



GEPVP

# Construction Products Directive



**Evaluation of conformity of  
“Coated glass” to hEN 1096-4**

(September 2006)

**GEPVP, THE EUROPEAN ASSOCIATION OF FLAT GLASS MANUFACTURERS**

members : GLAVERBEL, GUARDIAN, PILKINGTON, SAINT-GOBAIN GLASS





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## **A** BACKGROUND

The first document prepared by the GEPVP explained the background to compliance with the CPD<sup>1</sup> and the second explained the principles of evaluation of conformity<sup>2</sup>.

This document will explain the system of “Evaluation of Conformity” applicable for “coated glass” as laid down in EN 1096-4<sup>3</sup>, the appropriate harmonised European Standard (hEN).

## **B** AUDIENCE

This part is applicable to any manufacturer of coated glass.

## **C** SCOPE

This is taken from EN 1096-4.

“This European Standard covers the evaluation of conformity and the factory production control of coated glass for use in buildings.”

## **D** METHODOLOGY (see also summary figure 1)

This document follows the methodology given in the second document. It also follows the same referencing with respect to “attachments”, etc.

This document includes explanatory information on Clause ZA.2.2 – EC Certificate and Declaration of Conformity (see Attachment 6).

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## Annex ZA

As detailed in the second document the starting point for undertaking the evaluation of conformity is Table ZA.1. This table is colour coded and each essential characteristic is numbered to line up with the corresponding table in the second document.

The “Systems of Attestation of Conformity” for the claimed intended uses are given in Table ZA.2 of the hEN. Details of the tasks relating to “Assignment of Evaluation of Conformity” are given in Tables ZA.3.1 to ZA.3.3 of the hEN (see second document for explanation).

The relationship between the intended use, the applicable “Systems of Attestation of Conformity” and the roles of the manufacturer and Notified Body(ies) is given in Figure 2. This figure is specific to conformity with EN 1096-4.

When a manufacturer has finalised the collection of all applicable information then he can proceed to CE Marking. This is detailed in Clause ZA.2.2 (see Attachment 6). Based on the manufacturer’s declaration of conformity is the CE Mark label. Examples of CE Mark labels for different coated glass products with different intended uses/ characteristics and hence “Systems of Attestation of Conformity” are shown in Figures 3 and 4.

<sup>1</sup> GEPVP CONSTRUCTION PRODUCTS DIRECTIVE – A guide to CE marking for glass in building 2003 onwards

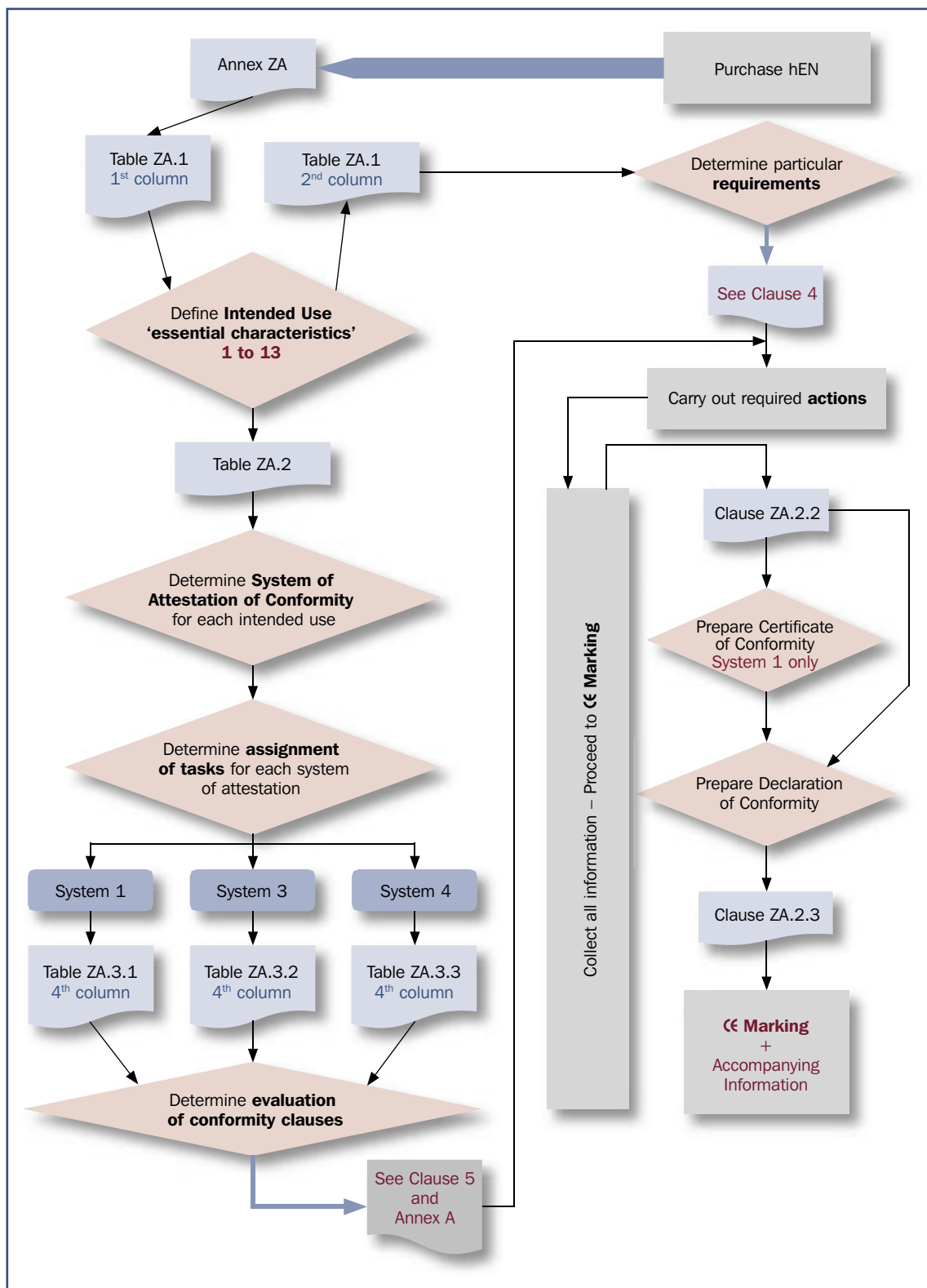
<sup>2</sup> GEPVP CONSTRUCTION PRODUCTS DIRECTIVE – Evaluation of conformity as laid down in the harmonised European Standards (hENs)

<sup>3</sup> EN 1096-4 Glass in building – Coated glass – Part 4: Evaluation of conformity/Product standard





Figure 1 – Summary of methodology



**Table ZA.1 – Specific to EN 1096-4: Coated glass**

Product: Coated glass as covered under the scope of this standard Intended use: In buildings and construction works				
Ref.	Essential Characteristics	Requirements in this and other European Standard(s)	Mandated levels and/or classes	Notes
<b>Safety in the case of fire –</b>				
(1)	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	All	Minutes
(2)	Reaction to fire	4.2, 4.3.1 and 4.3.2.2	Any	Euroclasses
(3)	External fire performance (for roof coverings only)	4.2, 4.3.1 and 4.3.2.3	Any	Euroclasses
<b>Safety in Use –</b>				
(4)	Bullet resistance: Shatter properties and resistance to attack	4.2, 4.3.1 and 4.3.2.4	-	Classes of convenience
(5)	Explosion resistance: Impact behaviour and resistance to attack	4.2, 4.3.1 and 4.3.2.5	-	Classes of convenience
(6)	Burglar resistance: Shatter properties and resistance to attack	4.2, 4.3.1 and 4.3.2.6	-	Classes of convenience
(7)	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
(8)	Mechanical resistance: Resistance against sudden temperature changes and temperature differentials	4.2, 4.3.1 and 4.3.2.8	-	K and/or °C
(9)	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
(10)	<b>Protection against noise –</b> Direct airborne sound reduction	4.2, 4.3.1 and 4.3.2.10	-	dB
<b>Energy conservation and heat retention –</b>				
(11)	Thermal properties	4.2, 4.3.1 and 4.3.2.11	-	W/(m <sup>2</sup> .K)
(12)	Radiation properties: - light transmittance and reflectance	4.2, 4.3.1 and 4.3.2.12	-	Fractions or %
(13)	- solar energy characteristics	4.2, 4.3.1 and 4.3.2.13	-	Fractions or %






**Figure 2 – Relationship between Intended Use, System of Attestation of Conformity and the Roles of Manufacturer and Notified Body – Specific to EN 1096-4**

Ref.	Intended Use	Applicable System of Attestation of Conformity	Initial Type Testing (IT)		Factory Production Control (FPC)			
			Producer/Manufacturer	Notified Testing Body	Producer/Manufacturer	Notified Certification Body		
						Inspection of FPC Documentation	Initial Inspection of Factory	Continuous Surveillance of FPC
(1)	Fire Resistance	1	NA	X	X	X	X	X
(4)	Bullet Resistance							
(5)	Explosion Resistance							
(3)	External Fire Performance	3	NA	X	X	NA	NA	NA
(6),(7),(8),(9)	Safety in Use							
(10)	Noise Reduction							
(11),(12),(13)	Energy Conservation							
(2)	Reaction to Fire	4	X	NA	X	NA	NA	NA

Key: NA not applicable  
X body responsible

Figure 3 – Example of a CE Marking label for System of Attestation of Conformity 1

 01234 <sup>4</sup>	
AnyCo Ltd, PO Box 21, B-1050 05  01234-CPD-00234 <sup>5</sup>	
<b>6mm Low-E Toughened                  EN 1096-4</b>	
Coated (fire resistance) thermally toughened soda lime silicate safety glass, intended to be used in buildings and construction works	
<b>Characteristics</b>	
<b>Resistance to fire</b>	<b>E30<sup>6</sup></b>
<b>Reaction to fire</b>	<b>A1*</b>
<b>External fire performance</b>	<b>NPD</b>
<b>Bullet resistance</b>	<b>NPD</b>
<b>Explosion resistance</b>	<b>NPD</b>
<b>Burglar resistance</b>	<b>NPD</b>
<b>Pendulum body impact resistance</b>	<b>1(C)1</b>
<b>Resistance against sudden temperature changes and temperature differentials</b>	<b>200K</b>
<b>Wind, snow, permanent and imposed load resistance</b>	<b>6mm</b>
<b>Direct airborne sound insulation</b>	<b>31(-2;-3)dB</b>
<b>Thermal properties</b>	<b>2,5W/(m<sup>2</sup>.K)</b>
<b>Radiation properties:</b>	
<b>Light transmittance and reflectance</b>	<b>0,70/0,11</b>
<b>Solar energy characteristics</b>	<b>0,55/0,13</b>

<sup>4</sup> Identification number of the certification body

<sup>5</sup> Certificate number

<sup>6</sup> Reference to the certification report that details the “virtual assembly” used for the fire testing.





Figure 4 – Example of a CE Marking label for System of Attestation of Conformity 3

<b>CE</b>	
AnyCo Ltd, PO Box 21, B-1050 05	
<b>6mm Coated float glass EN 1096-4</b>	
Coated glass, intended to be used in buildings and construction works	
<b>Characteristics</b>	
<b>Resistance to fire</b>	<b>NPD</b>
<b>Reaction to fire</b>	<b>A1*</b>
<b>External fire performance</b>	<b>NPD</b>
<b>Bullet resistance</b>	<b>NPD</b>
<b>Explosion resistance</b>	<b>NPD</b>
<b>Burglar resistance</b>	<b>NPD</b>
<b>Pendulum body impact resistance</b>	<b>NPD</b>
<b>Resistance against sudden temperature changes and temperature differentials</b>	<b>40K</b>
<b>Wind, snow, permanent and imposed load resistance</b>	<b>6mm</b>
<b>Direct airborne sound insulation</b>	<b>31(-2;-3)dB</b>
<b>Thermal properties</b>	<b>5,6W/(m<sup>2</sup>.K)</b>
<b>Radiation properties:</b>	
<b>Light transmittance and reflectance</b>	<b>0,55/0,11</b>
<b>Solar energy characteristics</b>	<b>0,40/0,13</b>

## Attachment 1: hEN Clause 4 Requirements

Clause No.	Content	Explanation
4.1	<p><b>Product description</b></p> <p>For conformity purposes, the coated glass manufacturer<sup>7</sup> is responsible for the preparation and maintenance of a product description. This description shall describe the product and/or product family.</p> <p>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.</p> <p>The normative part of the description shall contain the following:</p> <ul style="list-style-type: none"> <li>• Reference to EN 1096 Parts 1, 2 and 3 and all other standards with which the manufacturer claims compliance.</li> <li>• Type of coating, i.e. on-line, off-line.</li> <li>• Method of coating deposition, e.g. chemical-vapour deposition, sputtering, etc.</li> <li>• The materials making up the layer(s) of the coating.</li> <li>• The order of stacking of the layers.</li> <li>• Glass substrates.</li> <li>• Classification of the coated glass.</li> <li>• Identity card (see EN 1096-1).</li> </ul> <p>The layers may be listed either in full, i.e. chemical composition, or by a manufacturer's code.</p> <p>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).</p> <p>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.</p>	<p>This document details the manufacturer's product offering. It could contain, as far as the product is concerned, the following:</p> <ol style="list-style-type: none"> <li>1. Full range of glass types and thicknesses offered;</li> <li>2. Full range of coating types and performances offered.</li> </ol> <p>The product description shall also contain all the detail required in the normative part of the description.</p> <p>Product families can be:</p> <ol style="list-style-type: none"> <li>1. Ones that have a claimed characteristic across a range, e.g. solar control coatings; low emissivity coating;</li> <li>2. Ones that are based on similar             <ol style="list-style-type: none"> <li>a. method of coating manufacture;</li> <li>b. coating make up;</li> <li>c. coating classification; etc.</li> </ol> </li> </ol>

<sup>7</sup> The terms "manufacturer" and "producer" are understood as being synonyms (see CPD working document NB-CPD/02/019 – issued 24 April 2002 – page 1)





<b>4.2</b>	<b>Conformity with the definition of coated glass</b>									
	Products shall conform with the manufacturer's product description and fulfil the definition and requirements for coated glass as defined in EN 1096-1.	EN 1096-1 defines coated glass in Clause 3.1, luminous, solar and thermal properties in Clause 5, classification and durability requirements in Clause 6 and identity card in Clause 8.2.								
<b>4.3</b>	<b>Determination of the characteristic's performances</b>									
<b>4.3.1</b>	<b>Characteristics of coated glass</b>									
<b>4.3.1.1</b>	<b>General</b>									
	The characteristics of coated glass are in general those of the glass substrate (see 4.3.1.2).									
<b>4.3.1.2</b>	<b>Characteristics of the glass panes used as substrates for the production of coated glass</b>									
	<p>The glasses given in Table 1 may be used for the manufacture of coated glass:</p> <p>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.</p> <p>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:</p> <table style="width: 100%; border: none;"> <tr> <td style="padding-left: 20px;">Resistance to fire</td> <td style="text-align: right;">4.3.2.1</td> </tr> <tr> <td style="padding-left: 20px;">Emissivity</td> <td style="text-align: right;">4.3.2.11</td> </tr> <tr> <td style="padding-left: 20px;">Light transmittance and reflectance</td> <td style="text-align: right;">4.3.2.12</td> </tr> <tr> <td style="padding-left: 20px;">Solar energy characteristics</td> <td style="text-align: right;">4.3.2.13</td> </tr> </table>	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	<p>These substrates can be any basic glass product, special basic glass, thermally treated glass and laminated/laminated safety glass in accordance with the applicable product standard. The applicable standards are listed in EN 1096-1 Table 1.</p> <p>Examples of the characteristics for glass substrates are listed in EN 1096-1 Table 2.</p>
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									

<p><b>4.3.2</b></p>	<p><b>Determination of characteristics of coated glass</b></p> <p>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 standard including his specific process control conditions.</p>	
<p><b>4.3.2.1</b></p>	<p><b>Safety in the case of fire – Resistance to fire (1)</b></p> <p>Fire resistance shall be determined and classified in accordance with EN 13501-2.</p>	<p>Glass CANNOT be tested for resistance to fire on its own. The tests have to be undertaken in a glazed assembly. The glazed assembly is regarded as a “virtual assembly”<sup>8</sup> and is detailed in the official classification report.</p>
<p><b>4.3.2.2</b></p>	<p><b>Safety in the case of fire – Reaction to fire (2)</b></p> <p>Reaction to fire shall be determined and classified in accordance with EN 13501-1.</p>	<p>This characteristic will be dependent on the glass substrate. If the coating is on a basic, special basic or thermally treated glass then it will be A1*. However, if it is coated laminated glass then the performance will be that of the laminated glass.</p>
<p><b>4.3.2.3</b></p>	<p><b>Safety in the case of fire – External fire behaviour (3)</b></p> <p>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 EN 13501-5.</p>	<p>This characteristic will be dependent on the glass substrate. The present situation is that there are four different test methods in ENV 1187. The applicability of these tests to glass is not totally clear. However, before deciding to test it is paramount that the manufacturer checks if the particular glass substrate type is permitted, by national regulations, in this application.</p>
<p><b>4.3.2.4</b></p>	<p><b>Safety in use – Bullet resistance: Shatter properties and resistance to attack (4)</b></p> <p>Bullet resistance shall be determined and classified in accordance with EN 1063.</p>	<p>This characteristic will be dependent on the glass substrate.</p>
<p><b>4.3.2.5</b></p>	<p><b>Safety in use – Explosion resistance: Impact behaviour and resistance to impact (5)</b></p> <p>Explosion resistance shall be determined and classified in accordance with EN 13541.</p>	<p>This characteristic will be dependent on the glass substrate.</p>

<sup>8</sup> Sectorial Group 09 – Glass in building: Determination of the fire resistance performance of glazed assemblies (Virtual Assemblies)





<p><b>4.3.2.6</b></p>	<p><b>Safety in use – Burglar resistance: Shatter properties and resistance to attack (6)</b></p> <p>Burglar resistance shall be determined and classified in accordance with EN 356.</p>	<p>This characteristic will be dependent on the glass substrate.</p>
<p><b>4.3.2.7</b></p>	<p><b>Safety in use – Pendulum body impact resistance: Shatter properties (safe breakability) and resistance to impact (7)</b></p> <p>Pendulum body impact resistance shall be determined and classified in accordance with EN 12600.</p>	<p>This characteristic will be dependent on the glass substrate.</p>
<p><b>4.3.2.8</b></p>	<p><b>Safety in use – Mechanical resistance: Resistance against sudden temperature changes and temperature differentials (8)</b></p> <p>The resistance against sudden temperature changes and temperature differentials is a generally accepted value that is given in EN 572-1 and shall be ensured by compliance with this standard.</p>	<p>This characteristic will be dependent on the glass substrate.</p>
<p><b>4.3.2.9</b></p>	<p><b>Safety in use – Mechanical resistance: Resistance against wind, snow, permanent load and/or imposed loads of the glass unit (9)</b></p> <p>The mechanical strength of basic soda lime silicate glass is a characteristic value that is given in EN 572-1 and is ensured by compliance with this standard.</p> <p>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.</p> <p>The manufactured or supplied thickness of soda lime silicate glass shall conform to the ordered thickness.</p>	<p>This characteristic will be dependent on the glass substrate.</p> <p>Note: The characteristic bending strength has to be used in conjunction with the design method given in prEN 13474<sup>9</sup>.</p> <p>Supplying what was ordered, in terms of thickness, will cover this characteristic.</p>

<sup>9</sup> prEN 13474: This standard is being drafted. It will consist of the following three parts:

- determination by calculation of the resistance to load of glass used in fenestration;
- determination by calculation of the resistance to load of glass used in common non-structural applications other than fenestration;
- general basis of design.

<p><b>4.3.2.10</b></p>	<p><b>Protection against noise – Direct airborne sound reduction (10)</b></p> <p>The sound reduction indexes shall be determined in accordance with EN 12758.</p>	<p>This characteristic will be dependent on the glass substrate. The data supplied with the substrate can be used as the coating will not alter the sound reduction.</p>
<p><b>4.3.2.11</b></p>	<p><b>Energy conservation and heat retention – Thermal properties (11)</b></p> <p>The thermal transmittance value (U-value) shall be determined by calculation in accordance with EN 673 with:</p> <ul style="list-style-type: none"> <li>- emissivity <math>\epsilon</math>: the declared value of the coating manufacturer. If the information is not available, the emissivity shall be determined in accordance with EN 12898</li> <li>- nominal thickness of the glass panes</li> </ul>	<p>For monolithic coated glass this value will be given on the Identity card, see EN 1096-1<sup>10</sup>.</p> <p>The value of emissivity <math>\epsilon</math> will also be given on the Identity card.</p>
<p><b>4.3.2.12</b></p>	<p><b>Energy conservation and heat retention – Radiation properties: Light transmittance and reflectance (12)</b></p> <p>The light transmittance and reflectance shall be determined in accordance with EN 410.</p>	<p>These values need to be determined in accordance with the standard EN 410.</p>
<p><b>4.3.2.13</b></p>	<p><b>Energy conservation and heat retention – Radiation properties: Solar energy characteristics (13)</b></p> <p>The solar energy transmittance and reflectance shall be determined in accordance with EN 410.</p>	<p>These values need to be determined in accordance with the standard EN 410.</p>

<sup>10</sup> EN 1096-1: Glass in building – Coated glass - Part 1: Definitions and classification





**Attachment 2: hEN Clause 5 Evaluation of conformity**

<p><b>5.2.2 Initial type testing of coated glass</b></p> <p>To establish if a product conforms to the definition of coated glass, initial type testing shall consist of:</p> <ul style="list-style-type: none"> <li>- 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;</li> <li>- Determination of the photometric and energy characteristics, as listed in Table 3, and determined in accordance with EN 1096-1.</li> </ul> <p>The performances of the photometric and energy characteristics shall be determined on 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.</p> <p>Clause 7 details sampling for initial type testing and method of measurement for photometric and energy characteristics.</p>	<p>The classification applicable to a coated glass is the responsibility of the manufacturer. (EN 1096-1, Clause 6). Therefore the manufacturer having declared a class for a particular coating then has it tested to show compliance with that class.</p> <p>The durability of a class of coating shall be determined in accordance with the appropriate clauses of EN 1096-2 or EN 1096-3.</p> <p>Clause 7 details the testing methodology for the measurement of photometric and energy characteristics and is useful for the Notified Testing Body.</p>
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**EN 1096-1 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	$\rho_{v,m}$	$\rho_{v,d}$	$\rho_{v,m} = \rho_{v,d} \pm 0,03$
– first side		$\rho'_{v,m}$	$\rho'_{v,d}$	$\rho'_{v,m} = \rho'_{v,d} \pm 0,03$
– second side				
Energy transmittance	EN 410	$\tau_e$	$\tau_{e,d}$	$\tau_e = \tau_{e,d} \pm 0,03$
Energy reflectance	EN 410	$\rho_{e,m}$	$\rho_{e,d}$	$\rho_{e,m} = \rho_{e,d} \pm 0,03$
– first side		$\rho'_{e,m}$	$\rho'_{e,d}$	$\rho'_{e,m} = \rho'_{e,d} \pm 0,03$
– second side				
Emissivity	EN 12898	$\epsilon_m$	$\epsilon_d$	$\epsilon_m \leq \epsilon_d + 0,02$
– first side		$\epsilon'_m$	$\epsilon'_d$	$\epsilon'_m \leq \epsilon'_d + 0,02$
– second side				

## Attachment 3: hEN Clause 6 Marking and labelling

<b>6.2</b>	<b>Product marking</b>	There is no requirement to mark coated glass products.	No requirement for marking on these products.
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## Attachment 4: hEN Annex A Factory production control

<b>Annex A</b>	<b>Factory production control requirements</b>	The generalities are covered in the GEPVP second document "Evaluation of conformity"
<b>Table A.1 and Table A.2</b>	<p>These cover:</p> <ul style="list-style-type: none"> <li>- Incoming raw materials</li> <li>- Process control</li> <li>- Product control; both the glass itself and the specific product</li> </ul> <p>There is also a requirement for further testing to ensure product conformity. Annex B (informative) proposes tests for factory production control that a manufacturer may wish to undertake.</p>	<p>Separate tables depending on method of coating:</p> <ul style="list-style-type: none"> <li>- Table 1 - for off-line coated glass, and</li> <li>- Table 2 – for on-line coated glass</li> </ul> <p>The tests proposed within Annex B cover both radiometric properties and durability. The manufacturer selects tests that will ensure that the product supplied meets at least the performance of the product determined during initial type testing.</p>

## Attachment 5: hEN Annex C – Provisions for voluntary involvement of third party(ies)

See Attachment 5 in the second document. There is nothing specific to this hEN.
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## Attachment 6: hEN Annex ZA

### Clause ZA.2.2 EC Certificate and Declaration of Conformity

Depending upon the intended use of the product and hence the applicable “System of Attestation of Conformity” will be the extent to which this clause applies.

#### 1. Products with System of Attestation of Conformity – 1;

This System of Attestation of Conformity requires the involvement of a Notified Certification Body (NCB). It is the responsibility of the NCB, when they are satisfied that compliance with the conditions of the Annex ZA has been achieved, to produce a certificate of conformity (EC Certificate of Conformity). This certificate allows the manufacturer to affix the CE Marking (see Figure 3). The detail of what is to be included in the certificate is given in the hEN.

When the manufacturer has the certificate of conformity then a declaration of conformity (EC Declaration of Conformity) has to be produced. The detail of what is to be included in the declaration is given in the hEN.

#### 2. Products with System of Attestation of Conformity – 3;

This System of Attestation of Conformity only requires the involvement of a Notified Body (NB) with the Initial Type Testing of the product. When the manufacturer is satisfied that compliance with this Annex has been achieved then a declaration of conformity (EC Declaration of Conformity) is prepared. This declaration allows the manufacturer to affix the CE Marking (see Figure 4). The detail of what is to be included in the declaration is given in the hEN.

#### 3. Products with System of Attestation of Conformity – 4;

This System of Attestation of Conformity does not require the involvement of a Notified Body (NB). Therefore when the manufacturer is satisfied that compliance with this Annex has been achieved then a declaration of conformity (EC Declaration of Conformity) is prepared. This declaration allows the manufacturer to affix the CE Marking. The detail of what is to be included in the declaration is given in the hEN.

Duplication of information between the certificate, where applicable, and the declaration should be avoided. This can be done by cross-referencing between documents if one contains more information than the other.

EC Declaration of Conformity and, if applicable, the EC Certificate of Conformity shall be presented in the official language or languages of the Member State in which the product is to be used.

## Attachment 7: hEN Other Annex(s)

### Annex B (informative) – Tests for factory production control

Clause No.	Content	Explanation
<b>B.1</b>	<b>General</b>  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.	These checks are necessary to ensure that the manufactured coated glass and its properties are the same as or better than that used for the Initial Type Testing.
<b>B.2</b>	<b>Radiometric properties</b>	
<b>B.2.1</b>	<b>Sampling</b>  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 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: 0,06L from the sample end - test specimen 2: 0,25L from the sample end - test specimen 3: in the centre of the sample - test specimen 4: 0,25L from the opposite sample end - test specimen 5: 0,06L from the opposite sample end  Note: A single test sample may be used for all determinations.	These samples are to be taken to cover the range of production.  Samples must be representative of production and cover the maximum variation.  The aim of the testing being to check that the coated glass manufactured at the extremes of the process control parameters is still within the allowable performance characteristics.





<p><b>B.2.2</b></p>	<p><b>Measurements</b></p> <p>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.</p>	
<p><b>B.3</b></p>	<p><b>Information on ensuring durability conformity</b></p> <p>Conformity of the durability of the coating of a produced coated glass 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 its product description.</p> <p>The check on continuing conformity during production will be by tests that can be either:</p> <ul style="list-style-type: none"> <li>- 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</li> <li>- proxy testing.</li> </ul> <p>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.</p> <p>Proxy tests can also be standardized tests where the material or the requirements (frequency, numbers of cycles, etc.) are changed.</p> <p>Such tests can be for instance:</p> <p>a) A, B and S coatings:</p> <ul style="list-style-type: none"> <li>- ISO 3537, for abrasion resistance test</li> <li>- ASTM D1044-99, for the Taber test</li> <li>- ASTM C724-91, for acid resistance (HCl) test</li> </ul> <p>b) C and D coatings:</p> <ul style="list-style-type: none"> <li>- ASTM D903-98, for peel or stripping testing</li> <li>- ASTM B571-97, for adhesive testing</li> <li>- Leybold-Heraeus: Doc 14-S13.02, for electrical resistance measurement method</li> </ul>	<p>The list of proxy tests mentioned is not exhaustive. The examples given have been found to work and are quicker than the initial type tests and as such are more applicable to factory production control.</p> <p>The manufacturer will need to select the test(s) that are appropriate for their coating type.</p> <p>See Bibliography for more detail of the specific tests.</p>

## Bibliography

ISO 3537:1999,  
Road vehicles – Safety glazing materials – Mechanical tests – International restrictions

ASTM D1044-99,  
Standard test method for resistance of transparent plastics for surface abrasion

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

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

ASTM B571-97,  
Standard practice for quantitative adhesion testing of metallic coatings

Leybold-Heraeus:  
Doc 14-S13.02, Methods for testing coated glass products

