Fire Testing Services

TITLE	:	Report on the evaluation of the **P&H Rocklite Class D Double Fire Door** assembly when classified in accordance with **SANS 1253**
REQUESTED BY	:	**P&H Protective Plaster Systems (Pty) Ltd** PO Box 11845 **ASTON MANOR** 1630
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SCOPE

This report contains the evaluation of the **P&H Rocklite Class D Double Fire Door** when classified in accordance with **SANS 1253: Fire-doors and fire-shutters**.

Section 1: Evaluation requirements

Section 2: Detailed information on the fire door assembly received for testing

Section 3: Test protocols used for classification

Section 4: Test results

Section 5: Discussion of results

Section 6: Conclusion

Annexure "A": Company information

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1. INTRODUCTION

P&H Protective Plaster Systems submitted the **P&H Rocklite Class D Double Fire Door** assembly for classification in accordance with **SANS 1253**.

The criteria for the classification, evaluation and testing of Fire Door Assemblies are as follows:

Class	Inspection	Test for Reliability	Sandbag Impact	Steel Tool Impact	Fire Resistance
A	✓	✓			✓
B	✓	✓			✓
C	✓	✓	✓	✓	✓
D	✓	✓	✓	✓	✓
E	✓	✓			✓
F	✓	✓			✓

*Table 1.1: Test requirements (**Section 5.1.** of **SANS 1253**)*

In accordance with **SANS 1253, Section 4**, the following aspects must be tested or determined. The relevant **Clauses** are indicated below and the results are found in **Section 4** of this report.

4.1	**General**	Applicable
4.2	**Class & Type**	Applicable
4.3	**Materials**	Applicable
4.4	**Glazing and Hardware**	Applicable to hardware only
4.5	**Hinged-door assemblies**	Applicable (Includes **Test for Reliability**)
4.6	**Sliding door assemblies**	*Not applicable*
4.7	**Dimensions**	Applicable
4.8	**Smoke emission**	Applicable
4.9	**Resistance to fire**	Applicable
4.10	**Structural strength**	*Not applicable*

2. FIRE DOOR ASSEMBLY DETAIL

FIRELAB installed the specimen for the **Reliability** and **Fire Resistance** tests.

Description of the door assembly:

Door Assembly Name:	P&H Rocklite Class D Double Fire Door
Abbr. Name:	Rocklite Class D Double
Overall size:	± 2 232 mm high x 1677 mm wide
Fire Door assembly:	Asymmetric (tested one side only)
Proposed classification:	Class D (Opening outward)
Proposed Application:	Internal and External Building doors

Door leaf (Symmetric);

Core:	Rocklite
Cladding/Facing:	1.2 mm Galvanised Cladding
Edges:	Galvanised channel

Door frame;

Type:	Steel
Fixing lugs:	4
Rebate size:	25 mm x 65 mm

Hinge;

Type:	PH03BR Heavy Duty Brass Butt Hinges
Quantity:	8
Fixing to door leaf:	4.8 x 50 mm CSK Pozi Zinc
Fixing to door frame:	4.8 x 19 mm CSK Pozi Zinc

Lockset & Ironmongery;

Type:	150 X 150 mm Push & Pull Handle on back plate with deadlock & knob cylinder
	Stainless Steel Flush Bolts to Inactive Leaf
Fixing:	*M4 male and female and CSK Pozi screws*

Closing devices;

Active leaf:	QS750 type EN1154
Inactive leaf:	QS750 type EN1154

The exposed and unexposed sides of the door specimen prior to the test are shown in Figures 2.1 and 2.2.

*Figure 2.1: The **Rocklite Class D Double** from the exposed side prior to the test*

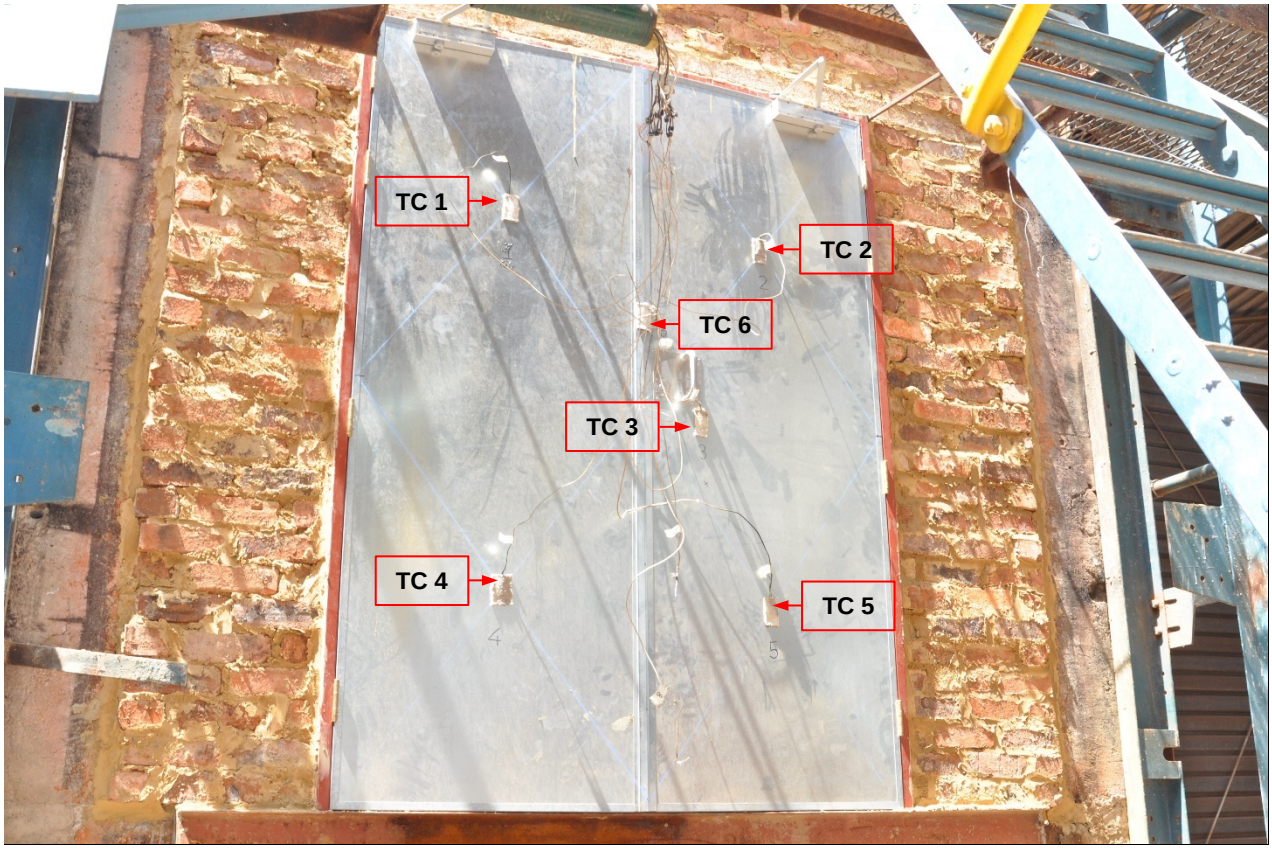

*Figure 2.2: The **Rocklite Class D Double** with thermocouples from the unexposed side*

3. TEST PROCEDURE: SANS 1253:2016

3.1. INSPECTION AND TEST FOR RELIABILITY

The specimen was inspected to verify if the specimen door meets all the requirements as stipulated in **Section 4.1** to **4.7** of **SANS 1253**. Measurements were taken where required.

During the **Test for Reliability** (**Section 5.3** of **SANS 1253**) the door specimen was subjected to 1 000 cycles of opening and closing at a rate of 4 cycles per minute.

The specimen door fails should one of the following occur:

- Signs of undue wear
- Hinges and fastenings not operate properly
- Clearance between the door and frame increased by more than 0.1 mm

3.1.1. TEST EQUIPMENT

- Actuating mechanism
- Stopwatch
- Mounting Frame

3.2. FIRE RESISTANCE

The **Fire Resistance** test was conducted in accordance with **SANS 10177 – 2**, **FIRELAB**'s large-scale air-aspirated diesel furnace was used.

The furnace temperature was controlled to follow the **ISO standard time-temperature curve** as stipulated in **SANS 10177 – 2**. Six thermocouples (TC) are used to measure the furnace's temperature (three on each side).

In terms of **Section 4.9** of **SANS 1253 Fire Resistance** is determined as follows:

- ***Stability (R):*** The door assembly shall withstand the prescribed fire exposure without the doors moving out of the frame by more than 25 mm. No flaming may occur on the unexposed face of the door within the first 30 minutes of the classification period. Light intermittent flames of approximately 150 mm long may occur, for periods not exceeding 5-minute intervals along the edges of the door, after 30 minutes. Light flaming may occur during the last 15 minutes of the classification period on the unexposed side face area of the door, provided it is contained with a distance of 40 mm from the vertical door edge and within 75 mm from the top edge of the door and within 75 mm from the top edge of the frame of the viewing panel.

- ***Integrity (E):*** The door is deemed to have failed should there be a straight-through gap exceeding 10 mm of width or a straight-through gap with a width more than 6 mm, not exceeding 10 mm and of combined length which exceeds the greater of the width or the height of the door.

- ***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 single surface position.

Class	Stability (minutes)	Integrity (minutes)	Insulation (minutes)
A	60	30	30
B	120	60	60
C	120	120	*No requirement*
D	120	120	120
E	30	30	30
F	30	30	*No requirement*

*Table 3.2.1: Minimum **Fire Resistance** requirements (**Section 4.2.1.** of **SANS 1253**)*

The ***Insulation*** criteria of the door specimen were measured using 5 thermocouples (TC 1 – TC 5) placed in a grid of equal area. TC 6 was placed on the door interface and will not be considered for the insulation criteria. The positions of the thermocouples are shown in Figure 1.2

Note: In accordance with **Section 4.8** of **SANS 1253** smoke emission was also evaluated during the **Fire Resistance** test.

3.2.1. TEST EQUIPMENT

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

4. TEST RESULTS

4.1. INSPECTION AND TEST FOR RELIABILITY

P&H – Rocklite Class D Double

INSPECTION IN ACCORDANCE WITH **SANS 1253**

General:		
Specimen Door was submitted as an assembly		✓
Class and Type:		
Class		Refer to Section 5.2
Type: Double-leaf, hinged, double action		✓
Materials:		
Structural materials		✓
Insulation materials		✓
Intumescent materials		N/A
Glazing and Hardware:		
General		✓
Glazing		N/A
Hinges		✓
Fastenings		✓
Closing Device		✓
Additional optional hardware		N/A
Hinged-Door Assemblies:		
Closing of hinged door		✓
Fitting of door leaf		✓
Frames	Dimensions	✓
Frames	Fixing lug	N/A
Test for Reliability		1 000 Oscillations
Reliability	No undue wear	✓
Reliability	Hinges and fastenings operate properly	✓
Reliability	Clearance not increased by more than 0.1 mm	✓
Dimensions:		
Width and height do not exceed 1.2 m & 2.7 m respectively		✓

Note(s): Inspection conducted on 19/10/2023

*Table 4.1.1: Results of inspections preformed in accordance with **SANS 1253***

4.2. FIRE RESISTANCE

P&H – Rocklite Class D Double

OBSERVATIONS DURING THE **FIRE RESISTANCE** TEST

TIME (hh:mm:ss)	**DESCRIPTION**
00:00:00	**– Test Started –**
00:04:48	Steam release on the door interface
00:06:00	Steam release on the bottom perimeter on the right leaf
00:07:00	Steam release turns to smoke release
00:07:38	Discolouration on door interface
00:10:00	Discolouration on the bottom perimeter on the right leaf
00:11:40	General smoke release increase
00:12:21	Smoke release from lockset
00:25:22	Left door leaf facing warping
00:44:00	Light gas flaming at the door bottom
00:49:20	Smoke release from the keyhole
01:23:42	Hinge washers melting
01:26:57	Door closer rupture
02:10:00	**– Test Concluded –**

Note(s): Tested on 16/11/2023, ambient temperature during the test = 24.7 °C.

Due to technical difficulties the furnace cut out at 28:34 and was restarted by 37:30.
Test duration was extended by 10 minutes to compensate.

*Table 4.2.1: Observations recorded during the **Fire Resistance** test*

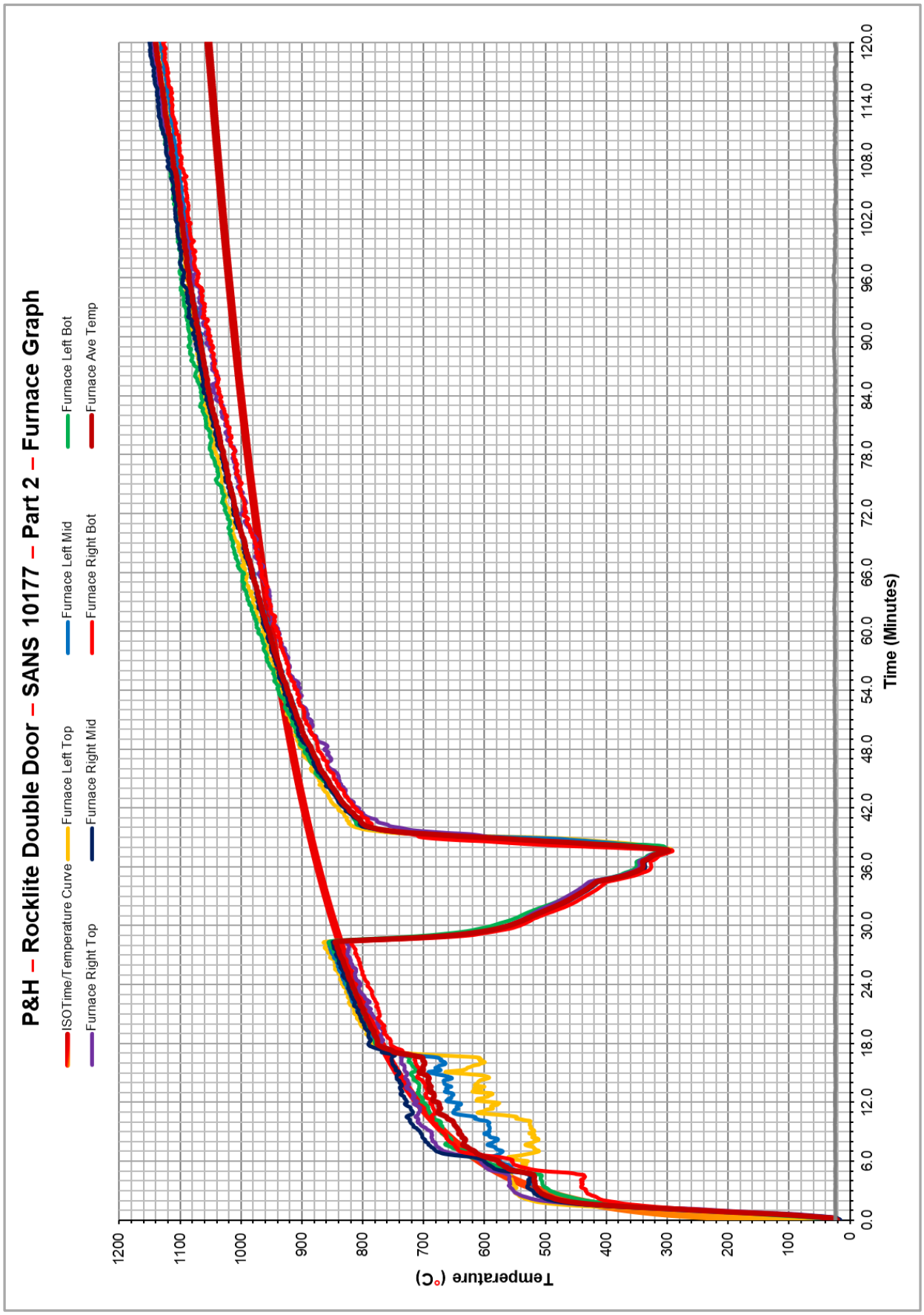

*Figure 4.2.1: Furnace temperatures recorded during the large-scale **FR** test*

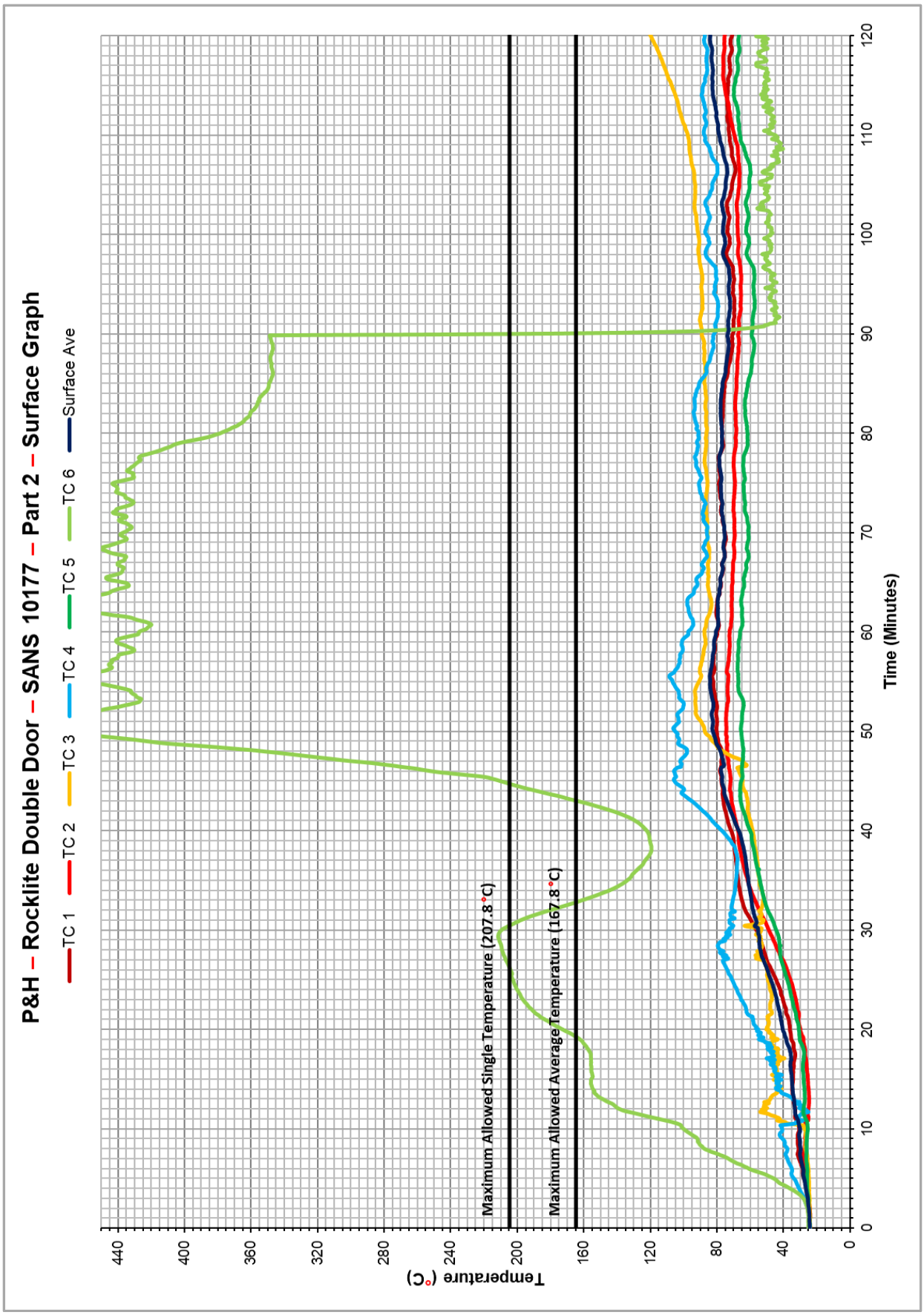

Figure 4.2.2: Temperatures recorded on the surface of the specimen

Figure 4.2.3: Slight steam release

Figure 4.2.4: Smoke release increase

Figure 4.2.5: Discolouration on the door interface

Figure 4.2.6: Door facing warping

Figure 4.2.7: Hinge washers melting

Figure 4.2.8: Door closer rupture

Figure 4.2.9: Door facing warping at 2 hours

*Figure 4.2.10: Exposed side of specimen at conclusion of the **Fire Resistance** test*

*Figure 4.2.11: Unexposed side of specimen at conclusion of the **Fire Resistance** test*

5. DISCUSSION OF RESULTS

5.1. INSPECTION

Summary of the inspection results:

- ***General*:** Complied to all requirements
- ***Class & Type*:** Complied to all requirements
- ***Materials*:** Complied to all requirements
- ***Glazing and Hardware*:** Complied to all requirements
- ***Hinged-door assemblies*:** Complied to all requirements
- ***Dimension*:** Complied to all requirements

5.2. FIRE RESISTANCE

Performance of the door specimen in accordance with **SANS 1253**:

- ***Stability (R)*:** Light gas flaming was observed. See the Discussion of results. The door stayed in place and was stable during the test.

  Stability satisfied for 120 minutes*

- ***Integrity (E)*:** No straight through gaps were observed that exceeded 10 mm in width. There were also no straight through gaps with a width more than 6 mm, not exceeding 10 mm and of combined length which exceeded the greater of the width or the height of the door for a period of 120 minutes.

  Integrity satisfied for 120 minutes

- ***Insulation (I)*:** All relevant temperatures remained within the allowed maximum for the duration of the test. TC6 exceeded the maximum allowed temperature for a single reading at approximately 26 minutes. However, since TC6 was installed on the interface joint between the two leaves of the double door it is not representative of the larger leaf surface areas. TC6's results will therefore be neglected for insulation criteria purposes.

  Insulation satisfied for 120 minutes

Smoke evaluation

The specimen released smoke during the test, but the smoke did not cause any discomfort in the vicinity area.

*This criterion is subject to an omission of Masonite facings under the steel cladding.

The door tested had two 1,6 mm Masonite panels between the core and the steel cladding, which caused flammable gas to escape and cause flaming on the unexposed side.

Removal of the facings will exclude any possibility of flaming on the unexposed side.

6. CONCLUSION

The **P&H Rocklite Class D Double Fire Door** supplied by **P&H Protective Plaster Systems** was evaluated in accordance with **SANS 1253.**

Results and classification:

- **Inspection** » **Satisfactory**
- **Test for Reliability** » **1 000 oscillations**
- **Fire Resistance** » **Class D (Opening outward)***

**Provided the door core is only clad with steel*

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Compiled by: **J. Vogel** Approved by: **J.S. Strydom**

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ANNEXURE "A"

– Company Information –	FIRELAB
Company Name:	P&H PROTECTIVE PLASTER SYSTEMS (PTY) LTD
Company Trading Name:	P&H PROTECTIVE PLASTER SYSTEMS (PTY) LTD
Company Registration Nr.:	79/00510.07
Company VAT Nr.:	4140104219
Core Business Activities:	CONSTRUCTION / MANUFACTURING
Postal Address:	P.O BOX 11845 ASTON MANOR 1630
Physical Address:	41 POMONA ROAD POMONA KEMPTON PARK
Company contact number:	011 979 3319
Direct Contact Details	
Technical (name):	BERND JONISCHKEIT / BERNEDENE ESTERHUIZEN
Cell phone number:	082 893 0777 / 084 999 5792
Email address:	bernd@phrocklite.co.za; bernedene@phrocklite.co.za
Financial (name):	RAINER JONISCHKEIT
Cell phone number:	011 979 3319
Email address:	rainer@phrocklite.co.za

– Test & Sample Information –	
Test Required:	CLASS D
Sample/Product name:	P&H ROCKLITE ®
Intended Use:	REQUIRED FOR BUILDINGS
Sample/Product Description: *(Short description of sample or product submitted for testing, and type of material to be tested)*	P&H ROCKLITE ® CLASS D DOUBLE FIRE DOOR & 2.0MM FRAME INSIDE REBATE SIZE: 1613 X 2200 X 230MM WALL 1.2MM GALVANISED CLADDING BOTH SIDES WITH CHANNEL SURROUND. GALVANISED SLAMBARS @ MEETING STILES YT SEAL ALL AROUND IN REBATE 8 PAIRS PH03BR HEAVY DUTY BRASS BUTT HINGES

ANNEXURE "B"

– SANS 10177 Part 2 – – Door Specimen Description –				FIRELAB
Proposed Usage:	Class E/F	Class	Class B	X Class D
Specify use:	INTERNAL & EXTERNAL BUILDING DOORS			
Door Assembly description:				
Assembly name:	P&H ROCKLITE CLASS D DOUBLE FIRE DOOR			
Overall size:	Single	X Double	1677 mm width	2232 mm length
Door leaf:				
Core:	ROCKLITE			
Cladding / Facing:	1.2MM GALVANISED CLADDING BOTH SIDES			
Edges:	GALVANISED CHANNEL SURROUND			
Door frame:				
Type:	Timber	X Steel	Double X / Single Rebate	
Dimensions:	Frame dimensions 1677 X 2232 mm		Rebate 65 x 25 mm	
Hinges:				
Type:	PH03BR HEAVY DUTY BRASS BUTT HINGES			
Quantity:	8			
Fixing to door leaf:	4.8 X 50MM CSK POZI ZINC			
Fixing to door frame:	4.8 X 19MM CSK POZI ZINC			
Lockset & Ironmongery:				
Type:	150 X 150MM PUSH & PULL HANDLE ON BACK PLATE WITH DEADLOCK & KNOB CYLINDER. STAINLESS STEEL FLUSH BOLTS TO INACTIVE LEAF			
Fixing:	M4 MALE & FEMALE & CSK POZI SCREWS			
Closing devices:				
Active leaf:	Model QS750	Type EN1154		
Inactive leaf:	Model QS750	Type EN1154		
Door glazing / viewing panel:				
Dimension:				
Glass Type:				