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**Steklo v gradbeništvu – Produktni standard za strukturna in/ali UV-odporna tesnila (za uporabo v strukturnih zasteklitvah in/ali v izolacijskih steklih z nezavarovanim robnim tesnjenjem)**

Glass in building - Product standard for structural and/or ultra-violet resistant sealant (for use with structural sealant glazing and/or insulating glass units with exposed seals)

Glas im Bauwesen - Produktnorm für lastübertragende und/oder UV-beständige Dichtstoffe (für geklebte Verglasungen und/oder Isolierverglasungen mit exponierten Dichtungen)

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Verre dans la construction - Norme de produits pour produit de collage et de scellement structurel et/ou résistants aux rayonnements ultraviolets (utilisé pour les vitrages extérieurs collés et/ou pour les vitrages isolants à bords exposés)

**Ta slovenski standard je istoveten z: EN 15434:2006**

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**ICS:**

81.040.20      Steklo v gradbeništvu      Glass in building

**SIST EN 15434:2006**

**en**

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English Version

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This European Standard was approved by CEN on 3 April 2006.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

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## Foreword

This European Standard (EN 15434:2006) has been prepared by Technical Committee CEN/TC 129 “Glass in building”, the secretariat of which is held by IBN/BIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2006, and conflicting national standards shall be withdrawn at the latest by November 2006.

This European Standard is one of a series of interrelated standard parts dealing with:

- glass products for structural sealant glazing systems;
- installation of glass products in a structural manner on building façades;
- UV-resistant and structural sealant for use in structural sealant glazing

The interrelated parts are:

- EN 13022-1: Glass in building — Structural sealant glazing — Part 1: Glass products for structural sealant glazing systems for supported and unsupported monolithic and multiple glazing
- EN 13022-2: Glass in building — Structural sealant glazing — Assembly rules
- EN 15434: Glass in building — Product standard for structural and/or ultra-violet resistant sealant (for use with structural sealant glazing and/or insulating glass units with exposed seals)

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

## 1 Scope

This European Standard covers the evaluation of conformity and the factory production control of sealant for the intrinsic capabilities when intended to apply for:

- manufacturing of insulating glass units where ultra-violet resistance and/or mechanical resistance (structural use) of the insulating glass edge seal is required:
  - required level of resistance to UV exposure will depend on the degree of exposure to UV radiation with or without protection;
  - when the outer seal of the insulating glass has a structural function and/or is exposed to the UV radiation without any protection, only silicone based sealants are permitted;
  - when the outer seal of the insulating glass has no structural function and is protected from direct exposure to UV radiation, organic and silicone based sealants are permitted;
- manufacturing of factory made structural sealant glazing elements when referred to by the relevant European Standards and ETAGs.

Only silicone based sealants are permitted;

- assembling of glass products into or onto supports, where also ultra-violet resistance and/or mechanical resistance (structural use) of the seal is required under controlled environmental conditions as described in Clause 5 of EN 13022-2:2006

Only silicone based sealants are permitted.

This European Standard also specifies requirements concerning seals and bonds of sealant in conformity with this European Standard.

- When bonding of sealant to a non-glass substrate is tested, the substrate, which means the material, its treatment and its preparations for bonding, as applied or to be applied on the work is used in testing (coating of coated glass is considered as a non-glass substrate).

This European Standard contains other aspects of importance of trade.

## 2 Normative references

The following referenced documents are indispensable for the application of this European Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 572-1, *Glass in building — Basic soda lime silicate glass products — Part 1: Definitions and general physical and mechanical properties*

EN 572-2, *Glass in building — Basic soda lime silicate glass products — Part 2: Float glass*

EN 1279-4:2002, *Glass in building — Insulating glass units — Methods of test for the physical attributes of edge seals*

EN 13022-1:2006, *Glass in Building — Structural sealant glazing — Glass products for structural sealant glazing systems for supported and unsupported monolithic and multiple glazing*

EN 13022-2:2006, *Glass in building — Structural sealant glazing — Assembly rules*



EN 13501-1, *Fire classification of construction products and building elements — Part 1: Classification using test data from reaction to fire tests*

EN ISO 527-3, *Plastics — Determination of tensile properties — Part 3: Test conditions for films and sheets (ISO 527-3:1995)*

EN ISO 868, *Plastics and ebonite — Determination of indentation hardness by means of a durometer (Shore hardness) (ISO 868:2003)*

EN ISO 1183-1:2004, *Plastics — Methods for determining the density of non-cellular plastics — Part 1: Immersion method, liquid pycnometer method and titration method (ISO 1183-1:2004)*

EN ISO 3231, *Paints and varnishes — Determination of resistance to humid atmospheres containing sulfur dioxide (ISO 3231:1993)*

EN ISO 4892-2, *Plastics — Methods of exposure to laboratory light sources — Part 2: Xenon-arc lamps (ISO 4892-2:1995)*

EN ISO 7389, *Building construction — Jointing products — Determination of elastic recovery of sealants (ISO 7389:2002)*

EN ISO 8339, *Building construction — Sealants — Determination of tensile properties (Extension to break) (ISO 8339:2005)*

prEN ISO 9227, *Corrosion tests in artificial atmospheres — Salt spray tests (ISO/FDIS 9227:2006)*

EN ISO 10563, *Building construction — Sealants — Determination of change in mass and volume (ISO 10563:2005)*

EN ISO 11358:1997, *Plastics — Thermogravimetry (TG) of polymers — General principles (ISO 11358:1997)*

ISO 16269-6, *Statistical interpretation of data — Part 6: Determination of statistical tolerance intervals*

### 3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 13022-1:2006, EN 13022-2:2006, EN 1279-4:2002 and the following apply.

#### 3.1

##### **initial cure**

stage in the curing where sealant has appropriate cohesive strength to resist to different levels of action

#### 3.2

##### **creep factor**

shear design stress under dynamic load

#### 3.3

##### **initial type testing**

determination of the performance of a product (characteristic, durability), on the basis of either actual tests or other procedures (such as conventional, standardised, tabulated or general accepted values, standardised or recognised calculation methods, test reports when made available), in accordance with this European Standard that demonstrates compliance with this European Standard

### 3.4

#### **test report**

document that covers the results of tests undertaken on a representative sample of the product from production or on a prototype design of the product

### 3.5

#### **product description**

document that details the relevant parameters for defining a product that complies with the standard. It includes specific reference(s) to characteristics that are modified by the production process and by raw materials

### 3.6

#### **significant change**

variation in performance beyond the permitted tolerance for the characteristic

### 3.7

#### **type of rupture**

number of tests prescribe "Rupture  $\geq 90$  % cohesive", i.e. the rupture of the samples need to be located at least 90 % within the sealant and a maximum 10 % at the interface between the sealant and the glass

## 4 Sealant

### 4.1 General

For conformity purposes, the sealant manufacturer shall describe the product in a product description, which will be part of the factory production control documentation, or of the quality insurance system, whichever is applied.

Disclosure of the product description is entirely at the discretion of the sealant manufacturer or his agent.

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The product description shall contain at least a normative part, and may contain an informative part when the manufacturer foresees further development of the product.

The product description shall be prepared under the responsibility of the sealant manufacturer or his agent.

### 4.2 The compulsory part of the product description

The compulsory part of the description consists of three sub parts:

1) component description:

name and/or type of the sealant, together if it concerns a mono or a multiple component sealant

and in the case of a multiple component sealant, the mixing ratio and the tolerances of the mixing ratio within which the performances of the characteristics and properties does not change significantly;

2) initial cure information:

— relevant data (or figure or values) depending on the temperature and the relative humidity, the chemistry of the curing system, number of components, mixing ratio and tolerances, section of the sealant to be applied, the nature of the adhesion surfaces ...;

3) cured sealant description:

- list of identification test results in accordance with 5.2 in order to ensure no significant change in the characteristics, properties and durability of the sealant.

The definition of product families shall be consistent with the normative part of the product description.

The substitution of raw materials or change in the process shall maintain the conformity with the product description. The substituting material can be added to the product family and also the product description when compliance has been demonstrated.

## 5 Requirements

### 5.1 General

#### 5.1.1 Identification - performances

Sealants shall be identified by the tests referred to in 5.2.

The performances of the characteristics claimed in Table 1 shall be determined. The assessments to which Table 1 refers include the durability of the sealant.

#### 5.1.2 Application

The sealant shall be applied in conformity with the manufacturer's recommendations and of the requirements of Clause 5 of EN 13022-2:2006.

**Table 1 — The performances of the characteristics to determine if relevant**

Nr	Performance of characteristic:	Refer to:
1	Mechanical resistance and stability	None
2	Safety in case of fire: 2.1 Reaction to fire	5.6
3	Hygiene, health and the environment:: 3.1 Release of dangerous substances	5.7
4	Safety in use: 4.1 Resistance against wind, snow, permanent load and/or imposed loads of the glass unit	5.3 and 5.4
5	Protection against noise (when intended for use in insulating glass seal):	5.3, 5.4, 5.5 and 5.8
6	Energy economy and heat retention (when intended for use in insulating glass seal):	5.3, 5.4, 5.5 and 5.8

### 5.2 Identification tests

#### 5.2.1 General

All tests of 5.2 except 5.2.5 "Change in volume" are carried out on cured products. When no curing time has explicitly been stated by the sealant manufacturer, a curing time of at least 28 days at (23 ± 2) °C and (50 ± 5) % relative humidity shall be maintained.

The identification test performances are independent of the production equipment used, provided that a factory production control in accordance with Annex C is in use.

### 5.2.2 Thermogravimetric analysis

The test shall be carried out in accordance with EN ISO 11358:1997, Temperature scanning method, Procedure A, non-oxidative condition, temperature slope 10 °C/min.

After conditioning / curing: (23 ± 2) °C, (50 ± 5) % RH, 28 days.

Number of test pieces: 1.

Evaluation:

- curve and the first derivate of the curve;
- percentage of cumulative losses up to 900 °C;
- zones of maximum loss through volatilisation;
- exo- or endothermic conversion zones.

### 5.2.3 Specific gravity

The determination of the specific mass shall be in accordance with EN ISO 1183-1:2004, Method A.

Test samples to take from:

- cured product;
- non cured product (mono component sealant);
- components (multiple component sealant).

Number of test pieces per test sample: 3

Evaluation: each value, after complete curing shall be within the minimum and maximum value declared by the sealant manufacturer.

### 5.2.4 Shore A hardness

The measurement of the shore A hardness shall be carried out in accordance with EN ISO 868.

Test time: 3 s, every sample 5 times.

The measurement shall be carried out on three test pieces after full curing of the sealant.

Number of test specimen: 3.

Evaluation: each value after complete curing shall be within the minimum and maximum value declared by the sealant manufacturer.

### 5.2.5 Change in volume or shrinkage

The aim of this test is to evaluate the degree of change of volume or shrinkage of the structural sealants to limit the initial stresses in the SSG joints.

The test shall be carried out in accordance with EN ISO 10563.

Number of test pieces: 3.

Evaluation: the average change in volume shall not exceed 10 %.

### 5.2.6 Infrared spectrometer analysis

The infrared spectrum is measured by transmission or by reflection in the range from 2,4  $\mu\text{m}$  to 50  $\mu\text{m}$ , preferably by use of a KRS 5 crystal.

Test specimen: a tongue shaped amount of cured sealant which shall be conditioned for at least 48 h at  $(23 \pm 2) ^\circ\text{C}$ , subsequently subjected to pyrolysis.

Evaluation: the measured spectrum highlighting the relevant characteristic wavelengths of absorption.

## 5.3 Intrinsic properties

### 5.3.1 General

For determining these properties, the tests are to be carried out on test pieces according to 5.3.2.

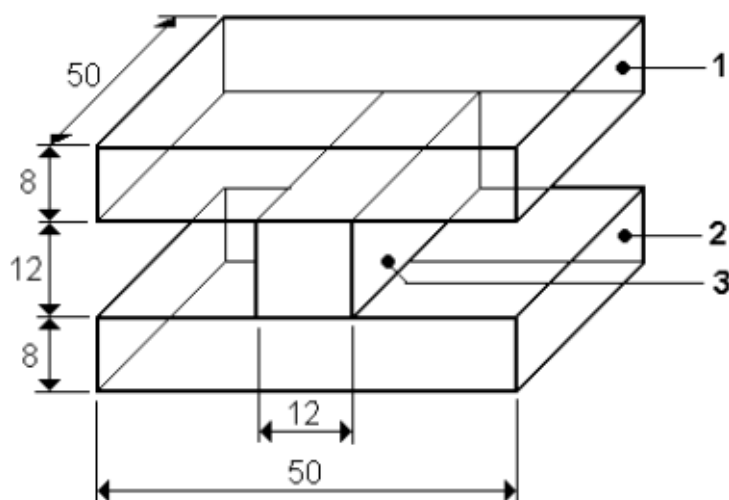
The rigidity modulus and strength  $R_{u,5}$  are defined in Annex A.

The intrinsic properties are independent of the production equipment used, provided that a factory production control in accordance with Annex C is in use.

### 5.3.2 Standard substrates and test pieces

Flat float glass, in accordance with EN 572 Parts 1 and 2, is to be used as a standard glass substrate.

Unless otherwise indicated in the various clauses, test pieces are to be used with the dimensions given in Figure 1. Substrate dimension may be different from those given in Figure 1. The dimensions of the sealant joint, however, shall always be 12 mm x 12 mm x 50 mm.

**Key**

- 1 float glass
- 2 float glass
- 3 sealant

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**Figure 1 — Standard test piece**

Unless otherwise specified in this European Standard the test pieces shall be conditioned for 28 days at  $(23 \pm 2) ^\circ\text{C}$  and  $(50 \pm 5) \% \text{ R.H.}$  or in conformity with the specification of the sealant's manufacturer.

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The stresses are given in MPa by the ratio of the breaking force in N and the initial cross section area in  $\text{mm}^2$ .

### 5.3.3 Tensile

Tests are carried out in conformity with EN ISO 8339, Conditioning A.

After conditioning for  $24 \pm 4$  hours, pulling of the test pieces at the following temperatures:

- for the class T1:  $-20 ^\circ\text{C}$ ,  $+23 ^\circ\text{C}$ ,  $+80 ^\circ\text{C}$ ;
- for the class T2:  $-40 ^\circ\text{C}$ ,  $+23 ^\circ\text{C}$ ,  $+80 ^\circ\text{C}$  (for Nordic countries).

Number of test specimen: 10 for each temperature.

Evaluation:

a) general:

visual examination: rupture shall be at least of 90 % cohesive;

b) sealant for structural purposes.

Criteria as defined in Table 2:

**Table 2 — Criteria for sealant for structural purposes**

	Criteria
Class T1:	
80 °C	$\Delta_{x \text{ mean}} \geq 75 \%$
23 °C	$R_{u5} \geq 0,5 \text{ MPa}$
-20 °C	$\Delta_{x \text{ mean}} \geq 75 \%$
Class T2:	
80 °C	$\Delta_{x \text{ mean}} \geq 75 \%$
23 °C	$R_{u5} \geq 0,5 \text{ MPa}$
-40 °C	$\Delta_{x \text{ mean}} \geq 75 \%$

With  $\Delta_{x \text{ mean}} = X_{\text{mean } 0^\circ\text{C}} / X_{\text{mean } 23^\circ\text{C}}$

$X_{\text{mean}}$  is defined in A.1.

From the stress-at-elongation graph recorded, the following shall be noted:

- type of failure - whether cohesive or adhesive;
  - stress at elongations of 5 %, 10 %, 15 %, 20 % and 25 %;
  - stress and elongation at rupture, only for test specimens conditioned at + 23 °C.
- c) sealant for use for non structural insulating glass unit seals
- strength and elongation criteria according to EN 1279-4.

#### 5.3.4 Shear at 23 °C

Tests are carried out in conformity with Annex B.

Direction of force: longitudinal.

Number of test specimen: 10.

Pulling of the test pieces at the following temperatures: -20 °C, +23 °C, +80 °C.

Evaluation: Shear displacement.

Criteria identical to 5.3.3.

Rupture shall be at least of 90 % cohesive.

#### 5.3.5 Elastic recovery

The purpose of the test is to evaluate the elastic recovery behaviour and consequently the relaxation behaviour after long term loading.

The test shall be carried out in accordance with EN ISO 7389, Conditioning A with a load to give 25 % elongation (= 125 % of original length).