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MS ISO/IEC 17025
TESTING
SAMM NO. 085

TEST REPORT

REPORT NO.: 2019FE0406	PAGE : 1 OF 19

THIS TEST REPORT IS ISSUED IN SECURED PDF SOFTCOPY

Applicant : **GE TECH INDUSTRY SDN. BHD.**
Wisma HCK, No. 6, Jalan 19/1B,
Seksyen 19, 46300 Petaling Jaya,
Selangor Darul Ehsan.
(Attn.: Mr. Tey / Ms. Jess)

Manufacturer : **GE TECH INDUSTRY SDN. BHD.**
PT1538, Industri Kajang Jaya,
Kawasan Perindustrian Kajang Jaya,
43500 Semenyih,
Selangor Darul Ehsan.

Product : **GEG ECO PANEL**

Reference Standard/ Method of test : BS 476: Part 22: 1987
Methods for determination of the fire resistance of non-load bearing elements of construction.
Clause 5 – Determination of fire resistance of partition

Description of test specimen : Brand : **GEG ECO Lightweight Panel System**
Panel Size : **3000 mm (l) × 600 mm (w) × 75 mm (t)**

Date Received : 03 APRIL 2019

Job No. : J20191440213

Overall test result : **Fire Resistance Test**

Integrity : 70 minutes
Insulation : 70 minutes

Issued date : **10 JULY 2019**

Approved Signatory:

(MUHAMMAD BAHEEJ MAZLI)
Testing Executive

SIRIM QAS International Sdn. Bhd. FIRE PROTECTION SECTION

(AZMI MUSA)
Head
Fire Protection Section
Testing Services Department

1. TEST CONSTRUCTION

The test specimen was installed into a test frame so that one vertical edge had freedom of movement.

The overall test construction size was **3000 mm (*h*) × 2950 mm (*w*) x 85 mm (t)** which does not include the gap along the one vertical edge to provide no lateral restraint to the specimen. The vertical gap between the test specimen and the test frame were filled with ceramic fiber insulation.

Inspection was carried out during the construction of the test specimen to verify on its design, dimensions and materials used. The constructions of the test specimen were identical. The construction and installation of the test specimen was arranged and carried out by the applicant and its agent. A comprehensive description of the test specimen is given in **APPENDIX 1.**

2. TEST SPECIFICATION

2.1 Integrity

2.1.1 In general, a failure of the test construction to maintain integrity shall be deemed to have occurred when collapse or sustained flaming for more than 10 s on the unexposed face.

2.1.2 Under criteria for impermeability, failure shall be deemed to have occurred when one or other of the following conditions prevail: -

a) Where cotton pad test is performed, flames and/or hot gases cause flaming and glowing of the cotton pad.
b) Where the use of cotton pad is not suitable, failure shall be deemed to have occurred when either: -
   - the 6 mm diameter gap gauge can penetrate a through gap such that the end of the gauge projects into the furnace and the gauge can be moved in the gap for a distance of at least 150 mm; or
   - the 25 mm diameter gap gauge can penetrate a through gap such that the end of the gauge projects into the furnace.

2.2 Insulation

Failure shall be deemed to have occurred when one of the following occurs :-

a) If the mean unexposed face temperature increases by more than 140 °C above its initial value.
b) If the temperature recorded at any position on the unexposed face is in excess of 180°C above the initial mean unexposed face temperature.
c) When failures as defined in **2.1** occur.

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3. TEST PROCEDURE

3.1 Fire Test

(a) Ambient temperature at the beginning of the test : **29.4 °C**
Ambient temperature on completion of the test : **29.6 °C**

(b) The actual temperature/time curve of the furnace heating conditions in relation to the standard temperature/time curve : Graph 1

(c) The pressure in the furnace, with respect to that in the Laboratory, was monitored and controlled at 5 minutes and followed throughout the test so that it complies with the standard requirements.

(d) Throughout the test, observations were made on the exposed and unexposed faces of the test specimen. In addition, observations were made of any sustained flaming on the unexposed face of the test specimen. Gap gauges were available to evaluate compliance with the requirements for impermeability : Table 1

(e) The deflection was measured at the mid-height : Table 2

(f) Thermocouples were provided to monitor the temperature of the specimen : Table 3

(g) Photographs of the test are included : Photo 1 – 6

(h) Date of testing : **21 JUNE 2019**

4. SUMMARY OF THE TEST RESULT

4.1 Fire Resistance Test

Integrity : 70 minutes
Insulation : 70 minutes

The test was terminated after a period of **70 minutes** at the request of the applicant.

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5. LIMITATIONS

5.1 The results only relate to the behaviour of the specimen of the element of construction under the particular conditions of test; they are not intended to be the sole criteria for assessing the potential fire performance of the element in use nor do they reflect the actual behaviour in fires.

5.2 The test results relate only to the specimen tested. Appendix A of BS 476: Part 22: 1987 provides guidance information on the application of the fire resistance tests and the interpretation of test data.

5.3 Application of the results to assemblies of different dimensions or incorporating different components should be subjected to re-verification.

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GRAPH 1: ACTUAL FURNACE TEMP./ TIME CURVE

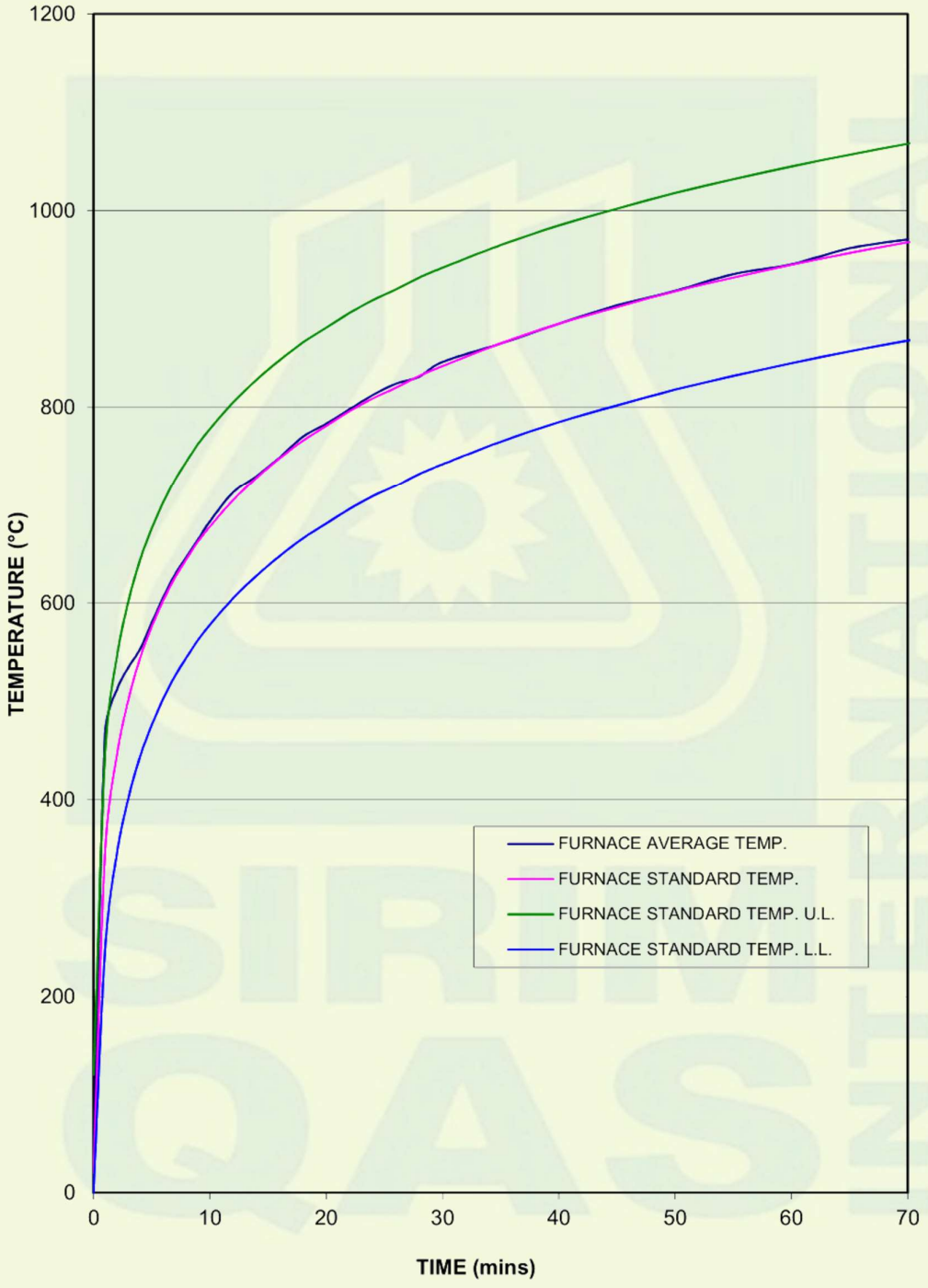

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TABLE 1: OBSERVATIONS MADE DURING THE TEST

TIME (min)	TEST FACE	OBSERVATIONS
0	-	Test commenced.
10	U	No significant changes.
16	U	Damping is observed at the top left corner of the wall panel system.
30	U	Damping is observed at the jointing panels.
45	U	Vertical hairline crack is observed at the jointing panel near thermocouple T3 area.
47	U	Diagonal hairline crack is observed at the middle right side of the wall panel system.
54	U	Diagonal hairline crack is observed at the top edge of the wall panel system.
58	U	Diagonal hairline crack is observed at the bottom edge of the wall panel system.
60	U	The wall panel system still maintains its integrity and insulation criterion.
64	U	Diagonal hairline crack is observed near thermocouple T1 area.
68	U	Cracks as mentioned at t = 47 mins is getting severe.
70	U	The test was terminated.

Note:

E- Observations from exposed face
U- Observations from unexposed face

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TABLE 2: DEFLECTION MEASUREMENTS

	MEASURING POINTS				
TIME	A	B	C	D	E
(mins)	(mm)	(mm)	(mm)	(mm)	(mm)
10	10	18	17	17	15
20	9	13	15	18	18
30	10	18	20	25	26
40	11	21	27	32	34
50	12	26	37	46	49
60	15	32	47	58	64
70	15	38	59	76	84

Note:

1- Positive (+) values indicate movement away from the furnace

2- Negative (-) values indicate movement towards the furnace

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TABLE 3: UNEXPOSED SURFACE TEMPERATURE OF THE TEST SPECIMEN

TIME (mins)	THERMOCOUPLE NO.							MEAN TEMP. (°C)	TEMP. RISE ABOVE INITIAL MEAN TEMP. (°C)	
	T1 (°C)	T2 (°C)	T3 (°C)	T4 (°C)	T5 (°C)	T6 (°C)	T7 (°C)		MEAN TEMP.	MAX. TEMP.
0	31	30	30	31	30	30	30	30	0	1
10	31	31	33	31	31	31	31	31	1	3
20	49	35	47	33	32	34	38	39	9	19
30	67	44	58	41	40	45	53	50	20	37
40	76	55	67	55	52	58	65	61	31	46
50	79	68	76	70	65	71	75	72	41	49
60	81	81	83	80	76	79	82	80	50	53
70	83	88	87	87	83	84	85	86	55	58

Note:

1. Thermocouples T1 to T5 were used to assess the ability of the wall panel system to satisfy the mean unexposed surface temperature criterion.
2. Thermocouples T1 to T7 were used to assess the ability of the wall panel system to satisfy the maximum unexposed surface temperature criterion.

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APPENDIX 1: CONSTRUCTION OF THE TEST SPECIMEN (Refer Figure 1 to Figure 7)

No. Test Specimen Description

Product name : GEG ECO PANEL
Brand : GEG ECO Lightweight Panel System
Measured Dimension : 3000 mm (l) × 600 mm (w) × 75 mm (t)
Nominal density : 700 ~800 kg/m^3
Measured Density : 898 kg/m^3

Material Mixed Composition :

No	Material Compositions	Mix Ratio
1.	Cement	50%
2.	Water	20%
3.	Foaming Agent	10%
4.	Volume Air	20%

The description of products given above has been prepared from information provided by the applicant of the test.

No inspection was carried out on the construction of the panels. The panels were precast at the factory and were tested as in received condition. The installation was arranged and carried out by the applicant and its agent.

Installation method :

The symmetrical non-load bearing GEG ECO Lightweight Panel System was constructed using 5 pieces panels which were erected and held to the test frame.

The panels were constructed by galvanized iron 0.8 mm (t) of profile 'A', profile 'B', profile 'C' and profile 'D' for intermediate, top, bottom and tongue and groove. 1 nos. galvanized iron 0.8 mm (t) of profile 'D' was constructed at vertical mid track for one panel near the vertical gap.

Galvanized iron 1.0 mm (t) of profile 'E' (Base rail) was fixed at the side and bottom edge of the test frame using screw of size M4 x 38 mm (l). Galvanized iron 1.0 mm (t) of profile 'F' (L Anchor) was fixed at the top of the test frame using screw of size M4 x 38 mm (l).

The panels were joined by tongue and groove at each ends of the panels. At the panel joint, **12M Mineral Glass Wool Rool** (said to be Brand: **Acepunch** ; Model: **AP1156**) with density claimed to be 1.29 g/cm^3 was applied at the joint of every panels. The panel joints were then applied with cement render 5mm (t).

The drawings illustrated in Figure 1 to Figure 7 shows the dimensions and details of the test specimen. The unexposed and exposed face of the test construction was not plastered.

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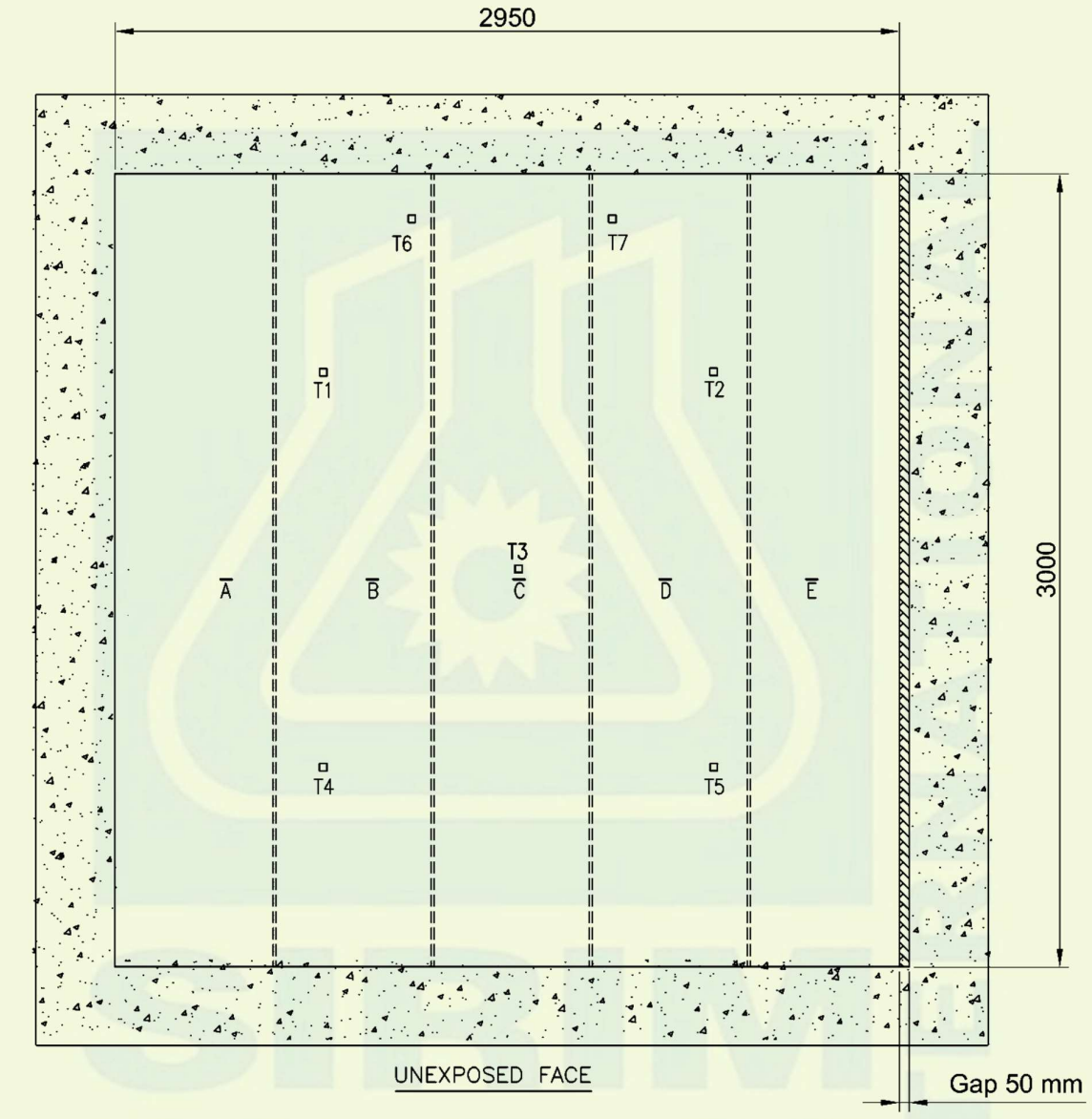

(▫) Thermocouple Points on the Unexposed Face
(–) Deflection Measuring Points on the Mid–Width of the Wall System

NOTE:
1. All dimensions are in mm
2. Drawing not to scale

FIGURE 1 : GENERAL ARRANGEMENT ON THE GEG ECO LIGHTWEIGHT PANEL SYSTEM

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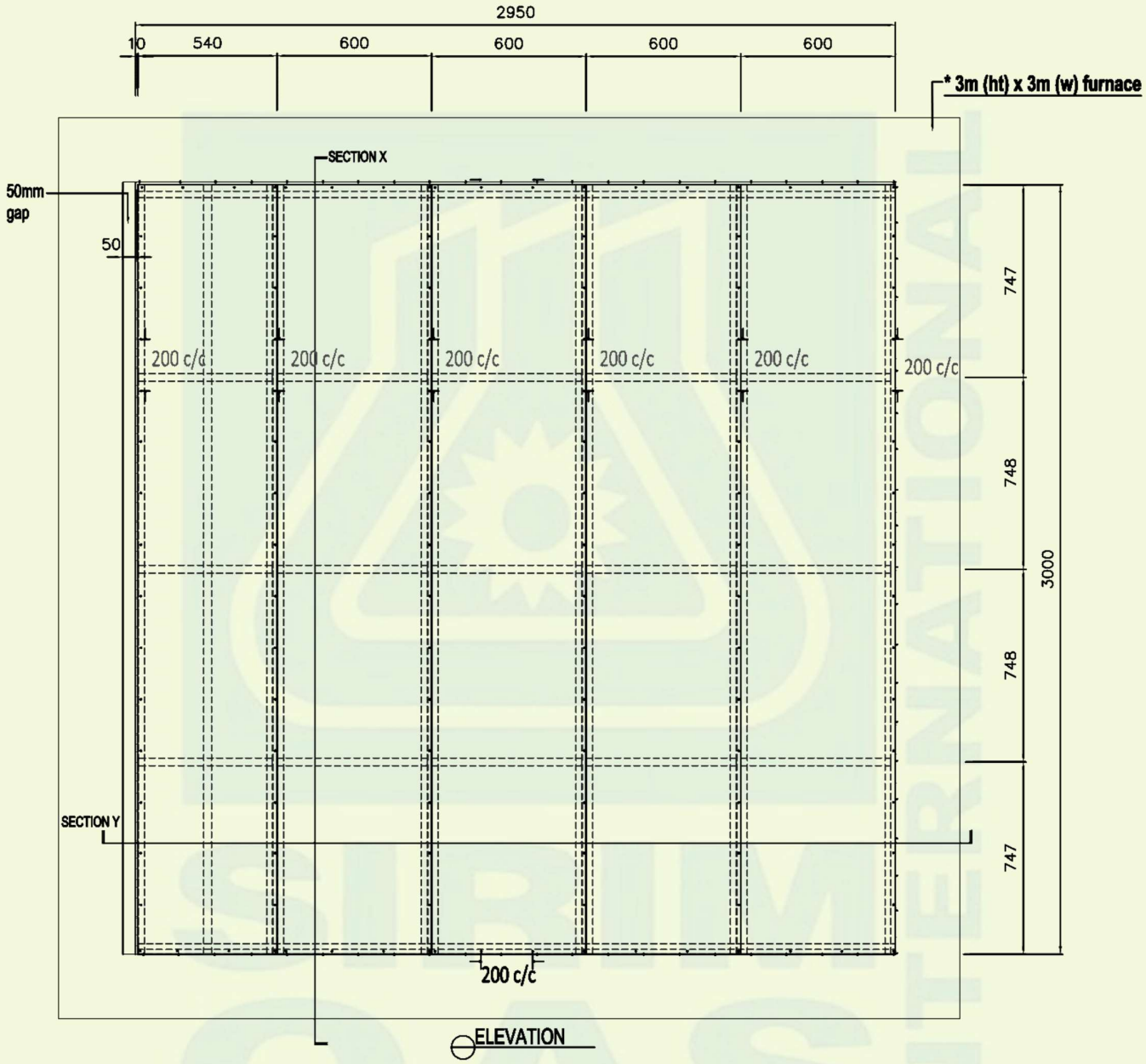

FIGURE 2 : GENERAL CONSTRUCTION OF THE GEG ECO LIGHTWEIGHT PANEL SYSTEM

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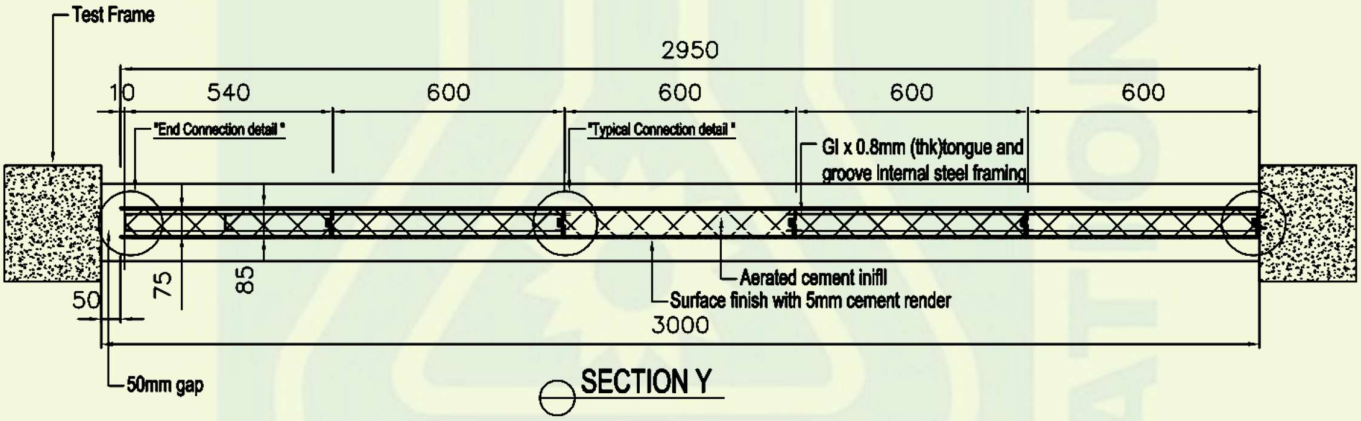

FIGURE 3 : HORIZONTAL SECTION OF THE GEG ECO LIGHTWEIGHT PANEL SYSTEM

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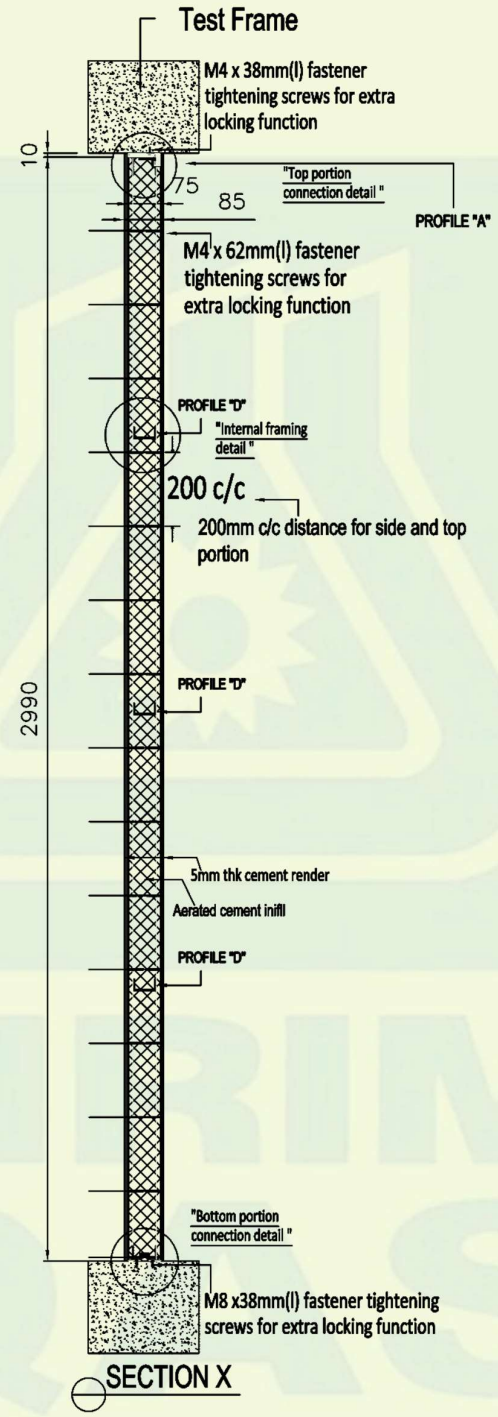

FIGURE 4 : VERTICAL SECTION OF THE GEG ECO LIGHTWEIGHT PANEL SYSTEM

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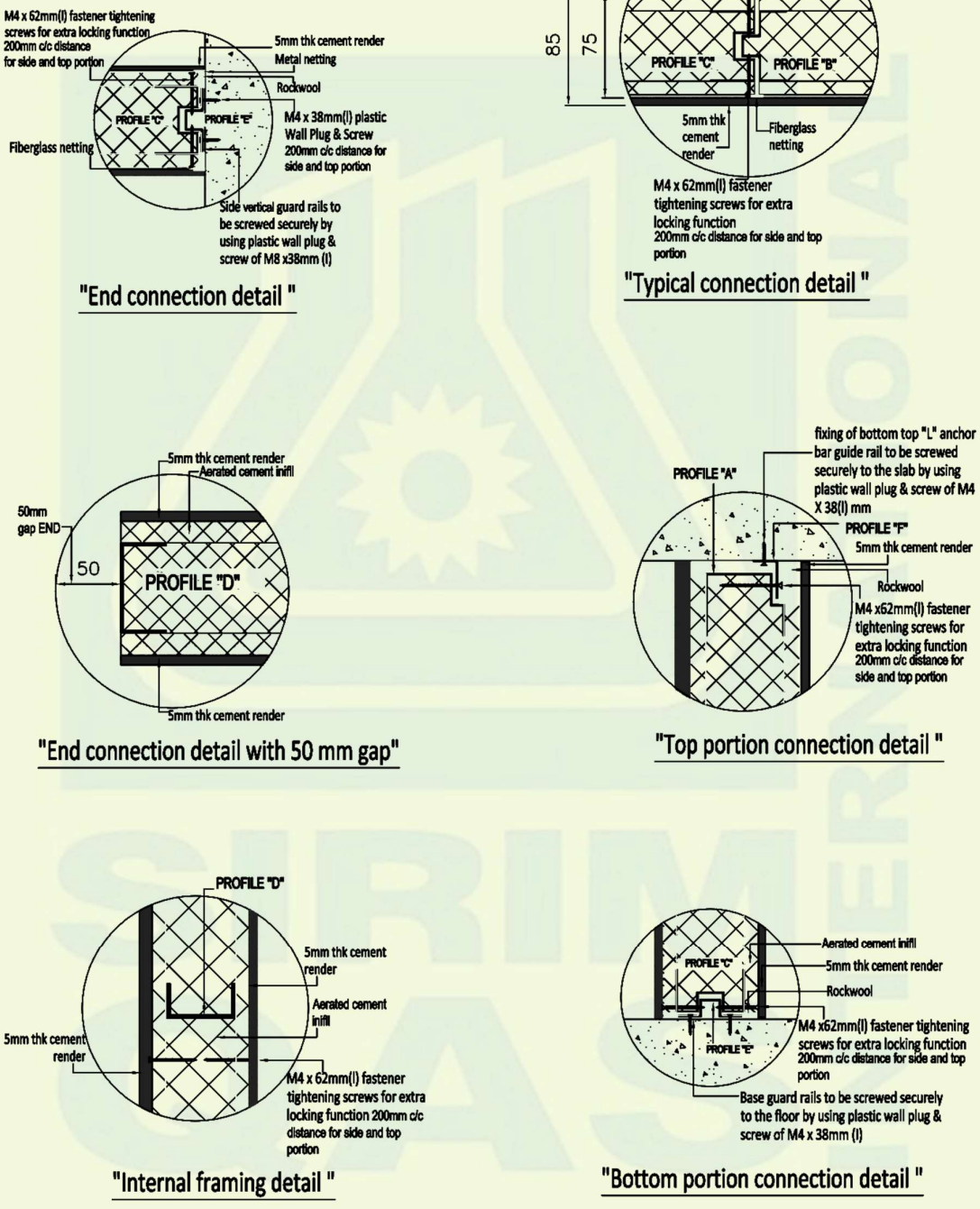

FIGURE 5 : CONNECTION AND FRAMING DETAILS OF THE GEG ECO LIGHTWEIGHT PANEL SYSTEM

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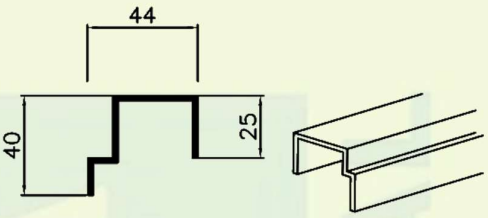
Profile "A"

G I Frame 0.8mm thk

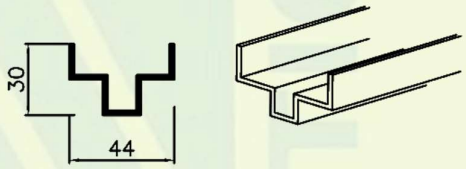
Material : GI Steel
Thickness : 0.8mm
Fixing : Screw securely to the Profile "F" by using screw of M4 x 62mm (l) @ 200mm c/c screw to screw istance



Profile "B"

Tongue frame 0.8mm thk

Material : GI Steel
Thickness : 0.8mm
Fixing : on each side of the respective wall panel side by side to ensure connection via the tongue and groove system by using plastic wall plug & screw of M4 x 62mm (l) @ 200mm c/c screw to screw distance



Profile "C"

Groove Frame 0.8mm thk

Material : GI Steel
Thickness : 0.8mm
Fixing : on each side of the respective wall panel side by side to ensure connection via the tongue and groove system by using plastic wall plug & screw of M4 x 62mm (l) @ 200mm c/c screw to screw distance

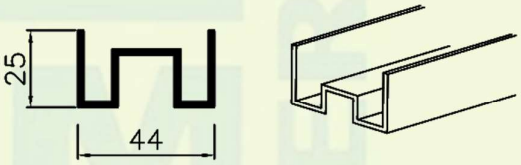


FIGURE 6 : DETAILS PROFILES OF THE GEG ECO LIGHTWEIGHT PANEL SYSTEM

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Profile "D"

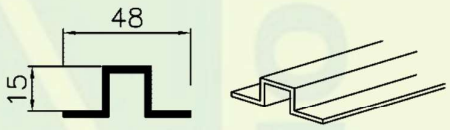
C Channel 0.8mm thk

Material : GI Steel
Thickness : 0.8mm
Fixing : internal steel framing mount to Others profile via spot weld

Profile "E"

Base Rail 1.0mm thk

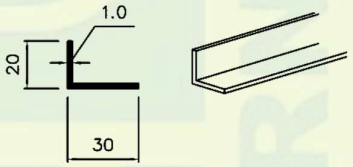
Material : GI Steel
Thickness : 1.0mm
Fixing : to be screwed securely to the floor or side certical first panel by using plastic wall plug & screw of M4 x 38mm (l) @ 200mm c/c screw to screw distance



Profile "F"

L Anchor 1.0mm thk

Material : GI Steel
Thickness : 1.0mm
Fixing : to be screwed securely to the beam & side vertical last panel by using plastic wall plug & screw of M4 x 38mm (l) @ 200mm c/c screw to screw distance



Mineral Glass wool

12M Mineral Glass Wool Roll
Brand : Acepunch
Model : AP1156
Size : 1200 x 30 x 2.5 cm (472 x 11.8 x 1 in)
Fixing : All jointings / connections are to be installed with mineral glass wool along the joint between the two panels

FIGURE 7 : DETAILS PROFILES OF THE GEG ECO LIGHTWEIGHT PANEL SYSTEM

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Photo 1 : The exposed face of the test specimen before the test

Photo 2 : The unexposed face of the test specimen before the test

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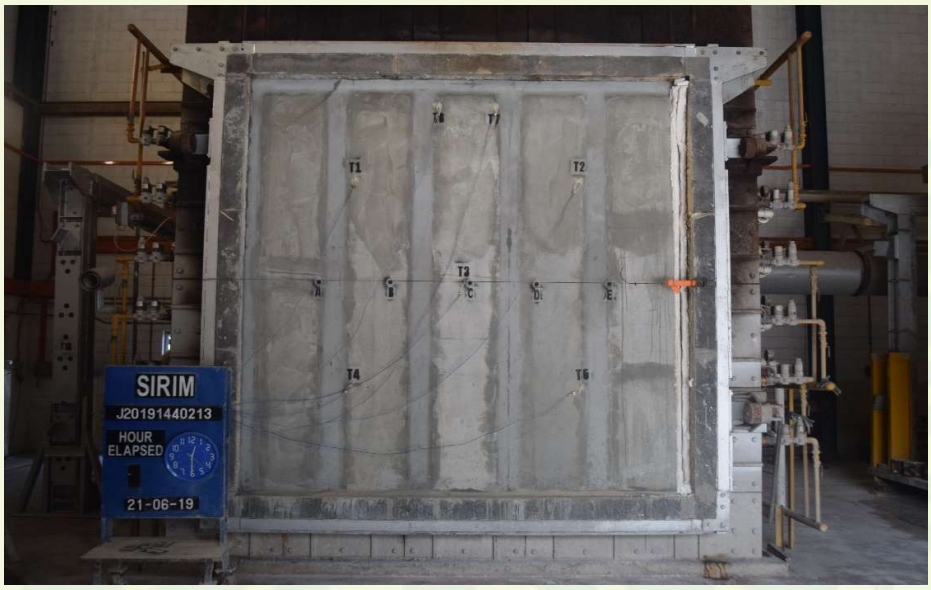

Photo 3 : At about 30 minutes of test

Photo 4 : At about 60 minutes of test

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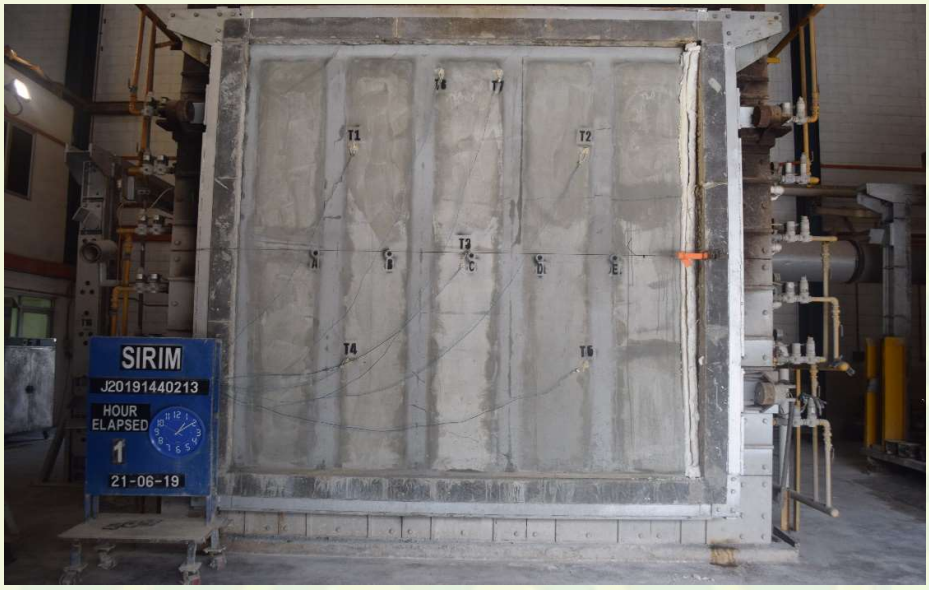

Photo 5 : At about 70 minutes of test

Photo 6 : The exposed face of the test specimen after the test

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7. In the event there is an investigation from a Government Regulatory Agency concerning the Applicant's Test Report, SIRIM QAS International may disclose the information pertaining to the Test Report for purposes of such investigation.

8. Further or in the alternative, it is strictly forbidden unless with prior written approval from the Managing Director of SIRIM QAS International, to represent in any manner whatsoever that SIRIM QAS International, SIRIM and/or other SIRIM's subsidiaries has endorsed, approved or validated the Product of the Applicant in any manner whatsoever.

9. In the event the Applicant is found in breach of this provision, SIRIM QAS International, SIRIM and/or other SIRIM's subsidiaries without prejudice to any other rights and remedies may take whatever action necessary including but not limited to:

    a) Informing and placing a notice in the media;
    b) Obtaining an injunction from Court (cost on a solicitor-client basis to be borne by the Applicant);
    c) Refusing to accept any further Product for Testing Services from the Applicant or whosoever related to the Applicant, whether subsidiary or otherwise;
    d) Instructing the Applicant to withdraw and recall the advertisement, statement or document in question and advertise a clarification and apology to SIRIM QAS International, SIRIM and/or other SIRIM's subsidiaries twice in a national publication of SIRIM QAS International's choice at the Applicant's sole cost; and
    e) Informing or lodging a report pertaining the Applicant's Test Report with the relevant authorities.

10. Certified true copies of the Test Report may be issued upon request by the Applicant upon payment of the relevant fee.

11. Corrections to test report shall only be allowed within 6 months from issuance date of the test report and shall be limited to maximum 3 times, after either case whichever occurs earlier, a new test report shall be issued and replace the previous one (having error(s) or lack of information). Issuance of Supplementary Report to the original Test Report shall be for the followings;

    a) Misprints and typo errors
    b) Missing technical information
    c) Test data not reported
    d) Mistake in reporting of test data