



FIRELAB

TITLE : Report on the Large-scale Fire Resistance properties of the **60 minutes Fire Rated Ceiling (Uninsulated)**

REQUESTED BY : **Capco (Pty) Ltd**
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SCOPE

This report classifies the Fire Resistance Properties of the **60 minutes Fire Rated Ceiling (Uninsulated)** 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 test

Section 4: Discussion of results

Section 5: Conclusion

Annexure “A”: Company information

Annexures “B”: System information and detailed drawings supplied by **Capco**

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1. SPECIMEN DESCRIPTION

Capco installed the **60 minutes Fire Rated Ceiling (Uninsulated)** into **FIRELAB's** Horizontal **SANS 10177 – 2** test facility.

Description of the ceiling system:

System:	Capco 60 minute Fire Rated Ceiling (Uninsulated)
System Abbr. name:	Capco (Uninsulated) Ceiling
Total Thickness:	± 68 mm
Proposed Application:	Ceiling system
Application requirement:	FR 60
Load required:	N/A

System make up:

Board:	15 mm Fire Shield Board
Plaster:	Casofour/Capco Jointing compound
Length (per board):	3.0 m
Width (per board):	1.2 m
Total Thickness	30 mm

System Composition:

Grid 1:	T38/35G Tee Grid System
Layer 1:	15 mm Fire Shield Drywall screwed to grid. Taped and jointed
Layer 2:	15 mm Fire Shield staggered with 100 x 0.5 mm galvanised steel sheet strips at joints

Support:

Main T's:	Capco Delta T38/35G Main Tee (3.600 m) + Cross Tees (1200 mm)
Hangers:	25 x 25 x 0.5 mm galvanised M/S angles
Clips:	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.

The Test Report and results only relate to the product(s) submitted for testing as identified in Section 1 and Annexures and do not apply to any similar product(s) that have 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 1.1: The **Capco (Uninsulated) Ceiling** with thermocouples on the unexposed side prior to testing



Figure 1.2: The **Capco (Uninsulated) Ceiling** from the exposed side

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

2.1. TEST PROCEDURE

The nominal 3 meter wide by 6 meter long system (3 meter section insulated and the remaining section un-insulated) was tested for fire resistance in FIRELAB's 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 may not collapse or fail structurally during 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.

The **Stability and Integrity** criteria are evaluated through observations which are noted in Table 3.1.

Insulation was measured using 5 thermocouples (TC 6 – TC 10) placed in a grid of equal area onto the surface of the specimen. An additional 4 thermocouples (TC 11 – TC 14) were placed on the grid to monitor the steel temperature.

The uninsulated ceiling was tested simultaneously with the insulated ceiling.

2.2. TEST EQUIPMENT

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

3. TEST RESULTS

Capco – Capco Ceiling

OBSERVATIONS DURING THE SANS 10177 – 2 TEST

TIME (hh:mm:ss)	DESCRIPTION
00:00:00	– Test Started –
00:02:02	Light smoke release on left perimeter
00:04:50	Light smoke release on front perimeter
00:10:06	General smoke release increase
00:18:40	Smoke coming through insulation in the middle
00:19:20	First layer of boards starting to sag
00:36:00	Density of smoke release increased
00:41:00	Pieces flaking off the first layer of boards
00:52:40	Insulation darkening on joint
00:55:20	Significant smoke release near TC 1
00:56:00	Board joints starting to open (exposed side)
00:59:00	Board charring on right perimeter and edging buckling (uninsulated section)
01:00:00	First layer of boards sagging significantly (insulated section)
01:03:20	System sagging near back perimeter and glowing under insulation (insulated section)
01:07:00	Insulation sagging significantly at back perimeter (insulated section)
01:09:55	System collapsed near back perimeter (insulated section) » Fails Stability
01:10:00	– Test Concluded –

Note(s): Tested on 26/10/2023, ambient temperature during the test = 28.5 °C
The observations above are for both the insulated ceiling and the uninsulated ceiling

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

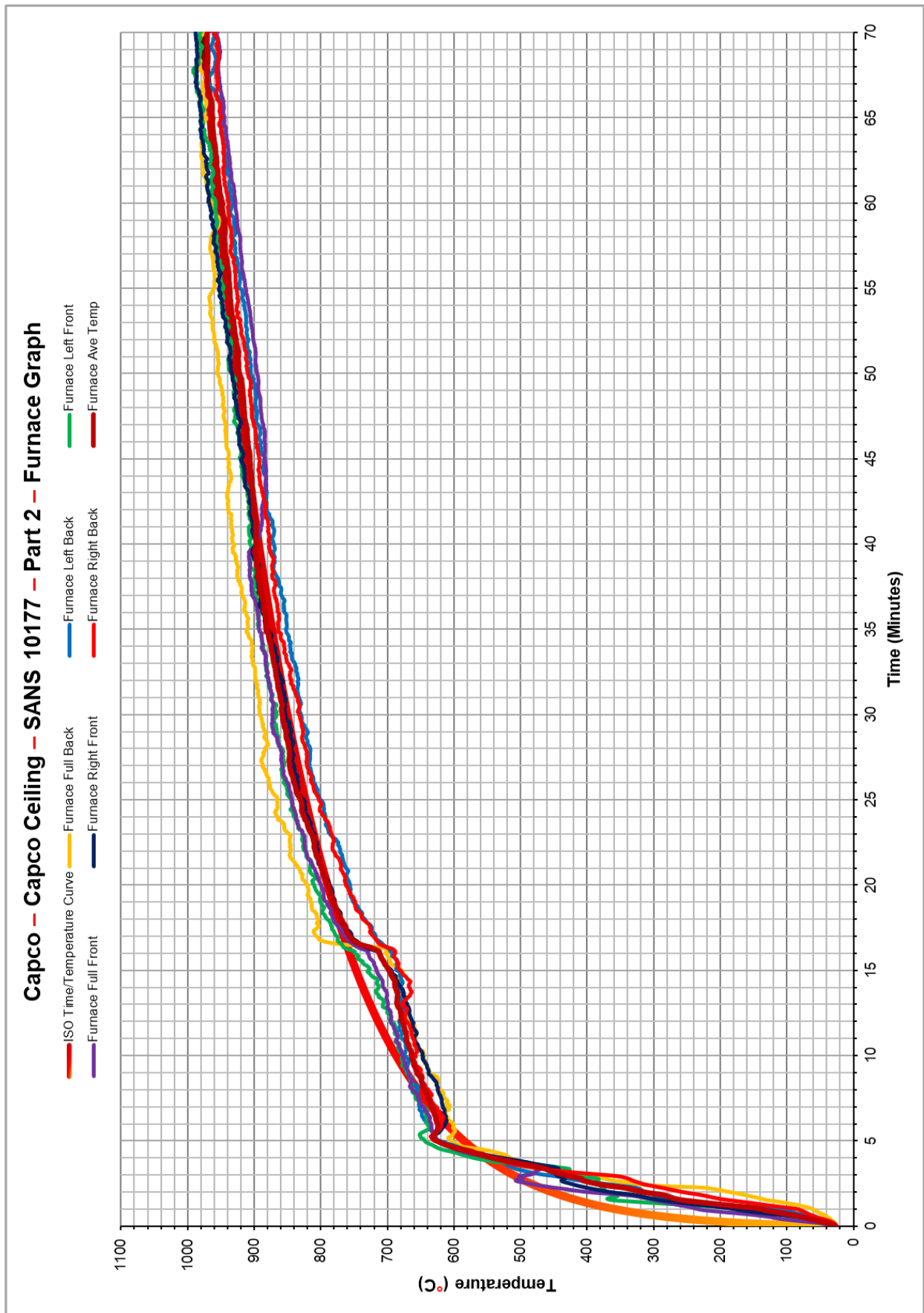


Figure 3.1: Furnace temperatures recorded during the large-scale FR test

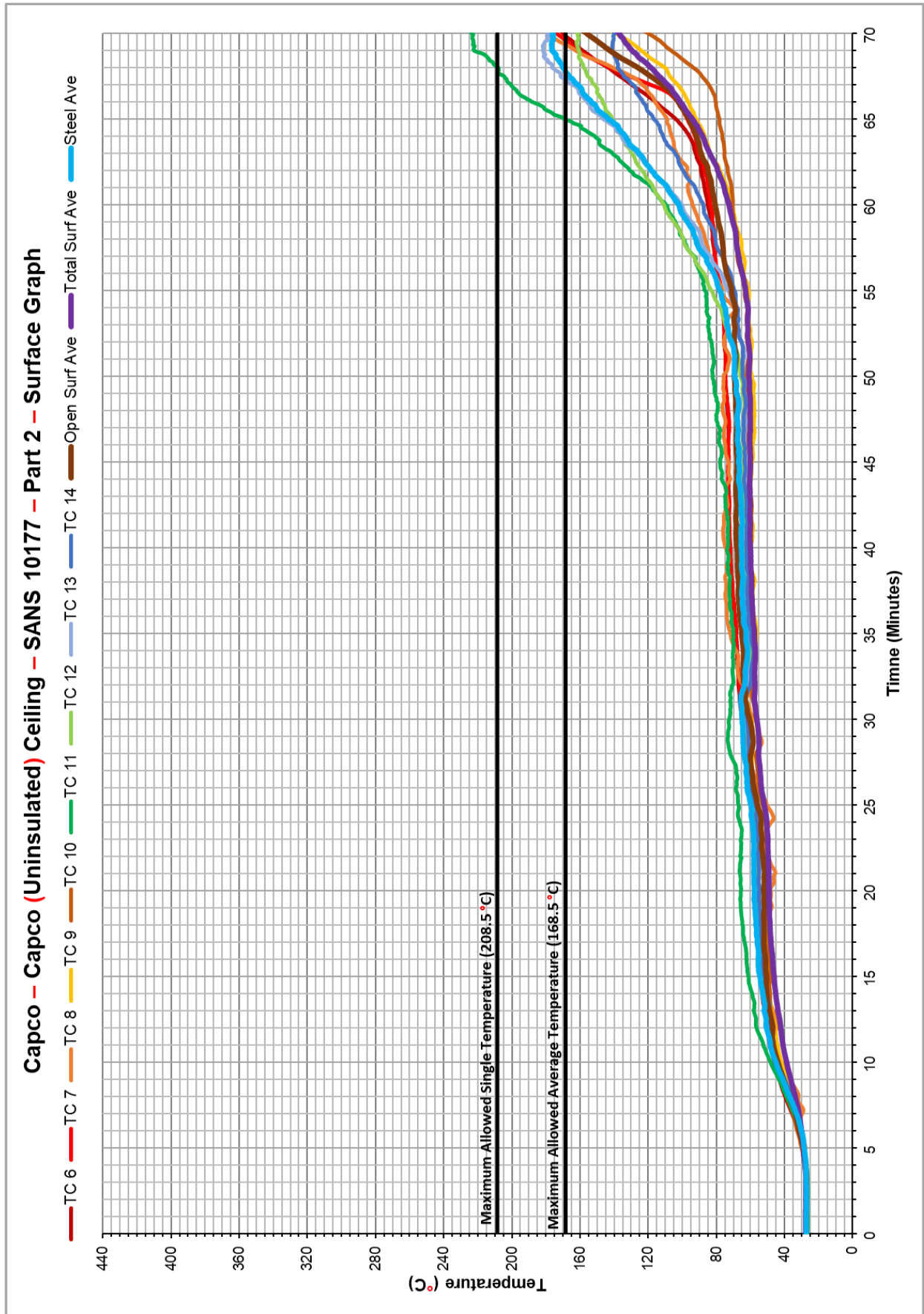


Figure 3.2: Temperatures recorded on the surface of the specimen

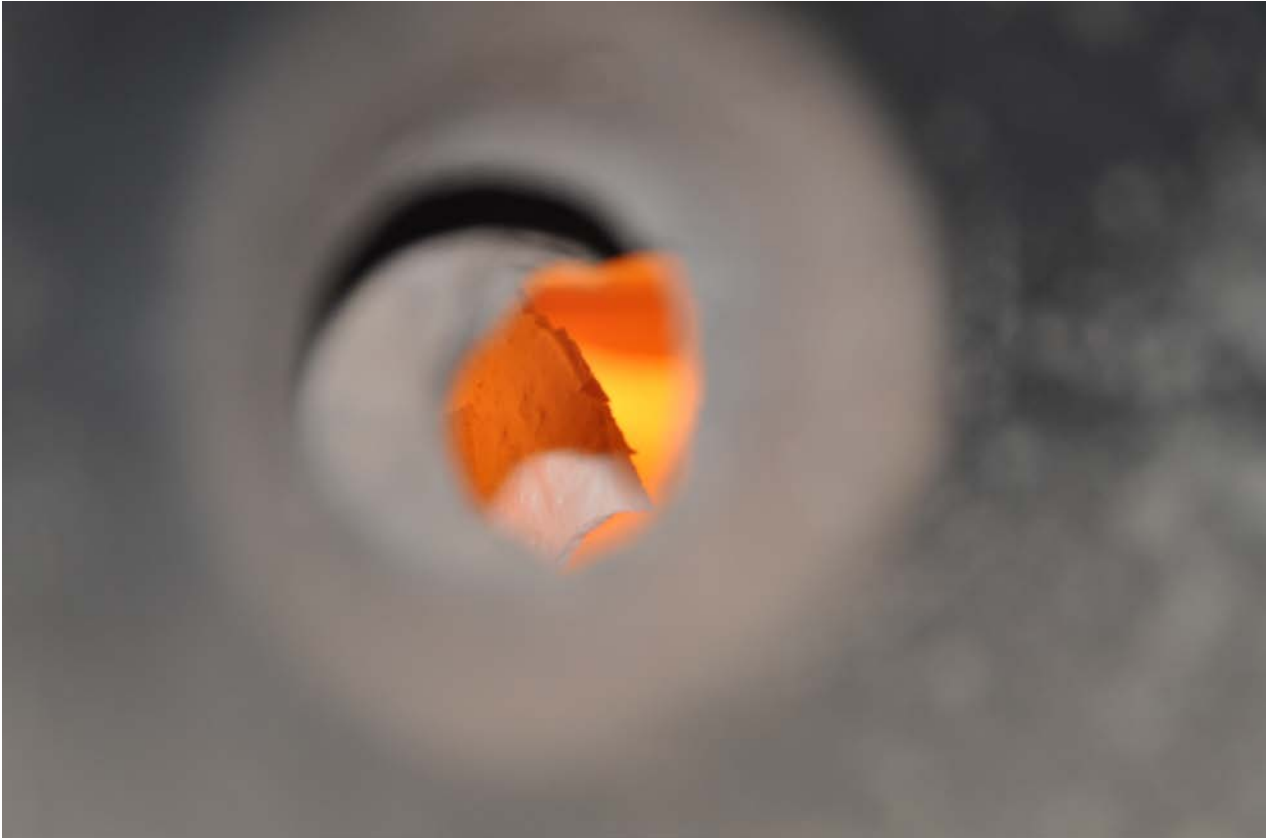


Figure 3.3: First layer of boards sagging



Figure 3.4: Glowing observed between board and steel

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Figure 3.5: Edging buckling and board charring



Figure 3.6: Charring at front perimeter




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Figure 3.7: First layer of boards sagging significantly





4. DISCUSSION OF RESULTS

Results in terms of **SANS 10177 – 2**:

-  **Stability (R):** The specimen did not collapse during the test period.
Stability satisfied for 60 minutes
-  **Integrity (E):** No flaming was observed on the unexposed side and no cracks wider than 6 mm and longer than 150 mm were observed.
Integrity satisfied for 60 minutes
-  **Insulation (I):** Single and average temperature readings exceeded their respective maximums but this happened after 60 minutes.
Insulation satisfied for 60 minutes

5. CONCLUSION

The Capco **60 minutes Fire Rated Ceiling (Uninsulated)** was tested for **Fire Resistance** in accordance with the **SANS 10177 – 2** test protocol and is classified as follows:

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





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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:	Distributor and stockist to Ceiling and Partition Industry	
Postal Address:	P.O Box 4203, Riverhorse Valley East, Durban, 4017	
Physical Address:	2 Corobrik Place, Riverhorse Valley Business Estate, Durban, 4017	
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Cell phone number:	083 272 1871	
Email address:	barry@capco.co.za	
Financial (name):	Justin Ellis - Finance Manager	
Cell phone number:	083 856 6447	
Email address:	justin@capco.co.za	
– Test & Sample Information –		
Test Required:	60 minutes Fire Rated Ceiling	
Sample/Product name:	Capco FireShield Gypsum Ceiling	
Intended Use:	Residential / Commercial / Industrial Building	
Sample/Product Description:	Suspended ceiling from light steel frame / structural steel or timber beams with covered tee system + 2 layers of 15mm Fire resistant gypsum boards fitted staggered to tee system.	
<i>(Short description of sample or product submitted for testing, and type of material to be tested)</i>		

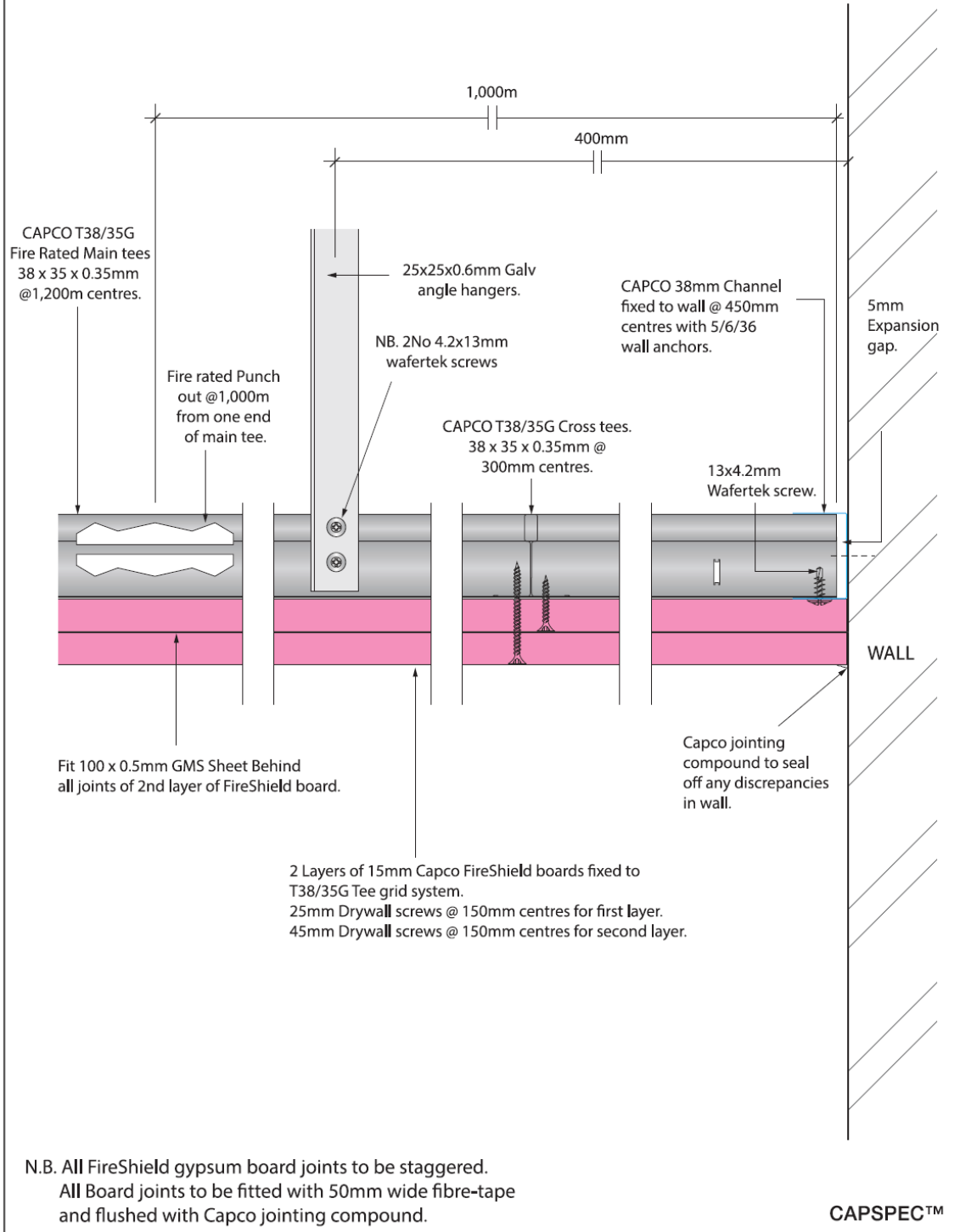
– SANS 10177 Part 2 – – Ceiling Specimen Description –		 FIRELAB
Ceiling system description:		
System name:	Capco 60minute Fire Rated Ceiling	
System type:	Capco FireShield Gypsum Board	
Proposed Usage:	Residential between garage and loft over: 30minutes and Commercial: 60 minutes required	
System make up:		
Board:	15mm FireShield board	
Plaster:	Casofour / Capco Jointing compound	
Length (per board):	3,000m	
Width (per board):	1,200m	
Overall Thickness:	15mm x 2 = 30mm + T38/35G grid	
Product composition (includes skin coat & coating):		
Layer 1:	15mm FireShield Drywall screwed to grid. Taped and jointed	
Layer 2:	15mm Fireshield staggered with 100 x 0,5mm galvanised steel sheet strips at joints	
Layer 3:	N/A	
Layer 4:	N/A	
Layer 5:	N/A	
Support:		
T's:	Capco Delta T38/35G Main Tee (3,600m) + Cross tees (1200mm)	
Hangers:	25 x 25 x 0,5mm galvanised M/S angles	
Clips:	N/A	

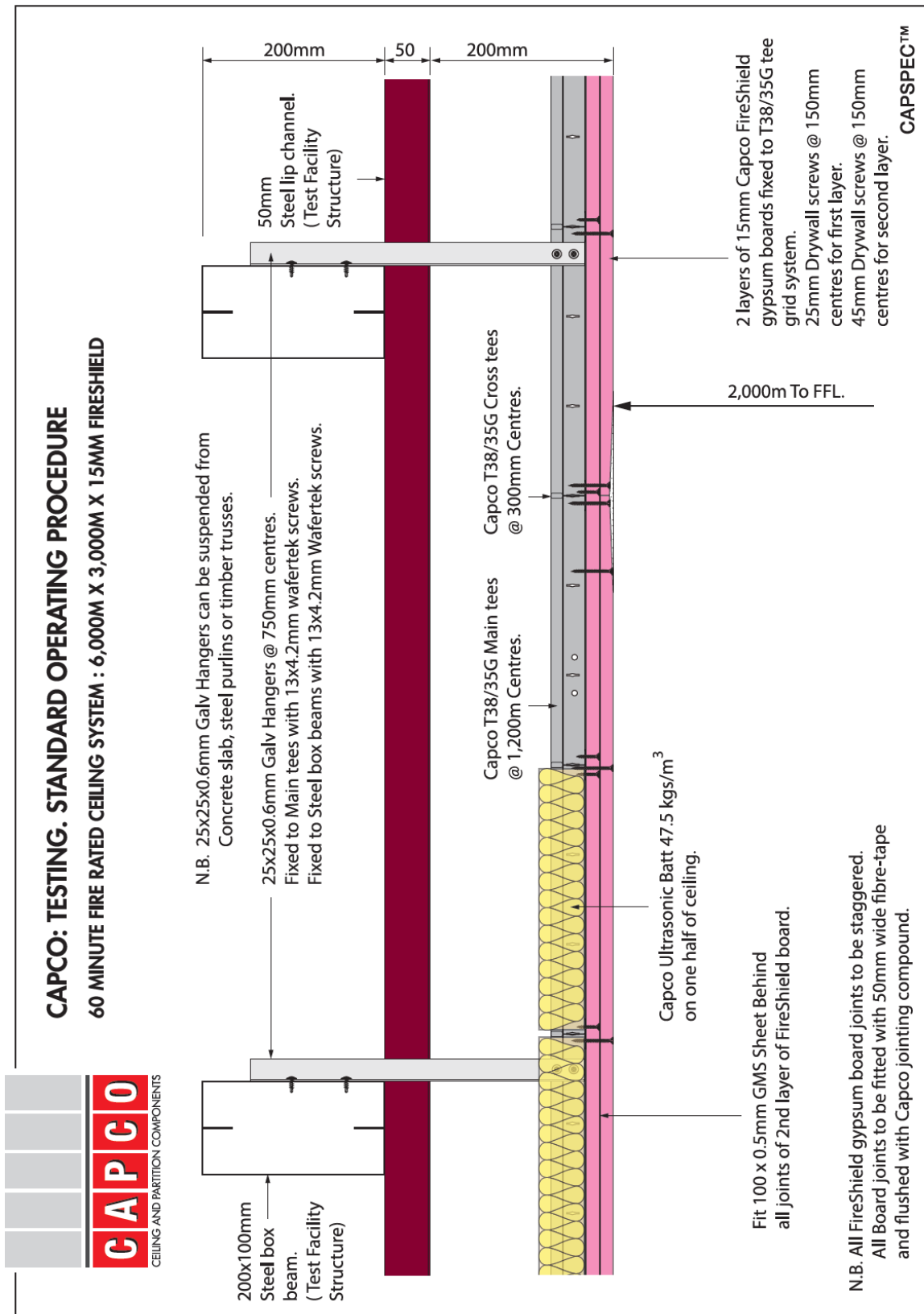
Capco: One Hour Fire-rated Gypsum Ceiling.
60 Minute Fire-rated ceiling description.

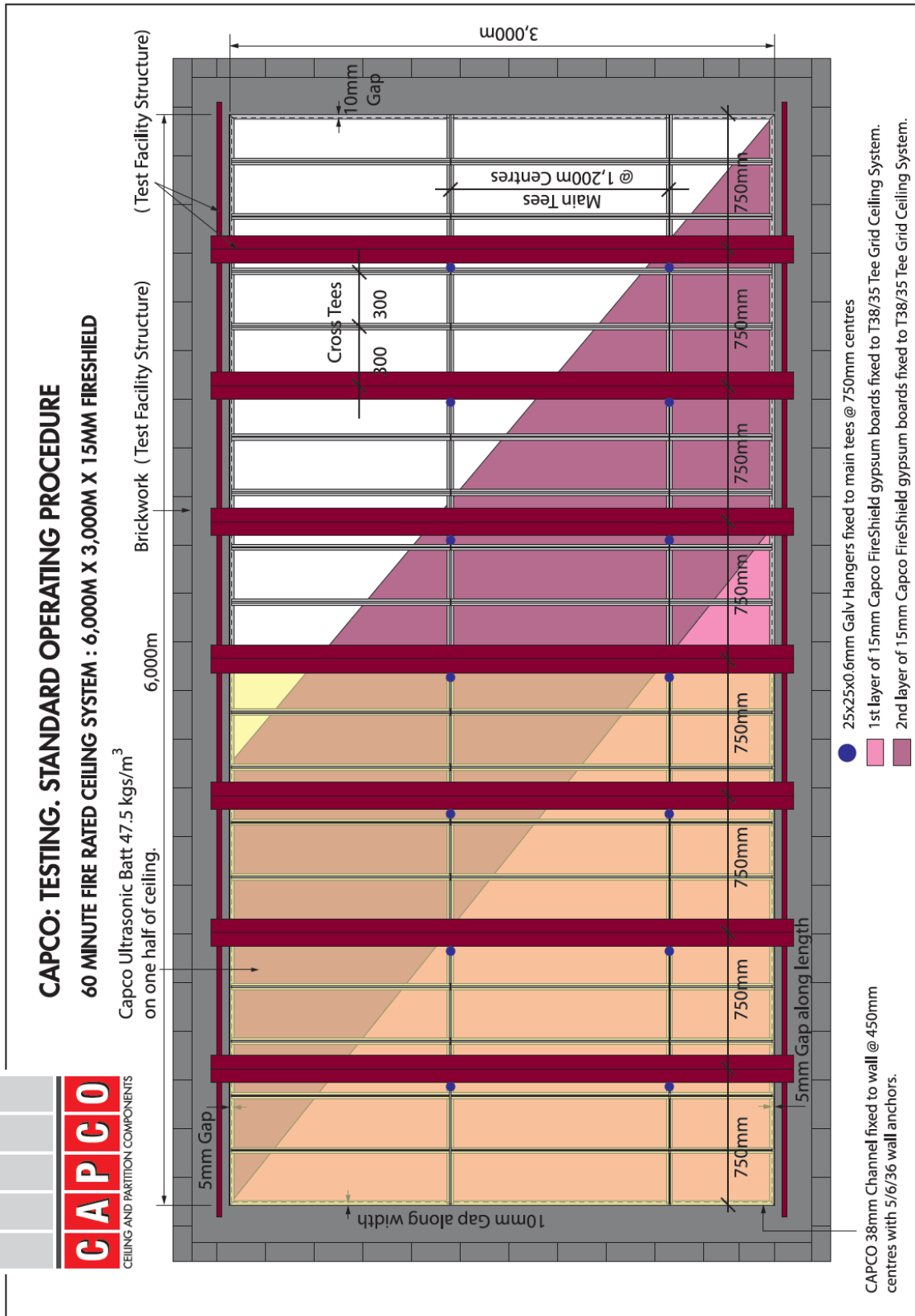
1. Ceiling suspended from light steel frame, structural steel frame or structural timber beams with 25 x 25 x 0,6mm galvanised mild steel angle hangers fixed at 750mm centres to Capco Delta galvanised mild steel covered tee system T38/35G fire rated main tees with Wafer Tek screws. Main tees supported at perimeter walls on Capco C39/25 Bulkhead "C" Channels fixed at 400mm centres. Delta 1,200m Cross tees T38/35G slotted into main tees at 300mm centres. Capco 15mm thick FireShield fire resistant gypsum board fixed to Covered Tee system with 25mm Drywall screws at 150mm centres and joints taped with 50mm wide fibreglass mesh tape and jointed with Capco jointing compound. All screw heads to be stopped with joint compound. Second layer of Capco 15mm thick FireShield gypsum board fixed in staggered pattern through first layer of board with 45mm drywall screws into covered tee grid system including 100 x 0,5mm galvanised mild steel strips behind all second layer board joints. Gypsum board Tapered edge joints to be fitted with 50mm fibreglass tape and flush jointed with Capco jointing compound. All screw heads to be stopped with Capco jointing compound.
2. Alternate. All as above with 50mm thick by 80Kgs/m³ density Capco mineral wool blanket 1,200m wide laid over entire suspended ceiling with joints closely butt jointed.

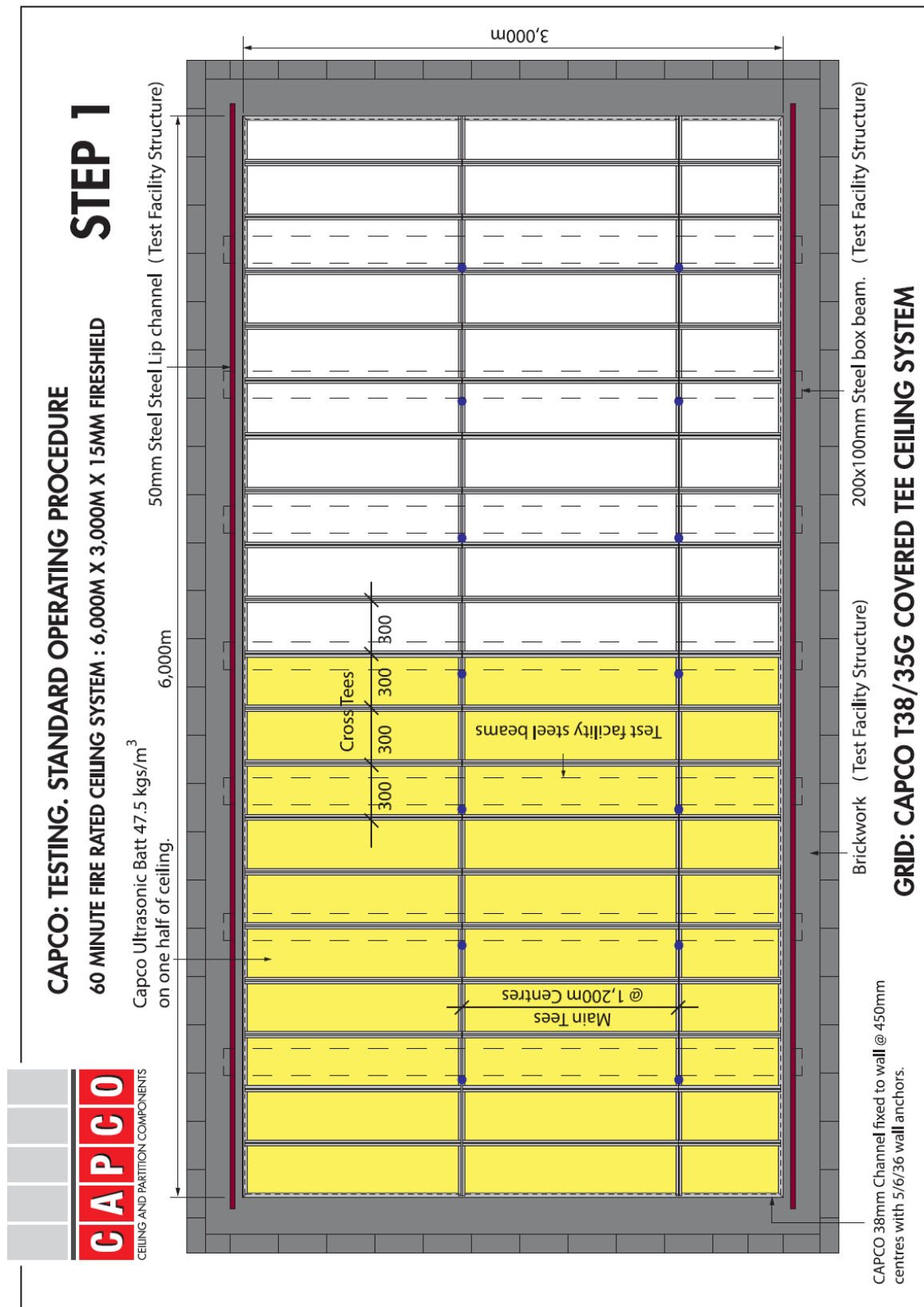


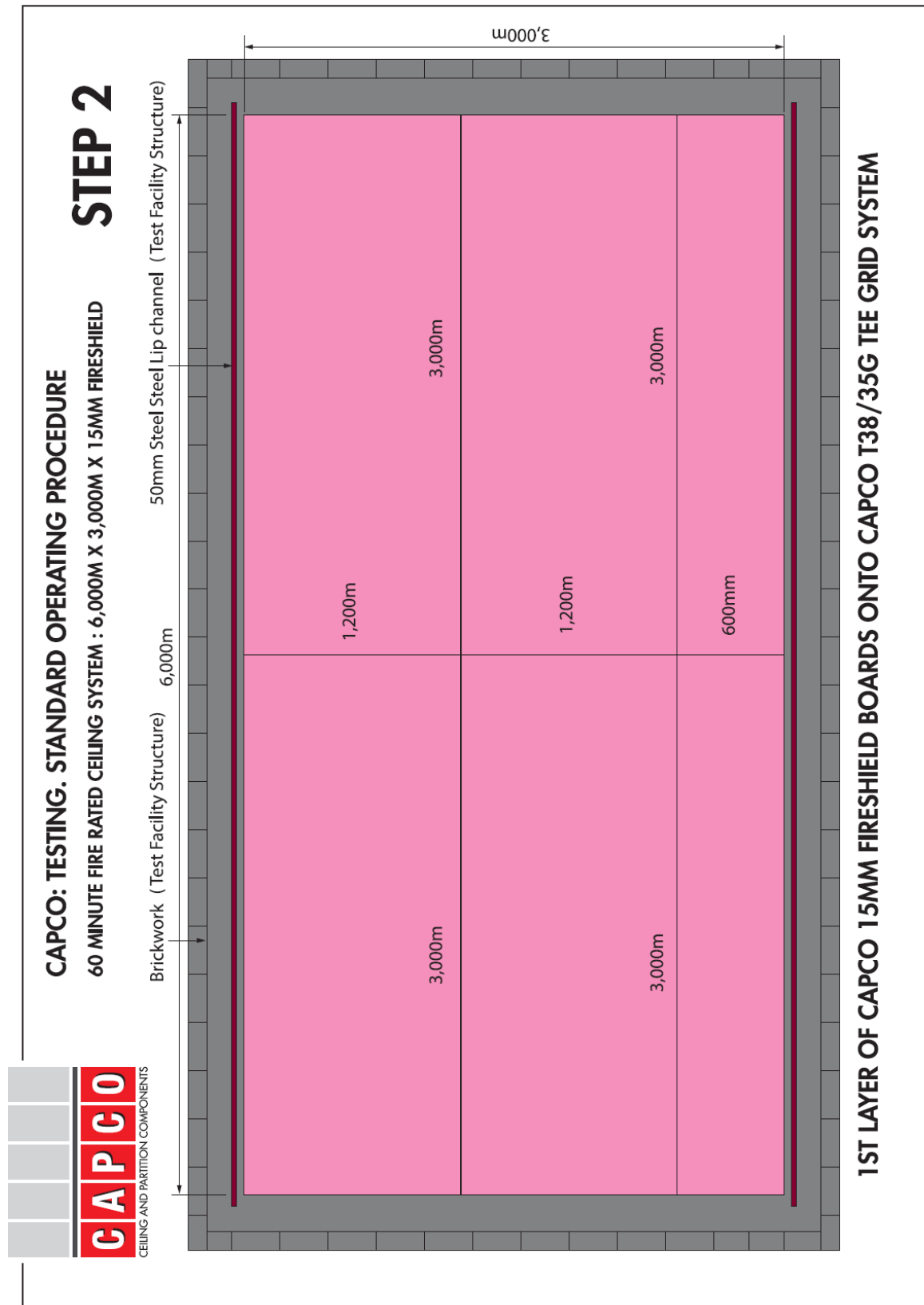
CAPCO: TESTING. STANDARD OPERATING PROCEDURE
60 MINUTE FIRE RATED CEILING SYSTEM : 6,000M X 3,000M X 15MM FIRESHIELD











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