FIRELAB

TITLE	:	Report on the Large-scale Fire Resistance Properties of the non-load-bearing self-supporting **Litespan Double Studded Firewall** (division separating wall system) when tested in accordance with the **SANS 10177 – Part 2** test protocol
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SCOPE

This report classifies the Fire Resistance Properties of the **Litespan Double Studded Firewall** system when tested and classified in accordance with the **SANS 10177 – 2** test protocol.

Section 1: Detailed information on the specimen construction

Section 2: Test protocol used for classification

Section 3: Observations made, temperatures recorded with photographs taken before, during and after the **SANS 10177 – 2** test

Section 4: Discussion of results

Section 5: Conclusion

Annexure "A": Company information

Annexures "B": Product information and schematic section through the test panel supplied by **Technopol SA**

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1. SAMPLE DESCRIPTION

Technopol SA installed the load-bearing **Litespan Double Studded Firewall** (division separating wall system) in the test frame of **FIRELAB**'s Vertical **SANS 10177 – 2** test facility. The wall system contained no service terminations.

Description of wall system:

System:	**Litespan Double Studded Firewall**
System Abbr. name:	**Litespan Firewall**
System Type:	Firewall
Total Thickness:	± 195 mm
Proposed Application:	Division/occupancy/tendency separating walls
Application requirement:	FR 120, non-load-bearing self-supporting
Wall Type:	Double composite panel wall system

Wall Details;

Type:	Double insulated panel on structural element
Panel orientation:	Horizontal
Structural element:	76 mm x 76 mmm x 3 mm square tubing
Wall Cavity:	No insulation

Panel details;

Type:	Panel consist of Stonewool and Chromadek (60 mm)
Fixing:	Polyurethane glue
Fixing to structural element:	Standard screw fixing

Panel Joint;

Type:	Chromadek profiled to clip into each other with feather
Sealant:	Fire Resistance
Joint reinforcement:	N/A
Cover Strips:	N/A
Fasteners:	Steel feather inserted between joint with 400 mm c/c screws

Structural and Non-Structural Elements;

Primary Studs:	76 mm x 76 mm x 3 mm square tubing
Stud Spacing:	2 m
Secondary:	N/A
Floor runner:	198 mm x 50 mm x 1.2 mm (thick) Chromadek C-Section
Top Runner:	198 mm x 50 mm x 1.2 mm (thick) Chromadek C-Section
Wall ties:	N/A

The test specimen is shown from the exposed and unexposed sides in Figures 1.1 and 1.2 prior to commencement of the test.

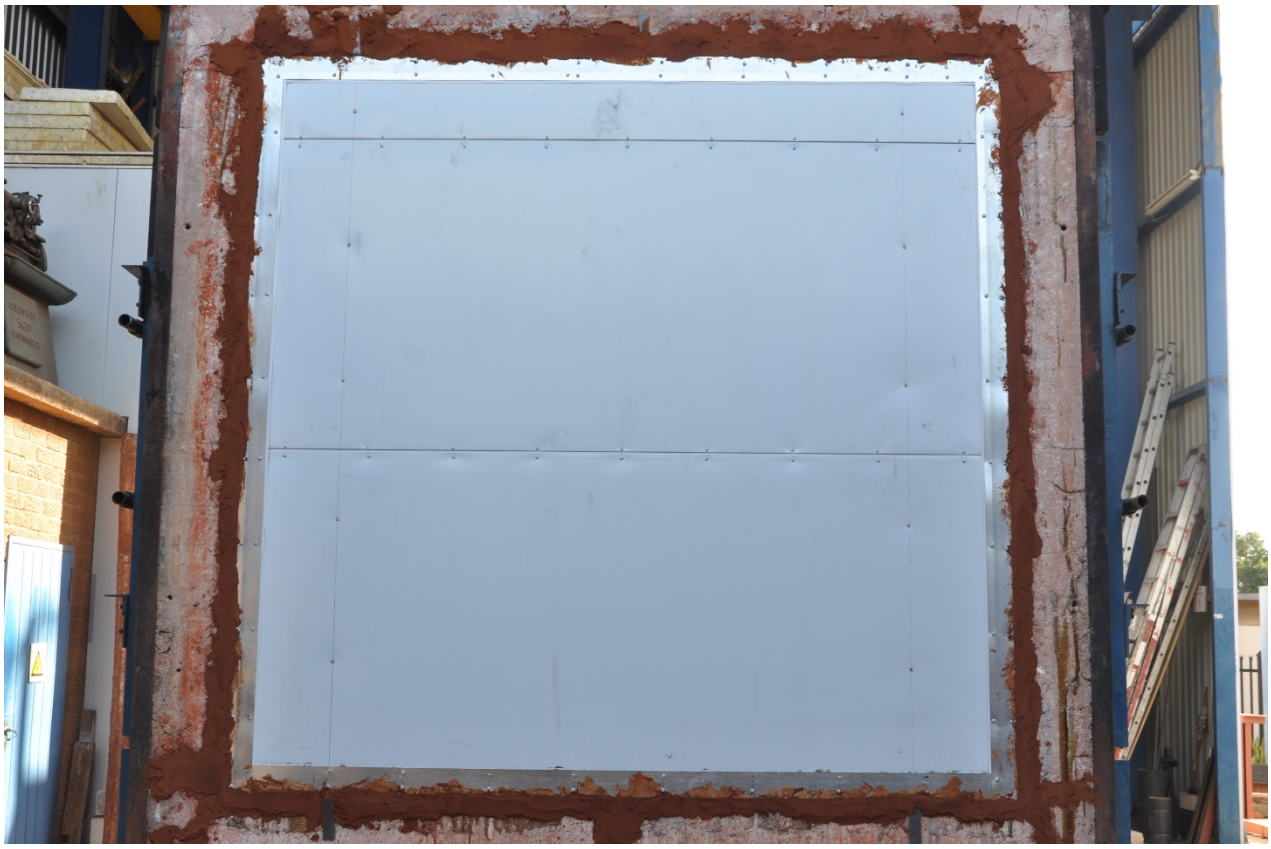


*Figure 1.1: The **Litespan Firewall** from the exposed side prior to the test*

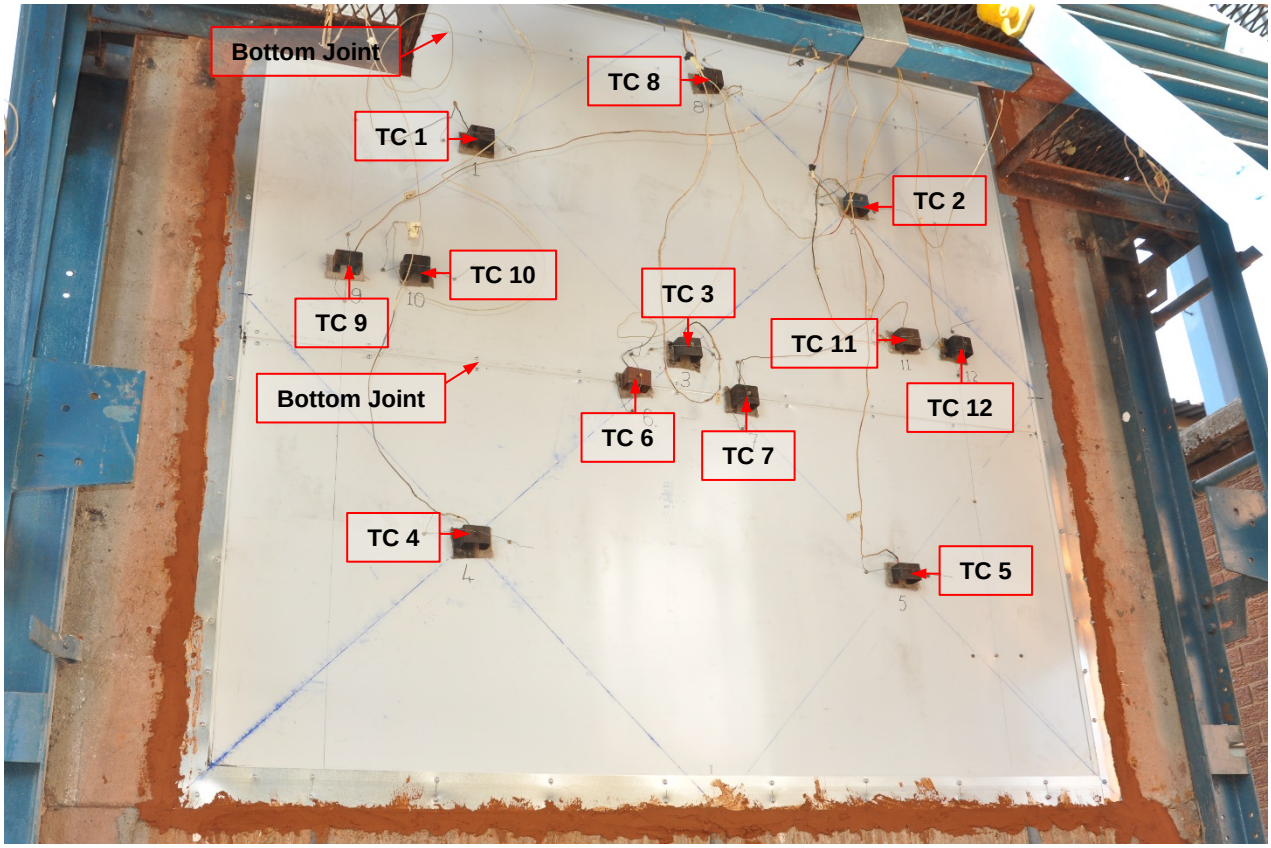


*Figure 1.2: The **Litespan Firewall** with thermocouples from the unexposed side*

2. FIRE RESISTANCE: SANS 10177 – PART 2:2005

2.1. TEST PROCEDURE

The 2.7 meter-high by 2.7 meter-wide system was tested for fire resistance in a large-scale air-aspirated diesel furnace. The furnace temperature was controlled to follow the **ISO standard time-temperature curve** as stipulated in **SANS 10177 – 2**. The **Fire Resistance Rating** (**FRR**) of the system is determined based on the following criteria:

- ***Stability (R)**: **Loadbearing**:

  The system is considered to fail structurally should the primary stud (structural element) temperature of a light-weight steel system reaches 375 °C or the deflection is beyond the Neutral Axis (Deflection measured from unexposed side is more than 50 % of the wall thickness).

  Non-loadbearing:

  The test specimen should remain in-tack inside the test frame for the full duration of the test.

- ***Integrity (E)***: The system is deemed to have failed should flames be observed on the unexposed side or an opening larger than 6 mm wide or 150 mm long is noted.

- ***Insulation (I)***: The temperature on the unexposed surface may not exceed 140 °C plus ambient temperature on average or 180 °C plus ambient maximum at any of the measured surface positions.

**Although the specimen is a non-load bearing system, cavity/stud temperature (TC 10 and TC 11) and deflection were measured for additional information.*

The criteria for ***Integrity*** were evaluated through the observations noted in Table 3.1.

The ***Insulation*** criteria of the specimen wall were measured using 5 K-Type thermocouples (TC 1 – TC 5) placed in a grid of equal area. Additional thermocouples were used to measure the joints (TC 6, TC 7 & TC 8)

For additional information, two thermocouples were used to measure/monitor the heat transmission effect of the screw fixing the panel to the studs (TC 9 and TC 12).

Positions of the thermocouples can be seen in Figure 1.2.

2.2. TEST EQUIPMENT

- Data logging equipment c/w controller
- Stopwatch
- K-Type thermocouples
- **SANS 10177 – 2** Vertical Test Facility

3. TEST RESULTS

The specimen was tested on 15 September 2020. The average ambient temperature during test was 25.3 °C.

Technopol SA – Litespan Firewall

OBSERVATIONS DURING THE **SANS 10177 – 2** TEST

TIME (hh:mm:ss)	**DESCRIPTION**
00:00:00	**– Test Started –**
00:02:20	Light smoke release from left perimeter
00:03:00	Light smoke release from all perimeters
00:06:40	Smoke release from bottom joint
00:07:45	Discolouration in smoke
00:11:30	Smoke release from top joint
00:12:45	Discoloration on left perimeter
00:22:40	Discolouration on left perimeter increase
00:35:30	Smoke release increase
01:11:30	Top joint discolouring
01:25:00	Smoke release increase
02:06:00	**– Test Concluded –**

Note(s):

*Table 3.1: Observations recorded during the **SANS 10177 – 2** test*

Technopol SA – Litespan Firewall

DEFLECTION MEASUREMENTS DURING THE **SANS 10177 – 2** TEST

EVENT	TIME (hh:mm:ss)	DESCRIPTION	
	00:00:00	**– Test Started**	2 mm
1	00:10:00	Deflection »	2 mm
2	00:20:00	Deflection »	2 mm
3	00:30:00	Deflection »	6 mm
4	00:40:00	Deflection »	10 mm
5	00:50:00	Deflection »	7 mm
6	01:00:00	Deflection »	5 mm
7	01:10:00	Deflection »	5 mm
8	01:20:00	Deflection »	- 7 mm
9	01:30:00	Deflection »	- 12 mm
10	01:40:00	Deflection »	- 20 mm
11	01:50:00	Deflection »	- 22 mm
12	02:00:00	Deflection »	- 27 mm
	02:06:00	**– Test Concluded –**	

Note(s):

*Table 3.2: Deflection measurements recorded during the **SANS 10177 – 2** test*

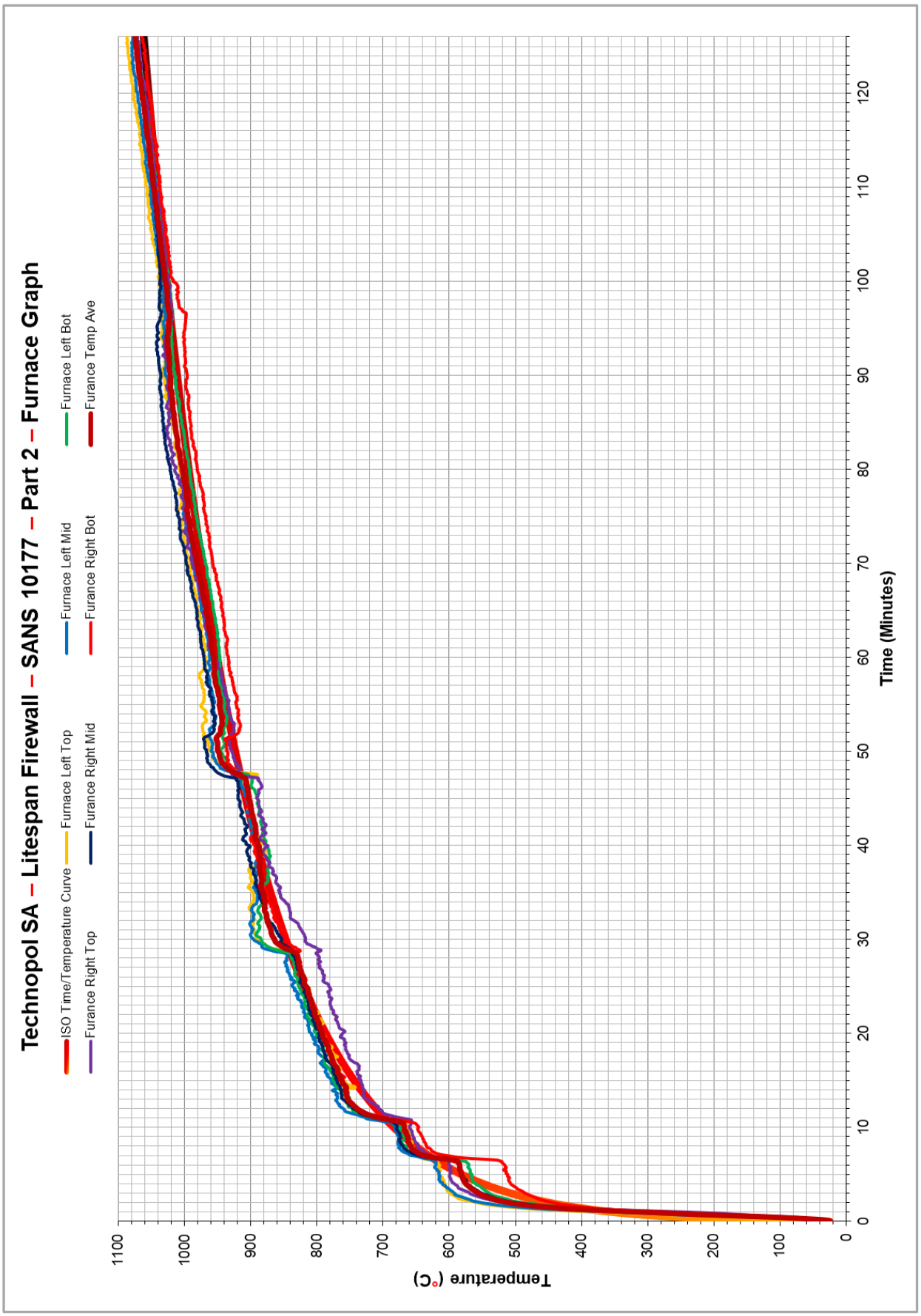


*Figure 3.1: Furnace temperatures recorded during the large-scale **FR** test*

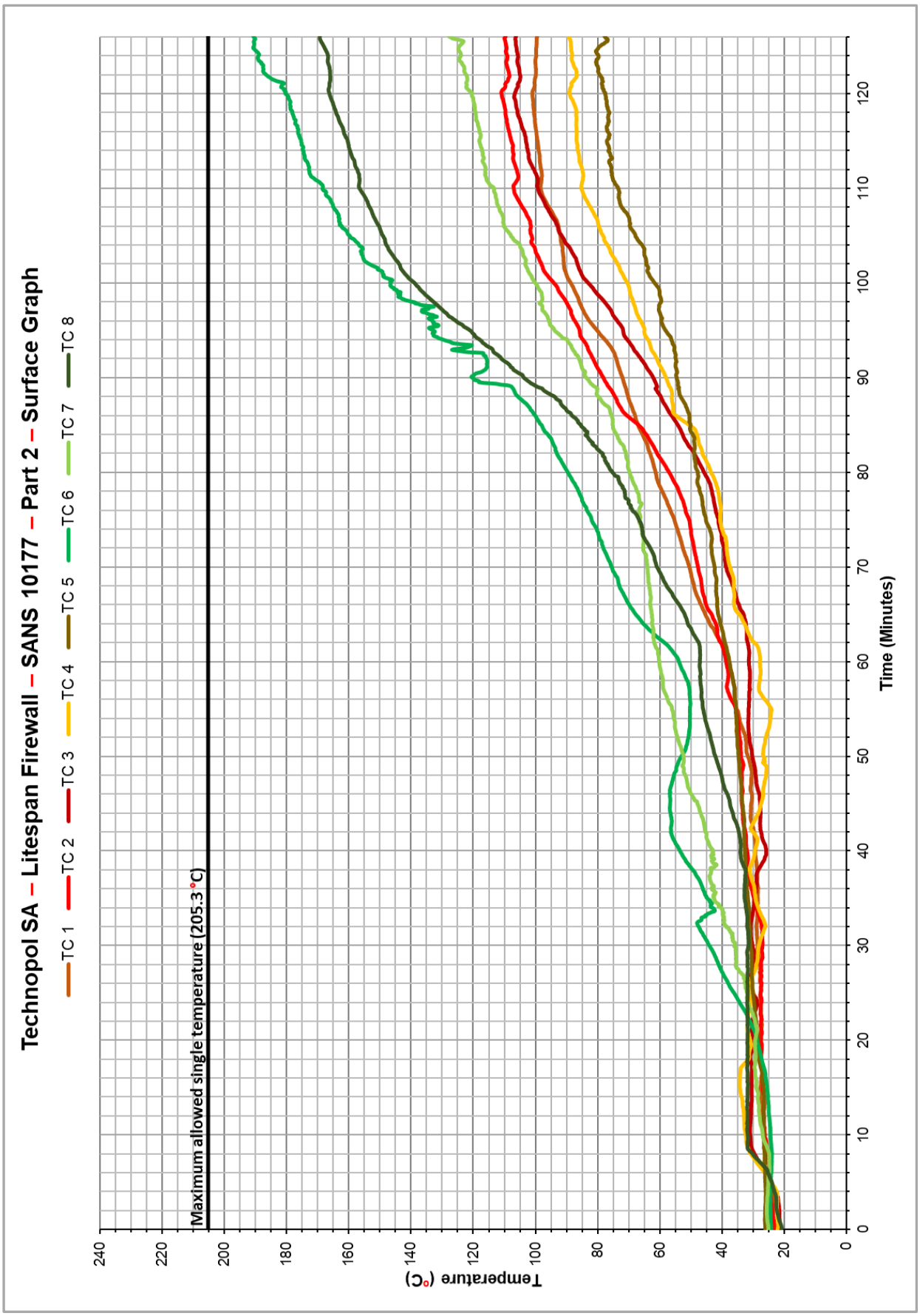


Figure 3.2: Temperatures recorded on the surface of the specimen

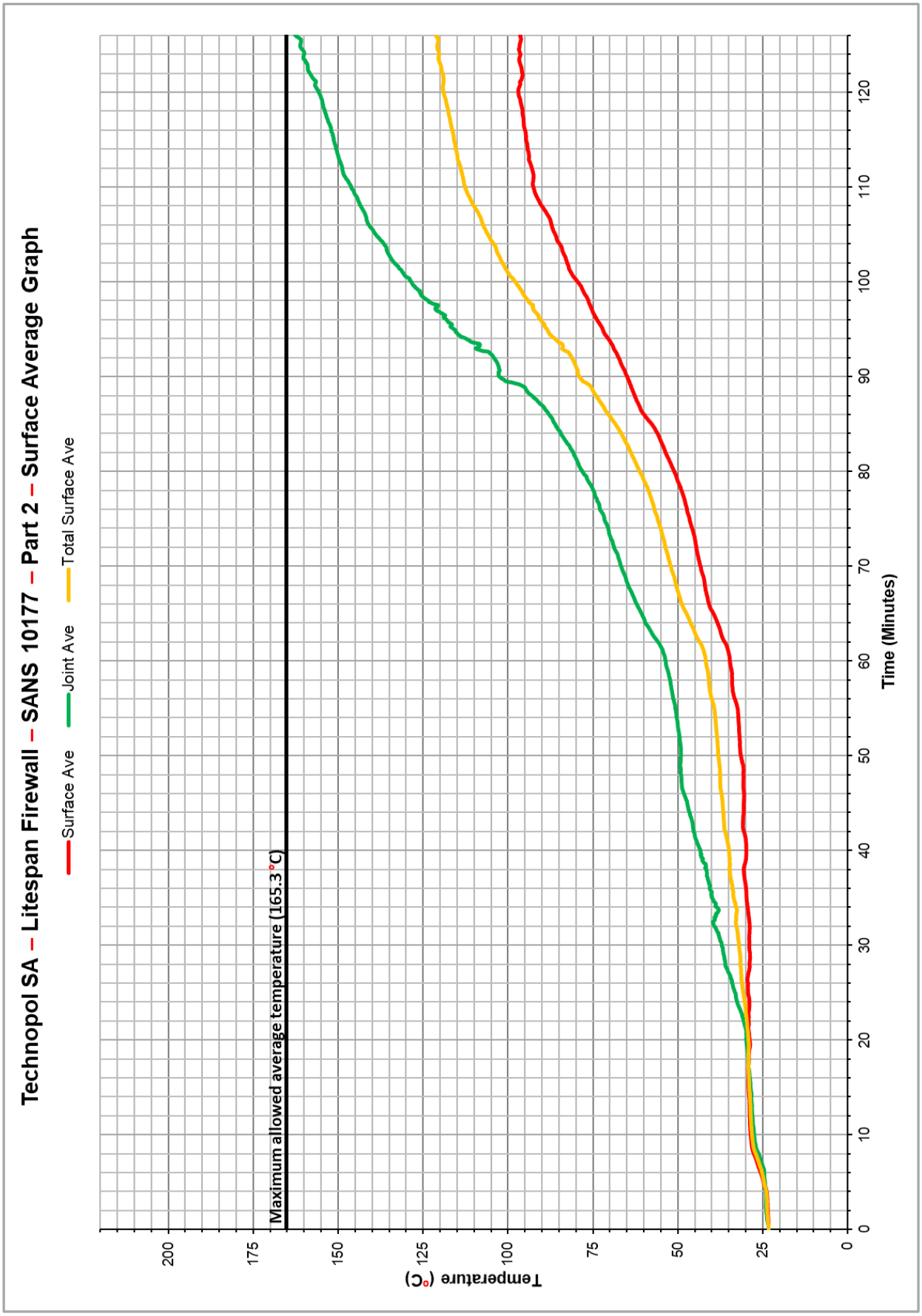


Figure 3.3: Temperatures recorded on the surface (averages) of the specimen

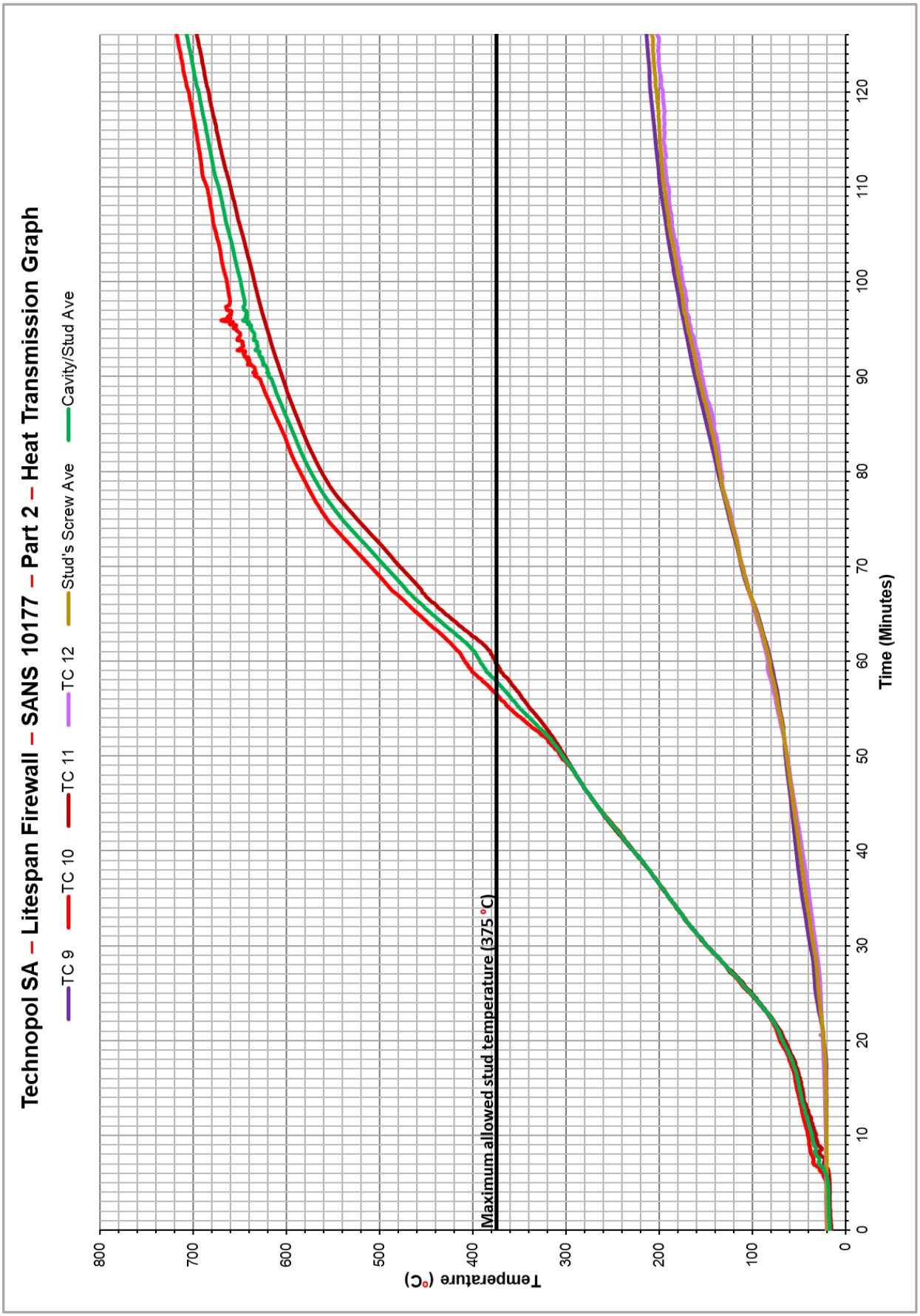


Figure 3.4: Temperatures recorded on the stud's screws and cavity/stud of the specimen

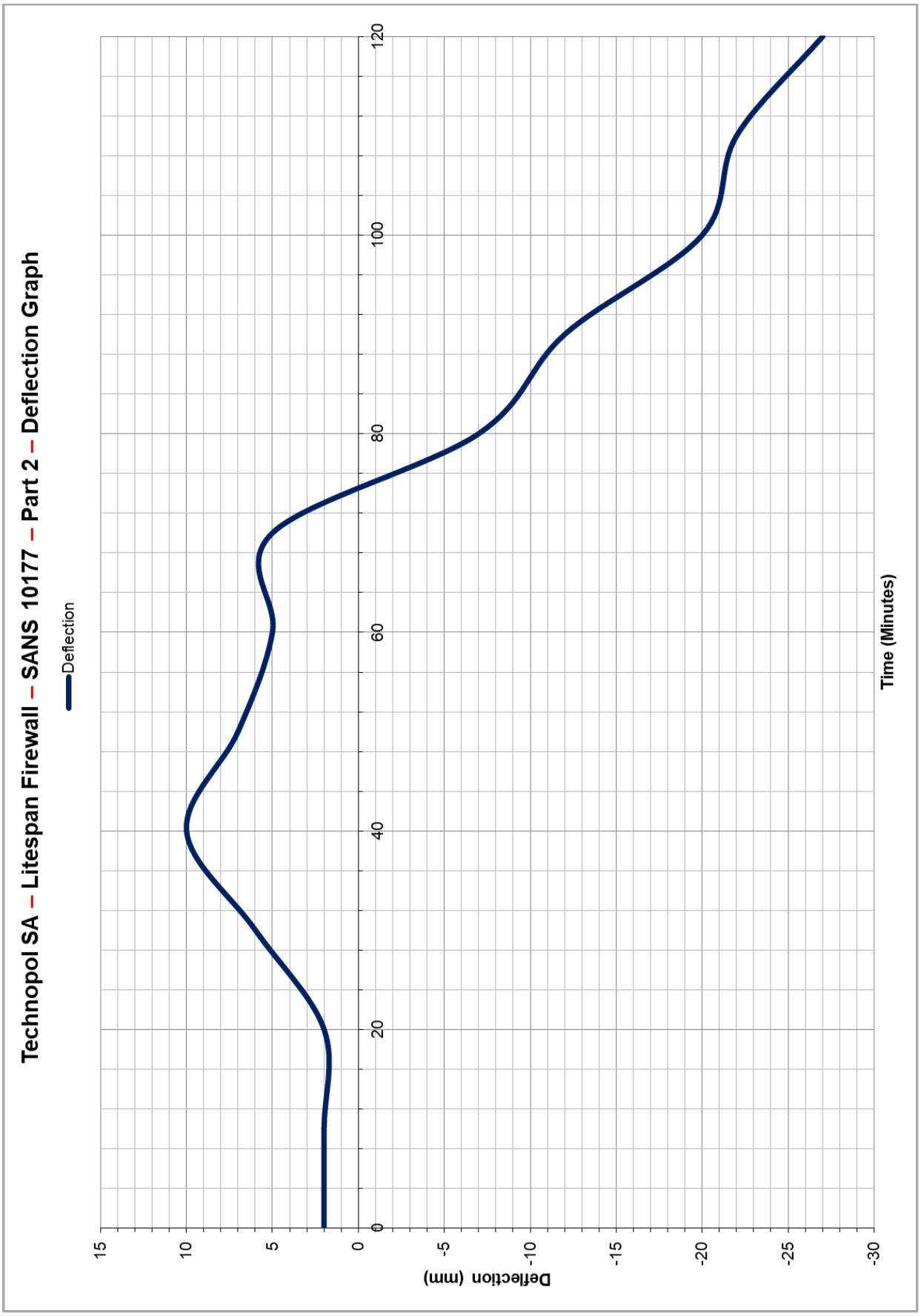


Figure 3.5: Deflection measured during the test

Figure 3.6: Smoke release on perimeter

Figure 3.7: Smoke release from top joint

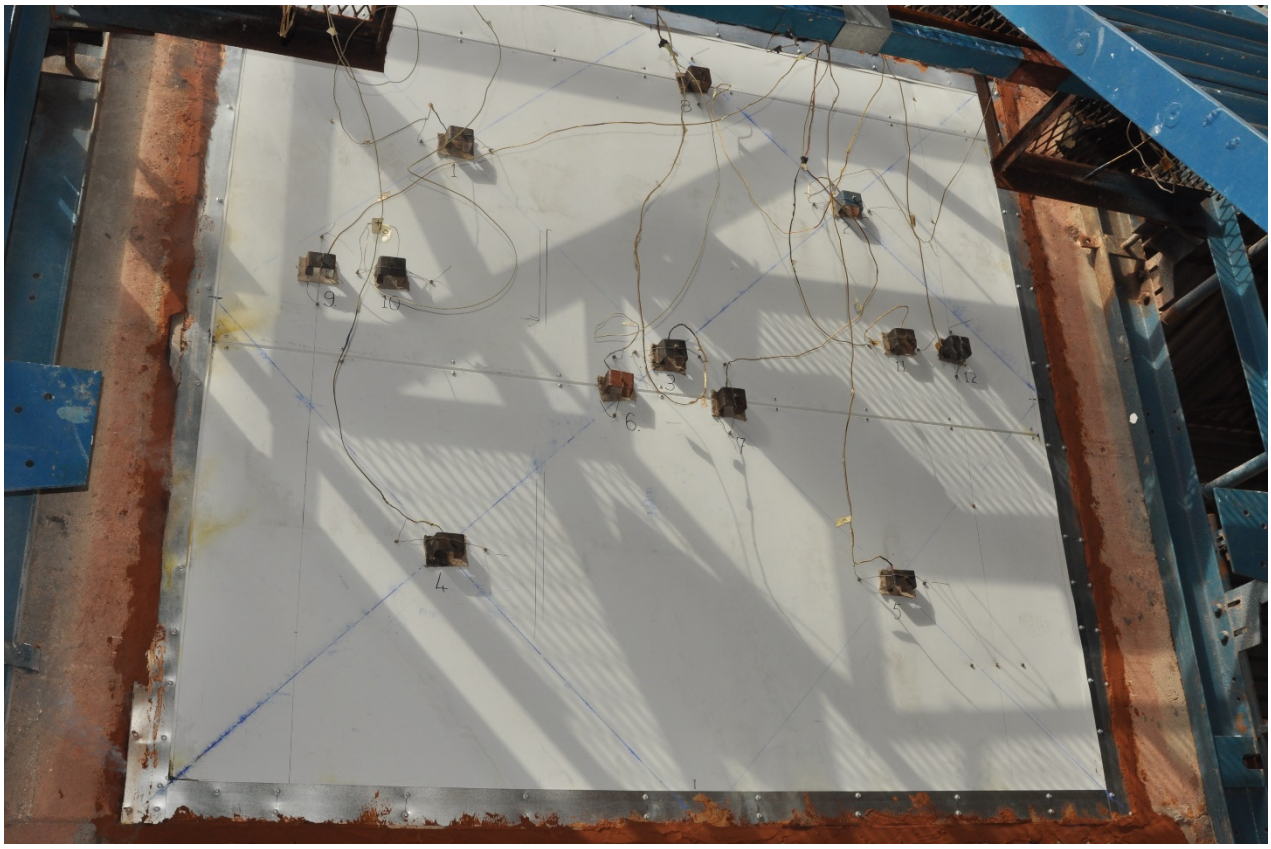


Figure 3.8: Specimen at approximately 34 minutes

Figure 3.9: Discolouration on bottom joint

Figure 3.10: Smoke release from TC 7 (bottom joint)

Figure 3.11: Specimen at approximately 1 hour and 30 minutes

*Figure 3.12: Exposed side of specimen wall after removal from the **SANS 10177 – 2** facility*

*Figure 3.13: Unexposed side of specimen wall after removal from the **SANS 10177 – 2** facility*

4. DISCUSSION OF RESULTS

The **Litespan Firewall** system was tested for **Fire Resistance** and met the following requirements in terms of **SANS 10177 – 2**:

- ***Stability (R):*** Maximum deflection measured was 27 mm at 120 minutes which does not exceed the Neutral Axis and the test specimen remained inside the test frame for the full duration of the test.

  Although the TC 10 exceeded 375 °C just after 56 minutes, this is not applicable for non-load bearing structure; however, it will be suitable for a self-supporting structure. The test wall did not collapse and therefore satisfied the stability criteria.

  Stability of the structural elements is not a criterion for a non-load bearing wall. Stability criteria were met as the test wall remained in-tact and did not collapse during the 120 minutes test.

- ***Integrity (E):*** No straight through gaps or flames were visible during the test.

  Integrity satisfied for 120 minutes

- ***Insulation (I):*** The surface temperature was below the maximum allowed temperatures

  Insulation satisfied for 120 minutes

5. CONCLUSION

The non-load-bearing self-supporting **Litespan Double Studded Firewall** (division separating wall system) was tested for **Fire Resistance** in accordance with the **SANS 10177 – 2** test protocol and is classified as follows:

- **SANS 10177 – 2 » FR120 (Non-Load bearing)***
  - **Stability (R) » 120 minutes**
  - **Integrity (E) » 120 minutes**
  - **Insulation (I) » 120 minutes**

**Suitable for all non-load bearing self-supporting division, occupancy and tendency separating walls requiring a 120-minute fire resistance without service terminations (plugs, light switches etc.).*

…….
Compiled by: **E.M. Nel**

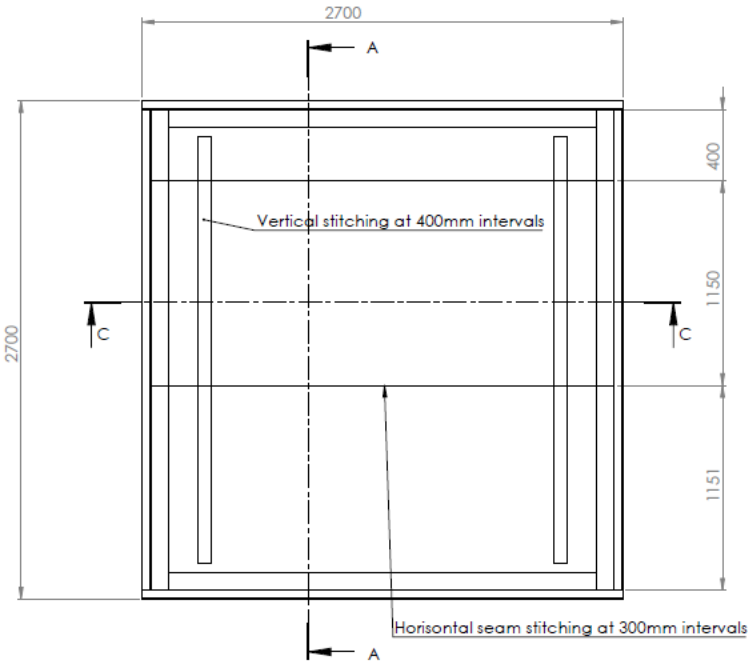
…….
Approved by: **J.S. Strydom**

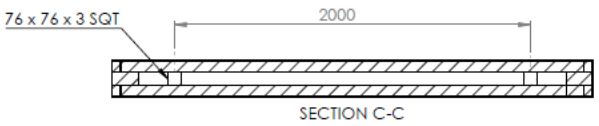
ANNEXURE "A"

– Company Information –	FIRELAB
Company Name:	Technopol SA (Pty) LTD
Company Trading Name:	Technopol SA (Pty) LTD
Company Registration Nr.:	1999/019612/07
Company VAT Nr.:	4320139613
Core Business Activities:	Manufacture and supply of Expanded Polystyrene Insulation Systems
Postal Address:	P.O. Box 2445 Springs 1560
Physical Address:	9 Wright Rd Ext Nuffield Springs 1560
Company contact number:	0113632780
Direct Contact Details	
Technical (name):	Hardus vd Westhuizen
Cell phone number:	0745675555
Email address:	hardus@technopol.co.za
Financial (name):	Lammie de Beer
Cell phone number:	0824434461
Email address:	lammie@technopol.co.za
– Test & Sample Information –	
Test Required:	SANS 10177-2
Sample/Product name:	LiteSpan, Double, Studded Firewall
Intended Use:	Firewalls
Sample/Product Description: *(Short description of sample or product submitted for testing, and type of material to be tested)*	60mm x 120kg/m³ Stonewool ,cladded with Chromadek, Panels, and secured to square tubing structural elements

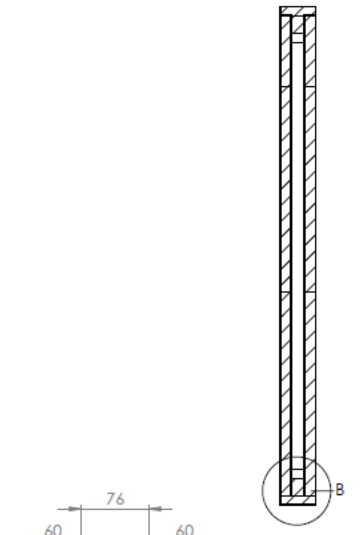
– SANS 10177 Part 2 – – Specimen Wall Description –	FIRELAB		
Proposed Application:	Yes Loadbearing	Non-Loadbearing	FR 120 (30, 60 or 120 minutes)
Additional information:			
System description:			
System name:	LiteSpan, Double,Studded Firewall		
System type:	Firewall		
Panel/Wall thickness:	Total 195mm		
Cavity insulation:			
Type:	Stonewool		
Density (kg/m^3):	120kg/cub.m		
Thickness:	Total thickness 195mm, 2x60mm with 75mm cavity created by square tubing		
Interior Skin:			
Make-up and Description:	Chromadek		
Glue Type and/or Fasteners Used:	Poly Urethane		
Exterior Skin (only for asymmetric systems)**:**			
Make-up and Description:	Chromadek		
Glue Type and/or Fasteners Used:	Poly Urethane		
Joint Detail:			
Type:	Chromadek profiled to clip into each other.		
Sealant:	Fire Resistant Silicone		
Cover Strips:	Nil		
Fasteners: *(Type and Spacing)*	Flat steel feather between joints with 400mm c/c stitching screws to fix, See attached drawing,		
Structural and Non-Structural Elements:			
Primary (Studs):	75mm x 75mm x 4mm Square Tubing		
Stud Spacing:	2000mm between Vertical Tubing		
Secondary (Stiffeners):	None		
Top/Bottom rail:	30x50x3mm Angle Top and Bottom		

LITESPAN FIREWALL

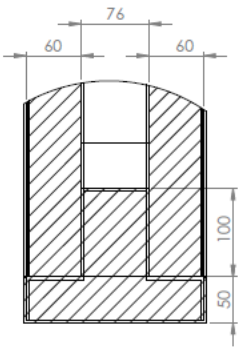




SECTION C-C



SECTION A-A



DETAIL B
SCALE 1 : 4