



SLOVENSKI STANDARD
oSIST prEN 15681-1:2007
01-julij-2007

**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

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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

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 129.

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Foreword

This document (prEN 15681-1:2007) 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.

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1 Scope

This European Standard defines and classifies basic alumino silicate glass products for use in building. It indicates their chemical composition, main physical and mechanical properties, dimensional and minimum quality requirements (in respect of optical and visual faults).

This European standard applies to basic alumino silicate glasses supplied in stock 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 m².

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

prEN 13474, *Glass in building – Design of glass panes*

3 Terms and definitions

For the purposes of this European Standard, the following definitions apply.

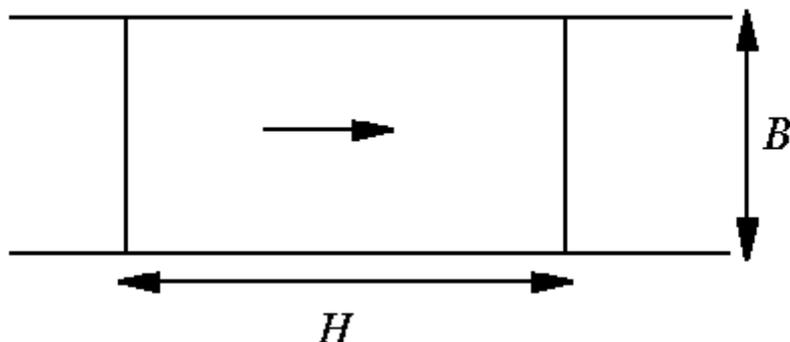
3.1 Basic alumino silicate float glass
flat, transparent or translucent, clear or tinted basic alumino silicate glass having parallel and polished faces obtained by continuous casting and flotation on a metal bath.

3.2 Basic alumino silicate drawn sheet glass
flat, transparent or translucent, clear or tinted basic alumino silicate glass obtained by continuous drawing and with two surfaces fire polished.

3.3 Basic alumino silicate rolled glass
flat, transparent or translucent, clear or tinted basic alumino silicate glass obtained by rolling.

3.4 Nominal length, H
pane length defined with reference to the direction of draw of the glass ribbon as shown in Figure 1.

3.6 Nominal width, B
pane width defined with reference to the direction of draw of the glass ribbon as shown in Figure 1.



→ Direction of draw

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

3.7

stock sizes

glass delivered in manufacturers standard stock sizes.

3.8

final cut size

a pane of glass that has been cut down to the dimensions being required either for installation or processing into a final product e.g. insulating glass units, thermally toughened safety glass.

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3.9

optical faults

these are faults, which lead to distortions on the appearance of objects observed through the glass.

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3.10

visual faults

these are faults, which alter the visual quality of the glass. They are spot faults and linear / extend faults.

3.11

spot faults

a spot fault is a nucleus, which is sometimes accompanied by a halo of distorted glass. The dimension of a spot fault comprising a nucleus with a halo is obtained by multiplying the dimension of the nucleus by a factor of 3.

3.12

linear / extended faults

these faults can be on or in the glass, in the form of deposits, marks or scratches that occupy an extended length or area.

3.13

edge defects

these defects can occur on the edge of a cut size piece in the form of entrant and emergent faults and / or bevels.

3.14

concentration, c

the 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 standard are all manufactured from alumino silicate glass.

The magnitude of the proportions by mass of the principal constituents of all the alumino silicate glass products covered by this standard is as follows:

Silicon Dioxide	SiO ₂	54 - 75 %
Aluminium Oxide	Al ₂ O ₃	16 - 27 %
Σ	SiO ₂ + Al ₂ O ₃	70 – 95 %
Lithium Oxide	Li ₂ O	0 – 8 %
Sodium Oxide	Na ₂ O	0 – 8 %
Calcium Oxide	CaO	0 – 3 %
Magnesium Oxide	MgO	0 – 4 %
Zinc Oxide	ZnO	0 – 3 %
Potassium Oxide	K ₂ O	0 – 3 %
Zirconium Oxide	ZrO ₂	0 – 4 %
Strontium Oxide	SrO	0 – 3 %
Barium Oxide	BaO	0 – 4 %
Others		0 – 8 %

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In addition to the above general composition, these glasses may also contain small quantities of other substances

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 are given in table 1. 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 1 — General characteristic values of basic alumino silicate glass

Characteristic	Symbol	Value and unit
Density (at 18°C)	ρ	2300 – 2600 kg/m ³
Hardness (Knoop)	HK _{0,1/20}	4 – 7 GPa
Young's modulus (modulus of elasticity)	E	7 - 9 x 10 ¹⁰ Pa
Poisson's ratio	μ	0,2 – 0,25
Characteristic bending strength of float glass	$f_{g,k/k}$	45 x 10 ⁶ Pa ^[1]
Specific heat capacity	c_p	0,7 – 0,9 x 10 ³ J/(kg K)
Nominal value of average coefficient of linear expansion between 20 °C and 300 °C	α	3,5 – 7,5 x 10 ⁻⁶ /K
Resistance against temperature differential and sudden temperature change		60 K ^[2]
Thermal conductivity	λ	0,8 - 1,7 W/(m K)
Mean refractive index to visible radiation (at 589,3 nm)	n	1,5 – 1,55
Emissivity (corrected)	ε	0,837
^[1] The characteristic bending strength has to be used in conjunction with the design method given in prEN 13474		
^[2] Generally accepted value that is influenced by edge quality and glass type		

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5.2 Designation of clear basic alumino silicate glass

5.2.1 General

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A basic 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 of, for example, a rolled glass complies with 5.2.2 and 5.2.3.

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

- 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.

Note: The light transmittance values given in 5.2.2 and 5.2.3 are not suitable for design. They are values used only for the designation of clear glass and exclude the effects of coatings and of surface roughness. The values of light transmittance used for design can be obtained from the glass manufacturer. They are determined in accordance with EN 410.

5.2.2 Clear transparent glass

A transparent glass product is designated as clear glass when it is not tinted and when its light transmittance:

- after any necessary pretreatment;
- measured according to EN 410; and

— rounded to the nearest 0,01;

is greater than or equal to the value given in Table 2 for the nominal thickness of the glass product.

Note: The limiting value given in Table 2 is appropriate provided that the measured thickness of the glass product is within the allowable tolerances for the nominal thickness of that glass product.

Table 2 — Minimum light transmittance values for designating a transparent glass product as clear glass

Nominal thickness in mm	Minimum value of light transmittance
2 – 4	0,88
5 – 6	0,87
8	0,86
10	0,85
12	0,84
15	0,82

5.2.3 Clear translucent glass

A translucent glass product is designated as clear glass when it is not tinted and when its light transmittance:

- after any necessary pretreatment;
- measured according to EN 410; and
- rounded to the nearest 0,01;

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is greater than or equal to the value obtained by linear interpolation from Table 3, for the measured thickness of the specimen.

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Note: The limiting value will vary with the exact thickness of the specimen after its pretreatment.

Table 3 — Minimum light transmittance values for designating a translucent glass product as clear glass

Thickness in mm	Minimum value of light transmittance
2 – 4	0,88
5 – 6	0,87
8	0,86
10	0,85
12	0,84
15	0,82

5.3 Stability of physical and chemical characteristics

For basic alumino silicate glass products, the physical and chemical characteristics can be considered as remaining constant over time.

- a) Since alumino silicate glass is insensitive to photochemical effects, the spectral properties (transmission of light and solar energy) of the basic glass products are not modified by direct or indirect solar radiation.
- b) The surface of the alumino silicate glass used in building is virtually insensitive to attack from the environment.