



SLOVENSKI STANDARD
oSIST prEN 16759:2014
01-september-2014

Sistemi strukturne zasteklitve (SSGS)

Structural Sealant Glazing Systems (SSGS)

Geklebte Glaskonstruktionen (SSGS)

Vitrages extérieurs collés (VEC)

Ta slovenski standard je istoveten z: prEN 16759

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ICS:

81.040.20	Steklo v gradbeništvu	Glass in building
91.060.10	Stene. Predelne stene. Fasade	Walls. Partitions. Facades
91.060.50	Vrata in okna	Doors and windows

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en,fr,de

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 16759

June 2014

ICS 81.040.20; 91.060.10; 91.060.50

English Version

Structural Sealant Glazing Systems (SSGS)

Vitrages extérieurs collés (VEC)

Geklebte Glaskonstruktionen (SSGS)

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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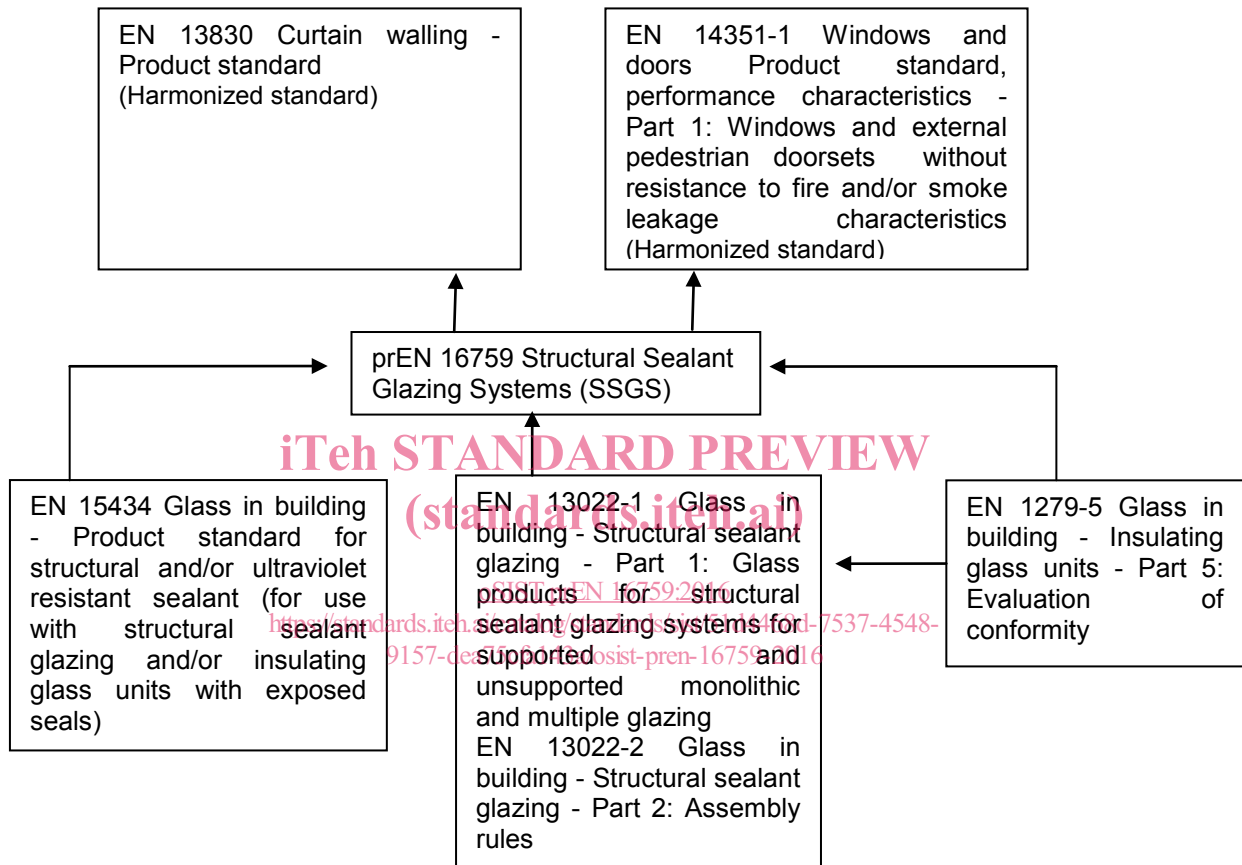
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Foreword

This document (prEN 16759:2014) has been prepared by Technical Committee CEN/TC 33 “Doors, windows, shutters, building hardware and curtain walling”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.



1 Scope

This European Standard specifies the method to be used to verify the mechanical performance of Structural Sealant Glazing Systems.

It applies to any window/doorset or curtain walling application (see Annex A).

Structural Sealant Glazing can be incorporated into the product as follows:

- either vertically; or
- up to 83° from the vertical (positive slope)
- up to 15° from the vertical onto the building face (negative slope).

NOTE A wall has a positive slope if its outer surface faces upwards.

It gives information to the manufacturer to comply with requirements regarding design, factory production control and assembly rules.

The parts concerned in the testing are the metal profile (anodized and coated aluminium, stainless steel), the glass coated or not which shall be bonded, the sealant and mechanical restraints when required.

The testing does not apply to other framing materials.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 573-3, *Aluminium and aluminium alloys - Chemical composition and form of wrought products - Part 3: Chemical composition and form of products*

EN 1279-1, *Glass in building - Insulating glass units - Part 1: Generalities, dimensional tolerances and rules for the system description*

EN 1990, *Eurocode - Basis of structural design*

EN 1991 (all parts), *Eurocode 1: Actions on structures*

EN 12206-1, *Paints and varnishes - Coating of aluminium and aluminium alloys for architectural purposes - Part 1: Coatings prepared from coating powder*

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

EN 13119, *Curtain walling – Terminology*

EN 13830, *Curtain walling – Product standard*

EN 14024:2004 *Metal profiles with thermal barrier - Mechanical performance - Requirements, proof and tests for assessment*

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EN 14351-1 *Windows and doors - Product standard, performance characteristics - Part 1: Windows and external pedestrian doorsets without resistance to fire and smoke leakage characteristics*

EN 15434:2006, *Glass in building - Product standard for structural and/or ultraviolet resistant sealant (for use with structural sealant glazing and/or insulating glass units with exposed seals)*

EN 15651-1, *Sealants for non-structural use in joints in buildings and pedestrian walkways - Part 1: Sealants for facade elements*

EN 15651-2, *Sealants for non-structural use in joints in buildings and pedestrian walkways - Part 2: Sealants for glazing*

EN ISO 2813, *Paints and varnishes - Determination of specular gloss of non-metallic paint films at 20 degrees, 60 degrees and 85 degrees*

ISO 1463 *Metallic and oxide coatings -- Measurement of coating thickness -- Microscopical method*

ISO 2106 *Anodizing of aluminium and its alloys - Determination of mass per unit area (surface density) of anodic oxidation coatings - Gravimetric method*

ISO 2128 *Anodizing of aluminium and its alloys - Determination of thickness of anodic oxidation coatings - Non-destructive measurement by split-beam microscope*

ISO 2143 *Anodizing of aluminium and its alloys - Estimation of loss of absorptive power of anodic oxidation coatings after sealing - Dye-spot test with prior acid treatment*

ISO 2360 *Non-conductive coatings on non-magnetic electrically conductive basis materials - Measurement of coating thickness - Amplitude-sensitive eddy current method*

ISO 2931 *Anodizing of aluminium and its alloys - Assessment of quality of sealed anodic oxidation coatings by measurement of admittance*

ISO 3210 *Anodizing of aluminium and its alloys - Assessment of quality of sealed anodic oxidation coatings by measurement of the loss of mass after immersion in phosphoric acid/chromic acid solution*

ISO 3668, *Paints and varnishes -- Visual comparison of the colour of paints*

3 Terms, definitions and Symbols

For the purposes of this European Standard, the terms and definitions given in EN 1279-1, EN 13022-1, EN 13022-2, EN 13119, EN 13830, EN 15434 and the following symbols apply.

F_{des}	design resistance
$F_{u,5}$	characteristic force giving 75 % confidence that 95 % of the test results will be higher than this value
F_{mean}	average breaking force
$\tau_{\alpha\beta}$	eccentricity of 5 % with a 75 % confidence
s	standard deviation of the series under consideration
$P_{br,n}$	breaking/rupture pressure, initial state
$P_{br,c}$	breaking pressure, after ageing test
γ	safety factor

4 Component requirements

4.1 Glass for SSGS

Glass used in SSGS shall conform to EN 13022-1.

4.2 Assembly rules for glass

The assembling of the glass elements into or onto the window, door or curtain-walling framework shall be in accordance with EN 13022-2, clause 4.

For requirements of the setting block material see Annex B.

4.3 Structural sealant

The structural sealant shall be identified and assessed according to EN 15434.

4.4 Anodised aluminium structural adhesion surface

4.4.1 Alloys of aluminium

The chemical composition of the aluminium alloy shall be recorded.

4.4.2 Characteristics of the anodising

The aluminium structural adhesion surface on which the tests in EN 15434 are to be performed, are identified as follows.

4.4.2.1 Measurement of the thickness

At least one of the following methods shall be used:

- Eddy current test method to ISO 2360
- Split-beam optical method to ISO 2128
- Micro-section method to ISO 1463
- Gravimetric method to ISO 2106.

4.4.2.2 Sealing tests

At least one of the following methods shall be used:

- Stain test to ISO 2143
- Immersion test to ISO 3210
- Measurement of admittance test at 1000 Hz to ISO 2931.

4.4.3 Description of the anodising process

The following information of the anodising process shall be recorded:

4.4.3.1 Scouring

- Composition of the bath

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- Time of immersion of aluminium in the bath

4.4.3.2 Anodic oxidation

- Composition of the bath
- Time of immersion of aluminium in the bath
- Temperature of the bath

4.4.3.3 Sealing of the anodised layer

- Composition of the bath or reference name
- Time of immersion of aluminium in the bath
- Temperature of the bath

NOTE 1 A misunderstanding can arise from the word "sealing" which is a post-treatment of the anodising. The equivalent in French is "colmatage" and in German "Verdichtung".

- Where cold sealing is proposed additional proof must be provided

NOTE 2 Details are prescribed on Qualanod 'Sealing by hydrothermal treatment' or 'Cold impregnation/Cold sealing (CI-CS) based on nickel fluoride'.

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4.5 Coated aluminium

For coated aluminium the relevant information regarding testing, inspection and factory production control shall be taken from EN 13022-2, 6.2.

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For coated aluminium surfaces see Annex C.

4.6 Stainless steel

For stainless steel the relevant information regarding testing, inspection and factory production control shall be taken from Annex D.

4.7 Metal profiles with thermal barrier

For metal profiles with thermal barrier the relevant information regarding testing, inspection and factory production control shall be taken from EN 14024 and Annex E.

5 Design of the structural seal

The design of the glass elements into or onto the window, door or curtain-walling framework shall be in accordance with of EN 13022-2, Annex B.

6 Evaluation of mechanical and retaining devices

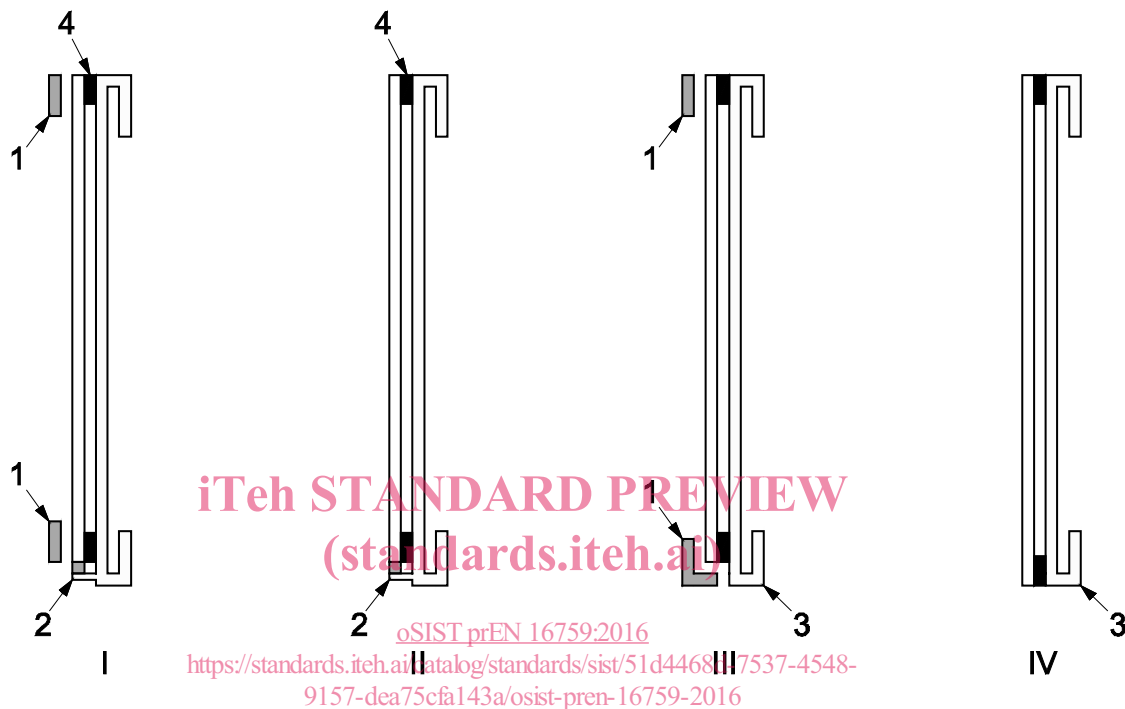
Devices are used to reduce danger in the event of bond failure and they may be required by national regulations. Functions of devices are illustrated in Figure 1.

Type I: Mechanical transfer of the self-weight of the infill to the sealant-support frame and thence to the structure. The structural seal transfers all other actions. Devices are used to reduce danger in the event of a bond failure.

Type II: Mechanical transfer of the self-weight of the infill to the sealant-support frame and thence to the structure. The structural seal transfers all other actions and no devices are used to reduce danger in the event of bond failure.

Type III: The structural seal transfers all actions including the self-weight of the infill to the sealant support frame and thence to the structure. Devices are used to reduce danger in the event of a bond failure.

Type IV: The structural seal transfers all actions, including self-weight of the infill to the sealant support frame and thence to the structure. No devices are used to reduce danger in the event of bond failure.



Key

- 1 retaining device to reduce danger in case of bond failure
- 2 mechanical self-weight support
- 3 structural sealant support frame
- 4 structural bonding

Figure 1 — Examples of the different types of SSGS

The performance of the devices shall be assessed either from the results of tests or from calculations which shall allow for the method of attachment to the frame and also consider a variety of designs. The devices shall not themselves cause damage to the glazing.

NOTE Some provisions may require mechanical retaining devices, e.g. for negative sloping surfaces.

6.1 Evaluation of mechanical devices by calculation

The structural adequacy of such supports is assessed using conventional calculations based upon the strength of materials and testing will not be required.

The design principles are based on the structural Eurocode EN 1990. The actions are determined in accordance with the structural Eurocode series EN 1991, including the National annexes.

The engineering stresses shall be calculated in accordance with the appropriate Eurocodes taking into account the nationally determined parameters relevant to the place of use. The engineering stresses induced

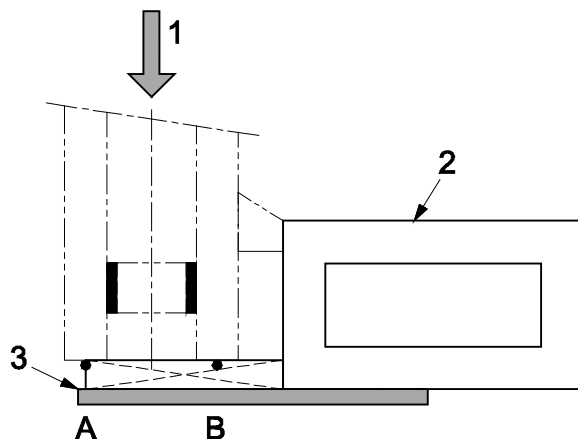
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into mechanical devices shall be no greater than those specified within the appropriate materials standard from which mechanical devices are made.

6.2 Evaluation of mechanical devices by testing

Where the design incorporates novel features the following test can be used.

6.2.1 Test on the mechanical self-weight support



Key

- 1 load application
- 2 structural sealant support frame
- 3 mechanical self-weight support

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Figure 2 — Test on mechanical self-weight support

The test piece comprises a mechanical self-weight support connected to the structural sealant support frame. The test piece shall reproduce the shape and the usage in the SSGS.

A vertical force simulating the self-weight of the glass is applied at the theoretical centre of gravity of the insulating unit by a mean which guarantees that the line of action is vertical.

When loaded, the displacement of the mechanical self-weight support is measured at the points A and B between two consecutive glass panes (Figure 2) and the difference must be less than 1 mm.

6.2.2 Test on retaining devices

Normally, these fastenings are assessed by conventional calculation. Where the design precludes this, one of the following tests should be used.

6.2.2.1 Method I (in case of applied load)

The test apparatus shall accurately reproduce the manner in which the fastening is loaded.

- For metallic fastenings, or when a safety factor $\gamma = 3$ is applied in equation (2) by the manufacturer, a static test only shall be undertaken.

Static test:

Five fastenings shall be submitted to tension until break, using a tension speed of 1 mm/min

The characteristic static breaking force $F_{u,5}$ value shall be calculated by the formula: