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REPORT

Determination of the fire resistance according to EN 1364-1:2015 of a partition with timber profiles glazed with 'Pyrobel-T EI30 - 22VL'

Report no.	2025-Efectis-R000305[Rev.1]
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1. GENERAL

1.1 REPORT

This report details the method of construction, the test conditions and the results obtained when the specific element of construction described herein was tested following the procedure outlined in EN 1363-1:2020, and where appropriate EN 1363-2:1999. Any significant deviation with respect to size, constructional details, loads, stresses, edge or end conditions other than those allowed under the field of direct application in the relevant test method is not covered by this report.

1.2 SUBJECT

Test of a non-loadbearing glazed partition.

1.3 INVESTIGATION

Determination of fire resistance according to EN 1364-1:2015; Fire resistance tests for non-loadbearing elements - Part 1: Walls. The specimen was exposed to the standard fire curve as specified in EN 1363-1:2020.

The construction was tested for the criteria Integrity (E), Insulation (I), and Radiation (W).

1.4 SPONSOR AND MANUFACTURER

Table 1.1: Sponsor and manufacturer

Sponsor and manufacturer of glass panes	AGC GLASS EUROPE
Manufacturer of profiles	Menuiserie contemporaine Marlair

1.5 LOCATION AND DATE REGARDING THE EXAMINATION

The research was conducted at the laboratory of Efectis Nederland BV in Bleiswijk, the Netherlands.

Table 1.2: Location and date of the examination

Delivery of materials	22nd of January 2025
Assembly of the test specimen	29th and 30th of January 2025
Fire resistance test	17th of February 2025

1.6 NORMATIVE REFERENCES

Table 1.3: Normative references

European standard	**Part**
EN 1363-1:2020	Fire resistance tests – Part 1: General requirements
EN 1363-2:1999	Fire resistance tests – Part 2: Alternative and additional procedures
EN 1364-1:2015	Fire resistance tests for non-loadbearing elements – Part 1: Walls

1.7 REVISION INFORMATION

This is the first issue of the test report. This is a revised version of this report. This version supersedes all previous versions of this reports that are hereby withdrawn. Details on the changes can be found in the tables below.

Table 1.4: Revision information

Issue	Date of issue	Report no.
First issue	March of 2025	2025-Efectis-R000305
First revision	March of 2025	2025-Efectis-R000305[Rev.1]

1.7.1 First revision detailed information

Table 1.5: First revision information

Chapter of revision	2.2.5
Reason of revision	Correction of glass thickness
Consequences of revision	None

2. TEST SPECIMEN

2.1 GENERAL

For the dimensions and specifications of the materials and components of the examined construction, also see the figures in chapter 8. Details of the assembly of the construction are given in the paragraphs below.

Detailed information of the tested specimen, in conformity with chapter 12.1.f of standard EN 1363-1, was supplied by the sponsor to Efectis, prior to the installation of the test specimen. Efectis performed a detailed examination of the test specimen prior to testing and verified the conformity of the test specimen with the information provided.

2.2 TEST SPECIMEN

The test specimen was a non-loadbearing partition consisting of timber profiles manufactured by Menuiserie contemporaine Marlair and glazed with glass panes of type ‘Pyrobel-T EI30 - 22VL’ manufactured by AGC GLASS EUROPE.

The specimen was built in a standard flexible high density supporting and mounted to the test frame on the bottom. With the glazing beads on both the unexposed and exposed side.
The construction was symmetrical with regard to exposed/unexposed side.

2.2.1 Test Frame

The test frame was constructed of steel beams comprising a fire-resistant concrete lining (density: 1450 kg/m^3 ± 200), with an aperture of 4000 x 4000 mm (w x h) with an insertion width of 240 mm.

2.2.2 Supporting Construction

The test specimen was built in a high density flexible standard supporting construction, being a with plasterboard cladded metal stud wall built according to table 1 of EN 1363-1. The bottom of the test specimen was built directly against the high-density (1450 kg/m^3 ± 200) concrete lining.

Table 2.1: Specifications supporting construction

Specifications standard flexible supporting construction according to EN 1363-1 table 1	
Overall dimensions	4000 x 4000 x 240 mm (w x h x t)
Intended fire resistance	30 minutes
Aperture	3800 x 3800 x 75 mm (w x h x t)
Materials	Plasterboard: type “F”, 12.5 mm (t) Steel profiles: C50 and U50 profiles, group A Insulation: ProRox SL 930, thickness 50 mm
Manufacturers of components	Plasterboard: Knauf Steel profiles: Knauf Insulation: Rockwool
Density insulation	55 kg/m^3
Number of layers plasterboard	1 layer of 12.5 mm plasterboard on both sides
Fixing	Both layers were fixed with galvanized gypsum board screws at a c.t.c. distance of max. 600 mm

2.2.3 Restraint / Free edge

The specimen was erected so that the right vertical edge (seen from the unexposed side) was unrestrained. The gap was filled with mineral wool of type ‘ProRox SL 970’ with a density of 115 kg/m^3 to provide a seal without restricting freedom of movement. The gap was approx. 40 mm wide.

2.2.4 Profiles

Specifications general	
Manufacturer	Menuiserie contemporaine Marlair
Type	Timber
Material	Hevea (Rubberwood)
Dimensions	3740 x 3760 x 62 (w x h x t)
Density	657 kg/m^3
Fixing	Screws of type ‘Hilte HRD-C’ Ø 8 x 80 mm (d x l) at a c.t.c. distance of 500 mm.
Specifications profiles	
Dimensions	2x: 62 x 3740 x 20 mm (w x h x t) 1x: 62 x 3760 x 20 mm (w x h x t)
Fixing	Screws of type ‘Hilte HRD-C’ Ø 8 x 80 mm (d x l) at a c.t.c. distance of 500 mm.
Specifications glazing beads	
Dimensions	2x: 17 x 3740 x 15 mm (w x h x t)

	1x: 17 x 3760 x 15 mm (w x h x t)
Function	Fixing the glass panes
Fixing	To the timber profiles with galvanized nails of type 'Kit Pro T38 16GA' Ø 1.5 x 38 mm (d x l) at a c.t.c. distance of 150 mm
Specifications setting block	
Manufacturer	Promat
Type	Promatect - H
Material	Calcium silicate
Dimensions	65 x 200 x 18 mm (w x h x t)
Density	96 kg/m^3
Location	On the test frame, under the framework
Function	Level the framework
Fixing	No fixing

2.2.5 Glass panes and glass fixing

Specifications glass panes	
Manufacturer	AGC GLASS EUROPE
Type	Fire resistant glass
Product name	Pyrobel-T EI30 - 22VL
Glass layer makeup	Toughened glass: 8 mm Intumescent layer: 6 mm Toughened glass: 8 mm
Dimensions	2x: 1500 x 3706 x 22 mm (w x h x t) 1x: 705 x 3706 x 22 mm (w x h x t)
Specifications glass blocks	
Manufacturer	Bohle
Type	Wood
Material	Hardwood
Density	665 kg/m^3
Dimensions	80 x 22 x 5 mm (w x h x t)
Location	On the profiles, under the glass

Specifications tape	
Manufacturer	Odice SA
Type	Ceramic paper
Product name	Superwool X607
Material	Ceramic fiber
Dimensions	15 x 5 mm (w x t)
Location	Between the glass panes and the glazing beads
Fixing	Self-adhesive
Specifications tape	
Manufacturer	Jung
Type	Intumescent strip
Product name	Flamiseal G
Material	Graphite based
Dimensions	18 x 2 mm (w x t)
Location	At the edges of the glass panes
Fixing	Self-adhesive

2.2.6 Intumescent seal

Specifications sealant	
Manufacturer	Dow
Type	Structural glazing sealant
Product name	Dowsil 895 black
Material	Neutral silicone
Location	Between the glass panes and between glass panes and profile
Fixing	Self-adhesive

2.2.7 Insulation

Specifications sealant	
Manufacturer	Promat

Type	Ceramic wool
Product name	Dalfrathem- 1200 ULS
Material	Ceramic fiber
Thickness	20 mm
Density	96 kg/m^3
Location	Between timber profiles and test frame/supporting construction
Fixing	Sealing gap

2.3 METHOD OF ASSEMBLY

The test specimen was built in the following order:

- The outer profiles were placed;
- Sticking both tapes on the edges of the glass, installing the glass;
- Installing the glazing beads;
- Sealing the glass and profiles.

3. ASSEMBLY AND MANUFACTURING OF THE CONSTRUCTION

Table 3.1: Assembly and manufacturing of the construction

Efectis Nederland	Test frame and supporting construction
AGC GLASS EUROPE	Assembly and manufacturing of glass
Menuiserie contemporaine Marlair	Manufacturing of the profiles

4. RESEARCH METHOD

4.1 VERIFICATION OF THE SPECIMEN

The materials and components used were inspected during assembly on the basis of the supplied drawings and data. Efectis Nederland BV was not involved in the selection or sampling of the materials.

4.2 CONDITIONING OF TEST SPECIMEN

4.2.1 Conditioning

From the moment of assembly until the fire resistance test, the specimen was stored in the laboratory of Efectis Nederland BV under the following conditions.

Table 4.1: Laboratory conditions during conditioning

Conditions during conditioning	
Ambient temperature:	20 ± 5°C
Relative humidity:	50 ± 10 %

4.2.2 Density and moisture content

The density and the moisture content of materials and components used during assembly was determined by Efectis Nederland.

Efectis Nederland BV received samples of materials used in the construction of the specimen to determine the density and moisture content.

Table 4.2: Density and moisture content

Material	**Density [kg/m^3]** *(information provided by sponsor)*	**Density [kg/m^3]** (*as determined by Efectis)*	**Moisture content [%]** (*as determined by Efectis)*
Timber frame	-	657	8.0
Promat ceramic wool	96	71	0.8

Note: The presented moisture content is calculated based on the dry weight of the product which is in line with international guidelines.

4.3 FIRE TEST

4.3.1 Laboratory conditions

During the fire resistance investigation, the test conditions in the laboratory were as given below.

Table 4.3: Laboratory conditions during fire test

Laboratory conditions	
Ambient temperature:	10 - 40°C
Relative humidity:	50 ± 10 %

4.3.2 Test direction

The specimen was fully symmetric built. Therefore, no specific test direction was identified.

4.3.3 Test conditions

The fire test was carried out according to EN 1363-1 and EN 1363-2.

4.3.4 Heating curve

The average temperature of the furnace followed the standard heating curve as described in EN 1363-1. The temperatures inside the furnace during the fire test are given in appendix A.

4.3.5 Furnace pressure

Due to the height of the test specimen the pressure would be higher than 20 Pa at the top of the test specimen with the neutral pressure plane at 0.5 m. As described in the requirements given in EN 1363-1 the nominal pressure of the furnace at the top of the specimen may not exceed 20 ± 3 Pa. Therefore, the height of the neutral pressure plane was adjusted by setting the furnace pressure to 9 Pa at 2.5 m above the furnace floor.

4.3.6 Measurements

During the fire test the following data was measured and registered:

Environment (measurements are given in appendix A)

- The temperature in the laboratory outside the furnace.

Furnace conditions (measurements are given in appendix A)

- The temperatures in the furnace using plate thermocouples, equally spread over the heated surface;
- The pressure in the furnace.

Specimen (measurements are given in appendix B)

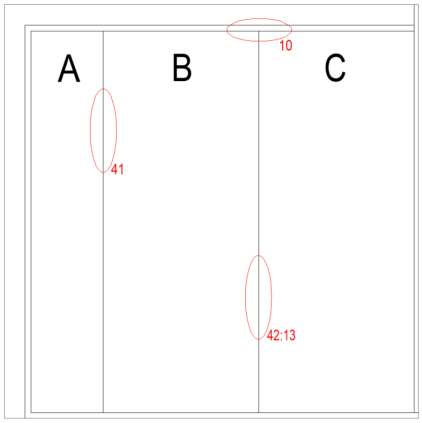
- Surface temperatures of the test specimen;
- Radiation levels at 1.0 m from the centre of the test specimen;
- Deflections of the test specimen.

The positions of thermocouples, deflection and radiation measurements are given in appendix B.

5. RESULTS OF THE FIRE RESISTANCE TEST

5.1 OBSERVATIONS DURING HEATING

Table 5.1: Observations during the fire test



The numbers refer to the time and position of the observation

Time [min:sec]	Pane	Observations
0		Start of heating
2		Deflection number 2 comes loose
3	B	Pane on the exposed side cracks
4	A, C	Pane on the exposed side cracks
6	A	Pane on the exposed side cracks and turns white
7	B, C	Pane on the exposed side cracks and turns white
9		Deflection number 1 comes loose
10		Smoke visible from between the profile

41	A, B	Smoke visible from between the panes
42	B,C	Opening of the panes, < 25 mm
42:13	B,C	Sustained flaming > 10 sec
43:30		End of heating after consulting client

5.2 TEST RESULTS

Test results for the specimen(s) are given in appendix B.

5.3 PHOTOGRAPHS

Photographs that were taken during construction and during the fire test are shown in appendix C.

5.4 UNCERTAINTY OF MEASUREMENT

Because of the nature of fire resistance testing and the consequent difficulty in quantifying the uncertainty of measurement of fire resistance, it is not possible to provide a stated degree of accuracy of the result.

6. SUMMARY OF THE TEST RESULTS

6.1 SUMMARY OF TESTED SPECIMEN

The test specimen was a non-loadbearing partition consisting of timber profiles manufactured by Menuiserie contemporaine Marlair and glazed with glass panes of type ‘Pyrobel-T EI30 - 22VL’ manufactured by AGC GLASS EUROPE.

The specimen was built in a standard flexible high density supporting and mounted to the test frame on the bottom. With the glazing beads on the unexposed side.

The fire test was carried out according to EN 1364-1:2015.

6.2 SUMMARY OF TEST RESULTS

6.2.1 Performances

Table 6.1: Main performances

Performances	**Criteria**	**Time (completed minute)**	**Time before failure* (min:sec)**
Integrity	*Ignition of a cotton pad*	*43*	*Not applied*
	Sustained flaming	*42*	*42:03*
	Cracks or openings in excess of given dimensions	*43*	*Not reached*
Insulation	*Average temperature, increase of Δ140 K*	*42*	*Not reached*
	Maximum temperature, increase of Δ180 K	*30*	*30:50*
Radiation	*Maximum radiation value > 5 kW/m²*	*43*	*Not reached*

	Maximum radiation value > 10 kW/m²	*43*	*Not reached*
	Maximum radiation value > 15 kW/m²	*43*	*Not reached*
	Maximum radiation value > 20 kW/m²	*43*	*Not reached*
	Maximum radiation value > 25 kW/m²	*43*	*Not reached*
	Maximum radiation was 0.9 kW/m² at 43 minutes		
Termination of the test at 43 minutes for the following reason: *Attainment of selected criteria*			

**) Time of the last measurement that this criterion was maintained.*

6.2.2 Validation of the test in case of inadvertently excessing tolerances

The deviation in excess of the tolerances on pressure in the furnace represents a more severe exposure to the test specimen. Therefore, according to §5.7 of EN 1363- 1, the test is still considered valid.

6.2.3 Validation of the test in case of failing to perform measurements

Due to the deflection coming loose we could not do any deflection measurements after 9 minutes, as described in § 5.1. This does not affect the validity of the test but does limit the Direct field of Application.

7. FIELD OF DIRECT APPLICATION OF TEST RESULTS

7.1 GENERAL

The test results are directly applicable to similar constructions where one or more of the changes in this chapter are made and the construction continues to comply with the appropriate design code for its stiffness and stability. Other changes are not permitted.

The result of a test on a specimen with mixtures of different types of construction (e.g. different types of glass or different types of framing, etc.) is only applicable to that tested.

7.2 FIELD OF DIRECT APPLICATION RULES NOT REQUIRING OVERRUN TIME

7.2.1 Glazed element

7.2.1.1 Installation angle

Test results on vertical glazed elements cover glazed elements sloped to a maximum angle of ± 10° from the vertical plane, provided the height of the glazed element is not larger than the maximum height tested.

7.2.1.2 Height of the glazed element

No direct application

7.2.1.3 Width of the glazed element

Test results cover rectangular glazed elements of greater width by replication of the tested glazed element or parts thereof, provided:

a) the framing system is identical to the one tested;
b) the width of the specimen in the test was 2,8 m or greater with one vertical edge unrestrained;
c) the mullions within and/or connection joints between glazed elements have been tested.

In case of elements intended to be classified for EW, the following additional provisions apply:

- the average temperature of the unexposed face of the glazed element as well as the average temperature of the unexposed face of the non-glazed area of the test specimen (see Figures 12 or 14 in EN 1364-1) remained below 300 °C, or
- the heat radiation measured from the complete and fully glazed test element with minimum size of 2,8 x 2,8 m did not exceed 12,3 kW/m².

Table 7.1: Limits of permitted width increase of glazed element requiring no overrun time

Limits of permitted size increase			
Tested dimensions		Permitted size increase	
Tested width [mm]	1500	Max permitted width [mm]	Endless by replication

7.2.2 Glazing system (see Figure 16 in EN 1364-1)

7.2.2.1 Linear dimensions

The linear dimensions of panes may be decreased from the dimensions tested. Height and width may be considered independently.

7.2.2.2 Aspect ratio

If both portrait and landscape aspect ratio rectangular panes have been tested, then the height of the landscape pane may be increased and/or the width of the portrait pane may be increased, subject to:

- the area of the pane after increasing the linear dimensions shall be less or equal to the average area of the largest tested landscape and portrait panes, i.e. $A \leq ½ * (A_{portrait, max} + A_{landscape, max})$, in which

  A — area of assessed glass pane;

  $A_{portrait, max}$ — maximum area of tested glass pane oriented in “portrait” format

  $A_{landscape, max}$ — maximum area of tested glass pane oriented in “landscape” format

- all panes were tested in an identical framing and glazing system,
- the largest tested width as well as the largest tested height is not exceeded.

Table 7.2: Permitted size variation of glass panes requiring no overrun time

Permitted sizes of ‘new’ glass pane	
Width [mm]	1500
Height [mm]	3706
Area [m²]	5.56

7.2.2.3 Glazing beads

~~Test results on 'clip-on' beads cover screwed-on glazing beads, applied with the same or smaller centre to centre distance.~~

Test results on timber beads fixed by nails/pins cover screw fixing of at least the same length, applied with the same or smaller centre to centre distance.

~~Test results for applications intended for EI classification on sloped or chamfered bead profiles also cover a flat bead of the same height (D in Figure 16 in EN 1364-1), but not vice versa, and also cover a bead depth that is at least the same as tested (C in Figure 16 in EN 1364-1).~~

~~Test results for applications intended for E and/or EW classification on non-combustible bead profiles also cover a bead depth that is at least the same as tested (C in Figure 16 in EN 1364-1) with the height remaining the same as tested (D in Figure 16 in EN 1364-1).~~

7.2.3 Framing system (see Figure 16 in EN 1364-1)

The distance between mullions and/or transoms may be decreased from that tested.

The distance between fixing centres may be decreased from that tested.

The cross-sectional dimensions of the frame profiles may be increased from the dimensions tested, under the following restrictions:

- For combustible framing intended to be used for E and/or EW classification, the depth of the frame profiles on the unexposed side is as tested.
- For framing systems intended to be used for EI classification, no increase in width is allowed in case no temperature measurements on the unexposed side of the profiles were made during the test.

7.2.4 Supporting constructions

7.2.4.1 General

For specimens tested in the test frame without any supporting construction, the result is applicable to high density rigid supporting constructions with at least the same fire resistance as the test specimen. For this test, this only applies to the connection at the bottom.

7.2.4.2 Standard supporting constructions

Test results obtained with flexible standard supporting constructions may be applied to high density rigid supporting constructions (in accordance with EN 1363-1) with at least the same fire resistance classification and an overall thickness equal to or greater than that of the element used in the tests.

~~Test results obtained with low density rigid standard supporting constructions may be applied to high density supporting constructions (in accordance with EN 1363-1) with at least the same fire resistance classification and an overall thickness equal to or greater than that of the element used in the tests.~~

Test results obtained with flexible standard supporting constructions do not cover sandwich panel constructions and flexible supporting constructions where the lining does not cover the studs on both sides.

Test results obtained with flexible standard supporting constructions cover alternative flexible constructions of the same fire resistance classification provided:

1) the construction is of a stud and board type construction, classified in accordance with EN 13501-2;
2) the construction has an overall thickness not less than the minimum thickness of the appropriate range given in EN 1363-1 for the standard flexible wall used in the test;
3) the number of board layers and the overall board layer thickness is equal or greater than that tested;
4) ~~flexible wall constructions with timber studs are constructed with at least the same number of layers given in EN 1363-1 on the faces and at the interface between the glazed element and the supporting construction.~~

If the specimen was tested with a flexible standard supporting construction fixed along the vertical and/or horizontal edge (see Figure 17 EN 1364-1), the permitted flexible supporting constructions can only be interfaced along its tested edge-types (vertical and/or horizontal). The permitted rigid supporting constructions can be interfaced with all edge-types of the glazed element.

7.2.4.3 Non-standard supporting construction

No direct application.
~~The result of a test of fire-resistant glazing tested in non-standard supporting constructions is only applicable to that construction.~~

7.3 FIELD OF DIRECT APPLICATION RULES REQUIRING OVERRUN TIME

7.3.1 General

For some rules to be applicable an overrun time in the fire test result compared to the intended classification period is required. The required overrun time is shown in Table 7.4.

Table 7.3: Overrun time

Intended classification period [min]	**Overrun time A [min]**	**Overrun time B [min]**
≤ 20	not applicable	≥ 3
30~~, 45 and 60~~	≥ 3 and < 6	≥ 6
~~≥ 90~~	~~≥ 5% and < 10% of the intended classification period~~	~~≥ 10 % of the intended classification period~~

NOTE The rules given in 7.3 may be used in addition to the rules in 7.2.

7.3.2 Dimensions of the glazed element

7.3.2.1 Height

The test result of the glazed element covers the height up to a maximum of the tested height multiplied by a factor of 1,1 provided overrun time A is achieved. This is irrespective of the measured deflections.

The test result of the glazed element covers the height up to a maximum of the tested height multiplied by a factor of 1,2 provided overrun time B is achieved. This is irrespective of the measured deflections.

In case of elements intended to be classified for EW, the following additional provisions apply:

- the average temperature of the unexposed face of the glazed element as well as the average temperature of the unexposed face of the non-glazed area of the test specimen (Figure 12 or 14 in EN 1364-1) remained below 300 °C, or
- the heat radiation measured from the complete and fully glazed element did not exceed 12,3 kW/m².

Table 7.4: Height increase glazed element for overrun time A

Permitted height increase is only applicable for the achieved fire resistance periods together with their criteria			
Tested dimensions		*Permitted size increase*	
Height [mm]	3706	Height 10% [mm]	4077

Table 7.5: Height increase glazed element for overrun time B

Permitted height increase is only applicable for the achieved fire resistance periods together with their criteria			
Tested dimensions		*Permitted size increase*	
Height [mm]	3706	Height 20% [mm]	4447

7.3.2.2 Width

The replication of the glazed element is covered based on rules described in 7.2.1.3.

For glazed elements tested with a width smaller than 2,8 meters, the following rules apply.

The test result of the glazed element covers the width up to a maximum of the tested width multiplied by a factor of 1,1 provided overrun time A is achieved. This is irrespective of the measured deflections.

The test result of the glazed element covers the width up to a maximum of the tested width multiplied by a factor of 1,2 provided overrun time B is achieved. This is irrespective of the measured deflections.

In case of elements intended to be classified for EW, the following additional provisions apply:

- the average temperature of the unexposed face of the glazed element as well as the average temperature of the unexposed face of the non-glazed area of the test specimen (Figure 12 or 14 in EN 1364-1) remained below 300 °C, or
- the heat radiation measured from the complete and fully glazed element did not exceed 12,3 kW/m².

Table 7.6: Width increase of glazed element for overrun time A

Permitted width increase is only applicable for the achieved fire resistance periods together with their criteria			
Tested dimensions		*Permitted size increase*	
Width [mm]	1500	Width 10% [mm]	1650

Table 7.7: Width increase glazed element for overrun time B

Permitted width increase is only applicable for the achieved fire resistance periods together with their criteria			
Tested dimensions		*Permitted size increase*	
Width [mm]	1500	Width 20% [mm]	1800

7.3.3 Dimensions and area of individual rectangular glass panes

The test result of a pane covers dimensions up to a maximum of the tested dimensions multiplied by a factor 1,1 in width and/or height, provided overrun time A is achieved and the maximum tested area multiplied by a factor 1,1 is not exceeded.

The test result of a pane covers dimensions up to a maximum of the tested dimensions multiplied by a factor 1,2 in width and/or height, provided overrun time B is achieved and the maximum tested area multiplied by a factor 1,21 is not exceeded.

In case of elements intended to be classified for EW, the following additional provisions apply:

- the average temperature of the unexposed face of the glazed element as well as the average temperature of the unexposed face of the non-glazed area of the test specimen (see Figure 12 or 14 in EN 1364-1) remained below 300 °C, or

- the heat radiation measured from the complete and fully glazed element did not exceed 12,3 kW/m².

Table 7.8: Permitted size variations of glass panes for overrun time A

Permitted height increase is only applicable for the achieved fire resistance periods together with their criteria (Portrait)			
Tested width [mm]	1500	Permitted width 10% [mm]	1650
Tested height [mm]	3706	Permitted height 10% [mm]	4077
Tested surface [m²]	5.56	Permitted surface 10% [m²]	6.11
~~**Permitted height increase is only applicable for the achieved fire resistance periods together with their criteria (Landscape)**~~			
~~Tested width [mm]~~		~~Permitted width 10% [mm]~~	
~~Tested height [mm]~~		~~Permitted height 10% [mm]~~	
~~Tested surface [m²]~~		~~Permitted surface 10% [m²]~~	

Table 7.9: Permitted size variations glass panes for overrun time B

Permitted height increase is only applicable for the achieved fire resistance periods together with their criteria (Portrait)			
Tested width [mm]	1500	Permitted width 20% [mm]	1800
Tested height [mm]	3706	Permitted height 20% [mm]	4447
Tested surface [m²]	5.56	Permitted surface 21% [m²]	6.73
~~**Permitted height increase is only applicable for the achieved fire resistance periods together with their criteria (Landscape)**~~			
~~Tested width [mm]~~		~~Permitted width 20% [mm]~~	
~~Tested height [mm]~~		~~Permitted height 20% [mm]~~	
~~Tested surface [m²]~~		~~Permitted surface 21% [m²]~~	

In order to accommodate the increase in glass dimensions, it is permitted to increase the distance between mullions and/or transoms.

7.3.4 Aspect ratio

The calculation of permitted aspect ratio as defined in 7.2.2.2 shall be conducted after any increase in glass dimensions based on overrun time has been established; i.e. $A \leq ½ * (A_{portrait, extended} + A_{landscape, extended})$, in which

- A area of assessed glass pane;
- $A_{portrait, extended}$ extended area of glass pane oriented in “portrait” format
- $A_{landscape, extended}$ extended area of glass pane oriented in “landscape” format

Table 7.10: Permitted maximum area concerning aspect ratio for overrun time A

Permitted maximum area concerning aspect ratio of 'new' glass pane for overrun time A increase only applicable for the achieved fire resistance periods together with their criteria	
Area [m^2]	6.11
Width [mm]	1650
Height [mm]	4077

Table 7.11: Permitted maximum area concerning aspect ratio for overrun time B

Permitted maximum area concerning aspect ratio of 'new' glass pane for overrun time B increase only applicable for the achieved fire resistance periods together with their criteria	
Area [m^2]	6.73
Width [mm]	1800
Height [mm]	4447

7.3.5 Area of individual circular, triangular and four side non-rectangular glass panes

The test result from individual circular, triangular and four-sided non-rectangular glass panes covers the area up to a maximum of the tested area multiplied by a factor 1,1 provided overrun time A is achieved.

The test result from individual circular, triangular and four-sided non-rectangular glass panes covers the area up to a maximum of the tested area multiplied by a factor 1,2 provided overrun time B is achieved.

J. Lopes B.Sc.
Project Leader Resistance to Fire

S.D. Nieuwendijk M.Sc.
Project Leader Resistance to Fire Engineering

8. DRAWINGS (SUPPLIED BY SPONSOR)

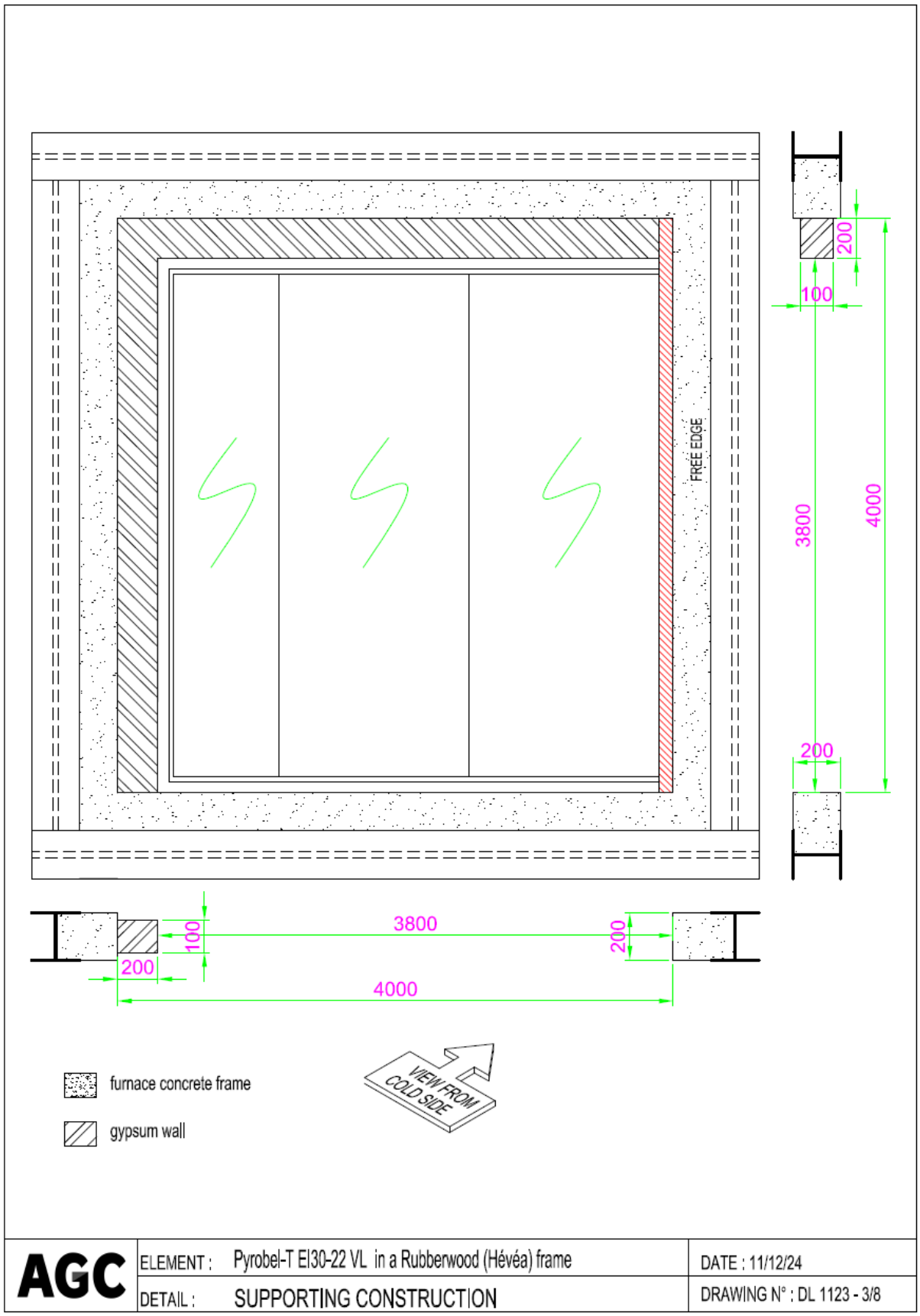


Figure 1: Test specimen with supporting construction (unexposed side)

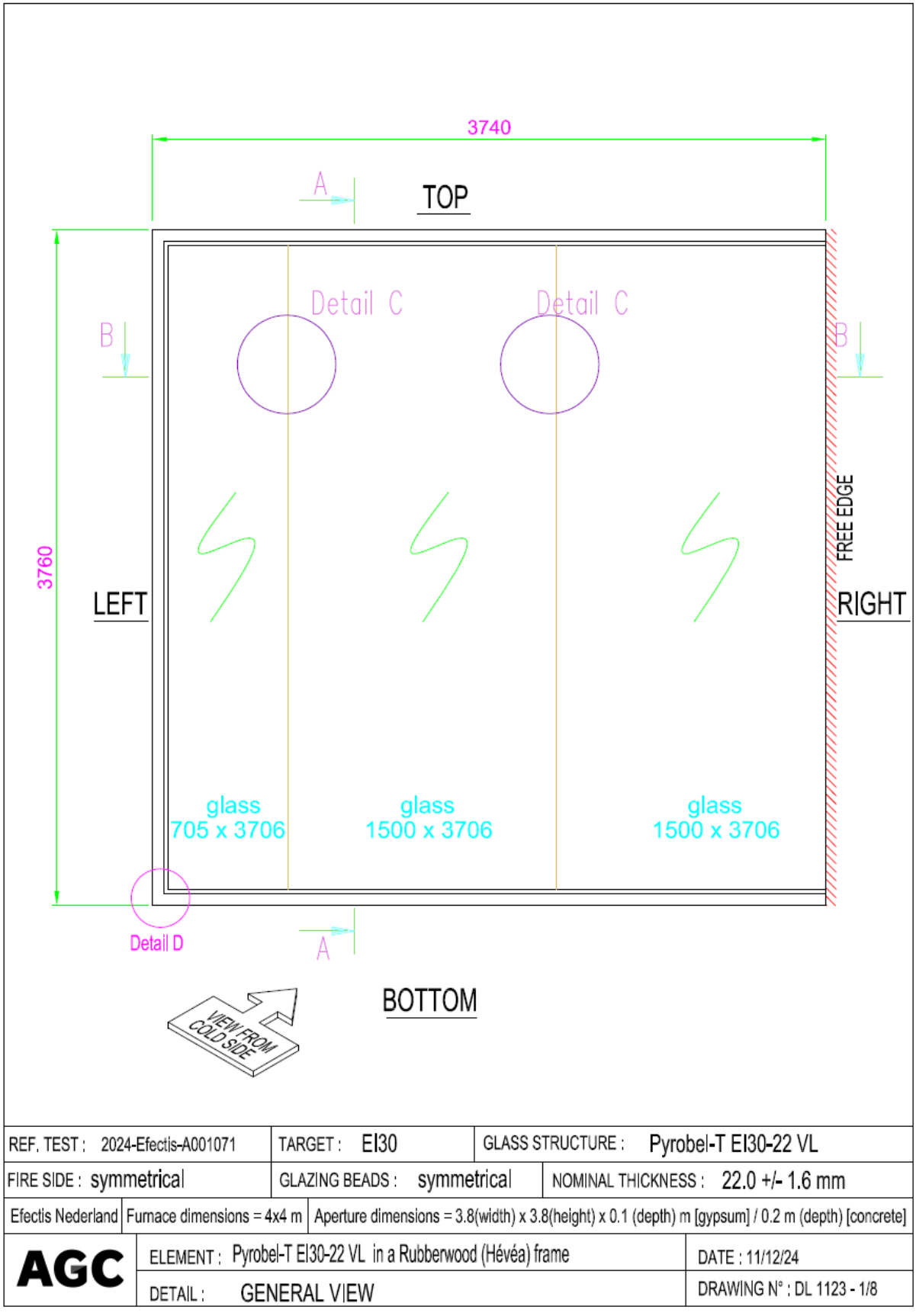


Figure 2: General view (unexposed side)

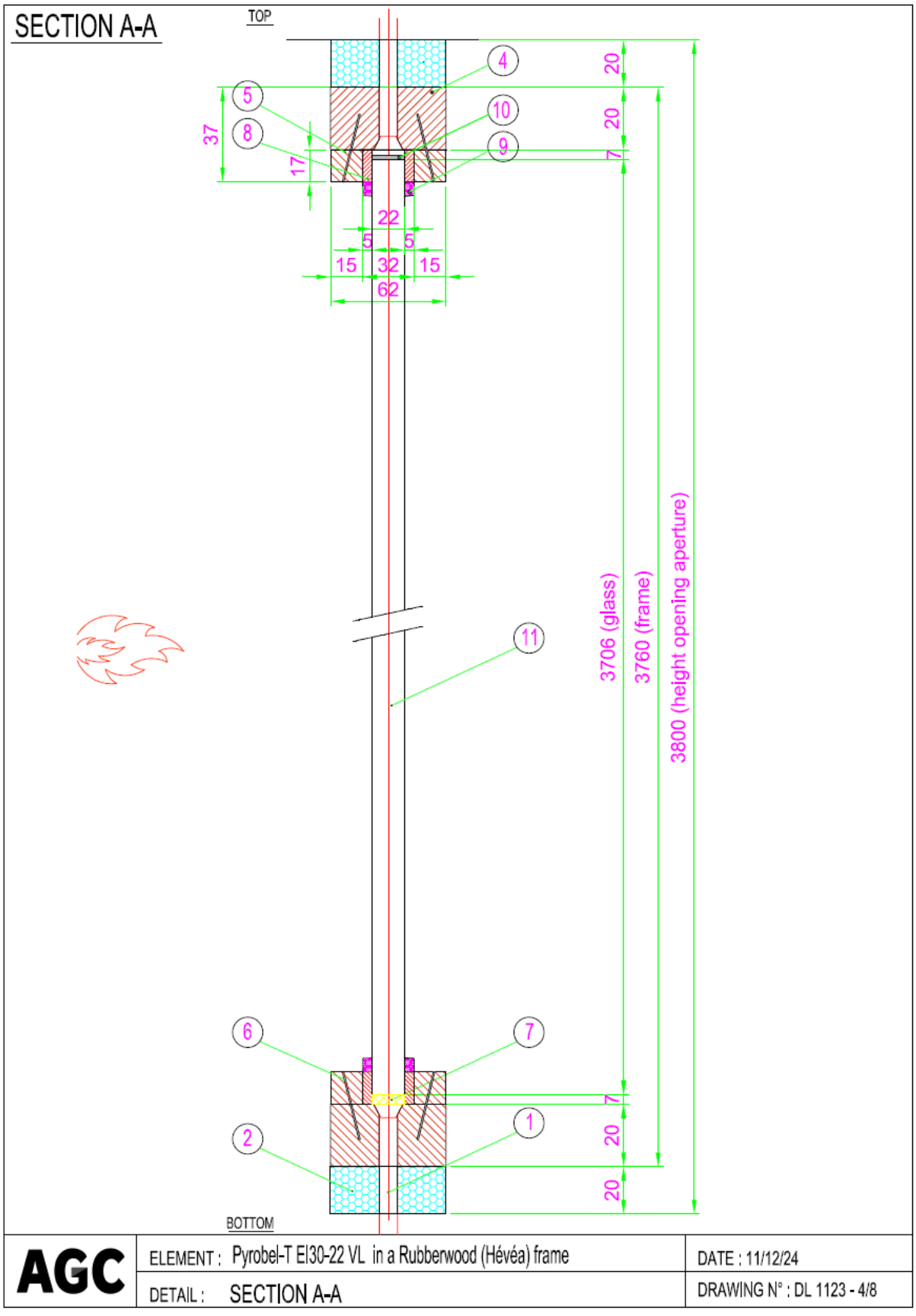


Figure 3: Section A-A

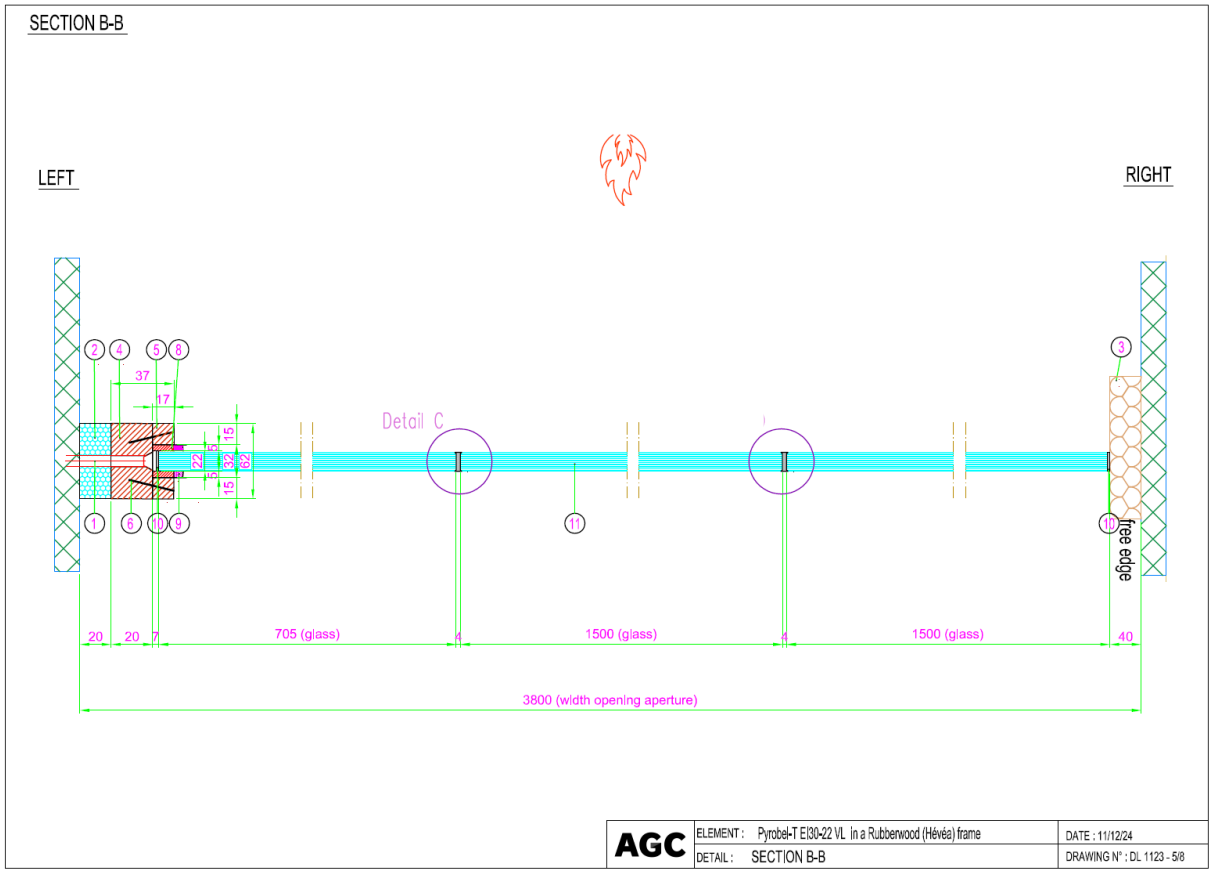
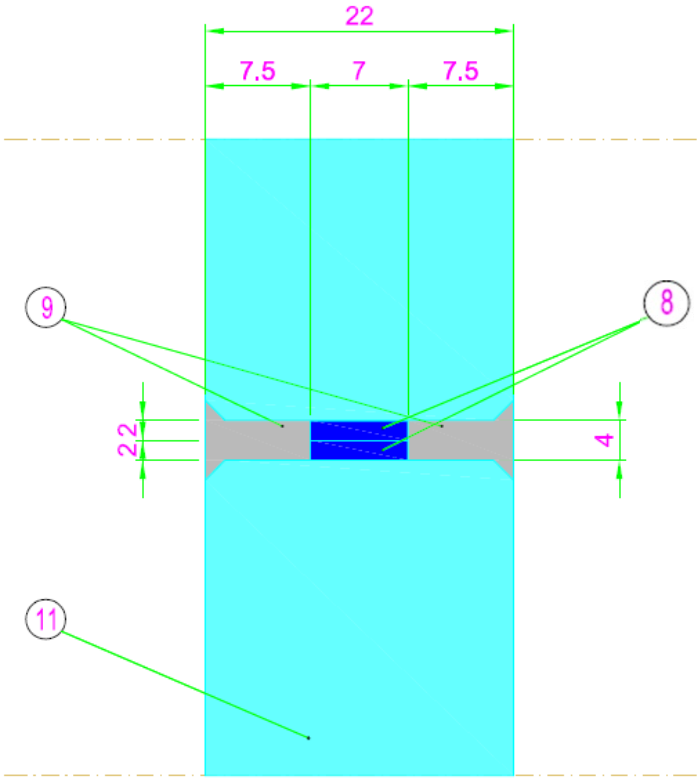


Figure 4: Section B-B

DETAIL C



AGC	ELEMENT : Pyrobel-T EI30-22 VL in a Rubberwood (Hévéa) frame	DATE : 11/12/24
	DETAIL : DETAIL C	DRAWING N° : DL 1123 - 6/8

Figure 5: Detail C

ITEM	COMPONENT
1	in concrete = Hilti 100 HT anchor - Ø10xL112 mm - fixing frame
	in gypsum = Hilti HRD-C plastic anchor - Ø8xL60 mm - fixing frame
	200 mm from corners and c.t.c. 450 to 500 mm maxi
2	Thermal Insulation - Promat Promaglaf HTK1100 - 96 kg/m3
3	Thermal Insulation - Mineral wool - 120 kg/m3
4	Rubberwood frame - hévéa (see sample delivered for density value)
5	Rubberwood bead - hévéa (see sample delivered for density value)
6	Galvanized nails - Ø1.5x38 mm - fixing beads
	Kit Pro T38 type 16GA
	150 mm from corners and c.t.c. 200 to 250 mm maxi
7	Glazing setting block - Hardwood - 80x22x5 mm
	2 per glass panes - at 80 mm from corners
8	Ceramic paper - Superwool X607 - 15x5 mm
9	Structural Glazing Sealant - Dow - Dowsil 895 - black
10	Intumescent strip - Jung - Flamiseal G - 18x2 mm
11	Pyrobel-T EI30-22 VL (Vision Line)

AGC	ELEMENT : Pyrobel-T EI30-22 VL in a Rubberwood (Hévéa) frame	DATE : 11/12/24
	DETAIL : COMPONENTS LIST	DRAWING N° : DL 1123 - 8/8

Figure 6: Components list

APPENDIX A: MEASUREMENT OF TEST CONDITIONS

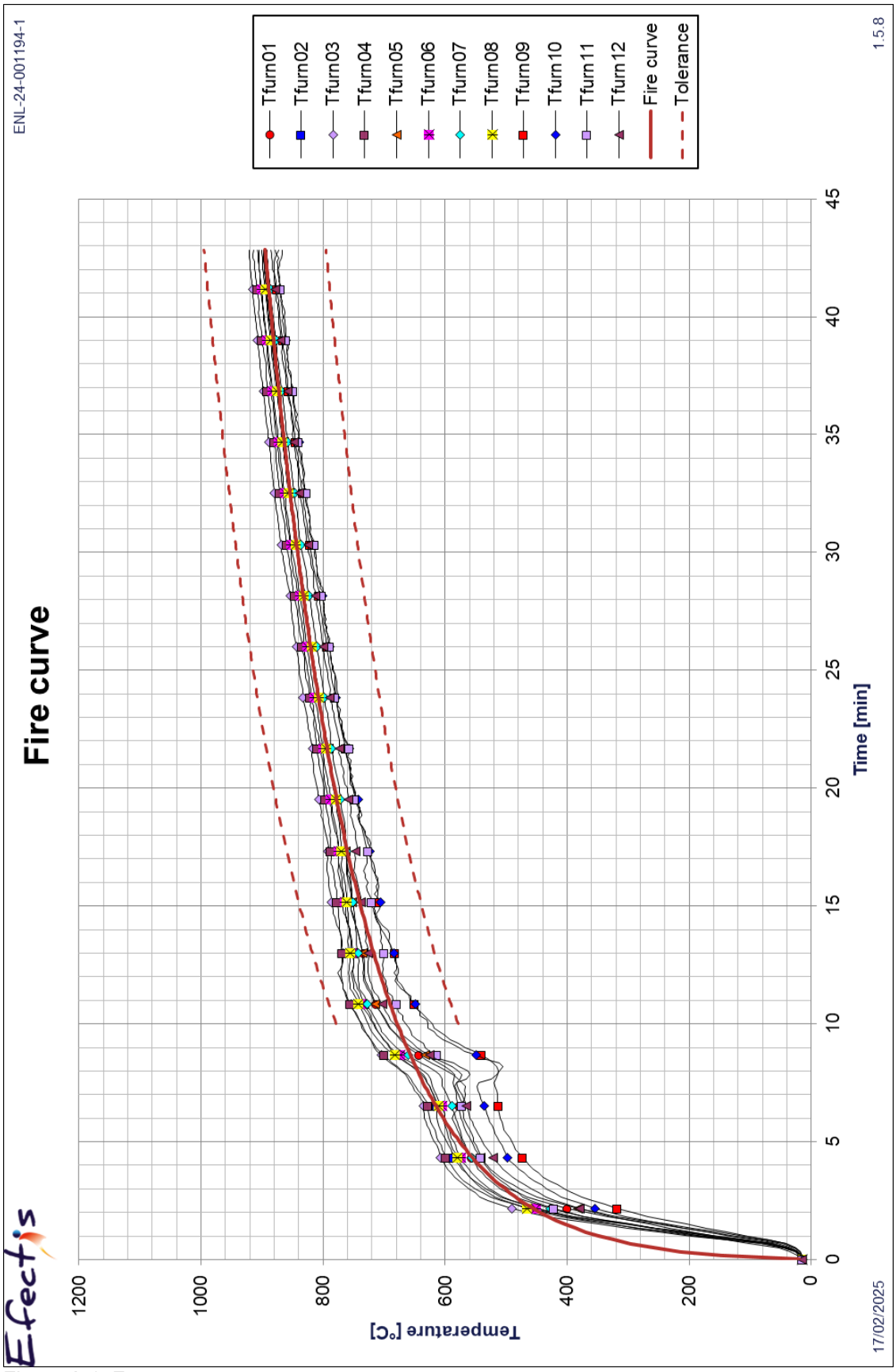


Figure A.1: Furnace temperature

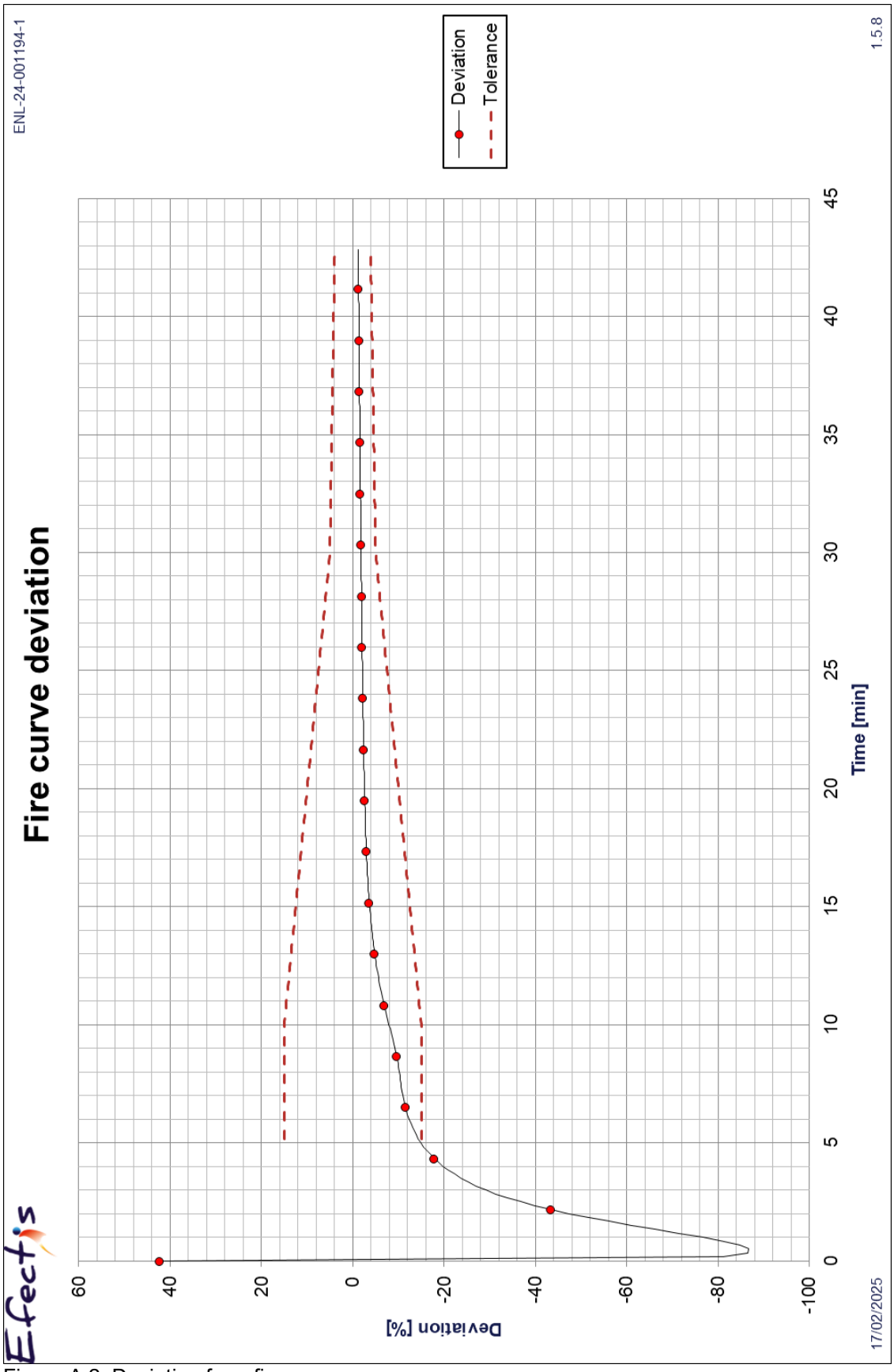


Figure A.2: Deviation from fire curve

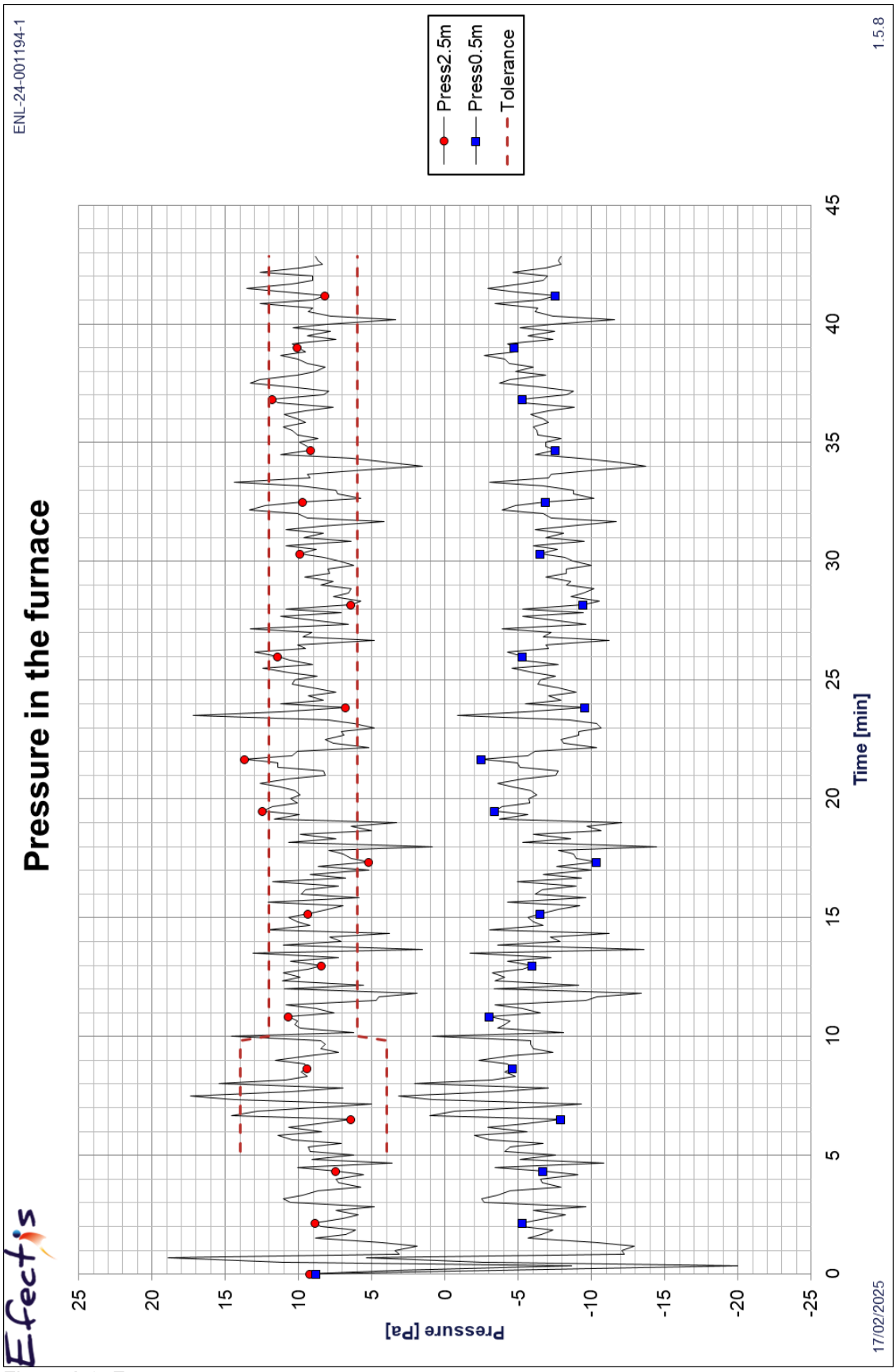


Figure A.3: Furnace pressure
Note: see chapter 6.2.2

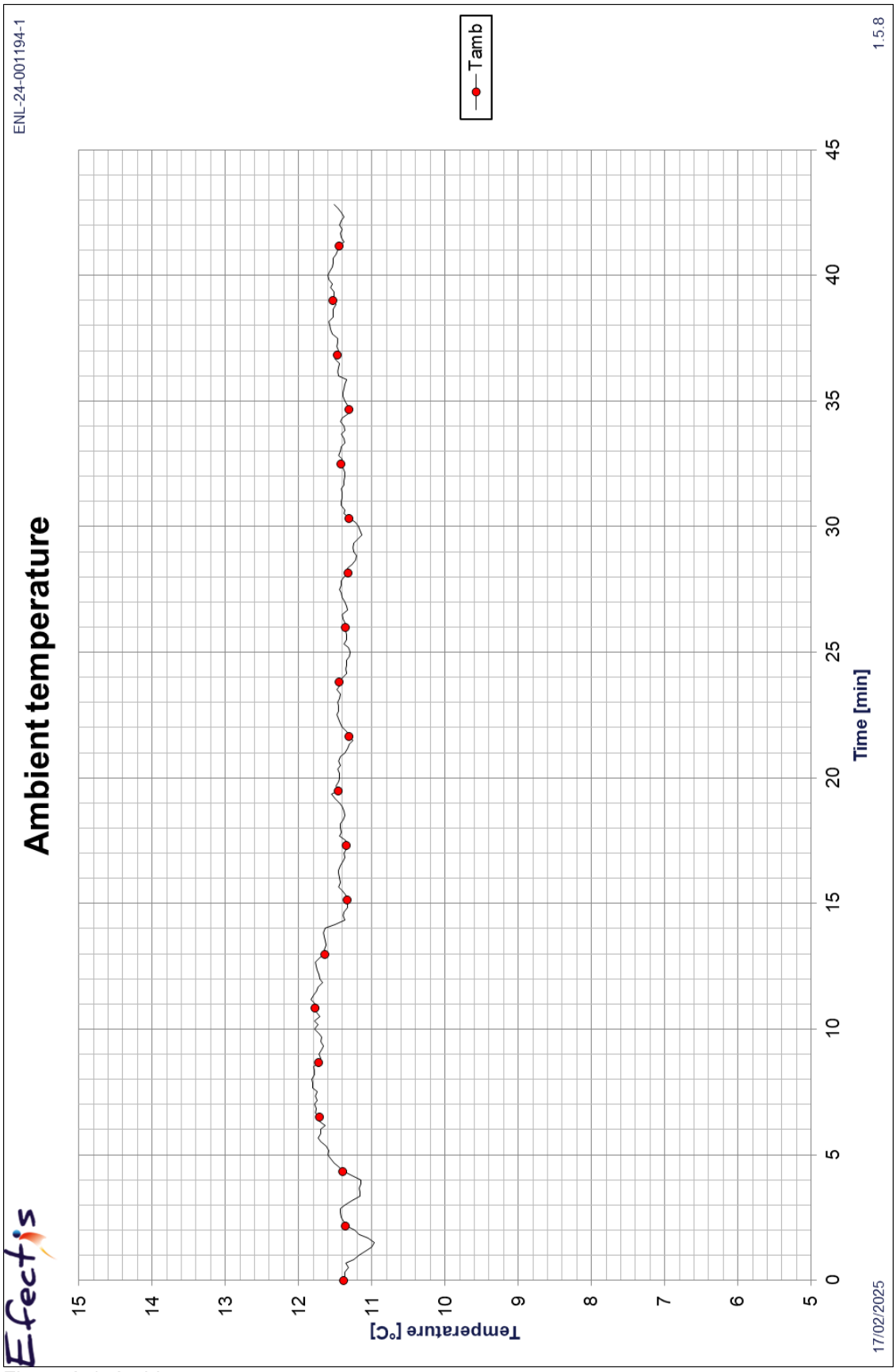


Figure A.4: Ambient temperature

APPENDIX B: MEASUREMENTS OF THE SPECIMENS

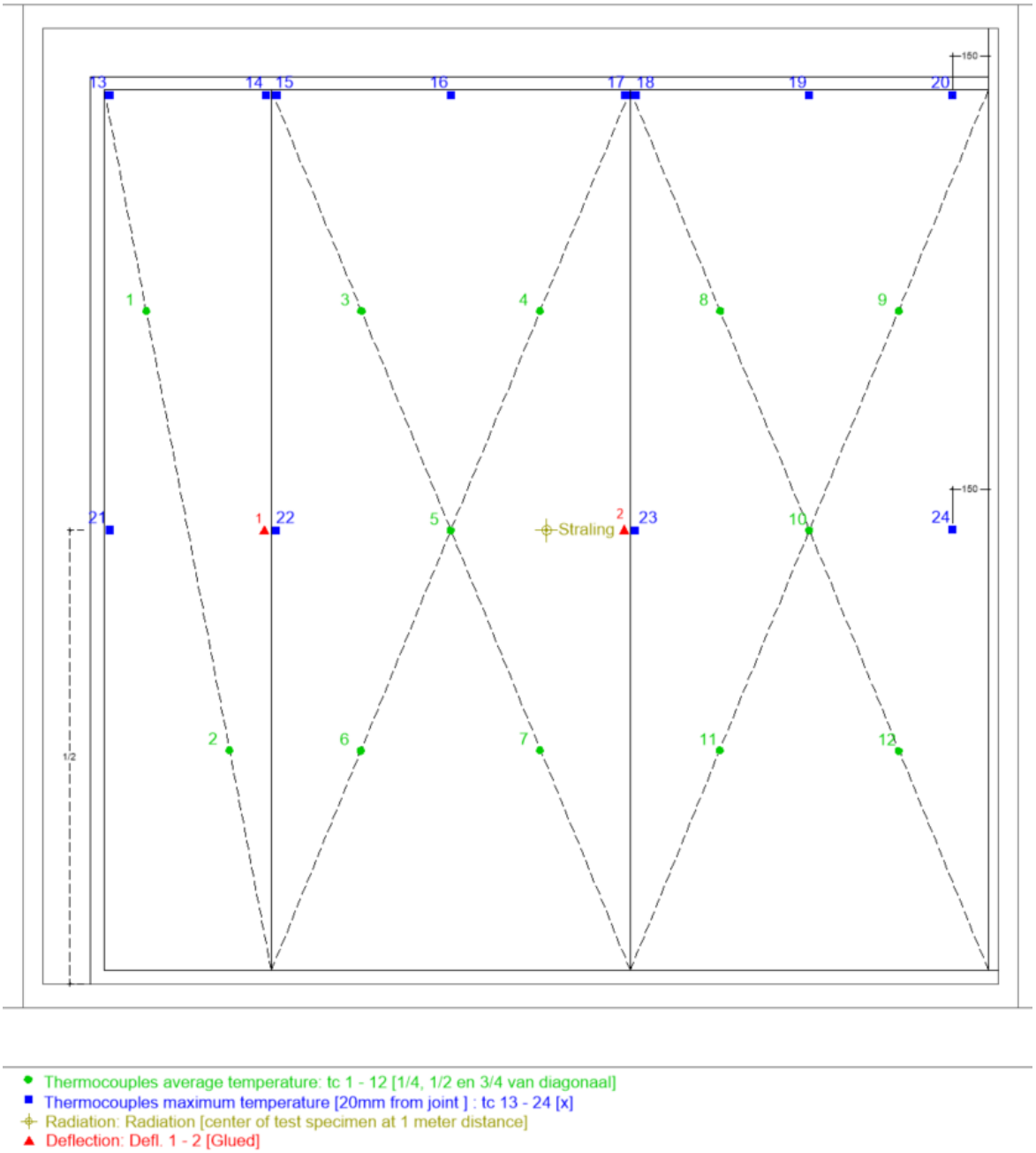


Figure B.1: Thermocouple drawing

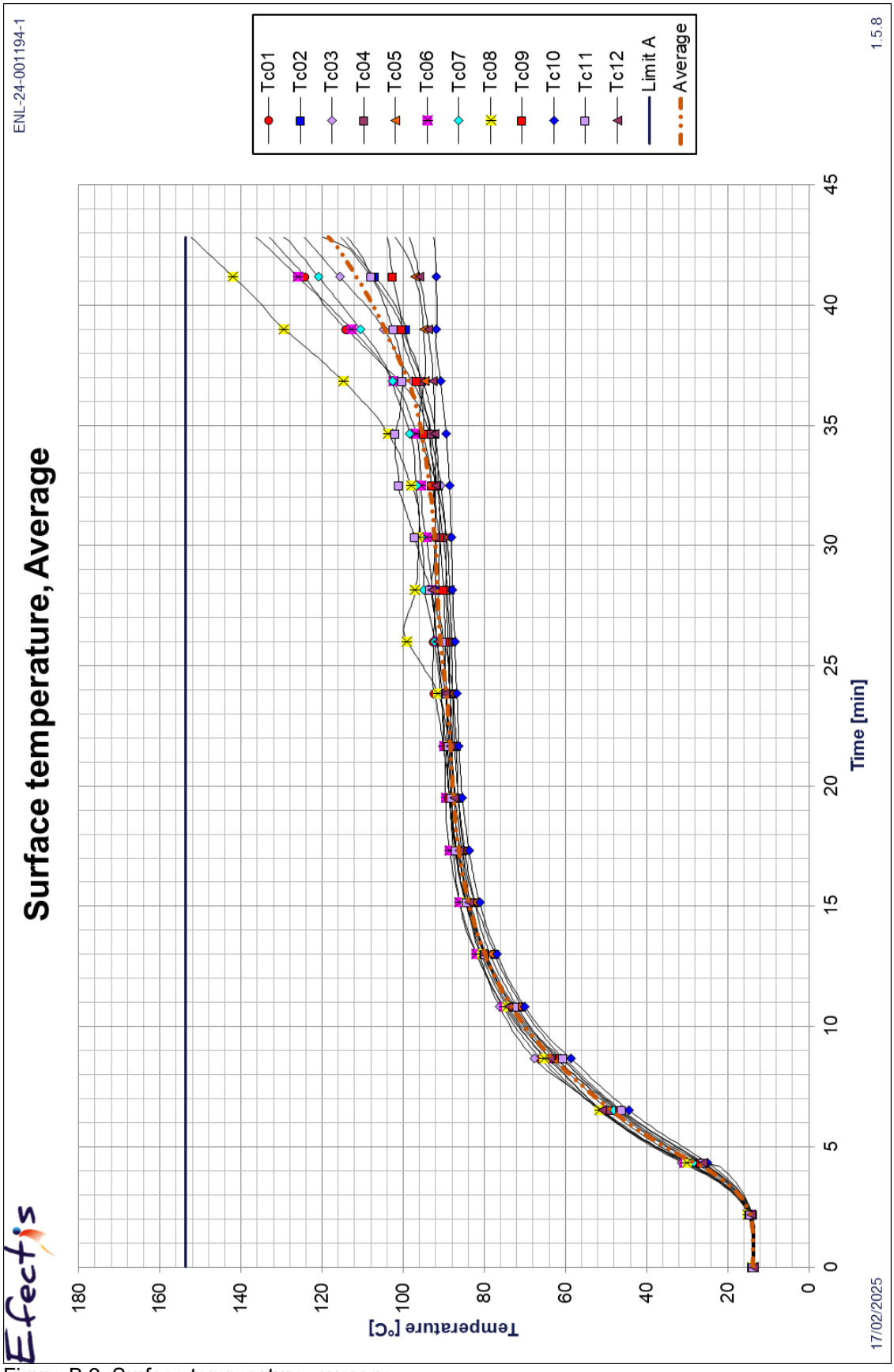


Figure B.2: Surface temperature, average

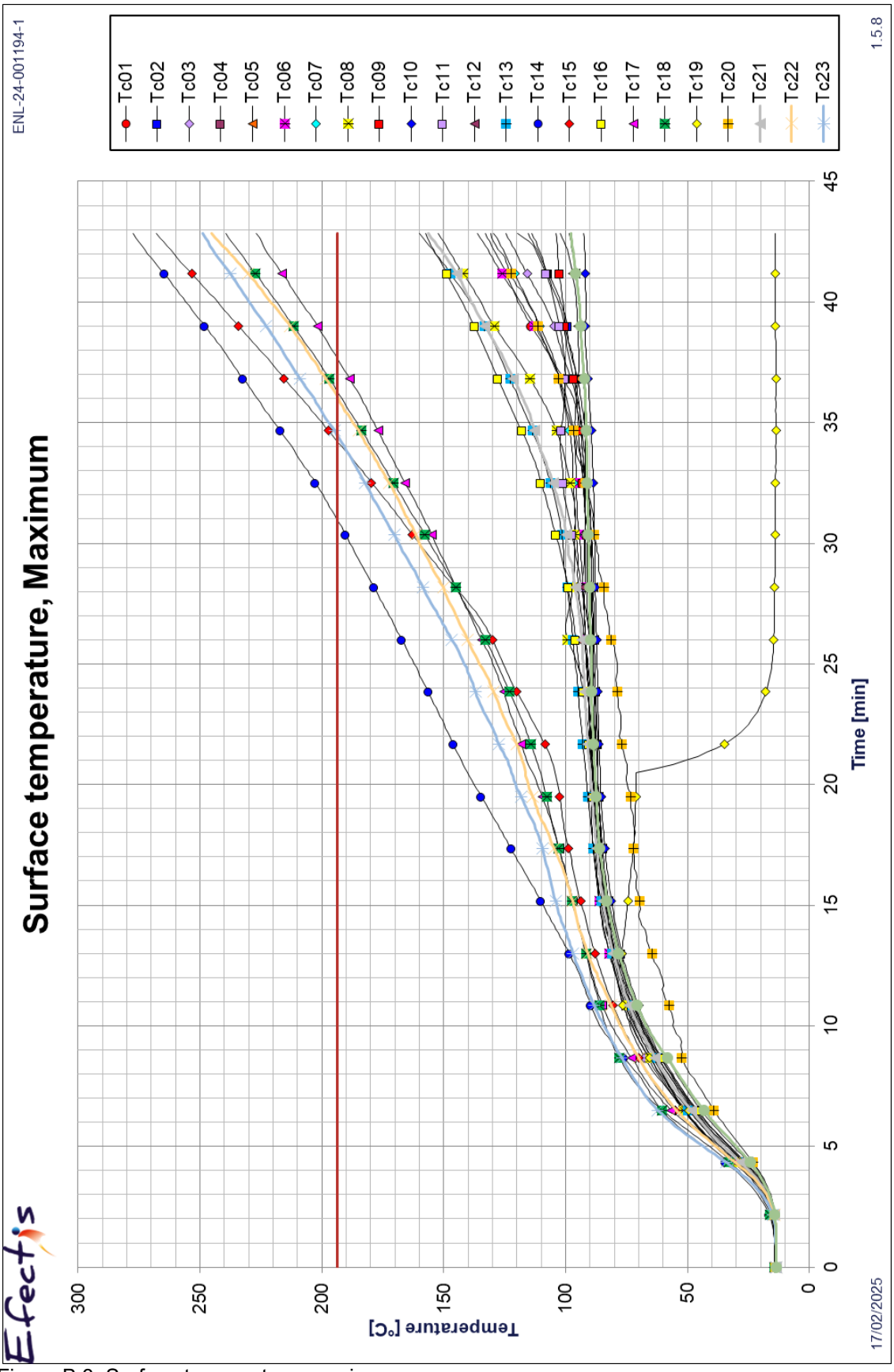


Figure B.3: Surface temperature, maximum

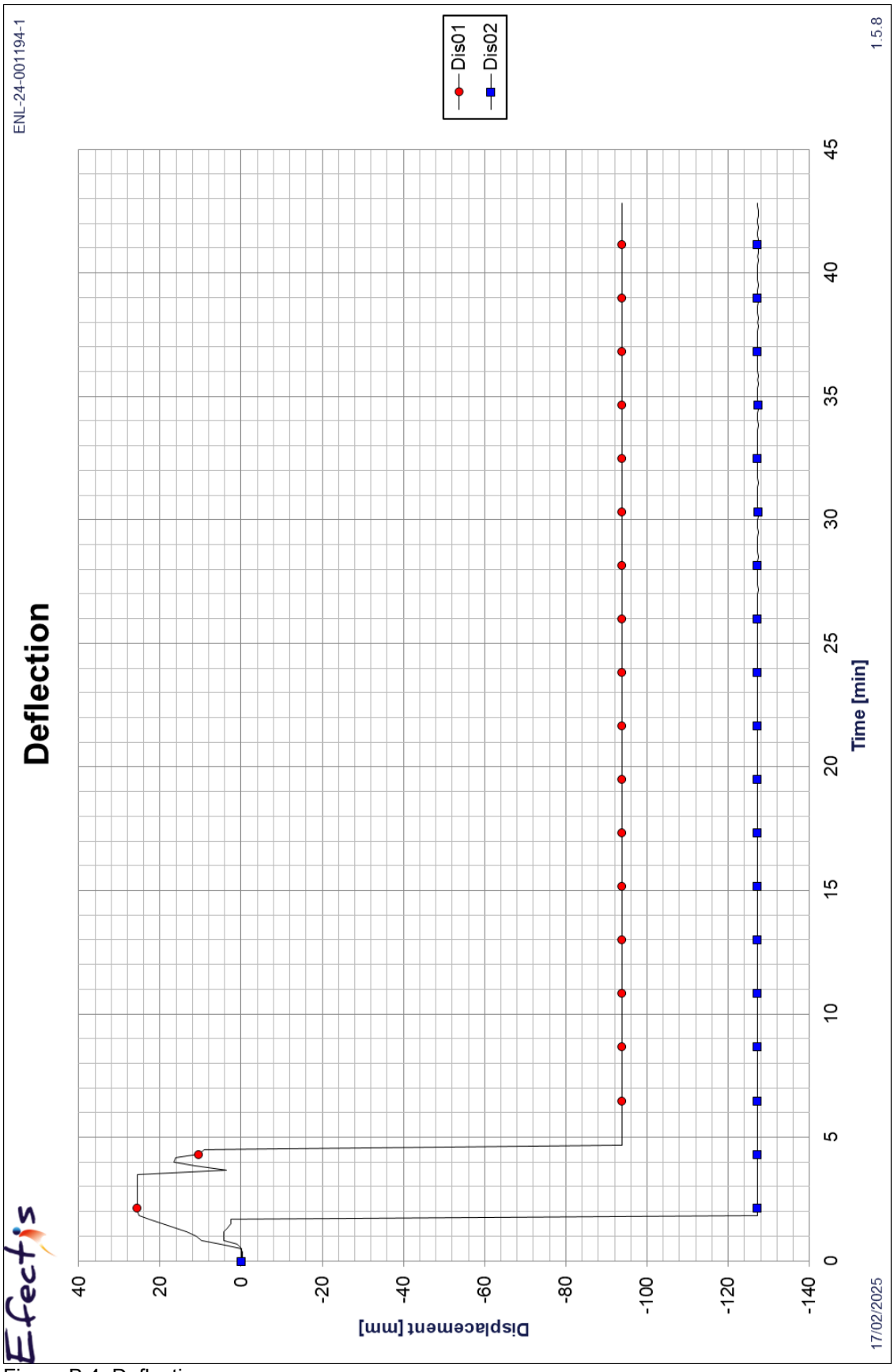


Figure B.4: Deflection
Note: see chapter 6.2.3

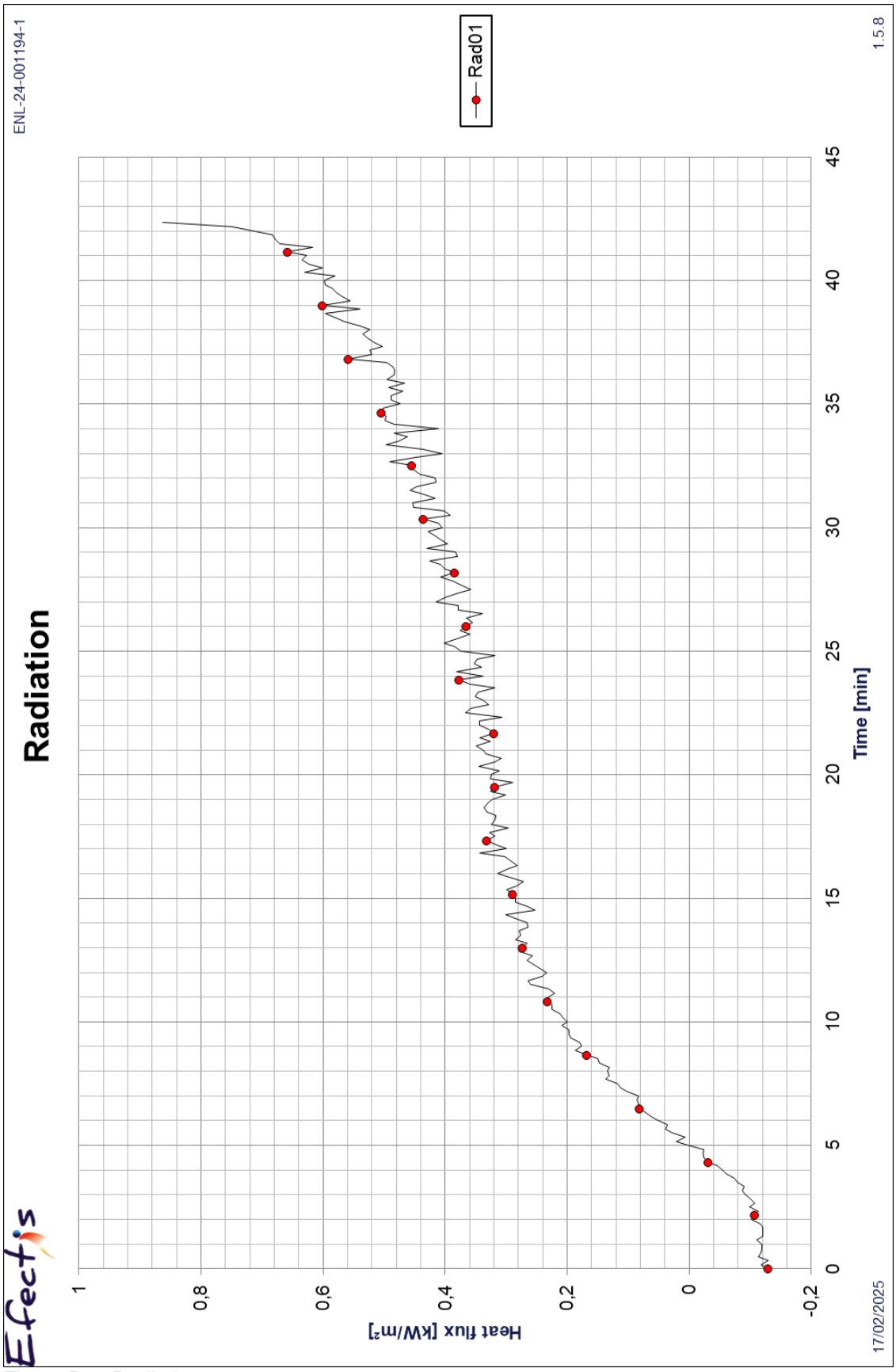


Figure B.5: Radiation

APPENDIX C: PHOTOGRAPHS

Photo C. 1: Timber profile

Photo C. 2: Timber profile with glazing bead and ceramic wool strip

Photo C. 3: Installing the glass with ceramic wool (temporary construction during installation)

Photo C. 4: Installing the glazing beads

Photo C. 5: After applying sealant

Photo C. 6: Test specimen at the start of heating

Photo C. 7: Test specimen after 10 minutes of heating

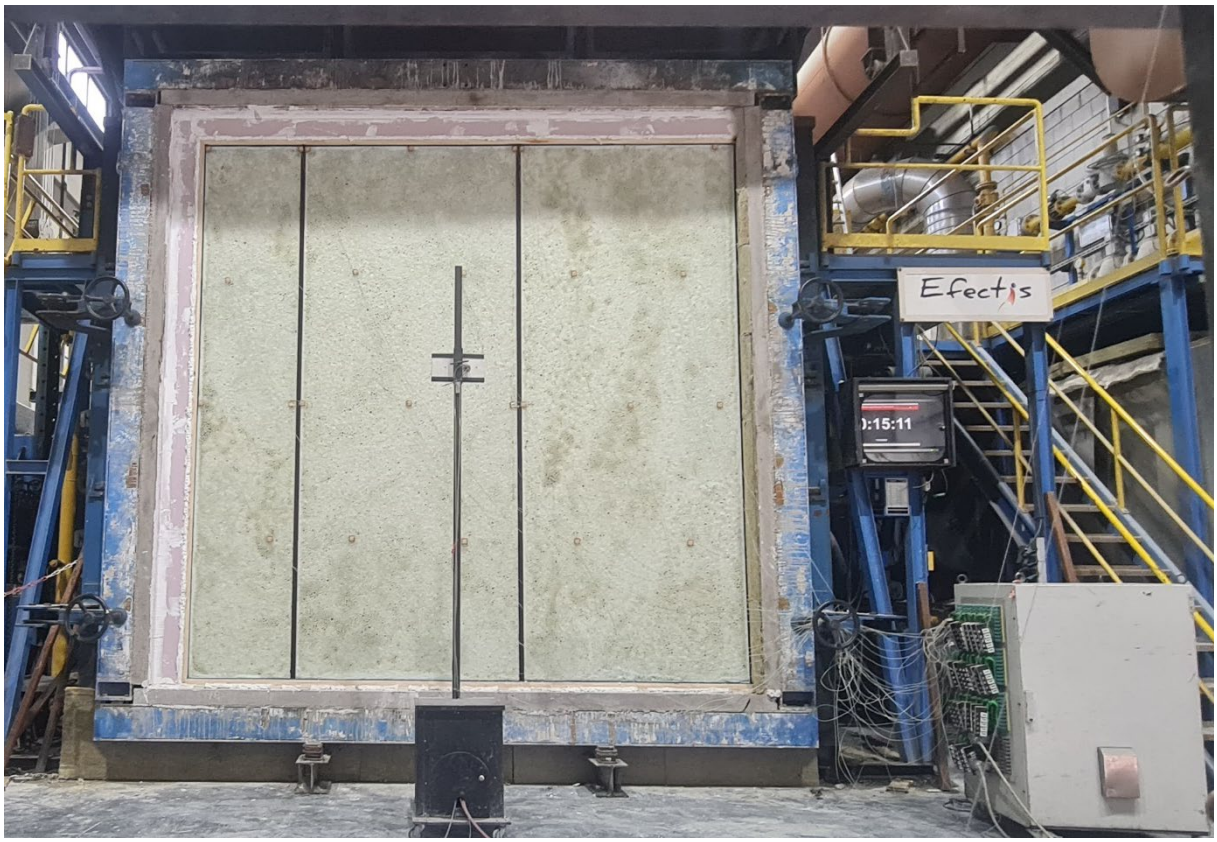


Photo C. 8: Test specimen after 15 minutes of heating

Photo C. 9: Test specimen after 20 minutes of heating

Photo C. 10: Test specimen after 30 minutes of heating

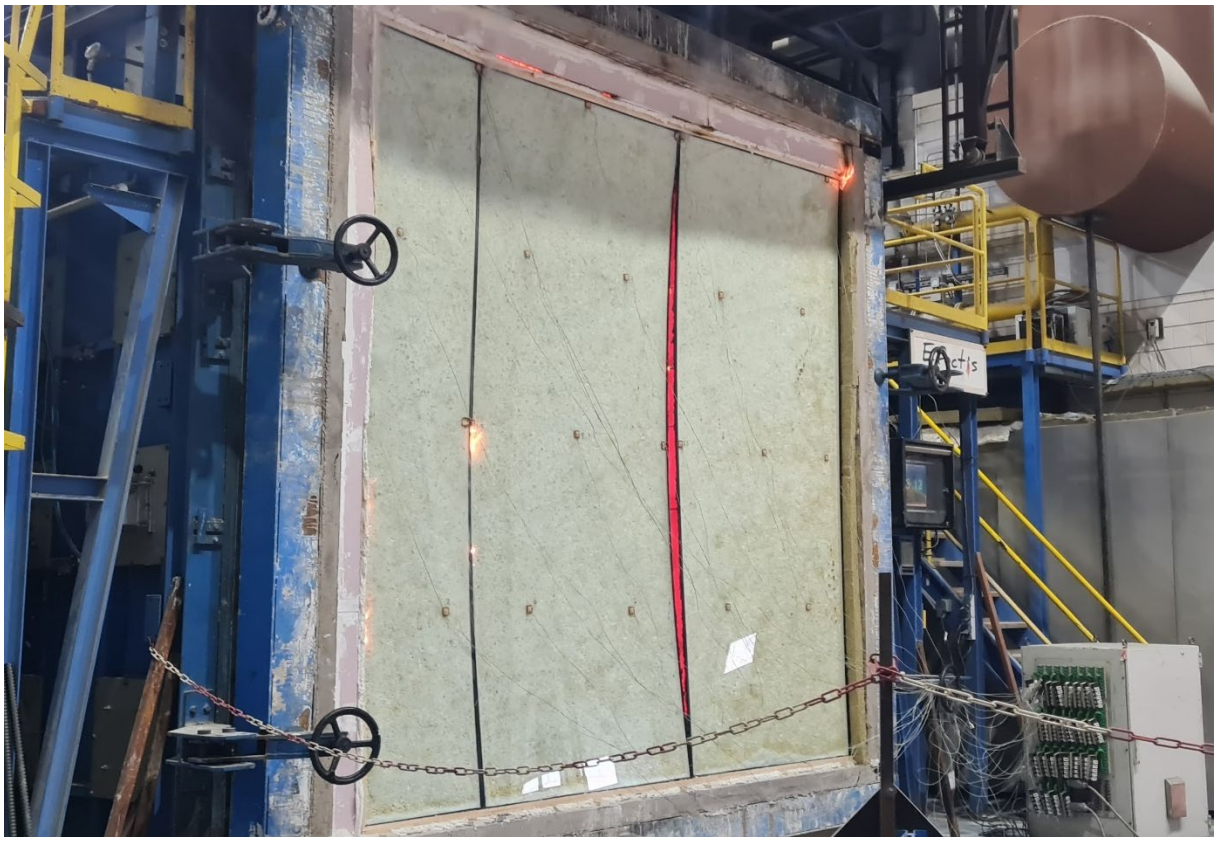


Photo C. 11: Test specimen at the end of the test