SLOVENSKI STANDARD
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Lepljena zasteklitev za vrata, okna in obešene fasade - Preverjanje mehanskih lastnosti zlepljenosti aluminijeve in jeklene površine

Bonded Glazing for doors, windows and curtain walling - Verification of mechanical performance of bonding on aluminium and steel surfaces

Geklebte Glaskonstruktionen für Türen, Fenster und Vorhangfassaden - Überprüfung der mechanischen Leistungseigenschaften der Verklebung auf Aluminium- und Stahloberflächen

Vitrages extérieurs collés (VEC) pour portes, fenêtres et façades rideaux - Vérification des propriétés mécaniques de collage sur surfaces aluminium et acier

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This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 33.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

This document (prEN 16759:2019) 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.

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Introduction

The flow chart is explaining the relationship between this standard and the relevant product and supporting standards.

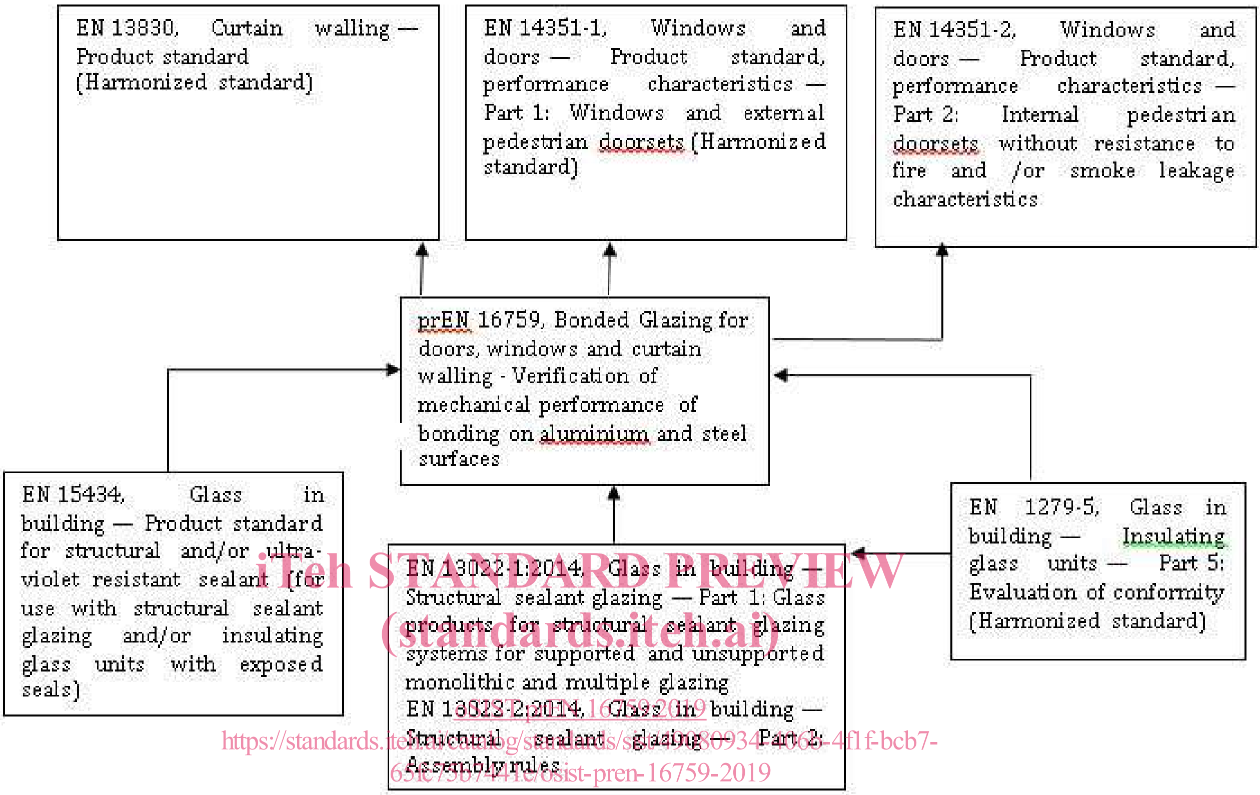

Figure 1 — Relationships with Relevant Product and Supporting Standards

1 Scope

This document specifies the method to be used to verify the mechanical performance of the bonded glazing for doors, windows and curtain walling (see examples in Annex A) and its durability. The bonding covered is only that between the glass and the metal surface.

NOTE 1 Bonded glazing was formerly known as structural sealant glazing SSGS.

This document covers bonded glazing incorporated into the product construction works as follows:

— either vertically; or

— up to 83° from the vertical (positive slope); or

— up to 15° from the vertical onto the building face (negative slope).

NOTE 2 A wall has a positive slope if its outer surface faces upwards.

NOTE 3 Specific additional safety provisions can apply nationally.

This document 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 surface (anodized and coated aluminium, stainless steel), the glass coated or not which shall be bonded, the bonding sealant and mechanical restraints when required.

This document does not apply to:

— other surfaces materials;

— direct glazing;

— glass-to-glass bonding and edge seal of insulating glass units (which are covered by EN 13022-1 and EN 1279-5);

— adhesive tapes.

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.

EN 1096-4, *Glass in building — Coated glass — Part 4: Product standard*

EN 1279-1, *Glass in Building — Insulating glass units — Part 1: Generalities, system description, rules for substitution, tolerances and visual quality*

EN 1990, *Eurocode — Basis of structural design*

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

EN 10088-1, *Stainless steels — Part 1: List of stainless steels*

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

EN 12487, *Corrosion protection of metals — Rinsed and non-rinsed chromate conversion coatings on aluminium and aluminium alloys*

EN 13022-1:2014, *Glass in building — Structural sealant glazing — Part 1: Glass products for structural sealant glazing systems for supported and unsupported monolithic and multiple glazing*

EN 13022-2:2014, *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*

EN 14351-1, *Windows and doors — Product standard, performance characteristics — Part 1: Windows and external pedestrian doorsets*

EN 14351-2, *Windows and doors — Product standard, performance characteristics — Part 2: Internal pedestrian doorsets*

EN 15434:2006+A1:2010, *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)*

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

EN ISO 1463, *Metallic and oxide coatings — Measurement of coating thickness — Microscopical method (ISO 1463)*

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

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

EN 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 2143)*

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

EN ISO 2931, *Anodizing of aluminium and its alloys — Assessment of quality of sealed anodic oxidation coatings by measurement of admittance (ISO 2931)*

EN 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 acid solution(s) (ISO 3210)*

EN ISO 4623-2, *Paints and varnishes — Determination of resistance to filiform corrosion — Part 2: Aluminium substrates (ISO 4623-2)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1279-1, EN 13022-1, EN 13022-2, EN 13119, EN 13830, EN 14351-1, EN 14351-2 and EN 15434 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

4 Symbols and abbreviations

For the purposes of this document, the following symbols apply.

F_k	characteristic static breaking force giving 75% confidence interval 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 interval
s	standard deviation of the series under consideration
$P_{br,n}$	breaking/rupture pressure, initial state
$P_{br,c}$	breaking pressure, after ageing test
R_d	design resistance
γ	safety factor
Dh'	residual deformation after ageing

5 Component requirements

5.1 Glass for bonded glazing

Glazing used in bonded glazing shall conform to EN 13022-1.

The assembling of the glass elements into or onto the window, door or curtain walling framework shall be in accordance with EN 13022-2:2014, Clause 4.

For requirements of the setting block material see Annex B.

Bonded glazing shall be designed to keep the bonding and bonded surfaces, free from stagnant water.

5.2 Bonding sealant

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

Table 1 — Product characteristics that need to be assessed for bonded glazing

Product characteristic	Assessing criteria	Performance expression
Bond strength	EN 15434:2006+A1:2010, 5.3.3 EN 15434:2006+A1:2010, 5.3.4	MPa MPa
Resistance of the bonding against moisture	EN 15434:2006+A1:2010, 5.4.2	MPa, %, type of rupture[1]
Durability of the bond strength	EN 15434:2006+A1:2010, 5.4.3 EN 15434:2006+A1:2010, 5.4.4 EN 15434:2006+A1:2010, 5.4.5	MPa, type of rupture[1] MPa, type of rupture[1] MPa, type of rupture[1]
[1] The declared performance shall be the lowest out of the test pieces tested according to the relevant clause		

5.3 Anodized aluminium adhesion surface

5.3.1 Alloys of aluminium

The chemical composition of the aluminium alloy shall be recorded.

5.3.2 Characteristics of the anodizing

5.3.2.1 General

The aluminium adhesion surface, on which the tests in EN 15434 shall be performed, are identified as follows:

— A minimum thickness of 15 µm is required.

— A minimum sealing of intensity 2 is required, with reference to EN ISO 2143.

5.3.2.2 Measurement of the thickness

At least one of the following methods shall be used:

— eddy current test method according to EN ISO 2360;

— split-beam optical method according to EN ISO 2128;

— micro-section method according to EN ISO 1463;

— gravimetric method according to EN ISO 2106.

5.3.2.3 Sealing tests

At least one of the following methods shall be used:

— stain test according to EN ISO 2143;

— immersion test according to EN ISO 3210;

— measurement of admittance test according to EN ISO 2931.

5.3.3 Description of the anodizing process

5.3.3.1 General

The process of anodizing shall be described and a specific factory production control shall apply for every single batch.

The following information of the anodizing process shall be recorded.

5.3.3.2 Scouring

— Composition of the bath;

— Duration of immersion of aluminium in the bath.

5.3.3.3 Anodic oxidation

— Composition of the bath;

— Duration of immersion of aluminium in the bath;

— Temperature of the bath.

5.3.3.4 Sealing of the anodized layer

— Composition of the bath or reference name;

— Duration of immersion of aluminium in the bath;

— Temperature of the bath.

5.3.3.5 Characteristic of the anodized layer

— Measurement of the sealing according 5.3.2.2;

— Measurement of the coating thickness according 5.3.2.1.

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

Where cold sealing is proposed additional proof shall be provided.

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

5.4 Coated aluminium

For coated aluminium the relevant information regarding testing, inspection and factory production control of the bonding shall be taken from EN 13022-2:2014, 6.2.

For coated aluminium surfaces, see Annex C.

5.5 Stainless steel

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