SIRIM QAS International Sdn.Bhd. (410334-X)
No.1, Persiaran Dato' Menteri, Section 2, P.O.BOX 7035,
40700 Shah Alam, Selangor Darul Ehsan, Malaysia.
Tel: 03-55446465
Fax: 03-55446454
www.sirim-qas.com.my

MS ISO/IEC 17025
TESTING

TEST REPORT

REPORT NO.: 2019FE0260	PAGE : 1 OF 17

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, **(Attn.: Mr. Tey / Ms. Jess)**
Manufacturer	:	**GE TECH INDUSTRY SDN. BHD.** PT1538, Industri Kajang Jaya, Kawasan Perindustrian Kajang Jaya, 43500 Semenyih, Selangor.
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 Hose Stream test utilizing the test methodology given in ASTM Standard E2226-10: Standard Practice for Application of Hose Stream
Description of test specimen	:	Brand : **GEG Eco Lightweight Panel System** Panel Size : **3000 mm (l) × 600 mm (w) × 105 mm (t)**
Date Received	:	17 DECEMBER.2018
Job No.	:	J20191440060
Overall test result	:	**Fire Resistance Test** **Integrity : 120 minutes** **Insulation : 120 minutes** **Hose Stream Test** **The wall panel system maintained its integrity with no development of any hole, crack or other penetrating that allows the passage of water from the hose stream and wetting on the unexposed surface of the test assembly.**
Issued date	:	**3 MAY 2019**

Approved Signatory:

(KHAIRUL ANWAR KAMARUDDIN) Testing Executive	(AZMI MUSA) Head Fire Protection Section Testing Services Department

SIRIM QAS International Sdn. Bhd. FIRE PROTECTION SECTION

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*) × 3975 mm (*w*) x 105 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.

SIRIM QAS International Sdn. Bhd. FIRE PROTECTION SECTION

3. TEST PROCEDURE

3.1 Conditioning Of The Test Construction

Prior to test, the test construction was kept in the laboratory proper in ambient atmosphere for a period of at least 28 days.

3.2 Fire Test

(a)	Ambient temperature at the beginning of the test Ambient temperature on completion of the test	: :	**34.1 °C** **34.7 °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)	Date of testing	:	**26 MARCH 2019**
(i)	Photographs of the test are included	:	Photo 1 – 6

SIRIM QAS International Sdn. Bhd. FIRE PROTECTION SECTION

4. TEST SPECIFICATION (HOSE STREAM TEST‡)

The Hose Stream test utilising the test methodology given in ASTM Standard E2226-10: Standard Practice for Application of Hose Stream. The water pressure and duration of application shall be as prescribed in Table 1 of ASTM E2226.

The test construction has withstood the fire and hose stream test, without passage of flame, of gases hot enough to ignite cotton waste, or of passage of water from the hose stream. The test specimen shall be considered to have failed the hose stream test if an opening develops that permits a projection of water from the stream beyond the unexposed surface during the time of the hose stream test.

5. TEST PROCEDURE

5.1 Immediately after the Fire Resistance Test, the test construction was moved into position for the Hose Stream Test. The exposed surface of the test construction was subjected to the impact, erosion, and cooling effects of a hose stream described in the ASTM Standard **E2226-10**: Standard Practice for Application of Hose Stream.

5.2 The unexposed surface of the test construction was observed during the application of the hose stream for the development of any hole, crack or other penetration that allows the passage of water from the hose stream.

5.3 Observation was performed to record any fully developed stream, wetting of the unexposed surface, water rolling down the unexposed surface, or water projected beyond the unexposed surface.

6. SUMMARY OF THE TEST RESULT

6.1 Fire Resistance Test

Integrity : 120 minutes
Insulation : 120 minutes

6.2 Hose Stream Test

A Hose Stream Test was conducted based on total assembly area of **10.19 m²** at required duration of **2 minutes 30 seconds**. The hose stream water pressure was **207 kPa (30 psi).**

The wall panel system maintained its integrity with no development of any hole, crack or other penetrating that allows the passage of water from the hose stream and wetting on the unexposed surface of the test assembly.

7. LIMITATIONS

7.1 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.

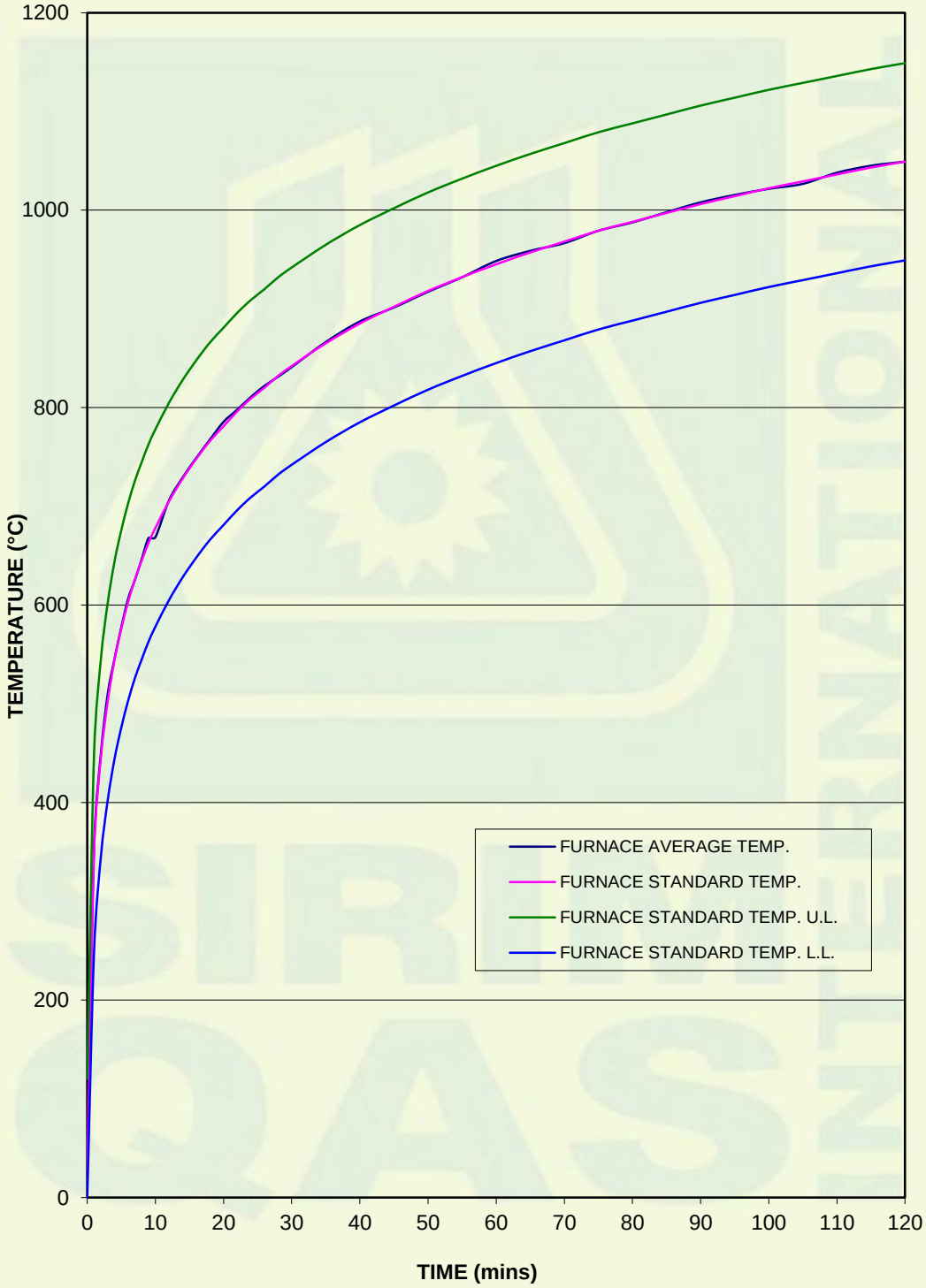
7.2 The test results relate only to the specimen tested. Appendix A of BS 476: Part 22: 1987 provides guidance information on the application of the fire resistance tests and the interpretation of test data.

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

‡ Not SAMM Accredited.
Test marked "Not SAMM Accredited" in this report are not included in the SAMM Accreditation schedule for our laboratory.

SIRIM QAS International Sdn. Bhd. FIRE PROTECTION SECTION

GRAPH 1: ACTUAL FURNACE TEMP./ TIME CURVE



SIRIM QAS International Sdn. Bhd.
FIRE PROTECTION SECTION

TABLE 1: OBSERVATIONS MADE DURING THE TEST

TIME (min)	TEST FACE	OBSERVATIONS
0	-	Test commenced.
3	-	Hammering sound heard from inside furnace.
12	U	Slight steam released from the wall panel system.
25	U	No significant change is observed.
35	U	Thermocouple T6 indicated highest temperature: 64 °c.
50	U	Thermocouple T8 indicated higher temperature than other thermocouple: 74 °c.
60	U	The wall panel system still maintains its integrity and insulation criterion.
85	U	No significant change is observed.
120	U	The wall panel system still maintains its integrity and insulation criterion.
132	U	The test was terminated.
Hose Stream Test A Hose Stream Test was conducted based on total assembly area of **10.19 m²** at required duration of **2 minutes 30 seconds**. The hose stream water pressure was **207 kPa (30 psi).**		
0	-	Test commenced.
2	30	The wall panel system maintained its integrity with no development of any hole, crack or other penetrating that allows the passage of water from the hose stream and wetting on the unexposed surface of the test assembly.

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

SIRIM QAS International Sdn. Bhd. FIRE PROTECTION SECTION

TABLE 2: DEFLECTION MEASUREMENTS

	MEASURING POINTS				
TIME	A	B	C	D	E
(mins)	(mm)	(mm)	(mm)	(mm)	(mm)
10	10	13	13	15	18
20	10	10	10	12	10
30	7	11	11	12	10
40	7	11	13	14	13
50	9	14	16	16	14
60	10	17	18	20	17
70	10	18	21	20	17
80	12	21	23	24	19
90	16	25	27	28	22
100	19	28	31	32	24
110	21	32	36	38	27
120	25	38	45	44	32
130	27	43	49	48	35

Note:

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

SIRIM QAS International Sdn. Bhd. FIRE PROTECTION SECTION

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)	T8 (°C)	T9 (°C)		MEAN TEMP.	MAX. TEMP.
0	33	32	32	33	34	33	33	35	34	33	0	1
10	33	32	32	33	34	33	33	34	34	33	0	1
20	33	33	33	34	34	41	33	34	34	33	1	8
30	36	36	34	36	35	55	34	29	33	35	3	22
40	40	39	38	41	39	66	37	27	31	39	7	33
50	45	44	42	47	44	72	41	75	28	44	12	39
60	51	49	48	55	50	76	45	78	52	51	18	43
70	58	55	55	62	57	78	51	80	58	57	25	45
80	64	61	62	68	63	79	56	80	64	64	31	46
90	70	66	68	74	69	80	61	82	71	69	37	48
100	74	71	74	79	73	81	66	83	76	74	41	48
110	78	74	79	82	73	82	64	84	80	77	44	49
120	82	76	83	85	74	83	65	85	84	80	47	52

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 T9 were used to assess the ability of the wall panel system to satisfy the maximum unexposed surface temperature criterion.
3. Thermocouples T1 to T5 is on horizontal stiffener.

SIRIM QAS International Sdn. Bhd. FIRE PROTECTION SECTION

APPENDIX 1: CONSTRUCTION OF THE TEST SPECIMEN (Refer Figure 1 to Figure 5)

No.	Test Specimen		Description
	Product name	:	GEG ECO PANEL
	Brand		GEG Eco Lightweight Panel System
	Measured Dimension	:	3000 mm (l) × 600 mm (w) × 105 mm (t)
	Nominal density	:	600 ~800 kg/m^3
	Material Mixed Composition	:	Cement + water + forming agent + 20 % of volume air The description of products given above has been prepared from information provided by the applicant of the test.
	Installation method	:	The panels were constructed by a framework consisted of galvanized iron C-Chanel frame for intermediate and vertical mid track, groove frame for vertical side and bottom track, Tongue frame for vertical side track and GI frame for top track. The void section of the panel was infilled with light weight concrete (LCW) mixture with known density of 360 kg/m^3. GI bottom bottom base guide rail of size 59 mm (l) x 15 mm (w) x 1.0 mm (t) GI vertical base stud of size 63 mm (l) x 25 mm (w) x 0.6 mm (t) and GI 'L' shape upper/top anchor bar of size 30 mm (l) x 20 mm (w) x 1.0 mm (t) which were fixed on the test frame using wall plug (refer Figure 1 – Figure 5). The overall size of GEG ECO PANEL wall system was 3000 mm (h) x 3975 mm (w) x 105 mm (t) constructed with one vertical side free end of 25 mm width to be filled with ceramic fiber insulation. The unexposed and exposed face of the test construction was not plastered.

SIRIM QAS International Sdn. Bhd. FIRE PROTECTION SECTION

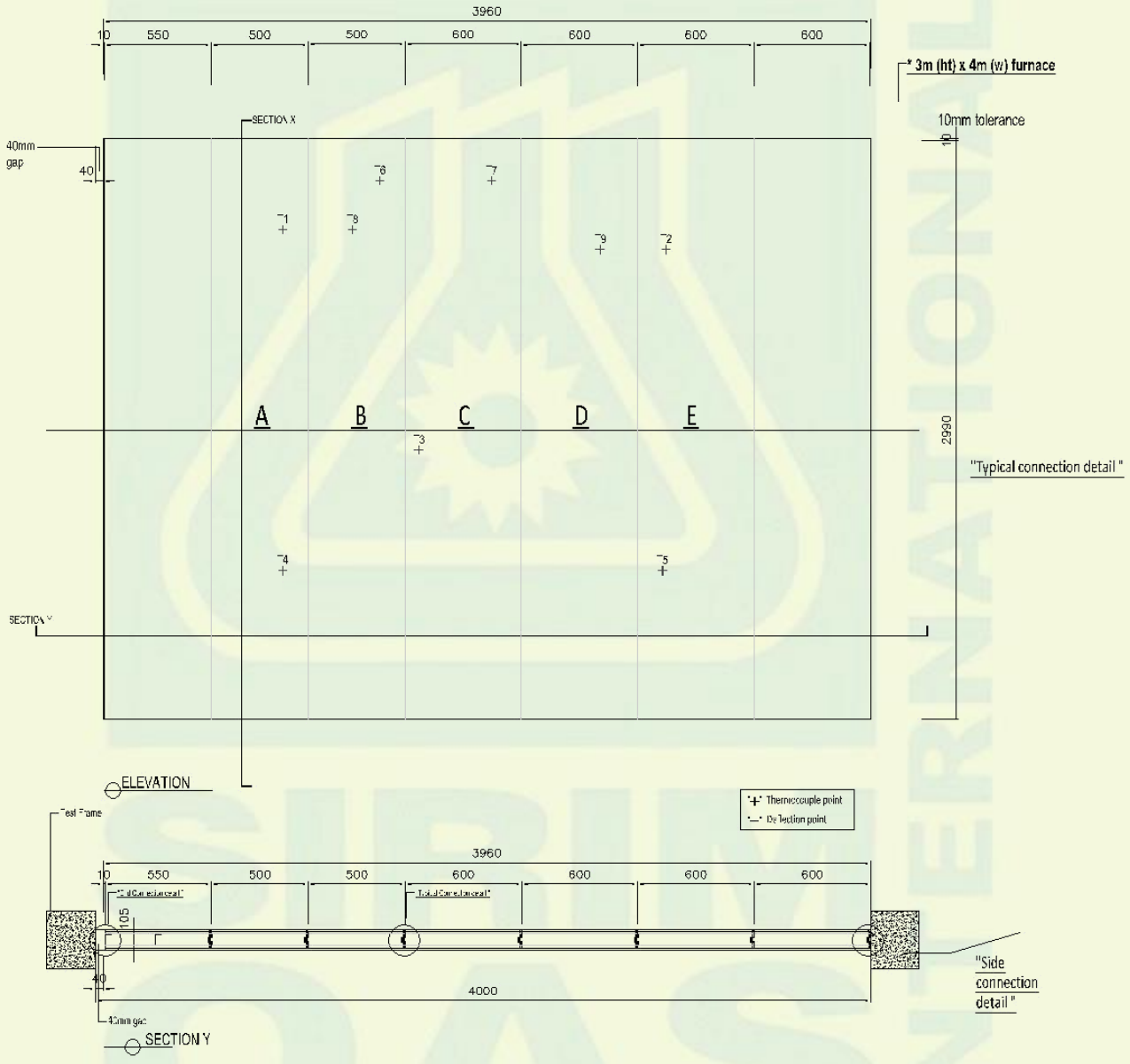


Figure 1: GENERAL ARRANGEMENT OF THE GEG ECO PANEL

SIRIM QAS International Sdn. Bhd. FIRE PROTECTION SECTION

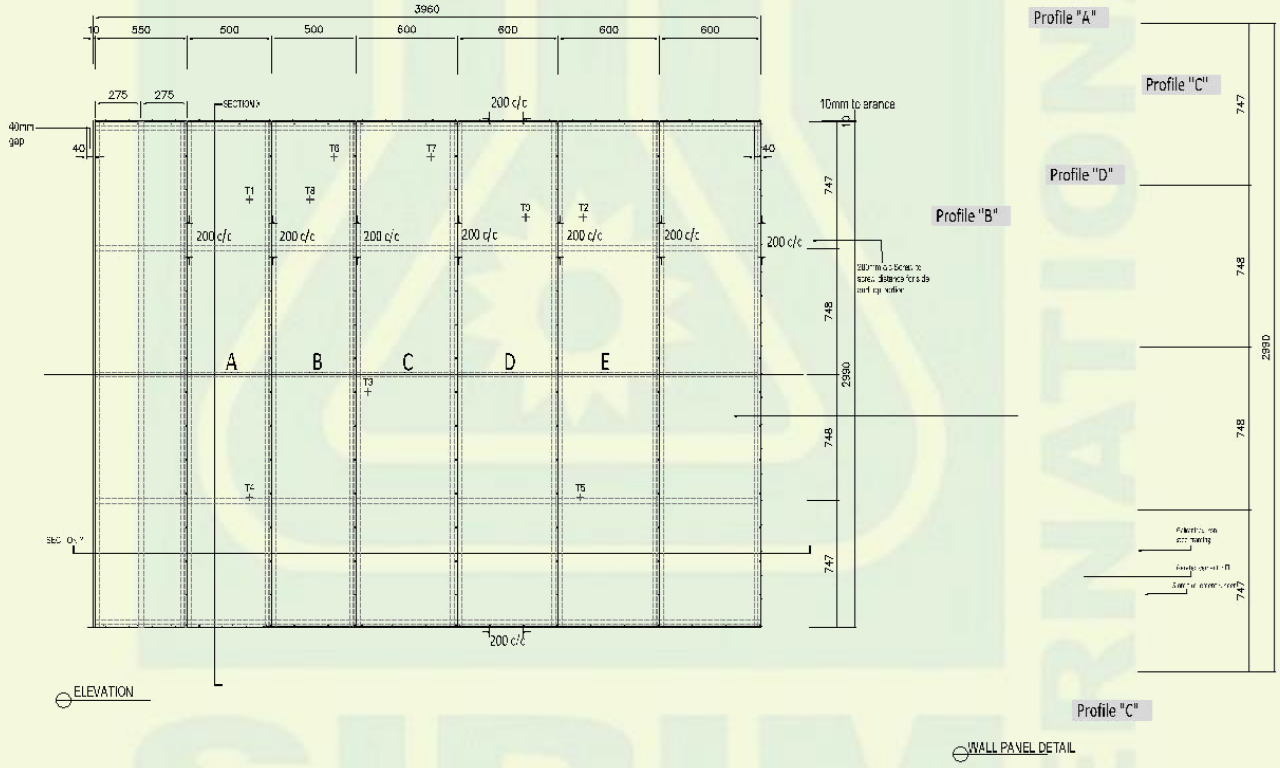


Figure 2: GENERAL CONSTRUCTION OF THE GEG ECO PANEL

SIRIM QAS International Sdn. Bhd.
FIRE PROTECTION SECTION

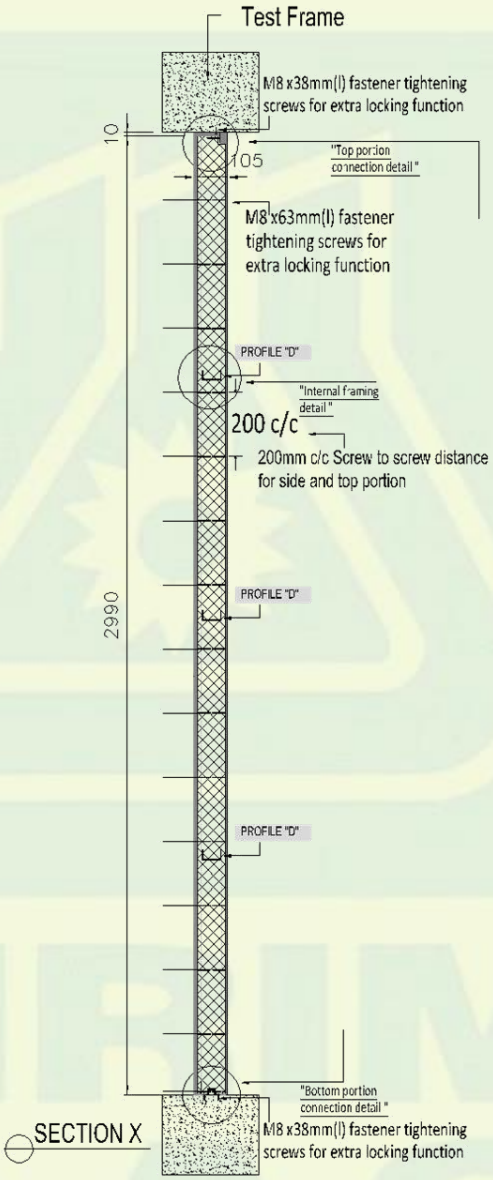


Figure 3: DETAIL OF THE GEG ECO PANEL

SIRIM QAS International Sdn. Bhd. FIRE PROTECTION SECTION

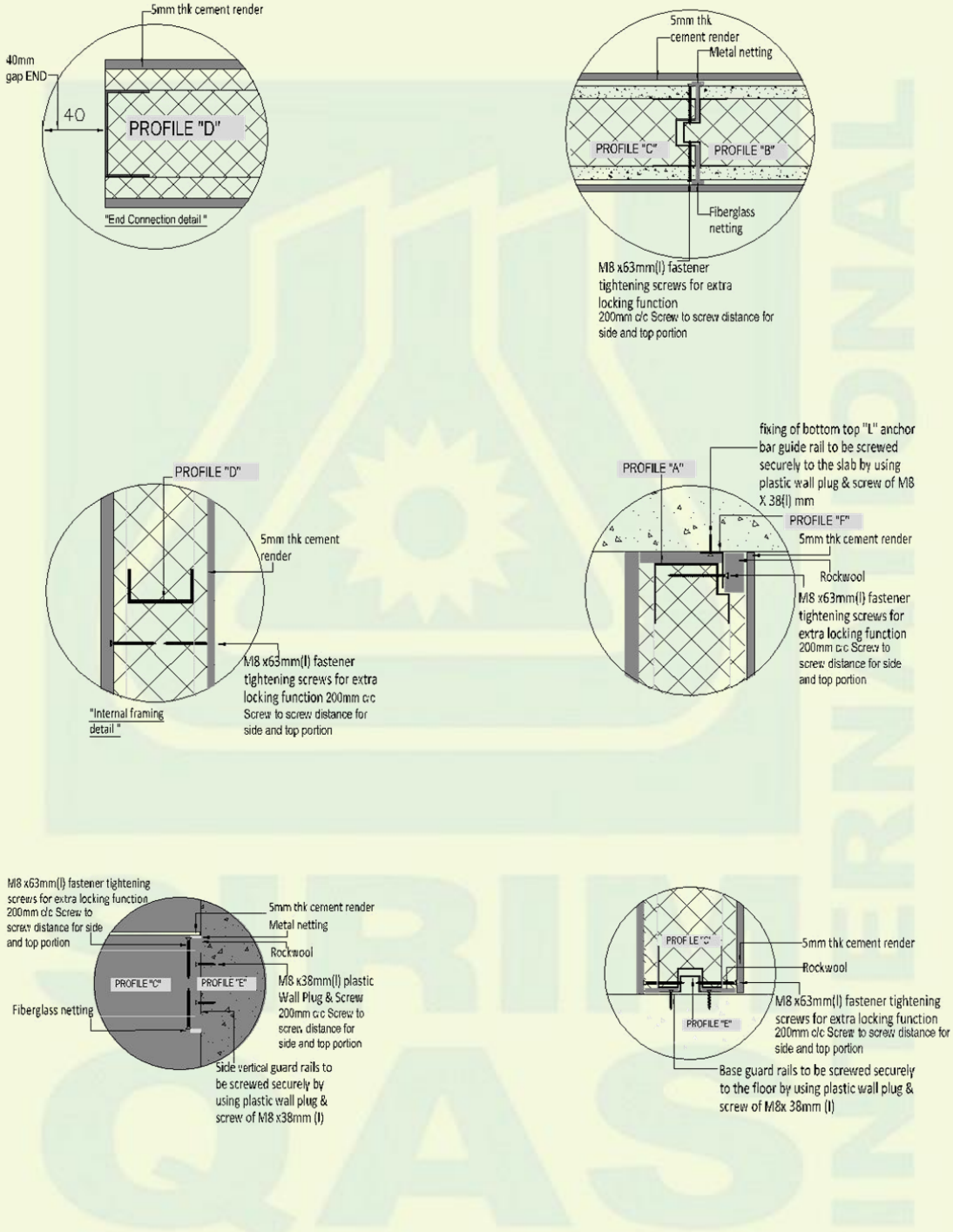


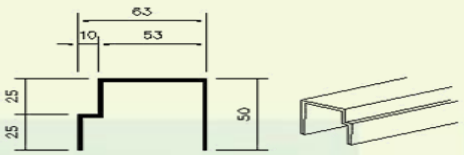
Figure 4: DETAIL OF THE GEG ECO PANEL

SIRIM QAS International Sdn. Bhd.
FIRE PROTECTION SECTION

Profile "A"

G I Frame 0.6mm thk

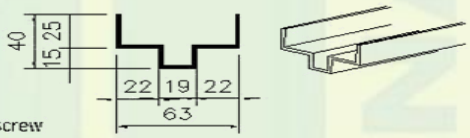
Material : GI Steel
Thickness : 0.6mm
Fixing : Screw securely to the Profile "F" by using screw of M8 x 63mm (l) @ 200mm c/c screw to screw istance



Profile "B"

Tongue frame 0.6mm thk

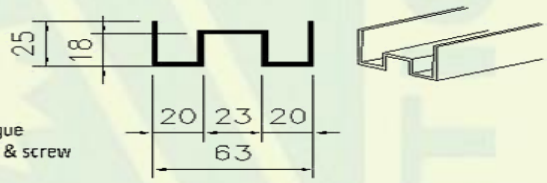
Material : GI Steel
Thickness : 0.6mm
Fixing : on each side of the respective wall panel side by side to ensure connection via the tongue and groove system by using plastic wall plug & screw of M8 x 63mm (l) @ 200mm c/c screw to screw distance



Profile "C"

Groove Frame 0.6mm thk

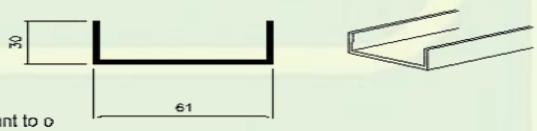
Material : GI Steel
Thickness : 0.6mm
Fixing : on each side of the respective wall panel side by side to ensure connection via the tongue and groove system by using plastic wall plug & screw of M8 x 63mm (l) @ 200mm c/c screw to screw distance



Profile "D"

C Channel 0.6mm thk

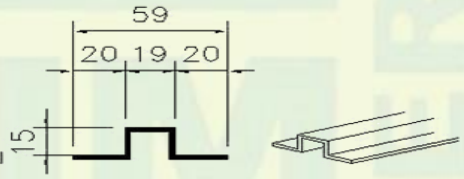
Material : GI Steel
Thickness : 0.6mm
Fixing : internal steel framing mount to o thers profile via spot weld



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 M8 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 M8 x 38mm (l) @ 200mm c/c screw to screw distance

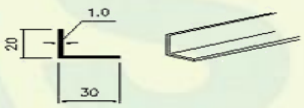


Figure 5: DETAIL OF THE GEG ECO PANEL

SIRIM QAS International Sdn. Bhd. FIRE PROTECTION SECTION

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

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

SIRIM QAS International Sdn. Bhd.
FIRE PROTECTION SECTION

Photo 3 : At about **60 minutes** of test

Photo 4 : At about 120 minutes of test

SIRIM QAS International Sdn. Bhd.
FIRE PROTECTION SECTION

Photo 5 : The exposed face of the test specimen after the test
Fire Resistance Test

Photo 6 : The exposed face of the test specimen after the test
Hose Stream Test

SIRIM QAS International Sdn. Bhd.
FIRE PROTECTION SECTION

CONDITIONS RELATING TO THE USE OF SIRIM QAS INTERNATIONAL TEST REPORT

1. A Test Report will be issued in respect of Testing Services conducted and shall relate only to the Sample actually tested. SIRIM QAS International makes no warranty whatsoever and the Applicant shall not represent in any manner that any duplication or mass production of the Product is same as the Sample actually tested or that SIRIM QAS International has tested any of the duplicated or mass produced Product.

2. The Test Report shall not be amended, changed, varied or modified in any manner whatsoever by the Applicant or otherwise.

3. If the Test Report is to be furnished to any third party or to the public, each such Test Report shall be furnished in full, legible and in its entirety.

4. The Test Report shall not be reproduced and shall not in any event be used for any advertising purposes or whatsoever without written approval from the Managing Director of SIRIM QAS International of No 1, Persiaran Dato' Menteri, Building 8, Section 2, P.O. Box 7035, 40700 Shah Alam, Selangor Darul Ehsan.

5. Customer (Applicant/Manufacture/Factory, etc.) is not permitted to use any SIRIM QAS International, SIRIM or other SIRIM's subsidiaries logo or words on packaging, sample's manual, technical specification, brochures/flyers or any other means without the prior written approval from the Managing Director of SIRIM QAS International.

6. If such approval is obtained from the Managing Director of SIRIM QAS International, the Applicant may only include the phrase, "A sample of this product has been tested by SIRIM QAS International ... (Test Report No) ... (dated) .... (for what test) ... (to which standard)" or such similar words which stress that only the Sample was actually tested. This phrase shall only be used for the purpose of product advertisement or product promotion (eg; brochures). For avoidance of doubt, the statement shall not be used on the sample and packaging of the sample.

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