

Glass in building — Special basic products — Borosilicate glasses —

Part 1-2: Evaluation of
conformity/Product standard

The European Standard EN 1748-1-2:2004 has the status of a
British Standard

ICS 81.040.20

<http://www.china-grades.com/>

National foreword

This British Standard is the official English language version of EN 1748-1-2:2004.

The UK participation in its preparation was entrusted by Technical Committee B/520, Glass and glazing in building, to Subcommittee, B/520/1, Glass and glazing in building — Basic and transformed glass products, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the *BSI Catalogue* under the section entitled “International Standards Correspondence Index”, or by using the “Search” facility of the *BSI Electronic Catalogue* or of British Standards Online.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 14 October 2004

Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 32, an inside back cover and a back cover.

The BSI copyright notice displayed in this document indicates when the document was last issued.

Amendments issued since publication

Amd. No.	Date	Comments

© BSI 14 October 2004

ISBN 0 580 44596 8

ICS 81.040.20

English version

Glass in building - Special basic products - Borosilicate glasses - Part 1-2: Evaluation of conformity/Product standard

Verre dans la construction - Produits de base spéciaux -
Verres borosilicatés - Partie 1-2: Evaluation de la
conformité/Norme de produit

Glas im Bauwesen - Spezielle Basiserzeugnisse -
Borosilicatgläser - Teil 1-2:
Konformitätsbewertung/Produktnorm

This European Standard was approved by CEN on 27 May 2004.

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.

This European Standard exists 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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents

Page

Foreword.....	4
1 Scope.....	5
2 Normative references	5
3 Terms and definitions.....	6
4 Requirements	6
4.1 Conformity with the definition of borosilicate glass products	6
4.2 Determination of the characteristic's performances.....	6
4.2.1 Characteristics of borosilicate glasses	6
4.2.2 Characteristics of borosilicate glass products.....	7
4.3 Durability.....	9
4.4 Characteristics other than those listed in 4.2	9
4.5 Dangerous substances.....	9
5 Evaluation of conformity	10
5.1 General	10
5.2 Initial type testing of the product (see 5.1, 2).....	10
5.2.1 General.....	10
5.2.2 Initial type testing if the product belongs to the group borosilicate glass, clear or tinted.....	11
5.2.3 Initial type testing of characteristic's performances.....	12
5.3 Factory production control and inspection of samples in accordance with a prescribed test plan (see 5.1, 1a and b).....	12
5.4 Initial inspection of factory and of factory production control (see 5.1, 1c).....	12
5.5 Continuous surveillance and assessment of the factory production control (see 5.1, 1c)	13
6 Marking and/or labelling.....	14
6.1 General	14
6.2 Product marking.....	14
6.3 Product characteristics	14
6.4 "Characteristics/performance identification paper"	14
Annex A (normative) Factory production control.....	15
A.1 Factory Production Control Requirements	15
A.1.1 General	15
A.1.2 Organisation	15
A.1.3 Control system	15
A.2 Marking	16
A.3 Inspection and testing tables of borosilicate glass products production.....	17
A.3.1 Information on Tables A.1 to A.3.....	17
A.3.2 Use of proxy testing.....	17
Annex ^o B (informative) Provisions for voluntary involvement of third party(ies).....	21
B.1 General	21
B.2 Voluntary tasks for third parties.....	21
B.3 Marking and labelling	21

Annex ZA (informative) Clauses of this European Standard addressing the provisions of EU Construction Products Directive.....	22
ZA.1 Scope and relevant characteristics.....	22
ZA.2 Procedure(s) for the attestation of conformity of borosilicate glass products.....	24
ZA.2.1 System(s) of attestation of conformity.....	24
ZA.2.2 EC Certificate and Declaration of conformity.....	27
ZA.3 CE marking and labelling.....	29
Bibliography.....	32

<http://www.china-glasses.com/>

Foreword

This document (EN 1748-1-2:2004) 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 April 2005, and conflicting national standards shall be withdrawn at the latest by July 2006.

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.

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

No existing document is superseded.

This part of the document does not stand-alone, it is a part of one document:

EN 1748 -1-1: *Glass in building – Special basic products – Borosilicate glasses – Part 1-1: Definition and general physical and mechanical properties*

EN 1748 -1-2: *Glass in building – Special basic products – Borosilicate glasses– Part 1-2: Evaluation of conformity/Product standard*

This document contains other aspects of importance of trade.

<http://www.china-grades.com/>

1 Scope

This document covers the evaluation of conformity and the factory production control of borosilicate 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 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 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*

ENV 1187, *Test methods for external fire exposure to roofs*

EN 1748–1-1, *Glass in building - Special basic products -Borosilicate glasses - Part 1-1: Definition and general physical and mechanical properties*

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*

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

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 resistance to fire tests, excluding ventilation services*

prEN 13501-5, *Fire classification of construction products and building elements - Part 5: Classification using data from fire exposure roof tests*

EN 13541, *Glass in building - Security glazing - Testing and classification of resistance against explosion pressure*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1748-1-1 and the following apply.

3.1

initial type testing

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 document that demonstrates compliance with this document.

3.2

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.

3.3

product description

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

3.4

significant change

variation in performance beyond the permitted tolerance for the characteristic.

4 Requirements

4.1 Conformity with the definition of borosilicate glass products

Products shall conform to the definition and fulfil the requirements of borosilicate glass products as defined in EN 1748 1-1.

4.2 Determination of the characteristic's performances

4.2.1 Characteristics of borosilicate glasses

Borosilicate glass products are made in accordance with EN 1748-1-1. The characteristics listed in Table 1, concern generally accepted values, calculated values or measured values.

Table 1: Necessary information on characteristics of borosilicate glasses

Characteristic	Symbol	Unit
Generally accepted values: - density - hardness - Young's modulus - Poisson's ratio - Characteristic bending strength - Resistance against sudden temperature changes and temperature differentials - Specific heat capacity - Coefficient of linear expansion - Thermal conductivity (for U -value) - Mean refractive index to visible radiation - Emissivity	ρ $HK_{0,1/20}$ E μ $f_{g,k}$ c α λ n ε	kg/m ³ Gpa Pa Dimensionless Pa K J/(kg.K) K ⁻¹ W/(m.K) Dimensionless Dimensionless
Measured values: - light transmittance - solar direct transmittance	τ_v τ_e	Dimensionless Dimensionless
Calculated values: - total solar energy transmittance	G	Dimensionless

4.2.2 Characteristics of borosilicate glass products

If the basic borosilicate glass 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.

4.2.2.1 Safety in the case of fire - Resistance to fire

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

Note: EN 357 may be used as a classification reference specific to fire resistant glazed elements.

4.2.2.2 Safety in the case of fire - Reaction to fire

Reaction to fire shall be determined and classified in accordance with EN 13501-1.

Borosilicate 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).

4.2.2.3 Safety in the case of fire - External fire behaviour

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 prEN 13501-5.

Note: Compliance with this requirement is not possible until a version of prEN 13501-5 later than 2002 becomes available.

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

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

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

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

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

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

4.2.2.7 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.

4.2.2.8 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 1748-1-1 and shall be ensured by compliance with this document.

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

The mechanical resistance of borosilicate glass is a characteristic value that is given in EN 1748-1-1 and shall be ensured by compliance with this document.

As long as on the concerned construction or building site no part of prEN 13474 is applicable then the current method of determining mechanical resistance in the country of destination shall be applied.

The manufactured or supplied thickness of borosilicate glass shall conform to the ordered thickness.

4.2.2.10 Protection against noise - Direct airborne sound reduction

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

4.2.2.11 Energy conservation and heat retention - Thermal properties

The thermal transmittance value (U -value) shall be determined by calculation in accordance with EN 673 with:

- emissivity ε : using the value of the emissivity as given in EN 1748-1-1.
- nominal thickness of the glass panes

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

The light transmittance and reflectance shall be determined in accordance with EN 410.

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

The solar energy transmittance and reflectance shall be determined in accordance with EN 410.

4.3 Durability

When products conform to the definition of basic borosilicate glass product as 4.1, the characteristic's performances in 4.2.2 are ensured during an economically reasonable working life.

The durability of 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 1: The durability of glass products depends on:

- building and construction movements due to various actions;
- building and construction vibrations due to various actions;
- deflection and racking of the glass support due to various actions;
- glass support design (e.g. drainage of infiltrated water in the rebate, prevention of direct contact between glass support members and glass);
- accuracy of glass support and glass support member dimensions;
- quality of the assembling of glass support members up to a glass support;
- quality of installation of the glass support into or onto the buildings or constructions;
- glass support expansion due to absorbed moisture from the air or other sources;
- the quality of installation of the glass product into or onto its support.

4.4 Characteristics other than those listed in 4.2

Optical and visual characteristics shall comply with EN 1748-1-1

Dimensional tolerances: shall comply with EN 1748-1-1

4.5 Dangerous substances

Materials used in products shall not release any dangerous substances in excess of the maximum permitted levels specified in a relevant European Standard for the material or permitted in the national regulations of the member state of destination.

5 Evaluation of conformity

5.1 General

Evaluation of conformity in accordance with this document shall be as a result of Factory Production Control and Initial Type Testing in accordance with this document.

- 1) Factory production control;

This shall include the following:

- a) Inspection of samples taken at the factory in accordance with a prescribed test plan;
- b) Initial inspection of the factory and of factory production control;
- c) Continuous surveillance and assessment of the factory production control.

- 2) Initial type testing of the product;

Note: There may be a need to involve a third party, with 1b, 1c, and/or 2, for the purpose of regulatory marking (see Annex ZA).

5.2 Initial type testing of the product (see 5.1, 2)

5.2.1 General

All the product's characteristics shall be initial type tested to verify they are in conformity with the requirements of this document. In addition, instead of performing any actual testing, initial type testing may make use of:

- generally accepted and/or conventional and/or standardised values, in the Clause 2 referenced standards, or in publications that are referred to in these standards;
- standardised calculation methods and recognised calculation methods in the Clause 2 referenced standards, or in publications that are referred to in these standards;
- test report(s) on the basis of 5.2.1.2 when made available except for the characteristics listed in 5.2.2.
- where components are used whose characteristics have already been determined, by the component manufacturer, on the basis of conformity with other product standards, these characteristics need not be reassessed providing they remain unchanged by the manufacturing process;
- release of dangerous substances may be assessed indirectly by controlling the content of the substance concerned;
- durability may be assessed indirectly by controlling the production processes according to this document;

Note 1: Products CE marked in accordance with appropriate harmonised European specifications may be presumed to have the performances stated with the CE marking.

Note 2: There may be a need to involve a third party for the purpose of regulatory marking (see Annex ZA).

When actual testing is required then the Initial Type Testing (ITT) shall be undertaken on a sample representative of the product taken from direct production or a prototype, any plant and/ or line.

Whenever a change occurs in the raw material or production process (subject to the definition of a family), which would change significantly one or more of the characteristics, the type tests shall be repeated for the appropriate characteristic(s).

5.2.1.1 Multiple lines/sites

If a manufacturer operates more than one line and/or site, the following can reduce the requirement for multiple Initial Type Testing (ITT):

- i) The manufacturers' technical file for a product shall specifically covers all sites and/or lines of the same manufacturer¹,
- ii) The manufacturer shall establish a direct relationship between production control, initial type testing and on-going internal audit testing,
- iii) The manufacturer shall have a responsible individual designated to ensure product compliance based on:
 - The operation of a consistent Factory Production Control system on all applicable sites and/or lines,
 - The manufacturer having obtained evidence that shows the product to be consistent, with respect to both product characteristics and intended use characteristics,
 - The manufacturer has in place an internal auditing scheme, including product consistency.

5.2.1.2 Historic Data

Tests previously performed in accordance with the provisions of this document (same product, same characteristic(s), same or more onerous test method, sampling method and attestation of conformity) may be taken into account.

5.2.2 Initial type testing if the product belongs to the group borosilicate glass, clear or tinted

Initial type testing to establish if a product conforms to the definition of borosilicate glass, may be economised as much as possible. For that purpose appropriate available test reports in accordance with 5.2.1.2 are equivalent to actual testing and may be used instead of actual testing. The initial type testing concerns the product aspects as listed in Table 2.

¹ The terms 'manufacturer' and 'producer' are understood as being synonyms (see CPD working document NB-CPD/02/019-issued 24 April 2002 – page1)

Table 2: Product aspects to be checked if product belongs to group borosilicate glass

Nr	Product aspect
1	Chemical composition
2	Thickness
3	Light transmittance (distinction clear glass from tinted glass)

5.2.3 Initial type testing of characteristic's performances

All characteristics in 4.2.2 shall be subject to initial type tests in accordance with Clause 5.2.1.

5.3 Factory production control and inspection of samples in accordance with a prescribed test plan (see 5.1, 1a and b)

Factory production control means the permanent internal control of production exercised by the manufacturer

All elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures. This production control system documentation shall ensure a common understanding of quality assurance and enable the achievement of the required product characteristics and the effective operation of the production control system to be checked.

Factory production control shall be according to Annex A of this document.

Note 1: A factory production control system similar to EN ISO 9001 made product specific to this document should also be deemed to satisfy the requirements of this Clause.

Note 2: There may be a need to involve a third party for the purpose of regulatory marking (see Annex ZA).

Annex A of this document also summarises the tests that shall be carried out by the manufacturer as part of the production control in the factory, and as further testing of samples taken at the factory in accordance with a prescribed test plan.

5.4 Initial inspection of factory and of factory production control (see 5.1, 1c)

The initial inspection of the factory and of the factory production control shall cover the parameters listed in Table 3 in conjunction with Annex A.

Note: There may be a need to involve a third party for the purpose of regulatory marking (see Annex ZA).

Table 3: Characteristics of interest for the Factory Production Control

Nr	Characteristic	Interested parameter related to the characteristic	For details, refer to
A	Resistance to fire Reaction to fire External fire behaviour	- checking incoming materials - chemical composition - product control after manufacture - labelling outgoing product	Annex A
B	Release of dangerous substances	- checking incoming materials	Annex A
C	Bullet resistance Explosion resistance Burglar resistance Pendulum body impact resistance Resistance against sudden temperature changes and temperature differentials Wind, snow, permanent and imposed load resistance of the glass unit	- checking incoming materials - chemical composition - product control after manufacture - labelling outgoing product	Annex A
D	Direct airborne sound reduction Thermal properties Radiation properties: – light transmittance and reflection – solar energy characteristic	- checking incoming materials - chemical composition - product control after manufacture - labelling outgoing product	Annex A

5.5 Continuous surveillance and assessment of the factory production control (see 5.1, 1c)

The continuous surveillance and assessment of the factory production control shall cover the parameters listed in Table 3 in conjunction with Annex A.

Note: There may be a need to involve a third party for the purpose of regulatory marking (see Annex ZA).

The frequency of production surveillance shall be twice per year for new production facilities or for facilities that do not already have a factory production control system in accordance with this document.

When assessment of FPC fails to identify major non-conformances during four successive assessments, the frequency may be reduced to once a year.

When a major non-conformance is recorded, the inspection shall be repeated within two month. The frequency of production surveillance shall return to, or remain at twice a year. When the repeated inspection also results in a major non-conformance, then the production shall be subject within two months to a repeated initial inspection of the factory and of the factory production control together with a surveillance inspection. When this repeated initial inspection and surveillance inspection also results in a major non-conformance then the products are considered as no longer conforming to this document.

6 Marking and/or labelling

6.1 General

All voluntary marking and/or labelling shall comply with Annex B.3.

Care shall be taken to ensure that any voluntary marking and/or labelling does not cause confusion with respect to the mandatory requirements.

Note: All marking and/or labelling of product to demonstrate compliance with the regulatory requirement is detailed in Annex ZA.

6.2 Product marking

There is no requirement to mark basic borosilicate glass products.

6.3 Product characteristics

The manufacturer or his agent shall organise a system of references that allows for the following:

- the identification of exactly which characteristics have to be assessed (see Clause 4.2.2);
- those characteristics that will be assessed;
- the values, classes, categories, etc. that have been determined for those characteristics.

This system shall be documented as part of the evaluation of conformity.

6.4 “Characteristics/performance identification paper”

The manufacturer shall prepare a “characteristics/performance identification paper” based on the information collected on the product characteristics (see 6.3). This document shall be part of the manufacturers technical file and is the basis for the accompanying information as required for regulatory purposes.

The “characteristics/performance identification paper” can be a catalogue in any media format (paper, disk, website, etc.), always identifiable by the reference that accompanies the marking with the product. The catalogue shall contain the values or classes of the characteristics for which a performance is declared. If no performance is declared, an indication of no performance determined (NPD) shall be made.

Note 1: The conditions of use of NPD are given in Annex ZA.

Note 2: The catalogue should not contain any information other than that relevant to the “characteristics/performance identification paper”.

Annex A (normative)

Factory production control

A.1 Factory Production Control Requirements

A.1.1 General

The FPC system shall consist of procedures, regular inspections and tests and/or assessments and the use of the results to control [raw and other] incoming materials or components, equipment, the production process and the product.

Note: An FPC system conforming with the requirements of EN ISO 9001 and made specific to the requirements of this document is deemed to satisfy the requirements of this document.

A.1.2 Organisation

A.1.2.1 Responsibility and authority

The responsibility, authority and the interrelation of all personnel who manage, perform and verify work affecting conformity shall be defined, particularly for personnel who have the organizational freedom and authority to:

- a) initiate action to prevent the occurrence of product non-conformity;
- b) identify and record any product non-conformances.

A.1.2.2 Management representative for factory production control

The manufacturer shall appoint a management representative who, irrespective of other responsibilities, shall have defined authority and responsibility for ensuring that the requirements of this document are implemented and maintained.

A.1.2.3 Management review

The production control system shall be reviewed by the manufacturer's management at appropriate intervals in accordance with the manufacturer's documented control system to ensure its continuing suitability and effectiveness. Records of such reviews shall be maintained for a minimum period of 5 years.

A.1.3 Control system

A.1.3.1 General

The manufacturer shall establish and maintain a documented system as a means of ensuring that the product conforms to EN 1748-1-1. The following requirements shall be fulfilled.

A.1.3.2 Personnel

The manufacturer shall use appropriately trained personnel for the operation and inspections of all production and inspection equipment.

A.1.3.3 Documentation

The manufacturer's documentation and procedures shall be relevant to the production and process control of the borosilicate glass products, and shall be adequately described in a manual which shall include:

- a) The organizational structure, responsibilities and authorities of the management with regard to product conformity.
- b) The procedures for specifying and verifying the incoming materials.
- c) The manufacturing, production control and other techniques, processes and systematic actions that will be used.
- d) The inspections that will be carried out before production, the inspections and tests during and after production, and the frequency at which they will be carried out.
- e) Required records of the inspections, test and assessments.
- f) Non-conformity situations requiring corrective action and the action taken.
- g) Unless otherwise indicated in national regulation records shall be kept for a minimum of one year after manufacturing the product.

A.1.3.4 Test equipment

Calibration of test equipment necessary for factory production control shall be documented.

Note: The precision of calibration required is implied by the accuracy of the test method and tolerances specified.

A.1.3.5 Inspection and testing

Clause A.3 designates the inspections and tests by means of tables. The requirements and records shall be normative.

Frequencies shall be regarded as a minimum frequency.

A.2 Marking

The manufacturer shall establish, document and maintain procedures for marking of the products. The product shall be marked in accordance with the established documents.

For tracing purposes, the manufacturer shall establish and maintain the records required in Clause A.3.

A.3 Inspection and testing tables of borosilicate glass products production

A.3.1 Information on Tables A.1 to A.3

These tables consist of three parts:

- section 1: Material control
- section 2: Production Control
- section 3 : Product control

When a manufacturing process is such that one or more of the listed inspections or tests are not applicable or physically not practical, the concerned inspection or test may be ignored.

The inspections and/or tests on incoming materials shall be carried out before use.

the case of non-conforming materials, action shall be taken so that:

- non-conforming raw materials cannot be used
- non-conforming products cannot to be delivered.

The required records in Tables A.1 to A.3 can be any document, e.g. order documents, production documents, logbook, etc., as described in the FPC procedures and associated documentation.

For those criteria where no record is required this situation shall only apply until a complaint regarding that criteria is received. Records shall subsequently be kept to show that corrective action has been successful.

The machinery and equipment used for manufacturing the products shall be checked at periods consistent with the manufacturers' documented process control against defined parameters, maintained and adjusted for optimal results.

A.3.2 Use of proxy testing

A manufacturer may employ a test method/method of evaluation other than those referred to in the Tables A.1. to A.3. However, it shall be the manufacturer's responsibility to prepare suitable documentation describing such tests and their correlation with the recommended method to ensure that the appropriate characteristic is as declared.

http://www.china-gauges.com/

Table A.1 — Inspection and test table for borosilicate float glass according to EN 1748-1-1

Section 1: Material Control						
Ref.	Material, inspection or test	Recommended method	Requirement	Recommended frequency	minimum	Record
1.1	Incoming materials					
1.1.1	raw material option a) option b)	Measurement - Audit of supplier - Supplier data check	See purchase specification - quality system e.g. EN ISO 9001 - See purchase specification	See standard operating procedure - According to audit plan - As agreed with supplier		Yes - Yes - Yes
1.1.2	Bought-in cullet	Visual / Measurement	See purchase specification	Each delivery		Yes
1.1.3	Raw material (check for contamination of vehicle) transport	Visual	See purchase specification	Each delivery		No
Section 2: Production control						
Ref.	Material, inspection or test	Recommended method	Requirement	Recommended frequency	minimum	Record
2.1	Process control					
2.1.1	Process conditions of production equipment	Standard operating procedure	Standard operating procedure	Standard operating procedure		Yes
Section 3: Product control						
Ref.	Inspection or test	Recommended method	Requirement	Recommended frequency		Record
3.1	Product control - Glass					
3.1.1	Chemical composition	chemical analysis	EN 1748-1-1	Once per week		Yes
3.1.2	light transmittance	Spectrophotometer	EN 1748-1-1	Once per week		Yes
3.1.3	Solar energy transmittance	EN 410	Claimed value	Once per week		Yes
3.2	Product control – Final Product					
3.2.1	Thickness	Measurement	EN 1748-1-1	Once per day		Yes
3.2.2	Plate dimensions	Measurement	EN 1748-1-1	Once per day		Yes
3.2.3	Optical quality	Measurement	EN 1748-1-1	Once per day		Yes
3.2.4	Visual quality	Visual test / Measurement	EN 1748-1-1	One stock size per day		Yes

Table A.2 — Inspection and test table for drawn sheet and/or rolled and/or cast borosilicate glass according to EN 1748-1-1

Section 1: Material Control						
Ref.	Material, inspection or test	Recommended method	Requirement	Recommended frequency	minimum	Record
1.1	Incoming materials					
1.1.1	raw material option a) option b)	Measurement - Audit of supplier - Supplier data check	See purchase specification - quality system e.g. EN ISO 9001 - See purchase specification	See standard operating procedure - According to audit plan - As agreed with supplier		Yes - Yes - Yes
1.1.2	Bought-in cullet	Visual / Measurement	See purchase specification	Each delivery		Yes
1.1.3	Raw material (check for contamination of vehicle)	Visual	See purchase specification	Each delivery		No
Section 2: Production control						
Ref.	Material, inspection or test	Recommended method	Requirement	Recommended frequency	minimum	Record
2.1	Process control					
2.1.1	Process conditions of production equipment	Standard operating procedure	Standard operating procedure	Standard operating procedure		Yes
Section 3: Product control						
Ref.	Inspection or test	Recommended method	Requirement	Recommended frequency	minimum	Record
3.1	Product control – Glass					
3.1.1	Chemical composition	chemical analysis	EN 1748-1-1	Once per week		Yes
3.1.2	light transmittance	Spectrophotometer	EN 1748-1-1	Once per week		Yes
3.1.3	Solar energy transmittance	EN 410	Claimed performance	Once per week		Yes
3.2	Product control – Final Product					
3.2.1	Thickness	Measurement	EN 1748-1-1	Once per day		Yes
3.2.2	Plate dimensions	Measurement	EN 1748-1-1	Once per day		Yes
3.2.3	Optical quality	Measurement	EN 1748-1-1	Once per day		Yes

3.2.4	Visual quality	Visual test / Measurement	EN 1748-1-1	One stock size per day	Yes
-------	----------------	---------------------------	-------------	------------------------	-----

Table A.3 — Inspection and test table for supplied and final cut size borosilicate glass according to EN 1748-1-1

Section 1: Material Control						
Ref.	Material, inspection or test	Recommended method	Requirement	Recommended frequency	minimum	Record
1.1	Incoming materials					
1.1.1	Glass (type, clear and/or tint) [CE Mark plus accompanying documentation]	Visual	See purchase specification	Each delivery		Yes
Section 2: Production control						
Ref.	Material, inspection or test	Recommended method	Requirement	Recommended frequency		Record
2.1	Process control					
2.1.1	Process conditions	Standard operating procedure	Standard operating procedure	Standard operating procedure		No
Section 3: Product control						
Ref.	Inspection or test	Recommended method	Requirement	Recommended frequency	minimum	Record
3.1	Product control – Final Product					
3.1.1	Thickness	Visual	See customer order	1 test specimen per day		No
3.1.2	Dimensions	Measurement	See customer order	1 test specimen per day		No
3.1.3	Visual / optical quality	Visual	EN 1748-1-1	1 test specimen per day		No

Annex°B (informative)

Provisions for voluntary involvement of third party(ies)

B.1 General

A manufacturer may employ third party(ies) for conformity assessment, which may involve a combination of initial type testing, inspection of factory production control, continuous surveillance and auditing of the product. The results of the conformity assessment by the bodies acting for regulators may be used by third party(ies) in carrying out their assigned tasks..

B.2 Voluntary tasks for third parties

A third party may be voluntarily contracted to perform the initial type testing, inspection of factory production control, continuous surveillance and auditing of the product.

Where a third party is voluntarily involved in the evaluation of conformity of the soda lime silicate glass products covered by this document then the assessment shall be in accordance with Clause 5, Evaluation of Conformity in this document.

A manufacturer may also voluntarily involve a third party in the control of characteristics, e.g. visual aspects, colour, etc., that are over and above the characteristics required for regulatory purposes.

B.3 Marking and labelling

The format of the label and the position should be agreed between the body involved and the manufacturer.

All marks and/or labels of a voluntary nature should be so affixed as not to be confused with those marks and/or labels that are required for regulatory purposes.

In order to prevent confusion with any regulatory marking and/or labelling any marking and/or labelling associated with the involvement of third party(ies) on a voluntary basis should be accompanied with the following warning: "This marking/labelling has no relationship with any product characteristic covered by any regulatory marking and/or labelling."

<http://www.china-grades.com/>

Annex ZA (informative)

Clauses of this European Standard addressing the provisions of EU Construction Products Directive

ZA.1 Scope and relevant characteristics

This European Standard has been prepared under a mandate M/135 “Flat glass, profiled glass and glass block products” given to CEN by the European Commission and the European Free Trade Association.

The clauses of this European standard shown in this Annex meet the requirements of mandate M/135 given under the EU Construction Products Directive (89/106/EEC).

Compliance with these clauses confers a presumption of fitness of the borosilicate glass product characteristics covered by this annex for the intended uses herein; reference should be made to the information accompanying the CE marking.

WARNING: Other requirements and other EU Directives, not affecting the fitness for intended uses, can be applicable to the borosilicate glass falling within the scope of this European Standard.

Note 1: In addition to any specific clauses relating to dangerous substances contained in this Standard, there may be other requirements applicable to products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the EU Construction Products Directive, these requirements need also to be complied with, when and where they apply.

Note 2: An informative database of European and national provisions on dangerous substances is available at the Construction web site on EUROPA (CREATE, accessed through <http://europa.eu.int/comm/enterprise/construction/internal/dangsub/dangmain.htm>).

This annex has the same scope as Clause 1 of this standard with regard to the products covered. It establishes the conditions for the CE marking of borosilicate glass intended for the use indicated below and shows the relevant clauses applicable (see Table ZA.1).

Construction Product: Borosilicate glass

Intended uses: In buildings and construction works

The requirement on a certain characteristic is not applicable in those Member States where there are no regulatory requirements on that characteristic of the intended end use of the product. In this case, manufacturers placing their products on the market of these Member States are not obliged to determine nor declare the performance of their products with regard to this characteristic and the option “No performance determined” (NPD) in the information accompanying the CE marking (see ZA.3) may be used. The NPD option may not be used, however, where the characteristic is subject to a threshold level.

Table ZA.1 – Relevant clauses for borosilicate glass and intended use in buildings and construction works

Product: Borosilicate glass as covered under the scope of this standard			
Intended use: In buildings and construction works			
Essential Characteristics	Requirements in this and other European Standard(s)	Mandated Levels and/or classes	Notes
Safety in the case of fire –			
Resistance to fire (for glass for use in a glazed assembly intended specifically for fire resistance)	4.1, 4.2.1 and 4.2.2.1	Any	Minutes
Reaction to fire	4.1, 4.2.1 and 4.2.2.2	All	Euroclasses
External fire performance (for roof coverings only)	4.1, 4.2.1 and 4.2.2.3	All	Euroclasses
Safety in Use –			
Bullet resistance: Shatter properties and resistance to attack	4.1, 4.2.1 and 4.2.2.4	-	Classes of convenience
Explosion resistance: Impact behaviour and resistance to attack	4.1, 4.2.1 and 4.2.2.5	-	Classes of convenience
Burglar resistance: Shatter properties and resistance to attack	4.1, 4.2.1 and 4.2.2.6	-	Classes of convenience
Pendulum body impact resistance: Shatter properties(safe breakability) and resistance to impact	4.1, 4.2.1 and 4.2.2.7	-	Classes of convenience
Mechanical resistance: Resistance against sudden temperature changes and temperature differentials	4.1, 4.2.1 and 4.2.2.8	-	K and/or °C
Mechanical resistance: Resistance against wind, snow, permanent and imposed load and/or imposed loads of the glass unit	4.1, 4.2.1 and 4.2.2.9	-	mm
Protection against noise:-Direct airborne sound reduction	4.1, 4.2.1 and 4.2.2.10	-	dB

Energy conservation and heat retention: –			
Thermal properties	4.1, 4.2.1 and 4.2.2.11	-	W/(m ² .K)
Radiation properties:			
– light transmittance and reflectance	4.1, 4.2.1 and 4.2.2.12	-	Fractions or %
solar energy characteristics	4.1, 4.2.1 and 4.2.2.13	-	Fractions or %

ZA.2 Procedure(s) for the attestation of conformity of borosilicate glass products

ZA.2.1 System(s) of attestation of conformity

The systems of conformity for borosilicate glass indicated in Table ZA.1, are in accordance with the Decision of the Commission 2000/245/EC of 2000-02-02 as given in Annex III of the mandate for “Flat glass, profiled glass and glass block products”, is shown in Table ZA.2 for the indicated intended use(s) and relevant level(s) or classes:

http://www.china-glasses.com

Table ZA.2 – System(s) of attestation of conformity

Product(s)	Intended use(s)	Level(s) or class(es)	Attestation of conformity system(s)
Borosilicate glass	For used in a glazed assembly intended specifically to provide fire resistance	Any	1
	For uses subject to reaction to fire regulations	Euroclass A1*	4
	For uses subject to external fire performance regulations	products requiring testing	3
		products "deemed to satisfy" without testing	4
	For use as anti-bullet, or anti-explosion glazing	-	1
	For other uses liable to present "safety-in-use" risks and subject to such regulations	-	3
	For uses relating to energy conservation and/or noise reduction	-	3
For uses other than those specified above	-	4	

System 1: see Directive 89/106/EEC (CPD) Annex III.2.(i), without audit-testing of samples.

System 3: see Directive 89/106/EEC (CPD) Annex III.2.(ii), Second possibility.

System 4: see Directive 89/106/EEC (CPD) Annex III.2.(ii), Third possibility

* 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)

The attestation of conformity of the borosilicate glass in Tables ZA.1. shall be based on the evaluation of conformity procedures indicated in Tables ZA.3.1 to ZA.3.3 resulting from the application of the clauses of this or other European Standard indicated therein.

Where more than one table applies for the product, i.e. because its intended use makes different characteristics relevant, Table ZA.3.1 has to be read in conjunction with subsequent tables in order to determine which characteristics assigned by the manufacturer in Table ZA.3.1 are type tested by a notified test lab (system 3) and which by the manufacturer (system 4).

Table ZA.3.1 – Assignment of evaluation of conformity tasks for borosilicate glass products under system 1

Tasks		Content of the task	Evaluation of conformity clauses to apply
Tasks for the Manufacturer	Factory production control (F.P.C.)	Parameters related to all relevant characteristics of Table ZA.1	5.3
	Further testing of samples taken at factory	All relevant characteristics of Table ZA.1	Annex A
	Initial type testing	All relevant characteristics of Table ZA.1, except: resistance to fire, anti-bullet anti-explosion	5.2
Tasks for the notified body	Initial type testing	Resistance to fire, Anti-bullet Anti-explosion	5.2
	Initial inspection of factory and F.P.C.	Parameters related to all relevant characteristics of Table ZA.1, in particular: Resistance to fire, Anti-bullet Anti-explosion	5.4
	Continuous surveillance, assessment and approval of F.P.C.	Parameters related to all relevant characteristics of Table ZA.1, in particular: Resistance to fire, Anti-bullet Anti-explosion	5.5

<http://www.china-grades.com/>

Table ZA.3.2 – Assignment of evaluation of conformity tasks for borosilicate glass products under system 3

Tasks		Content of the task	Evaluation of conformity clauses to apply
Tasks for the Manufacturer	Factory production control (F.P.C.)	Parameters related to all relevant characteristics of Table ZA.1	5.3
	Initial type testing	All other relevant characteristics of Table ZA.1 other than those shown below	5.2
Tasks for the notified body	Initial type testing	External fire performance Burglar resistance Pendulum body impact resistance Direct airborne sound insulation Thermal properties Radiation properties: – light transmittance and reflection – solar energy characteristics	5.2

Table ZA.3.3 – Assignment of evaluation of conformity tasks for borosilicate glass products under system 4

Tasks		Content of the task	Evaluation of conformity clauses to apply
Tasks for the Manufacturer	Factory production control (F.P.C.)	Parameters related to all relevant characteristics of Table ZA.1	5.3
	Initial type testing	All relevant characteristics of Table ZA.1, i.e. External fire performance	5.2

ZA.2.2 EC Certificate and Declaration of conformity

In case of products with system 1: When compliance with the conditions of this Annex is achieved, the certification body shall draw up a certificate of conformity (EC Certificate of conformity), which entitles the manufacturer to affix the CE marking. This certificate shall include:

- name, address and identification number of the certification body
- name and address of the manufacturer, or his authorised representative established in the EEA, and place of production;
- description of the product (type, identification, use, ...),
- provisions to which the product conforms (i.e. Annex ZA of this EN 1748-1-2)
- particular conditions applicable to the use of the product (e.g. provisions for use under certain conditions, etc.);

EN 1748-1-2:2004 (E)

- the number of the certificate;
- conditions and period of validity of the certificate, where applicable;
- name of, and position held by, the person empowered to sign the certificate.

In addition, the manufacturer shall draw up a declaration of conformity (EC Declaration of conformity) including the following:

- name and address of the manufacturer, or his authorised representative established in the EEA;
- name and address of the certification body;
- description of the product (type, identification, use, ...), and a copy of the information accompanying the CE marking;
- provisions to which the product conforms (i.e. Annex ZA of this EN 1748-1-2);
- particular conditions applicable to the use of the product (e.g. provisions for use under certain conditions, etc.);
- number of the accompanying EC Certificate of conformity;
- name of, and position held by, the person empowered to sign the declaration on behalf of the manufacturer or of his authorised representative.

In case of products under system 3: When compliance with the conditions of this Annex is achieved, the manufacturer or his agent established in the EEA shall prepare and retain a declaration of conformity (EC Declaration of conformity), which entitles the manufacturer to affix the CE marking. This declaration shall include:

- name and address of the manufacturer, or his authorised representative established in the EEA, and place of production;
- description of the product (type, identification, use,...), and a copy of the information accompanying the CE marking;
- provisions to which the product conforms (i.e. Annex ZA of this EN 1748-1-2);
- particular conditions applicable to the use of the product, (e.g. provisions for use under certain conditions, etc);
- name and address of the notified laboratory(ies);
- name of, and position held by, the person empowered to sign the declaration on behalf of the manufacturer or his authorised representative.

In case of products under system 4: When compliance with this Annex is achieved, the manufacturer or his agent established in the EEA shall prepare and retain a declaration of conformity (EC Declaration of conformity), which entitles the manufacturer to affix the CE marking. This declaration shall include:

- name and address of the manufacturer, or his authorised representative established in the EEA, and place of production;
- description of the product (type, identification, use,...), and a copy of the information accompanying the CE marking;

- provisions to which the product conforms (i.e. Annex ZA of this EN 1748-1-2);
- particular conditions applicable to the use of the product (e.g. provisions for use under certain conditions, etc.);
- name of, and position held by, the person empowered to sign the declaration on behalf of the manufacturer or of his authorised representative.

Note: Duplication of information between the declaration and certificate should be avoided. To avoid duplication of information, cross-reference between documents may be made when one contains more information than the other.

The above mentioned declaration and certificate shall be presented in the official language or languages of the Member State in which the product is to be used.

ZA.3 CE marking and labelling


The manufacturer or his authorised representative established within the EEA is responsible for the affixing of the CE marking. The CE marking symbol to affix shall be in accordance with Directive 93/68/EC and shall be shown on the borosilicate glass product (or when not possible it may be on the accompanying label, the packaging or on the accompanying commercial documents e.g. a delivery note). The following information shall accompany the CE marking symbol:

- identification number of the certification body (only for products under systems 1);
- name or identifying mark and registered address of the producer;
- the last two digits of the year in which the marking is affixed;
- number of the EC Certificate of conformity or factory production control certificate (if relevant);
- reference to this European Standard;
- description of the product: generic name, material, dimensions, ... and intended use;
- information on those relevant essential characteristics listed in Table ZA.1 which are to be declared presented as :
 - declared values and, where relevant, level or class (including “pass” for pass/fail requirements, where necessary) to declare for each essential characteristic as indicated in "Notes" in Table ZA.1;
 - as an alternative, standard designation(s) alone or in combination with declared values as above, and;
 - “No performance determined” for characteristics where this is relevant.

The “No performance determined” (NPD) option may not be used where the characteristic is subject to a threshold level. Otherwise, the NPD option may be used when and where the characteristic, for a given intended use, is not subject to regulatory requirements in the Member State of destination.

[Figure ZA.1 gives an example of the information to be given on the product, label, packaging, and/or commercial documents.

Figure ZA.1 - Example CE marking information for system of attestation 3

	
AnyCo Ltd, PO Box 21, B-1050	
04	
EN 1748-1-2	
Borosilicate glass, intended to be used in buildings and construction works	
Characteristics	
Resistance to fire	NPD
Reaction to fire	A1*
External fire performance	NPD
Bullet resistance	NPD
Explosion resistance	NPD
Burglar resistance	NPD
Pendulum body impact resistance	
Resistance against sudden temperature changes and temperature differentials	100K
Wind, snow, permanent and imposed load resistance	5mm
Direct airborne sound insulation	30 -1 -2 dB
Thermal properties	5,6W/(m ² K)
Radiation properties:	
light transmission and reflection	0,85/0,10
solar energy characteristics	0,84/0,11

CE conformity marking, consisting of the "CE"-symbol given in directive 93/68/EEC.

Name or identifying mark and registered address of the producer

Last two digits of the year in which the marking was affixed

No. of European standard

Description of product and

information on regulated characteristics

www.china-glasses.com

In addition to any specific information relating to dangerous substances shown above, the product should also be accompanied, when and where required and in the appropriate form, by documentation listing any other

legislation on dangerous substances for which compliance is claimed, together with any information required by that legislation.

Note: European legislation without national derogations need not be mentioned.

<http://www.china-grades.com/>

Bibliography

- [1] EN 357, *Glass in building - Fire resistant glazed elements with transparent or translucent glass products*
– *Classification of fire resistance*
- [2] EN ISO 9001, *Quality management systems - Requirements (ISO 9001:2000)*

<http://www.china-glasses.com/>

<https://www.china-grades.com/>

BSI — British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

Revisions

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover.
Tel: +44 (0)20 8996 9000. Fax: +44 (0)20 8996 7400.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

Buying standards

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services. Tel: +44 (0)20 8996 9001.
Fax: +44 (0)20 8996 7001. Email: orders@bsi-global.com. Standards are also available from the BSI website at <http://www.bsi-global.com>.

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

Information on standards

BSI provides a wide range of information on national, European and international standards through its Library and its Technical Help to Exporters Service. Various BSI electronic information services are also available which give details on all its products and services. Contact the Information Centre.
Tel: +44 (0)20 8996 7111. Fax: +44 (0)20 8996 7048. Email: info@bsi-global.com.

Subscribing members of BSI are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration.
Tel: +44 (0)20 8996 7002. Fax: +44 (0)20 8996 7001.
Email: membership@bsi-global.com.

Information regarding online access to British Standards via British Standards Online can be found at <http://www.bsi-global.com/bsonline>.

Further information about BSI is available on the BSI website at <http://www.bsi-global.com>.

Copyright

Copyright subsists in all BSI publications. BSI also holds the copyright, in the UK, of the publications of the international standardization bodies. Except as permitted under the Copyright, Designs and Patents Act 1988 no extract may be reproduced, stored in a retrieval system or transmitted in any form or by any means – electronic, photocopying, recording or otherwise – without prior written permission from BSI.

This does not preclude the free use, in the course of implementing the standard, of necessary details such as symbols, and size, type or grade designations. If these details are to be used for any other purpose than implementation then the prior written permission of BSI must be obtained.

Details and advice can be obtained from the Copyright & Licensing Manager.
Tel: +44 (0)20 8996 7070. Fax: +44 (0)20 8996 7553.
Email: copyright@bsi-global.com.