GEPVP

Construction Products Directive

Evaluation of conformity of “Heat soaked thermally toughened soda lime silicate safety glass” to hEN 14179-2

(September 2006)

GEPVP, THE EUROPEAN ASSOCIATION OF FLAT GLASS MANUFACTURERS

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

CONTENTS

A BACKGROUND

The first document prepared by the GEPVP explained the background to compliance with the CPD[1] and the second explained the principles of evaluation of conformity[2].

This document will explain the system of "Evaluation of Conformity" applicable for "heat soaked thermally toughened soda lime silicate safety glass" as laid down in EN 14179-2[3], the appropriate harmonised European Standard (hEN).

B AUDIENCE

This part is applicable to any manufacturer of heat soaked thermally toughened soda lime silicate safety glass.

C SCOPE

This is taken from EN 14179-2.

"This European Standard covers the evaluation of conformity and the factory production control of heat soaked thermally toughened soda lime silicate safety 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).

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 14179-2.

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 Marking label. Examples of CE Marking labels for different heat soaked thermally toughened soda lime silicate safety glass products with different intended uses/characteristics and hence "Systems of Attestation of Conformity" are shown in Figures 3 and 4.

[1] GEPVP CONSTRUCTION PRODUCTS DIRECTIVE – A guide to CE marking for glass in building 2003 onwards

[2] GEPVP CONSTRUCTION PRODUCTS DIRECTIVE – Evaluation of conformity as laid down in the harmonised European Standards (hENs)

[3] EN 14179-2 Glass in building – Heat soaked thermally toughened soda lime silicate safety glass – Part 2: Evaluation of conformity/Product standard

Figure 1 – Summary of methodology

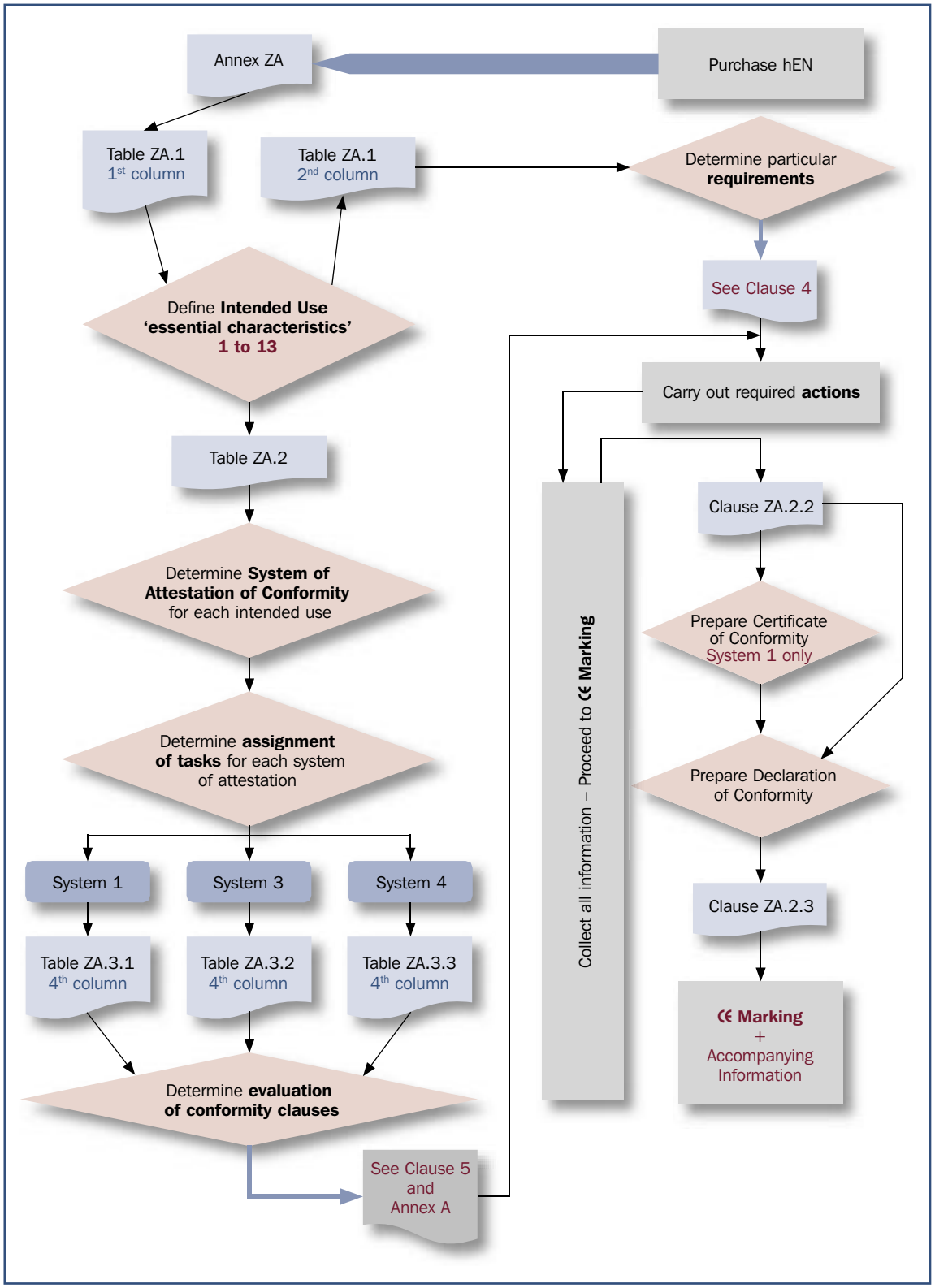


Table ZA.1 – Specific to EN 14179-2: Heat soaked thermally toughened soda lime silicate safety glass

Product: Heat soaked thermally toughened soda lime silicate safety 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**
	Safety in the case of fire –			
(1)	Resistance to fire (for glass for use in a glazed assembly intended specifically for fire resistance)	4.2, 4.3.1 and 4.3.2.2	All	Minutes
(2)	Reaction to fire	4.2, 4.3.1 and 4.3.2.3	Any	Euroclasses
(3)	External fire performance (for roof coverings only)	4.2, 4.3.1 and 4.3.2.4	Any	Euroclasses
	Safety in Use –			
(4)	Bullet resistance: Shatter properties and resistance to attack	4.2, 4.3.1 and 4.3.2.5	-	Classes of convenience
(5)	Explosion resistance: Impact behaviour and resistance to attack	4.2, 4.3.1 and 4.3.2.6	-	Classes of convenience
(6)	Burglar resistance: Shatter properties and resistance to attack	4.2, 4.3.1 and 4.3.2.7	-	Classes of convenience
(7)	Pendulum body impact resistance: Shatter properties (safe breakability) and resistance to impact	4.2, 4.3.1 and 4.3.2.8	-	Classes of convenience
(8)	Mechanical resistance: Resistance against sudden temperature changes and temperature differentials	4.2, 4.3.1 and 4.3.2.9	-	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 4.3.2.10	-	mm
(10)	**Protection against noise –** Direct airborne sound reduction	4.2, 4.3.1 and 4.3.2.11	-	dB
	Energy conservation and heat retention –			
(11)	Thermal properties	4.2, 4.3.1 and 4.3.2.12	-	W/(m².K)
(12)	Radiation properties: - light transmittance and reflectance	4.2, 4.3.1 and 4.3.2.13	-	Fractions or %
(13)	- solar energy characteristics	4.2, 4.3.1 and 4.3.2.14	-	Fractions or %

Figure 2 – Relationship between Intended Use, System of Attestation of Conformity and the Roles of Manufacturer and Notified Body – Specific to EN 14179-2

Ref.	Intended Use	Applicable System of Attestation of Conformity	Initial Type Testing (ITT)		Factory Production Control (FPC)			
						Notified Certification Body		
			Producer/ Manufacturer	Notified Testing Body	Producer/ Manufacturer	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

CE

01234[4]

AnyCo Ltd, PO Box 21, B-1050
05

01234-CPD-00234[5]

6mm Heat soaked thermally toughened (FR) safety glass
EN 14179-2

Heat soaked thermally toughened soda lime silicate safety glass (fire resistant), intended to be used in buildings and construction works

Characteristics

Resistance to fire	**E30[6]**
Reaction to fire	**A1***
External fire performance	**NPD**
Bullet resistance	**NPD**
Explosion resistance	**NPD**
Burglar resistance	**NPD**
Pendulum body impact resistance	**1(C)1**
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	**5,6W/(m².K)**
Radiation properties:	
Light transmittance and reflectance	**0,85/0,11**
Solar energy characteristics	**0,83/0,13**

[4] Identification number of the certification body

[5] Certificate number

[6] Reference to the certification report. Traceable from the certification report will be detail(s) of the "virtual assembly (ies)" used for the fire testing.

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

CE

AnyCo Ltd, PO Box 21, B-1050
05

6mm Heat soaked thermally toughened safety glass
EN 14179-2

Heat soaked thermally toughened soda lime silicate safety glass, intended to be used in buildings and construction works

Characteristics

Resistance to fire	**NPD**
Reaction to fire	**A1***
External fire performance	**NPD**
Bullet resistance	**NPD**
Explosion resistance	**NPD**
Burglar resistance	**NPD**
Pendulum body impact resistance	**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	**5,6W/(m^2.K)**
Radiation properties:	
Light transmittance and reflectance	**0,85/0,11**
Solar energy characteristics	**0,83/0,13**

Attachment 1: hEN Clause 4 Requirements

Clause No.	Content	Explanation
4.1	**Product description** For conformity purposes the heat soaked thermally toughened soda lime silicate glass manufacturer is responsible for the preparation and maintenance of the product description. This description shall describe the product and/or product families. Disclosure of the product description shall be at the discretion of the heat soaked thermally toughened 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. The normative part of the description shall contain the following minimum information: • a reference to EN 14179 Parts 1 and 2 and all other standards with which the manufacturer claims compliance. • the radiometric properties and durability of coated glass, i.e. coated glass that conforms with EN 1096-1, EN 1096-2, EN 1096-3, when those properties are changed, intentionally or unintentionally, by the thermal toughening process. The definition of product families shall be consistent with the normative part of the product description. The substitution of materials shall maintain the conformity with the product description. The substituting material can be added to the product family and also the product description when compliance has been demonstrated.	This document details the manufacturer's product offering. It should contain, as far as the product is concerned, the following: 1. Full range of glass types and thicknesses offered; 2. Details of edgework, holes, etc. where applicable; 3. Full production control data; a. Pre-processing; b. Processing, heating/cooling/time; 4. Full product control data: a. What tests; b. What pass level; c. If proxy testing: relationship to prescribed parameter. 5. Special conditions for products, such as fire resistant heat soaked thermally toughened glass, which require different systems of attestation of conformity; 6. If coated glasses are heat soaked thermally toughened what procedures are used to show that the quoted figures are applicable. Product families can be: 1. Ones that have a claimed characteristic across a range, e.g. EN 12600 performance for all heat soaked thermally toughened patterned glasses determined on the poorest performer; 2. Ones that have identical processing conditions, e.g. clear glass and tinted glass of the same thickness, patterned glasses of the same thickness.
4.2	**Conformity with the definition of heat soaked thermally toughened soda lime silicate safety glass** Products shall conform to the definition and fulfil the requirements of heat soaked thermally toughened soda lime silicate safety glass as defined in EN 14179-1.	EN 14179-1 defines heat soaked thermally toughened soda lime silicate safety glass products in Clause 3 and their fracture characteristics in Clause 7. Also given: fragmentation test in Clause 10, thermal durability in Clause 11.3 and mechanical strength in Clause 11.4.
4.3	**Determination of the characteristic's performances**	
4.3.1	**Characteristics of heat soaked thermally toughened soda lime silicate safety glass**	

4.3.1.1	**General** The characteristics of heat soaked thermally toughened soda lime silicate safety glass are in general those of the glass substrate (see 4.3.1.2).	Characteristics, generally, those of the incoming raw material, i.e. basic soda lime silicate glass product or coated soda lime silicate glass product.
4.3.1.2	**Characteristics of the soda lime silicate glass panes used for the production of heat soaked thermally toughened soda lime silicate safety glass** Panes shall be made of soda lime silicate glass according to EN 572-1, EN 572-2, EN 572-4, EN 572-5. The panes may be coated according to EN 1096–1, EN 1096-2, EN 1096-3 and/or enamelled according to EN 14179-1. For the characteristics listed in Table 1, for the soda lime silicate glass panes, generally accepted values or calculated values may be used. Since the majority of the characteristics of Table 1 are not changed significantly by the thermal toughening process they shall be used for heat soaked thermally toughened soda lime silicate safety glass. The exceptions shall be the characteristic bending strength ($f_{g,k}$) and the resistance against sudden temperature changes and temperature differentials. **Table 1: Information on the characteristics of soda lime silicate glass panes, according to EN 572-1, used for the production of heat soaked thermally toughened soda lime silicate safety glass** If some coatings, i.e. coated glass conforming with the EN 1096 series, when heat soaked thermally toughened change their radiometric properties the manufacturer shall refer to the following for the determination of the appropriate characteristics, etc.: • 4.3.2.12 for the emissivity; • 4.3.2.13 for the light transmittance and reflectance; • 4.3.2.14 for the solar energy transmittance; • EN 1096-2 for the durability of A, B and S coatings; • EN 1096-3 for the durability of C and D coatings.	The values given for resistance against sudden temperature change and characteristic bending strength ($f_{g,k}$), see 4.3.2.9 and 4.3.2.10, are guaranteed by compliance with this standard. If such changes occur then it is the responsibility of the heat soaked thermally toughened glass manufacturer to determine the values to be quoted. However, the coated glass supplier may be able to give values for the heat soaked thermally toughened product together with appropriate factory production control tests. Therefore the toughener can quote applicable values as well as ensuring that the product values are maintained without the need to undertake these determinations.

4.3.2	**Determination of characteristics of heat soaked thermally toughened soda lime silicate safety glass products** If the heat soaked thermally toughened 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.	
4.3.2.2	**Safety in the case of fire – Resistance to fire (1)** Fire resistance shall be determined and classified in accordance with EN 13501-2.	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"[7] and is detailed in the official classification report.
4.3.2.3	**Safety in the case of fire – Reaction to fire (2)** Reaction to fire shall be determined and classified in accordance with EN 13501-1.	Heat soaked thermally toughened soda lime silicate safety glass products are products/ materials that do not require to be tested for reaction to fire (e.g. Products/materials of Classes A1* according to Commission Decision 96/603/EC, as amended 2000/605/EC).
4.3.2.4	**Safety in the case of fire – External fire behaviour (3)** 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.	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 this particular glass product type is permitted, by national regulations, in this application.
4.3.2.5	**Safety in use – Bullet resistance: Shatter properties and resistance to attack (4)** Bullet resistance shall be determined and classified in accordance with EN 1063.	Heat soaked thermally toughened soda lime silicate safety glass would not be expected to pass this test method. NPD is the appropriate information for the CE marking label/accompanying information.
4.3.2.6	**Safety in use – Explosion resistance: Impact behaviour and resistance to impact (5)** Explosion resistance shall be determined and classified in accordance with EN 13541.	Heat soaked thermally toughened soda lime silicate safety glass would not be expected to pass this test method. NPD is the appropriate information for the CE marking label/accompanying information.

[7] Sectorial Group 09 – Glass in building: Determination of the fire resistance performance of glazed assemblies (Virtual Assemblies)

4.3.2.7	**Safety in use – Burglar resistance: Shatter properties and resistance to attack (6)** Burglar resistance shall be determined and classified in accordance with EN 356.	Heat soaked thermally toughened soda lime silicate safety glass would not be expected to pass this test method. NPD is the appropriate information for the CE marking label/accompanying information.
4.3.2.8	**Safety in use – Pendulum body impact resistance: Shatter properties (safe breakability) and resistance to impact (7)** Pendulum body impact resistance shall be determined and classified in accordance with EN 12600.	If a manufacturer wants to make a performance claim then the heat soaked thermally toughened soda lime silicate safety glass shall be tested to EN 12600. Classification should be 1(C)Φ, where Φ is dependent upon product thickness/type.
4.3.2.9	**Safety in use – Mechanical resistance: Resistance against sudden temperature changes and temperature differentials (8)** The resistance against sudden temperature changes and temperature differentials is a generally accepted value that is given in EN 14179-1 and shall be ensured by compliance with this standard.	EN 14179-1: Clause 11.3 gives a generally accepted value of 200 K.
4.3.2.10	**Safety in use – Mechanical resistance: Resistance against wind, snow, permanent load and/or imposed loads of the glass unit (9)** The mechanical strength of heat soaked thermally toughened soda lime silicate safety glass is a characteristic value that is given in EN 12150-1 and is ensured by compliance with this standard. 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 heat soaked thermally toughened soda lime silicate safety glass shall conform to the ordered thickness.	EN 14179-1 gives values for the mechanical strength of heat soaked thermally toughened soda lime silicate safety glass as follows: Float: clear, tinted, coated -- 120N/mm² Enamelled float -- 75N/mm² (based on enamelled surface in tension) Patterned glass and Sheet glass -- 90N/mm² Note: The characteristic bending strength has to be used in conjunction with the design method given in prEN 13474[8]. Supplying what was ordered, in terms of thickness, will cover this characteristic.

[8] 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.

4.3.2.11	**Protection against noise – Direct airborne sound reduction (10)** 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 heat soaked thermal toughening process does not alter the values.	EN 12758 gives generally accepted values that can be used in the absence of measured data. Hence there is no reason to test this characteristic.
4.3.2.12	**Energy conservation and heat retention – Thermal properties (11)** The thermal transmittance value (U-value) shall be determined by calculation in accordance with EN 673 with: • emissivity ε: the declared value of the glass manufacturer. If the information is not available, the emissivity shall be determined in accordance with EN 12898. • nominal thickness of the glass panes.	The information supplied with the incoming material can be used if the heat soaking thermal toughening process does not alter the values. If the heat soaked thermal toughening process alters the emissivity then the value must be determined in accordance with EN 12898. The determination should be obtained on a heat soaked thermally toughened sample.
4.3.2.13	**Energy conservation and heat retention – Radiation properties: Light transmittance and reflectance (12)** The light transmittance and reflectance shall be determined in accordance with EN 410.	The information supplied with the incoming material can be used if the heat soaked thermal toughening process does not alter the values.
4.3.2.14	**Energy conservation and heat retention – Radiation properties: Solar energy characteristics (13)** The solar energy transmittance and reflectance shall be determined in accordance with EN 410.	The information supplied with the incoming material can be used if the heat soaked thermal toughening process does not alter the values.

Attachment 2: hEN Clause 5 Evaluation of conformity

Note: Initial Type Testing of the glass MUST be undertaken on a product that has been through the complete production cycle, i.e. a heat soaked thermally toughened soda lime silicate safety glass.

5.2.2	**Initial type testing of heat soaked thermally toughened soda lime silicate safety glass**	
5.2.2.1	**General** To establish if a product conforms to the definition of heat soaked thermally toughened soda lime silicate safety glass, initial type testing shall consist of: a) mechanical strength measurement in accordance with EN 14179-1; b) fragmentation test in accordance with EN 14179-1.	Mechanical strength shall meet the requirement in EN 14179-1 Clause 11.4 when determined in accordance with Annex B.1.1 of EN 14179-2. Fragmentation test is detailed in EN 14179-1 Clause 10.
5.2.2.2	**Test specimens** The test specimens needed for the initial type test shall be processed from float glass according to EN 572-1 and EN 572-2 in accordance with this standard. The "simplest" type of edge work specified in the manufacturer's production control documentation shall be used. However, if an arrissed edge is used then all other types of edge working are deemed to satisfy. The number of test specimens is as follows: a) For mechanical strength measurement they are given in Table 2a for float glass, Table 2b for coated float glass and Table 2c for enamelled float glass. b) For fragmentation 5 test specimens per thickness are required.	Initial type testing is undertaken on float glass, both coated and uncoated if appropriate. The tables detail the number of test specimens required for the 4-point mechanical strength test. [If a larger range of thicknesses is produced, than the table covers, then the manufacturer may wish to consider 2 specimens per thickness. This will give proof that all thicknesses meet the strength requirement.] For all products/thicknesses fragmentation tests must be undertaken.
5.2.2.3	**Test results** a) When the mechanical strength is measured, no measured value shall be below that given in clause 11.4 of EN 14179-1. However, if one value falls below then the manufacturer shall ensure that the results relate to a 5 % probability of breakage at the lower limit of the 95 % confidence interval. b) In the fragmentation test, no test specimen shall exhibit a fragmentation assessment that does not meet clauses 10.5 and 10.7 of EN 14179-1.	

5.2.2.4	**Measurement of surface pre-stress** The manufacturer may also use surface pre-stress measurement as a means of product control. If this is done then all test specimens shall be measured prior to testing. This will show the relationship between surface pre-stress and mechanical strength/ fragmentation. Manufacturers with more than one production line may perform the initial type test on specimens from one line. The outcome value of surface pre-stress measurement may then be used as reference for the other production lines and shall be confirmed by factory production control (FPC). This may also be applied to new production lines.	Measurement of surface pre-stress can be undertaken as a means of product control, (see 3.1.4.1 of Table A.1), for heat soaked thermally toughened float glass. The test should be undertaken as detailed in Annex B.1.2.
5.2.2.5	**Heat soaked thermally toughened patterned glass** Initial type testing of heat soaked thermally toughened patterned glass may not be undertaken as a result of the wide variety of patterned surfaces of patterned glass in accordance with EN 572-5. Compliance of heat soaked thermally toughened patterned glass shall be ensured by the sampling during product control given Annex A – Table A.1 – 3.1.3 together with either 3.1.4.2 or 3.1.4.3.	If a manufacturer only toughens and heat soaks a small number of pattern types/thicknesses then it may be worthwhile to subject test specimens to the mechanical strength and fragmentation tests, (see 5.2.2.1). However, a manufacturer can produce these products as long as they ensure by the factory production control, especially product control, that they meet the requirements.

Attachment 3: hEN Clause 6 Marking and labelling

6.2	**Product marking** The heat soaked thermally toughened soda lime silicate safety glass product shall be marked in accordance with Clause 12 of EN 14179-1	The manufacturer shall permanently mark with: • name or trade mark • EN 14179

Attachment 4: hEN Annex A Factory production control

Annex A	**Factory production control requirements** This is covered in the GEPVP second document “Evaluation of conformity”.	The generalities are covered in the GEPVP second document “Evaluation of conformity”.
Table A.1	Table A1 applies to all types of heat soaked thermally toughened soda lime silicate safety glass.	These cover: • Incoming raw materials • Process control • Product control. On product that has been through the complete production process

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.

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.

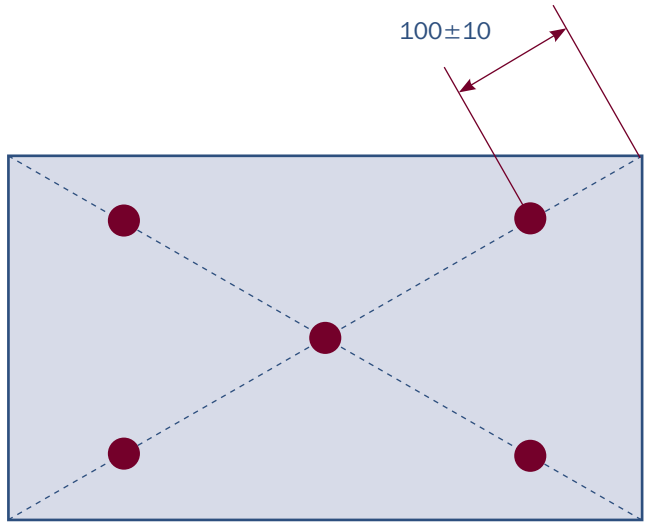
Attachment 7: hEN Other Annex(s)

Annex B (informative) – Tests for factory production control

Clause No.	Content	Explanation
B.1	**Strength measurement**	
B.1.1	**Four point bending strength test**	
B.1.1.1	**Requirements** For the requirements, refer to the value given in EN 14179-1 when measured in accordance with EN 1288-3[9].	EN 14179-1 defines the mechanical strength of heat soaked thermally toughened soda lime silicate safety glass products in Clause 11.4.
B.1.1.2	**Measurement method** This test should be performed in accordance with EN 1288-3.	EN 1288 – 3 Clause 7 details the test procedure.
B.1.1.3	**Test specimens** The dimensions of the test specimens should be in accordance with EN 1288-3. The test specimens will be manufactured in accordance with this standard.	EN 1288 – 3 Clause 6.2 details the specimen dimensions, i.e. 1100±5mm by 360±5mm. Test specimens must be manufactured in accordance with the Factory Production Control – Annex A.
B.1.2	**Optical surface pre-stress measurement** If the optical surface pre-stress measurement is a part of the factory production control then the values obtained during factory production control may not be less than the reference values obtained during the initial type test (see 5.2.2). Additionally for these test specimens the fragmentation should be in accordance with the requirements of EN 14179-1.	See specifically Clause 5.2.2.4. See B.2.
B.1.2.1	**Measurement method** Pre-stress measurements should conform to the recommendation of the test equipment supplier. The pre-stress measurements should have place on five points as indicated in figure B.1	
B.2	**Fragmentation test**	
B.2.1	**Requirements** For the requirements, refer to EN 14179-1.	EN 14179-1 defines the fragmentation of heat soaked thermally toughened soda lime silicate safety glass products in Clause 10.
B.2.2	**Test method** Fragmentation tests should be performed in accordance with EN 14179-1.	EN 14179-1 details the fragmentation of heat soaked thermally toughened soda lime silicate safety glass products in Clause 10.

[9] EN 1288-3: Glass in building – Determination of the bending strength of glass – Part 3: Test with specimens supported at two points (four point bending)

Figure B.1



Dimensions in mm