SLOVENSKI STANDARD
SIST EN 15681-1:2016

01-junij-2016

Steklo v gradbeništvu - Osnovni proizvodi iz aluminij-silikatnega stekla - 1. del: Definicije in splošne fizikalne in mehanske lastnosti

Glass in building - Basic alumino silicate glass products - Part 1: Definitions and general physical and mechanical properties

Glas im Bauwesen - Basiserzeugnisse aus Alumo-Silicatglas - Teil 1: Definitionen und allgemeine physikalische und mechanische Eigenschaften

Verre dans la construction - Produits de base : verre aluminosilicate - Partie 1 : Définitions et propriétés physiques et mécaniques générales

Ta slovenski standard je istoveten z: **EN 15681-1:2016**

ICS:

81.040.20	Steklo v gradbeništvu	Glass in building

SIST EN 15681-1:2016 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 15681-1

January 2016

ICS 81.040.20

English Version

Glass in building - Basic alumino silicate glass products - Part 1: Definitions and general physical and mechanical properties

Verre dans la construction - Produits de base : verre aluminosilicate - Partie 1 : Définitions et propriétés physiques et mécaniques générales

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 15681-1:2016 E

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European foreword

This document (EN 15681-1:2016) 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of an identical text or by endorsement, at the latest by July 2016, and conflicting national standards shall be withdrawn at the latest by July 2016.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] 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.

This European Standard consists of the following parts:

— EN 15681-1 Glass in Building — Basic alumino silicate glass products — Part 1: Definitions and general physical and mechanical properties;

— EN 15681-2 Glass in Building — Basic alumino silicate glass products — Part 2: Evaluation of conformity / Product standard[1].

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

[1] Standard under development.

1 Scope

This Part of this European Standard specifies and classifies basic alumino silicate glass products, indicates their chemical composition, their main physical and mechanical characteristics, their dimensional and their minimum quality requirements (in respect of optical and visual faults).

This European Standard applies to basic alumino silicate glasses supplied in stock sizes, supplied sizes or in cut sizes for final end use.

This European Standard does not apply to final cut sizes having a dimension less than 100 mm or a surface area less than 0,05 m^2.

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

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

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
alumino silicate glass
silicate glass containing between 5,8 % to 16,2 % aluminium and with a chemical composition according to 4.1 of this standard

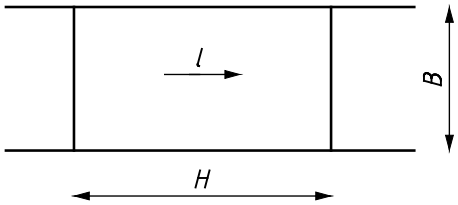
3.2
alumino silicate float glass
flat, transparent, clear or tinted alumino silicate glass having parallel and polished faces obtained by continuous casting and floatation on a metal bath

Note 1 to entry: In French called 'glace' and in German 'Floatglas'.

3.3
alumino silicate drawn sheet glass
flat, transparent or translucent, clear or tinted basic alumino silicate glass obtained by continuous drawing of a regular thickness and with the two surfaces fire polished

3.4
alumino silicate rolled glass
flat, transparent or translucent, clear or tinted basic alumino silicate glass obtained by rolling

3.5
length, H and width, B
defined with reference to the direction of draw of the glass ribbon as shown in Figure 1



Key

l	direction of draw
H	length
B	width

Figure 1 — Relationship between length, width and direction of draw

3.6
stock sizes
glass delivered in manufacturers standard stock sizes

3.7
supplied size
pane of glass that has been supplied either as raw material for further processing and/or cutting down to a size for installation

Note 1 to entry: This is a size that is outside the stock size.

3.8
final cut size
pane of glass that has been cut down to the dimensions being required either for installation or processing into a final product

Note 1 to entry: Examples of processed final products are insulating glass units and thermally toughened safety glass of those dimensions.

3.9
optical fault
fault which leads to distortions in the appearance of objects observed through the glass

3.10
visual fault
fault which alters the visual quality of the glass

Note 1 to entry: Visual faults include spot faults and linear / extended faults.

3.11
spot fault
spherical or quasi spherical fault which is produced by differing mechanisms, e.g. gaseous inclusion, solid inclusion, mark or deposit of small size

3.12
linear / extended faults
fault which can be on or in the glass, in the form of deposits, reams, marks or scratches that occupy an extended length or area

3.13
edge defect
defect which can occur on the edge of a cut size piece in the form of entrant and emergent fault and/or bevel

3.14
concentration
sum of the lengths of gaseous inclusions greater than 1,0 mm in any circle of 400 mm diameter

4 Chemical composition

4.1 General

The basic glass products covered by this European Standard are all manufactured from alumino silicate glass.

The magnitude of the proportions by mass of the constituents of alumino silicate glass covered by this standard is given in Table 1, see also Annex A

Table 1 — Magnitude of the proportions by mass of the constituents of alumino silicate glass

Constituents	Proportion by mass of element
Silicon (Si)	25,3 % to 35,1 %
Aluminium (Al)	5,8 % to 16,2 %
Σ Si + Al	32,1 % to 51,3 %
Lithium (Li)	0 % to 3,7 %
Sodium (Na)	0 % to 10,5 %
Calcium (Ca)	0 % to 2,1 %
Magnesium (Mg)	0 % to 5 %
Zinc (Zn)	0 % to 2,4 %
Potassium (K)	0 % to 7 %
Zirconium (Zr)	0 % to 3,0 %
Strontium (Sr)	0 % to 2,5 %
Barium (Ba)	0 % to 3,6 %
Other components[a]	0 % to 5 %
[a] Properties other than photometric characteristics shall not be significantly altered by these other components	

4.2 Tint

Body tinted glass is obtained by the addition of suitable materials.

5 Physical and mechanical characteristics

5.1 General characteristics

Conventional numerical values for the physical and mechanical characteristics of basic alumino silicate glass products excluding ‘Characteristic bending strength’ ($f_{g;k}$) are given in Table 2. These values, for

normal annealed glass without any further toughening, are not precise requirements with which the glass shall strictly comply, but are the generally accepted figures for use in calculations where a high degree of accuracy is not required.

Table 2 — General characteristic values of basic alumino silicate glass

Characteristic	Symbol	Value and unit
Density (at 18 °C)	ρ	2300 to 2600 kg/m³
Hardness (Knoop)	$HK_{0,1/20}$	400 to 700 [a]
Young's modulus (modulus of elasticity)	E	70 to 90 x GPa
Poisson's ratio	μ	0,2 to 0,25
Specific heat capacity	C_p	0,7 to 0,9 × 10³ J/(kg*K)
Nominal value of average coefficient of linear expansion between 20 °C and 300 °C	α	3,5 to 9,8 × 10⁻⁶/K
Resistance against temperature differential and sudden temperature change		60 K [b]
Thermal conductivity	λ	0,8 to 1,7 W/(m*K)
Mean refractive index to visible radiation (at 589,3 nm)	n	1,5 to 1,55
Emissivity (corrected)	ε	0,837

a Knoop Hardness in accordance with ISO 9385

b Generally accepted value that is influenced by edge quality and glass type

5.2 Characteristic bending strength

The characteristic bending strength value applies to quasi-static loading over a short time, e.g. wind loading, and relate to a 5 % probability of breakage at the lower limit of the 95 % confidence interval.

The value of the characteristic bending strength, $f_{g;k}$, for alumino silicate float glass is 45 MPa, for drawn sheet and rolled glass 25 MPa.

NOTE Methods of determination of the bending strength of glass are given in EN 1288–1, EN 1288–2, EN 1288–3, EN 1288–4 and EN 1288–5 (see [1], [2], [3], [4], [5]). Design of glass panes is covered by prEN 16612 (see [6]).

5.3 Designation of clear alumino silicate glass

5.3.1 General

An alumino silicate glass product is designated as clear alumino silicate glass when it is not tinted and when the light transmittance of the glass material, unmodified by the possible presence of a coating or surface roughness complies with 5.3.2 and 5.3.3.

In order to measure the light transmittance characteristics of glass, to determine whether it can be designated as a clear glass, it is necessary, in some cases, to carry out a pre-treatment:

— coatings on smooth surfaces have to be eliminated, without modifying the thickness of the glass substrate;

— rough surfaces, with or without coatings, have to be eliminated by smoothing and polishing. The thickness of the glass will be modified by this process.

The light transmittance of the glass substrate shall be measured with its surfaces in a polished condition.