BRITISH STANDARD

BS EN
1096-4:2004

Glass in building — Coated glass —

Part 4: Evaluation of conformity/Product standard

The European Standard EN 1096-4:2004 has the status of a British Standard

ICS 81.040.20

National foreword

This British Standard is the official English language version of EN 1096-4:2004.

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

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

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

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

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Foreword

This document (EN 1096-4:2004) has been prepared by Technical Committee CEN/TC 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of an identical text or by endorsement, at the latest by April 2005, and conflicting national standards shall be withdrawn at the latest by July 2006.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, B, C or D, 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 1096-1, *Glass in building – Coated glass - Part 1: Definitions and classification*

– EN 1096-2, *Glass in building - Coated glass - Part 2: Requirements and test methods for class A, B and S coatings*

– EN 1096-3, *Glass in building - Coated glass - Part 3: Requirements and test methods for class C and D coatings*

– EN 1096-4, *Glass in building - Coated glass - Part 4: Evaluation of conformity/Product standard*

This document contains other aspects of importance of trade.

1 Scope

This document covers the evaluation of conformity and the factory production control of coated glass 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 572-1, *Glass in building — Basic soda lime silicate glass products - Part 1: Definitions and general physical and mechanical properties*

EN 572-2, *Glass in building — Basic soda lime silicate glass products - Part 2: Float glass*

EN 572-3, *Glass in building — Basic soda lime silicate glass products - Part 3: Polished wired glass*

EN 572-4, *Glass in building — Basic soda lime silicate glass products - Part 4: Drawn sheet glass*

EN 572-5, *Glass in building — Basic soda lime silicate glass products - Part 5: Patterned glass*

EN 572-6, *Glass in building — Basic soda lime silicate glass products - Part 6: Wired patterned glass*

EN 572-7, *Glass in building — Basic soda lime silicate glass products - Part 7: Wired or unwired channel shaped glass*

EN 673, Gla*ss 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*

EN 1096-1, *Glass in building - Coated glass - Part 1: Definitions and classification*

EN 1096-2, *Glass in building - Coated glass - Part 2: Requirements and test Methods for class A, B and S coatings*

EN 1096-3, *Glass in building - Coated glass - Part 3: Requirements and test methods for class C and D coatings*

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

EN 1748-2-1, *Glass in building - Special basic products - Glass ceramics – Part 2-1: Definitions and general physical and mechanical properties*

EN 1863-1, *Glass in building – Heat strengthened soda lime silicate glass Part 1: Definition and description*

EN 12150-1, *Glass in building – Thermally toughened soda lime silicate safety glass –Part 1: Definition and description*

EN 12337-1, *Glass in building –Chemically strengthened soda lime silicate glass - Part 1: Definition and description*

EN ISO 12543-1, *Glass in building – Laminated and laminated safety glass - Part 1: Definitions and description of component parts (ISO 12543-1:1998)*

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*

EN 12898, *Glass in building - Determination of the emissivity*

EN 13024-1, *Glass in building – Thermally toughened borosilicate safety glass - Part 1: Definition and description*

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

EN 13501-1, *Fire classification of construction products and building elements – Part 1: Classification using test data from reaction to fire tests*

EN 13501-2, *Fire classification of construction products and building elements – Part 2: Classification using data from fire resistance 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*

EN 14178-1, *Glass in building - Basic earth alkaline silicate glass products – Part 1: Float glass*

prEN 14179-1, *Glass in building – Heat soaked thermally toughened soda lime silicate safety glass – Part 1 Definition and description*

prEN 14321-1, *Glass in building – Thermally toughened alkaline earth silicate safety glass Part 1: Definition and description*

3 Terms, definitions and symbols

3.1
Terms and definitions
For the purpose of this document, the terms and definitions given in EN 1096-1, 2 and 3 and the following apply:

3.1.1
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

3.1.2
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

3.1.3
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

3.1.4
significant change
variation in performance beyond the permitted tolerance for the characteristic

3.2 Symbols

ε and ε'	emissivity of both sides of a coated glass pane
τ_V	light transmittance
ρ_V and ρ_V'	light reflectance of both sides of a coated glass pane
τ_e	energy transmittance
ρ_e and ρ_e'	energy reflectance of both sides of a coated glass pane
ε_i	emissivity of a test specimen measured during factory production control

Additional subscripts:

d	indicates that the value is a declared value
m	indicates that the value is a determined value obtained by measurement, calculation or other means

4 Requirements

4.1 Product description

For conformity purposes, the coated glass manufacturer[1] is responsible for the preparation and maintenance of a product description. This description shall describe the product and/or product family.

Disclosure of the product description shall be at the discretion of the coated glass manufacturer or his agent except in the case of regulatory requirements.

The description shall contain at least a normative part. The description may also contain an informative part, when the manufacturer foresees further development of the product.

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

The normative part of the description shall contain the following:

- Reference to EN 1096 Parts 1, 2 and 3 and all other standards with which the manufacturer claims compliance.
- Type of coating, i.e. on-line, off-line.
- Method of coating deposition, e.g. chemical-vapour deposition, sputtering, etc.
- The materials making up the layer(s) of the coating.
- The order of stacking of the layers.
- Glass substrates.
- Classification of the coated glass.
- Identity card (see EN 1096-1)

The layers may be listed either in full, i.e. chemical composition, or by a manufacturer's code.

Product families shall be defined in terms of the above normative part of the product description taking into account the criteria for demonstrating equivalence of coatings (see EN 1096-2, Annex F and EN 1096-3, Annex B).

The substitution of materials and/or components shall maintain the conformity with the product description. The substituting materials and/or components can be added to the product family and also the product description when compliance has been demonstrated

4.2 Conformity with the definition of coated glass

Products shall conform with the manufacturer’s product description and fulfil the definition and requirements for coated glass as defined in EN 1096-1.

4.3 Determination of the characteristic’s performances

4.3.1 Characteristic of coated glass

4.3.1.1 General

The characteristics of coated glass are in general those of the glass substrate (see 4.3.1.2).

4.3.1.2 Characteristics of the glass panes used as substrates for the production of coated glass

The glasses given in Table 1 may be used for the manufacture of coated glass:

Table 1 - Glass types used as substrates for the production of coated glass

Glass type	Reference
Basic soda lime silicate glass products	EN 572-1, 2, 3, 4, 5, 6, 7
Special basic glass products	EN 1748-1-1, EN 1748-2-1
Alkaline earth silicate glass products	EN 14178-1
Thermally toughened soda lime silicate safety glass	EN 12150-1
Heat soaked thermally toughened soda lime silicate safety glass	prEN 14179-1
Thermally toughened borosilicate safety glass	EN 13024-1
Thermally toughened alkaline earth silicate safety glass	prEN 14321-1
Heat strengthened soda lime silicate glass	EN 1863-1
Chemically strengthened soda lime silicate glass	EN 12337-1
Laminated and laminated safety glass	EN ISO 12543-1

Note: Certain coated glasses can be toughened or heat strengthened. These final products should comply with the appropriate product standard, e.g. EN 12150, EN 1863, etc., and the performance of the coated glass should be determined on the final product.

The characteristics of the glass substrates are listed in Table 2 and the values can be found in the appropriate product standard, e.g. EN 572-1, EN 1748-1-1, etc.

For the characteristics listed in Table 2, for the glass pane types, generally accepted values or calculated values shall be used.

Since the majority of the characteristics of Table 2 are not changed significantly by the coating process, they shall be used for coated glass. The characteristics being those for the glass substrate with the following exceptions:

Resistance to fire	4.3.2.1
Emissivity	4.3.2.11
Light transmittance and reflectance	4.3.2.12
Solar energy characteristics	4.3.2.13

Table 2 — Example of characteristics for glass substrates

Characteristic	Symbol	Unit
Generally accepted values:		
- - density	ρ	kg/m³
- hardness	$HK_{0,1/20}$	GPa
- Young's modulus	E	Pa
- Poisson's ratio	μ	Dimensionless
- Characteristic bending strength	$f_{g,k}$	Pa
- Resistance against sudden temperature changes and temperature differentials		K
- Specific heat capacity	c	J/(kg.K)
- Coefficient of linear expansion	α	K^{-1}
- Thermal conductivity (for *U*-value)	λ	W/(m.K)
- Mean refractive index to visible radiation	n	Dimensionless
- Emissivity	ε	Dimensionless
Measured values:		
- light transmittance	τ_v	Dimensionless
- solar direct transmittance	τ_e	Dimensionless
Calculated values:		
- total solar energy transmittance	g	Dimensionless

4.3.2 Determination of characteristics of coated glass

If the coated 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.

4.3.2.1 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.

4.3.2.2 Safety in the case of fire - Reaction to fire

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

4.3.2.3 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.

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

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

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

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

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

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

4.3.2.7 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.

4.3.2.8 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 value is given in the standards (see Table 1) for the appropriate glass substrate.

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

The mechanical resistance is a characteristic value. That value is given in the standards (see Table 1) for the appropriate glass substrate.

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 coated glass shall conform to the ordered thickness.

4.3.2.10 Protection against noise - Direct airborne sound reduction

The sound reduction indexes shall be determined in accordance with EN 12758. However, the information supplied with the incoming glass may be used, as the coating process does not alter the values.

4.3.2.11 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: the declared value of the coating manufacturer. If the information is not available, the emissivity shall be determined in accordance with EN 12898.

— nominal thickness of the glass panes

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

The light transmittance and reflectance shall be determined in accordance with EN 410. Subject to 5.2.1, the information supplied about the radiation properties of the incoming glass may be used if the coating process does not alter the values.

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

The solar energy transmittance and reflectance shall be determined in accordance with EN 410. Subject to 5.2.1, the information supplied about the radiation properties of the incoming glass may be used if the coating process does not alter the values.

4.4 Durability

When products conform to the definition of coated glass as 4.2 the characteristics' performances in 4.3.2 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 adsorbed moisture from the air or other sources;

— the quality of installation of the glass product into or onto its support.

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 real 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 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 re-assessed providing they remain unchanged by the manufacturing process.

— release of dangerous substances maybe assessed indirectly by controlling the amount 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 cover all sites and/or lines of the same manufacturer[2],

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 of coated glass

To establish if a product conforms to the definition of coated glass, initial type testing shall consist of:

— Confirmation of the claimed classification in accordance with EN 1096-2 for class A, B or S coatings or EN 1096-3 for class C or D coatings;

— Determination of the photometric and energy characteristics, as listed in Table 3, and determined in accordance with EN 1096-1.

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

Table 3 — Information on performances of photometric and energy characteristics

Characteristic	Method of Determining conformity	Determined Value	Declared value	Requirement
Light transmittance	EN 410	$\tau_{v,m}$	$\tau_{v,d}$	$\tau_{v,m} = \tau_{v,d} \pm 0{,}03$
Light reflectance:	EN 410			
– first side		$\rho_{v,m}$	$\rho_{v,d}$	$\rho_{v,m} = \rho_{v,d} \pm 0{,}03$
– second side		$\rho'_{v,m}$	$\rho'_{v,d}$	$\rho'_{v,m} = \rho'_{v,d} \pm 0{,}03$
Energy transmittance	EN 410	τ_e	$\tau_{e,d}$	$\tau_e = \tau_{e,d} \pm 0{,}03$
Energy reflectance	EN 410			
– first side		$\rho_{e,m}$	$\rho_{e,d}$	$\rho_{e,m} = \rho_{e,d} \pm 0{,}03$
– second side		$\rho'_{e,m}$	$\rho'_{e,d}$	$\rho'_{e,m} = \rho'_{e,d} \pm 0{,}03$
Emissivity	EN 12898			
– first side		ε_m	ε_d	$\varepsilon_m \leq \varepsilon_d + 0{,}02$
– second side		ε'_m	ε'_d	$\varepsilon'_m \leq \varepsilon'_d + 0{,}02$

The performances of the photometric and energy characteristics shall be determined of both sides of the coated glass. These may be conventional values, calculated values and/or results of measurements. Where calculations are applied, whether or not in combination with measurements, the incoming glass products shall be accompanied by the declared values of the characteristics as listed in Table 3.

Clause 7 details sampling for initial type testing and method of measurement for photometric and energy characteristics.

5.2.3 Initial type testing of characteristic's performances

All characteristics in 4.3 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 is 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 summarizes 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 4 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 4: 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 - product control after coating process *(not required for reaction to fire)* - labelling outgoing glass 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 glass - labelling outgoing glass product	Annex A
d	Direct airborne sound reduction Thermal properties Radiation properties: – light transmittance and reflection – solar energy characteristic	- checking incoming glass - product control after coating process *(not required for sound reduction)* 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 4 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 an established factory production control system in accordance with this document.

When assessment of factory production control fails to identify major non-conformances during four successive assessments the frequency can be reduced to once a year.

When a major non-conformance is recorded, the inspection shall be repeated within two months. 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 C.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 coated glass products. However, if they are processed, e.g. thermally toughened, heat strengthened etc, then they have to comply with the appropriate product standard, e.g. EN 12150, EN 1863.

6.3 Product characteristics

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

— identification of exactly which characteristics have to be assessed (see Clause 4.3);

— those characteristics that will be assessed;

— 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”.

7 Initial type testing; sampling and measurement of photometric and energy characteristics

7.1 Sampling

7.1.1 General

Samples for the initial type testing shall be representative of the product family as defined in the product description (see Clause 4.1). One specimen is required for the measurement of the following characteristics:

— light transmittance and reflectance determination

— energy transmittance and reflectance determination

— emissivity determination

Note: The same specimen may be employed for the measurement of all characteristics.

7.1.2 Sample specification

The manufacturer is responsible for specifying the glass substrate on which the initial type testing of the coated glass is undertaken. The chosen substrate shall be within the product family and is deemed to cover all the substrates within the product description.

7.2 Measurement of photometric and energy characteristics

When measuring in accordance with EN 410 and EN 12898, using an appropriate spectrophotometer, then three measurements per characteristic shall be made. The specimen shall be mounted in the spectrophotometer and a measurement made. Then the specimen shall be demounted, remounted and a further measurement made. This shall be repeated until the three measurements have been made. The average of the three measurements for each characteristic shall be used for the evaluation of the characteristic as required by Table 3.

Note: These three measurements are made to remove any possible angular influence caused by the mounting of the measurement specimen.

In the event of a Fourier transform instrument, i.e. an integrating method, being used for the measurement of the characteristic then only one measurement per characteristic per sample is required. This measurement shall be used for the evaluation of the characteristics as required by Table 3.

Note: An integrating method is regarded as a proxy method of measurement.

Annex A
(normative)

Factory production control

A.1 Factory Production Control Requirements

A.1.1 General

The factory production control 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: A factory production control system conforming to 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 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 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 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 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 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 1096-1. The following requirements shall be fulfilled.

A.1.3.2 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 A.1.3.3 Documentation

The manufacturer's documentation and procedures shall be relevant to the production and process control of the coated glass, 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 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 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 d 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 coated glass product production

A.3.1 Information on Tables A.1 and A.2

A.3.1.1 A.3.1.1 General

The 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.

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

— non-conforming raw materials cannot be used

— non-conforming products cannot be delivered.

The required records in Tables A.1 and A.2 may be any document such as 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.3.1.2 A.3.1.2 Specific requirements

A.3.1.2.1 Material for coatings:

A certificate of analysis and conformity shall accompany the delivery to the supplier's specifications.

If the material remains unused in the factory for a time longer than the time recommended by the supplier, it shall be analysed before use.

A.3.1.2.2 Homogeneity of the coatings:

The coating shall not have uniformity defects (see definitions in EN 1096-1). Suitable devices shall be used to check the uniformity of colour and the constancy of luminous transmittance or reflectance or of the spectral transmittance and reflectance in the visible range (e.g. 550 nm).

A.3.1.2.3 Solar parameters:

The constancy of the solar direct transmittance and reflectance shall be checked using radiometers which directly give integrated solar values or by spectral measurements of transmittance or reflectance at a wavelength in the near infrared range (e.g. 900 nm).

A.3.2 Comments specific to Table A.1

The incoming glass substrate(s) (see 4.3.1) shall comply with the appropriate European technical specification and shall be accompanied by the appropriate documentation (see product standard).

A.3.3 Comments specific to Table A.2

In the case of on-line coated glass the substrate cannot be checked prior to coating. Therefore the coated glass shall also comply with the appropriate European technical specification referring to the type of glass product.

A.3.4 Use of proxy testing

A manufacturer may employ a test method/method of evaluation other than those referred to in the Tables A1 and A2. 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.

Table A.1 — Inspection and test table for OFF LINE coated glass

Section 1: Material Control					
Ref.	Material, inspection or test	Recommended method	Requirement	Recommended frequency	Record
1.1	Incoming materials glass				
1.1.1	Type/tint etc --Packaging	Visual	See purchase specification	Each delivery	Yes
1.1.2	CE Mark labelling inc accompanying documentation	Visual	See purchase specification	Each delivery	Yes
1.2	Incoming material for coating				
1.2.1	Packaging	Visual	See purchase specification	Each delivery	Yes
1.2.2	Labelling	Visual	See purchase specification	Each delivery	Yes
1.2.3	Analysis certificate	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	Yes

Section 3: Product control

Ref.	Characteristic, inspection or test	Recommended method	Requirement	Recommended frequency	Record
3.1	Radiometric properties				
3.1.1	Luminous transmittance or/and reflectance	Measurement, see Annex B	$\tau_{v,m} = \tau_{v,d} \pm 0,03$ or/and $\rho_{v,m} = \rho_{v,d} \pm 0,03$ (1)	1 sheet per hour	Yes
3.1.2	Solar direct transmittance or/and reflectance	Measurement, see Annex B	$\tau_{e,m} = \tau_{e,d} \pm 0,03$ or/and $\rho_{e,m} = \rho_{e,d} \pm 0,03$ (1)	per coating: 1 sheet per day	Yes
3.1.3	Near normal emissivity (only for coated glass claiming to have a low emissivity)	Measurement, see Annex B	$\varepsilon_l \leq \varepsilon_d + 0,02$(1)	per coating: 1 sheet per day	Yes
3.2	Visual aspects				
3.2.1	Appearance of coated glass	Visual	See product specification	1 sheet per hour	No
3.2.2	Colour	See product specification	See product specification	1 sheet per two hour	No
3.3	Further testing				
3.3.1	Test for ensuring conformity	See Annex B	See product specification	See product specification	Yes

NOTE (1): These requirements are valid when determination methods in accordance with EN 410 and EN 12898 are used. When proxy testing is applied, the requirement may be adapted to the test. In that case the equivalency of the adapted requirements shall be demonstrated.

Table A.2 — Inspection and test table for ON LINE coated glass

Section 1: Material Control					
Ref.	Material, inspection or test	Recommended method	Requirement	Recommended frequency	Record
1.1	Incoming material for coating				
1.1.1	Packaging	Visual	See purchase specification	Each delivery	Yes
1.1.2	Labelling	Visual	See purchase specification	Each delivery	Yes
1.1.3	Analysis certificate	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	Yes

Section 3: Product control					
Ref.	Characteristic, inspection or test	Recommended method	Requirement	Recommended frequency	Record
3.1	Radiometric properties				
3.1.1	Luminous transmittance or/and reflectance	Measurement, see Annex B	$\tau_{v,m} = \tau_{v,d} \pm 0,03$ or/and $\rho_{v,m} = \rho_{v,d} \pm 0,03$ (1)	1 sheet per hour	Yes
3.1.2	Solar direct transmittance or/and reflectance	Measurement, see Annex B	$\tau_{e,m} = \tau_{e,d} \pm 0,03$ or/and $\rho_{e,m} = \rho_{e,d} \pm 0,03$ (1)	per coating: 1 sheet per day	Yes
3.1.3	Near normal emissivity (only for coated glass claiming to have a low emissivity)	Measurement, see Annex B	$\varepsilon_i \leq \varepsilon_d + 0,02$(1)	per coating: 1 sheet per day	Yes
3.2	Visual aspects				
3.2.1	Appearance of coated glass	Visual	See product specification	1 sheet per hour	No
3.2.2	Colour	See product specification	See product specification	1 sheet per two hour	No
3.3	Further testing				
3.3.1	Test for ensuring conformity	See Annex B	See product specification	See product specification	Yes
NOTE (1): These requirements are valid when determination methods in accordance with EN 410 and EN 12898 are used. When proxy testing is applied, the requirement may be adapted to the test. In that case the equivalency of the adapted requirements shall be demonstrated.					

Annex B
(informative)

Tests for factory production control

B.1 General

During production, radiometric properties and/or durability conformity are ensured by means of proxy testing (see Tables A.1 and A.2, the rows "Radiometric properties" and "Further testing"). Reference values and/or threshold values can be obtained by performing on the first occasion the proxy testing on samples manufactured at the same time as the samples needed for the determination of the photometric and energy characteristics as listed in 4.3 so that equivalence of the proxy test with the initial type testing is demonstrated.

B.2 Radiometric properties

B.2.1 Sampling

The coated glass pane may be selected from production, or may be a separate glass sheet, coated during the production run, and should be appropriately marked with the date, production line and coating identification.

Test specimens, for the determination of the three characteristics:

a) Luminous transmittance or/and reflectance:

b) Solar direct transmittance or/and reflectance:

c) Near normal emissivity:

are to be taken from the coated pane as follows:

A sample of at least 100 mm wide will be cut from the coated glass pane. The length L of the sample should cover the expected largest variations in the characteristic to be controlled.

From the sample, five test specimens should be cut in dimensions adapted to the measurement equipment in such a way that the measurement spots are located approximately:

— test specimen 1: 0,06*L* from the sample end

— test specimen 2: 0,25*L* from the sample end

— test specimen 3: in the centre of the sample

— test specimen 4: 0,25*L* from the opposite sample end

— test specimen 5: 0,06*L* from the opposite sample end

Note: A single test sample may be used for all determinations.

B.2.2 Measurements

The method of measurement is given in 7.2.

Five test specimens are to be used for each characteristic determination. The evaluation of the characteristic concerns the five measurements.

B.3 Information on ensuring durability conformity

Conformity of the durability of the coating of a produced coated glasses with the declaration classification, i.e. class A, B, S, C or D coating, will be ensured as long as the coating conforms to the product subjected to the initial type test. The coating should conform to it's product description.

The check on continuing conformity during production will be by tests that can be either:

— the initial type test on durability for verifying the declared class of coating, all in accordance to EN 1096-2 or EN 1096-3; or

— proxy testing.

Proxy tests are developed by manufacturers themselves on the basis of experience collected from the feed back circuit from measuring deviations to re-adjustment of the process conditions. Those tests and the related optimal frequencies gained from the same experiences depend on the type of coating and are the property of the manufacturer.

Proxy tests can also be standardized tests where the material or the requirements (frequency, numbers of cycles, etc.) are changed.

Such tests can be for instance:

a) A, B and S coatings:

— ISO 3537, for abrasion resistance test

— ASTM D1044-99, for the Taber test

— ASTM C724-91, for acid resistance (HCl) test

b) C and D coatings:

— ASTM D903-98, for peel or stripping testing

— ASTM B571-97, for adhesive testing

— Leybold-Heraeus: Doc 14-S13.02, for electrical resistance measurement method

Annex C
(informative)

Provisions for voluntary involvement of third party(ies)

C.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 the third party(ies) in carrying out their assigned tasks.

C.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 coated glass products covered by 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.

C.3 Marking and labelling

The format of the label and 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 legal marking and/or labelling".

(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 coated 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 coated 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 coated glass intended for the use indicated below and shows the relevant clauses applicable (see Table ZA.1).

Construction Product: Coated 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 for 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 coated glass and intended use in buildings and construction works

Product: Coated 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)	4.2, 4.3.1 and 4.3.2.1	Any	Minutes
Reaction to fire	4.2, 4.3.1 and 4.3.2.2	Any	Euroclasses
External fire performance (for roof coverings only)	4.2, 4.3.1 and 4.3.2.3	Any	Euroclasses
Safety in Use –			
Bullet resistance: Shatter properties and resistance to attack	4.2, 4.3.1 and 4.3.2.4	-	Classes of convenience
Explosion resistance: Impact behaviour and resistance to attack	4.2, 4.3.1 and 4.3.2.5	-	Classes of convenience
Burglar resistance: Shatter properties and resistance to attack	4.2, 4.3.1 and 4.3.2.6	-	Classes of convenience
Pendulum body impact resistance: Shatter properties(safe breakability) and resistance to impact	4.2, 4.3.1 and 4.3.2.7	-	Classes of convenience
Mechanical resistance: Resistance against sudden temperature changes and temperature differentials	4.2, 4.3.1 and 4.3.2.8	-	K and/or °C
Mechanical resistance: Resistance against wind, snow, permanent and imposed load and/or imposed loads of the glass unit	4.2, 4.3.1 and 4.3.2.9	-	mm

Protection against noise:-Direct airborne sound reduction	4.2, 4.3.1 and 4.3.2.10	-	dB
Energy conservation and heat retention: – Thermal properties Radiation properties: - light transmittance and reflectance - solar energy characteristics	 4.2, 4.3.1 and 4.3.2.11 4.2, 4.3.1 and 4.3.2.12 4.2, 4.3.1 and 4.3.2.13	 - - -	 W/(m².K) Fractions or % Fractions or %

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

ZA.2.1 System(s) of attestation of conformity

The systems of conformity for coated 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:

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

Product(s)	Intended use(s)	Level(s) or class(es)	Attestation of conformity system(s)
Coated glass	For used in a glazed assembly intended specifically to provide fire resistance	Any	1
	For uses subject to reaction to fire regulations	Euroclasses A1, A2, B, C, D, E --- Euroclasses A1*, F	3 --- 4
	For uses subject to external fire performance regulations	Products requiring testing --- Products "deemed to satisfy" without testing	3 --- 4
	For use as anti-bullet, or anti-explosion glazing --- For other uses liable to present "safety-in-use" risks and subject to such regulations	- --- -	1 --- 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 coated 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 coated glass 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

Table ZA.3.2 – Assignment of evaluation of conformity tasks for coated glass 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	Reaction to fire (Classes A1, A2, B, C, D, E) 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 coated glass 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. Reaction to fire (Classes A1*, F) 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 1096-4)

— particular conditions applicable to the use of the product (e.g. provisions for use under certain conditions, etc.);

— 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 1096-4);

— 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 1096-4)

— 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 1096-4);

— 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 coated glass (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 [15]:

  — 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.

[**NOTE 15:** When a standard designation is used, this should give information on all the relevant mandated characteristics; if all are not covered, then values for those not covered must be additionally given. Care must be taken, however, that using standard designations does not bring information on non-harmonised characteristics into the CE marking.]

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 in the case of system of attestation 1

CE 01234	*CE conformity marking, consisting of the* *"CE"-symbol given in directive 93/68/EEC.* *Identification number of the certification body (where relevant) [16]*
AnyCo Ltd, PO Box 21, B-1050 **99** 01234-CPD-00234	*Name or identifying mark and registered address of the producer* *Last two digits of the year in which the marking was affixed* *Certificate number (where relevant) [17]*
EN 1096-4 Coated toughened glass, intended to be used in buildings and construction works **Characteristics**	*No. of European standard* *Description of product* *and* *information on regulated characteristics*
Resistance to fire	**E30**
Reaction to fire	**A1***
External fire performance	**NPD**
Bullet resistance	**NPD**
Explosion resistance	**NPD**
Burglar resistance	**NPD**
Pendulum body impact resistance	**1(C)2**
Resistance against sudden temperature changes and temperature differentials	**200K**
Wind, snow, permanent and imposed load resistance	**6mm**
Direct airborne sound insulation	**31 -2 -3 dB**
Thermal properties	**3,5 W/(m^2K)**
Radiation properties:	
light transmission and reflection	**0,35/0,20**
solar energy characteristics	**0,20/0,20**

NOTE 16: The identification of the notified body is only relevant for system 1.
NOTE 17: Reference to the Certificate number shall only be made under system 1.

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.

Bibliography

[1] EN 357, *Glass in building - Fire resistant glazed elements with transparent or translucent glass products – Classification of fire resistance*

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[4] ASTM D1044-99, *Standard test method for resistance of transparent plastics for surface abrasion*

[5] ASTM C724-91, *Standard test method for acid resistance of ceramic decorations on architectural type glass*

[6] ASTM D903-98, *Standard test method for peel or stripping strength of adhesive B*

[7] ASTM B571-97, *Standard practice for quantitative adhesion testing of metallic coatings*

[8] Leybold-Heraeus: Doc 14-S13.02, Methods for testing coated

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