



**Siniat
TECHNICAL DEVELOPMENT CENTRE**

**Test Report
20150710-0464-WTR - Standard boards**

TSRR 3047 : Resistance to fire of a single layers partition – Standard boards from Colombia

Sébastien Segura/Florent Stachetti

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Written by	Validated by
Sébastien Segura Fire Expert	Jean Philippe BOISVERT Head of Department Plasterboards & Systems

Requester:	Division or Local Company:
Claudia Botero Innovation and Technical Manager	Gyplac

Contributors:	Job Title:
Florent Stachetti	Fire Test Leader
Sébastien Heyer	Products & Systems Technical Officer

Revision History	
Date:	Description of modifications:

DIFFUSION LIST	
Internal (Siniat): addressee's name and addressee's Division or Local Company	
Claudia Botero, Gyplac	Eric Bertrand, Siniat International
	Jean-Philippe Boisvert, Siniat International
External addressees: addressee's name and addressee's external organisation	

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Siniat R&D and Innovation, Siniat International SAS

500 rue Marcel DEMONQUE _ Pôle Technologique AGROPARC _ FR-CS70088 _ 84915 Avignon Cedex 9 _ FRANCE

T +33 (0)4 32 44 44 44 F +33 (0)4 32 44 40 00

Société Anonyme au capital de 140 779 968 euros – RCS Avignon 562 620 773 – N° TVA Intracommunautaire : FR57 562 620 773 – APE 2362Z



Summary of test report

This report relates to the fire resistance of a single layer partition in accordance with the requirements of standard ASTM E119.

However due to technical limitation, the thermal program applied during the test is those defined in EN 1363-1 instead of those defined in ASTM E119.

The measured performance has been corrected according to ASTM E119 §8 note 5 in order to correct the slight differences between the two thermal program.

The test sponsor was Gyplac.

The test took place on 10th of July 2015 at TDC.

The tested partition was built as described below :

- 1 layer of 12,7 mm standard boards produced in Colombia
- 80 mm metal studs @610 / Compressed 85 mm glass wool layer
- 1 layer of 12,7 mm standard boards produced in Colombia

The characteristics of the boards were the following :

- Dry weight : 6,87 ± 0,05 kg/m²
- Glass wool insulation : 12,2 kg/m³

The target classification of the partition tested was 30 minutes

The integrity has been lost at 21 minutes due to a positive cotton pad test.

Due to a temperature above 218°C measured with the TC17 the insulation has been lost at 31 minutes.

Even once corrected these results do not allow, according the ASTM E119 to reach a 30 minutes resistance period.

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1. INTRODUCTION

This report relates to the fire resistance of a single layer partition in accordance with the requirements of standard ASTM E119.

The test sponsor was Gyplac.

The test took place on 10th of July 2015 at TDC.

2. MATERIALS & SYSTEMS TESTED

2.1.GENERALITIES

The test specimen was installed by TDC Products & Systems Technical Officers. The construction of the specimen took place between the 08th and 09th July 2015. The TDC Fire Expert and Gyplac Technical Manager, designed the partition system and selected the materials that comprised the test system.

2.2.COMPONENT LIST

Designation	Description	Characteristics	Origin
Plasterboards	Gyplac SA Placa ST 1.22x12.7mm 03/04/2015 12:57:02	2440x1220x12,7mm 6,87 ± 0,05 kg/m2	Gyplac
Head and base tracks	Colmena LTDA PA 3526 3.05m 09 sep 10 NTC 5680	80 x 30 x 0,48 mm	Gyplac
Studs	Paral collmena PI01808803103050G NTC 5680 21 may 2014	80 x 30 x 0,46 mm	Gyplac
Dowels	PR06 6x30	Ø 6 x 30 mm	
Screws	Tornillo 6x1	Ø 3,9 x 35 mm	Siniat France
Boards joints and Finishing	Siniat P35 PR		Siniat France
Joints tape	Micro perforated paper tape	52,5 mm wide	Siniat France

2.3.DESCRIPTION OF THE TEST SPECIMEN

The specimen was constructed in a refractory concrete lined steel restraint frame having an opening of 3000mm high x 3000mm wide.

The head and base tracks were fixed to the restraint frame with studs fitted between at 610 mm centers one from the others. The left and right edges were fixed to the concrete frame

Tracks and studs on fixed edges were fixed on the supporting refractory concrete frame by means of Ø 6 x 30 mm plastic plugs and Ø 3,5 mm x 35 mm screws at 500 mm center spacing.

Studs were screwed with the tracks by means the screws N°8 1/2".

The partition was installed with 4 fixed edges.

Siniat R&D and Innovation, Siniat International SAS

500 rue Marcel DEMONQUE _ Pôle Technologique AGROPARC _ FR-CS70088 _ 84915 Avignon Cedex 9 _ FRANCE
T +33 (0)4 32 44 44 44 F +33 (0)4 32 44 40 00
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The facing was made with a single layer of 12,7 mm standard boards installed vertically.

The vertical joints were 610 mm staggered between each layer. The boards were screwed at nominally 150 mm and 300mm for respectively the perimeter and the center of the board.

The horizontal joints were staggered and located respectively at 600 mm and 2440mm for the exposed and non exposed face.

Compound and jointing tape were used for horizontally and vertically joints of both sides and for screw heads too.

3. TEST CONDITIONS

3.1. THERMAL PROGRAM

The furnace temperature rise above ambient was conducted according to the conventional thermal program represented by the following function:

$$T = 345 \log_{10} (8t+1) + 20$$

Where: t = time [min]
 T = temperature of the furnace at time t

This thermal program is close from those defined in the ASTM E 119 standard.

3.2. AMBIENT PRESSURE

Ambient pressure within the furnace was controlled and set at $+ 20 \pm 3$ Pa.

Recording pressure data is shown in Graphic 9.

4. TEST MEASUREMENTS

The location of the thermocouples installed appears in Appendix .

The measurement results are shown in the Appendix on the boards listed below.

4.1.TEMPERATURE MEASUREMENTS

4.1.1. Ambient temperature in the test hall

The initial ambient temperature in the test hall was taken as the average of TC15 to 20 before the start of the test, so **28°C**.

4.1.2. Temperatures in the furnace

Temperatures were measured by 6 thermocouples conform to ASTM E119, installed at 152 mm forward the exposed face of the partition.

Location	Identification	Graphic
At 152 mm forward the exposed face	PT1 to PT6	1

4.1.3. Temperature on the non exposed face of the specimen

They were measured by thermocouples complying with the requirements of ASTM norm

Location	Identification	Graphic
Temperatures in the quarters and the intersection of the diagonals of the partition	TC15-16-17-18-19	2
Temperatures of the boards on the non exposed face	TC20-21-22-23-24-25-26	3

4.1.4. Non mandatory measurements

Sixteen additional thermocouples has been implemented in order to better understand the heat transfer through the partition

4.1.4.1. Temperatures on the framework

Location	Identification	Graphic
Temperatures on the second stud	TC34-35-36	4
Temperatures on the third stud	TC37-38-39	5

4.1.4.2. Temperatures in the cavity

<i>Location</i>	<i>Identification</i>	<i>Graphic</i>
On the non exposed face of the first layer of the exposed boards	TC41-42-43-44-45	6
On the exposed face of the first layer of the non exposed boards	TC28-29-30-31-32	7

4.2.PRESSURE MEASUREMENTS

<i>Location</i>	<i>Identification</i>	<i>Graphic</i>
Ambiant pressure inside the furnace	TC60	8

4.3.DEFORMATION MEASUREMENTS

According to the requirements of EN 1364-1, vertical bending of the partition were measured at its center and at mid height of the free border side.

<i>Location</i>	<i>Identification</i>	<i>Graphic</i>
At the center of the partition	D1	10
At mid-height, free border side	D2	

5. CALCULATED RESULTS

5.1.INSULATION CRITERIA

According ASTM E 119, the insulation performance of a system is the time (full minutes) , while the separation function is kept until the surface temperature:

- a) does not exceed , on average, the initial average temperature of more than 139 K; or
- b) does not exceed , on the measurement points, the initial temperature of more than 181 K

The initial average temperature should be the average temperature of the unexposed side before the start of the test.

<i>Location</i>	<i>Identification</i>	<i>Graphic</i>
Temperature increase	TC15-16-17-18-19-20-21-22-23	11

5.2.THERMAL TRANSFER THROUGH THE PARTITION

The curves of the average temperature of all the instrumented surfaces have been gathered in a same graphic in order to better see the protecting effect of each layer.

<i>Location</i>	<i>Identification</i>	<i>Graphic</i>
Protecting effect of the exposed boards	PT1 to PT6 TC41-42-43-44-45	12
Protecting effect of the non exposed boards	TC28-29-30-31-32 TC15-16-17-18-19-20-21-22-23	

6. OBSERVATIONS

<i>Time (min)</i>	<i>Face</i>	<i>Comments</i>
00		Start of the test
07	Exposed	The joint tape starts to char
15	Exposed	Cracks on all the boards
17	Exposed	First pieces of boards start to fall
20	Non exposed	Opening of a vertical joint due to the twisting a stud
21	Non exposed	Opening of a vertical joint due to the twisting a stud
21'50	Non exposed	Positive cotton pad test
31'	Non exposed	Temperature measured above 218°C on TC17
33		End of test

7. PERFORMANCE CRITERIA

7.1.FIRE INTEGRITY

7.1.1. Cotton pad

Duration : **21'50 minutes**
Failure origin : **Test is positive**

7.1.2. Persistent flame

Duration : **34 minutes**
Failure origin : No failure at the end of test

7.2.THERMAL INSULATION

Duration : **32 minutes**
Failure origin : **Temperature measured above 218°C on TC17**

8. RESISTANCE TO FIRE PERFORMANCE

8.1.CORRECTED PERFORMANCE CRITERIA

8.1.1. Cotton pad

Duration : **23 minutes**
Failure origin : **Test is positive**

8.1.2. Persistent flame

Duration : **34 minutes**
Failure origin : No failure at the end of test

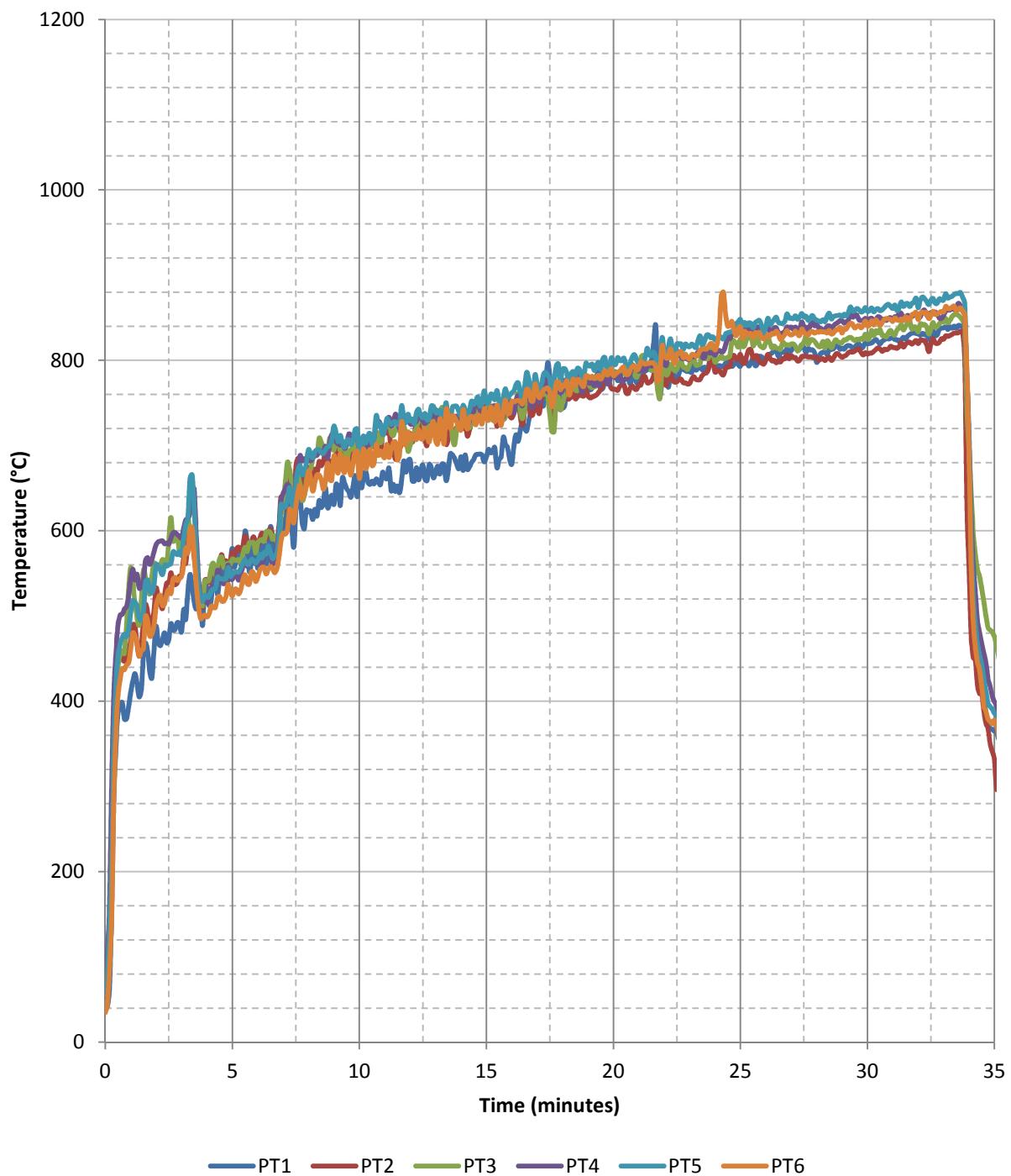
8.2.THERMAL INSULATION

Duration : **32 minutes**
Failure origin : **Temperature measured above 218°C on TC17**

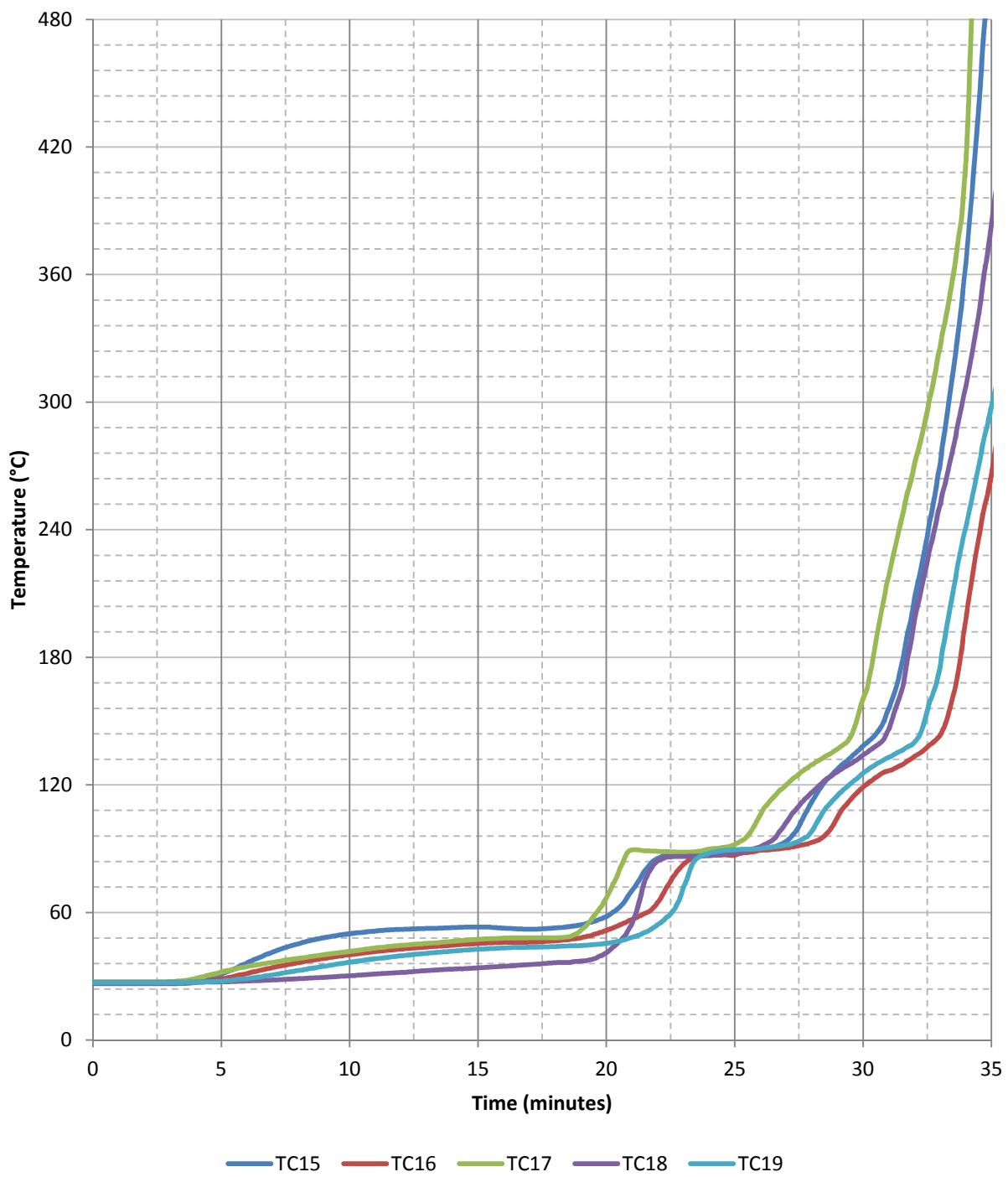
8.3.CONCLUSION

According the ASTM E119, the tested partition doesn't full fill the requirements to reach a 30 minutes resistance period.

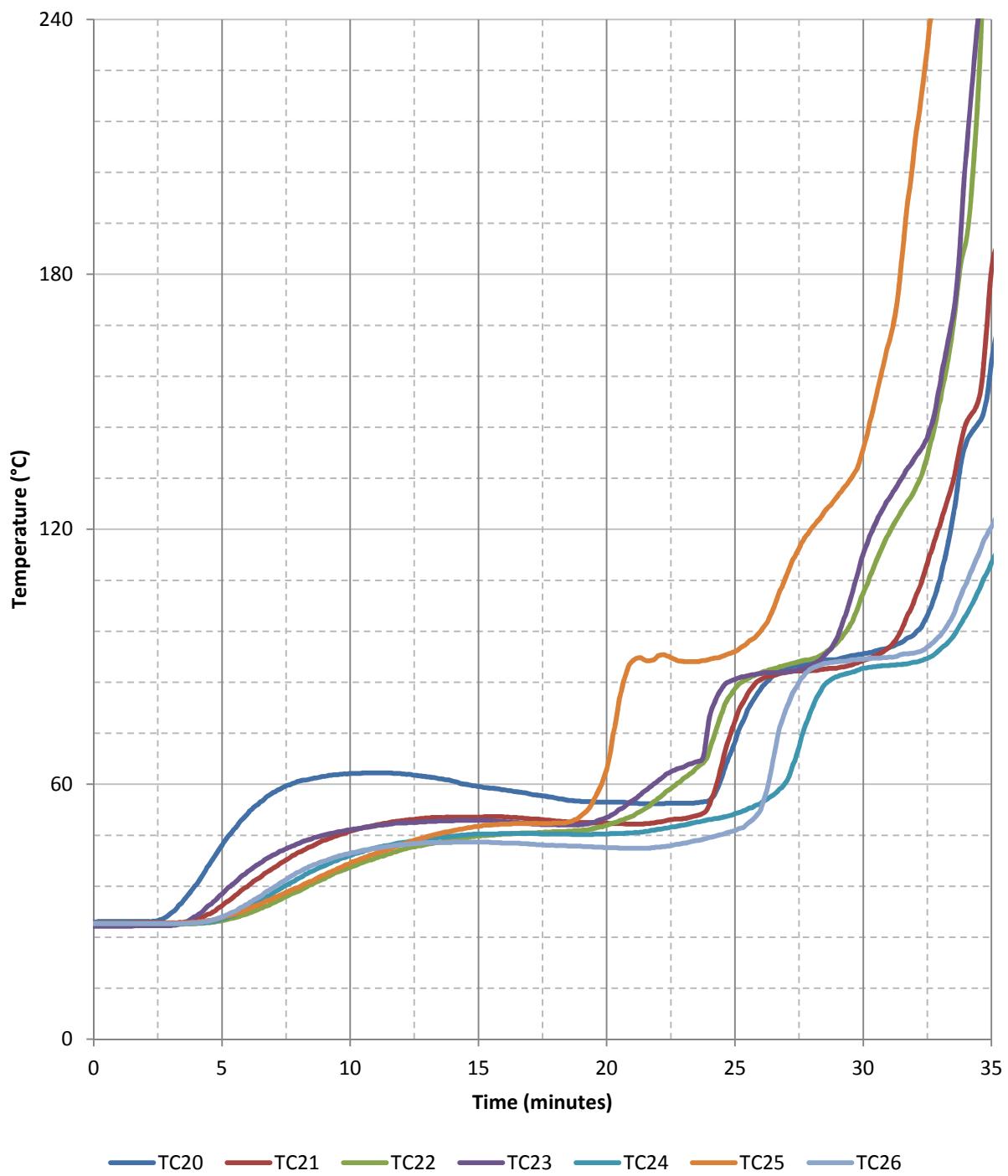
ANNEX 1-Graphics



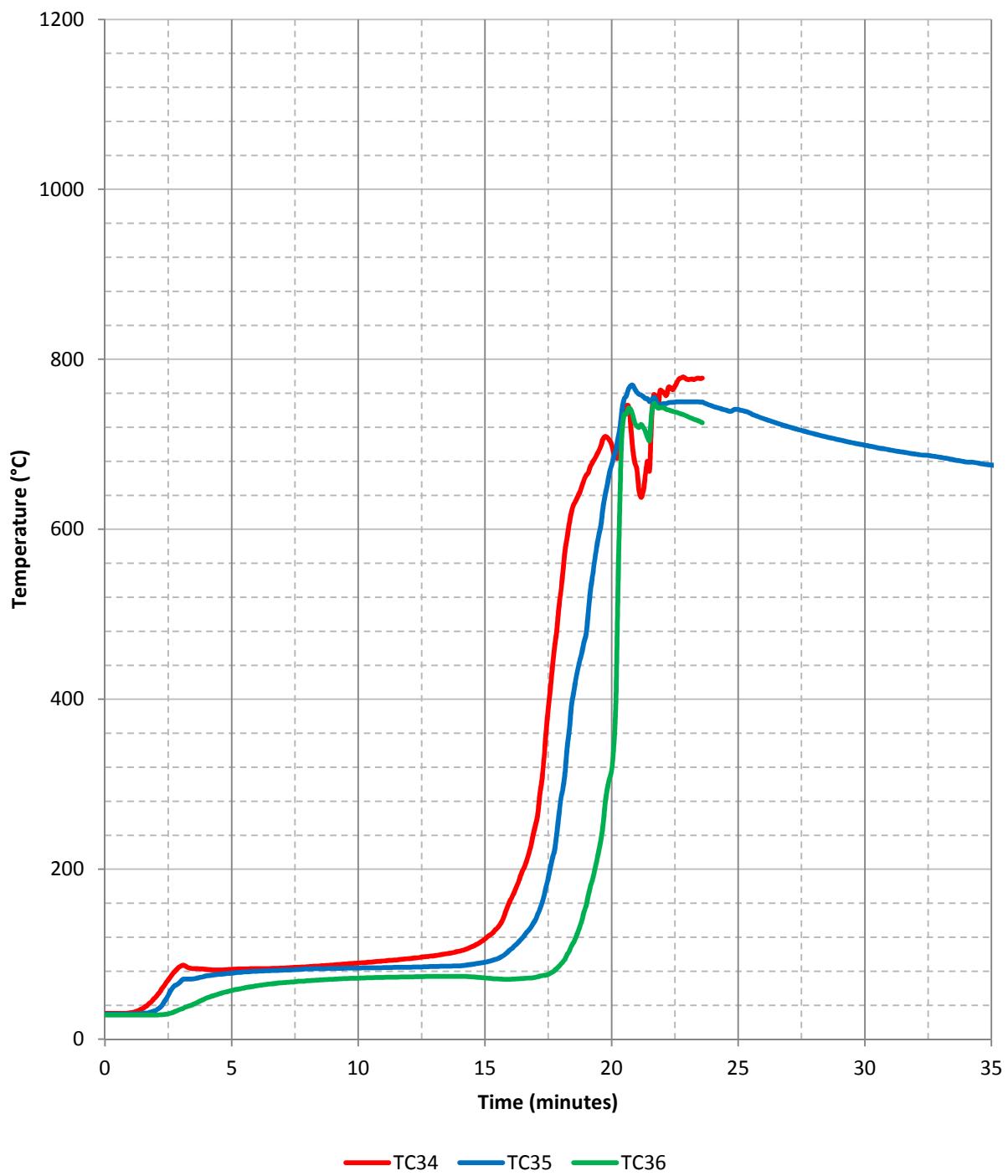
 Siniat Shaping the way people build	Temperatures in the furnace	TSRR	3047
		Graphic	1



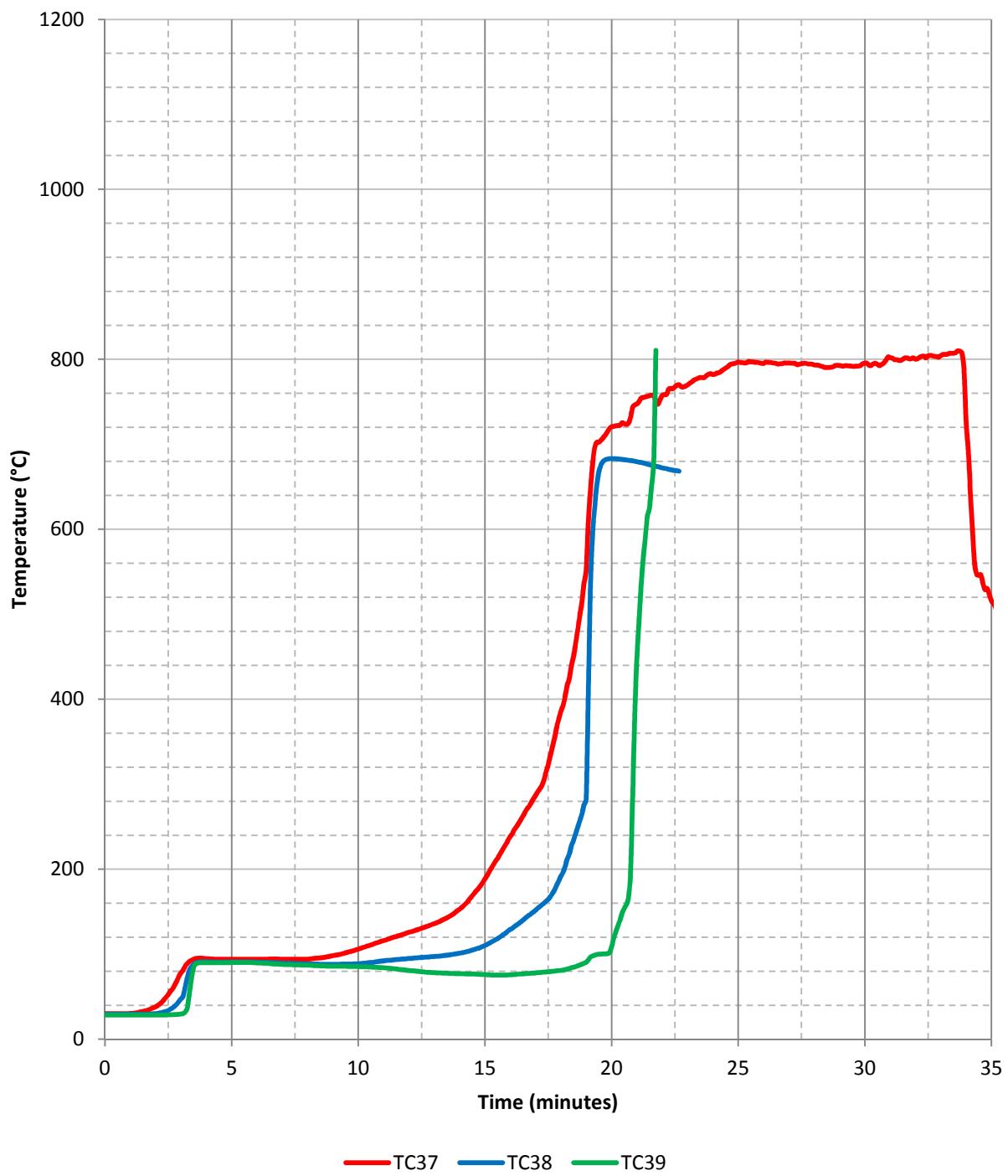
 Siniat Shaping the way people build	Temperatures in the quarters and the intersection of the diagonals of the partition	TSRR	3047
		Graphic	2



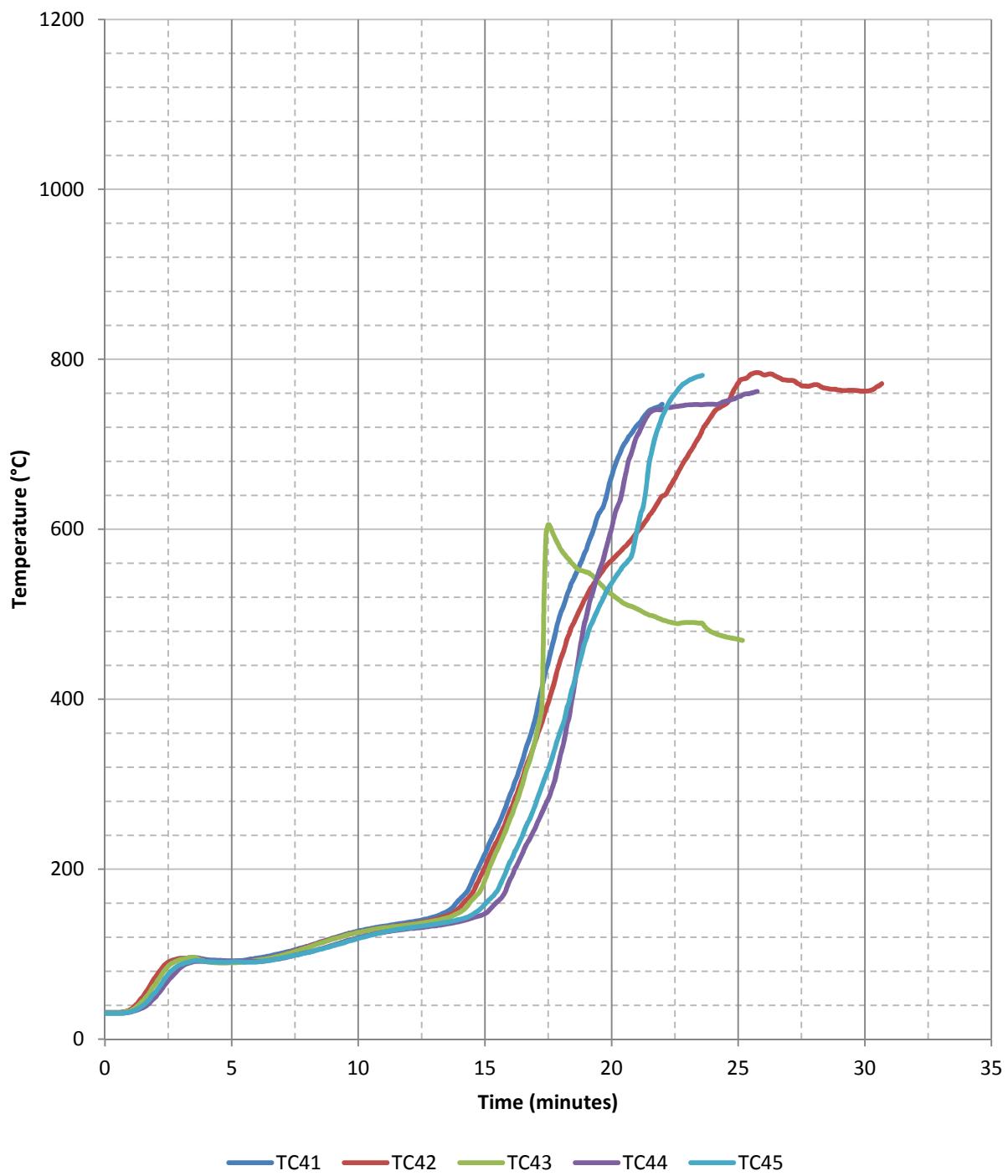
	Temperatures of the boards on the non exposed face	TSRR	3047
		Graphic	3



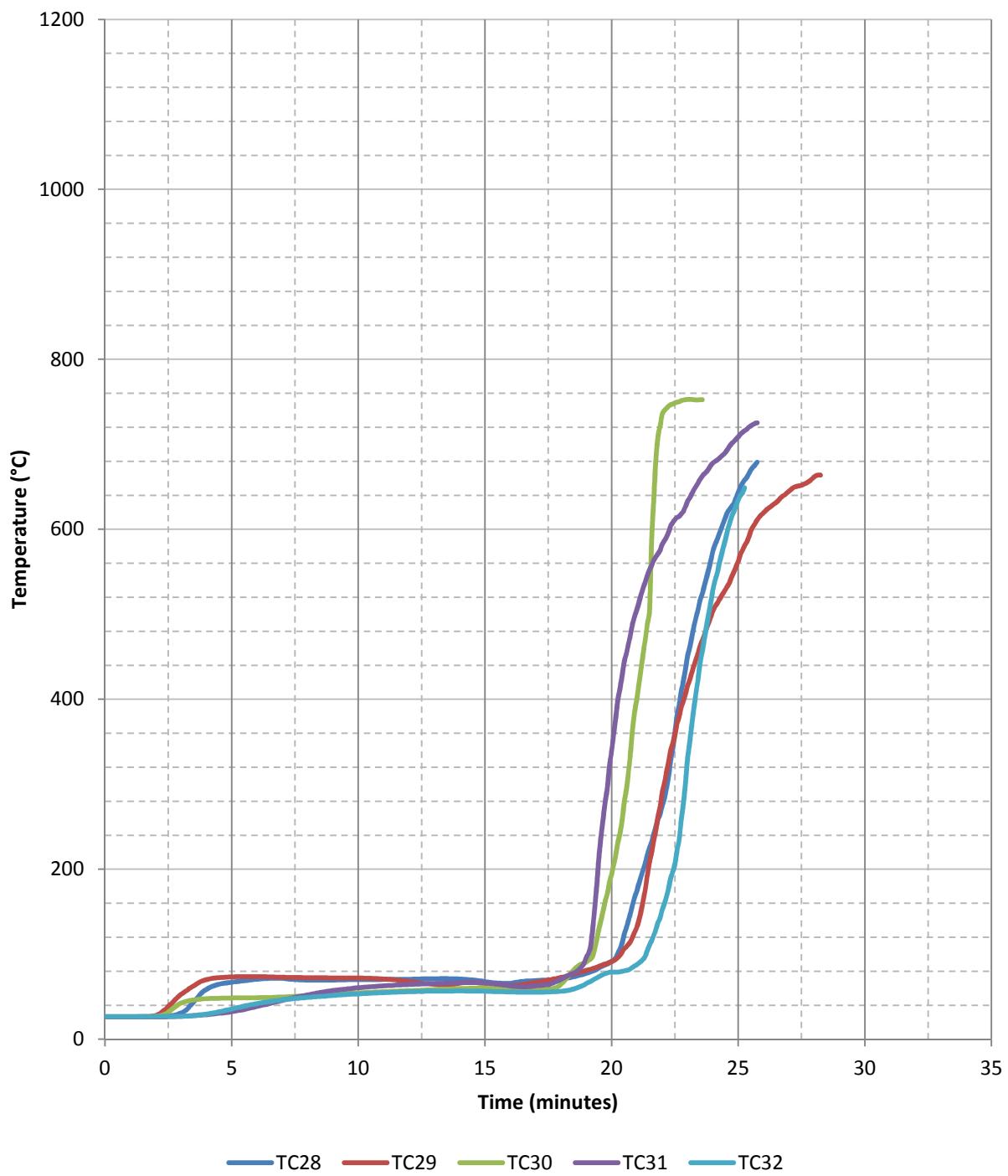
 Shaping the way people build	Temperatures on the second stud	TSRR	3047
		Graphic	4



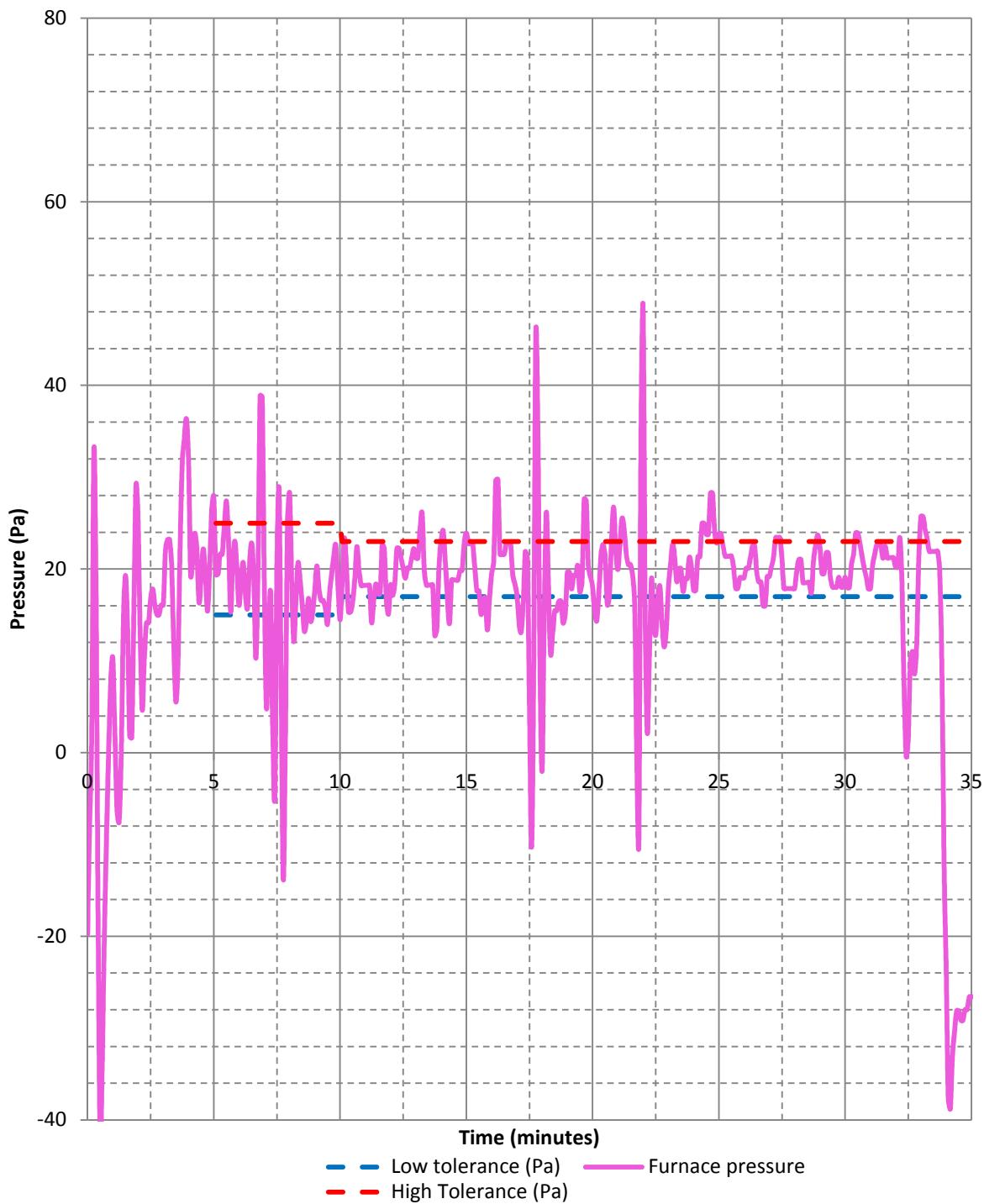
 Siniat	Temperatures on the third stud	TSRR	3047
		Graphic	5



 Siniat <small>Shaping the way people build</small>	Temperatures on the non exposed face of the first layer of the exposed boards	TSRR	3047
		Graphic	6

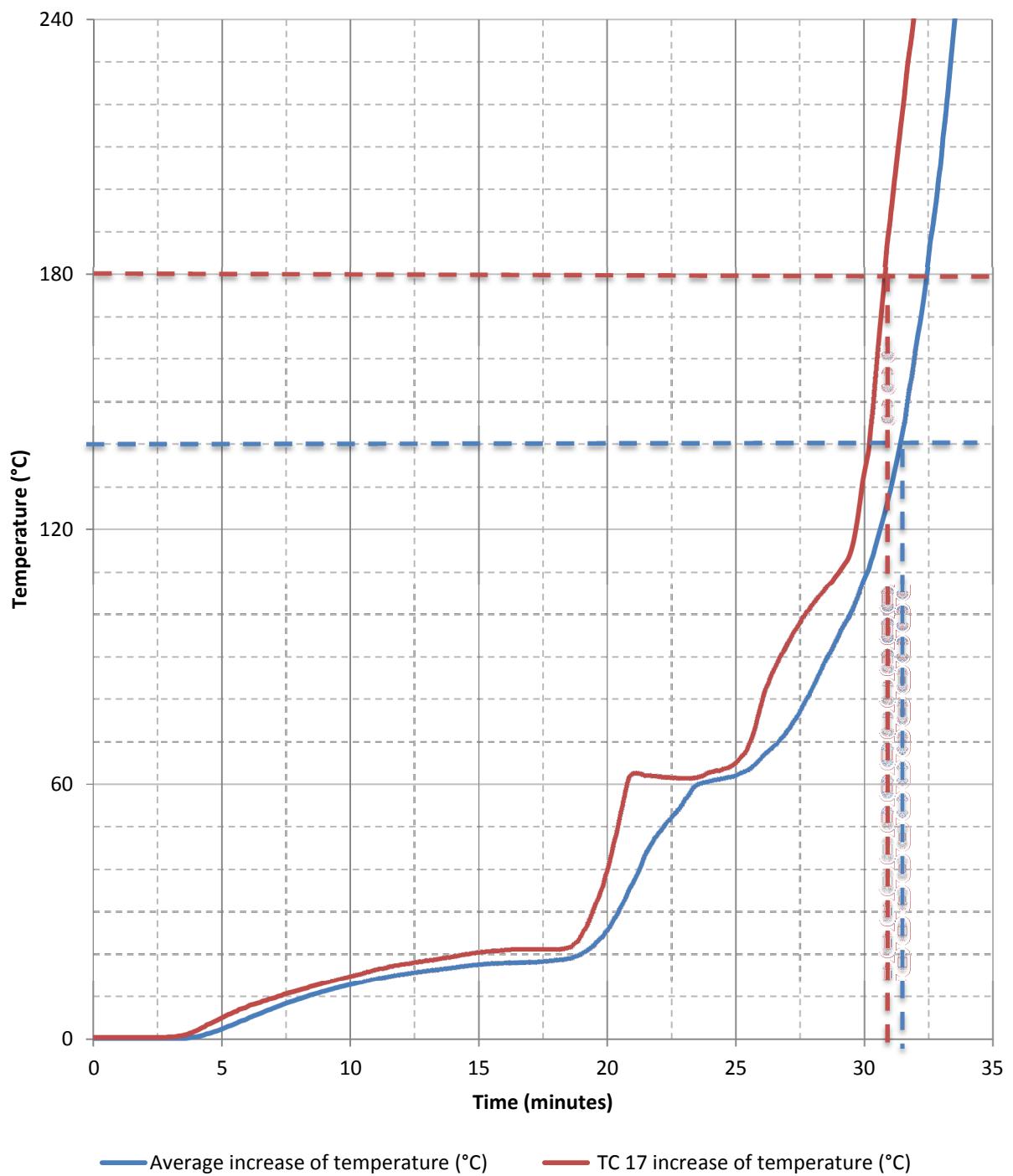


 Shaping the way people build	Temperatures on the exposed face of the first layer of the non exposed boards	TSRR	3047
		Graphic	7

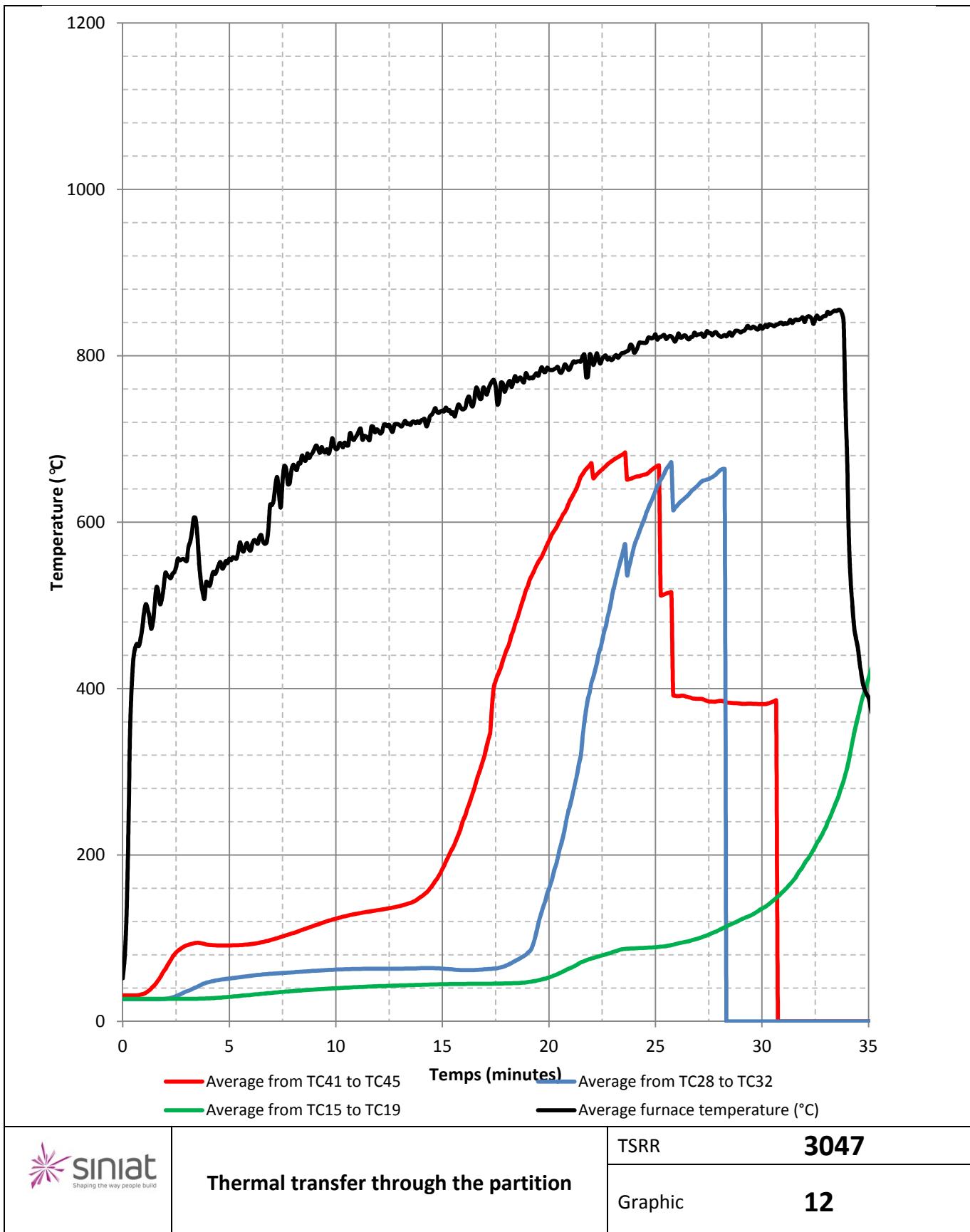


 Siniat <small>Shaping the way people build</small>	Ambient pressure inside the furnace at 100 mm of the top of the element	TSRR	3047
		Graphic	8





 Shaping the way people build	Insulation criteria	TSRR	3047
		Graphic	10



ANNEX 2-MOUNTING PLANS & INSTRUMENTATIONS

	SINIAT INTERNATIONAL SAS 500, rue Marcel Demonque Zone du Pôle Technologique Agroparc 84915 AVIGNON Cedex 9	Technical support SINIAT R&D and innovation Téléphone : + 33 4 32 44 42 45
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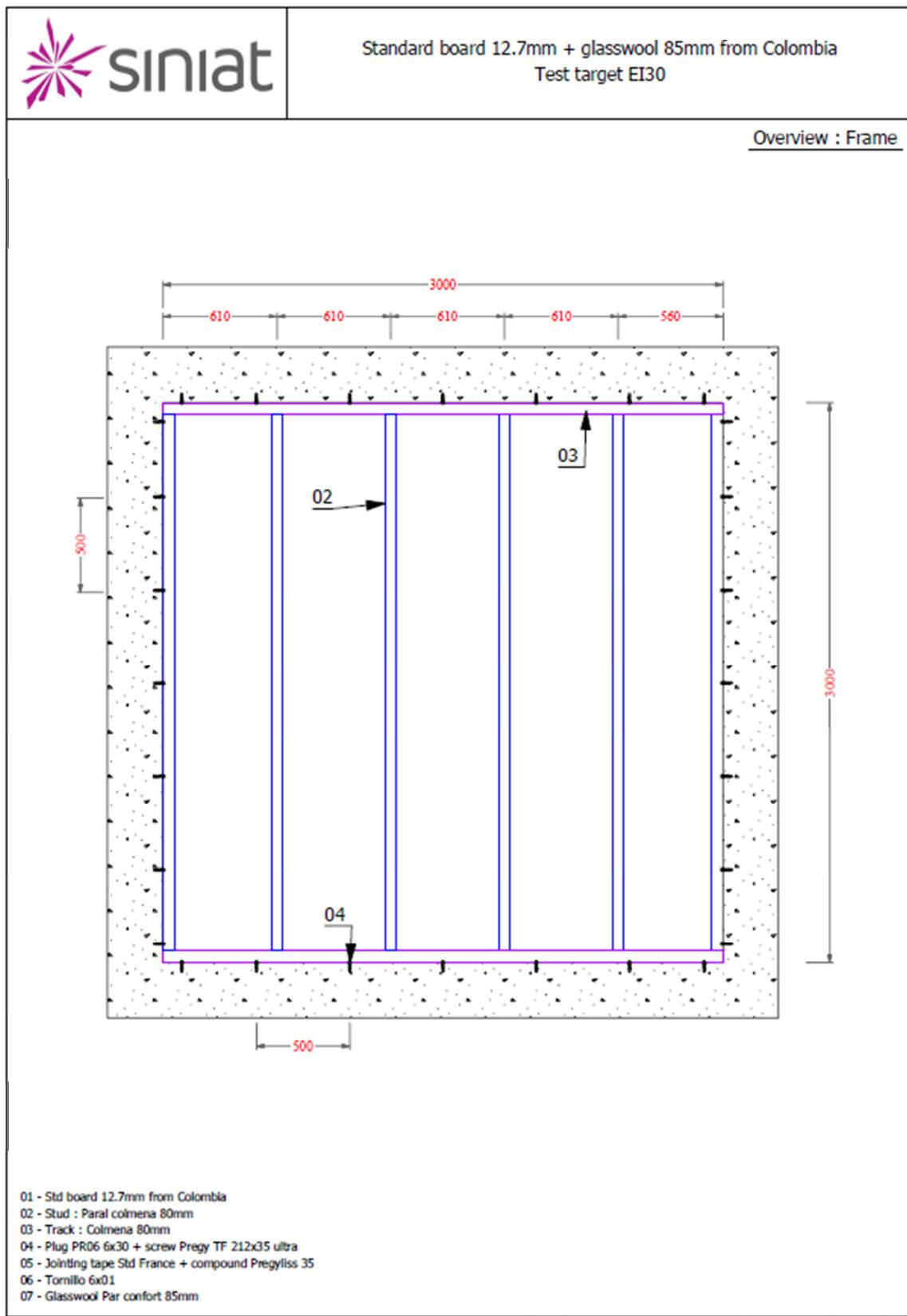
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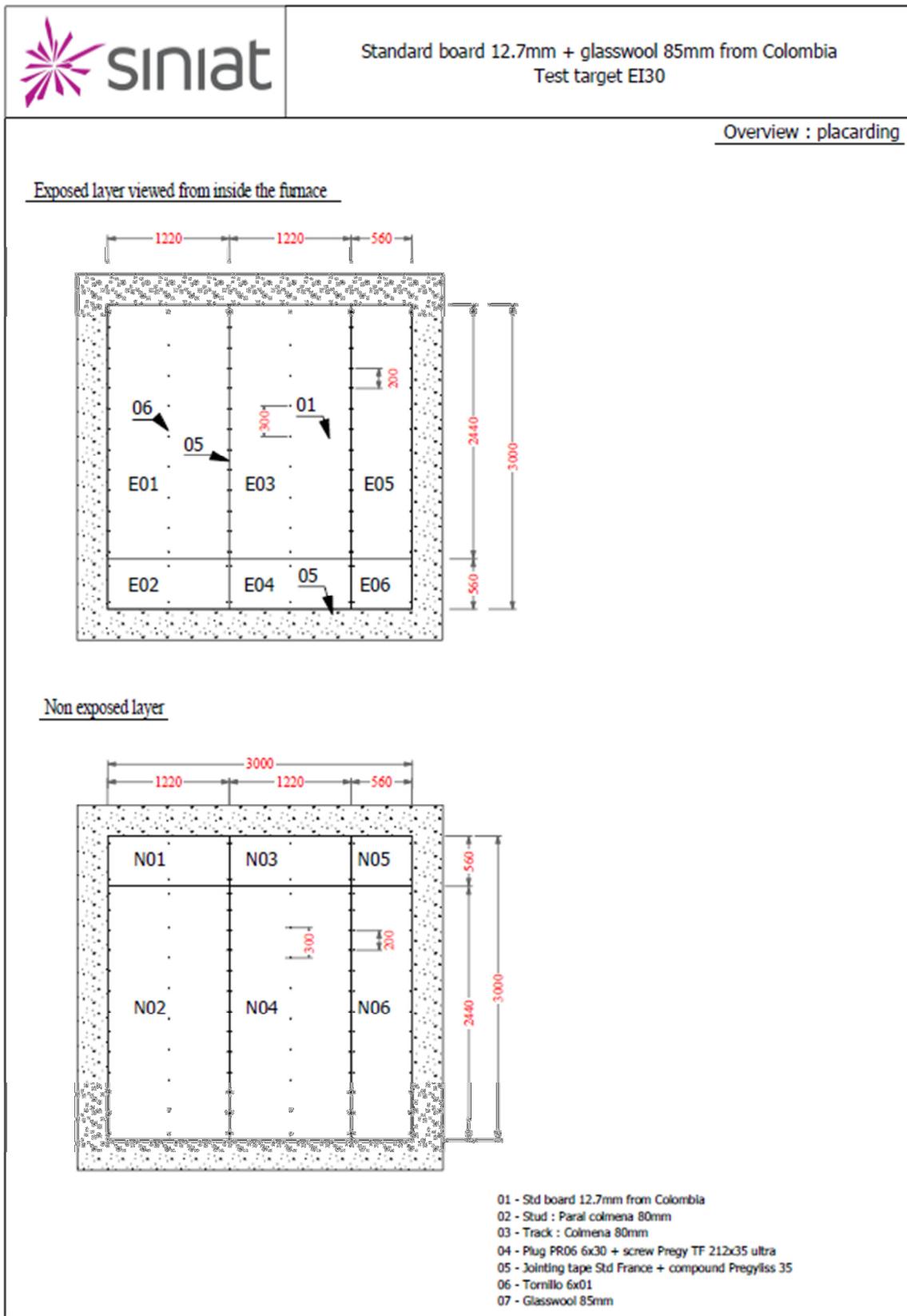
Resistance to fire
 Standard board 12.7mm + glasswool 85mm from Colombia
 Test target EI30

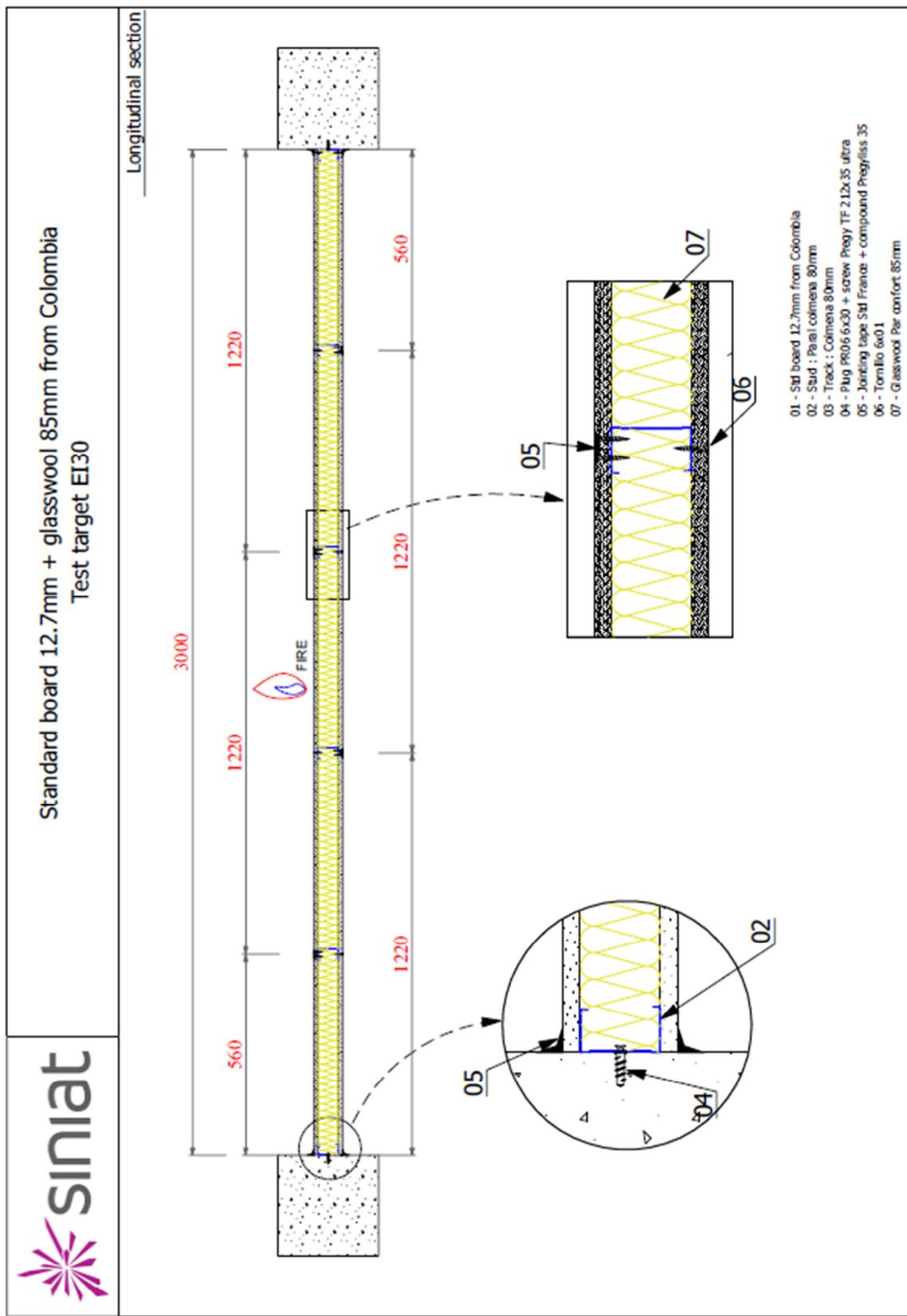
DESCRIPTION

Standard board 12.7mm from Colombia
 Glasswool 85mm
 Studs Paral colmena 80mm
 Tracks Colmena 80mm

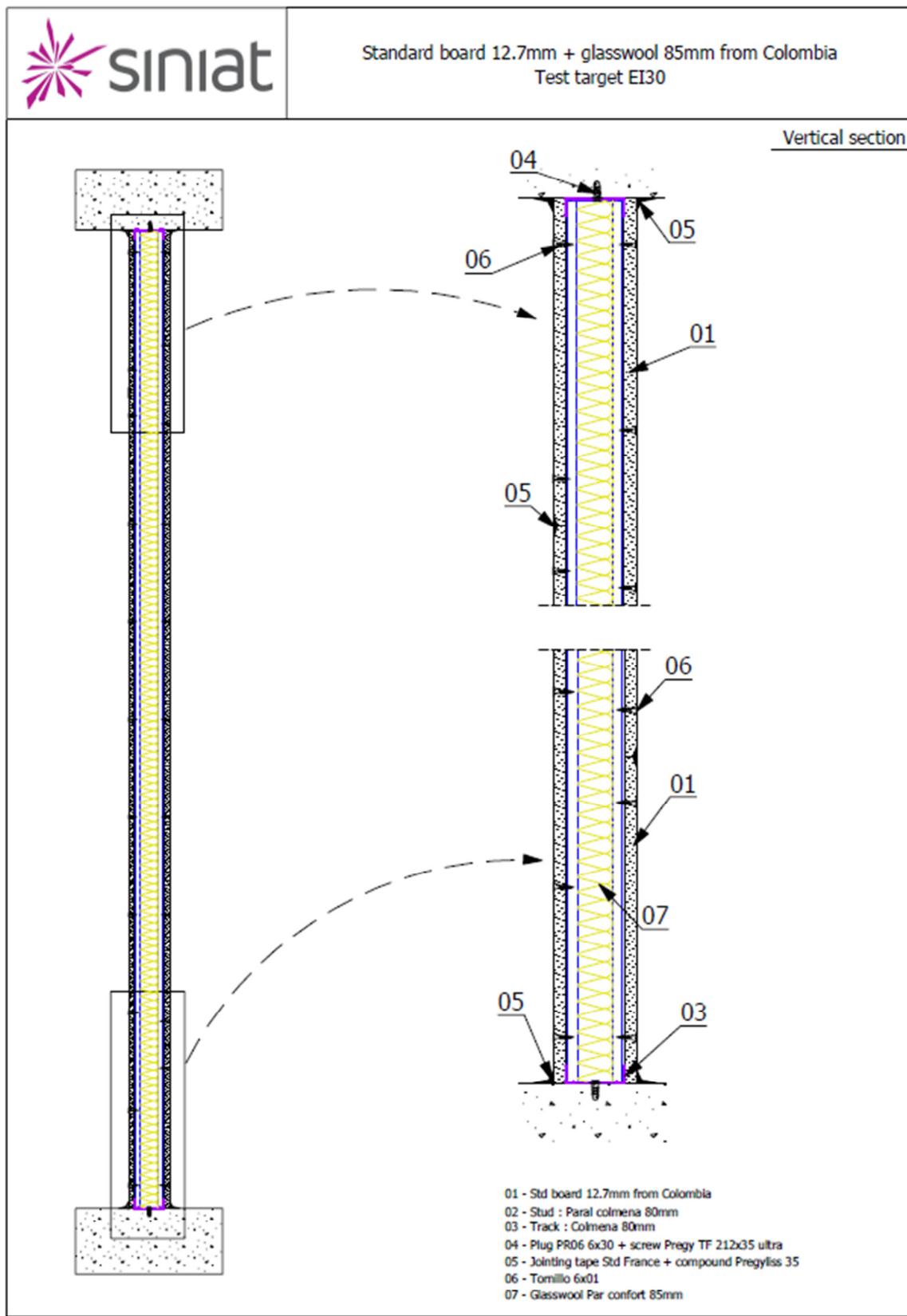
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This drawing is copyright ETEX and may not be reproduced without prior permission. Any modification or substitution of commercial components invalids the Systems technical performance and disclaims Dv-co from liability		Scale : cm/m	Reference file : TSRR 3047	Date : 27/05/2015
Person in charge Siniat : S.SEGURA		Index : 0	Writer : SF	Number of page : 09

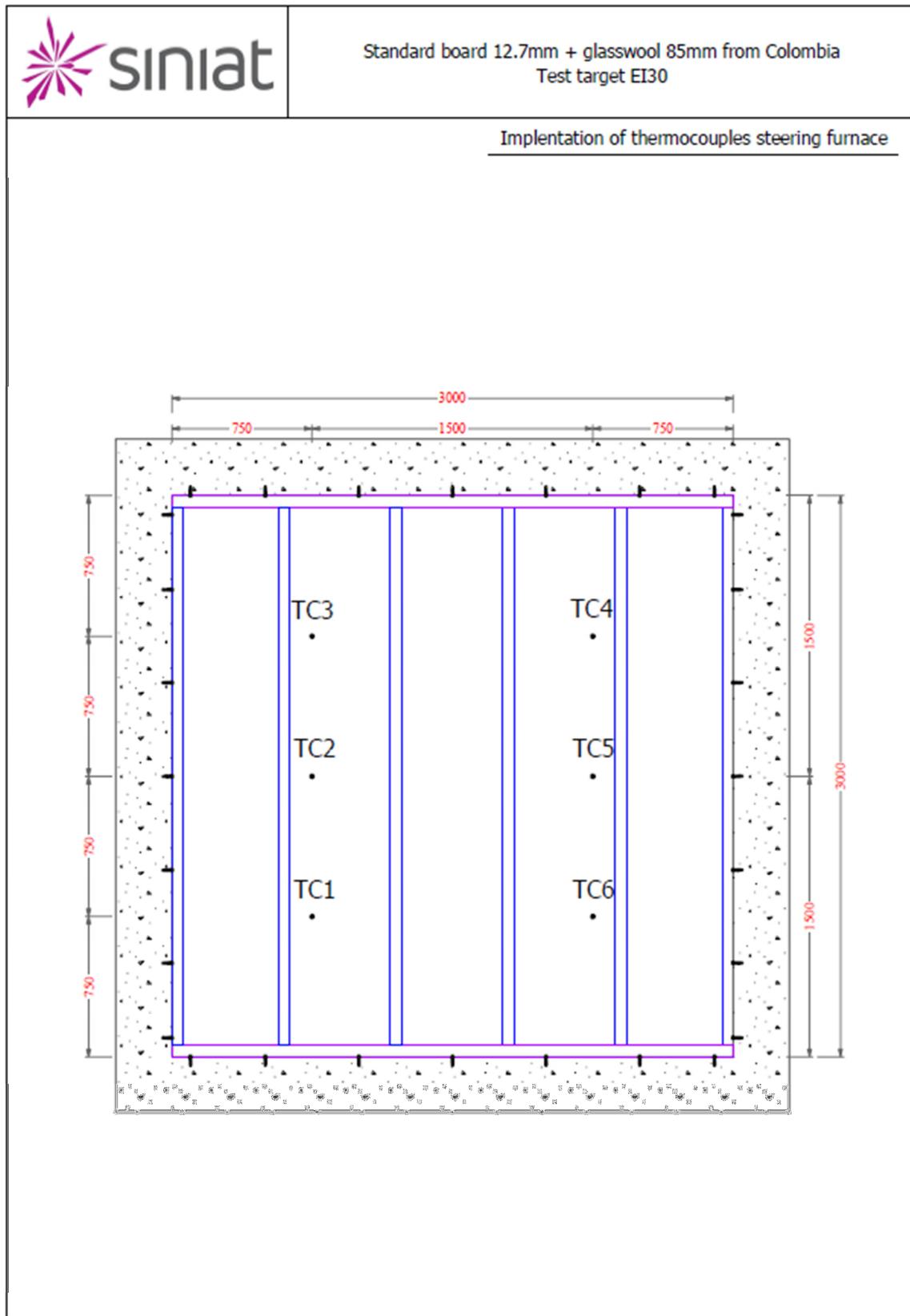




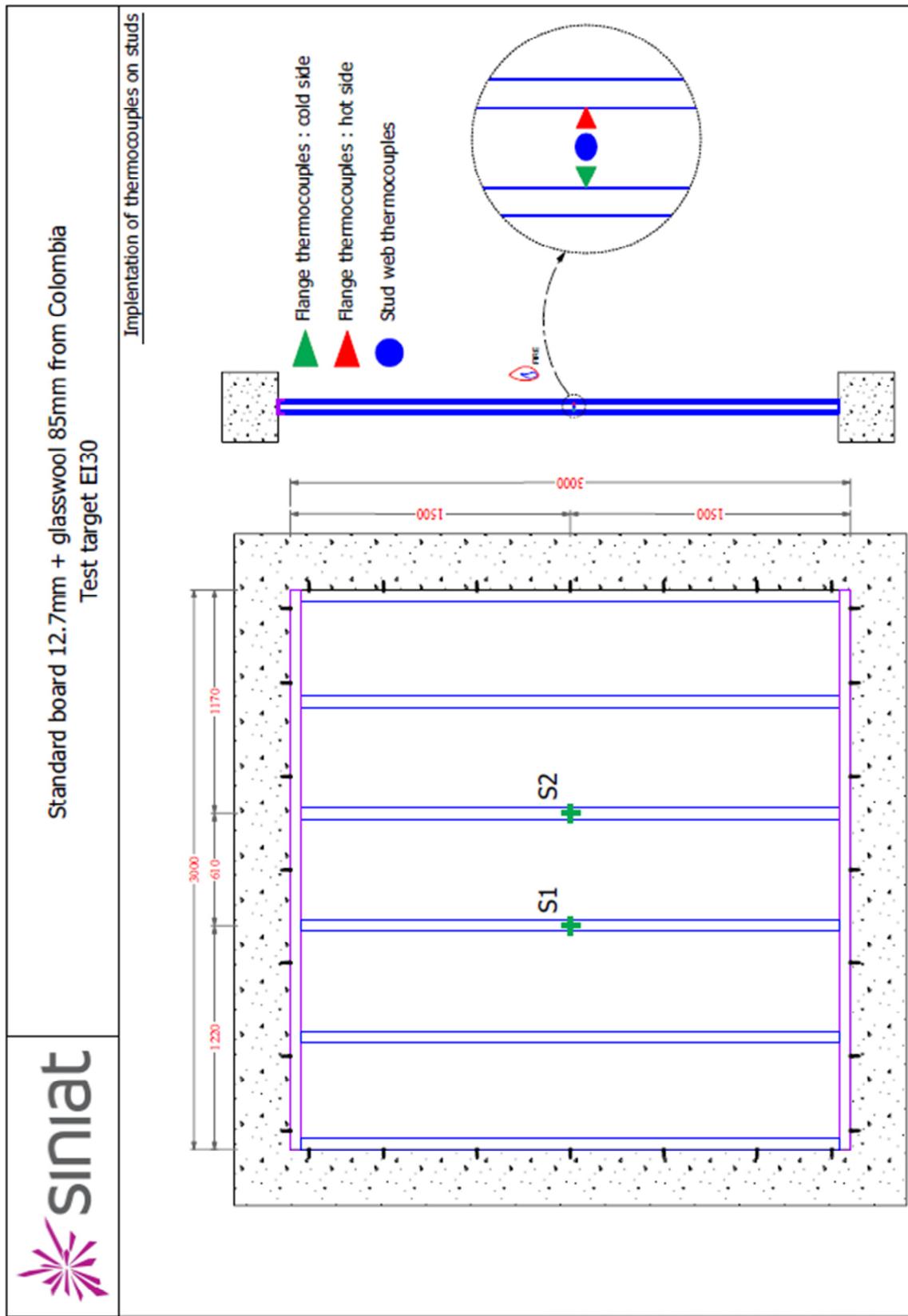


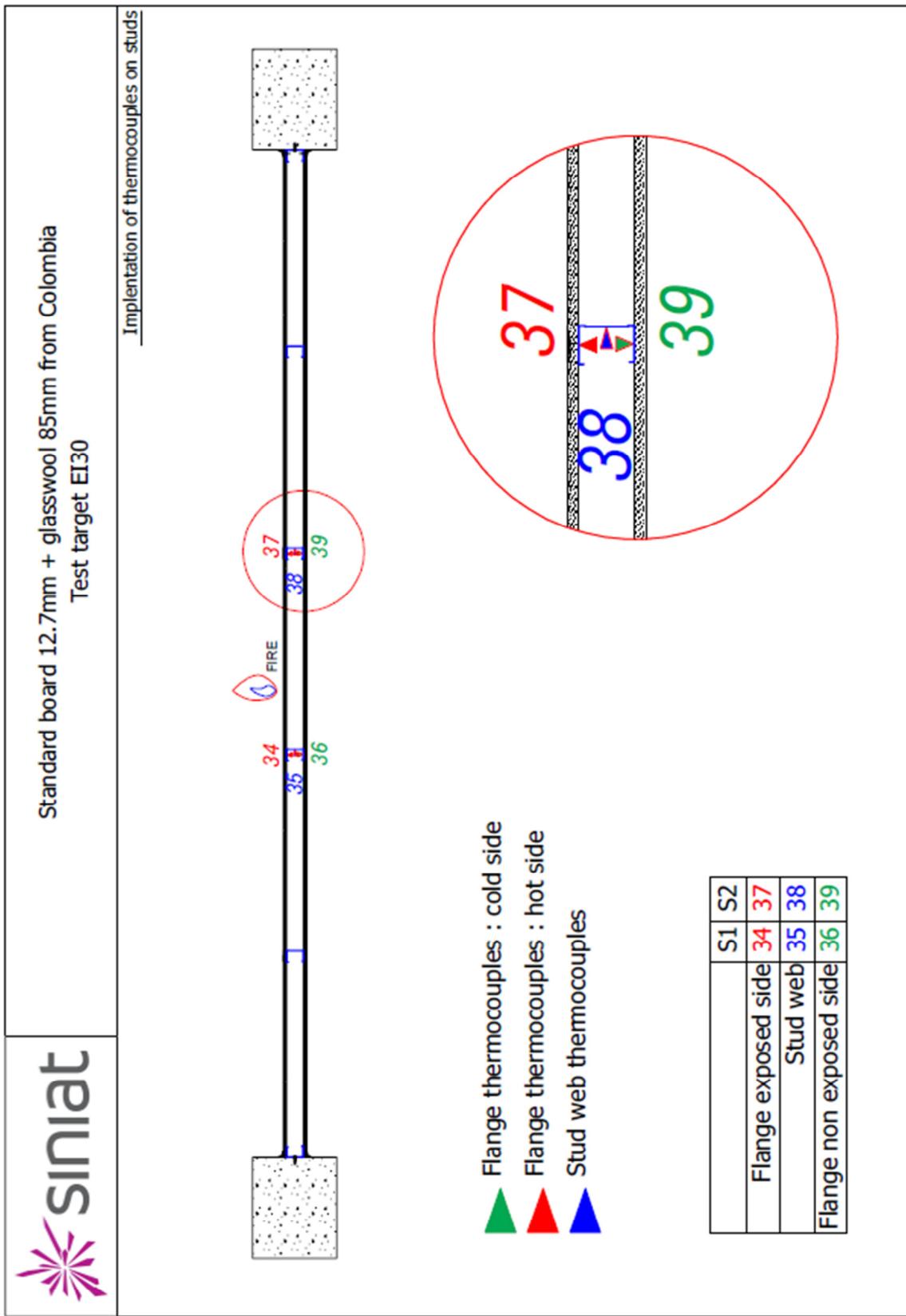
TSRR 3047-TDC-Std board Colombia 12.7mm - 27/05/15 - Page 03



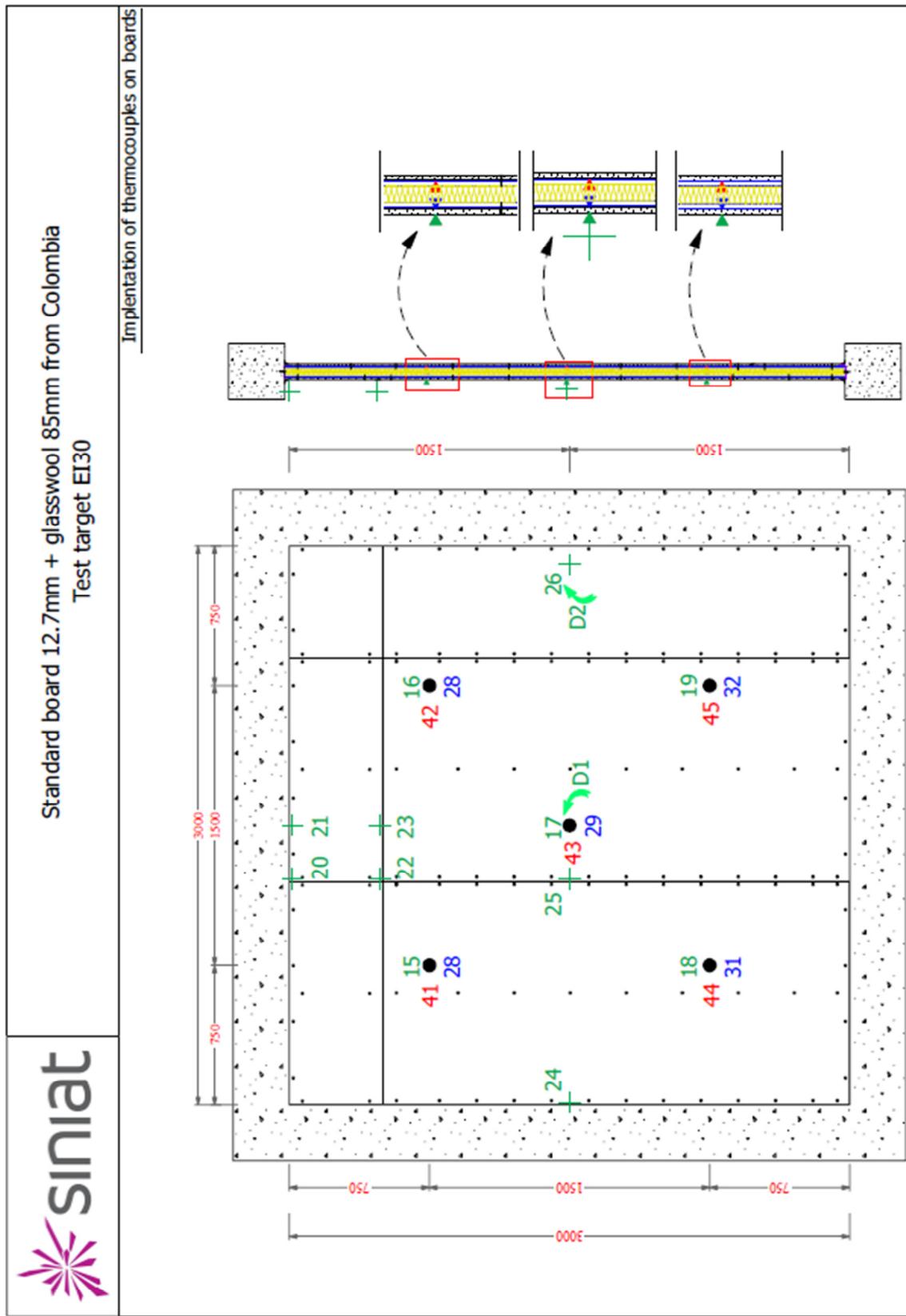


TSRR 3047-TDC-Std board Colombia 12.7mm - 27/05/15 - Page 06





TSRR 3047-TDC-Std board Colombia 12.7mm - 27/05/15 - Page 07



TSRR 3047-TDC-Std board Colombia 12.7mm - 27/05/15 - Page 08

ANNEX 3-PICTURES

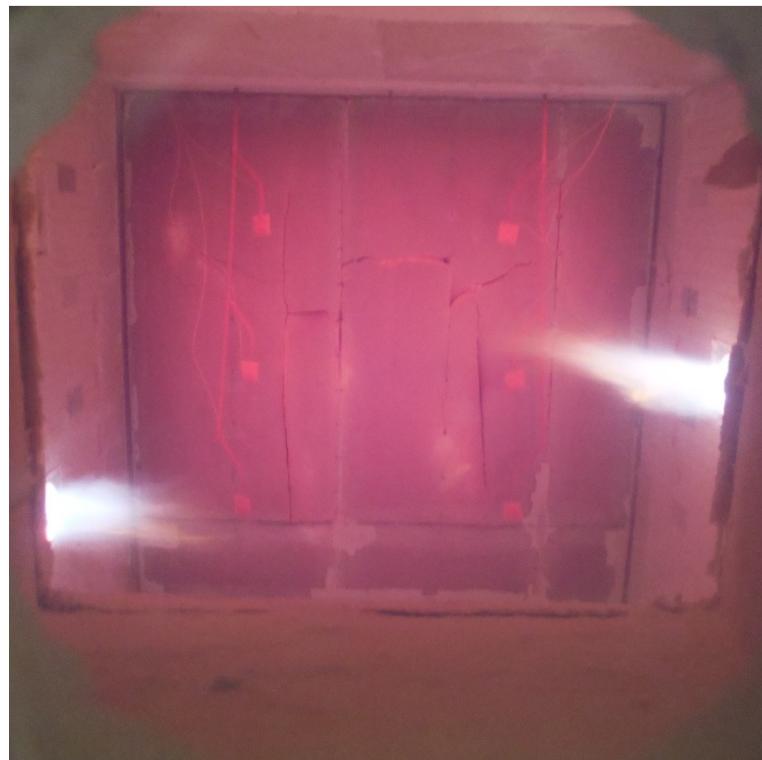


Figure 1 : Exposed face at 15 minutes

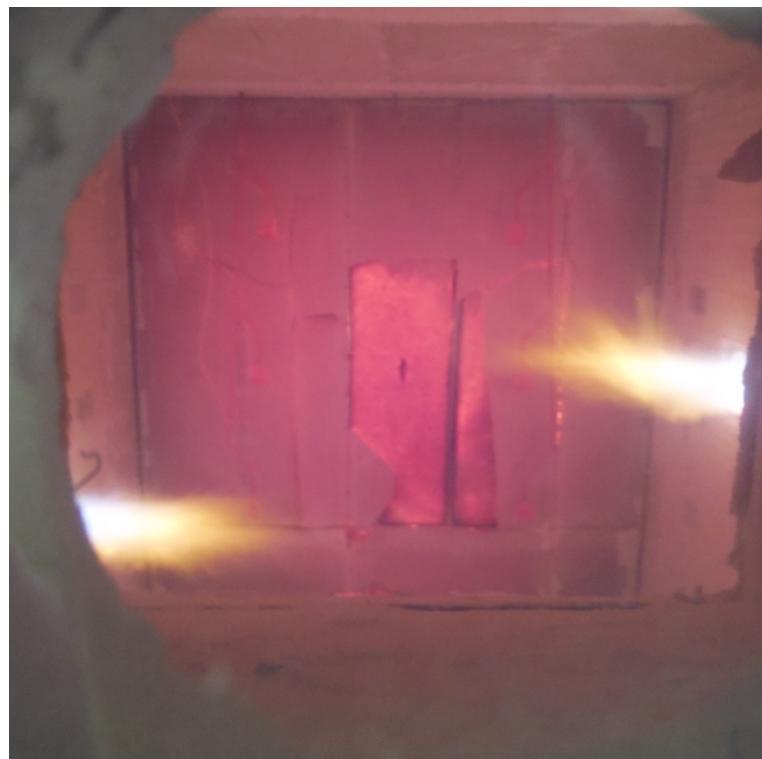


Figure 2 : Exposed face at 17 minutes

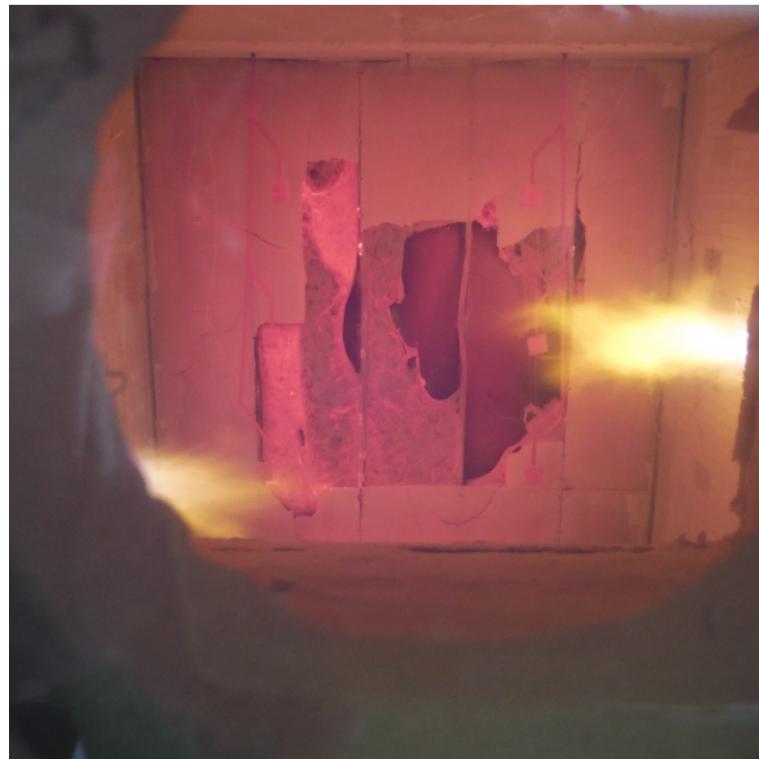


Figure 3 : Exposed face at 21 minutes

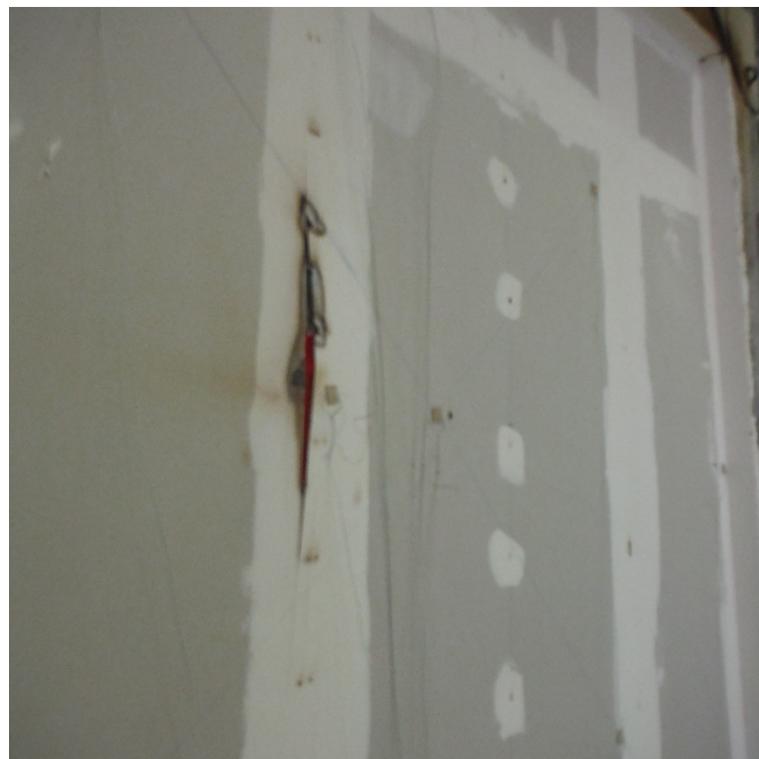


Figure 4 : Exposed face at 30 minutes



Figure 5 : Exposed face at 38 minutes



Contact Details

Sébastien Segura
(+33) 4 32 44 43 82
sebastien.segura@siniat.com

Siniat International S.A.S.

TECHNICAL DEVELOPMENT CENTER
500, rue Marcel DEMONQUE
Pôle AGROPARC
84915 Avignon _ Cedex 9
FRANCE
www.siniat.com