FIRELAB

TITLE	:	Report on the Large-scale Fire Resistance Properties of the non-load bearing **CAPCO FireShield (400 mm stud spacing)** partition wall system
REQUESTED BY	:	**CAPCO (Pty) Ltd** PO Box 4203 **RIVERHORSE VALLEY EAST** Durban 4017
CONTRACT No	:	FTC 20/110
ISSUE No	:	1
DATE	:	16 September 2020

Copyright is vested with **FIRELAB cc** Reg no: 2005/087037/23

The use of this report is subject to the condition that it will only be published in full, an abridged version can only be approved by **FIRELAB**

FIRELAB, Building 28, CSIR Campus, Meiring Naudé Road, Brummeria, Pretoria, SA +27 12 349 2929
www.firelab.co.za

SCOPE

This report classifies the Fire Resistance Properties of the **CAPCO FireShield (400 mm stud spacing)** partition wall 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

Annexure "B": Product information and schematic section through the test panel supplied by **CAPCO**

The Test Report and results only relate to the product(s) and/or specimen(s) submitted for testing as identified in Section 1 and Annexures and do not apply to any similar product(s) or specimen(s) that has not been tested. This Test Report is only valid for 5 years or until there is a change to the product composition, manufacturing process or previously approved supplier(s).

FIRELAB

TABLE OF CONTENTS

LIST OF FIGURES AND TABLES 1
1. SYSTEM DESCRIPTION 2
2. FIRE RESISTANCE: **SANS 10177 – PART 2:2005** 4
2.1. TEST PROCEDURE 4
2.2. TEST EQUIPMENT 4
3. TEST RESULTS 5
4. DISCUSSION OF RESULTS 16
5. CONCLUSION 17
ANNEXURE "A" 18
ANNEXURE "B" 19

LIST OF FIGURES AND TABLES

Figure 1.1: **FireShield (400 mm stud spacing)** system from the exposed side prior to the test 3
Figure 1.2: **FireShield (400 mm stud spacing)** system with thermocouples from the unexposed side ... 3
Table 3.1: Observations recorded during the **SANS 10177 – 2** test 5
Table 3.2: Deflection measurements recorded during the **SANS 10177 – 2** test 6
Figure 3.1: Furnace temperatures recorded during the large-scale **FR** test 7
Figure 3.2: Temperatures recorded on the surface of the specimen 8
Figure 3.3: Deflection measured during the test 9
Figure 3.4: Slight discolouration on LHJ 10
Figure 3.5: Steam release from TC 8 (stud thermocouple) 10
Figure 3.6: Approximately 30 minutes 11
Figure 3.7: Crack forming and screw discolour on LHJ 11
Figure 3.8: Crack discolour on LHJ 12
Figure 3.9: Crack forming and discolour on RHJ 12
Figure 3.10: Crack propagate 13
Figure 3.11: Glowing visible on LHJ 13
Figure 3.12: Condition of specimen shortly before the test was stopped 14
Figure 3.13: Exposed side of specimen wall after removal from **SANS 10177 – 2** facility 14
Figure 3.14: Unexposed side of specimen wall after removal from **SANS 10177 – 2** facility 15

1. SYSTEM DESCRIPTION

CAPCO installed the non-load bearing **CAPCO FireShield (400 mm stud spacing)** partition wall system into the test frame of **FIRELAB**'s Vertical **SANS 10177 – 2** test facility. The system contained no service terminations.

Description of wall system:

System:	**CAPCO FireShield (400 mm stud spacing)**
System Type:	Drywall Board System
Total Thickness:	± 95 mm
Proposed Application:	Partition/division/occupancy separating
Application requirement:	FR 60, Non-load bearing
Wall Type:	Drywall

Core Details;

Type:	None (Air)
Density:	N/A
Thickness:	64 mm

Interior & Exterior Skin;

Type:	15 mm FireShield board
Fixing:	25 mm drywall screws at 230 mm centers

Joint;

Type:	Tapered edges
Sealant:	Fibre-glass tape 50 mm and CAPCO jointing compound
Cover Strips:	N/A
Fasteners:	Drywall screws at 230 mm centers

Structural and Non-Structural Elements;

Primary Studs:	63.5 mm x 35 mm x 0.5 mm stud
Stud Spacing:	400 mm
Secondary:	N/A
Floor runner:	65 mm Track channel
Top Runner:	65 mm Track channel
Wall ties:	Wall anchors 5/6/36 mm

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: **FireShield (400 mm stud spacing)** system from the exposed side prior to the test*

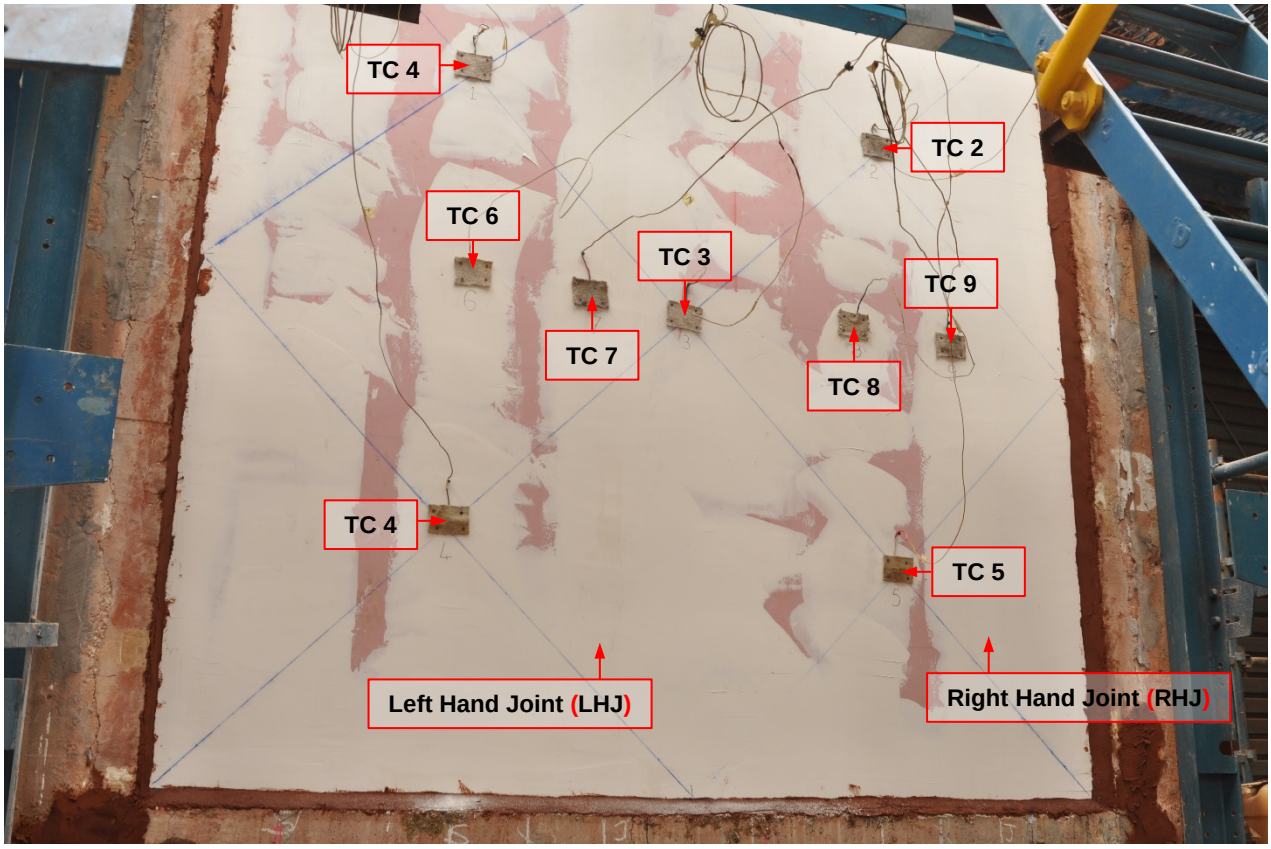


*Figure 1.2: **FireShield (400 mm stud spacing)** system with thermocouples from the unexposed side*

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

The ***Stability*** criteria was measured using two thermocouples (TC 6 and TC 8) measuring the stud. The deflection was manually measured from the unexposed side.

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

Insulation was measured using 5 thermocouples (TC 1 – TC 5) placed in a grid of equal area onto the surface of the specimen. An additional two thermocouples were used to measure the surface joints (TC 7 & TC 9). The positions of the thermocouples are shown in Figure 1.2.

2.2. TEST EQUIPMENT

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

3. TEST RESULTS

The specimen was tested on 31 August 2020. The average ambient temperature during test was 19.0 °C.

CAPCO – FireShield (400 mm stud spacing)

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

TIME (hh:mm:ss)	**DESCRIPTION**
00:00:00	**– Test Started –**
00:12:30	Light steam release at top left corner
00:20:00	Joint opening on exposed side
00:25:00	General steam release increase
00:28:45	Smoke release
00:28:50	Steam/smoke release form stud thermocouples (TC 6 & TC 8)
00:36:05	Steam release increase on bottom perimeter
00:39:20	Discolouration at TC 6
00:46:30	Crack forming on LHJ
00:50:20	Discolouration on screws
00:51:00	Discolouration on LHJ
00:53:20	Crack forming on RHJ
00:58:00	Crack on LHJ slightly enlarging
01:02:00	Discolouration next to TC 4
01:03:00	LHJ glowing
01:04:00	**– Test Concluded –**

Note(s): TC 7 measuring the left hand joint failed at just after 63 minutes.

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

CAPCO – FireShield (400 mm stud spacing)

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

EVENT	TIME (hh:mm:ss)	DESCRIPTION
	00:00:00	**– Test Started –** 3 mm
1	00:10:00	Deflection » 3 mm
2	00:20:00	Deflection » 4.5 mm
3	00:30:00	Deflection » 35 mm
4	00:40:00	Deflection » 34 mm
5	00:50:00	Deflection » 28 mm
6	01:00:00	Deflection » 18 mm
	01:04:00	**– Test Concluded –**

Note(s):

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

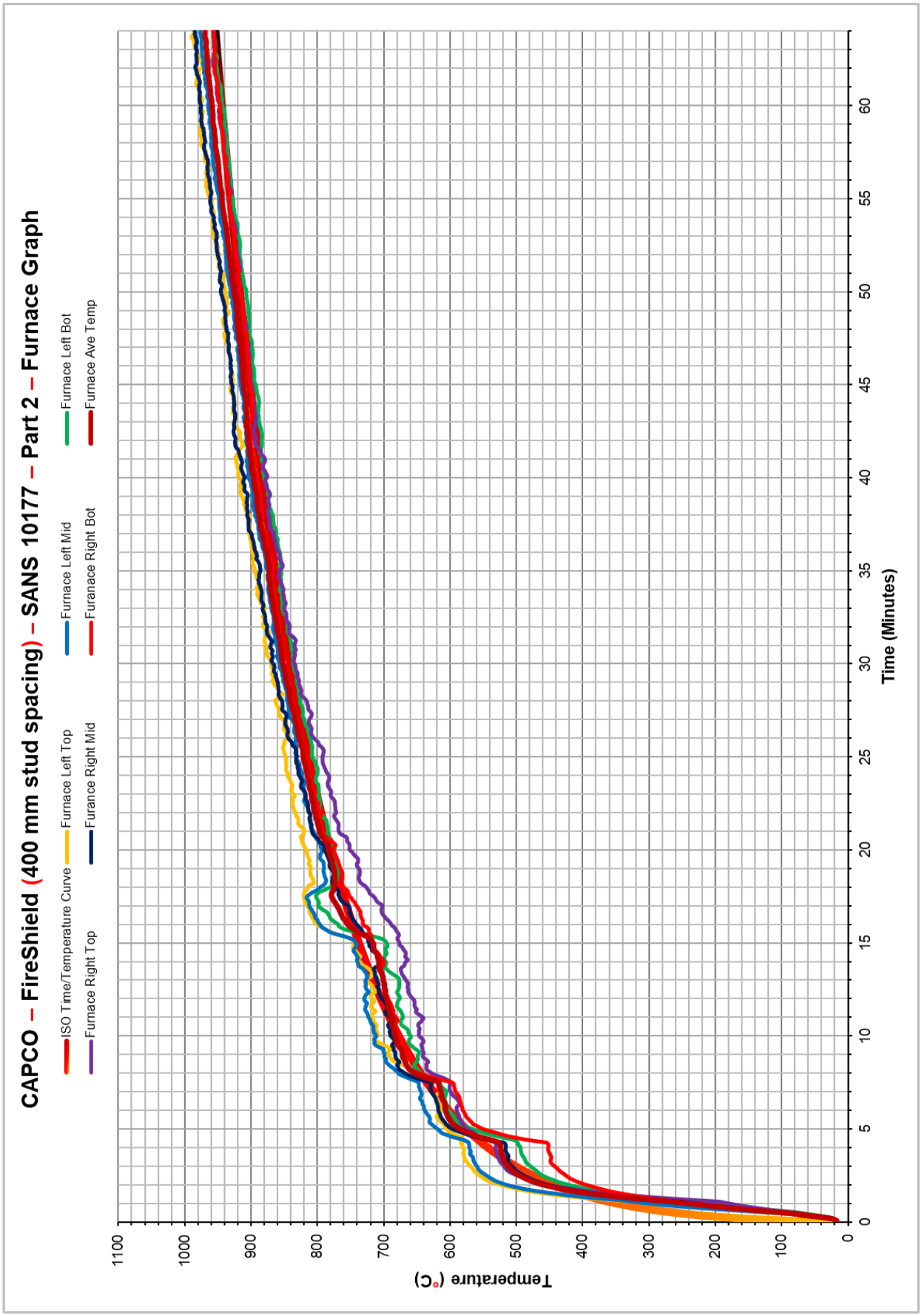


*Figure 3.1: Furnace temperatures recorded during the large-scale **FR** test*

The Test Report and results only relate to the product(s) and/or specimen(s) submitted for testing as identified in Section 1 and Annexures and do not apply to any similar product(s) or specimen(s) that has not been tested. This Test Report is only valid for 5 years or until there is a change to the product composition, manufacturing process or previously approved supplier(s).

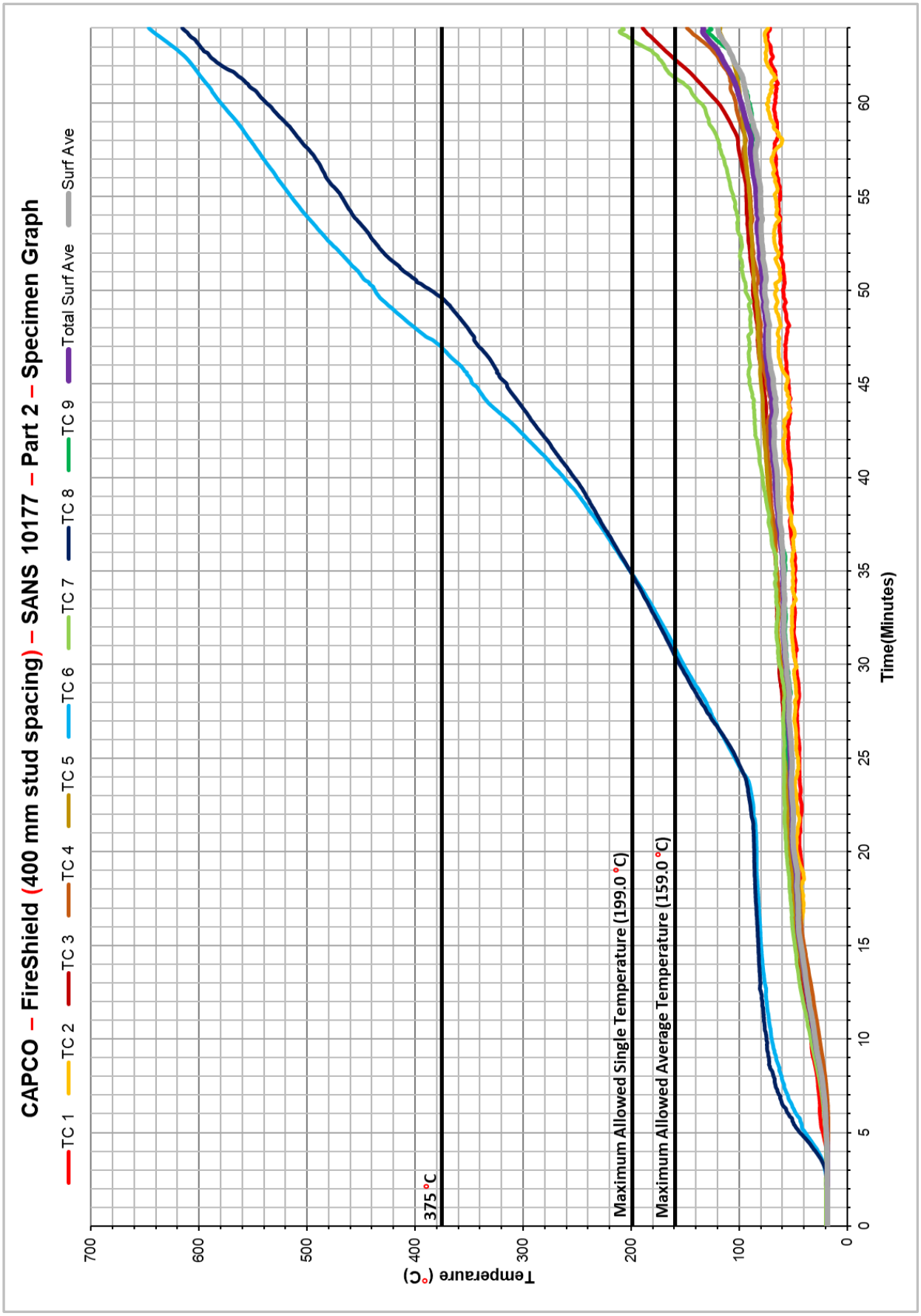


Figure 3.2: Temperatures recorded on the surface of the specimen

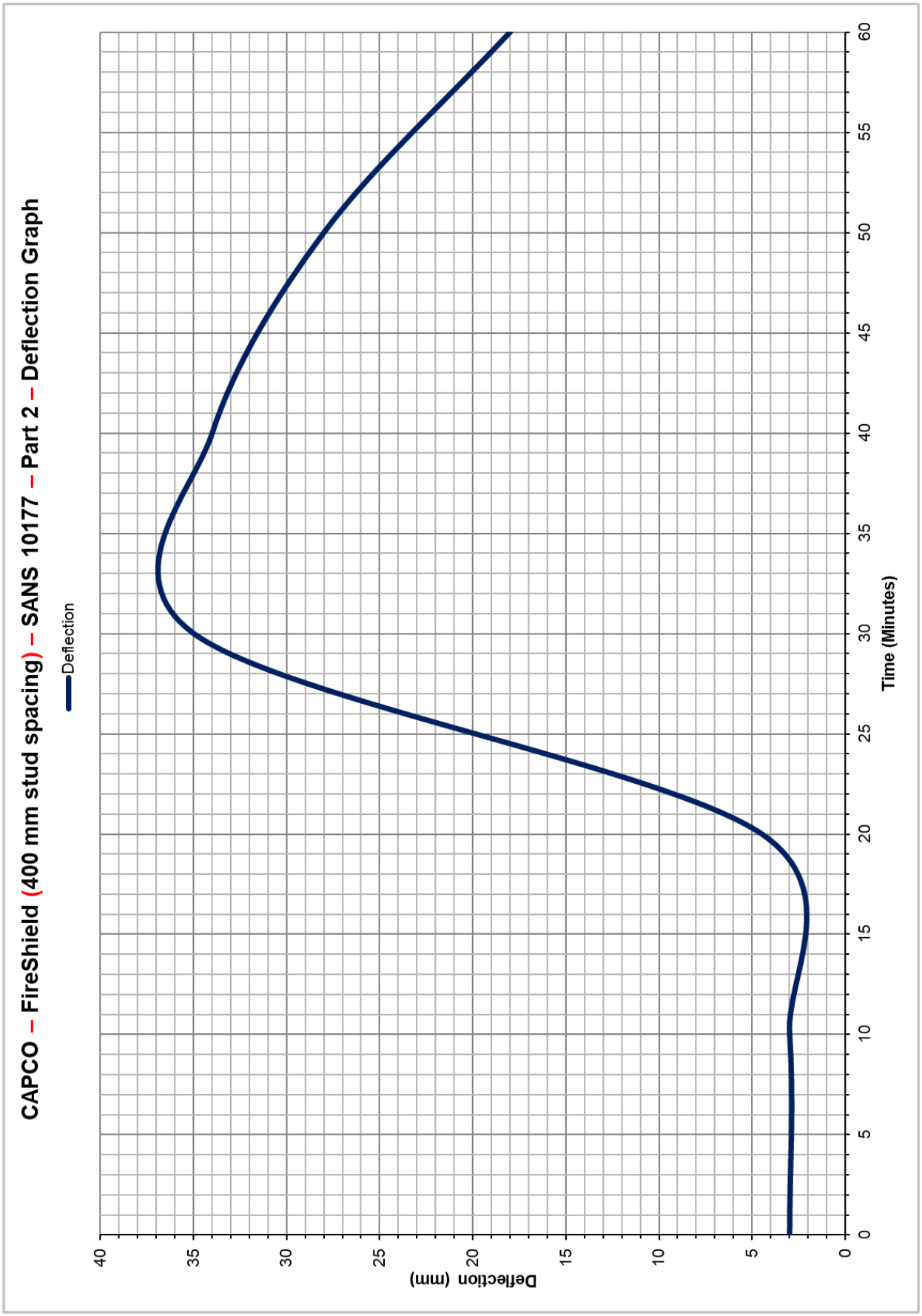


Figure 3.3: Deflection measured during the test



Figure 3.4: Slight discolouration on LHJ

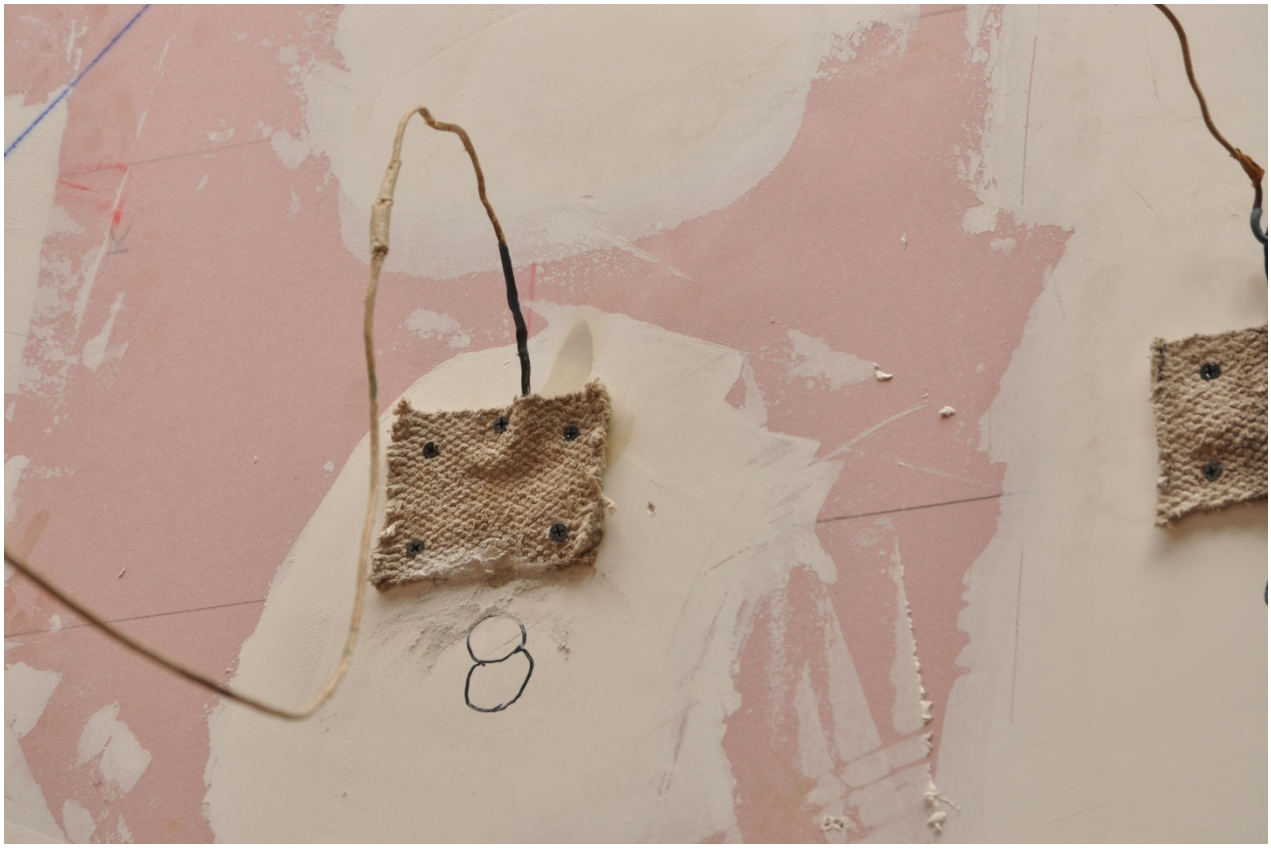


Figure 3.5: Steam release from TC 8 (stud thermocouple)



Figure 3.6: Approximately 30 minutes

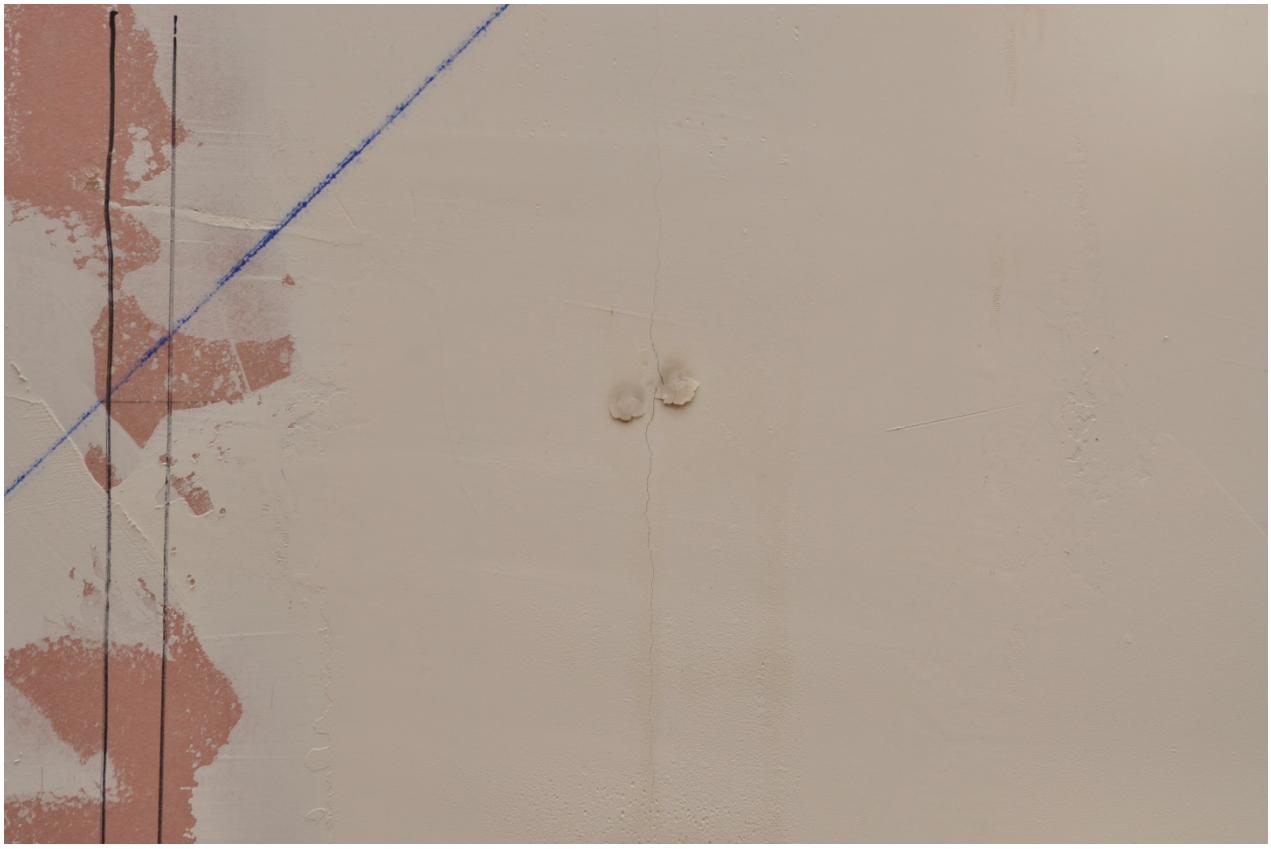


Figure 3.7: Crack forming and screw discolour on LHJ



Figure 3.8: Crack discolour on LHJ



Figure 3.9: Crack forming and discolour on RHJ



Figure 3.10: Crack propagate



Figure 3.11: Glowing visible on LHJ



Figure 3.12: Condition of specimen shortly before the test was stopped



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



*Figure 3.14: Unexposed side of specimen wall after removal from **SANS 10177 – 2** facility*

4. DISCUSSION OF RESULTS

The **Fire Resistance** requirements in terms of **SANS 10177 – 2**, were achieved as follows:

- ***Stability (R):*** Stud temperatures reached 375 °C at approximately 47 minutes. Maximum deflection measured was 35 mm at 30 minutes which does not exceed the Neutral Axis.

  Stability of the structural elements is not a criterion for a non-load bearing wall

- ***Integrity (E):*** Cracks formed on both joints, however no straight through gaps were noted.

  Integrity satisfied for 60 minutes

- ***Insulation (I):*** TC 7 (left joint) exceeded the maximum single temperature allowed temperature at 63 minutes and 25 seconds.

  Insulation satisfied for 60 minutes

5. CONCLUSION

The **CAPCO Fireshield (400 mm stud spacing)** partition wall system met following requirements for a non-load bearing **Fire Resistance Rating** (**FRR**) when tested in accordance with the **SANS 10177 – 2** test protocol.

The classification is as follows:

- **SANS 10177 – 2 » FR60 (Non-load bearing)***
  - **Stability (R) » 60 minutes**
  - **Integrity (E) » 60 minutes**
  - **Insulation (I) » 60 minutes**

**Suitable for all non–loadbearing internal walls and division separating walls requiring a 60-minute fire resistance without services.*

…….
Compiled by: **E.M. Nel**

…….
Approved by: **J.S. Strydom**

This copy has been produced from a .pdf format electronic file that has been provided by **FIRELAB** to the sponsor of the report and may only be reproduced in full. Extracts or abridgements of reports must not be published without permission of **FIRELAB**. The original signed paper version of this report is the sole authentic version. Only original paper versions of this report bear authentic signatures of the responsible **FIRELAB** staff.

The Test Report and results only relate to the product(s) and/or specimen(s) submitted for testing as identified in Section 1 and Annexures and do not apply to any similar product(s) or specimen(s) that has not been tested. This Test Report is only valid for 5 years or until there is a change to the product composition, manufacturing process or previously approved supplier(s).

FIRELAB

ANNEXURE "A"

– Company Information –	FIRELAB
Company Name:	CAPCO (PTY) LTD
Company Trading Name:	CAPCO
Company Registration Nr.:	2019/574495/07
Company VAT Nr.:	4600104667
Core Business Activities:	DISTRIBUTORS OF CEILING & PARTITION MATERIALS
Postal Address:	P.O Box 4203, RIVERHORSE VALLEY EAST, DURBAN, 4017
Physical Address:	2 COROBRIK PLACE, RIVERHORSE VALLEY BUSINESS ESTATE, DURBAN, 4017
Company contact number:	031 - 569 6090
Direct Contact Details	
Technical (name):	BARRY GOULD
Cell phone number:	083 - 272 1871
Email address:	barry@capco.co.za
Financial (name):	BRAD Mc LEARY
Cell phone number:	083 - 856 6447
Email address:	brad@capco.co.za
– Test & Sample Information –	
Test Required:	1 HOUR FIRE-RATED DRYWALL
Sample/Product name:	CAPCO FIRESHIELD BOARD
Intended Use:	DRYWALL FIRE-RATED
Sample/Product Description: *(Short description of sample or product submitted for testing, and type of material to be tested)*	2,700 x 2,700 m STEEL FRAMED DRYWALL USING 63,5 mm STUDS AND 65 mm TRACKS WITH 1 x 15 mm FIRESHIELD BOARD EACH SIDE + TAPED AND JOINTED.

APRIL 2018

The Test Report and results only relate to the product(s) and/or specimen(s) submitted for testing as identified in Section 1 and Annexures and do not apply to any similar product(s) or specimen(s) that has not been tested. This Test Report is only valid for 5 years or until there is a change to the product composition, manufacturing process or previously approved supplier(s).

FIRELAB

ANNEXURE "B"

– SANS 10177 Part 2 – – Specimen Wall Description –	FIRELAB		
Proposed Application:	Loadbearing	✓ Non-Loadbearing	FR (30, 60 or 120 minutes)
Additional information:			
System description:			
System name:	CAPCO FIRESHIELD		
System type:	DRYWALL 63,5mm + 2 x 15mm BOARDS		
Panel/Wall thickness:	65 + 15 + 15 = 95mm		
Cavity insulation:			
Type:	N/A		
Density (kg/m³):	N/A		
Thickness:	N/A		
Interior Skin:			
Make-up and Description:	15mm FIRESHIELD BOARD		
Glue Type and/or Fasteners Used:	25mm DRYWALL SCREWS @230mm CENTRES.		
Exterior Skin (only for asymmetric systems)**:**			
Make-up and Description:			
Glue Type and/or Fasteners Used:			
Joint Detail:			
Type:	TAPERED EDGES		
Sealant:	FIBRE-GLASS TAPE 50mm+CAPCO JOINTING COMPOUND		
Cover Strips:	N/A		
Fasteners: *(Type and Spacing)*	DRYWALL SCREWS @230 mm CENTRES		
Structural and Non-Structural Elements:			
Primary (Studs):	63,5 x 35 x 0,5 mm "C" SHAPED STUDS.		
Stud Spacing:	400 mm CENTRES		
Secondary (Stiffeners):	N/A		
Top/Bottom rail:	65mm x 25mm x 0,5mm TRACK "U"		
Wall ties:	WALL ANCHORS 5/6/36 mm		

CAPCO: TESTING. STANDARD OPERATING PROCEDURE

60 MINUTE FIRE RATED DRYWALL SYSTEM : 2,700M X 2,700M (FIRESHIELD)

CAPCO
CEILING AND PARTITION COMPONENTS

CAPCO

CAPCO DRYWALL: 60 MINUTE FIRE RESISTANCE

STEEL FRAMEWORK

HEAD TRACK
Capco Drywall track consisting of galvanised mild steel "U" shaped channel section measuring 25 x 65 x 0.5mm fixed at head at 600mm centres.

FLOOR TRACK
Capco Drywall track consisting of galvanised mild steel "U" shaped channel section measuring 25 x 65 x 0.5mm fixed to floor at 600mm centres.

VERTICAL STUDS
Capco Drywall studs consisting of galvanised mild steel "C" shaped channel sections measuring 32 x 64 x 6.5 x 0.5mm friction fitted between head and floor tracks at 400mm centres.

DRY LINING

BOARDING
Capco FireShield 15mm thick tapered edge gypsum boards fitted to both sides of 64mm drywall steel framing with 25 x 3.5mm black phosphated fine thread drywall screws fixed at 230mm centres.

FINISHING
CAPCO 50mm wide self adhesive fiberglass mesh tape applied to recessed edges of gypsum boards and flush jointed with 2 coats of Capco drywall jointing compound.

NB. All drywall screws to be fitted by means of drywall screwdriver with depth gauge so that drywall screws do not penetrate gypsum board paper lining. Screws depth to be ± 0.5mm depressed into paper lining and covered with Capco drywall jointing compound.

The Test Report and results only relate to the product(s) and/or specimen(s) submitted for testing as identified in Section 1 and Annexures and do not apply to any similar product(s) or specimen(s) that has not been tested. This Test Report is only valid for 5 years or until there is a change to the product composition, manufacturing process or previously approved supplier(s).

FIRELAB

60MIN FIRE TEST: 1 LAYER OF 15MM FIRESHIELD GYPSUM BOARD EACH SIDE

CAPCO

