



# SLOVENSKI STANDARD

## SIST EN 1748-2:1999

01-november-1999

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### **Steklo v stavbah - Posebni osnovni proizvodi - 2. del: Steklena keramika**

Glass in building - Special basic products - Part 2: Glass ceramics

Glas im Bauwesen - Spezielle Basiserzeugnisse - Teil 2: Glaskeramik

Verre dans la construction - Produits de base spéciaux - Partie 2: Vitrocéramiques

**Ta slovenski standard je istoveten z: EN 1748-2:1997**

[SIST EN 1748-2:1999](https://standards.iteh.ai/catalog/standards/sist/4392f951-0ceb-45fd-a35c-2776265c93e9/sist-en-1748-2-1999)

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#### **ICS:**

81.040.20      Steklo v gradbeništvu      Glass in building

**SIST EN 1748-2:1999**

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EUROPEAN STANDARD

EN 1748-2

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 1997

ICS 81.040.20

Descriptors: construction, glass, glassware, glass ceramics, mechanical properties, physical properties, dimensions, dimensional tolerances, defects, measurements, viewing conditions

English version

## Glass in building - Special basic products - Part 2: Glass ceramics

**iTeh STANDARD PREVIEW**Verre dans la construction - Produits de base  
spéciaux - Partie 2: VitrocéramiquesGlas im Bauwesen - Spezielle Basiserzeugnisse  
Teil 2: Glaskeramik**(standards.iteh.ai)**SIST EN 1748-2:1999

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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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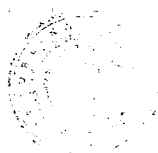
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INTERNATIONAL ORGANIZATION OF STANDARDIZATION



## 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, specifies and classifies glass ceramics 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 glass ceramics supplied in stock sizes.

This standard does not apply to glass ceramics 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 <https://standards.iteh.ai/catalog/standards/sist/4392f951-0ceb-45fd-a35c-2776265c93e9/sist-en-1748-2-1999>

For the purposes of this European Standard the following definitions apply:-

**3.1 glass ceramic:** A type of glass consisting of a crystalline and a residual glass phase. The glass is obtained by normal glass manufacturing methods, e.g. casting, rolling, drawing, floating, and is subsequently subjected to a heat treatment which transforms, in a controlled manner, part of the glass into a fine grained crystalline phase. The glass ceramic has properties which deviate from those of the glass from which it was transformed.

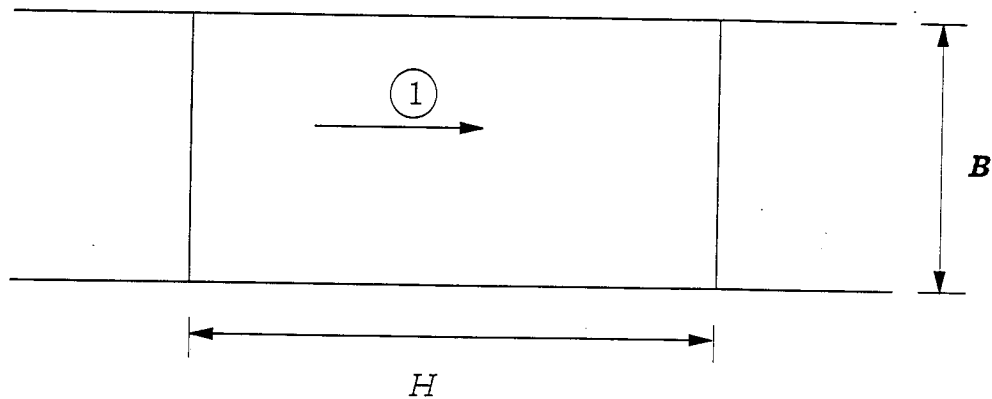
**3.2 floated glass ceramic:** Flat, transparent or translucent, clear or tinted glass ceramic having parallel and polished faces obtained by continuous casting and flotation on a metal bath.

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

**3.4 rolled glass ceramic:** Flat, transparent or translucent, clear or tinted glass ceramic obtained by continuous casting and rolling.

**3.5 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.



1 Direction of draw

**Figure 1: Relationship of length, width and direction of draw**  
(standards.iteh.ai)

**3.7 stock sizes:** Glass delivered in the following size range:

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Nominal length  $H$ : 500 mm to 3300 mm

Nominal width  $B$ : 500 mm to 2300 mm

**3.8 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 glass ceramic products covered by this standard is as follows:

Silicon dioxide	SiO <sub>2</sub>	50% to 80%
Aluminium oxide	Al <sub>2</sub> O <sub>3</sub>	15% to 27%
Lithium oxide	Li <sub>2</sub> O	0% to 5%
Zinc oxide	ZnO	1% to 5%
Titanium dioxide	TiO <sub>2</sub>	0% to 5%
Zirconium dioxide	ZrO <sub>2</sub>	0% to 5%
Magnesium oxide	MgO	0% to 8%
Calcium oxide	CaO	0% to 8%
Barium oxide	BaO	0% to 8%

Sodium oxide	Na <sub>2</sub> O	0% to 2%
Potassium oxide	K <sub>2</sub> O	0% to 2%
Others		0% to 5%

## 4.2 Tint

Body tinted glass ceramic 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 ceramic used to manufacture basic product are given in table 1. These values, for normal annealed glass ceramic without any further toughening, are not precise requirements with which the glass ceramic 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 glass ceramic**  
(standards.iteh.ai)

Characteristic	Symbol	Value and unit
Density (at 18°C)	$\rho$	2500 kg/m <sup>3</sup> to 2600 kg/m <sup>3</sup>
Hardness (Knoop)	$HK_{0,1/20}$	600 to 750
Young's modulus (modulus of elasticity)	$E$	9 x 10 <sup>10</sup> Pa
Poisson's ratio	$\mu$	0,2
Specific heat capacity	$c_p$	0,8 x 10 <sup>3</sup> J/(kg·K) to 0,9 x 10 <sup>3</sup> J/(kg·K)
Nominal value of average coefficient of linear expansion between 20 °C and 300 °C	$\alpha$	zero
Thermal conductivity	$\lambda$	1,5 W/(m·K)
Mean refractive index to visible radiation (380 nm to 780 nm)	$n$	1,5

### 5.2 Definition of clear glass ceramic

A glass ceramic product is defined as clear glass ceramic when it is not tinted and when the light transmittance of the glass ceramic material, unmodified by the possible presence of a coating or surface roughness,

- after any necessary pretreatment
- measured according to prEN 410
- 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 ceramic product.

In order to measure the light transmittance characteristics of glass ceramic, to determine whether it can be classified as clear, 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 ceramic substrate.
- rough surfaces, with or without coatings, have to be eliminated by smoothing and polishing. The thickness of the glass ceramic will be modified by this process.

The light transmittance of a glass ceramic substrate has to be measured with its surfaces in a polished condition.

**Table 2: Minimum values for determining if a transparent or translucent glass ceramic product is clear**

Nominal thickness in mm	Minimum value <sup>(1,2)</sup>
3	0,86
4	0,84
5	0,82
6	0,80
7	0,78
8	0,76

<sup>1)</sup> The limiting values given are applicable provided that the measured thickness of the glass ceramic product is within the allowable tolerances for the nominal thickness of that product.

<sup>2)</sup> The values given are not suitable for design. They are values used only for the definition of clear glass ceramic and exclude the effects of coatings and of surface patterns. The values of light transmittance used for design should be obtained from the glass manufacturer, measured according to prEN 410.

### 5.3 Stability of physical and chemical characteristics

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

- a) Since glass ceramic is insensitive to photochemical effects, the spectral properties (transmission of light and solar energy) of the glass ceramic products are not modified by direct or indirect solar radiation.