



SLOVENSKI STANDARD

SIST EN 1748-1:1999

01-november-1999

Steklo v stavbah - Posebni osnovni proizvodi - 1. del: Borosilikatno steklo

Glass in building - Special basic products - Part 1: Borosilicate glasses

Glas im Bauwesen - Spezielle Basiserzeugnisse - Teil 1: Borosilicatgläser

Verre dans la construction - Produits de base spéciaux - Partie 1: Verres borosilicates

Ta slovenski standard je istoveten z: EN 1748-1:1997

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ICS:

81.040.20 Steklo v gradbeništvu Glass in building

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en

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EUROPEAN STANDARD

EN 1748-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 1997

ICS 81.040.20

Descriptors: construction, glass, glassware, borosilicate glass, definitions, chemical composition, mechanical properties, physical properties, dimensions, dimensional tolerances, classifications, defects, acceptability, designation

English version

Glass in building - Special basic products - Part 1: Borosilicate glasses

Verre dans la construction - Produits de base
spéciaux - Partie 1: Verres borosilicatés

Glas im Bauwesen - Spezielle Basiserzeugnisse
- Teil 1: Borosilicatgläser

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This European Standard was approved by CEN on 1997-07-24. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

The European Standards exist in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 129 "Glass in building", the secretariat of which is held by IBN.

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 February 1998, and conflicting national standards shall be withdrawn at the latest by February 1998.

This European Standard consists of the following parts, under the general title "Glass in building - Special basic products" :

- Part 1 : Borosilicate glasses
- Part 2 : Glass ceramics
- Part 3 : Evaluation of conformity of borosilicate glasses and glass ceramics.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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1 Scope

This European Standard defines and classifies borosilicate glasses 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 standard applies only to borosilicate glasses supplied in stock sizes.

This standard does not apply to borosilicate glasses supplied in cut sizes for final end use.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

prEN 410 Glass in building – Determination of light transmittance, solar direct transmittance, total solar energy transmittance, ultraviolet transmittance and related glazing characteristics

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3 Definitions

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

3.1 borosilicate glass: Silicate glass containing between 7% and 15% boron oxide. As a result of the composition it has a high thermal shock resistance and a very high hydrolytic and acid resistance.

3.2 borosilicate float glass: Flat, transparent, clear or tinted borosilicate glass having parallel and polished faces which can be manufactured by continuous casting and flotation on a metal bath.

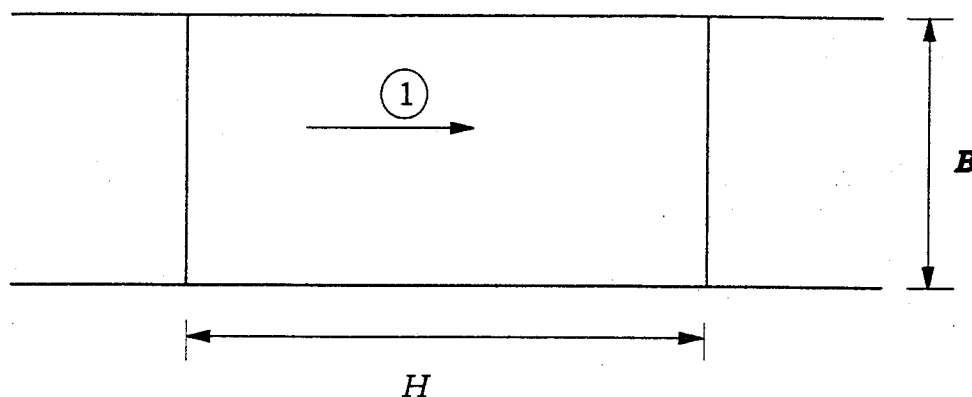
3.3 drawn sheet borosilicate glass: Flat, transparent, clear or tinted borosilicate glass obtained by continuous drawing, initially vertically, of a regular thickness and with two surfaces fire polished.

3.4 rolled borosilicate glass: Flat, transparent or translucent, clear or tinted borosilicate glass obtained by rolling.

3.5 cast borosilicate glass: Flat, translucent, clear or tinted borosilicate glass obtained by casting.

3.6 nominal length, H : Pane length defined with reference to the direction of draw of the glass ribbon as shown in figure 1, except for cast borosilicate glass which does not have a direction of draw.

3.7 nominal width, B : Pane width defined with reference to the direction of draw of the glass ribbon as shown in figure 1, except for cast borosilicate glass which does not have a direction of draw.



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1 Direction of draw

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

3.8 stock sizes: Glass delivered in the following size range:

Nominal length H : 500 mm to 3300 mm

Nominal width B : 500 mm to 2300 mm

3.9 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 Principal constituents

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

Silicon Dioxide	SiO ₂	70% to 87%
Boron Oxide	B ₂ O ₃	7% to 15%
Sodium Oxide	Na ₂ O	0% to 8%
Potassium Oxide	K ₂ O	0% to 8%

Aluminium Oxide	Al_2O_3	0% to 8%
Others		0% to 8%

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 the glass used to manufacture basic 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: Physical and mechanical characteristics of borosilicate glass

Characteristic	Symbol	Value and unit
Density (at 18°C)	ρ	2200 kg/m ³ to 2500 kg/m ³
Hardness (Knoop)	$HK_{0,1/20}$	450 to 600
Young's modulus (modulus of elasticity)	E	6×10^{10} Pa to 7×10^{10} Pa
Poisson's ratio	μ	0,2
Specific heat capacity	c_p	$0,8 \times 10^3$ J/(kg·K)
Nominal value of average coefficient of linear expansion between 20 °C and 300 °C	α	Class 1: $(3,1 \text{ to } 4,0) \times 10^{-6}/\text{K}$ Class 2: $(4,1 \text{ to } 5,0) \times 10^{-6}/\text{K}$ Class 3: $(5,1 \text{ to } 6,0) \times 10^{-6}/\text{K}$
Thermal conductivity	λ	1 W/(m·K)
Mean refractive index to visible radiation (380 nm to 780 nm)	n	1,5

5.2 Definition of clear borosilicate glass

A borosilicate glass product is defined as clear borosilicate glass when it is not tinted and when the light transmittance of the glass material unmodified by the possible presence of a coating and/or surface roughness of, for example, a rolled borosilicate glass, complies with 5.2.1 and 5.2.2.

In order to measure the light transmittance characteristics of glass, to determine whether it can be designated as 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.

Clear glass is defined as a glass which is not tinted and which has, after any necessary pretreatment, a minimum light transmittance according to 5.2.1 and 5.2.2.

NOTE: The values given in 5.2.1 and 5.2.2 are not suitable for design. They are values used only for the definition of clear glass and exclude the effects of coatings and of surface roughness. The values of light transmittance used for design could be obtained from the glass manufacturer. They are determined in accordance with prEN 410.

5.2.1 Clear transparent glass

A transparent glass product is defined as clear glass when it is not tinted and when its light transmittance,

- after any necessary pretreatment,
- measured according to prEN 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 applicable provided that the measured thickness of the glass product is within the allowable tolerances for the nominal thickness of that glass product.