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Steklo v gradbeništvu - Osnovni proizvodi iz alumosilikatnega stekla - 2. del: Standard za proizvod

Glass in Building - Basic alumino silicate glass products - Part 2: Product standard

Glas im Bauwesen - Basiserzeugnisse aus Alumo-Silicatglas - Teil 2: Produktnorm

Verre dans la construction - Produits de base : Verre alumino silicaté - Partie 2 : Norme de Produit

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Verre dans la construction - Produits de base : Verre alumino silicaté - Partie 2 : Norme de Produit

Glas im Bauwesen - Basiserzeugnisse aus Alumo-Silicatglas - Teil 2: Produktnorm

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European foreword

This document (EN 15681-2:2017) 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of an identical text or by endorsement, at the latest by August 2017, and conflicting national standards shall be withdrawn at the latest by November 2018.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

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

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

EN 15681 *Glass in Building — Basic alumino silicate glass products* consists of the following parts:

— Part 1: Definitions and general physical and mechanical properties;

— Part 2: Product standard.

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, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard covers the assessment and verification of constancy of performance and the factory production control of basic alumino silicate glass products 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 documents, in whole or in part, are normatively referenced in this document and 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 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 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 15681-1:2016, *Glass in building - Basic alumino silicate glass products - Part 1: Definitions and general physical and mechanical properties*

EN 15998, *Glass in building - Safety in case of fire, fire resistance - Glass testing methodology for the purpose of classification*

prEN 16612, *Glass in building — Determination of the load resistance of glass panes by calculation and testing*

ISO 9385, *Glass and glass-ceramics — Knoop hardness test*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 15681-1:2016 and the following apply.

3.1
factory production control
FPC
documented, permanent and internal control of production in a factory, in accordance with this standard

Note 1 to entry: See also Annex A.

3.2
product-type
set of representative performance levels or classes of a construction product, in relation to its essential characteristics, produced using a given combination of raw materials or other elements in a specific production process

3.3
essential characteristic
characteristic of the construction product which relate to the basic requirements for construction works

Note 1 to entry: Basic requirements for construction work are given in the regulation (EU) No 305/2011, Annex I.

3.4
performance of a construction product
performance related to the relevant essential characteristics, expressed by level or class, or in a description

3.5
level
result of the assessment of the performance of a construction product in relation to its essential characteristics, expressed as a numerical value

3.6
class
range of levels, delimited by a minimum and a maximum value, of performance of a construction product

3.7
type testing
TT
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 and that demonstrates compliance with this European Standard

3.8
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

3.9
product description
document that details the relevant parameters, e.g. process conditions, structure, etc., for defining a product that complies with the standard and that includes specific reference(s) to characteristics that are modified by the production process

3.10
product family
group of products determined by the manufacturer, which is made with similar components and processes and which is tested for FPC using the same test method

3.11
significant change
variation in performance beyond the permitted tolerance for the characteristic

4 Requirements

4.1 Product description

For conformity purposes the basic alumino silicate glass products 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 basic alumino silicate glass products manufacturer or his agent except in the case of regulatory requirements.

The product description shall contain at least the following:

— a reference to EN 15681-1 and EN 15681-2 and all other standards with which the manufacturer claims compliance;

— the type of manufacturing process used, i.e. float glass, drawn sheet glass, rolled glass;

— a description of the product family(ies);

— the spectrophotometric properties of the basic alumino silicate glass products;

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

4.2 Determination of the characteristic's performances

4.2.1 Characteristics of basic alumino silicate glass products

Basic alumino silicate glass products are made in accordance with EN 15681-1. For the characteristics listed in Table 1, the values given in EN 15681-1:2016, 5.1 and 5.2 shall be used.

Table 1 —Characteristics of basic alumino silicate glass products

Characteristic	Symbol	Unit
Density	ρ	kg/m^3
Hardness (Knoop hardness in accordance with ISO 9385)	$HK_{0,1/20}$	Dimensionless
Young's modulus	E	GPa
Poisson's ratio	μ	Dimensionless
Characteristic bending strength	$f_{g,k}$	MPa
Resistance against sudden temperature changes and temperature differentials		K
Specific heat capacity	c	J/(kg.K)
Coefficient of linear expansion	α_l	K^{-1}
Thermal conductivity	λ	W/(m.K)
Mean refractive index to visible radiation	n	Dimensionless

4.2.2 Determination of the characteristics of basic alumino silicate glass products

4.2.2.1 General

If the basic alumino silicate glass products 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.

4.2.2.2 Safety in the case of fire - Resistance to fire

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

The testing methodology specified in EN 15998 shall be used for glass products that are claiming fire resistance.

4.2.2.3 Safety in the case of fire - Reaction to fire

Reaction to fire shall be determined and classified according to EN 13501-1.

Basic alumino silicate 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).

4.2.2.4 Safety in the case of fire - External fire performance (for roof coverings only)

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.

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

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

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

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

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

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

4.2.2.8 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.

4.2.2.9 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 15681-1 and shall be ensured by compliance with this standard.

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

The mechanical resistance of basic alumino silicate glass products is a characteristic value that shall be ensured by compliance with this document.

The value to be declared is the characteristic bending strength, as defined in EN 15681-1:2016, 5.2.

As long as prEN 16612 is not applicable for the glass design with respect to the concerned construction or building site, then the current method of determining mechanical resistance in the country of destination shall be applied.

4.2.2.11 Protection against noise - Direct airborne sound reduction

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

The values to be declared shall be rounded down to the nearest whole number.

4.2.2.12 Energy conservation and heat retention - Thermal properties

The thermal transmittance value (U-value) shall be determined in accordance with the following procedure:

a) The emissivity shall be taken equal to 0,837, as given in EN 15681-1

b) The U-value shall be determined by calculation in accordance with EN 673, with the normal emissivity as defined above and the nominal thickness of the glass panes.

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

The light transmittance and light reflectance shall be determined either:

a) in accordance with the following procedure:

   1) The light transmittance and light reflectance of one sample of basic alumino silicate glass product shall be determined in accordance with EN 410 and Annex B. The exact thicknesses of the glass shall be measured.

   2) The light transmittance and the light reflectance of any other thickness shall be calculated according to EN 410.

   3) The tool used to calculate the light transmittance and the light reflectance shall be validated.

b) or measured following EN 410 and Annex B.

The tolerances on the calculated light transmittance and light reflectance are given in Annex B.

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

The solar direct transmittance, the solar direct reflectance and the total solar energy transmittance (solar factor or g-value) shall be determined either:

a) in accordance with the following procedure:

1) The solar direct transmittance and solar direct reflectance of one sample of basic alumino silicate glass product shall be determined in accordance with EN 410 and Annex B. The exact thicknesses of the glass shall be measured.

2) The solar direct transmittance, the solar direct reflectance and the total solar energy transmittance (solar factor or g-value) of any other thickness shall be calculated according to EN 410.

3) The tool used to calculate the solar direct transmittance, the solar direct reflectance and the total solar energy transmittance (solar factor or g-value) shall be validated.

b) or measured following EN 410 and Annex B.

The tolerances on the calculated solar energy characteristics are given in Annex B.

4.2.2.15 Durability / Conformity with the definition of basic alumino silicate glass products

Products shall conform to the definition, to the manufacturer product description and fulfil the requirements of basic alumino silicate glass products as defined in EN 15681-1.

The type testing concerns the product aspects as listed in Table 2.

Table 2 — Product aspects to be checked if product belongs to the group basic alumino silicate glass products

Product aspect	Requirement	Number of samples
Chemical composition	EN 15681–1:2016, Clause 4	1
Thickness	EN 15681–1:2016, 6.2	1
Light transmittance (distinction clear glass from tinted glass)	EN 15681–1:2016, 5.3	1

When products conform to the definition of basic alumino silicate glass as in 4.1, the other characteristic's performances in 4.2 are ensured during an economically reasonable working life.

The durability / conformity of basic alumino silicate glass products, including their characteristics, shall be ensured by the following:

— compliance with this document,

— 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 also on: