4	> 0,4	—	—	—	
at – 20 °C (N/mm ²)	≤ 0,6	> 0,6	≤ 0,6	> 0,6	—	—	—	
at an extension of 2) (%)	200	200	160	160	—	—	—	
b) elongation at break (%)	—	—	—	—	—	≥ 100	≥ 20	
Tensile properties at maintained extension	nf	nf	nf	nf	nf	—	—	ISO 8340 ¹⁾
Adhesion/cohesion properties at variable temperatures	nf	nf	nf	nf	nf	—	—	ISO 9047 ¹⁾
Adhesion/cohesion properties at constant temperatures	—	—	—	—	—	nf	nf	ISO 9046 ¹⁾
Adhesion/cohesion properties at maintained extension after water immersion	nf	nf	nf	nf	nf	—	—	ISO 10590 ¹⁾
Adhesion/cohesion properties after water immersion, elongation at break (%)	—	—	—	—	—	≥ 100	≥ 20	ISO 10591
Loss of volume (%)	≤ 10 ³⁾	≤ 10 ³⁾	≤ 10 ³⁾	≤ 10 ³⁾	≤ 25	≤ 25	≤ 25	ISO 10563
nf = no failure								
1) Under specified test conditions; see clause 7.								
2) The value of the extension is on the basis that the original width is 100 %.								
3) Max. 25 % for water-based dispersive sealants.								

7.2 Resistance to flow

For testing in accordance with ISO 7390, the following conditions shall be applied.

The U-profile with a nominal width of 20 mm and a nominal depth of 10 mm shall be used. Test temperatures of $(50 \pm 2) ^\circ\text{C}$ and $(5 \pm 2) ^\circ\text{C}$ shall be applied.

7.3 Elastic recovery

For testing in accordance with ISO 7389, the extension to be applied shall be as follows:

class 25LM sealants	200 %
class 25HM sealants	200 %
class 20LM sealants	160 %
class 20HM sealants	160 %
class 12,5E sealants	160 %

7.4 Tensile properties at maintained extension

For testing in accordance with ISO 8340, the extension to be applied shall be as follows:

class 25LM sealants	200 %
class 25HM sealants	200 %
class 20LM sealants	160 %
class 20HM sealants	160 %
class 12,5E sealants	160 %

7.5 Adhesion/cohesion properties at variable temperatures

For testing in accordance with ISO 9047, the amplitude of extension/compression shall be as follows:

class 25LM sealants	± 25 %
class 25HM sealants	± 25 %