



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
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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**

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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.

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Figure 1.1: **FireShield (400 mm stud spacing)** system from the exposed side prior to the test

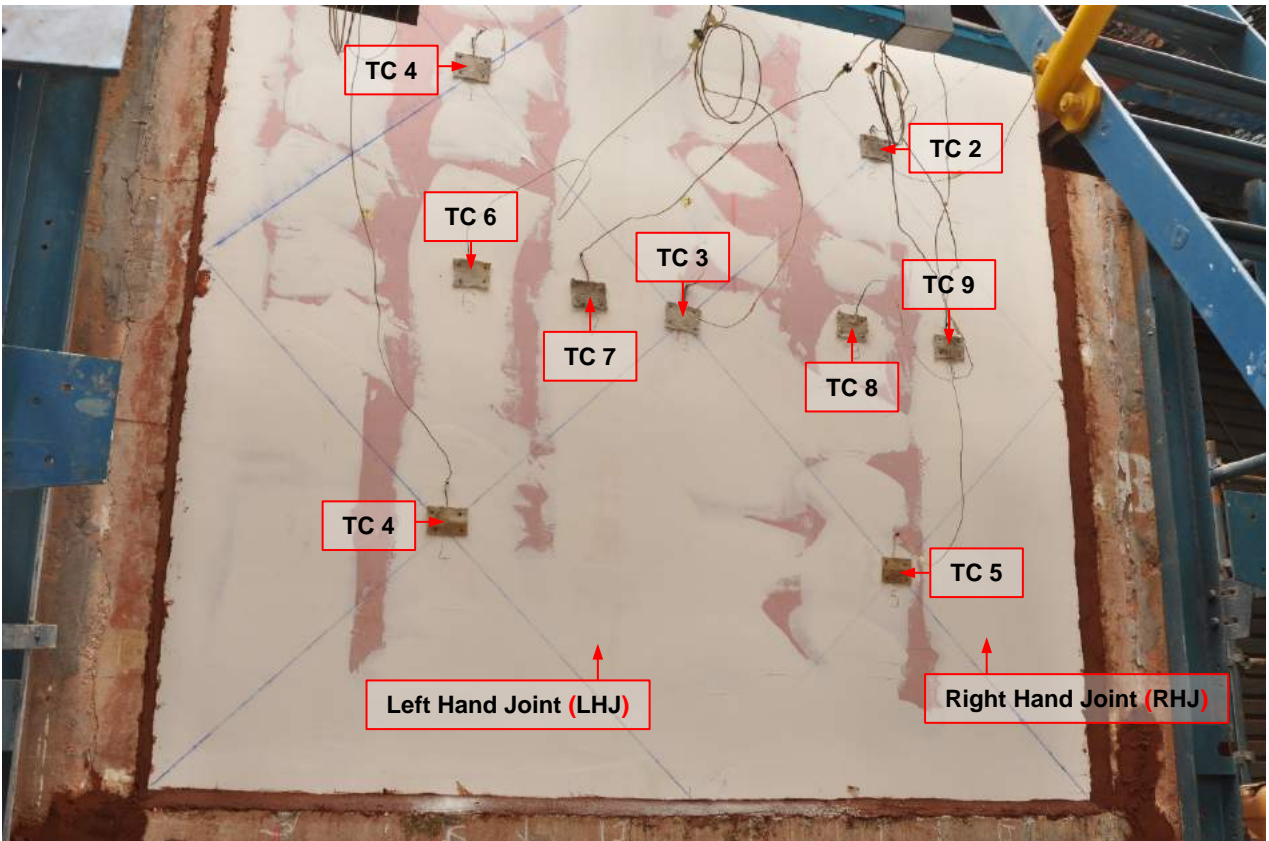





Figure 1.2: **FireShield (400 mm stud spacing)** system with thermocouples from the unexposed side

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

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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

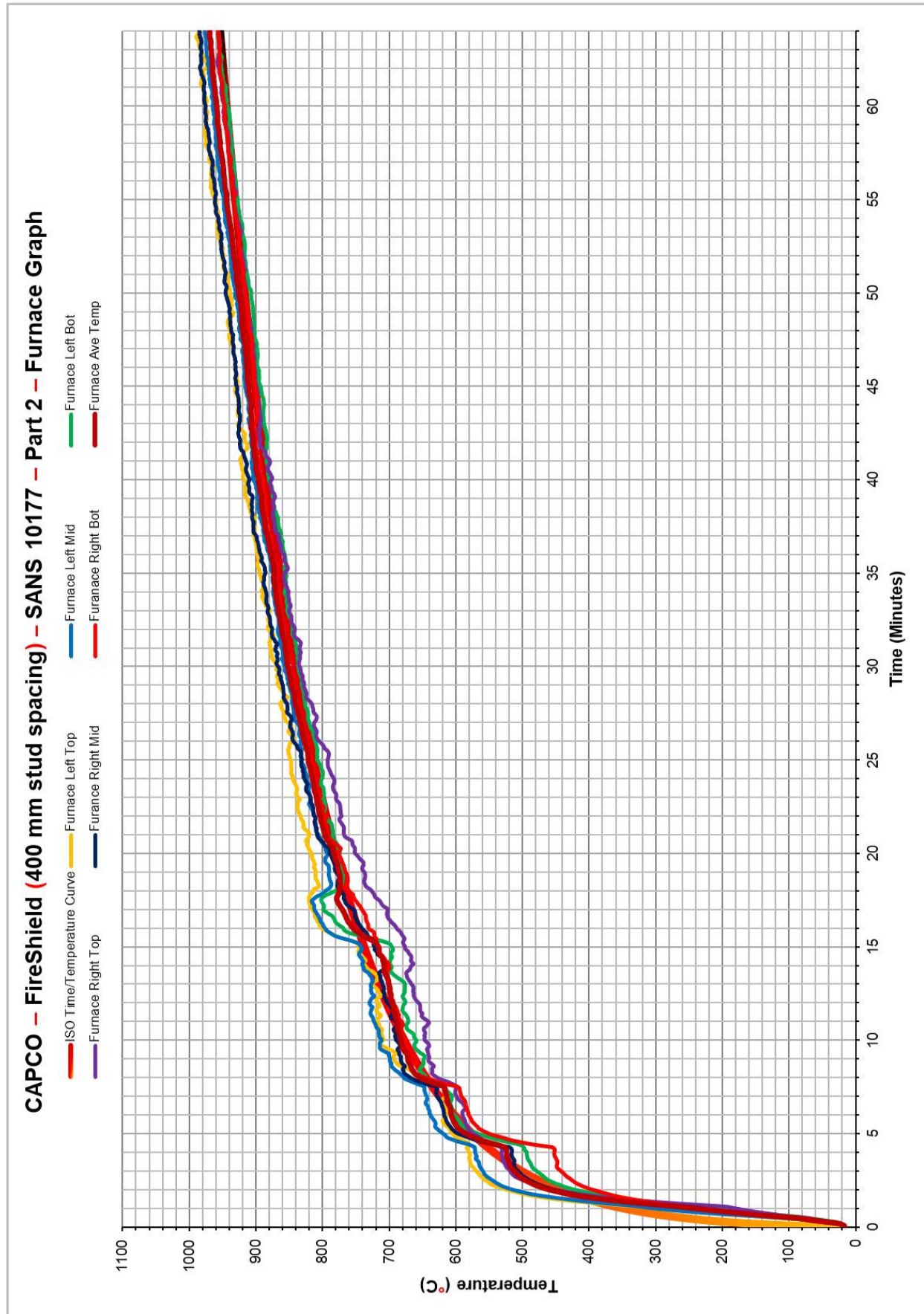


Figure 3.1: Furnace temperatures recorded during the large-scale FR test

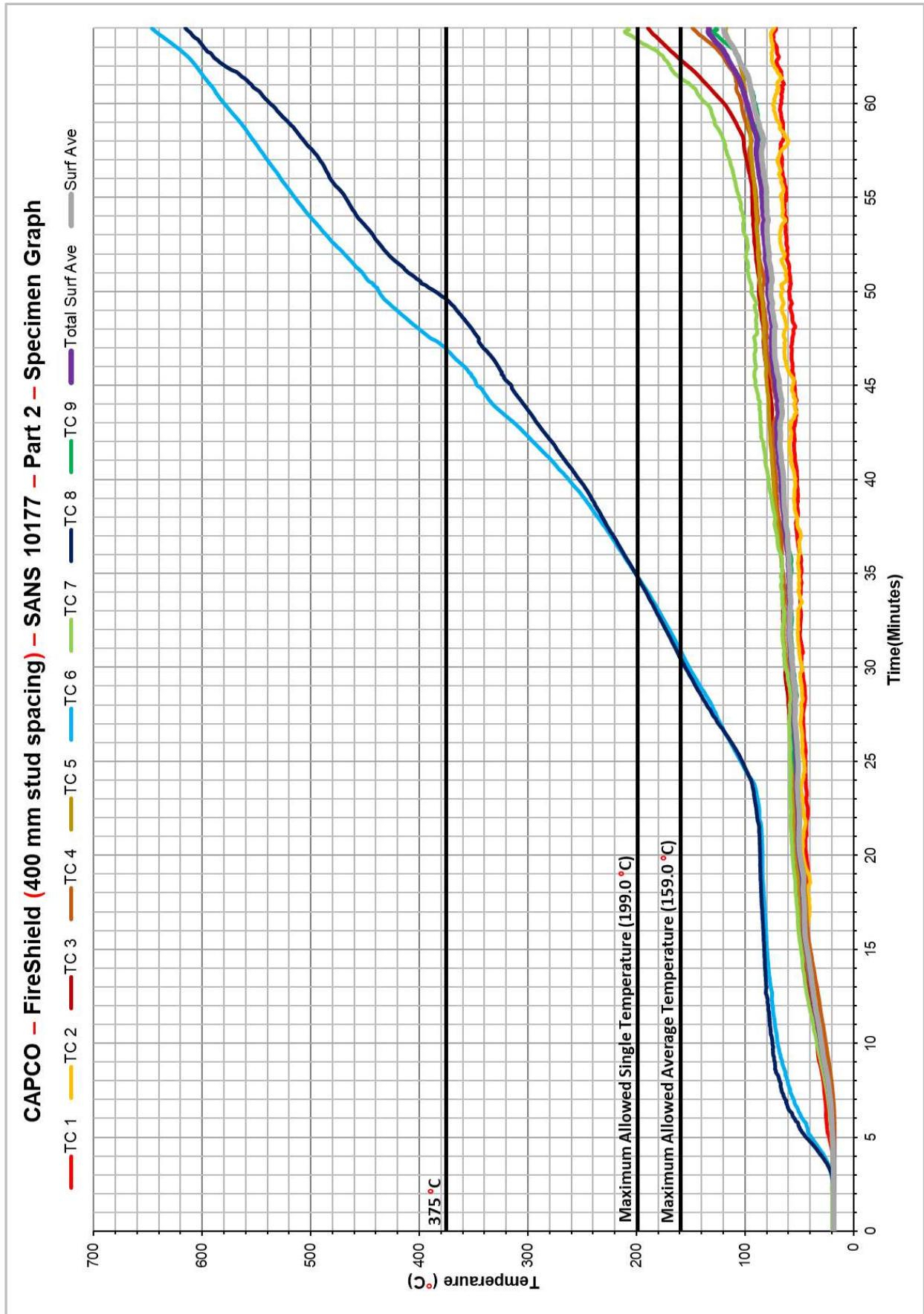


Figure 3.2: Temperatures recorded on the surface of the specimen

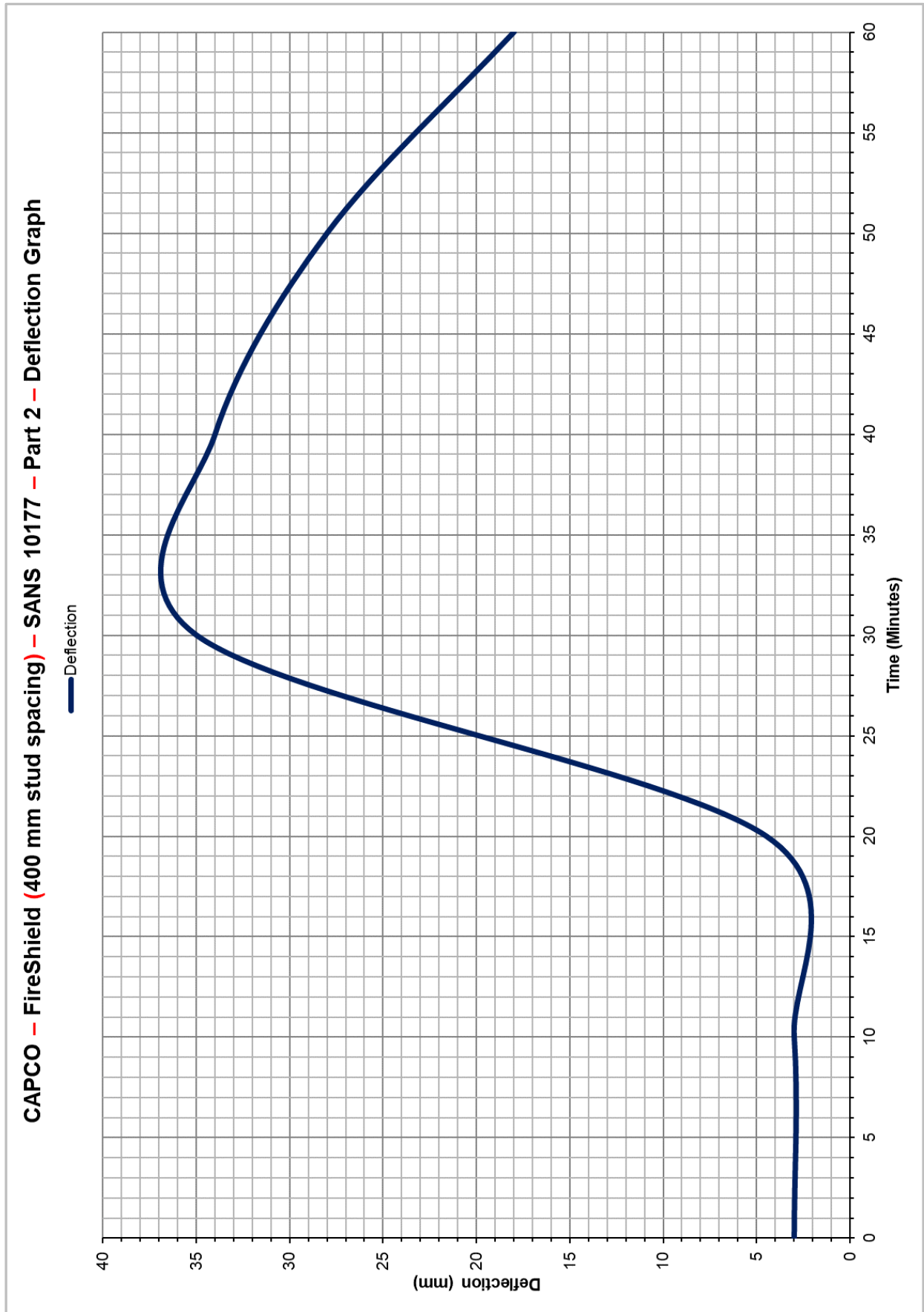


Figure 3.3: Deflection measured during the test



Figure 3.4: Slight discolouration on LHH

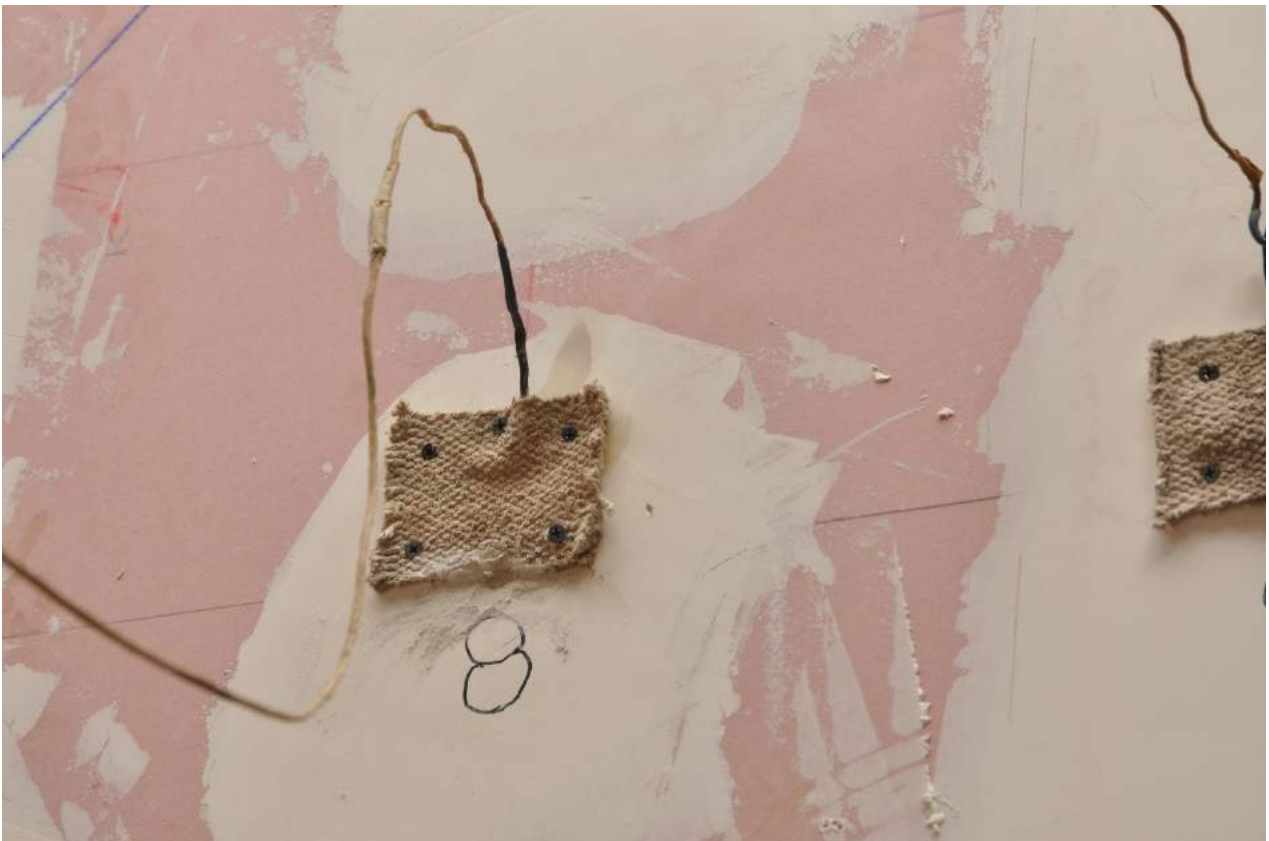


Figure 3.5: Steam release from TC 8 (stud thermocouple)



Figure 3.6: Approximately 30 minutes

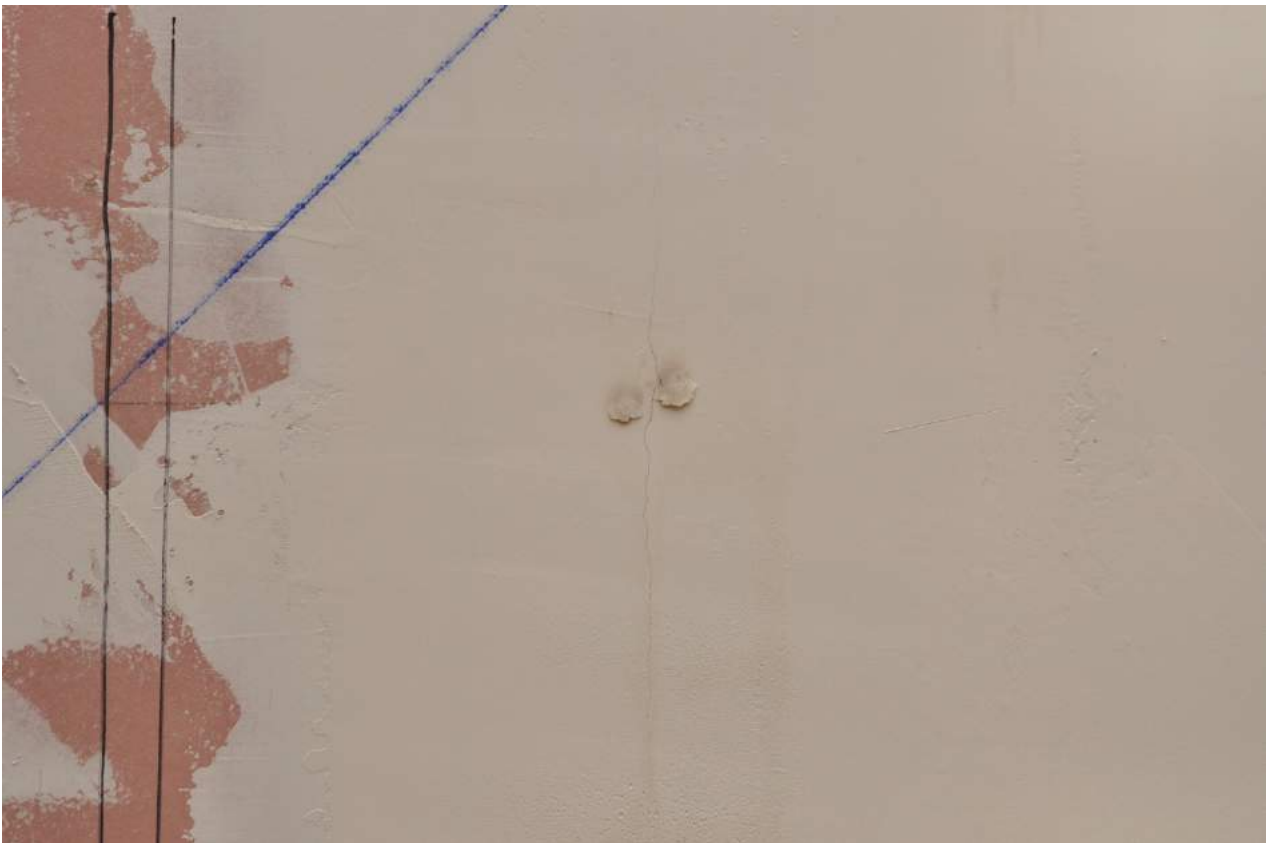


Figure 3.7: Crack forming and screw discolour on LHJ

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Figure 3.8: Crack discolour on LHJ



Figure 3.9: Crack forming and discolour on RHJ

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Figure 3.10: Crack propagate

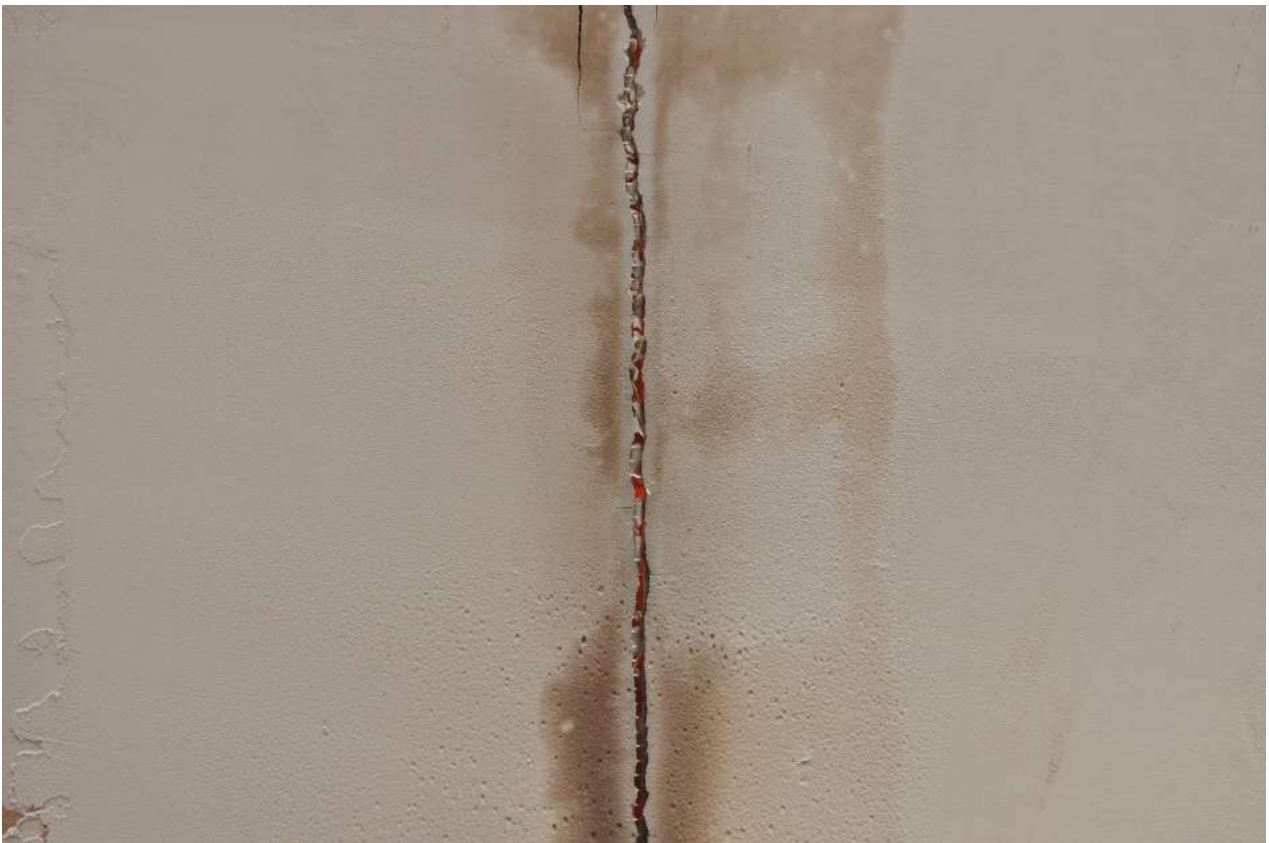


Figure 3.11: Glowing visible on LHJ

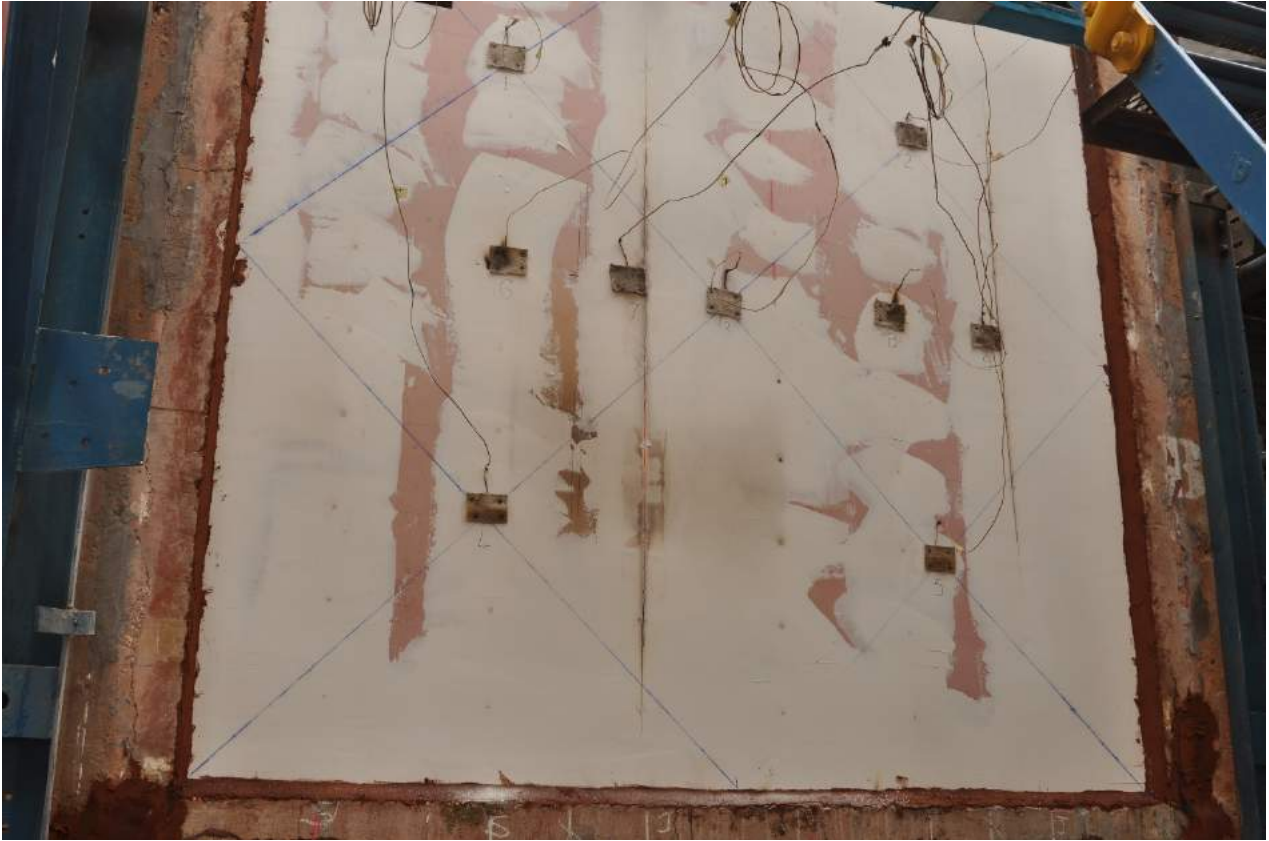


Figure 3.12: Condition of specimen shortly before the test was stopped



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

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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.




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Compiled by: **E.M. Nel**




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

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- 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: <small>(Short description of sample or product submitted for testing, and type of material to be tested)</small>	2,700 x 2,700m STEEL FRAMED DRYWALL USING 63,5mm STUDS AND 65mm TRACKS WITH 1 x 15mm FIRESHIELD BOARD EACH SIDE + TAPED AND JOINTED.	

ADRII 2018

ANNEXURE "B"

- SANS 10177 Part 2 - - Specimen Wall Description -		 FIRELAB	
Proposed Application:	Loadbearing	<input checked="" type="checkbox"/> 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/m ³):	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 @ 230mm CENTRES		
Structural and Non-Structural Elements:			
Primary (Studs):	63,5 x 35 x 0,5mm "C" SHAPED STUDS.		
Stud Spacing:	400mm CENTRES		
Secondary (Stiffeners):	N/A		
Top/Bottom rail:	65mm x 25mm x 0,5mm TRACK "U"		
Wall ties:	WALL ANCHORS 5/6/36mm		

CAPCO: TESTING. STANDARD OPERATING PROCEDURE



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

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 ± 0.5 mm depressed into paper lining and covered with Capco drywall jointing compound.

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

