Test Report

(Document No.: FERL/TR/01/I3/U0)

Project Number		P76	
Unique Laboratory Report (ULR) No:		TC1207226000000011F	
Type of Sample		Fire Rated Hinged Door (Wooden Composite)	
Sample ID	P76-S1	**Report Number**	FERL/LR-81
Date of Receipt	16.03.2026	**Date of Issue**	30.03.2026
Date of Test	19.03.2026	**Location**	FERL, IIT Gandhinagar
Revision No.	R0	**Date of Revision**	Not applicable (original report)

Name & Address of Laboratory	**Name & Address of Test Sponsor**
Fire Engineering Research Laboratory (FERL) Indian Institute of Technology Gandhinagar Palaj, Gandhinagar, Gujarat – 382055, India	Greenlam Industries Limited Plot No. E176-179, Phase-II, RIICO-Industrial Area, PO : Behror, District: Alwar State: Rajasthan 301701(INDIA)

Test Information

Sr. No.	Test Description	Test Method	Specimen Specification	Performance Criteria	Results (minutes)
1	Fire Resistance Test	IS 17518-1: 2022 / ISO 3008-1: 2019	IS 3614: 2021	Integrity	65
				Insulation	65

Note:

i) The results relate only to the items tested and apply to the sample as received.
ii) The report shall not be reproduced except in full without the approval of the laboratory.
iii) This report provides the constructional details, the test conditions, and the results obtained when a specific element of the construction was tested following the procedure specified in 3008-1:2019 and ISO 834-1. Any significant deviation with respect to size, constructional details, loads, stresses, edge, or end conditions may invalidate the test results.
iv) The scope of installation of the test specimen is within the sponsor, as intended for use in practice, incorporating all hardware and other items that can influence the performance of the specimen.
v) The specimen information provided by the sponsor is denoted by (*).

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GAURAV

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Authorized Signatory: Dr. Gaurav
Chief Executive of Laboratory

TC-12072

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1. Specimen description*

Type and material of specimen	Single Leaf Hinged Door (Wooden Composite)
Manufacturer of specimen	Greenlam Industries Limited

Supporting Construction	
Details	Made of AAC block, dimension(mm):300 x 200 x 200 (length x width x height) with symmetrical faces.
Wall Opening	1200 x 2400mm (width x height).
Block Jointing Mortar	Made up of cement-graded and polymeric additives with the appearance of greyish powder, having a bulk density of 1440-1550 kg/m^3.
Lintel	Made of concrete of dimensions 2400 x 200 x 100mm (length x width x height).
Curing Time	24 Hours (As per IS 17518-1 A.2.2).

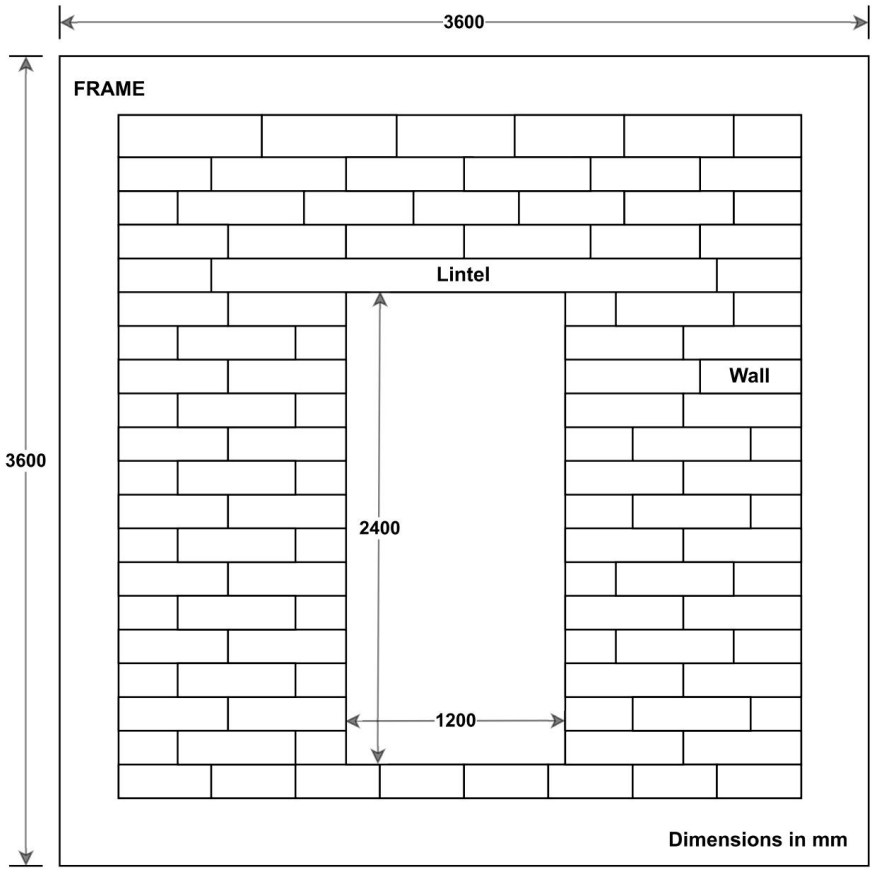

Figure 1: Schematic of supporting construction for door assembly.

Frame	
Dimension	2387 x 1180mm (height x width).
Material	Steam Beech Engineered Frame with stain to match facing (Density 650kg/m^3)
Cross-section view (Dimensions are in mm)	Refer to *Figure 3* for more details.
Gap between the frame and supporting wall is filled with	Filled with 10mm Fire-rated PU Foam (Boss 813+)
Fixing	Anchor Fastener 10x120mm (Make: Rawlplug -R-FF1-N10L-120), 11 Nos.

Shutter/Leaf	
Dimension(mm)	2337 x 1084 x 55mm (height x width x thickness).
Core*	44mm High density Particle board + 5mm MDF both side + 0.8mm Laminate/veneer both side
Swings	Towards the unexposed Side.

Hardware	Quantity	Make	Description
Hinges	5 Nos	Assa Abloy	Hinge AAH203 recess only
Door closer	1 Nos	Assa Abloy	Aluminium (DC105U/EV1)
Door Viewer	1 Nos	Assa Abloy	ADSS-03-70mm-FR
Pull Handle	1 Nos	Assa Abloy	AEH-05-SINGLE Outside
Mortise Handle	1 Nos	Assa Abloy	ATL-060 (LH/RH) Inside
Mortise Lock	1 Nos	Assa Abloy	JL24EUS-SS-60
Pin cylinder	1 Nos	Assa Abloy	AACT40 40 SNKD-S
Intumescent Seal	2 Nos	Galford	15 x 4mm (width x thickness), mounted on the frame.

Retention Force	57N force required to open the door.
Mechanical Conditioning	A series of 50 opening/closing cycles of at least 75° was performed before test.
Door Condition before test	Locked and latched.
Verification of specimen	The door dimension and hardware make were verified before the test, other than the information displayed as provided by the sponsor.

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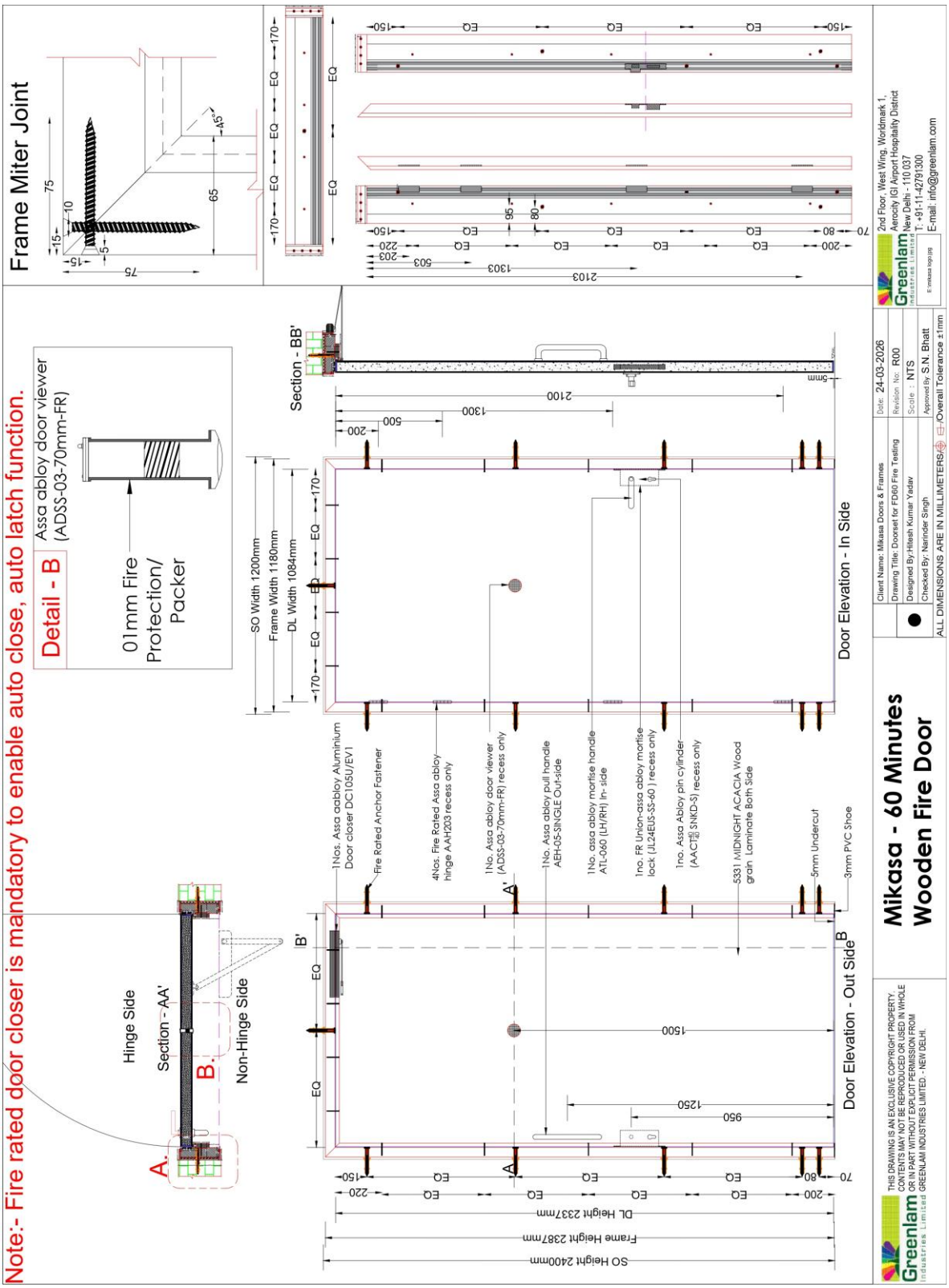

Figure 2: Drawing provided by the manufacturer*.

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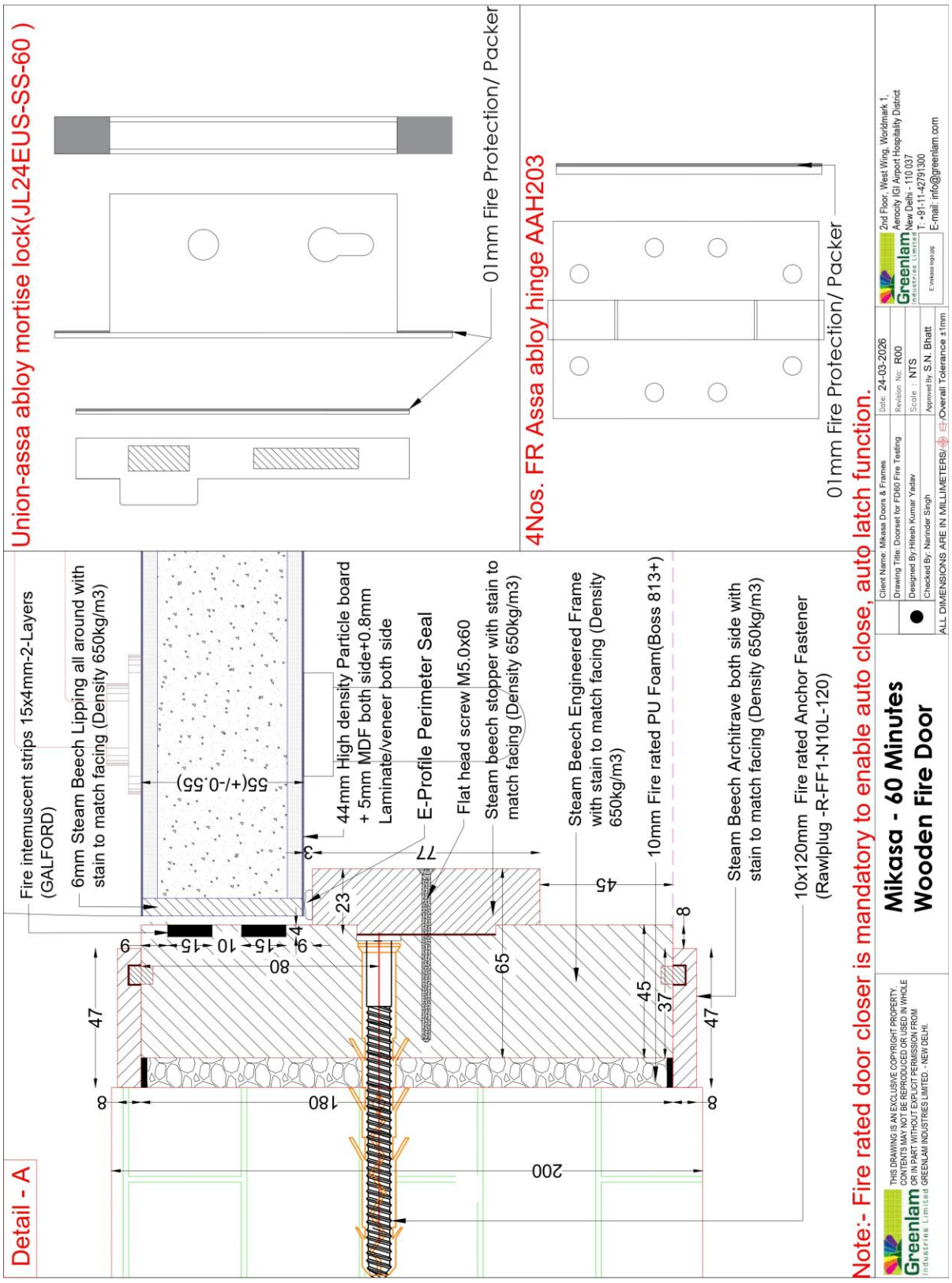

Figure 3: Drawing provided by the manufacturer*.

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Gap measurements

a) Gap measurements of unexposed side are summarized below:

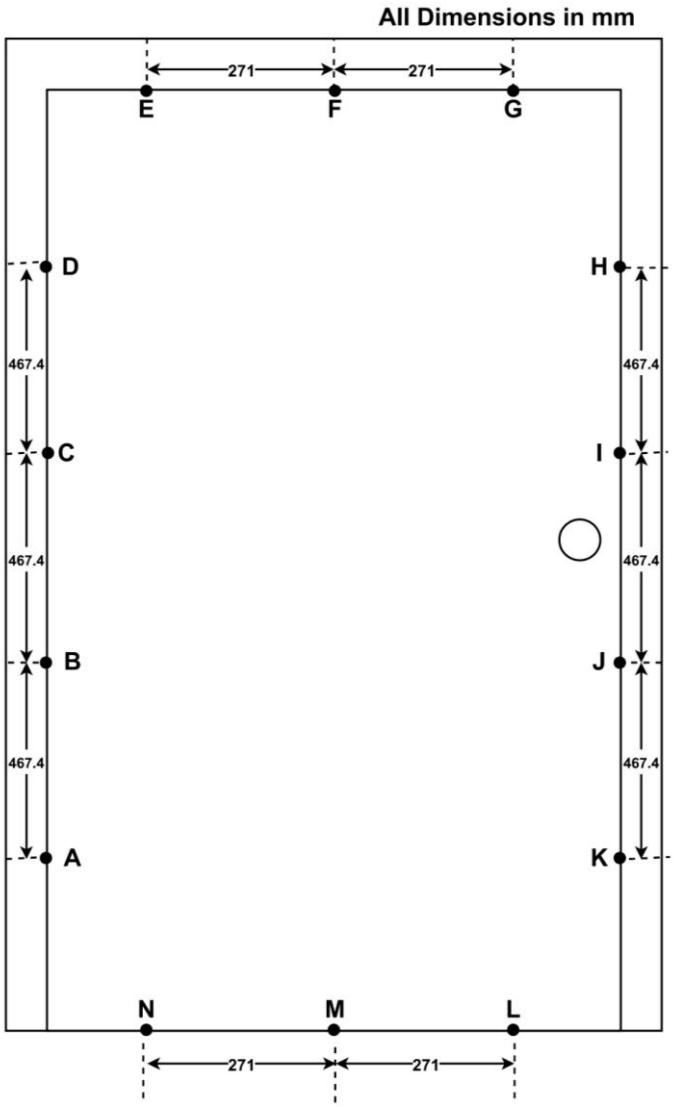

Figure 4*: *Unexposed side gap measurements.

Location (Unexposed Face)	A	B	C	D	E	F	G	H	I	J	K	L	M	N
Clearance (mm)	3.0	3.5	3.0	3.0	3.5	3.0	3.0	2.5	3.0	2.3	2.5	3.5	3.8	3.0

b) Gap measurements of exposed side are summarized below:

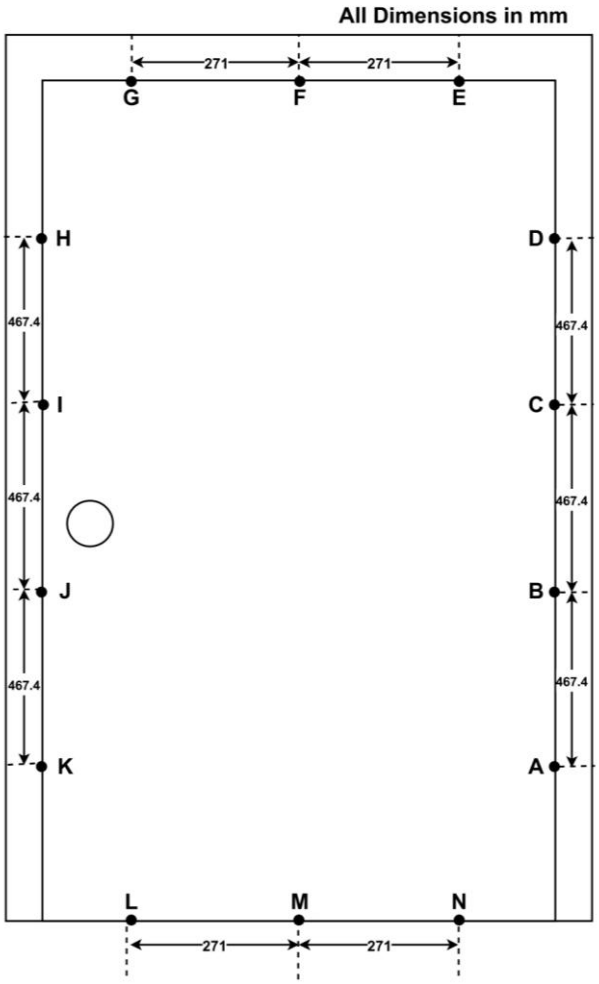

Figure 5: Exposed side gap measurements.

Location (Exposed Face)	A	B	C	D	E	F	G	H	I	J	K	L	M	N
Clearance (mm)	3.0	3.0	3.0	3.5	3.0	3.5	3.0	4.0	3.4	3.0	3.0	3.0	3.5	3.5

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2. Test observations

A. Time-Temperature observations (Furnace temperature)

- The fire resistance test was carried out in accordance with **IS 17518-1 Fire Resistance Tests —Door and Shutter Assemblies Part 1 General Requirements.**
- The ambient temperature at the commencement of the test was 26.2°C, and at the end was 29.3°C.
- The furnace thermocouples were placed 100mm away from the exposed face of the specimen, and this distance was maintained throughout the test duration.
- Time-Temperature observations (Furnace temperature) are shown in *Table 1* (For thermocouple location in the furnace, refer **Annexure A – Details of instrumentation**).
- The average time-temperature curve observed and the required time-temperature curve are shown in *Figure 6*.

Table 1: Time-Temperature observations (Furnace temperature)

Time (min)	Furnace Temperature (°C)		Area under Time-Temperature curve		
	Required	Observed	Observed (°C·min)	Allowed Deviation ±(%)	Observed Deviation (%)
00	20.0	42.1	-	-	-
05	576.4	510.9	1986.8	15.0	-9.8
10	678.4	731.0	5146.8	15.0	-4.1
15	738.6	792.8	8983.6	12.5	0.7
20	781.4	850.0	13161.6	10.0	3.4
25	814.6	855.0	17421.3	7.5	4.2
30	841.8	888.2	21756.8	5.0	4.3
35	864.8	885.5	26186.6	4.6	4.2
40	884.7	895.0	30513.8	4.2	3.4
45	902.3	922.0	35075.6	3.8	3.2
50	918.1	912.0	39649.0	3.3	2.9
55	932.3	946.2	44350.2	2.9	2.8
60	945.3	933.2	49076.5	2.5	2.6
65	957.3	958.3	53829.2	2.5	2.3

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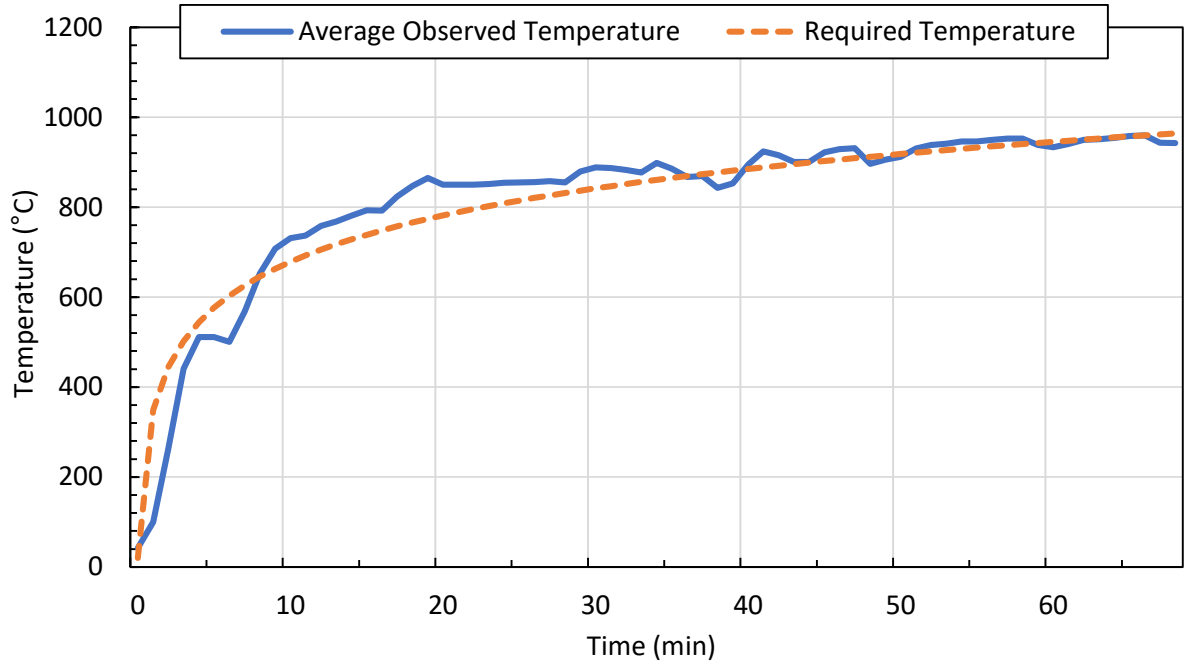

Figure 6: Observed Average and Required Temperature.

B. Pressure observations

- For pressure locations in the furnace, refer to **Annexure A – Details of instrumentation**.
- The given pressure value represents the moving average pressure over the measurement period.

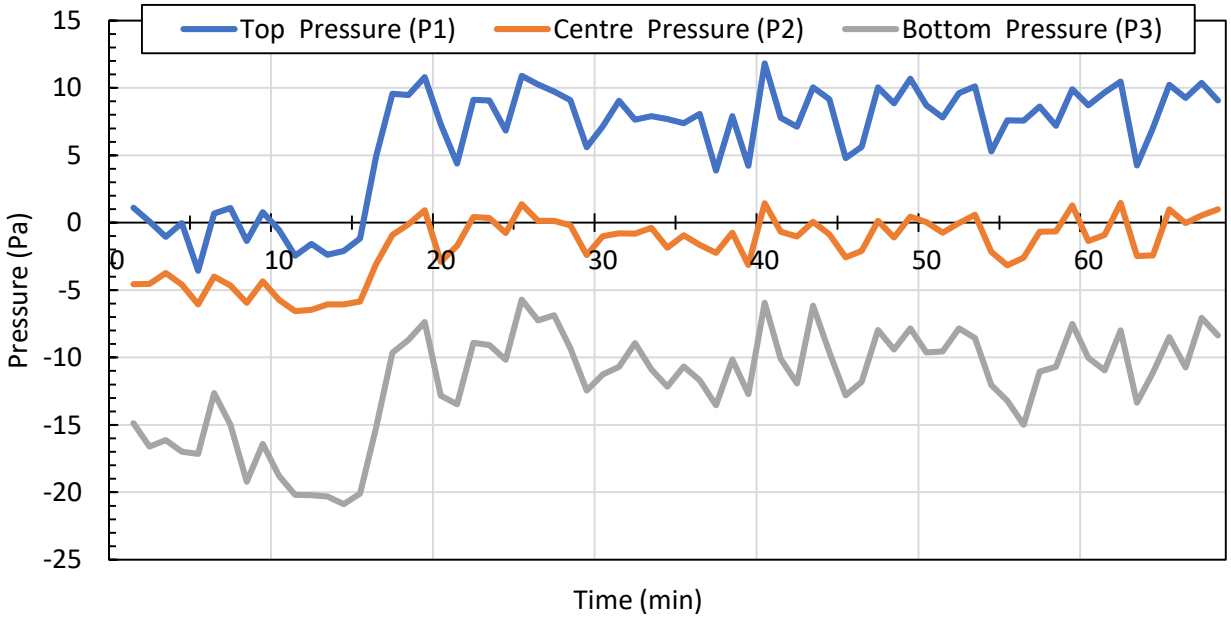

Figure 7: Pressure P1, P2, and P3 of the furnace.

C. Time-Temperature observations (Unexposed side)

- The unexposed thermocouples were placed in accordance with **IS 17518-1 Fire Resistance Tests —Door and Shutter Assemblies Part 1 General Requirements**.
- *Figure 8* shows the location of all the unexposed side thermocouples.
- The average observed temperature at the unexposed side is shown in *Figure 9.*
- The initial average temperature of all the unexposed side thermocouples at the commencement of the test was 25.3°C.
- The maximum observed temperature on the shutter was 77°C at thermocouple location 12 for the test duration.
- The maximum observed temperature on the frame was 28.5°C at thermocouple location 13 for the test duration.

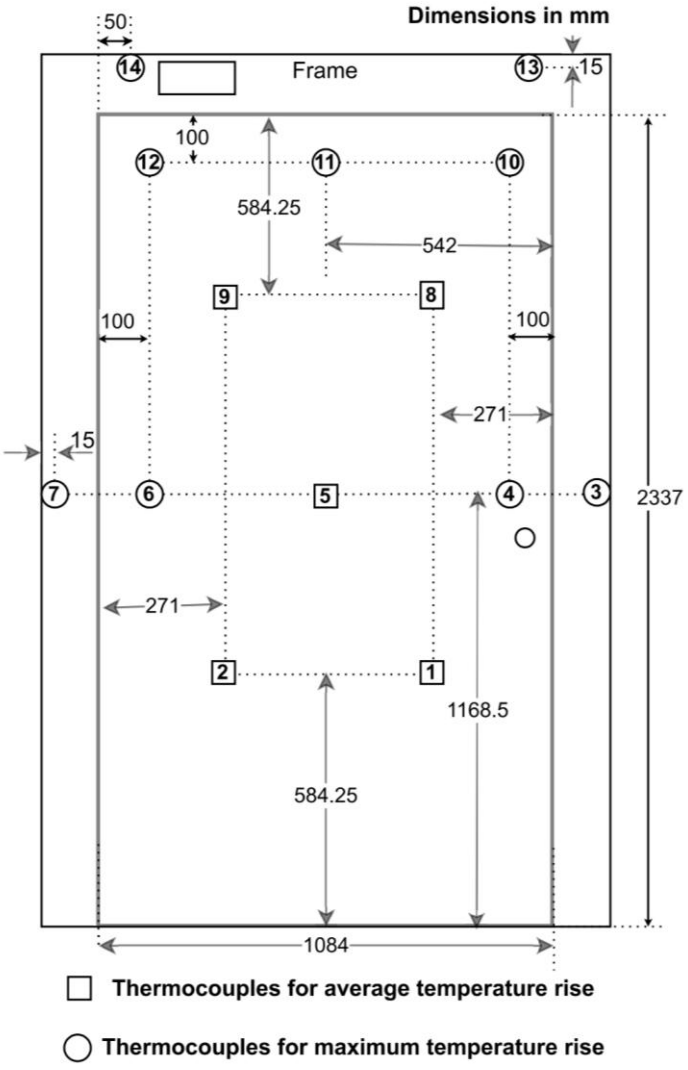

Figure 8: Schematic for thermocouple locations on the unexposed side.

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Table 2: Average observed temperature at unexposed side

Time (min)	Average Temperature (°C)
00	25.3
05	25.5
10	25.5
15	25.9
20	27.8
25	30.1
30	32.3
35	34.4
40	45.5
45	50.3
50	56.1
55	62.3
60	66.5
65	70.9

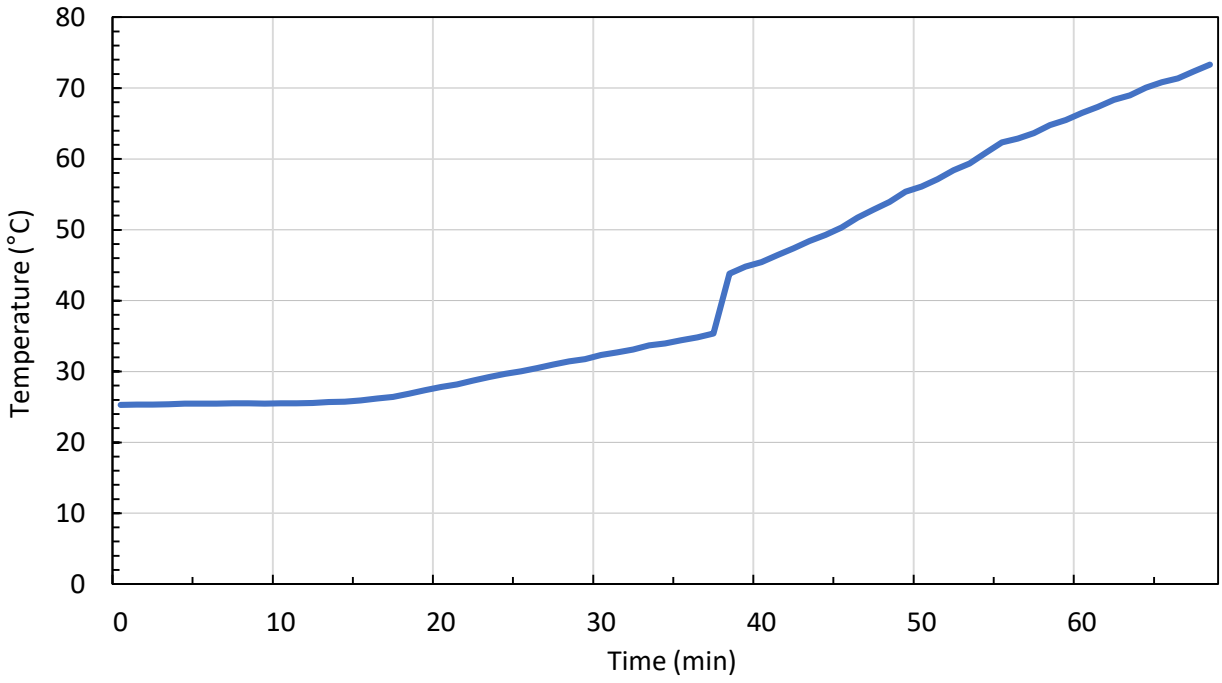

Figure 9: Average observed temperature at unexposed Side.

D. Deflection Measurement

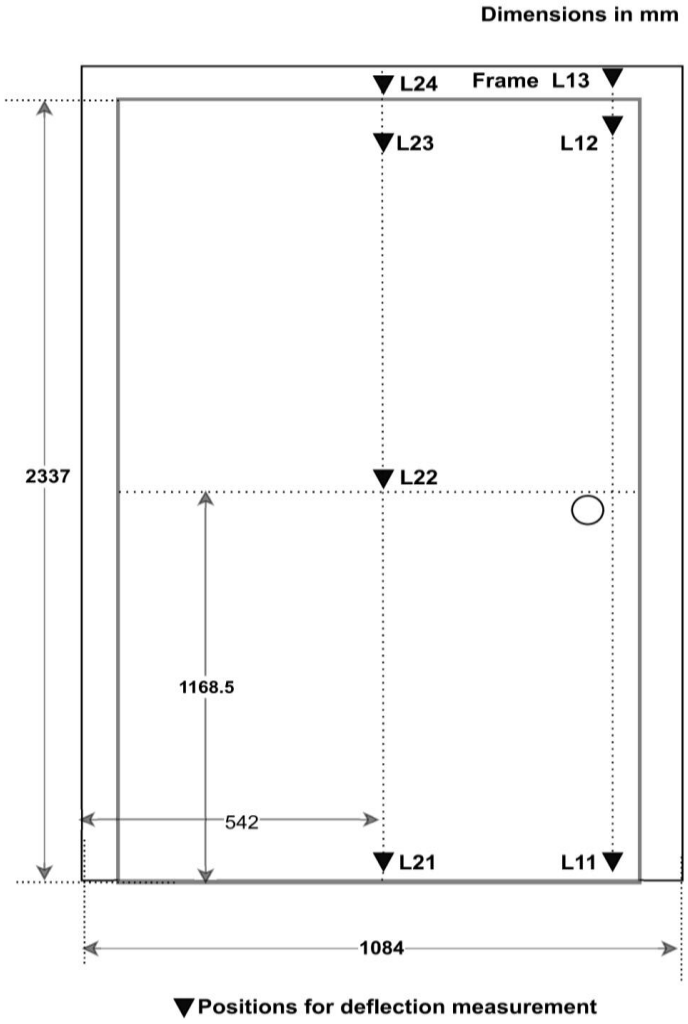

Figure 10 : Schematic for deflection measurement position on unexposed side.

Table 3 shows the total deflection at different positions on the door after 60 minutes of exposure.

- Positive values indicate deflection into the furnace.
- Negative values indicate deflection out of the furnace.

Table 3: Deflection observations

Measurement Position	Deflection at 60 min (mm)	Measurement Position	Deflection at 60 min (mm)
L11	-01	L22	-18
L12	06	L23	-04
L13	02	L24	05
L21	03		

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3. Visual observations

Time (Hr:min)	Observations
00:00	Test started at 09:34 am.
00:05	Grey smoke was observed emanating from the top edge of the leaf.
00:15	No significant change observed.
00:30	Blackening was observed near door viewer.
00:45	Oil leakage from the door closer was observed.
01:00	Increased blackening was observed near the door viewer.
01:05	The test was discontinued at 10:40 am as requested by the test sponsor.
Occurrence observed during the test duration (Yes/No)	
1. Sustained flaming: No 2. Cotton pad ignition/glowing: No 3. Openings exceeding 6 mm (with displacement of 150 mm) or 25 mm: No	

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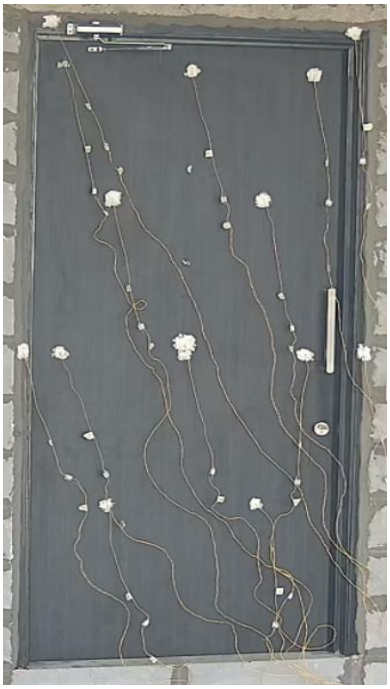
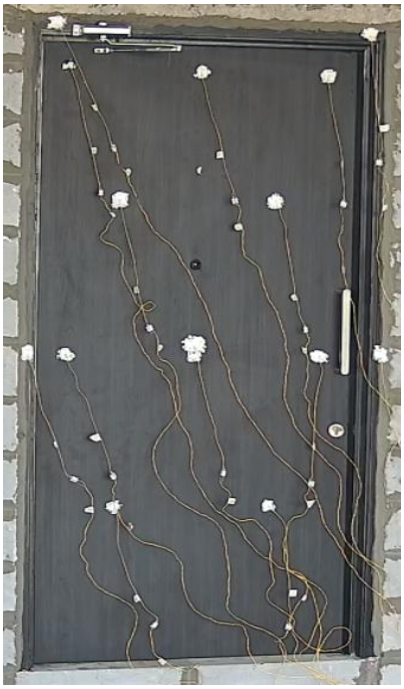
a) t = 0 min, start of the test.

b) t = 05 min, grey smoke was observed emanating from the top edge of the leaf.



c) t = 15 min, no significant change observed.



d) t = 30 min, blackening was observed near door viewer.

e) t = 45 min, oil leakage from the door closer was observed.

f) t = 60 min, increased blackening was observed near the door viewer.

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g) t =65 min, at the end of the test.

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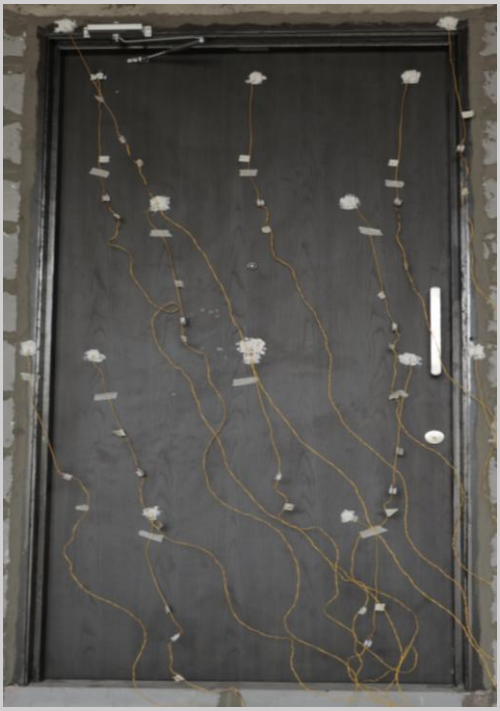
Exposed Side

Before Test

After Test

Unexposed Side

Before Test



After Test

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4. Conclusion

The test assembly (Fire Rated Hinged Door (Wooden Composite)) satisfied the fire resistance performance requirements as per IS 17518-1/ ISO 3008-1 for the following duration:

Sr. No.	Performance Criteria	Time up to which the test assembly withstood the performance criteria
1	Integrity	65 minutes
2	Insulation	65 minutes

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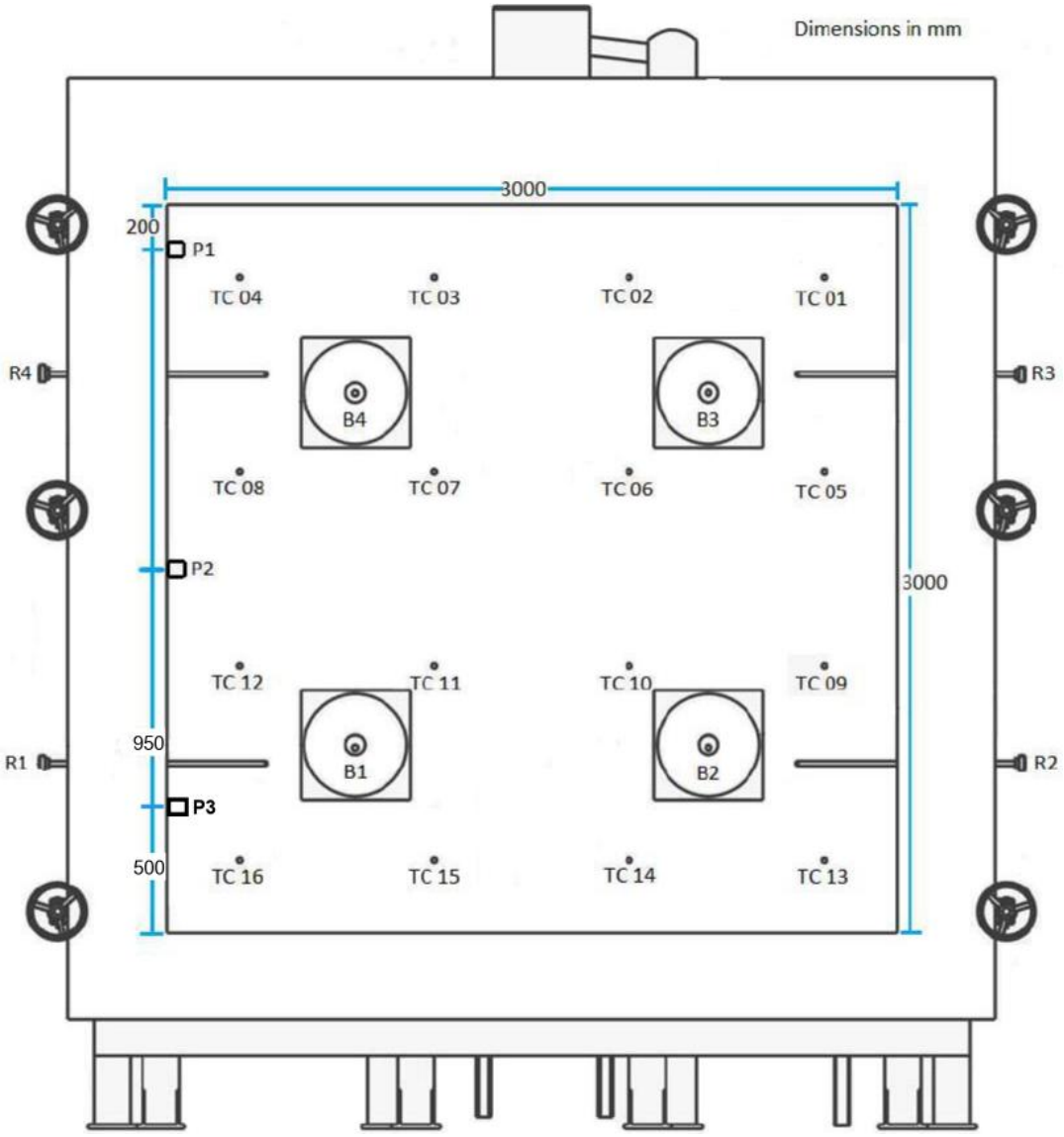
Annexure A – Details of instrumentation

(informative)

There are 16 thermocouples, 100mm away from the specimen surface at every 0.56m^2 area in the furnace. There are three pressure sensors located in the furnace, (1) at top (200mm below the furnace ceiling), (2) at center (1450mm above the furnace floor), and (3) at bottom (500mm above the furnace floor).

Furnace (3 X 3 m)



TC i	Thermocouple (100mm away from specimen surface) Number i (i= 1,2,3...16)
R i	Temperature Controlling Thermocouple Number i (i= 1,2,3,4)
B i	Burner Number i (i= 1,2,3,4)
P i	Pressure Sensor Number i (i=1,2,3)

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Annexure B – Details of calibration

(informative)

FERL ID Number	Instrument Type	Range	Last Calibration Date	Next Calibration Date
TM-01	SCADA Timer	0 to 4 hours	18.02.2026	18.02.2027
TC-01 to TC-20	Temperature Sensor with Indicator (Thermocouple)	Ambient to 1200 °C	05.03.2026	05.03.2027
DPT-01	DPT (Pressure Sensor)	±150 Pa	01.07.2025	01.07.2026
DPT-02	DPT (Pressure Sensor)	±30 Pa	01.07.2025	01.07.2026
DPT-03	DPT (Pressure Sensor)	±150 Pa	04.09.2025	04.09.2026
FERL/GLM40/01	Laser Distance meter	0.2 to 2 m	25.10.2025	25.10.2026
FERL/GLM40/02	Laser Distance meter	0.2 to 2 m	25.10.2025	25.10.2026

Measurement of Uncertainty	Method Used	Environmental Conditions		Uncertainty
		Temperature	Humidity	
Temperature (°C)	FERL/QP/15	38.7 °C	38.6%	± 26.04 °C at 900°C
Time (sec)	FERL/QP/15	25.6 °C	53%	±2.57 seconds at 4 hrs

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Annexure C – Test witness details

Sr. No.	Name	Company	Designation
1	Mr. Narinder Singh	Greenlam Industries Ltd.	Deputy General Manager

Annexure D – Revision history of this test report

Revision No.	Date of Revision	Reason for change
R0	Not applicable (original report)	Not applicable (original report)

==== END OF THE REPORT ====