# SLOVENSKI STANDARD
# SIST EN 1279-5:2005+A1:2009

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**Steklo v gradbeništvu - Izolacijsko steklo - 5. del: Ovrednotenje skladnosti**

Glass in building - Insulating glass units - Part 5: Evaluation of conformity

Glas im Bauwesen - Mehrscheiben-Isolierglas - Teil 5: Konformitätsbewertung



Verre dans la construction - Vitrage isolant - Partie 5: Evaluation de la conformité



**Ta slovenski standard je istoveten z:** **EN 1279-5:2005+A1:2008**



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81.040.20 Steklo v gradbeništvu Glass in building

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EUROPEAN STANDARD

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# EN 1279-5:2005+A1

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English Version

# Glass in building - Insulating glass units - Part 5: Evaluation of conformity

Verre dans la construction - Vitrage isolant - Partie 5: Evaluation de la conformité

Glas im Bauwesen - Mehrscheiben-Isolierglas - Teil 5: Konformitätsbewertung

This European Standard was approved by CEN on 24 March 2005 and includes Amendment 1 approved by CEN on 2 October 2008.

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# Foreword

This document (EN 1279-5:2005+A1:2008) has been prepared by Technical Committee CEN/TC 129 "Glass in building", the secretariat of which is held by NBN.

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of an identical text or by endorsement, at the latest by May 2009, and conflicting national standards shall be withdrawn at the latest by May 2009.

This document includes Amendment 1 approved by CEN on 2008-10-02.

This document supersedes EN 1279-5:2005.

The start and finish of text introduced or altered by amendment is indicated in the text by tags A1 A1.

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 Part of the European Standard does not stand-alone, it is part of one standard with the general title *Glass in building - Insulating glass units*:



— *Part 1: Generalities, dimensional tolerances and rules for the system description*



— *Part 2: Long term test method and requirements for moisture penetration*

— *Part 3: Long term test method and requirements for gas leakage rate and for gas concentration tolerances*

— *Part 4: Methods of test for the physical attributes of edge seals*

— *Part 5: Evaluation of conformity*

— *Part 6: Factory production control and periodic tests*

This European Standard contains other aspects of importance of trade.

This European Standard includes a Bibliography.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, 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 specifies requirements, the evaluation of conformity and the factory production control of insulating glass units for use in buildings.

NOTE 1 For glass products with electrical wiring or connections for e.g. alarm or heating purposes, other directives, e.g. Low Voltage Directive, may apply.

The main intended uses of the insulating glass units are installations in windows, doors, curtain walling, roofs and partitions where there exists protection against direct ultraviolet radiation at the edges.

NOTE 2 In cases where there is no protection against direct ultra-violet radiation at the edges, such as structural sealant glazing systems, additional European technical specifications should be followed (e.g. [A1] EN 15434 [A1], [A1] EN 13022-1 [A1]).

NOTE 3 Units for which the intended use is only 'artistic' and therefore no essential requirement is required, are not subject to CE marking and are not part of this European Standard.

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

EN 674, *Glass in building – Determination of thermal transmittance (U value) – Guarded hot plate method*

EN 675, *Glass in building – Determination of thermal transmittance (U value) – Heat flow meter method*

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

EN 1279-1:2004, *Glass in building – Insulating glass units – Part 1: Generalities, dimensional tolerances and rules for the system description*

EN 1279-2:2002, *Glass in building – Insulating glass units – Part 2: Long term test method and requirements for moisture vapour penetration*

EN 1279-3:2002, *Glass in building – Insulating glass units – Part 3: Long term test method and requirements for gas leakage rate and for gas concentration tolerances*

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

EN 1279-6:2002, *Glass in building – Insulating glass units – Part 6: Factory production control and periodic tests*

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, [A1] *Glass in building - Special basic products - Glass ceramics - Part 2-1: Definitions and general physical and mechanical properties* [A1]

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 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*

[A1] 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* [A1]

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

EN 13501-1, *Fire classification of construction products and building elements – Part 1: Classification using* [A1] *Deleted text* [A1] *data from reaction to fire tests*

EN 13501-2, *Fire classification of construction products and building elements – Part 2: Classification using* [A1] *Deleted text* [A1] *data from fire resistance tests, excluding ventilation services*



[A1] EN 13501-5 [A1], *Fire classification of construction products and building elements – Part 5: Classification using data from external 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*

[A1] 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)* [A1]

[A1] *deleted text* [A1]

## 3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 1279-1:2004, EN 1279-2:2002, EN 1279-3:2002, EN 1279-4:2002 and EN 1279-6:2002 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 European Standard that demonstrates compliance with this European Standard

**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 references to characteristics that are modified by the production process

**3.4**
**significant change**
variation in performance beyond the permitted tolerance for the characteristic

# 4 Requirements

## 4.1 Product description

For conformity purposes the insulating glass unit 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 insulating glass unit 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 1279 Part 1, 2, 3, 4 and 6 and all other standards with which the manufacturer claims compliance;

— system description.



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 insulating glass units

Products shall conform to the definition and fulfil the requirements of insulating glass units as defined in EN 1279-1.

## 4.3 Determination of the characteristic's performances

### 4.3.1 Characteristics of glass panes for use in insulating glass units

For panes made of glass covered by European specifications generally accepted values, declared values, or calculated values of the characteristics listed in Table 1 shall be used.

For panes made of glass not covered by European specifications measured values of the characteristics listed in Table 1 shall be used, and their chemical and mechanical stability over time shall be demonstrated (refer to 5.2.4).

**Table 1 - Necessary information on characteristics of glass panes for use in insulating glass units**

| Characteristic | Symbol | Unit |
|---|---|---|
| - density | $\rho$ | kg/m³ |
| - hardness | $HK_{0,1/20}$ | GPa |
| - Young's modulus | $E$ | Pa |
| - Poisson's ratio | $\mu$ | Dimensionless |
| - characteristic bending strength | $f_k$ | Pa |
| - specific heat capacity | $c$ | J/(kg·K) |
| - coefficient of linear expansion | $\alpha$ | $K^{-1}$ |
| - thermal conductivity | $\lambda$ | W/(m·K) |
| - mean refractive index to visible radiation | $n$ | Dimensionless |
| - emissivity | $\varepsilon$ | Dimensionless |
| - light transmittance | $\tau_v$ | Dimensionless |
| - solar direct transmittance | $\tau_e$ | Dimensionless |
| - total solar energy transmittance | $g$ | Dimensionless |



### 4.3.2 Determination of characteristics of insulating glass units



#### 4.3.2.1 General

If the insulating 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 European Standard 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.

For classification, consideration shall be given to:

a) the following product changes require new type testing on reaction to fire:

— reduction of the reaction to fire classification of the glass components in the insulating glass unit;

— reduction of the reaction to fire performance of the organic sealant in the edge seal;

b) however when not tested, the insulating glass unit shall be classified either:

— by the reaction to fire classification of the glass component used in the insulating glass unit, or

— by the classification of an insulating glass units using the same organic sealant in the edge seal,

— the classification claimed shall be the lower of the two possibilities.

#### 4.3.2.4 Safety in the case of fire - External fire performance

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 [A1] EN 13501-5 [A1].

NOTE Compliance with this requirement is not possible until a version of [A1] EN 13501-5 [A1] later than 2002 becomes available.

For classification, consideration shall be given to:

a) the following product changes require new type testing on external fire behaviour:

- reduction of external fire behaviour of the glass component in the insulating glass unit;

b) however when not tested, the insulating glass unit shall be classified by the external fire performance of the glass components used in the insulating glass unit. The classification claimed shall be that of the glass component with least performance.

#### 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.

In those instances when a bullet resistant glass component is used as the non-attack face of an insulating glass unit then there is no need to test. The classification of the insulating glass unit shall be the same as the glass component used.



#### 4.3.2.6 Safety in use - Explosion resistance: shatter properties and resistance to impact



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

In those instances when an explosion resistant glass component is used as the non-attack face of an insulating glass unit then there is no need to test. The classification of the insulating glass unit shall be the same as the glass component used.

#### 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.

In those instances when a burglar resistant glass component is used as the non-attack face of an insulating glass unit then there is no need to test. The classification of the insulating glass unit shall be the same as the glass component used.

#### 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 on the glass components in accordance with EN 12600.

NOTE EN 12600 tests and classifies individual pane of glass and NOT products such as insulating glass units.

As not tested, the insulating glass unit shall be classified the same as the pendulum body impact resistance of the weakest glass component used in the insulating glass unit. [A1] If the identification of the product composition is clear enough to avoid confusion, the performances of each component will be given, in the order given by the mentioned composition. [A1]

[A1] The performances are these of the components tested as single glass, according to EN 12600 and 4.3.2.8. Care should be taken to place the insulating glass unit in a position corresponding to the expected performances. [A1]

#### 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 the appropriate standards: e.g. EN 1863-1, EN 12150-1, EN 12337-1, EN 13024-1, etc., and shall be ensured by compliance with this European Standard.

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

The ordered assemblies of insulating glass units (thickness and types of glass components, cavity width) shall ensure the resistance against wind, snow, permanent load, and other mechanical, (quasi-) static action, which shall be checked in accordance with prEN 13474.

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

The manufactured or supplied thickness of insulating glass shall conform to the ordered thickness and assembly.

The edge seal strength determined in accordance with EN 1279-4 is part of the definition of insulating glass units and is not subject for separate information. When additional ultraviolet resistance and/or increased mechanical resistance is required (e.g. where no protection against ultraviolet is applicable, or where insulating glass units are used in structural sealant glazing), the edge seal strength shall be determined in accordance with [A1] EN 13022-1 [A1] using a sealant in accordance with [A1] EN 15434 [A1]. See Annex A.



#### 4.3.2.11 Direct airborne sound reduction



The sound reduction indexes shall be determined in accordance with EN 12758.

#### 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 $\varepsilon$: 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;

— nominal thickness of any other material layer, if any;

— the nominal cavity width; assuming that the panes are parallel;

— the nominal gas concentration $c_{i,o}$ , or the final gas concentration $c_{i,f}$ (see EN 1279-3).

NOTE In the case of gas filled units EN 1279-3 should be consulted in order that the *U*-value for publication includes all the relevant negative aspects.

In those instances when the thermal transmittance value (U-value) cannot be calculated then it shall be determined by testing in accordance with EN 674 or EN 675.

#### 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.

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

The solar energy characteristic shall be determined in accordance with EN 410.

### 4.4 Durability

When products conform to the definition of insulating glass unit as in 4.2, the characteristics' performances in 4.3.2 are ensured during an economically reasonable working life.

The durability of insulating glass units, including their characteristics, shall be insured 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, see also Annex B.

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;



– 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

Evaluation of conformity in accordance with this document shall be as a result of FPC and ITT in accordance with this European Standard.

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;