SLOVENSKI STANDARD
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Steklo v gradbeništvu - Poslikano steklo za interno uporabo - 2. del: Vrednotenje skladnosti

Glass in building - Painted glass for internal use - Part 2: Evaluation of conformity

Glas im Bauwesen - Farbiges Glas für den Innenbereich - Teil 2: Konformitätsbewertung

Verre dans la construction - Verre laqué destiné à un usage à l'intérieur - Partie 2: Évaluation de la conformité

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81.040.20 Steklo v gradbeništvu Glass in building

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

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Foreword

This document (prEN 16477-2:2012) has been prepared by Technical Committee CEN/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.

1 Scope

This European Standard covers requirements, the evaluation of conformity and the factory production control of flat painted glass for internal 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 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 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: Definition and general physical and mechanical properties*

EN 572–2, *Glass in Building - Basic soda lime silicate glass products – Part 2: -Float glass*

EN 572-8, *Glass in building – Basic soda lime silicate glass products – Part 8: supplied and final cut sizes*

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

prEN 16477-1, *Glass in building – Painted glass for internal use – Part 1: Requirements*

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

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 13501-1:2007+A1:2009, *Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests*

EN 13501-2:2007+A1:2009, *Fire classification of construction products and building elements – Part 2: Classification using data from resistance to fire tests excluding ventilation services*

EN 13501-5:2005+A1:2009, *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*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in prEN 16477-1 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 standard that demonstrates compliance with this 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 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.

4 Requirements

4.1 Product description

For conformity purposes the painted 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 painted 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 information:

— reference to prEN 16477 Parts 1 and 2 and all other standards with which the manufacturer claims compliance.

- materials making up the layers of the painted glass.
- glass substrates

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

The substitution of materials shall maintain the conformity with the product description. The substituting material can be added to the product description when compliance has been demonstrated.

4.2 Conformity with the definition of painted glass

Products shall conform to the definition and fulfil the requirements of painted glass as defined in prEN 16477-1.

4.3 Determination of the characteristic's performances

4.3.1 Characteristics of painted glass

4.3.1.1 General

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

4.3.1.2 Characteristics of the glass panes used for the production of painted glass

Panes shall be made of soda lime silicate float glass according to EN 572-1, EN 572-2, 572-8.

For the characteristics listed in Table 1, for the soda lime silicate glass panes, generally accepted values or calculated values shall be used.

Since the painted glass production process does not change the majority of the characteristics of table 1 significantly they shall be used for painted glass. The characteristics that are significantly changed are the light transmittance/reflectance and solar heat transmittance/reflectance.

Table 1 — Information on the characteristics of soda lime silicate glass panes, according to EN 572-1, used for the production of painted glass

Characteristic	Symbol	Unit
- density	ρ	kg/m³
- 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_e	Dimensionless
- Total energy transmittance	g	Dimensionless

4.3.2 Determination of characteristics of painted glass

If the painted 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 standard including his specific process control conditions.

NOTE Products complying with the definition from prEN 16477-1, are unlikely to be capable of being classified for the following characteristics: 4.3.2.1; 4.3.2.4; 4.3.2.5; 4.3.2.6; 4.3.2.7.

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 case of fire – Reaction to fire

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

From CEN/TS 15117:2005, 6.3 it may be specified that if the painted glass is applied on a non-combustible substrate (e.g. wall) the paint is considered as an internal non substantial component and A1 criteria may be applied.

When the PCS of the paint component of the painted glass does not exceed 1.4 MJ/m², Painted glass are products/materials that may be classified A1 following EN 13501-1.

When the PCS of the paint component of the painted glass does not exceed 4 MJ/m², Painted glass are products/materials that may be classified A2 following EN 13501-1.

NOTE The undertaking of PCS determination can be unnecessary if test report according EN ISO 1716 are supplied by paint supplier.

If the application is not against a non-combustible substrate (e.g.; wall) the paint is considered as an external non substantial component and a general classification according EN 13501-1 applies.

4.3.2.3 Safety in 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 in accordance with prEN 13501-5.

NOTE 1 Compliance with this requirement is not possible until a version of prEN 13501-5 later than 2002 becomes available.

NOTE 2 As EN 16477 (all parts) is for internal use only this application is not applicable.

4.3.2.4 Safety in use – Bullet resistance : shatter properties and resistance to attack

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

4.3.2.5 Safety in use – Explosion resistance : impact behaviour and resistance to impact

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

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

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

4.3.2.7 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.

4.3.2.8 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 prEN 16477-1 and shall be ensured by compliance with this standard.

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

The mechanical strength of painted glass is a characteristic value that is given in EN 13474 and shall be ensured by compliance with this standard.

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

The manufactured or supplied thickness of painted glass shall conform to the ordered thickness.

4.3.2.10 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 can be used as the painted glass production process does not alter the values.

4.3.2.11 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

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

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

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

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

4.4 Durability

When products conform to the definition of painted 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, is ensured by the following:

— Compliance with this 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 Also 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 standard shall be as a result of FPC and ITT in accordance with this 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;

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

The product's characteristics shall be initial type tested to verify they are in conformity with the requirements. Instead of performing any actual testing, initial type testing may make use of:

— generally accepted and/or conventional and/or standardised values, mentioned in the relevant standards, or in publications that are referred to in the relevant standards;

— standardised calculation methods and recognised calculation methods mentioned in the relevant standards, or in publications that are referred to in the relevant standards;

— test report(s) on the basis of 5.2.1.2 when made available;

— 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 re-assessed providing they remain unchanged by the manufacturing process;

— release of dangerous substances maybe assessed indirectly by controlling the amount of the substance concerned;

— durability may be assessed indirectly by controlling the production processes according to this standard.

NOTE 1 Products CE marked in accordance with appropriate harmonised European specifications may be presumed to have the performances stated with the CE marking.

NOTE 2 There may be a need to involve a third party for the purpose of regulatory marking (see Annex ZA).

When actual testing is required then the Initial Type Testing (ITT) shall be undertaken on a sample representative of the product taken from direct production or a prototype, any plant and/ or line.

Whenever a change occurs in the raw material or the production process (subject to the definition of the family), which would change significantly one or more of the characteristics, the type tests shall be repeated for the appropriate characteristics.

5.2.1.1 Multiple lines/sites

If a manufacturer operates one and/or more lines and/or sites, the following can reduce the requirement for multiple Initial Type Testing (ITT):

i) The manufacturers' technical file for a product shall specifically covers all sites and/or lines of the same manufacturer[1];

ii) The manufacturer shall establish a direct relationship between production control, initial type testing and on-going internal audit testing;

iii) The manufacturer has a responsible individual designated to ensure product compliance based on:

— The operation of a consistent Factory Production Control system on all applicable sites and/or lines;

— The manufacturer having obtained evidence that shows the product to be consistent, with respect to both product characteristics and intended use characteristics;

— The manufacturer has in place an internal auditing scheme, including product consistency.

5.2.1.2 Historic data

(a) For all characteristics except those listed in 5.2.2 the following applies:

Tests previously performed in accordance with the provisions of this standard (same product, same characteristic(s), same or more onerous test method, sampling method and attestation of conformity) may be taken into account.

(b) For characteristics listed in 5.2.2, the following applies:

Tests previously performed in accordance with the provisions of this standard may be taken into account when all of the following conditions are met:

1) The results of tests conducted have been confirmed ;

NOTE A Notified Body should confirm the results of tests conducted by a non-notified testing body and as far as he is satisfied with the competence of the testing body.

2) Tests have been conducted in accordance with a prEN version that shall not be materially different from the EN with regard to the impact on testing ;

1) The terms 'manufacturer' and 'producer' are understood as being synonyms (see CPD working document NB-CPD/02/019-issued 24 April 2002 – page1)