

TEST REPORT

No. 112604-001-1-a

CUSTOMER 1	SUSENSIONES ELÁSTICAS DEL NORTE, S.L. (SEÑOR)
ADDRESS	POL. IND. EL GARROTAL, PARCELA 10, MODULOS 4 Y 5 14700 PALMA DEL RIO CORDOBA SPAIN
CUSTOMER 2	SAINT-GOBAIN PLACO IBÉRICA, S.A.
ADDRESS	C/ PRÍNCIPE DE VERGARA 132, 8ª PLANTA 28002 MADRID SPAIN
PURPOSE	FIRE RESISTANCE TEST ACCORDING TO EN 1364-1:2015 FLEXIBLE PARTITION
TESTED SAMPLE (*)	Customer 1 - REF. "3PPF15+M90 LM/600+SE-9600+M90 LM/600+3PPF15" Customer 2 - REF. "3PPF15+M90 LM/600+M90 LM/600+3PPF15"
RECEPTION DATE	15.05.2024
TEST DATE	23.05.2024
ISSUE DATE	20.09.2024
TRANSLATION DATE	09.10.2024

Technical Manager

Eñaut Aguirregabiria



- The results set out in this report refer solely and exclusively to the material tested.

- This report shall not be reproduced, except in full, without the express authorisation of FUNDACIÓN TECNALIA R&I.

(*) Data provided by the customer. TECNALIA accepts no responsibility or liability for the data provided by the customer and this information is not covered by the accreditation.

- In case of a lawsuit, the original spanish version shall be taken as reference.

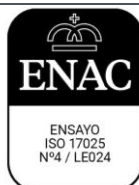


TABLE OF CONTENTS

1. REGULATORY REFERENCES.....	3
2. TEST SAMPLES.....	3
3. TEST PERFORMED.....	8
4. SAMPLE ASSEMBLY	8
5. TEST CONDITIONS	9
6. RESULTS	10
ANNEXES.....	12
ANNEX 1: Sketch of samples tested and layout of measurement equipment. ..	13
ANNEX 2: Graphs.....	20
ANNEX 3: Test photographs.....	28
ANNEX 4: Technical documentation provided by the customer (*).....	52

1. REGULATORY REFERENCES

- [A] *EN 1363-1:2020 "Fire resistance tests – Part 1: General requirements".*
- [B] *EN 1364-1:2015 "Fire resistance tests for non-loadbearing elements. Part 1: Walls".*

2. TEST SAMPLES

Reception Material needed to assemble a flexible partition of (3000 x 3000) mm.

Reference (*) **"3PPF15+M90 LM/600+SE-9600+M90 LM/600+3PPF15"**
"3PPF15+M90 LM/600+M90 LM/600+3PPF15"

Verification of the sample was carried out during its assembly along with the technical documentation issued by the manufacturer, which is available in Annex 4 (*) to this report.

The data of the samples verified by the laboratory are as follows:

Materials used (*)

- Framing:

Designation	Make, model	Material	Cross-section (mm)	Thickness (mm)
[C]	PLACO RAIL 90, Ref.MEH84203000	Galvanised steel	30/90/30	0.55
[M]	PLACO MONTANTE 90 Ref.MEH84502990	Galvanised steel	39/88.5/41	0.6

- Spring system / Shock absorber:

Designation	Make, model	Material	Dimensions (mm)
[A]	SENR SE-9600-TBM2	Shock absorber	Total length: 260 Sheet thickness: 1.5

- Acoustic strip:

Designation	Make, model	Material	Dimensions (mm)
[B1]	Acoustic strip, SENR SE-BEC 10x135	CR140 micro cellular EPDM sheet	Width: 125 Thickness: 10
[B2]	SENR SE-MONT- BICAPA 40	EPDM + cross-linked polyethylene insulation strip	Width: 40 Thickness: 5.5

- Bolts:

Designation	Make, model	Material	Diameter (mm)	Length (mm)
[T1]	SENR SE-TAV-500/11A	Elastic separator	29/36.5	34.5
[T2]	SENR SE-TAV-500/11R	Elastic separator	29/36.5	34.5
[T3]	PLACO TTPC 25 screw Ref.TOH86000025	Self-tapping screw	3.5	25
[T4]	PLACO TTPC 45 screw Ref.TOH86000045	Self-tapping screw	3.5	45
[T5]	PLACO TTPC 70 Screw Ref.TOH86000070	Self-tapping screw	4.2	70
[T6]	FISHER DUOPOWER 6x30	Plastic plug	6	30
[T7]	TRPF 13 Ref.TOH86130000	Self-tapping sheet metal screw	-	13

- Board:

Designation	Make, model	Material	Weight (kg/m ²)	Dimensions (mm)
[P]	PLACO PPF BA15 Ref.P03593000	Fire-break laminated gypsum board	12.5	1200x3000x15

- Insulation:

Designation	Make, model	Material	Dimensions (mm)
[LM]	ISOVER ARENA APTA Ref.KD10991	Mineral wool	1350x600 Thickness: 90

- Joint filler:

Designation	Make, model	Material	Characteristics
[Pa]	PLACO PR1	Powdered gypsum jointing paste + additives	25 kg bag

- Joint tape for joint treatment:

Designation	Make, model	Material	Dimensions (mm)
[Ci]	PLACO GR RLX	Microperforated Paper Joint Tape	Width: 50

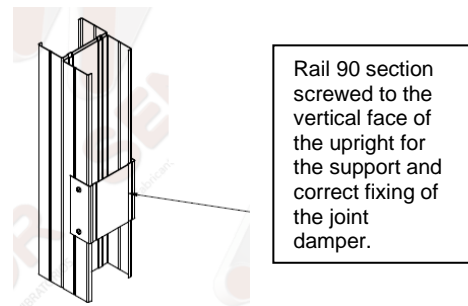
Definition of sample

Partition made of a double metal structure of galvanised steel sheet consisting of standards [M] and rails [C], placed 245mm from the centres of the rails. The vertical standards are reinforced in an "H" shape by joining the rear of two standards with screws [T7] every 400 mm.

Two EPDM sheets [B1] are fixed around the entire perimeter of the sample (except for the free lateral edge) with a gap of 155 mm between the two sheets. The lower rails [C] on the EPDM sheets [B1] are fixed to the floor with plastic plugs [T6] and self-tapping screws [T5] every 700 mm. The elastic spacer (blue) [T1] is incorporated in these fixings.

The upper rails [C] on the EPDM sheets [B1] are fastened to the ceiling with plastic plugs [T6] and self-tapping screws [T5] every 600 mm. The elastic spacer (red) [T1] is incorporated in these fixings. The standard of the fixed edge [M] on the EPDM sheets [B1] is fastened to the side frame edge with plastic plugs [T6] and self-tapping screws [T5] every 600 mm. The elastic spacer (blue) [T1] is incorporated in these fixings.

The H-shaped standards are then installed, connected together with sheet metal screws [T7] at a distance of 600 mm. Small pieces of rail are fixed to these standards at the height of the shock absorbers that connect the double structure. (See detail 1). Shock absorbers [A] are installed by means of [T7] fixings, 6 shock absorbers in total distributed at 1500mm and 2500mm from the floor on two standards and 2000mm from the floor on another two standards.



(Detail 1).

Finally, an insulation strip [B2] is placed on the two front sides of the profiles that will be in contact with the gypsum boards.

The inside of the double profile is made of mineral wool insulation [LM].

Three layers of 15mm gypsum board [P] are installed on each side of the double profile, forming a partition wall with a final width of 425mm.

The first layer is fixed to the standards using self-tapping screws [T3] with a distance of 500 mm between screws, on the sides of each board and in the centre, coinciding with the metal structure. The second layer is fixed to the standards using self-tapping screws [T4] with a distance of 500 mm between screws on the sides of each board and in the centre, coinciding with the metal structure. Both the first and second layers end perimetrically against the EPDM sheet [B1]. The assembly of the second board is identical to the first one, except that in this case longer screws [T4] are used and screws [B1] are used in the third one, but this final board is not supported by the EPDM sheet [B1]. The third layer is fixed to the standards using self-tapping screws [T5] with a distance of 250 mm between screws on the sides of each board and in the centre, coinciding with the metal structure. All layers of gypsum boards are installed with the joints butting up against each other on each side, and in turn with the joints butting up against the opposite side.

On each layer, all of the joints between boards are fixed with filler [Pa1] and joint tape [Ci]. The screw heads of all boards are filled [Pa] and the perimeter of the sample is coated with the same paste [Pa].

The end joints shall be made according to the sketch. A horizontal joint is made 500 mm from the upper edge of the sample.

The sample is tested with dimensions of (3000 x 3000) mm and a free moving edge.

The main descriptive characteristics were provided by the applicant. This information is included in Annex 4 (*) of this test report.

The drawings prepared by the laboratory after verifying the sample in the testing position are included in Annex 1.

3. TEST PERFORMED

Test type	[A] and [B].
Type of fire exposure	Symmetrical construction exposed on one of the sides.
Test date	23.05.2024
Test location	Azpeitia facilities.

4. SAMPLE ASSEMBLY

Assembly	<p>Sample assembly was entirely performed by the customer.</p> <p>No additions were made to the sample subsequent to the laboratory review.</p> <p>In accordance with [B] 6.3.4, one of the vertical sides of the assembly was not fixed, leaving a gap of 25 mm between the sample side and the test frame, which was filled with a flexible fireproof material.</p> <p>For further information, see full construction details in Annex 1.</p>
Assembly date	22.05.2024

5. TEST CONDITIONS

Sample conditioning

Average temperature	18 (°C)
Average relative humidity	68 (% RH)
Conditioning period	8 days (d)
Moisture content of the boards	0.61 (%)
Board density	859 kg/m ³
Density of the mineral wool	20.8 kg/m ³

Furnace temperature

According to the thermal programme in [A].

Pressure inside the furnace

During the test, pressure of 20 Pa was maintained on the upper part of the sample.

As shown in Figure 5 in Annex 1, pressure shall be measured in the sensor as follows:

$$P_{sensor} = P_{test} + (8.5 \times d_{sensor})$$

$$P_{sensor} = 20 \text{ Pa} + (8.5 \text{ Pa/m} \times -0.750 \text{ m})$$

$$P_{sensor} \approx 13 \text{ Pa}$$

where:

P_{sensor} : Pressure in the furnace sensor.

P_{test} : Pressure in the upper part of the sample.

d_{sensor} : Distance between the horizontal parallels, secant to the sensor and P_{test} .

Environmental conditions prior to the test

Room temperature	23 (°C)
Room relative humidity	61 (% RH).

6. RESULTS

Duration of the test 222 minutes

Reason for stopping the test Integrity failure.

Observations during the test

Minute	Observations
0	The test starts. Start time (10.33am) and initial temperature (16.0 °C).
30	The test proceeds without incident.
45	Slight deflection appearing towards the inside of the furnace.
60	The test proceeds without incident.
76	Pieces of the first board fall towards the inside of the furnace.
90	The test proceeds without incident.
107	Boards continue to fall towards the inside of the furnace.
120	The test proceeds without incident.
135	The sample starts to rapidly deform
138	Inside the furnace, the three layers of board are lying in the central area of the sample.
150	No incidences.
170	The sample keeps deforming towards the inside of the furnace.
173	Marks start to appear on the heads of the screws.
180	The test proceeds without incident.
195	The sample continues to deform.
210	The vertical joints start to crack.
222	One of the vertical joints opens completely, enabling the Ø 6 gauge to pass through up to 150mm. Integrity failure.
222	The test is stopped.

Test results

Integrity (E)		222 min
Performance criterion		
Cotton pad	Flaming or glowing of the cotton pad.	222 min ⁽¹⁾
Gauge Ø 6 mm	Openings in the sample which allow the gauge to move more than 150 mm along the opening.	222 min
Gauge Ø 25 mm	Openings in the sample allowing the gauge to pass through.	222 min ⁽¹⁾
Sustained flaming > 10 s	Appearance of sustained flaming on the unexposed side of the sample for more than 10 s.	222 min ⁽¹⁾
Insulation (I)		222 min
Performance criterion		
Maximum temperature	Not exceeding the initial temperature of each thermocouple by more than 180 °C.	222 min ⁽¹⁾
Average temperature	Initial average temperature of thermocouples TR1 to TR5 not to be exceeded by 140 °C.	222 min ⁽¹⁾

⁽¹⁾: The measurement is stopped if a gap of more than Ø 6 mm and 150 mm occurs.

NOTE: Due to the nature of the fire performance tests and the subsequent difficulty in quantifying the uncertainty of the fire resistance measurements, it is impossible to determine any degree of accuracy in the results. However, all the devices used in the performance of this test comply with the measuring accuracy specified in [A].

NOTE: This test report details the construction method, test conditions and the results obtained when a specific construction element as the one described here has been tested following the procedure described in [A]. Any significant deviation regarding the size, construction details, loads, stress, sample limits or its ends, excluding those included in the scope of direct application of the test results specified in the relevant sampling method, shall not be covered by any means by this test report.

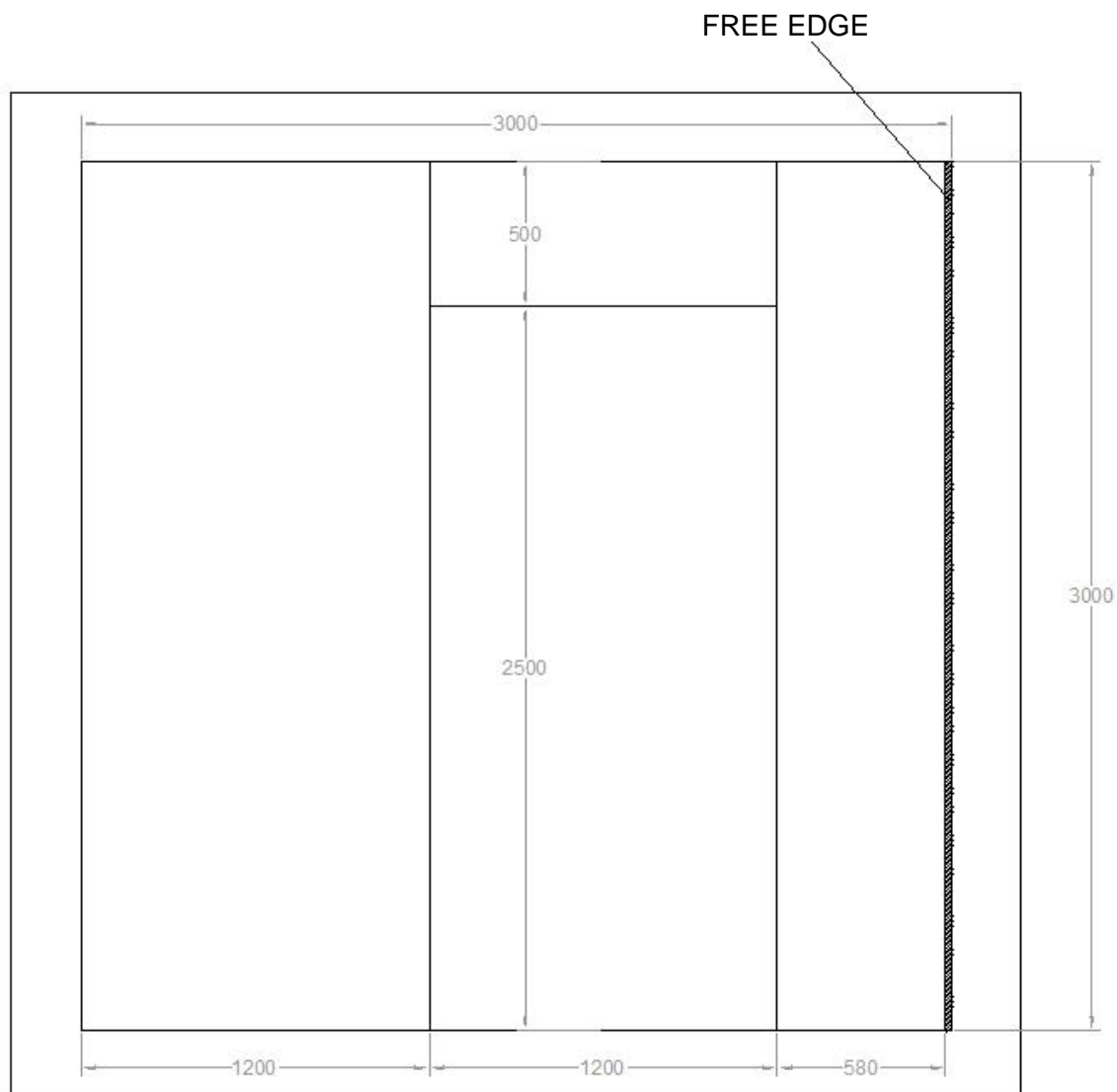
ANNEXES

- ANNEX 1:** Sketch of samples tested and layout of measurement equipment.
- ANNEX 2:** Graphs.
- ANNEX 3:** Test photographs.
- ANNEX 4:** Technical documentation provided by the customer (*).

ANNEX 1: Sketch of samples tested and layout of measurement equipment.

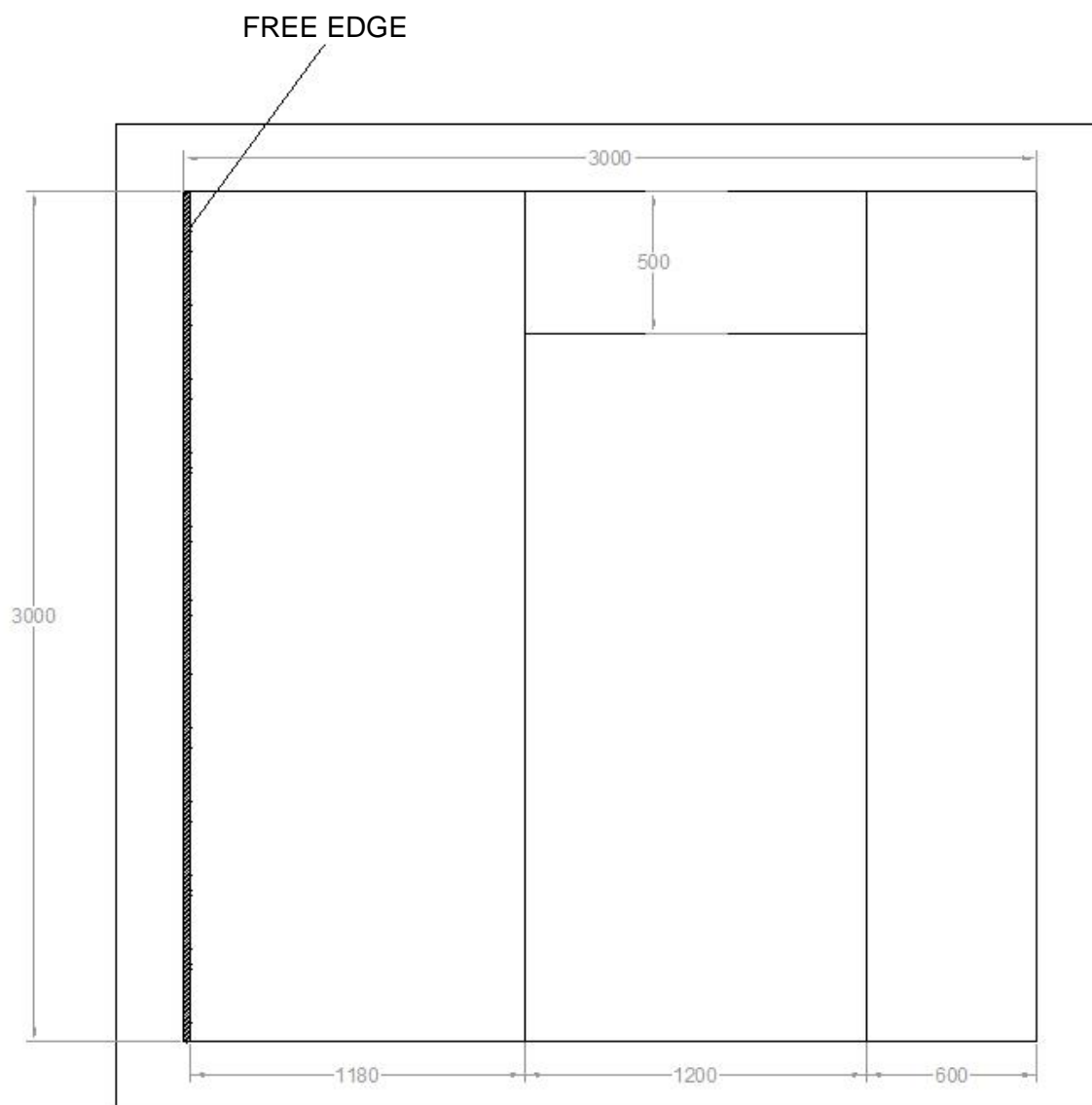
Figure 1	Denomination and levels of the tested sample (unexposed side).
Figure 2	Denomination and levels of the tested sample (exposed side).
Figure 3	Denomination and levels of the tested sample (horizontal cut).
Figure 4	Denomination and levels of the tested sample (section detail).
Figure 5	Denomination and levels of the tested sample (profiles).
Figure 6	Layout of the measurement equipment in the sample, thermocouples and strain gauge.
Figure 7	Location of the measuring equipment in the furnace.

Figure 1 - Denomination and levels of the tested sample (unexposed side).



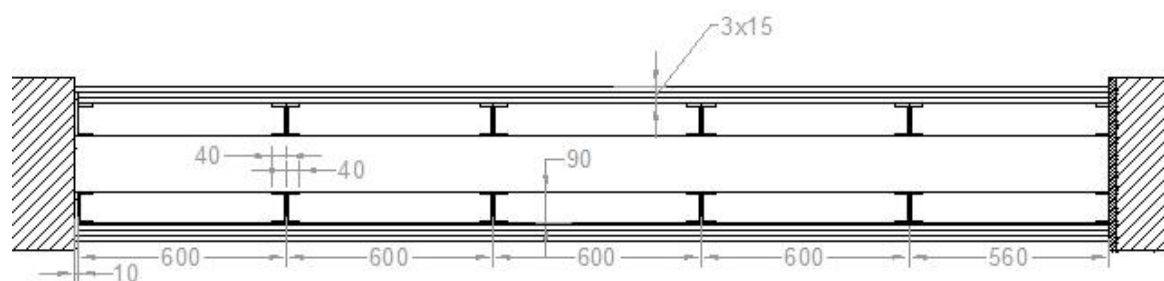
Level (mm).

Figure 2 - Denomination and levels of the tested sample (exposed side).



Level (mm).

Figure 3 - Denomination and levels of the tested sample (horizontal cut)



Level (mm).

Figure 4 - Denomination and levels of the tested sample (section detail).

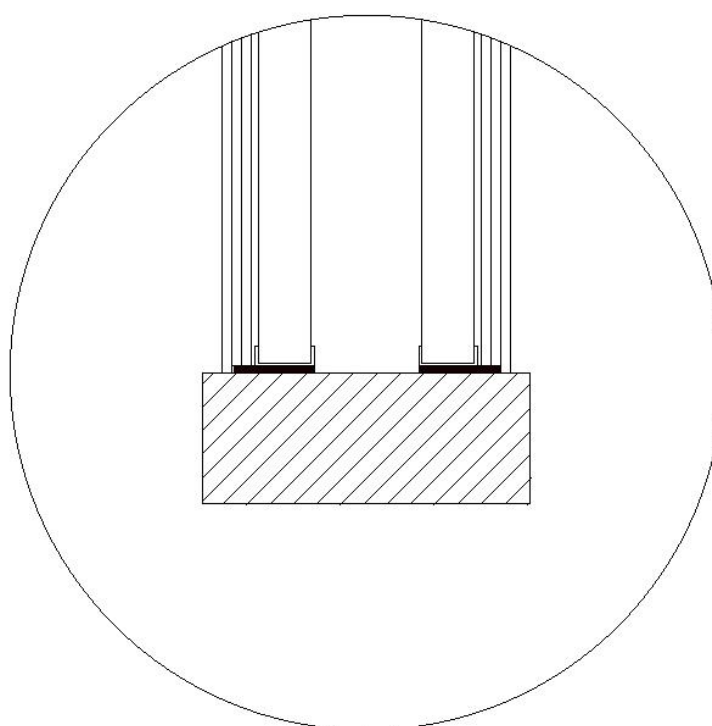
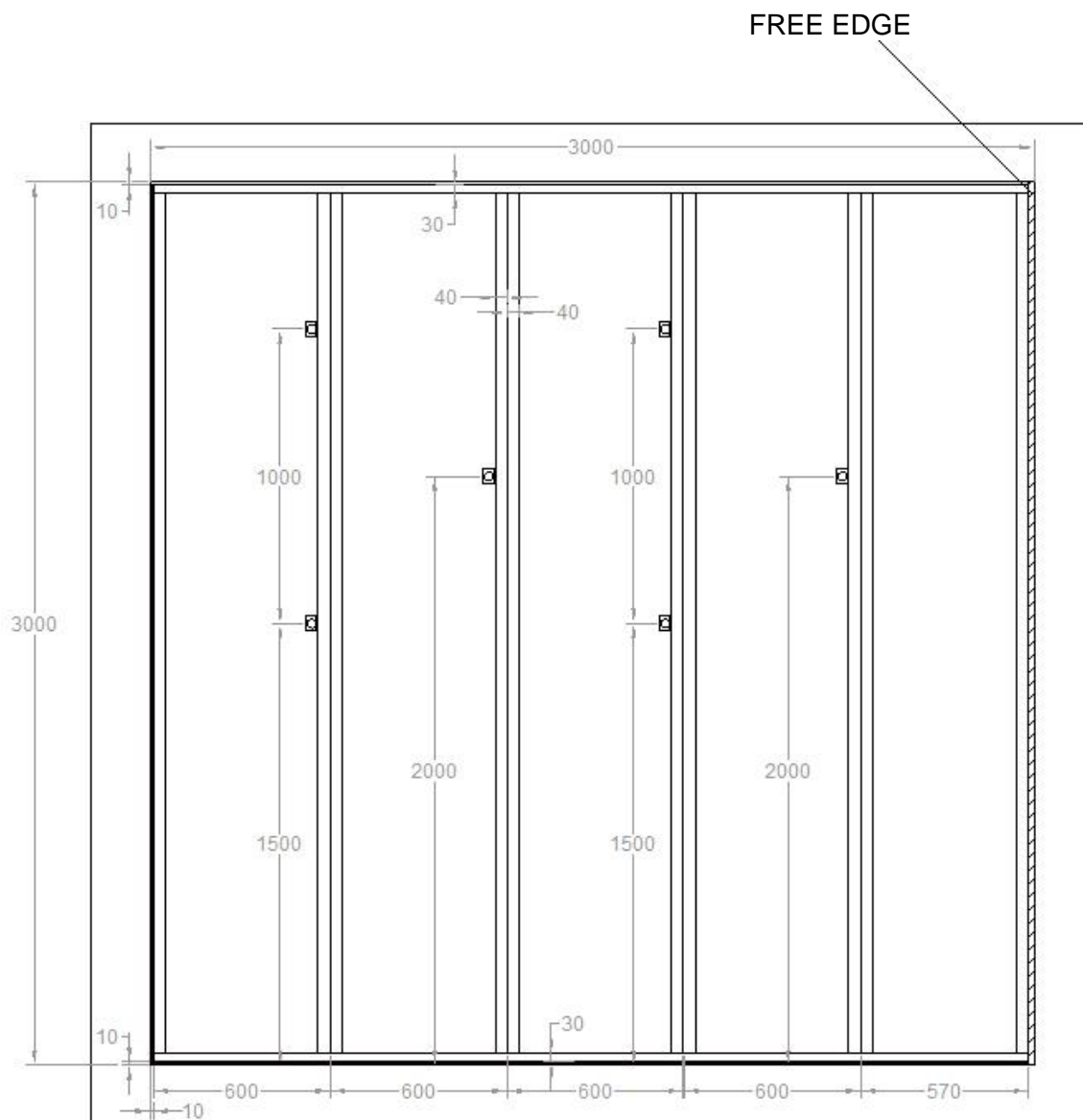
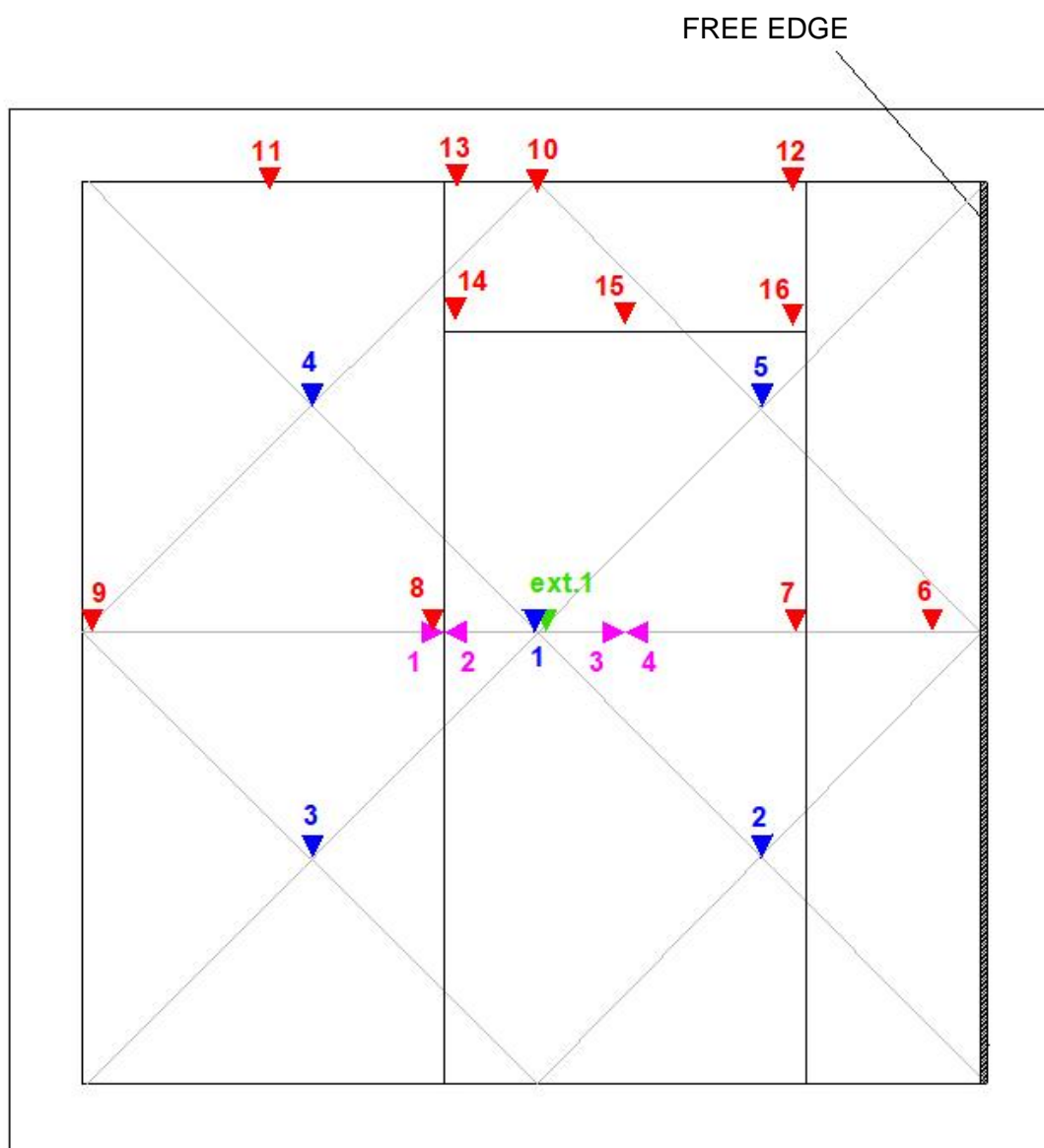


Figure 5 - Denomination and levels of the tested sample (profiles).



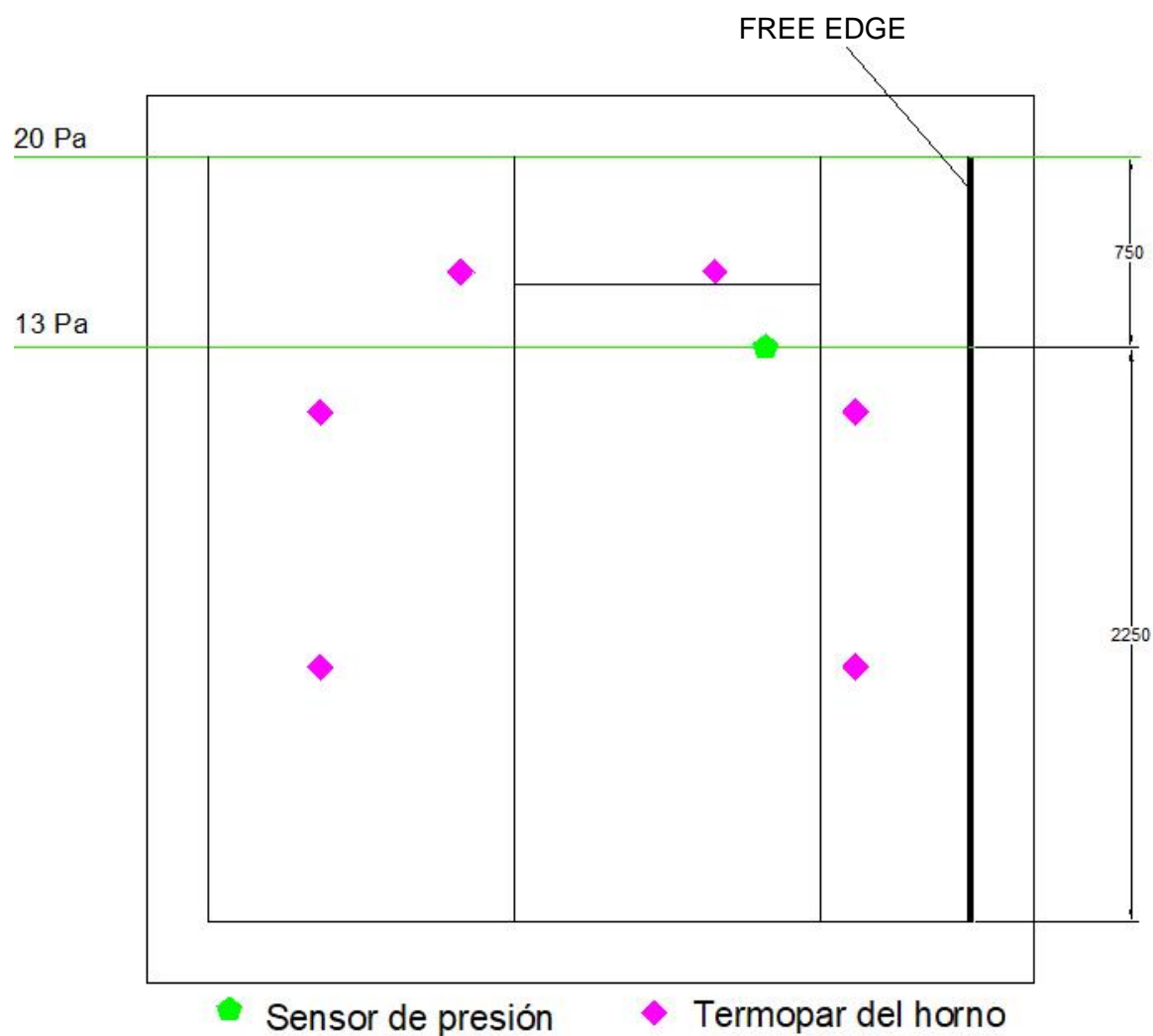
Level (mm).

Figure 6 - Layout of the measurement equipment in the sample, thermocouples and strain gauge.



Blue: average and maximum temperature measurement thermocouples.
Red: maximum temperature measurement thermocouples.
Green: measurement of the deformation.
Purple: measurement thermocouples for EXAP.

Figure 7 - Location of the measuring equipment in the furnace.



Level (mm).

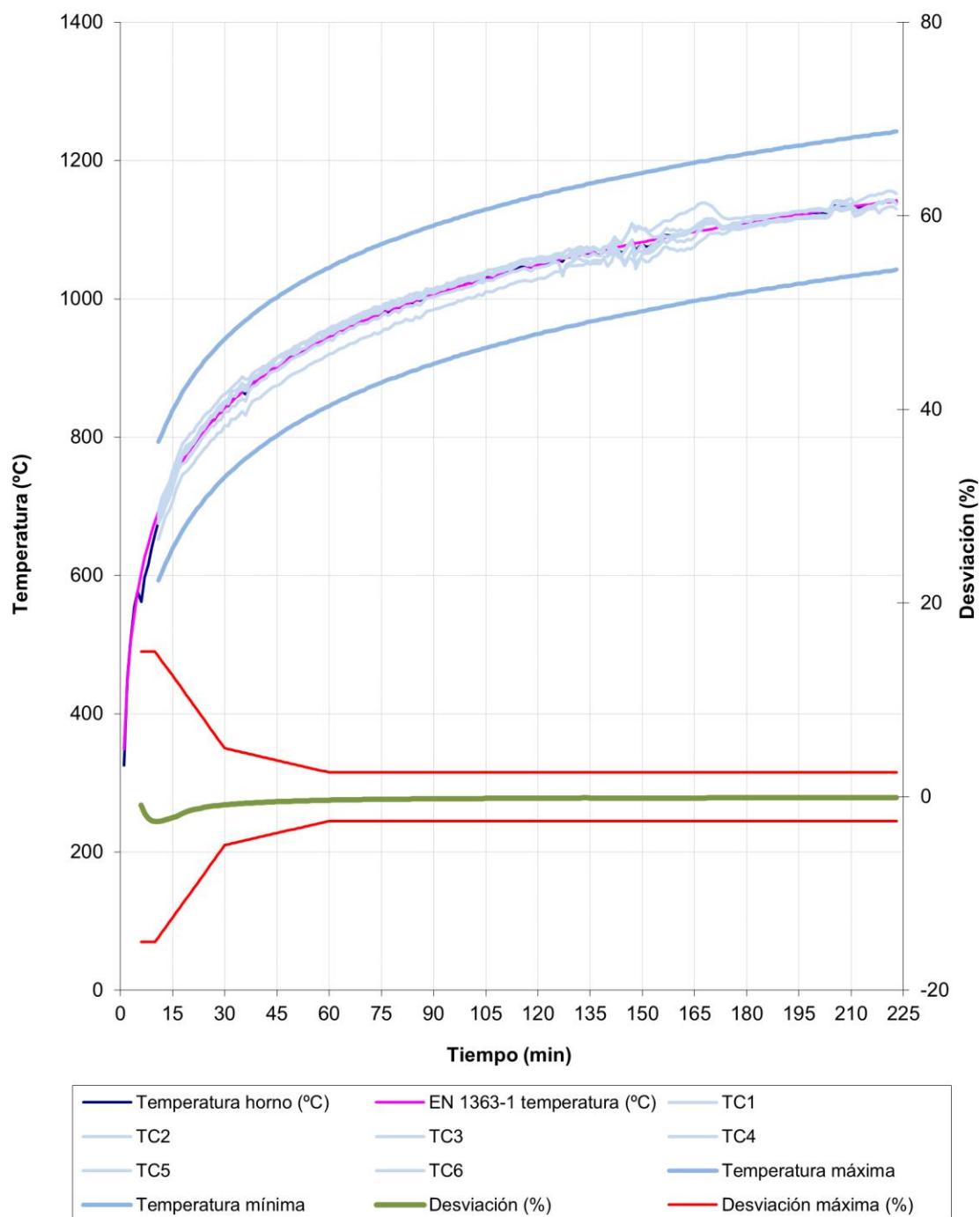


ANNEX 2: Graphs.

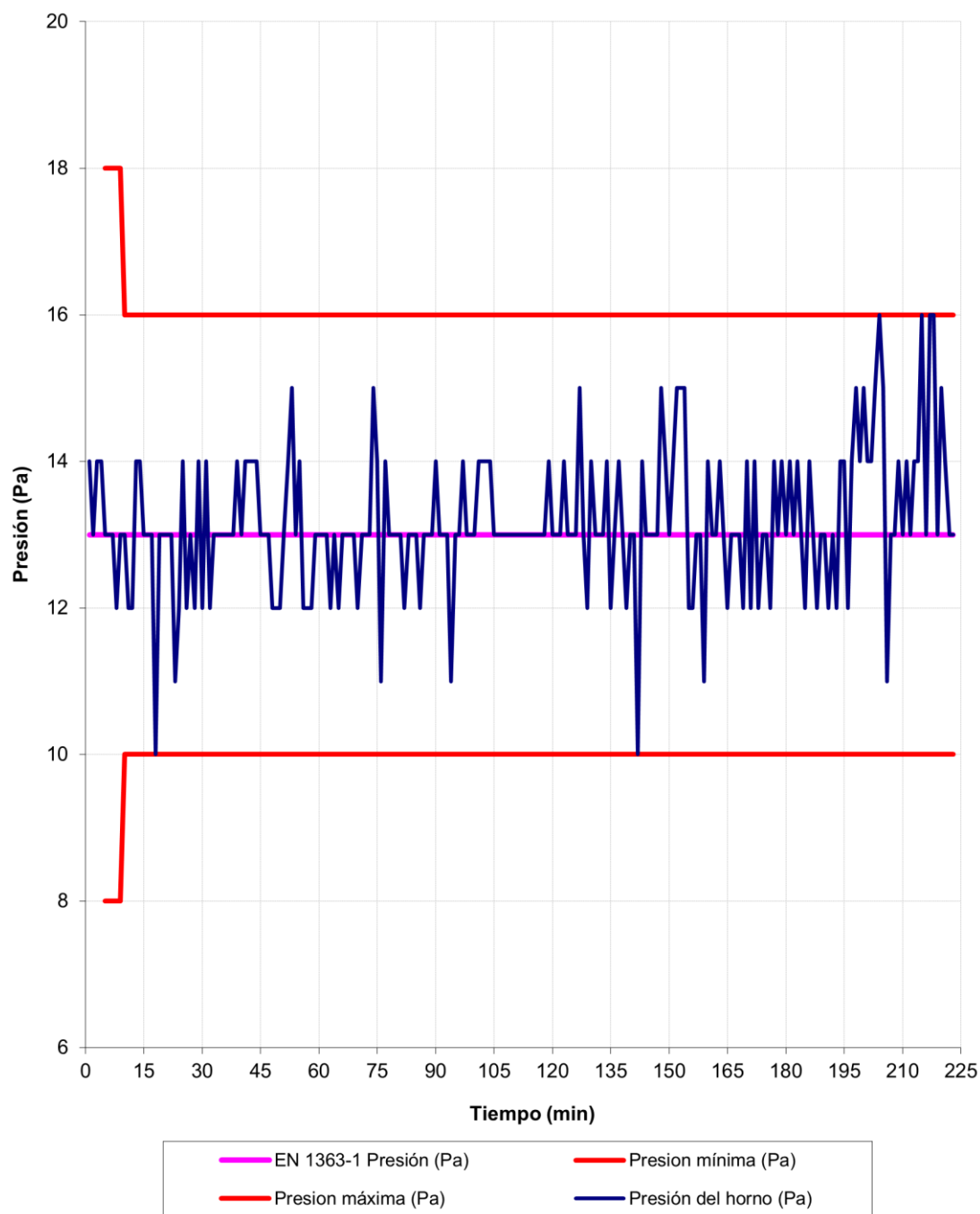
Graph 1	Furnace temperature.
Graph 2	Pressure within the furnace.
Graph 3	Evolution of ambient temperature.
Graph 4	Average sample temperature.
Graph 5	Maximum sample temperatures.
Graph 6	Maximum EXAP temperatures.
Graph 7	Maximum sample deflection.



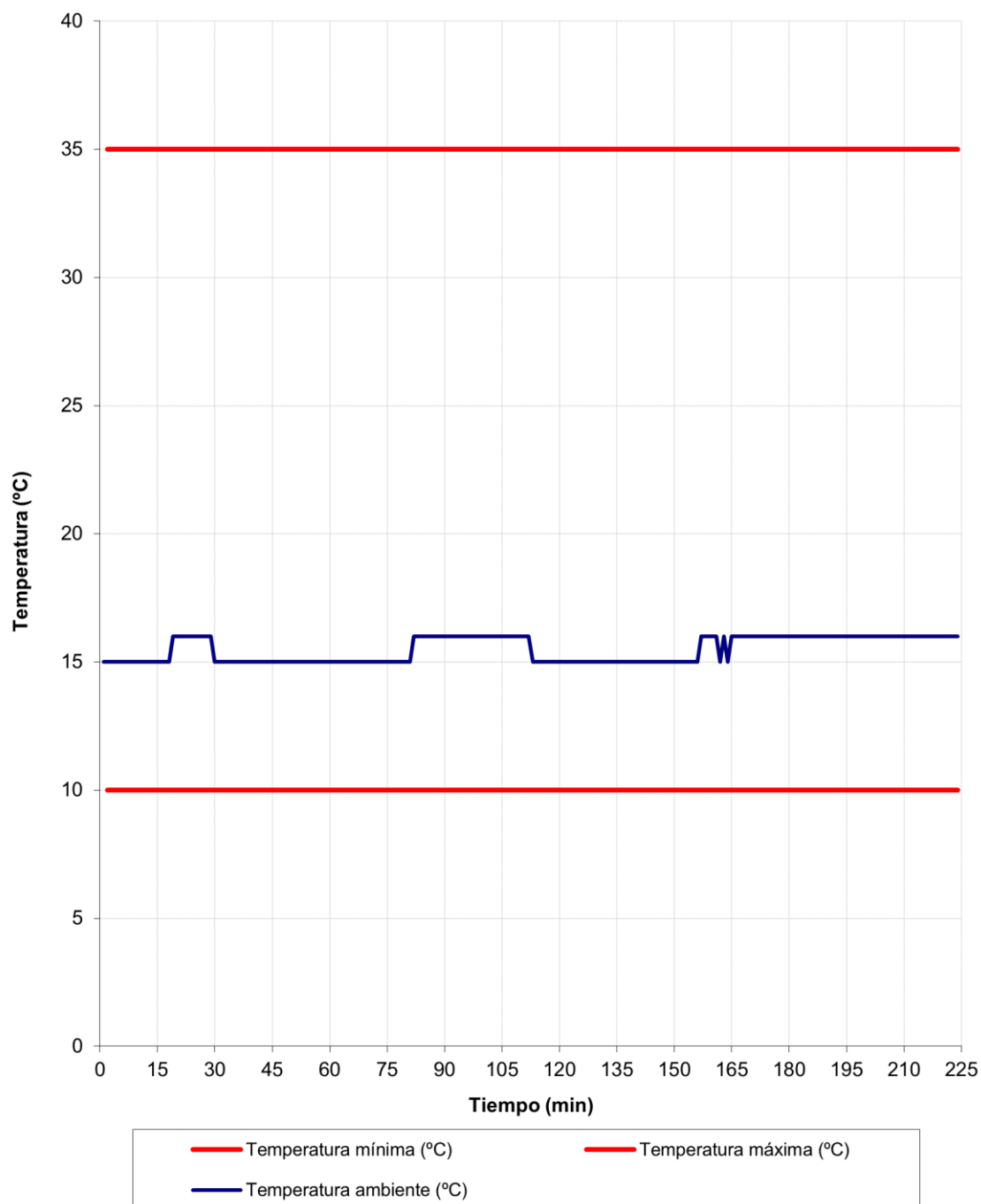
Graph 1: Temperature within the furnace.



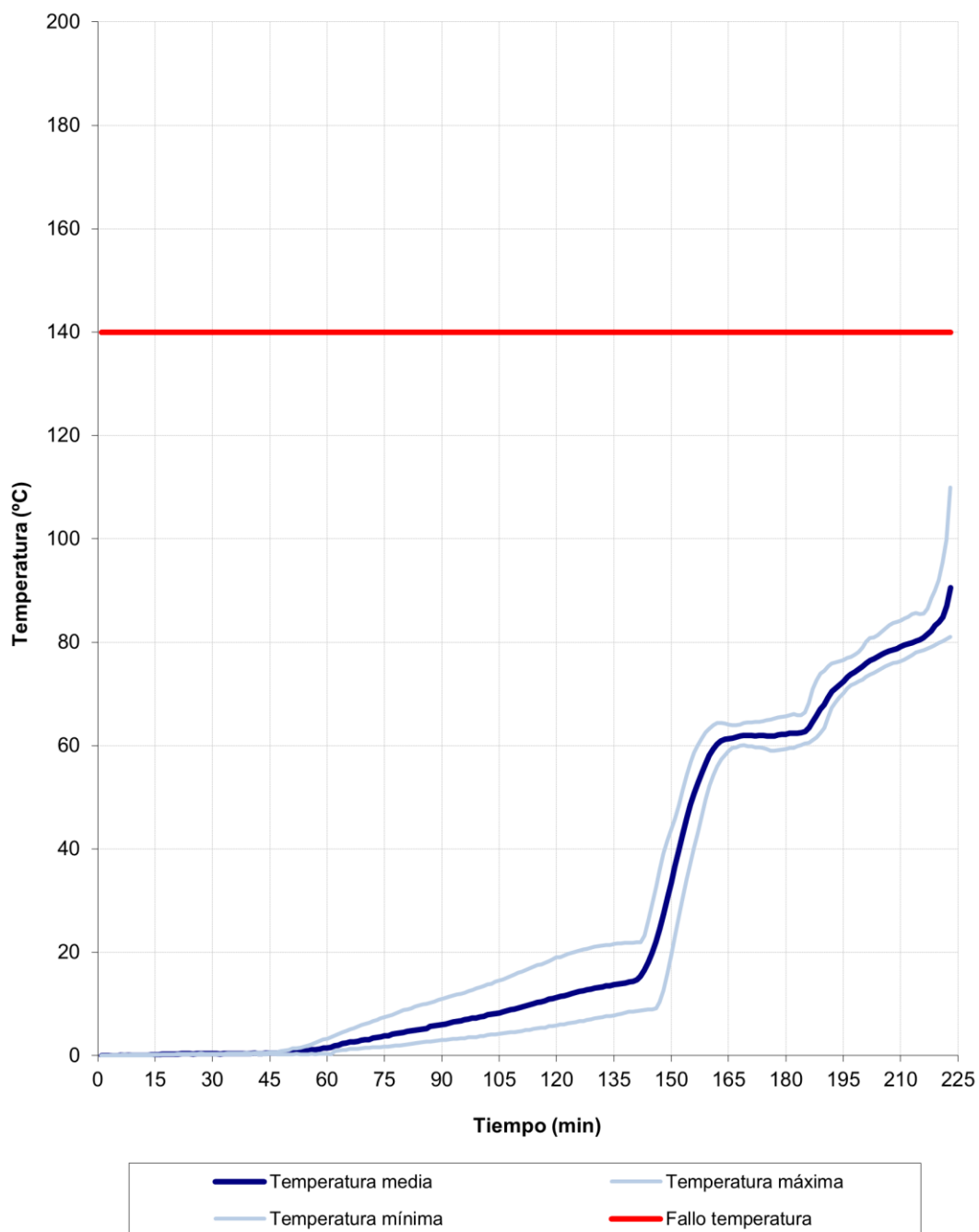
Graph 2: Pressure within the furnace.



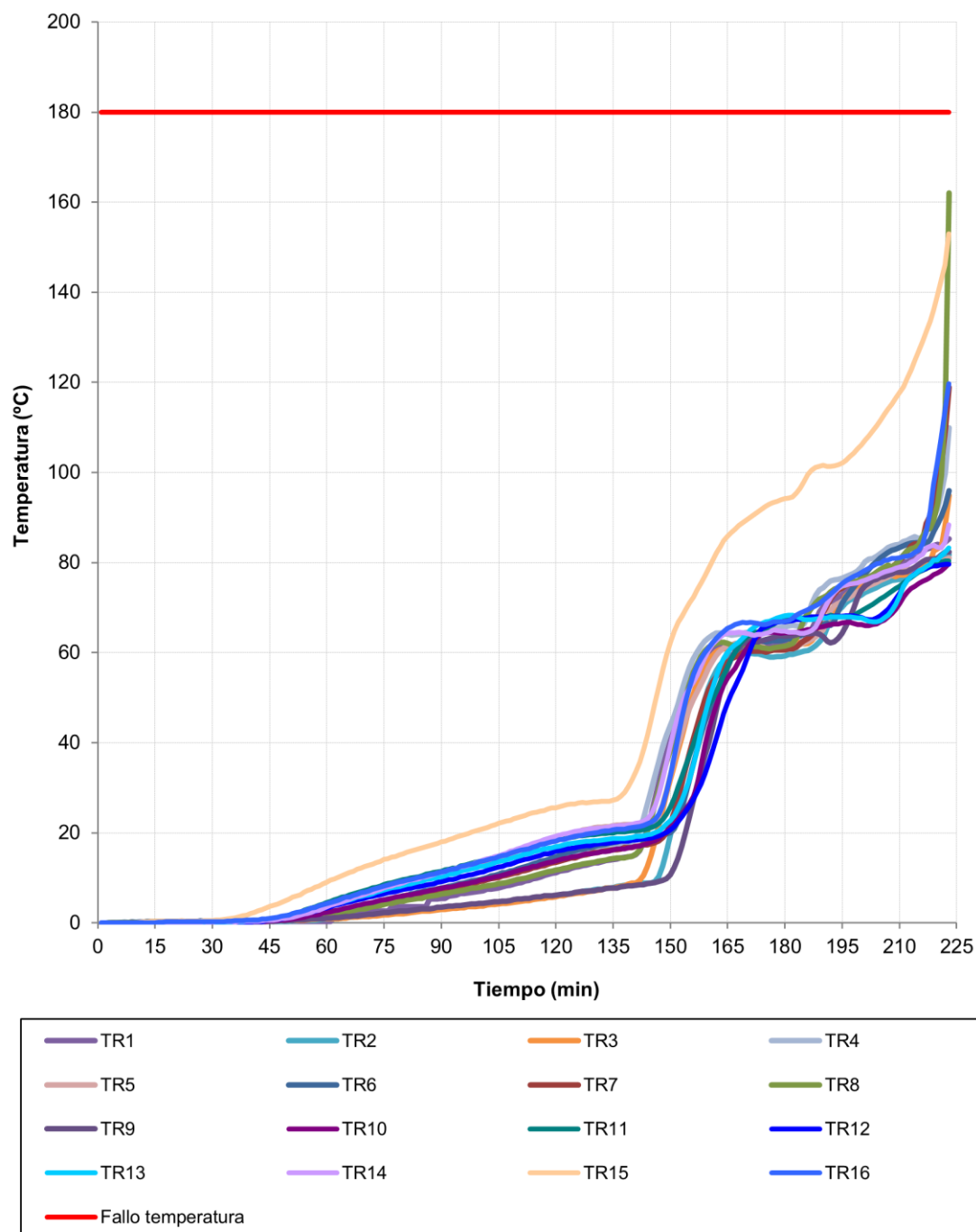
Graph 3: Evolution of ambient temperature.



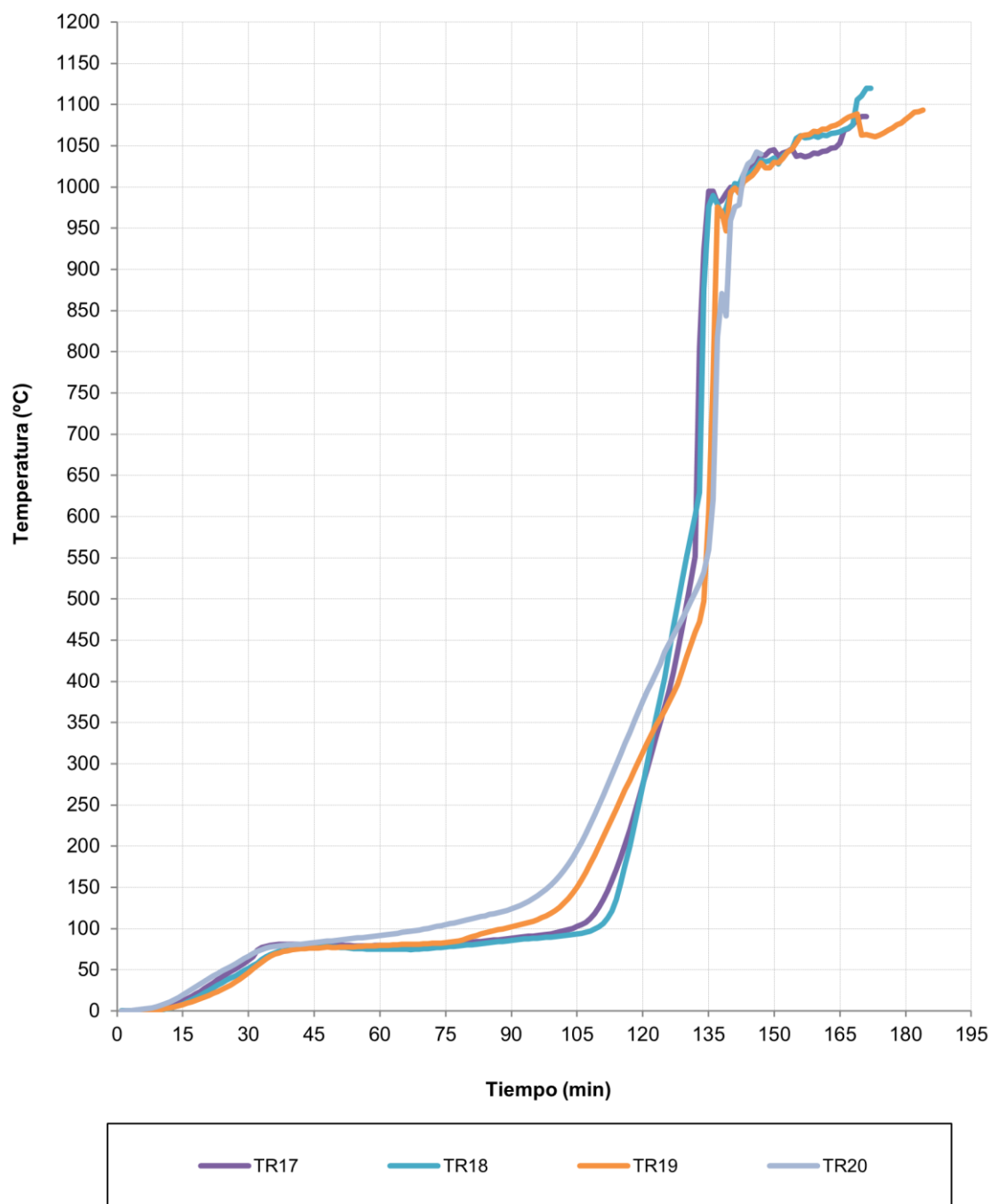
Graph 4: Average sample temperature.



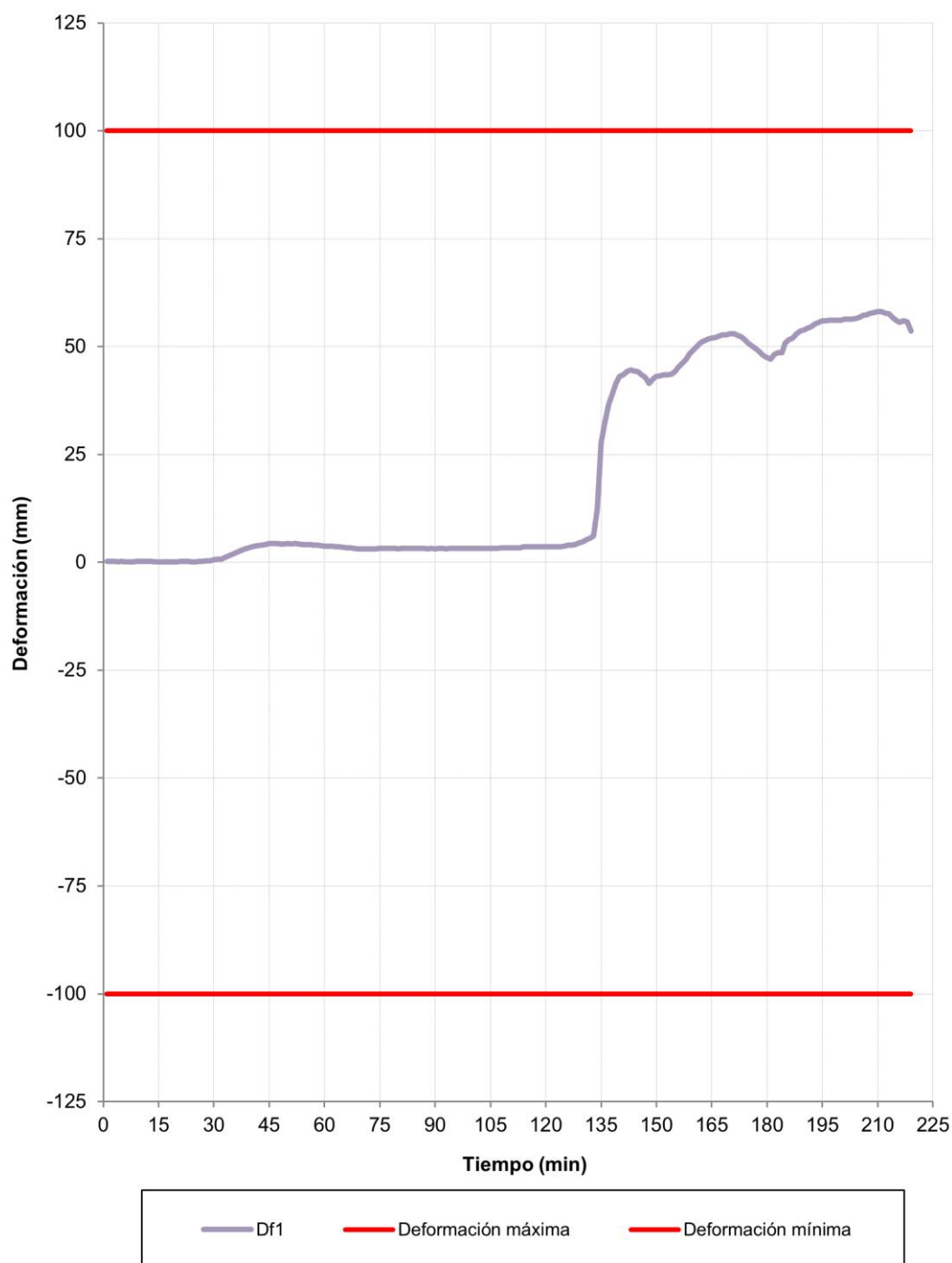
Graph 5: Maximum sample temperatures.



Graph 6: Maximum EXAP temperatures.



Graph 7: Maximum sample deflection.



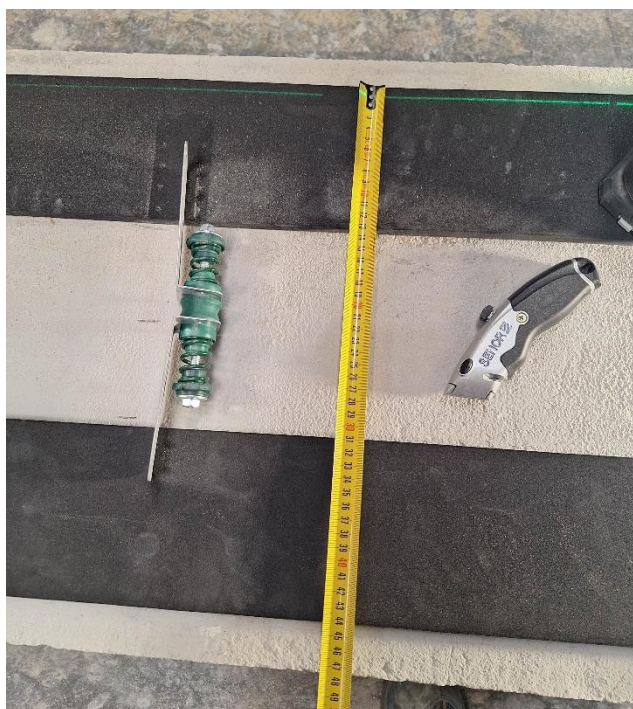


ANNEX 3: Test photographs

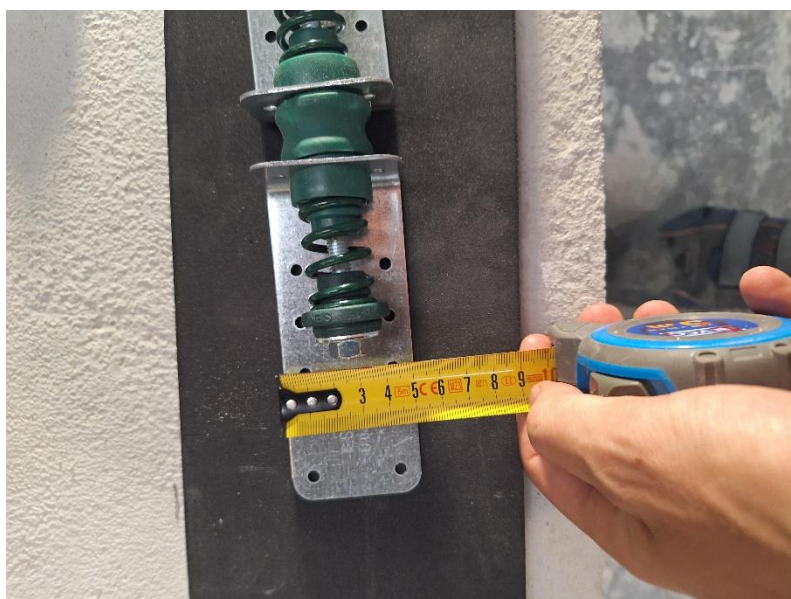
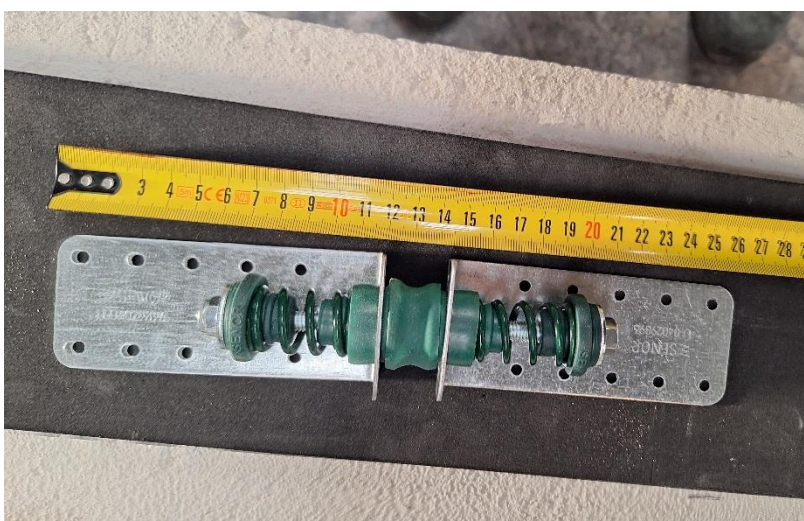
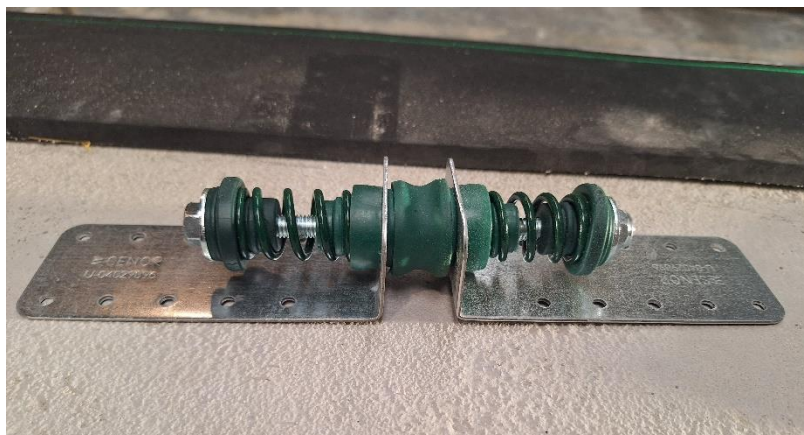
Photographs 1-27	Sample assembly.
Photograph 28	Appearance of the sample before the test, exposed side.
Photograph 29	Appearance of the sample before the test, unexposed side.
Photographs 30-37	Appearance of the sample during the test.
Photographs 38-39	Appearance of the sample at the end of the test.
	Thermographic sequence.



Photographs 1-27: Sample assembly.







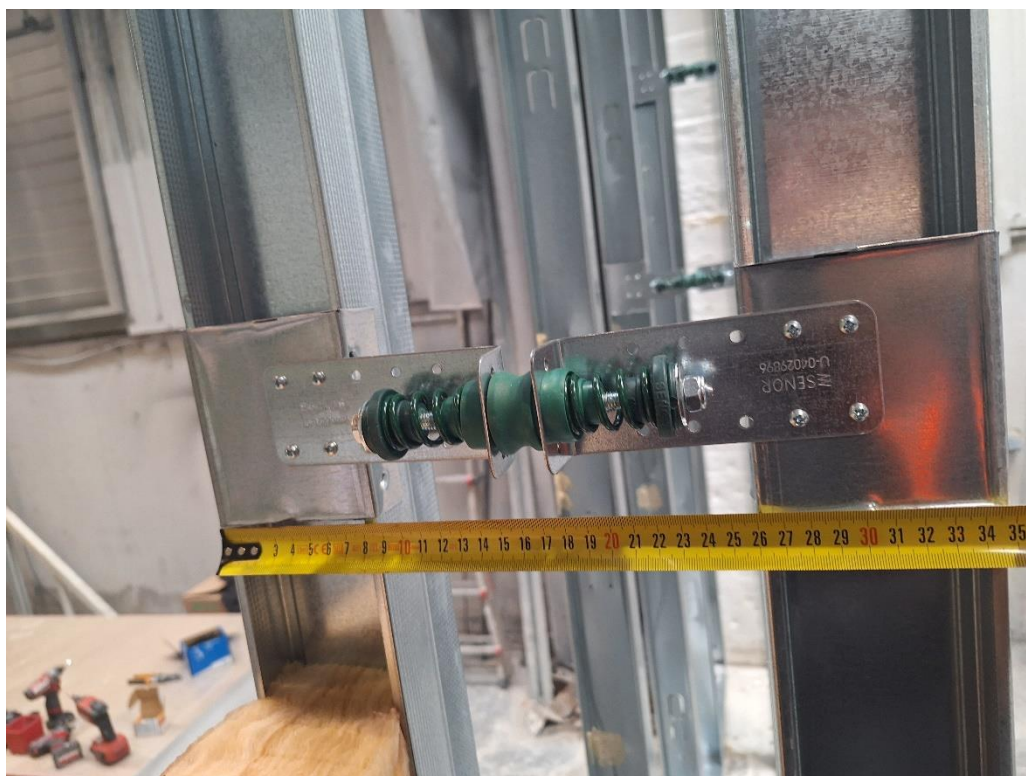








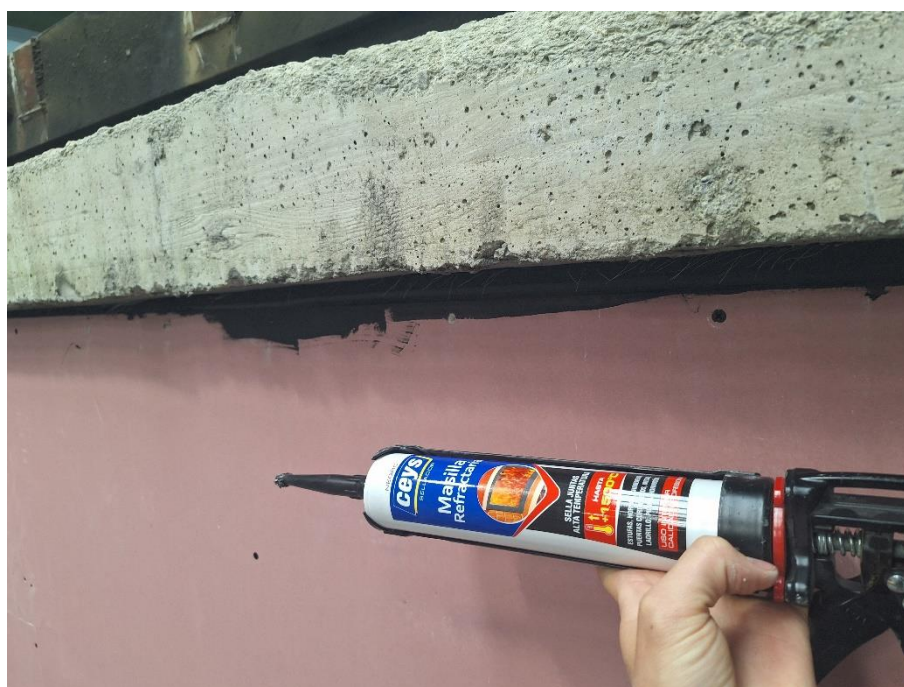
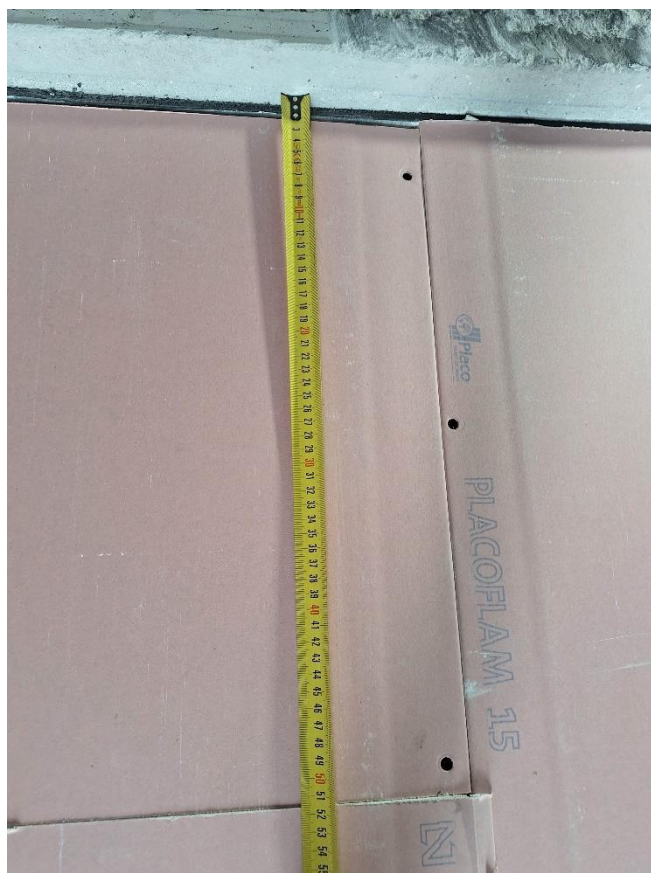










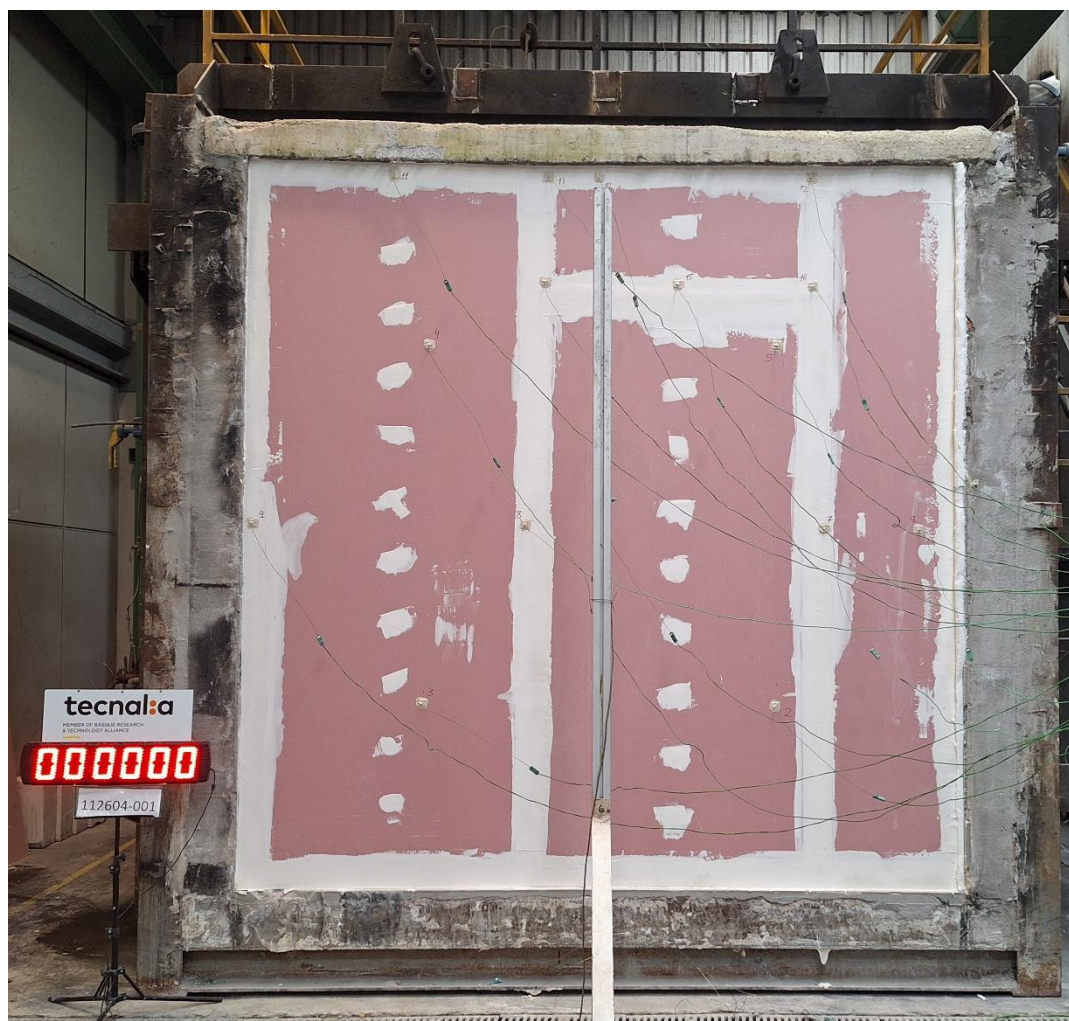




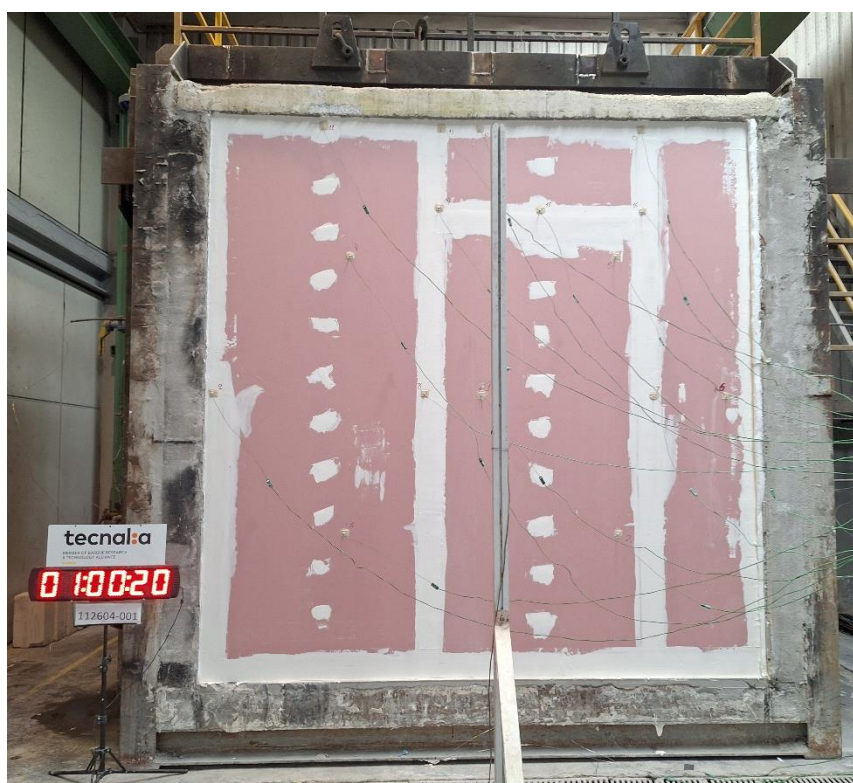
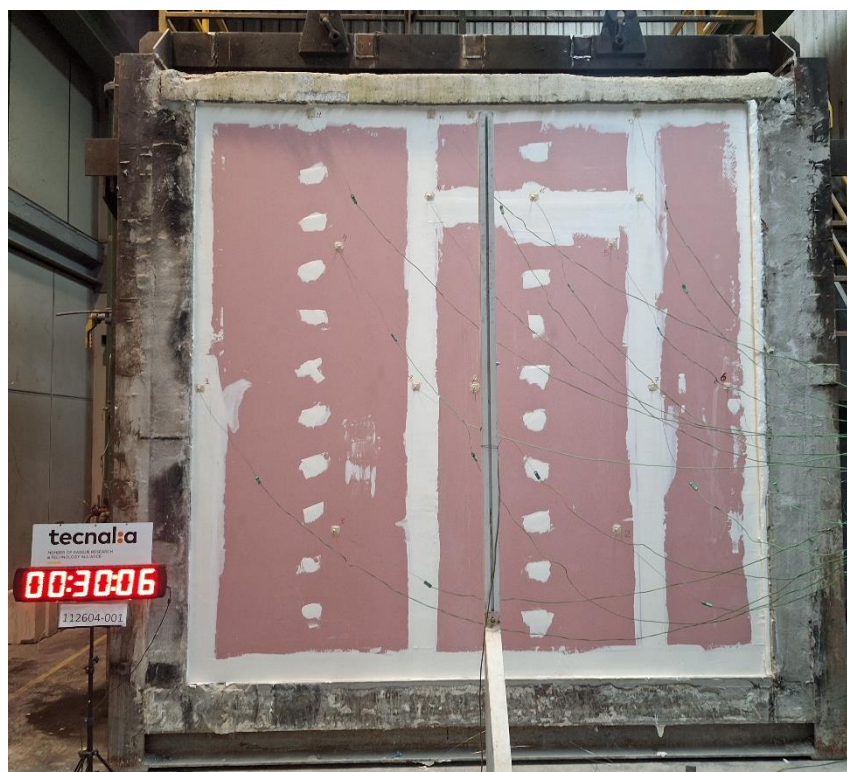
Photograph 28: Appearance of the sample before the test, exposed side.

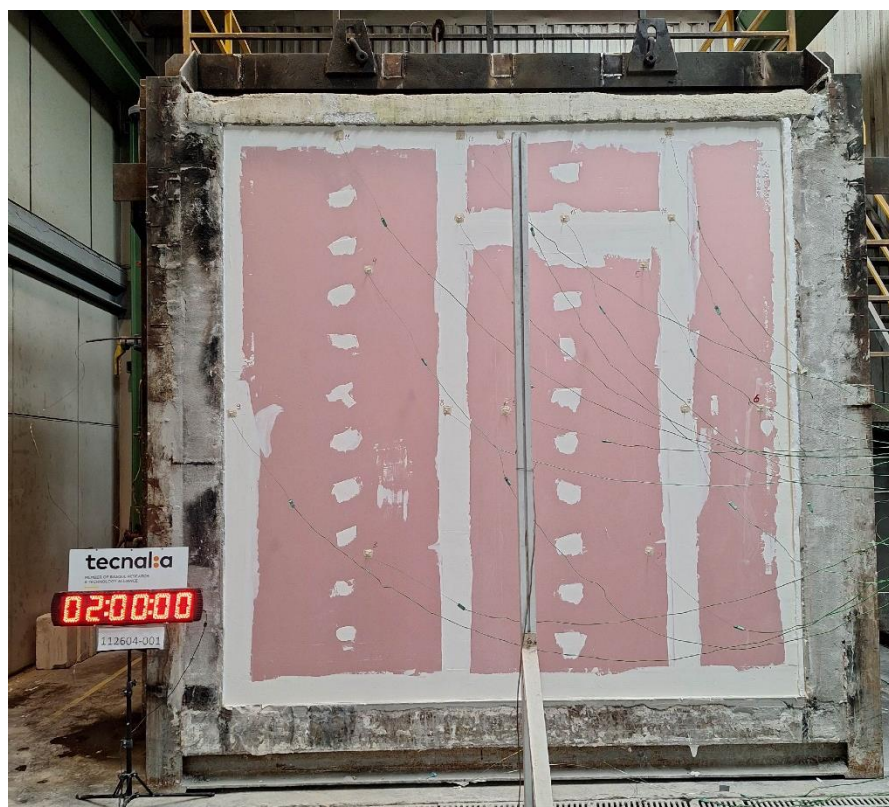


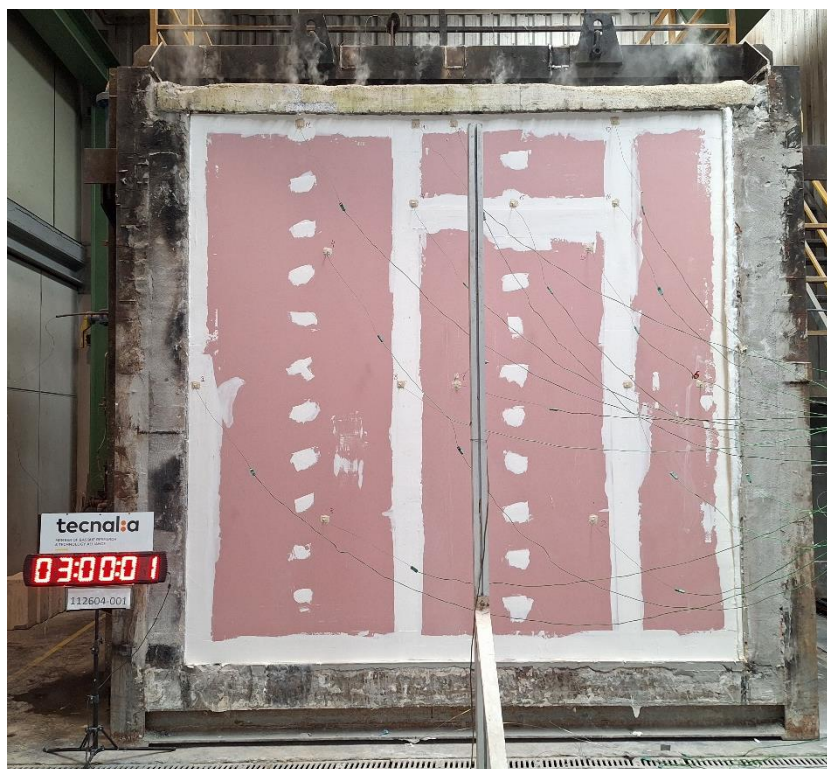
Photograph 29: Appearance of the sample before the test, unexposed side.

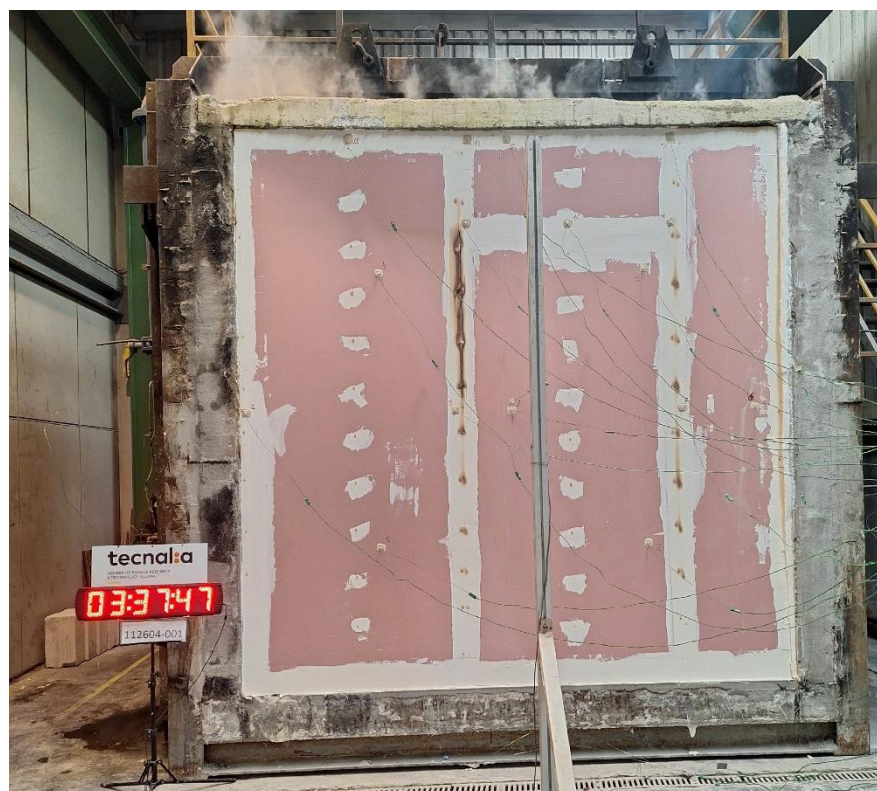
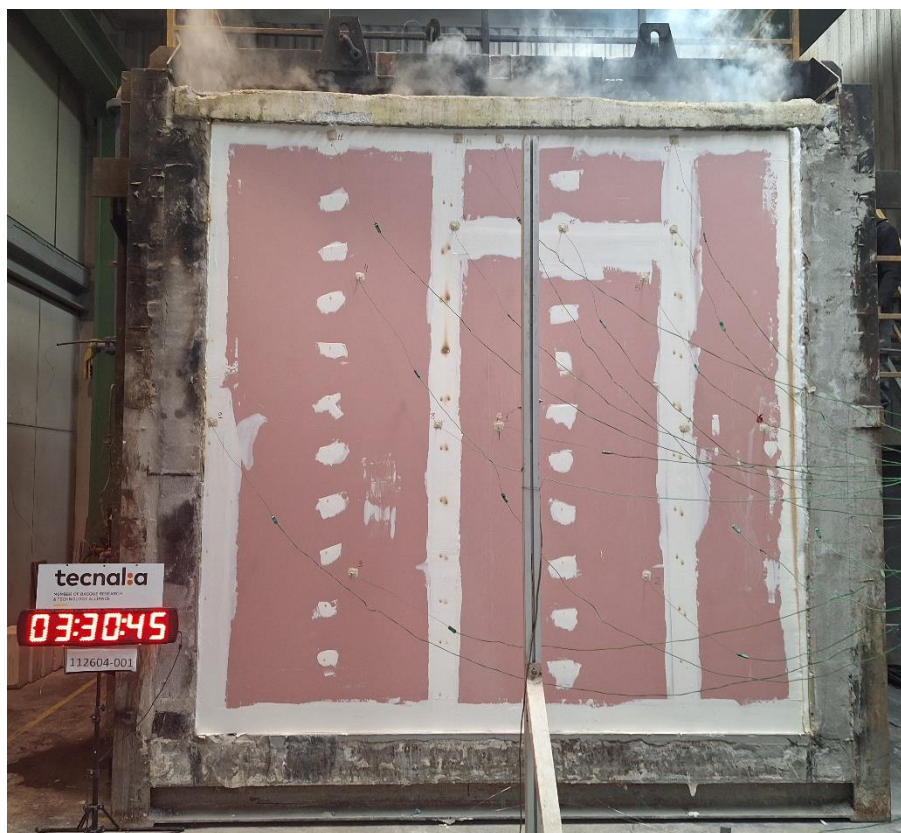


Photographs 30-37: Appearance of the sample during the test.





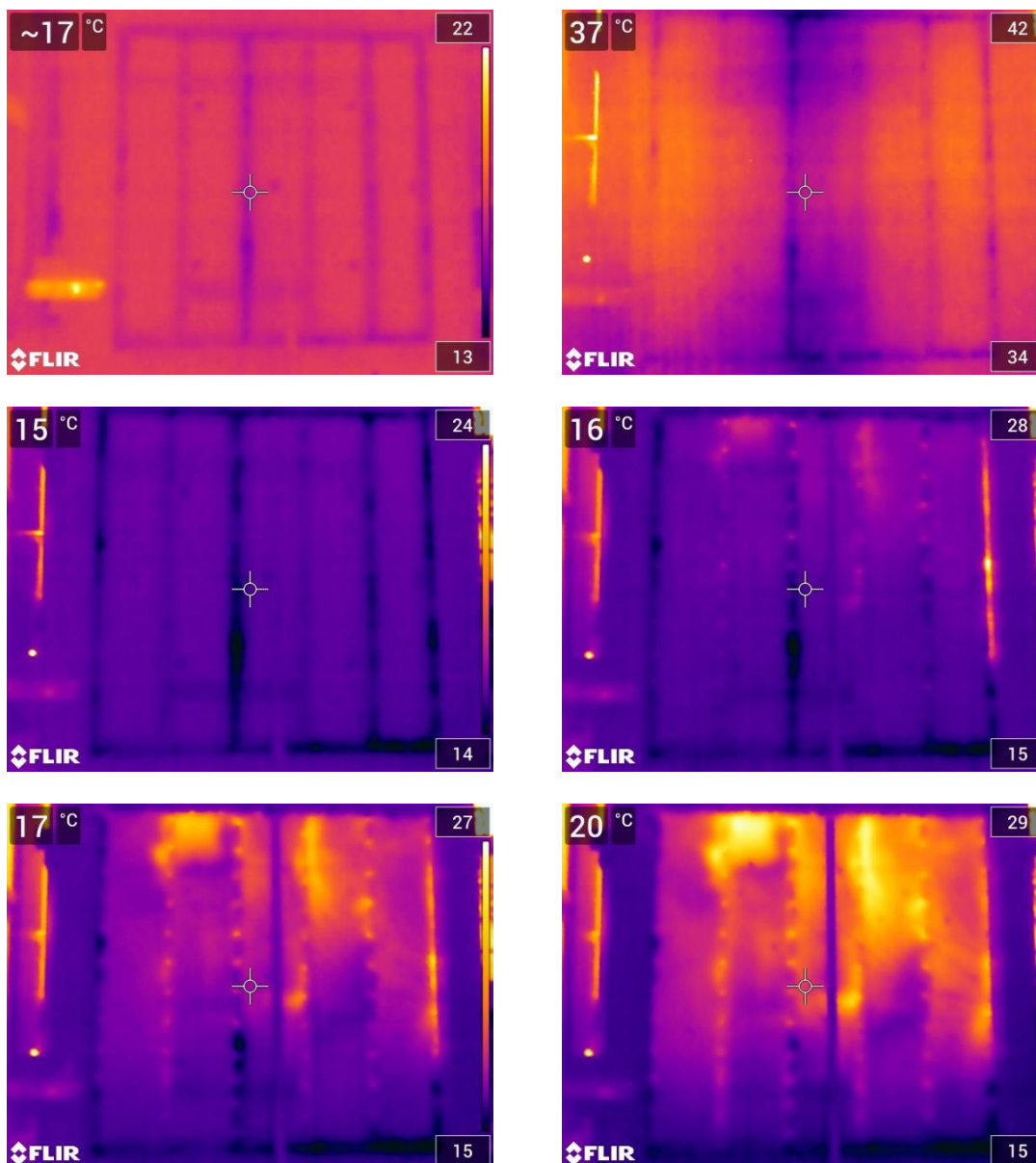


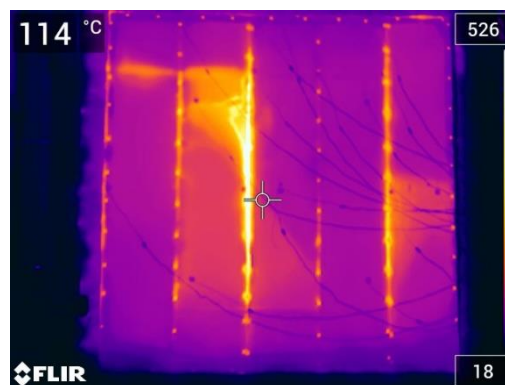
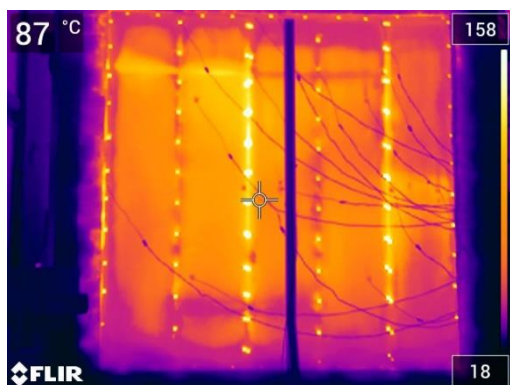
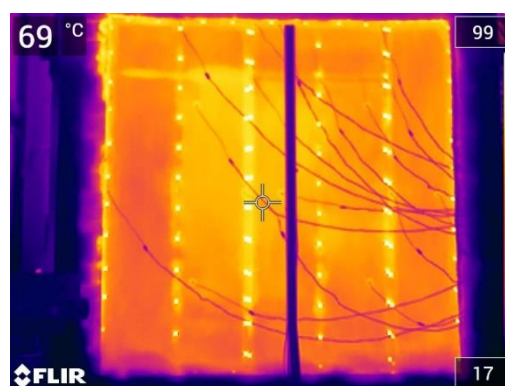
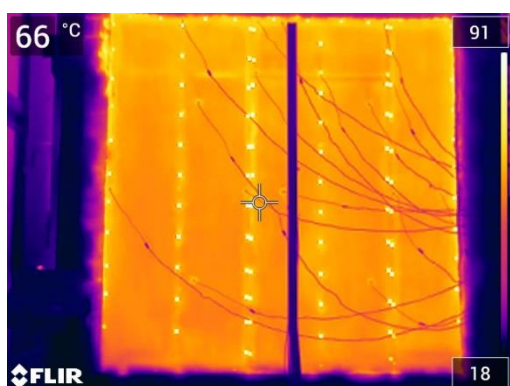
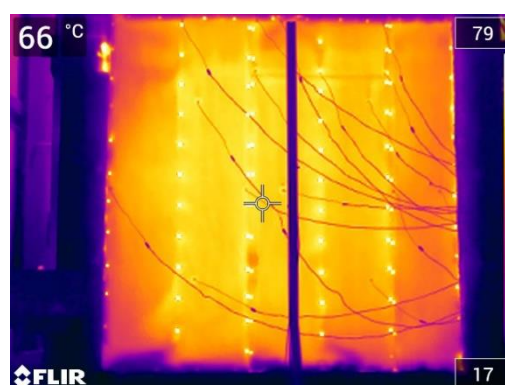
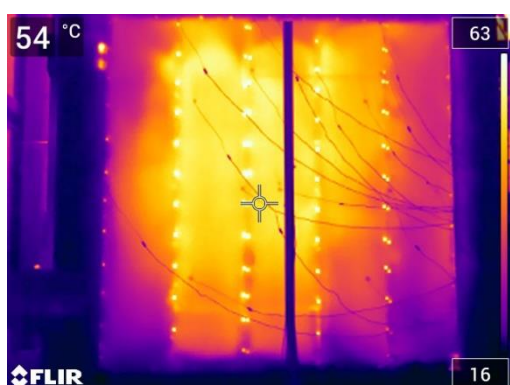
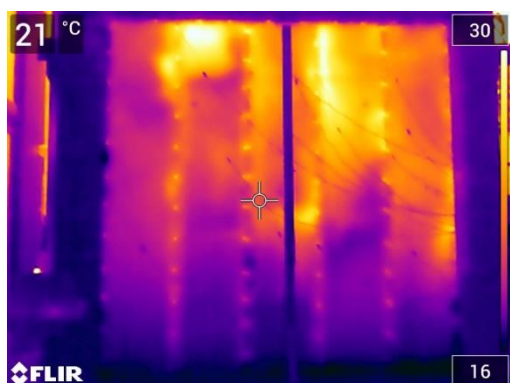


Photographs 38-39: Appearance of the sample at the end of the test.



Thermographic sequence of the test
(The indicated values of the pictures are illustrative).

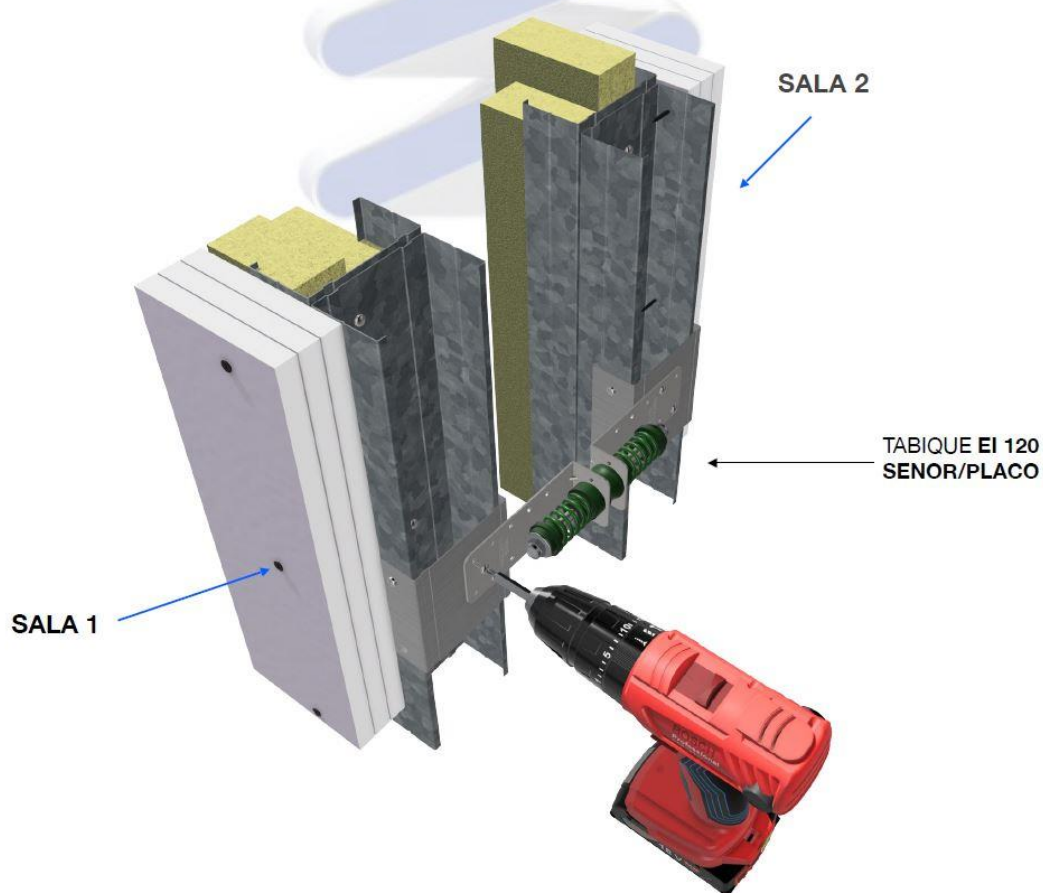


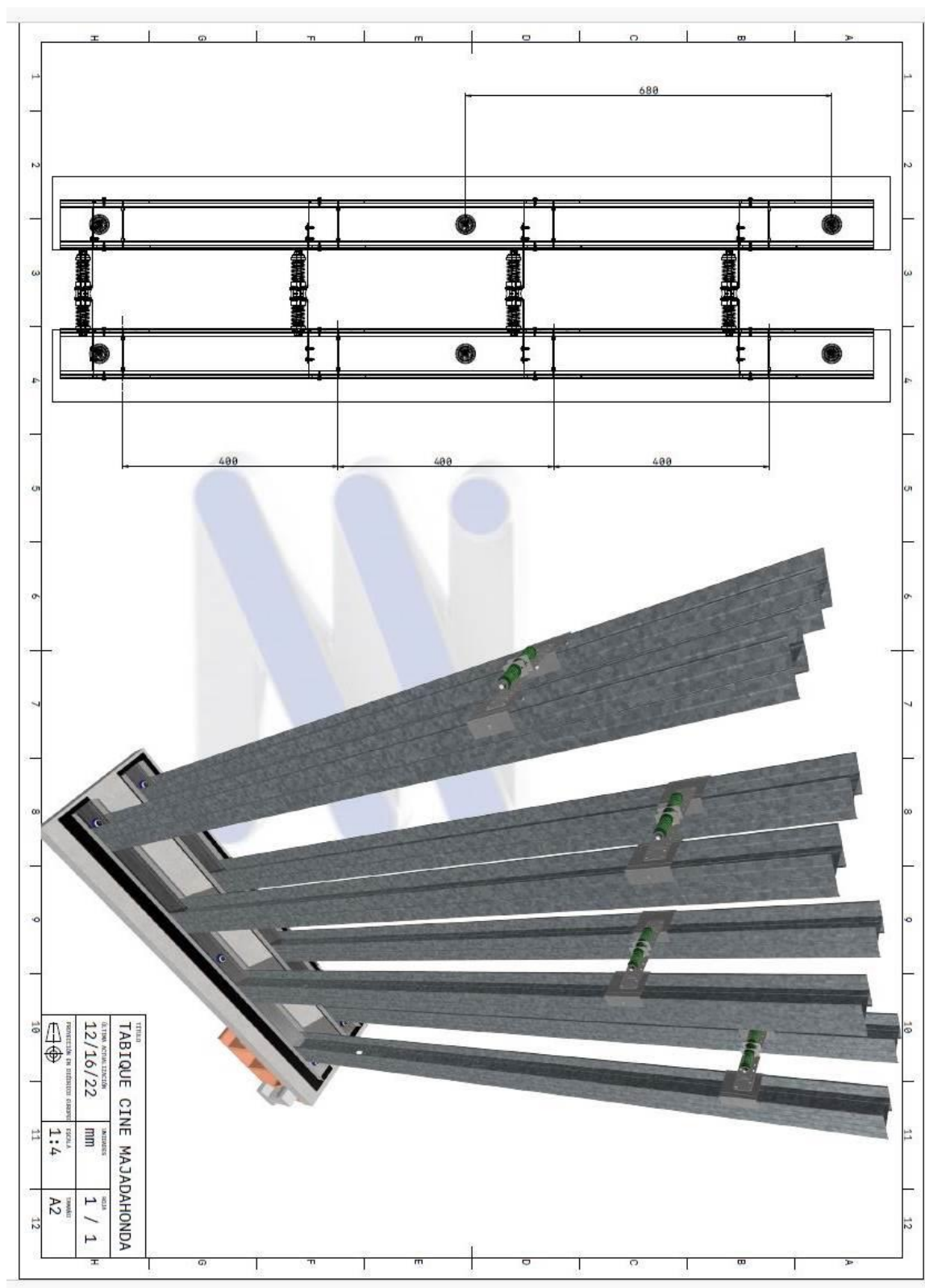


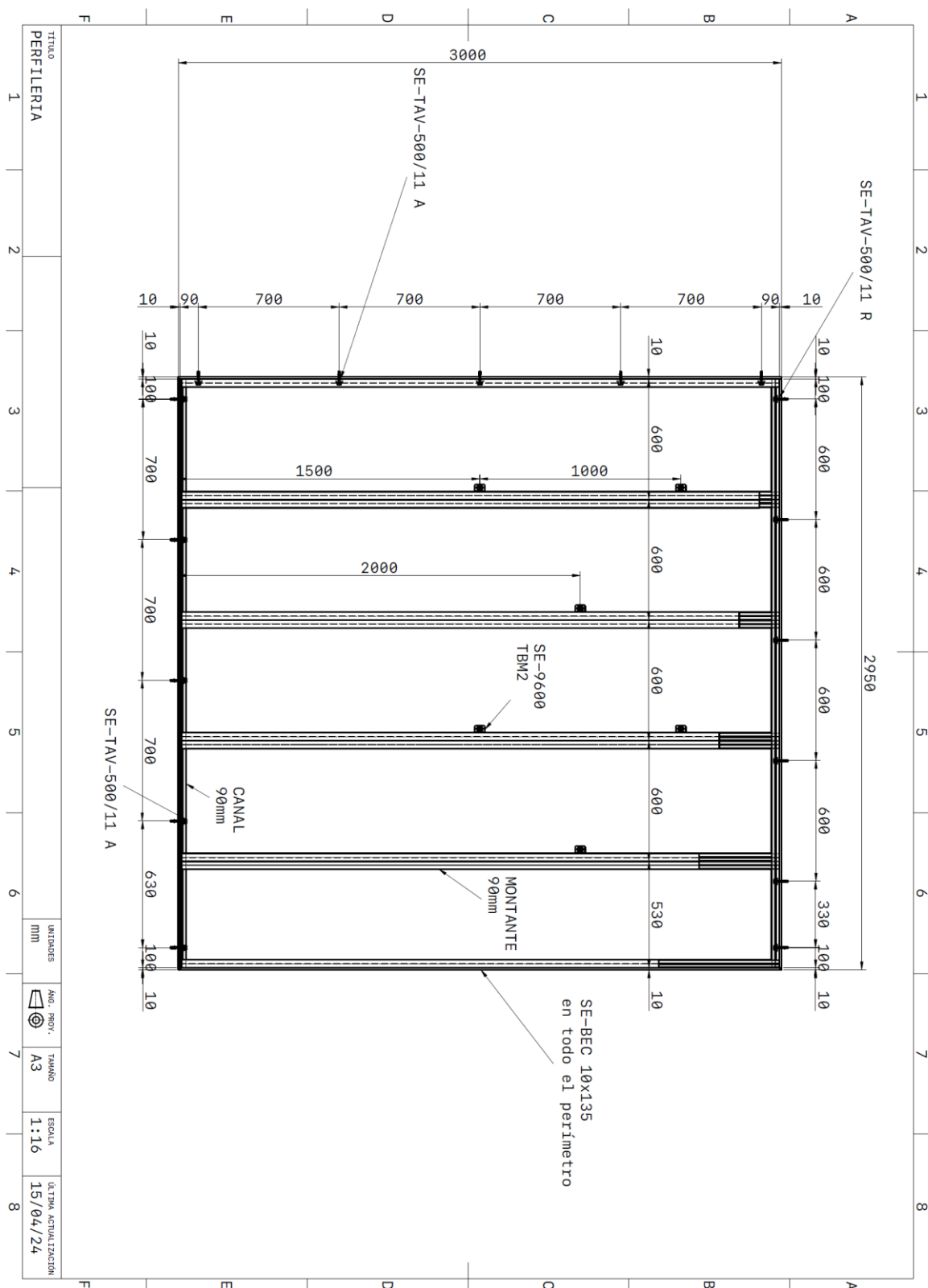
ANNEX 4: Technical documentation provided by the customer (*).

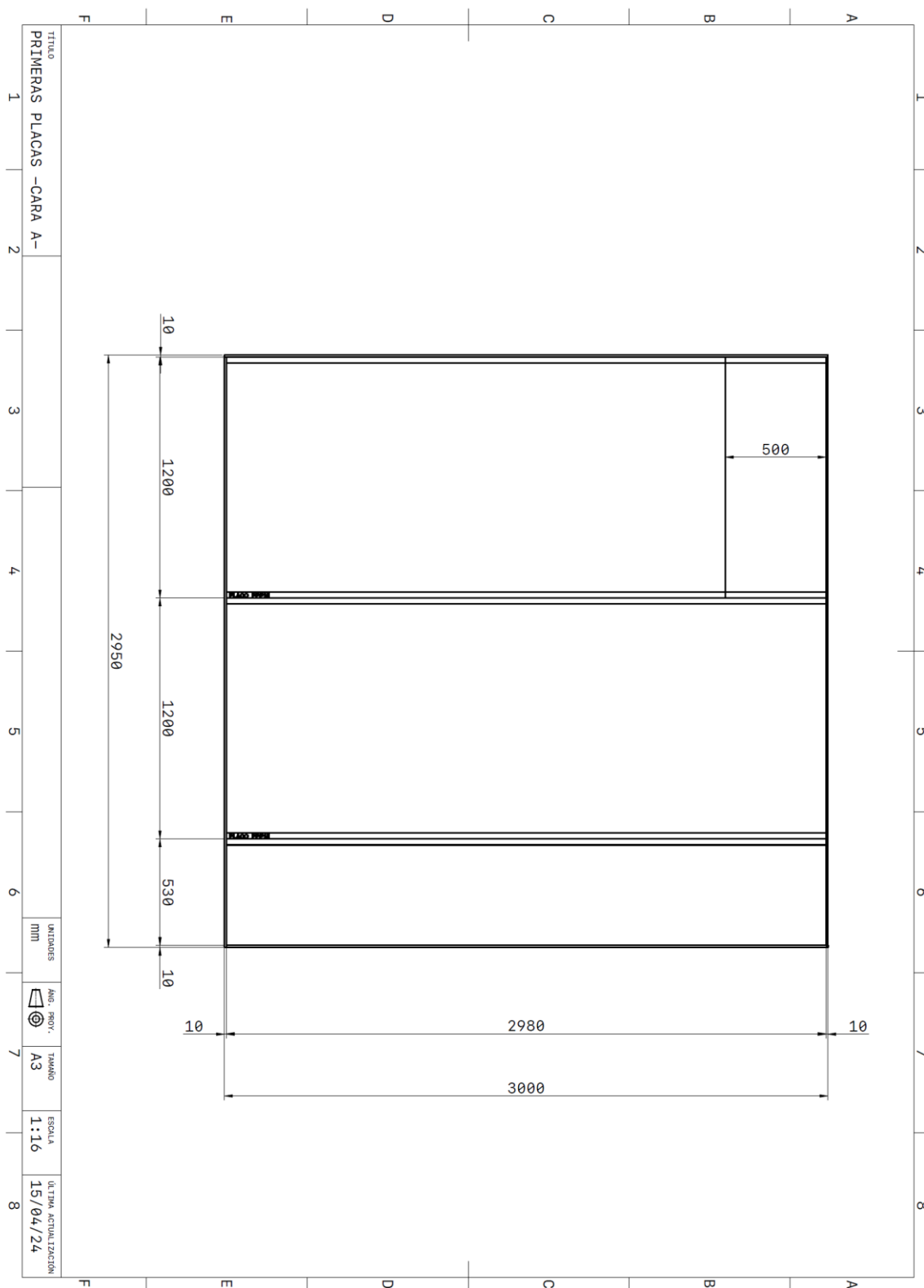
TABIQUE CINES

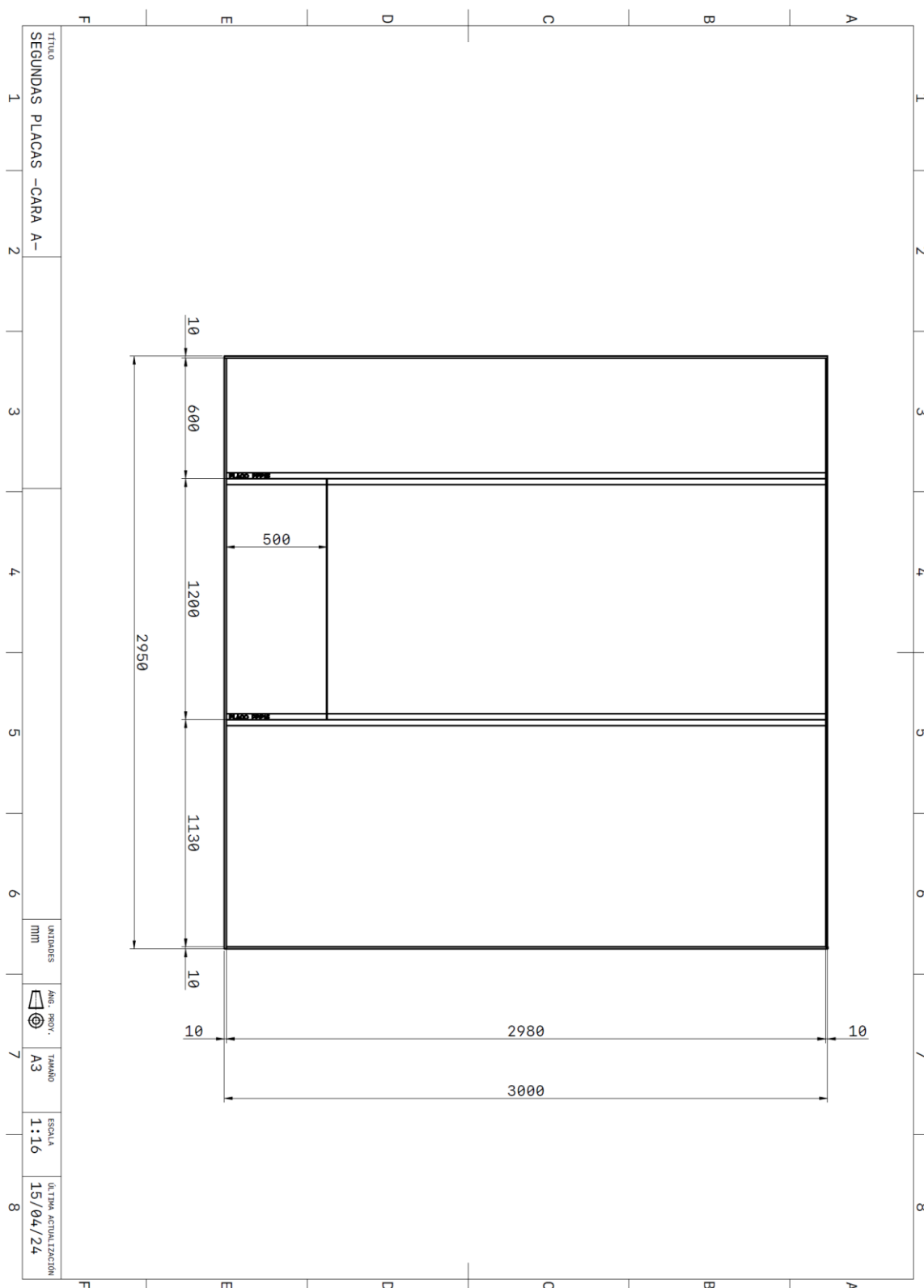
(SEPARACIÓN ENTRE SALAS)

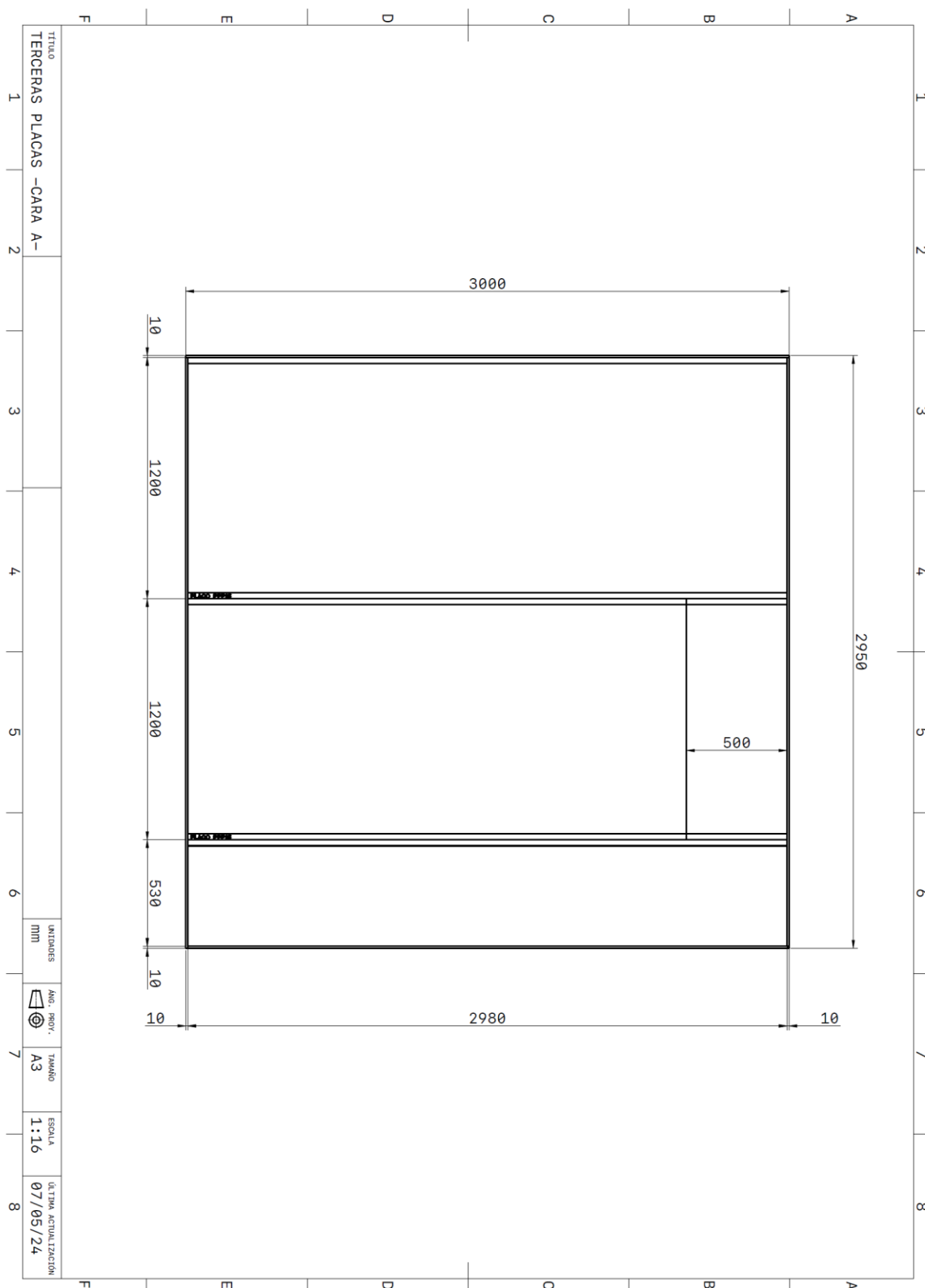


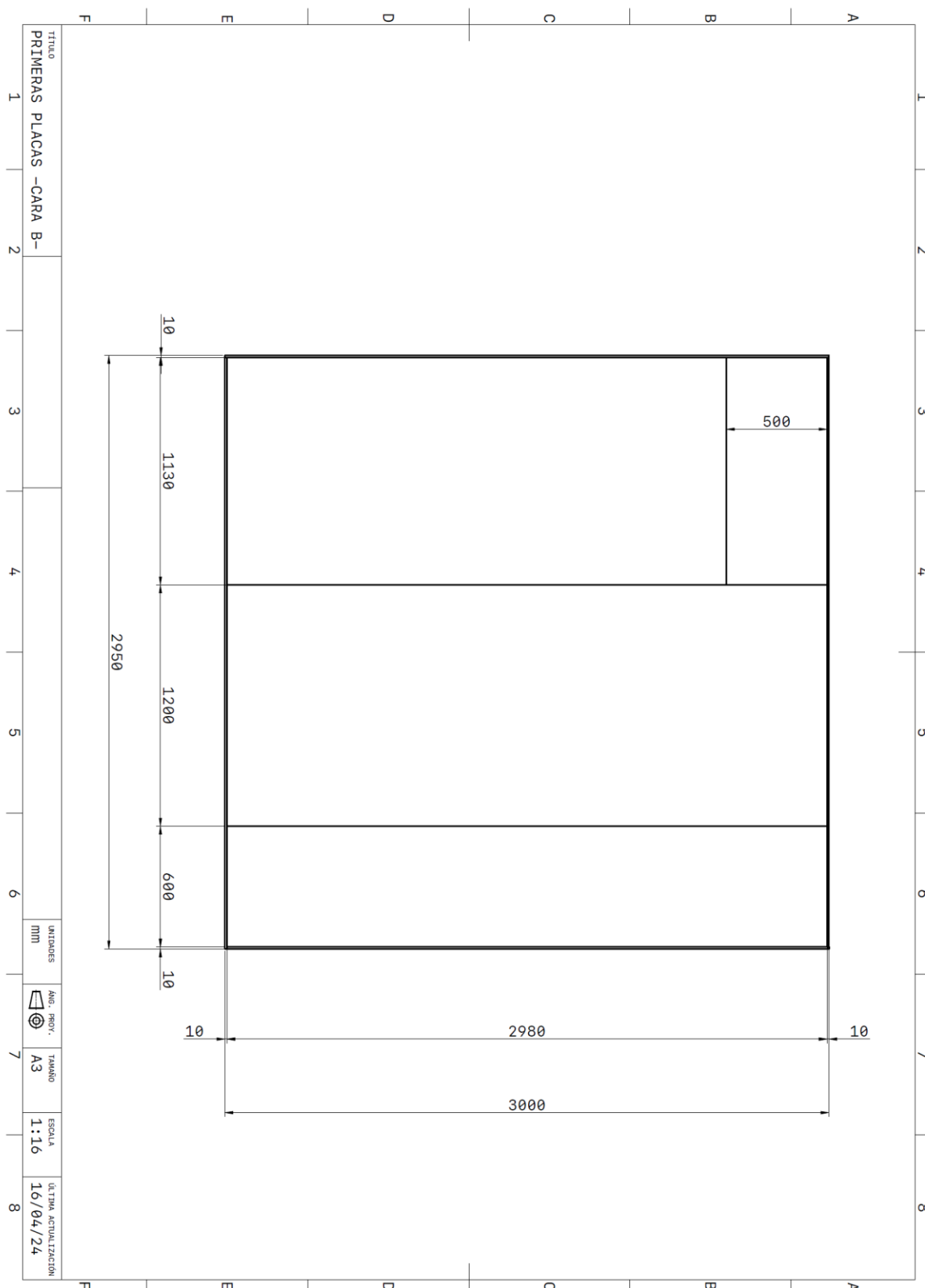


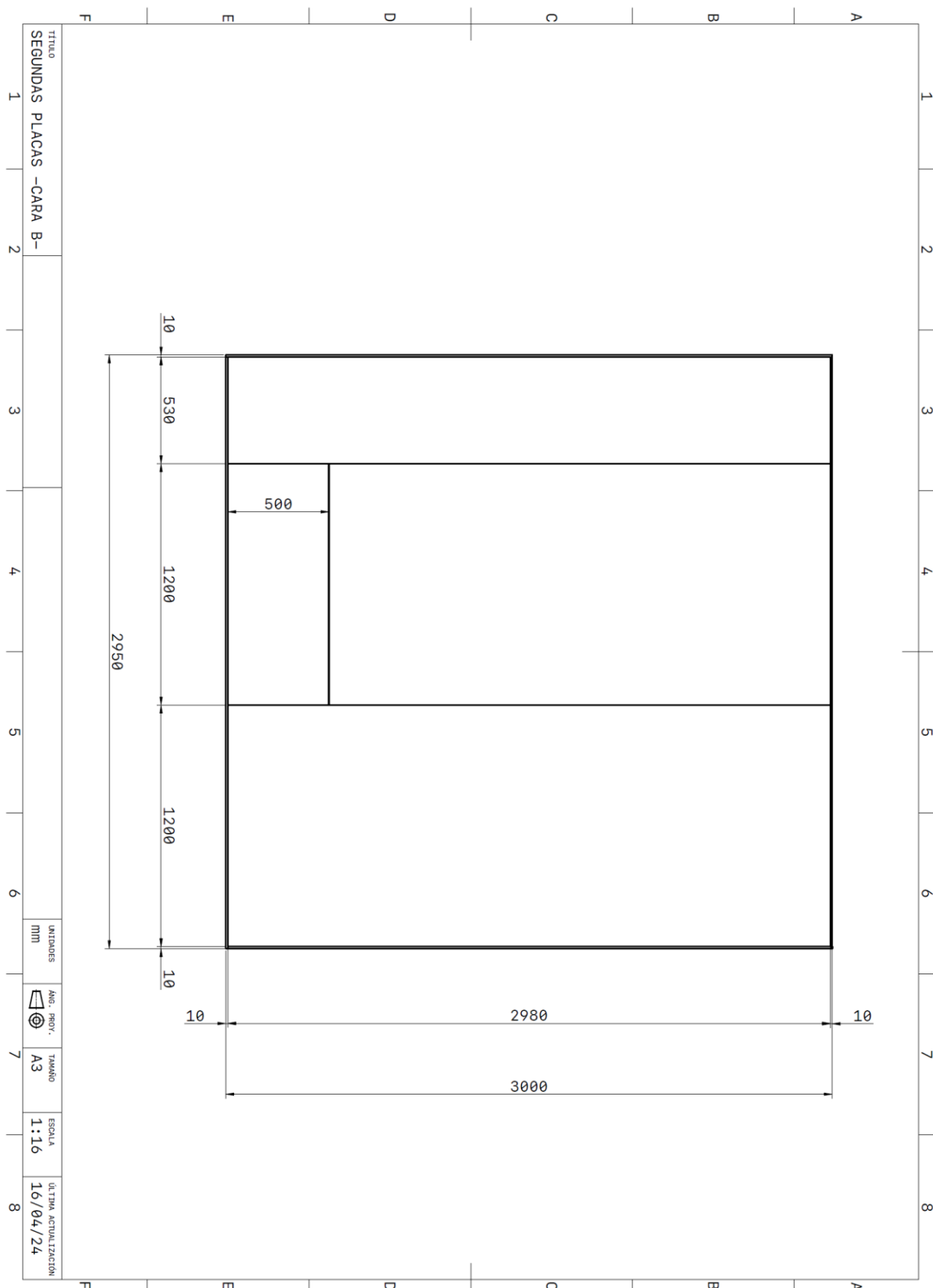


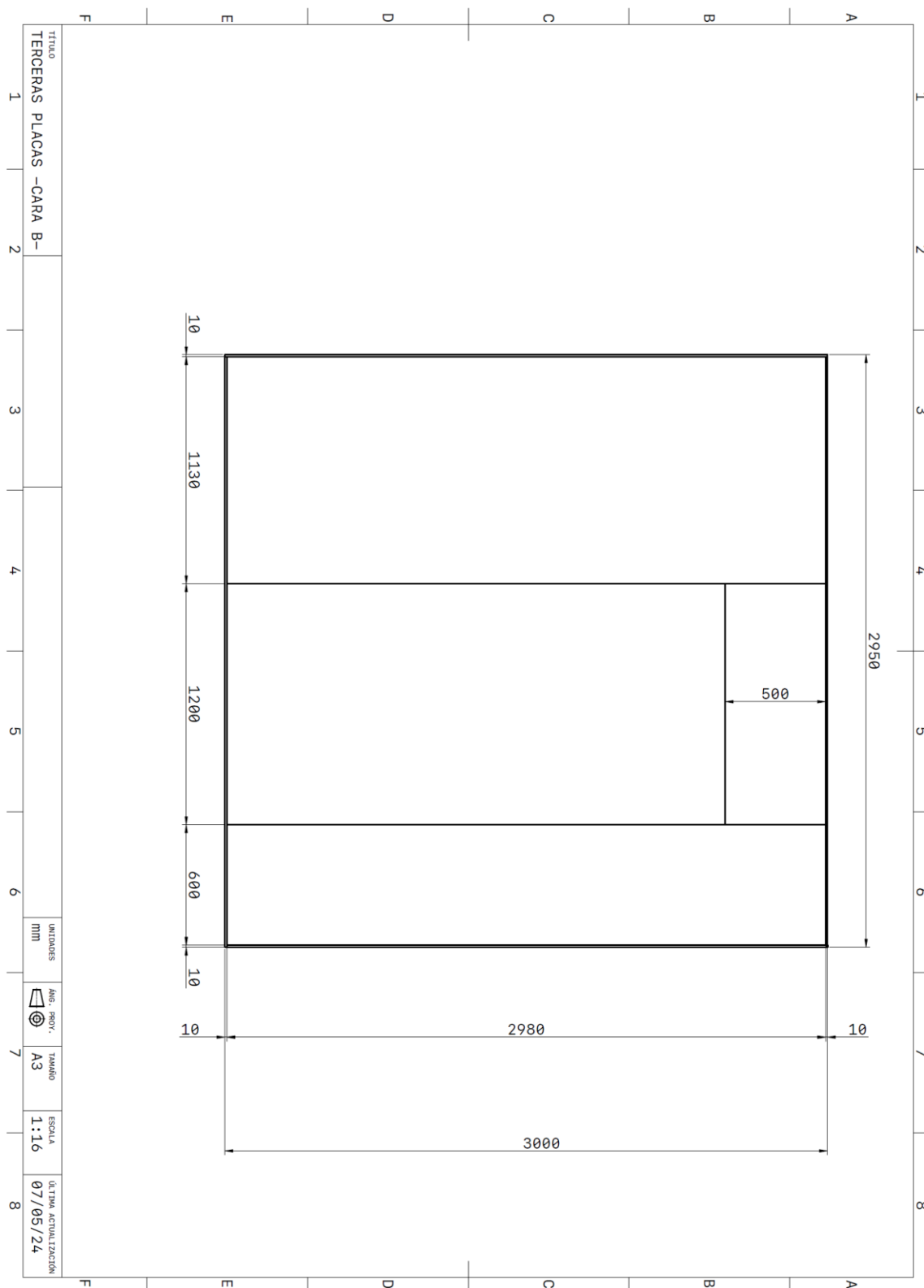


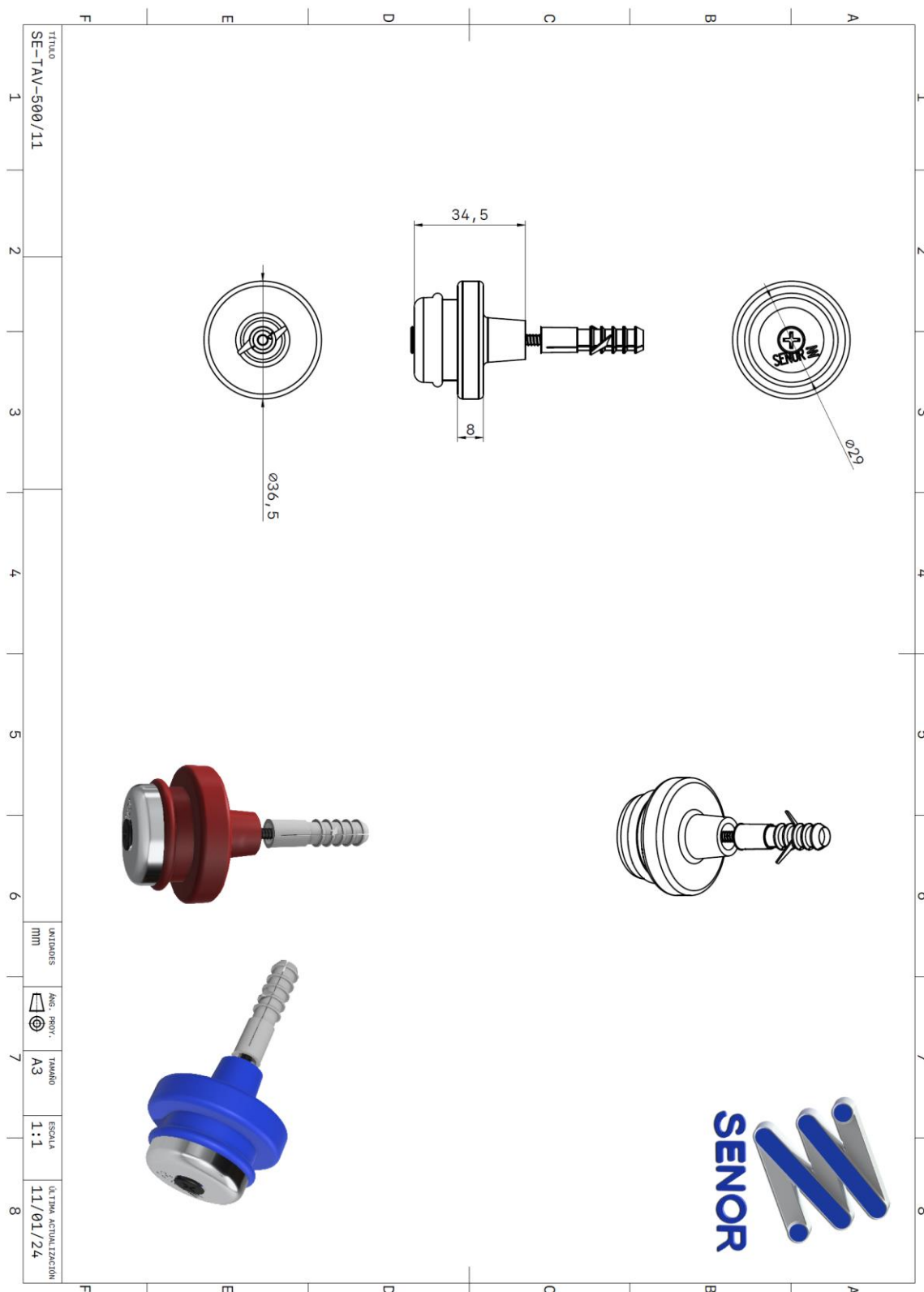


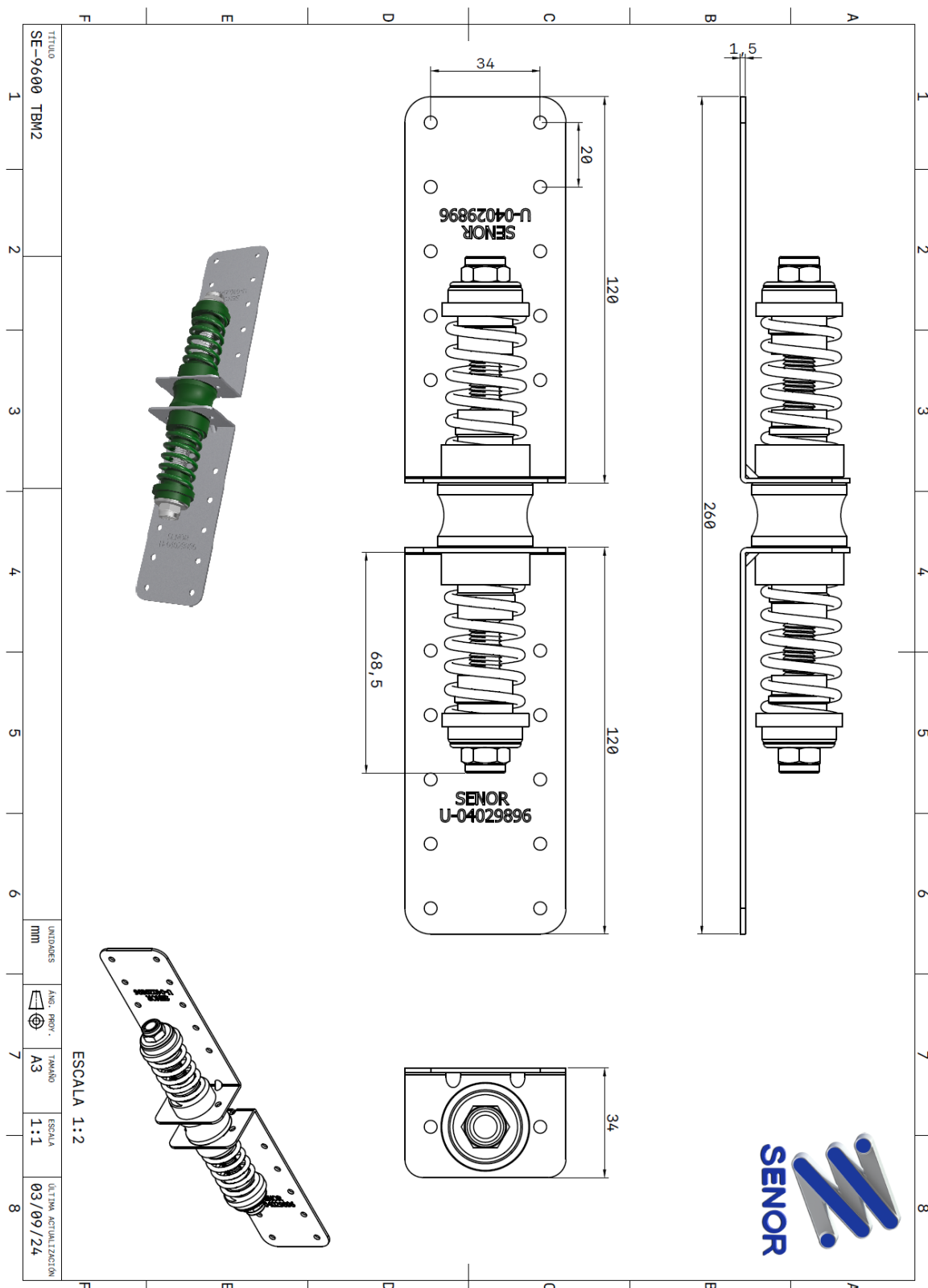


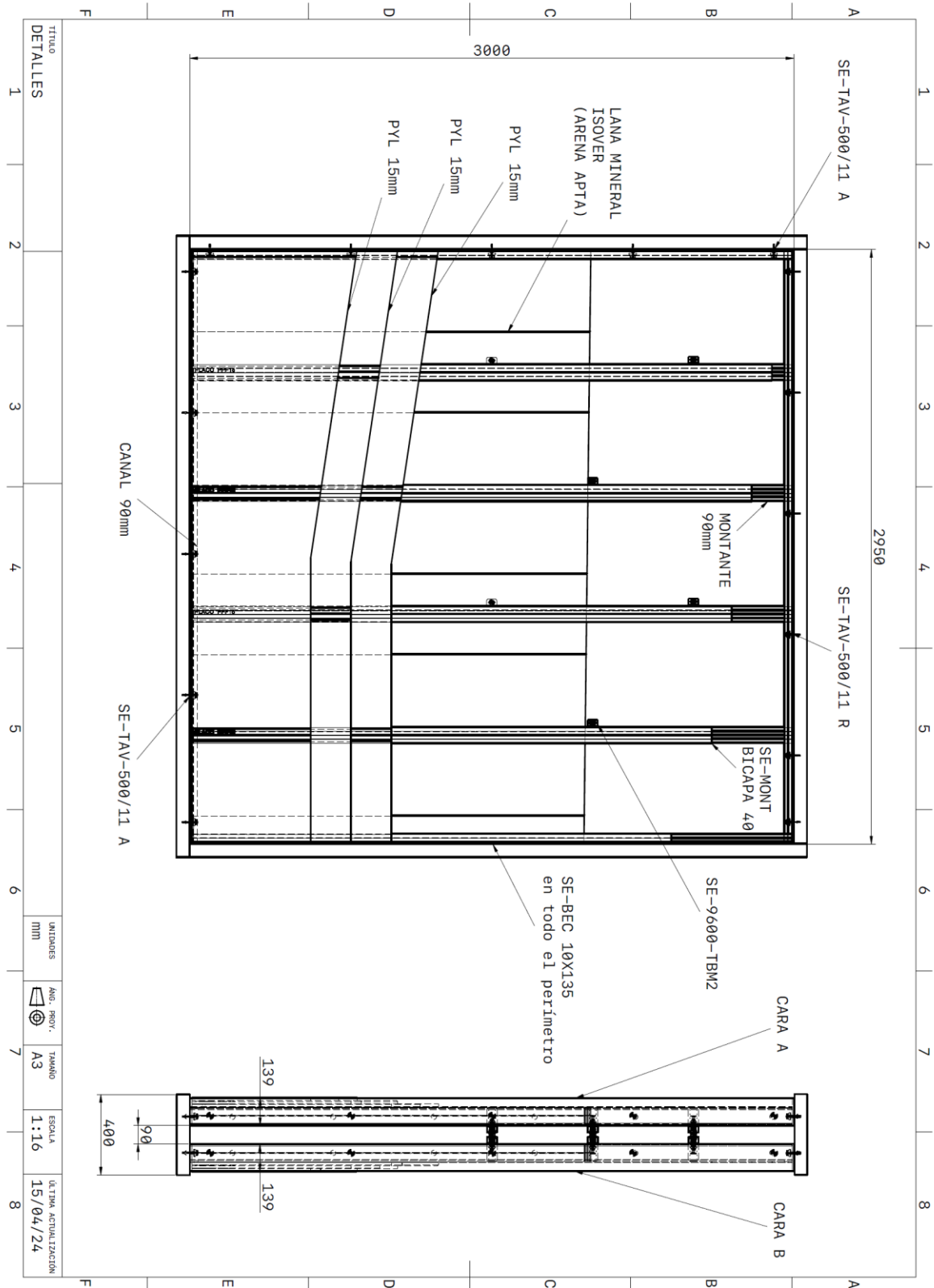


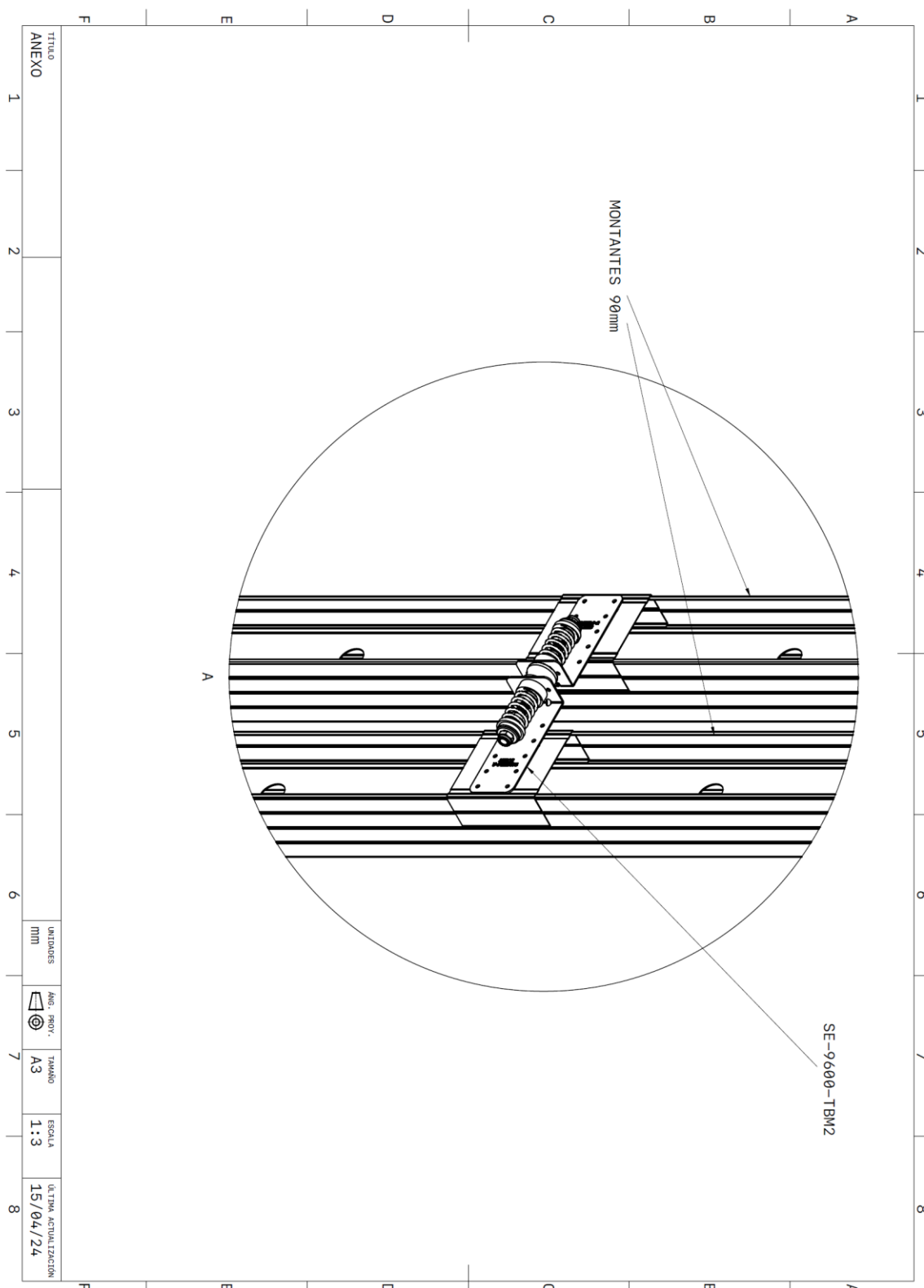




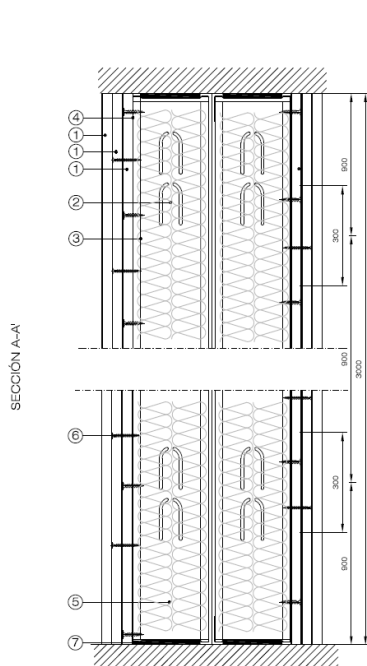






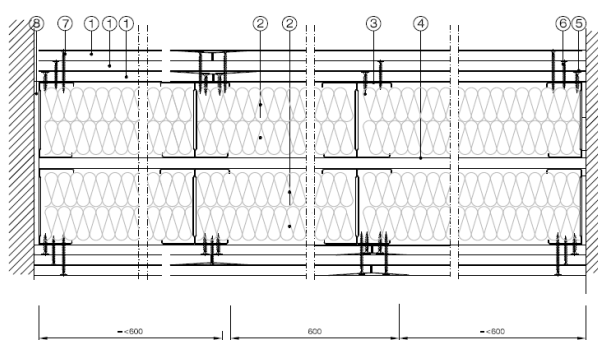


RELACIÓN DE MATERIALES




DESIGNACIÓN	REFERENCIA	CARACTERÍSTICAS
Placa de yeso	PLACA PPF 15	Anchura 1200 mm Longitud 3000 mm Espesor 15 mm
Montante	M-90	41 x 88,50 x 39 mm Longitud 3000 mm Espesor 0,60 mm
Rall	R-90	30 x 90 x 30 mm Longitud 3000 mm Espesor 0,55 mm
Tornillo	TTPC 25	Tornillo autorroscante Longitud 25 mm
Tornillo	TTPC 45	Tornillo auto perforante Longitud 45 mm
Tornillo	TTPC 70	Tornillo auto perforante Longitud 70 mm
Pasta de Juntas	PR1	
Cinta de Juntas	GR RLX	Papel microperforado de 50mm de ancho
Banda estanca	BANDA 70	70mm x 3mm
Fijación al bastidor	Remache de bola	
Aislamiento	Arena APTA	Espesor 90mm

- 1.- PLACA PPF 15 de 15 mm de espesor
- 2.- AISLAMIENTO ARENA APTA
- 3.- MONTANTE M-90
- 4.- RAIL R-90
- 5.- TORNILLOS TTPC 25
- 6.- TORNILLOS TTPC 45
- 7.-TORNILLOS TTPC 70
- 8.- BANDA ESTANCA
- 9.- BORDE LIBRE



SECCIÓN B-B'

 Príncipe de Vergara 132 - 28002 - MADRID	Denominación Tabique 3PPF15+M90 en H (LM) /600+M90 en H (LM)/600+3PPF15		
	Dibujado	CRISTINA TRIANO	
	Revisado	PILAR GARCÍA	
	Ensayo Tabique 3PPF15+M90 en H (LM) /600+M90 en H (LM)/600+3PPF15	Fecha MAYO 2024	Escala A3 - Nº Plano 2

