



SLOVENSKI STANDARD
oSIST prEN 1096-4:2012
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Steklo v gradbeništvu – Steklo z nanosi – 4. del: Ovrednotenje skladnosti/standard za izdelek

Glass in building - Coated glass - Part 4: Evaluation of conformity / Product standard

Glas im Bauwesen - Beschichtetes Glas - Teil 4: Konformitätsbewertung / Produktnorm

Verre dans la construction - Verre à couche - Partie 4: Évaluation de la conformité / Norme de produit

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EUROPEAN STANDARD
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Verre dans la construction - Verre à couche - Partie 4:
Évaluation de la conformité / Norme de produit

Glas im Bauwesen - Beschichtetes Glas - Teil 4:
Konformitätsbewertung / Produktnorm

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 129.

If this draft becomes a European Standard, 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.

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prEN 1096-4:2011 (E)

Foreword

This document (prEN 1096-4:2011) has been prepared by Technical Committee CEN/TC TC 129 “Glass in building”, the secretariat of which is held by NBN.

This document is currently submitted to the CEN Enquiry.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

This document supersedes EN 1096-4:2004.

The main changes compared to the previous edition are:

- a) The tolerance on emissivity is reduced to +0,01 for coatings with a declared normal emissivity lower than 0,10;
- b) The solar factor, g , is listed within the spectrophotometric characteristics to be declared.

This part of the document does not stand alone; it is a part of one document:

- EN 1096-1, *Glass in building – Coated glass - Part 1: Definitions and classification*
- EN 1096-2, *Glass in building - Coated glass - Part 2: Requirements and test methods for class A, B and S coatings*
- EN 1096-3, *Glass in building - Coated glass - Part 3: Requirements and test methods for class C and D coatings*
- EN 1096-4, *Glass in building - Coated glass - Part 4: Evaluation of conformity/Product standard*
- EN 1096-5, *Glass in building – coated glass – Part 5: Test method and classification for the self-cleaning performances of coated glass surfaces*

This document contains other aspects of importance of trade.

1 Scope

This document covers the evaluation of conformity and the factory production control of coated glass for use in buildings.

NOTE For glass products with electrical wiring or connections for, e.g. alarm or heating purposes, other directives, e.g. Low Voltage Directive, may apply.

2 Normative references

The following referenced documents are indispensable for the application 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 356, *Glass in building - Security glazing - Testing and classification of resistance against manual attack*

EN 410, *Glass in building - Determination of luminous and solar characteristics of glazing*

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 572-3, *Glass in building — Basic soda lime silicate glass products - Part 3: Polished wired glass*

EN 572-4, *Glass in building — Basic soda lime silicate glass products - Part 4: Drawn sheet glass*

EN 572-5, *Glass in building — Basic soda lime silicate glass products - Part 5: Patterned glass*

EN 572-6, *Glass in building — Basic soda lime silicate glass products - Part 6: Wired patterned glass*

EN 572-7, *Glass in building — Basic soda lime silicate glass products - Part 7: Wired or unwired channel shaped glass*

EN 673, *Glass in building – Determination of thermal transmittance (U value) – Calculation method*

EN 1063, *Glass in building - Security glazing - Testing and classification of resistance against bullet attack*

EN 1096-1, *Glass in building - Coated glass - Part 1: Definitions and classification*

EN 1096-2, *Glass in building - Coated glass - Part 2: Requirements and test methods for class A, B and S coatings*

EN 1096-3, *Glass in building - Coated glass - Part 3: Requirements and test methods for class C and D coatings*

EN 1096-5, *Glass in building - Coated glass - Part 5: Test method and classification for the self-cleaning performances of coated glass surfaces*

EN 1748-1-1, *Glass in building - Special basic products - Borosilicate glasses – Part 1-1: Definition and general physical and mechanical properties*

EN 1748-2-1, *Glass in building - Special basic products - Glass ceramics – Part 2-1: Definitions and general physical and mechanical properties*

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EN 1863-1, *Glass in building – Heat strengthened soda lime silicate glass Part 1: Definition and description*

EN 12150-1, *Glass in building – Thermally toughened soda lime silicate safety glass –Part 1: Definition and description*

EN 12337-1, *Glass in building –Chemically strengthened soda lime silicate glass - Part 1: Definition and description*

EN ISO 12543-1, *Glass in building - Laminated glass and laminated safety glass - Part 1: Definitions and description of component parts (ISO 12543-1:2011)*

EN 12600, *Glass in building - Pendulum test - Impact test method and classification for flat glass*

EN 12758, *Glass in building - Glazing and airborne sound insulation – Product descriptions and determination of properties*

EN 12898, *Glass in building - Determination of the emissivity*

EN 13024-1, *Glass in building – Thermally toughened borosilicate safety glass - Part 1: Definition and description*

prEN 13474, *Glass in building – Design of glass panes*

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

EN 13501-2, *Fire classification of construction products and building elements – Part 2: Classification using data from fire resistance tests, excluding ventilation services*

EN 13501-5, *Fire classification of construction products and building elements - Part 5: Classification using data from external fire exposure to roofs tests*

EN 13541, *Glass in building - Security glazing - Testing and classification of resistance against explosion pressure*

EN 14178-1, *Glass in building - Basic alkaline earth silicate glass products - Part 1: Float glass*

EN 14179-1, *Glass in building – Heat soaked thermally toughened soda lime silicate safety glass – Part 1 Definition and description*

EN 14321-1, *Glass in building – Thermally toughened alkaline earth silicate safety glass Part 1: Definition and description*

3 Terms, definitions and symbols

3.1 Terms and definitions

For the purpose of this document, the terms and definitions given in EN 1096-1, 2 and 3 and the following apply:

3.1.1

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 document that demonstrates compliance with this document

3.1.2**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

3.1.3**product description**

document that details the relevant parameters, e.g. process conditions, structure, etc., for defining a product that complies with the standard. It includes specific reference(s) to characteristics that are modified by the production process

3.1.4**significant change**

variation in performance beyond the permitted tolerance for the characteristic

3.2 Symbols

ε and ε' normal emissivity of both sides of a coated glass pane

τ_V light transmittance

ρ_V and ρ_V' light reflectance of both sides of a coated glass pane

τ_e energy transmittance

ρ_e and ρ_e' energy reflectance of both sides of a coated glass pane

ε_i emissivity of a test specimen measured during factory production control

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d indicates that the value is a declared value

m indicates that the value is a determined value obtained by measurement, calculation or other means

4 Requirements**4.1 Product description**

For conformity purposes, the coated glass manufacturer¹ is responsible for the preparation and maintenance of a product description. This description shall describe the product and/or product family.

Disclosure of the product description shall be at the discretion of the coated glass manufacturer or his agent except in the case of regulatory requirements.

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

¹ The terms 'manufacturer' and 'producer' are understood as being synonyms (see CPD working document NB-CPD/02/019 – issued 24 April 2002 – page 1)

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The normative part of the description shall contain the following:

- Reference to EN 1096 Parts 1, 2 and 3 and all other standards with which the manufacturer claims compliance.
- Type of coating, i.e. on-line, off-line.
- Method of coating deposition, e.g. chemical-vapour deposition, sputtering, etc.
- The materials making up the layer(s) of the coating.
- The order of stacking of the layers.
- Glass substrates.
- Classification of the coated glass.
- Identity card (see EN 1096-1, annex A)

The layers may be listed either in full, i.e. chemical composition, or by a manufacturer's code.

Product families shall be defined in terms of the above normative part of the product description taking into account the criteria for demonstrating equivalence of coatings (see EN 1096-2, Annex F and EN 1096-3, Annex B).

The substitution of materials and/or components shall maintain the conformity with the product description. The substituting materials and/or components can be added to the product family and also the product description when compliance has been demonstrated.

4.2 Conformity with the definition of coated glass

Products shall conform to the manufacturer's product description and fulfil the definition and requirements for coated glass as defined in EN 1096-1.

4.3 Determination of the characteristic's performances

4.3.1 Characteristic of coated glass

4.3.1.1 General

The characteristics of coated glass are in general those of the glass substrate (see 4.3.1.2).

4.3.1.2 Characteristics of the glass panes used as substrates for the production of coated glass

The following glass substrates may be used for the production of coated glass:

4.3.1.2.1 Basic glasses

These are glass products manufactured from soda lime silicate glass in accordance with EN 572 – 1 and consist of the follows:

- Float glass EN 572 – 2
- Drawn sheet glass EN 572 – 4
- Patterned glass EN 572 – 5

- Wired patterned glass EN 572 – 6
- Wired and unwired channel shaped glass EN 572 – 7

4.3.1.2.2 Special basic glasses

These are glass products manufactured from a variety of compositions, which are in accordance with appropriate European standards, and consist of the follows:

- Borosilicate glass EN 1748 – 1 – 1
- Glass ceramics EN 1748 – 2 – 1
- Alkaline earth silicate glass EN 14178 – 1
- Alumino silicate glass EN 15681 – 1

4.3.1.2.3 Strengthened glasses

These are soda lime silicate glasses that have been strengthened by thermal or chemical means and are as follows:

- Heat strengthened EN 1863 – 1
- Chemically strengthened EN 12337 - 1

4.3.1.2.4 Thermally toughened safety glasses

These are glasses that have been toughened by thermal treatment and are as follows:

- Thermally toughened soda lime silicate safety glass EN 12150 – 1
- Thermally toughened borosilicate safety glass EN 13024 – 1
- Heat soaked thermally toughened soda lime silicate safety glass EN 14179 – 1
- Thermally toughened alkaline earth silicate safety glass EN 14321 – 1
- Heat soaked thermally toughened alkaline earth silicate safety glass prEN 15682–1
- Thermally toughened soda lime silicate channel shaped safety glass prEN 15683–1

4.3.1.2.5 Laminated glasses

These are glasses that are in accordance with EN ISO 12543 – 1 and consist of the following:

- Laminated glass EN ISO 12543 – 3
- Laminated safety glass EN ISO 12543 – 2

NOTE Certain coated glasses can be toughened or heat strengthened. These final products should comply with the appropriate product standard, e.g. EN 12150, EN 1863, etc., and the performance of the coated glass should be determined on the final product in accordance with EN 1096-2, Annex A or EN 1096-3 Annex A.

The characteristics of the glass substrates are listed in Table 2 and the values can be found in the appropriate product standard, e.g. EN 572-1, EN 1748-1-1, etc.

For the characteristics listed in Table 2, for the glass pane types, generally accepted values or calculated values shall be used.

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Since the majority of the characteristics of Table 2 are not changed significantly by the coating process, they shall be used for coated glass. The characteristics being those for the glass substrate with the following exceptions:

Resistance to fire	4.3.2.1
Emissivity	4.3.2.11
Light transmittance and reflectance	4.3.2.12
Solar energy characteristics	4.3.2.13

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Table 2 — Example of characteristics for glass substrates

Characteristic	Symbol	Unit
Generally accepted values:		
- density	ρ	kg/m ³
- hardness	HK _{0,1/20}	GPa
- Young's modulus	E	Pa
- Poisson's ratio	μ	Dimensionless
- Characteristic bending strength	$f_{g,k}$	Pa
- Resistance against sudden temperature changes and temperature differentials		K
- Specific heat capacity	c	J/(kg.K)
- Coefficient of linear expansion	α	K ⁻¹
- Thermal conductivity (for U -value)	λ	W/(m.K)
- Mean refractive index to visible radiation	n	Dimensionless
- Emissivity	ε	Dimensionless
Measured values:		
- light transmittance	τ_v	Dimensionless
- solar direct transmittance	τ_e	Dimensionless
Calculated values:		
- total solar energy transmittance	g	Dimensionless

4.3.2 Determination of characteristics of coated glass

If the coated glass manufacturer wishes to claim that any performance characteristic is independent of the production equipment used then the factory production control system shall be in accordance with this document including his specific process control conditions.

4.3.2.1 Safety in the case of fire - Resistance to fire

Fire resistance shall be determined and classified in accordance with EN 13501-2.

NOTE EN 357 may be used as a classification reference specific to fire resistant glazed elements.

4.3.2.2 Safety in the case of fire - Reaction to fire

Reaction to fire shall be determined and classified in accordance with EN 13501-1.

4.3.2.3 Safety in the case of fire - External fire behaviour

Where the manufacturer wishes to declare external fire performance (e.g. when subject to regulatory requirements), the product shall be tested and classified in accordance with EN 13501-5.