



SLOVENSKI STANDARD
SIST EN 14321-2:2006
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**Steklo v gradbeništvu – Kaljeno zemljoalkalijsko silikatno varnostno steklo – 2.
del: Ocena skladnosti/standard za izdelek**

Glass in building - Thermally toughened alkaline earth silicate safety glass - Part 2:
Evaluation of conformity/Product standard

Glas im Bauwesen - Thermisch vorgespanntes Erdalkali-Silicat-
Einscheibensicherheitsglas - Teil 2: Konformitätsbewertung/Produktnorm

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(standard in use)
Verre dans la construction - Verre de silicate alcalino-terreux de sécurité trempé
thermiquement - Partie 2 : Evaluation de la conformité/Norme produit

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ICS 81.040.20

English version

Glass in building - Thermally toughened alkaline earth silicate safety glass - Part 2: Evaluation of conformity/Product standard

Verre dans la construction - Verre alcalinoterreux de sécurité trempé thermiquement - Partie 2 : Evaluation de la conformité/Norme produit

Glas im Bauwesen - Thermisch vorgespanntes Erdalkali-Silicat-Einscheibensicherheitsglas - Teil 2: Konformitätsbewertung/Produktnorm

This European Standard was approved by CEN on 27 June 2005.

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.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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Contents

	Page
Foreword	3
1 Scope	4
2 Normative references	4
3 Terms and definitions	5
4 Requirements	5
5 Evaluation of conformity	10
6 Marking and labelling	16
Annex A (normative) Factory production control	17
Annex B (informative) Tests for factory production control	23
Annex C (informative) Provisions for voluntary involvement of third party(ies)	25
Annex ZA (normative) Clauses of this European Standard addressing the provisions of EU Construction Products Directive	26
Bibliography.....	36

SIST EN 14321-2:2006
<https://standards.iteh.ai/catalog/standards/sist/16750f28-25a0-4591-810c-c16b1fc9ea7c/sist-en-14321-2-2006>

Foreword

This European Standard (EN 14321-2:2005) has been prepared by Technical Committee CEN/TC 129 “Glass in building”, the secretariat of which is held by IBN.

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 February 2006, and conflicting national standards shall be withdrawn at the latest by February 2006.

This European Standard 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 89/106/EEC.

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

No existing European Standard is superseded.

This Part of the European Standard does not stand alone, it is a part of one standard:

- EN 14321-1: Glass in Building – Thermally toughened alkaline earth silicate safety glass – Part 1: Definition and description
- EN 14321-2: Glass in Building - Thermally toughened alkaline earth silicate safety glass – Part 2: Evaluation of conformity/Product standard

This document contains other aspects of importance of trade.

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, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

1 Scope

This European Standard covers the evaluation of conformity and the factory production control of flat thermally toughened alkaline earth silicate safety glass for use in buildings.

NOTE 1 This also includes requirements subject to regulation.

NOTE 2 For glass products with electrical wiring or connections for e.g. alarm or heating purposes, this European Standard covers only wiring subject for electrical potential difference to earth less than 50 V a.c. or less than 75 V d.c.

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 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 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.*

prEN 13474 (all parts), *Glass in building – Design of glass panes.*

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

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

prEN 13501-5, *Fire classification of construction products and building elements – Part 5: Classification using test data from fire exposure to roof 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 14321-1:2005, *Glass in Building – Thermally toughened alkaline earth silicate safety glass – Part 1: Definition and description.*

3 Terms and definitions

For the purpose of this European Standard, the terms and definitions given in EN 14321-1:2005 and the following apply.

3.1

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.

3.2

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.

3.3

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.

3.4

significant change

variation in performance beyond the permitted tolerance for the characteristic.

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4 Requirements

SIST EN 14321-2:2006

4.1 Product description

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For conformity purposes the thermally toughened alkaline earth silicate glass manufacturer is responsible for the preparation and maintenance of the product description. This description shall describe the product and/or product families.

Disclosure of the product description shall be at the discretion of the thermally toughened 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.

The normative part of the description shall contain the following minimum information:

- a reference to EN 14321 Parts 1 and 2 and all other standards with which the manufacturer claims compliance.
- the radiometric properties and durability of coated glass, i.e. coated glass that conforms with EN 1096-1, EN 1096-2, EN 1096-3, when those properties are changed, intentionally or unintentionally, by the thermal toughening process.

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

The substitution of materials 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.

4.2 Conformity with the definition of thermally toughened alkaline earth silicate safety glass

Products shall conform to the definition and fulfil the requirements of thermally toughened alkaline earth silicate safety glass as defined in EN 14321-1.

4.3 Determination of the performances of characteristics

4.3.1 Characteristics of thermally toughened alkaline earth silicate safety glass

4.3.1.1 General

The characteristics of thermally toughened alkaline earth silicate safety glass are those of the glass substrate (see 4.3.1.2).

4.3.1.2 Characteristics of glass panes used for thermally toughened alkaline earth silicate safety glass

Panes shall be made of basic alkaline earth silicate glass products according to EN 14178-1. The panes may be coated according to EN 1096-1, EN 1096-2, EN 1096-3 and/or enamelled according to EN 14321-1.

For the characteristics listed in Table 1, for thermally toughened alkaline earth silicate safety glass, generally accepted values or calculated values may be used.

Since the majority of the characteristics of Table 1 are not changed significantly by the thermal toughening process they shall be used for thermally toughened alkaline earth silicate safety glass. The exceptions shall be the characteristic bending strength ($f_{g,k}$) and the resistance against sudden temperature changes and temperature differentials.

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SIST EN 14321-2:2006

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Table 1 — Information on the characteristics of basic alkaline earth silicate glass, according to EN 14178-1, used for the production of thermally toughened alkaline earth silicate safety glass

Characteristic	Symbol	Unit
- 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
- Light transmittance	τ_V	Dimensionless
- Solar direct transmittance	τ_{ec}	Dimensionless
- Total energy transmittance	g	Dimensionless

If some coatings, i.e. coated glass conforming with the EN 1096 series, when thermally toughened change their radiometric properties the manufacturer shall refer to the following for the determination of the appropriate characteristics, etc.:

- 4.3.2.12 for the emissivity;
- 4.3.2.13 for the light transmittance and reflectance;
- 4.3.2.14 for the solar energy transmittance;
- EN 1096-2 for the durability of A, B and S coatings;
- EN 1096-3 for the durability of C and D coatings.

4.3.2 Determination of characteristics of thermally toughened alkaline earth silicate safety glass products

4.3.2.1 General

If the thermally toughened 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

4.3.2.2 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.

4.3.2.3 Safety in the case of fire - Reaction to fire

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

Thermally toughened alkaline earth silicate safety glass products are products/materials that do not require to be tested for reaction to fire (e.g. Products/materials of Classes A1 according to Commission Decision 96/603/EC, as amended 2000/605/EC).

4.3.2.4 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 prEN 13501-5.

Note Compliance with this requirement is not possible until a version of prEN 13501-5 later than 2002 becomes available.

4.3.2.5 Safety in use - Bullet resistance: shatter properties and resistance to attack

Bullet resistance shall be determined and classified in accordance with EN 1063.

4.3.2.6 Safety in use - Explosion resistance: impact behaviour and resistance to impact

Explosion resistance shall be determined and classified in accordance with EN 13541.

4.3.2.7 Safety in use - Burglar resistance: shatter properties and resistance to attack

Burglar resistance shall be determined and classified in accordance with EN 356.

4.3.2.8 Safety in use - Pendulum body impact resistance: shatter properties (safe breakability) and resistance to impact

Pendulum body impact resistance shall be determined and classified in accordance with EN 12600.

4.3.2.9 Safety in use - Mechanical resistance: Resistance against sudden temperature changes and temperature differentials

The resistance against sudden temperature changes and temperature differentials is a generally accepted value that is given in EN 14321-1 and shall be ensured by compliance with this document.

4.3.2.10 Safety in use - Mechanical resistance: Resistance against wind, snow, permanent load and/or imposed loads of the glass unit

The mechanical strength of thermally toughened alkaline earth silicate safety glass is a characteristic value that is given in EN 14321-1 and shall be ensured by compliance with this document.

As long as on the concerned construction or building site no part of prEN 13474 is applicable for the design then the current method of determining mechanical resistance in the country of destination shall be applied.

The manufactured or supplied thickness of thermally toughened alkaline earth silicate safety glass shall conform to the ordered thickness.

4.3.2.11 Protection against noise - Direct airborne sound reduction

The sound reduction indexes shall be determined in accordance with EN 12758. However, the information supplied with the incoming glass may be used as the thermal toughening process does not alter the values.

4.3.2.12 Energy conservation and heat retention - Thermal properties

The thermal transmittance value (U -value) shall be determined by calculation in accordance with EN 673 with:

- emissivity ε : the declared value of the glass manufacturer. If the information is not available, the emissivity shall be determined in accordance with EN 12898.
- nominal thickness of the glass panes

Subject to 5.2.1 the information supplied about the thermal properties of the incoming glass may be used if the thermal toughening process does not alter the values.

4.3.2.13 Energy conservation and heat retention - Radiation properties: Light transmittance and reflectance

The light transmittance and reflectance shall be determined in accordance with EN 410.

Subject to 5.2.1 the information supplied about the radiation properties of the incoming glass may be used if the thermal toughening process does not alter the values.

4.3.2.14 Energy conservation and heat retention - Radiation properties: Solar energy characteristics

The solar energy transmittance and reflectance shall be determined in accordance with EN 410.

Subject to 5.2.1 the information supplied about the radiation properties of the incoming glass can be used if the thermal toughening process does not alter the values.

4.4 Durability

When products conform to the definition of thermally toughened alkaline earth silicate glass as 4.2 then the characteristics' performances in 4.3.2 are ensured during an economically reasonable working life.

The durability of glass products including their characteristics, shall be ensured by the following:

- Compliance with this European Standard
- Compliance with instructions from the glass product manufacturer or supplier

The manufacturer shall supply specific installation instructions or make reference to appropriate technical specifications.

NOTE The durability of glass products depends on:

- building and construction movements due to various actions;
- building and construction vibrations due to various actions;
- deflection and racking of the glass support due to various actions;
- glass support design (e.g. drainage of infiltrated water in the rebate, prevention of direct contact between glass support members and glass);
- accuracy of glass support and glass support member dimensions;

EN 14321-2:2005 (E)

- quality of the assembling of glass support members up to a glass support;
- quality of installation of the glass support into or onto the buildings or constructions;
- glass support expansion due to adsorbed moisture from the air or other sources;
- the quality of installation of the glass product into or onto its support.

4.5 Dangerous substances

Materials used in products shall not release any dangerous substances in excess of the maximum permitted levels specified in a relevant European Standard for the material or permitted in the national regulations of the Member State of destination.

5 Evaluation of conformity

5.1 General

The evaluation of conformity shall be based on:

- 1) Factory production control;

This shall include the following:

- a) Inspection of samples taken at the factory in accordance with a prescribed test plan;
 - b) Initial inspection of the factory and of factory production control;
 - c) Continuous surveillance and assessment of the factory production control.
- 2) Initial type testing of the product;

Note There may be a need to involve a third party, with 1b, 1c, and/or 2, for the purpose of regulatory marking (see Annex ZA).

5.2 Initial type testing of the product (see 5.1, 2)

5.2.1 General

All the product's characteristics shall be initial type tested to verify they are in conformity with the requirements of this document. In addition instead of performing any actual testing, initial type testing may make use of:

- generally accepted and/or conventional and/or standardised values, in the Clause 2 referenced standards, or in publications that are referred to in these standards;
- standardised calculation methods and recognised calculation methods in Clause 2 referenced standards, or in publications that are referred to in these standards;
- test report(s) on the basis of 5.2.1.2 when made available except for the characteristics listed in 5.2.2.
- where components are used whose characteristics have already been determined, by the component manufacturer, on the basis of conformity with other product standards, these characteristics need not be reassessed providing they remain unchanged by the manufacturing process;
- release of dangerous substances may be assessed indirectly by controlling the content of the substance concerned;