

CERTIFICATE OF PRODUCT COMPLIANCE
Certificate No. DA.PCAO25000005

ACES hereby attest under compliance with ISO 17065 that the listed product:

ECO WALL PANEL - 100mm THICK

Manufactured by:

ALWATHNA GREEN CONSTRUCTION TECHNOLOGIES

BUILDING 260, STREET 709, ZONE 92
INDUSTRIAL AREA, MESAIEED, QATAR
Phone: (+974) 5552 2271
Email: Fmalkhater@hotmail.com

Have been assessed in accordance with the requirements of the
Technical Scheme denoted below and are approved for use
subject to the conditions appended hereto:

TECHNICAL SCHEME
ACES/SM/02
FIRE RATED BUILDING MATERIALS, PRODUCTS AND ASSEMBLIES SYSTEM

Accordingly, ACES hereby authorize the above manufacturer
to affix the ACES Product Conformity Mark
on the above-mentioned product(s)


Eng. Mohammed Jamal
Program Manager

Issued : 05-11-2025
Expiration : 04-11-2027





Arab Center
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CERTIFICATE No. DA.PCAO25000005

ALWATHNA GREEN CONSTRUCTION TECHNOLOGIES

V. Initial Type Testing (with reference DA.MMR250036992 Rev.3 and DA.MMR250036993)

NON-LOAD BEARING ECO WALL PANELS ASSEMBLY - 100mm THICK

Tensile Strength	:	112 kPa
Coefficient of Water Absorption	:	1.1 kg/(m ² ·min ^{0.5})
Thermal Conductivity K-value	:	0.1837 W/m. K
Thermal Conductivity R-value	:	0.544 m ² . K/W
Moisture Content	:	9.38%
Compressive Strength	:	1.84 MPa
Gross Dry Density	:	515.43 kg/m ³
Sound Reduction Index	:	40 dB
Pull-Out Force	:	26.6 kN
Hanging Force	:	No Crack at 150 kg

VI. Illustrative Figure



NON-LOAD BEARING ECO WALL PANELS ASSEMBLY - 100mm THICK

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III. Limitations:

1. The fire test results may not be representative of all possible installation configurations or usage scenarios for the NON-LOAD BEARING ECO WALL PANELS ASSEMBLY - 100mm THICK.
2. Other factors that could affect the NON-LOAD BEARING ECO WALL PANELS ASSEMBLY - 100mm THICK performance in a real-world fire situation, such as building layout, ventilation, or fire suppression systems, may not be fully accounted for in the testing.
3. Fire tests may only evaluate the NON-LOAD BEARING ECO WALL PANELS ASSEMBLY - 100mm THICK performance in isolation, without considering their interaction with other building materials, such as the cladding or structural elements. The actual fire performance of the building as a whole may be different from what is suggested by the individual panel test results.
4. Fire testing may not account for the effects of aging, weathering, or exposure to chemicals or pollutants on the panel performance over time.
5. The fire testing standards and procedures used for NON-LOAD BEARING ECO WALL PANELS ASSEMBLY - 100mm THICK may not be uniform across different regions or jurisdictions, and also due to the nature of fire resistance testing, a stated degree of accuracy of the results cannot be provided making it difficult to compare results or ensure consistent performance.
6. Only the fire resistance performance for panels is verified within this certification, and other properties included in the Initial Type Testing.



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I. Fire Rating Performance:

The products have been tested based and according to the ACES/SM/02 Initial Type Testing requirements. The products were then assessed and met the requirements of the BS 476-20 and BS 476-22 and technical data sheet declarations.

Product Name	Fire Resistance Rating	Report Reference
NON-LOAD BEARING ECO WALL PANELS ASSEMBLY - 100mm THICK	Insulation: 180 minutes Integrity: 180 minutes	DA.MMR25036983

II. Important Note:

It is imperative to emphasize that the outcomes of this fire testing must be evaluated in parallel with the specifications stated in ACES/SM/02, BS 476-20 and BS 476-22. These standards provide crucial guidelines and procedures that must be adhered to when assessing the fire performance of building materials. While the fire test results are a crucial aspect of determining the panels fire rating performance appropriateness for a specific application, it is essential to consider them within the wider context of these standards and any other relevant regulations or guidelines. Thus, this statement highlights the significance of reading and evaluating the fire testing results together with the relevant standards to ensure accurate and reliable conclusions.



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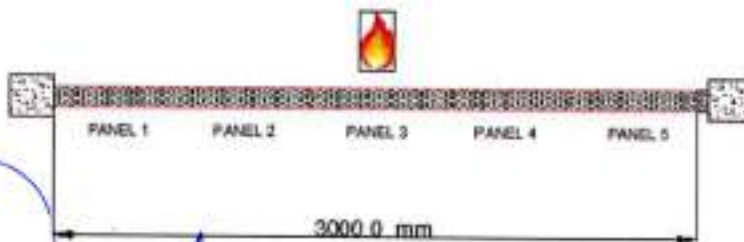
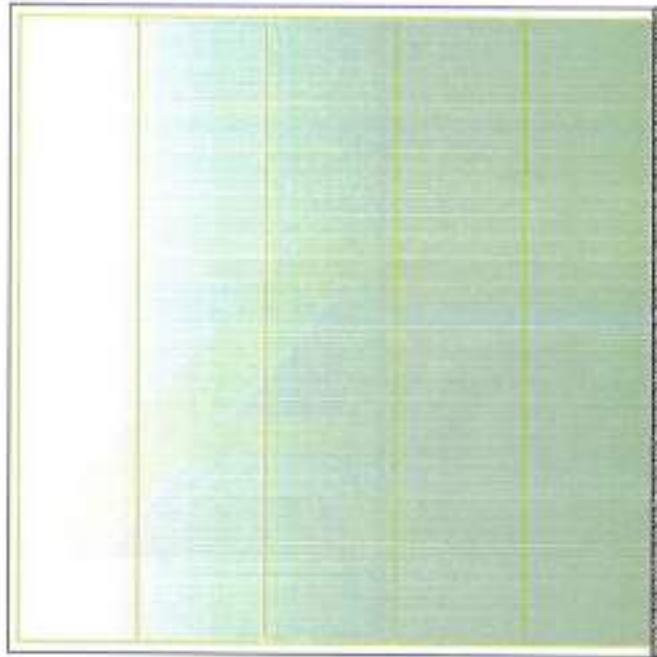
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IV. Assembly Configuration



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Validation of Product Performance and Compliance

1. This approval is predicated on the product's demonstrated performance and its compliance with the technical declarations and assessment criteria specified in BS 476-20, BS 476-22, which were validated through prescribed testing procedures.
2. The certification of NON-LOAD BEARING ECO WALL PANELS ASSEMBLY - 100mm THICK manufactured by ALWATHNA GREEN CONSTRUCTION TECHNOLOGIES is approved on the basis of:
 - i) Initial type testing (under references shown in Page 2 of 8)
 - ii) Verification of Quality Management Systems to ISO 9001
 - iii) Audit testing as specified in ACES/SM/02
 - iv) Inspection and surveillance of factory production control
3. The approval relates to on-going production. The product and/or its immediate packaging is identified with the manufacturers' name, the product name or number, the ACES name or name and mark, together with the ACES certificate number and application where appropriate.
4. If there are additional or supplementary characteristic requirements that were not included in the certification's initial type testing (ITT), these characteristics will require separate evaluation to determine whether the product meets the enhanced product requirements.
5. For verification of the validity of this certificate, please contact ACES Certification Department.



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Requirement & Performance Attestation

This certificate that test all provisions concerning the evaluation of the performance under characteristics which are applied and the product(s) fulfil(s) all prescribed requirements set out in this certificate.

	ITT TEST REPORT	AUDIT REPORT	CERTIFICATE OF COMPLIANCE
Number:	DA.MMR250036983 DA.MMR250036992 Rev.3 DA.MMR250036993	QPCB004-F007/AR25-PCQ-005	DA.PCAO25000005
ITT and Audit Report remains valid provided that the product, the relevant standards, and the production process remain unchanged until the next scheduled surveillance, which should be dated on or before 04/11/2026.			Date of issue: 05-11-2025 Expiry date: 04-11-2027



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ALWATHNA GREEN CONSTRUCTION TECHNOLOGIES

Further Information

Further information regarding the details contained in technical data sheet may be obtained from:

ALWATHNA GREEN CONSTRUCTION TECHNOLOGIES
BUILDING 260, STREET 709, ZONE 92
INDUSTRIAL AREA, MESAIEED, QATAR
Phone: (+974) 5552 2271
Email: Fmalkhater@hotmail.com

Further information regarding ACES and other approved products can be obtained from ACES by contacting the below details:

Tel: 00974 4487 0141
Website: www.aces-int.com



Eng. Mohammed Jamal
Program Manager

Issued : 05-11-2025
Expiration: 04-11-2027





FIRE RESISTANCE REPORT FOR NON-LOADBEARING WALL BUILD USING 100 MM -THICK ECO WALL PANELS.



ARAB CENTER FOR ENGINEERING STUDIES

- ◆ ACES Client : Al Wathna For Green Construction Technology
- ◆ Project : Private
- ◆ Manufacturer : Al Wathna For Green Construction Technology
- ◆ Product : 100 mm -THICK ECO WALL PANEL

MATERIALS DEPARTMENT

Request No.	D	A	.	M	M	O	2	5	0	0	8	6	3	3
Report No.	D	A	.	M	M	R	2	5	0	3	6	9	8	3

0	07-10-2025
Rev.	Date Issued



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Request No. DA. MMO2508633

Report No. DA. MMR25036983

Rev.0

**M/S: Al Wathna For Green Construction Technology,
Doha Qatar.**

**SUBJECT: FIRE RESISTANCE TEST REPORT FOR NON-LOADBEARING WALL BUILD USING
100 mm -THICK ECO WALL PANELS.**

Dear Sir,

Arab Center for Engineering Studies (ACES) is pleased to submit laboratory test report of the **FIRE
RESISTANCE FOR NON-LOADBEARING ECO Wall Panel Assembly**

In accordance with the procedure of **BS 476-22 :1987, dated 17-09- 2025**

This report presents the fire resistance performance evaluation of the ECO Wall Panels, with overall wall
assembly size of 3000 × 610 × 100 mm

In the event that additional information or clarifications are required, please contact our office at your
convenience. We would like to take this opportunity to thank you for your confidence and look forward to
be of service to you in the near future.

Sincerely yours,

**ARAB CENTER FOR ENGINEERING STUDIES
MATERIALS DEPARTMENT**



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1. SUMMARY

1.1. Objective:

Determination of the Fire Resistance of Non-Load-Bearing ECO Wall Panel, 4-Inch Thick, with reference to:

- BS 476-20 :1987-; Fire tests on building materials and structures- Part 20: Method for determination of the fire resistance of elements of construction (general principles.)
- BS 476-22:1987 -; Fire test on building materials and structures- Part 22: Methods for determination of the fire resistance of non-loadbearing elements of construction.
- The non-loadbearing of 4-inch thick ECO wall panel assembly has been evaluated in accordance with BS 476-PART 22, Section 5: Determination of the fire resistance of partitions

1.2. General Contact Information:

ACES client : Al Wathna For Green Construction Technology
Project : Private
Address : Zone 92-Street no. 709-Building no. 260
Manufacturer : Al Wathna Green Construction Technology
Email : mohamedalun@yahoo.com
Contact number : +974-55873102

Testing Laboratory

Name : Arab Center For Engineering Studies
Address : Street: Industrial Area Zone 57, Street No. 41, Gate No. 471
Email : acesdoha@aces-int.com

1.3. Summary of the Tested Specimen:

4-inch thick ECO wall panel assembly of overall dimensions of 3000 mm high by 3000 mm width and total thickness 100 mm incorporate the infill EPS Cement Mixture Core of 88 mm thick that were molded between 5 mm fiber cement board sheet.

The assembly consists of total five panels, the panel consists the dimensions of 3000 mm x 610 mm x 100 mm (H*W*T) and the density 550 to 600 kg/m³ (stated) and strength 4.4 N/mm² (Stated)

On the morning of the test, the moisture content of the ECO panel assembly was measured using a moisture meter. The moisture readings were taken, and the average moisture content of the specimen, based on 5 readings, was found to be 1.5 %.



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2. TEST RESULTS

Arab Center for Engineering Studies has conducted an evaluation for AL WATHNA FOR GREEN CONSTRUCTION TECHNOLOGY to determine the fire resistance characteristics of their 100 mm thick ECO wall panel in accordance with BS 476-20:1987 and BS 476-22: 1987, Section 5: Determination of fire resistance of partitions.

The requirement of the standard was satisfied for

Item	Parameter	Results in minutes
100 mm Thick ECO Wall Panel	Integrity:	180
	Insulation:	No failure
* The test was terminated after 180 minutes upon meeting the test sponsor's requirements.		

3. INTRODUCTION

The non-loadbearing of 100 mm thick ECO wall panel assembly has been evaluated in accordance with BS 476-PART 22, Section 5: Determination of the fire resistance of partitions.

The Test Specimen located at AL WATHNA FOR GREEN CONSTRUCTION TECHNOLOGY bearing GPS coordinates 25°00'45.127"N, 51°57'41.724"E and test Specimen was delivered to the ACES dated on 09th-09-2025

The ECO assembly fixation and installation carried out between 10th of September 2025 and 11th of September 2025 by AL WATHNA FOR GREEN CONSTRUCTION TECHNOLOGY representatives.

The test was conducted on 17th of September 2025 at the request of AL WATHNA FACTORY the test sponsor.



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4. CONSTRUCTION

4.1. General description of assembly:

ECO wall panels were interlocked with each other through a tongue-and-groove mechanism with a 20 mm overlap, forming a complete assembly. The assembly was mounted to the supportive construction using a U-channel framing system with stainless steel self-drilling screws (M8 × 72 mm). The panel assembly was additionally supported and fixed to the supportive construction by means of steel rods.

The ECO wall panels assembly was installed on 6" inch thick concrete masonry constructive support like frame. The constructive support was well built inside the restrained furnace frame. This entire set-up underwent to the storage till equilibrium. Throughout this period both temperature and Humidity of the laboratory were measured and recorded as being within a range of from 27 °C to 32 °C and 45% to 68%.

All materials and components utilized in the construction of the assembly and test setup were supplied by Al Wathna For Green Construction Technology.

4.2. Set-up and test situation:

The specimen assembly was installed on 8- inch thick concrete masonry constructive support, and the free edge gap of 50 mm was on only one vertical edge, in accordance with section 5.3.3 of BS 476-22:1987. The gap between the specimen assembly and supporting construction (free edge) was filled with 25 mm thick ceramic fiber insulation. The constructive support was well built inside the restrained furnace frame.

The specimen was installed using only full-sized panels, oriented vertically, and incorporated no horizontal joints. As such, the applicability of a horizontal joint used in practice is not considered within the scope of this report.

4.3. Specimen Design and verification:

The choice and design of the test specimen were made by AL WATHNA FOR GREEN CONSTRUCTION TECHNOLOGY, and ACES Testing Laboratory, as the certification agency, was involved in the sample selection. This report clarifies that the test results apply only to the sample configuration as tested

There are contexts where information has been provided by the sponsor and verification of information has been done through either technical datasheet or other document submission, or as indicated directly by the sponsor. For this reason, materials have been tested in an as-received condition and ACES bears no liability for the legitimacy of the submitted information.

5. METHOD OF TEST

5.1. Performance Determination:

The fire resistance performance of an ECO wall panel required to determine accordingly with respect to integrity and insulation criteria.

5.2. Integrity:

Integrity failure of the test construction shall be deemed to have occurred if the specimen collapses, if sustained flaming for more than 10 seconds is observed on the unexposed face, a positive cotton pad test is taken, or permitting the penetration of gap gauges through the specimen, as specified in BS 476-20:1987, Section 10.3.2.

5.3. Insulation:

Insulation failure of the test construction shall be deemed to have occurred if the mean unexposed face temperature exceeds 140 °C above its initial value and maximum unexposed face temperature, if any thermocouple exceeds 180 °C above the initial mean unexposed face temperature, or if integrity failure occurs, as per BS 476-20:1987, Section 10.4.



6. INSTRUMENTATION

General	The instrumentation was provided in accordance with the requirements of the Standard.
Furnace	The furnace was controlled so that its mean temperature complied with the requirements, the furnace temperature control thermocouples has been positioned as described in C.1.2 and furnace temperature monitor and control using eleven furnace thermocouples, distributed over a plane 100 mm from the surface of the test construction. The thermometers positioned such that they are not in contact with flames from the furnace burners and that they are at least 450 mm away from any wall, floor or roof of the furnace.
Thermocouple Allocation	Thermocouples were provided to monitor the unexposed surface of the specimen. The output of all instrumentation was recorded at one-minute intervals as follows.
Thermocouples (individual and mean temperatures)	The total five thermocouples (numbered 1 TO 5) were used for recording mean temperature for specimen assembly. The surface temperature thermocouples were positioned with one approximately at center of the specimen and one at the center of each quarter section.
Thermocouples	The four additional thermocouples (6-9) were positioned on the unexposed surface for maximum temperatures measurements.
Integrity Criteria	Cotton pads and gap gauges were available to evaluate the integrity of the specimen where relevant.
Furnace Pressure	The furnace pressure control and maintained such that the overhead pressure at the top of the vertical test specimen is not exceeded 20Pa (i.e. 18.1 Pa). Hence the neutral pressure plane is established 800 mm above notional floor level.
Thermocouple (ambient temperature)	The ambient temperature of the laboratory at the commencement of the test is 28.9°C, and temperature monitored at a distance of between 1 m horizontally away from the unexposed face
Radiometer	The radiation was measured at geometrical center of specimen at the 1-meter distance away from unexposed surface.



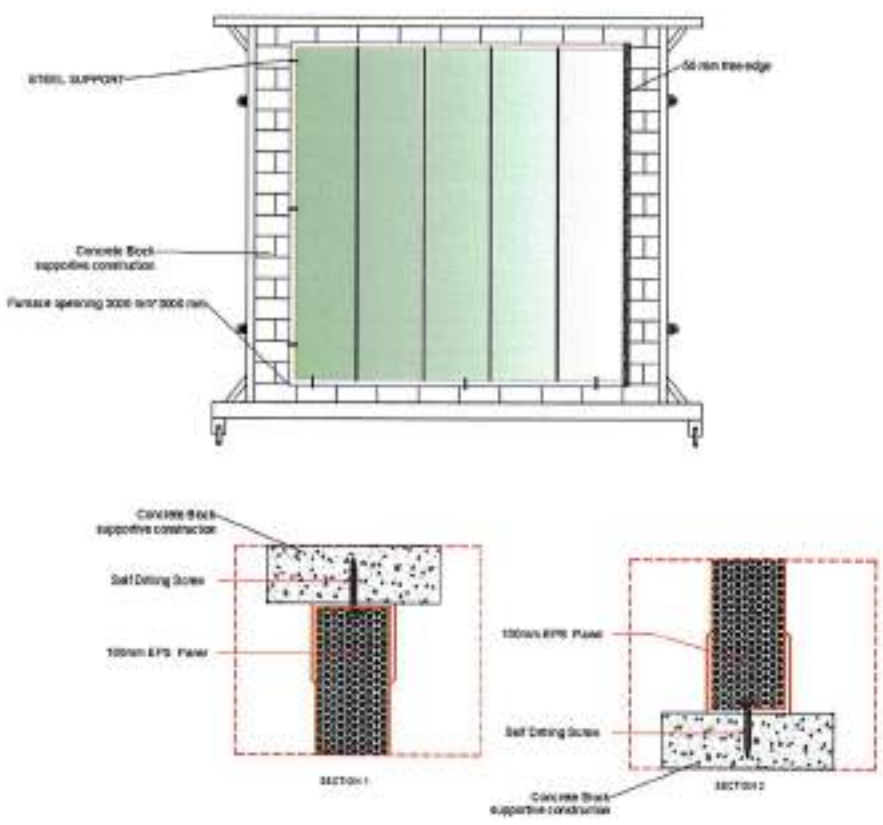
7. TEST OBSERVATIONS

Time		Observations
Min	Seconds	
00	00	The test commences
15	15	Popping Sounds are heard from specimen assembly
30	00	The test specimen assembly remain stable
60	25	Popping Sounds are heard from specimen assembly
90	00	Specimen assembly continues to satisfy the integrity criteria of the test
100	00	The Specimen assembly remain stable
120	00	Specimen assembly continues to satisfy the integrity and insulation criteria of the test
170	00	The Specimen assembly remain stable
180	00	The test was terminated upon the request of the test sponsor

CH: J. Saiting
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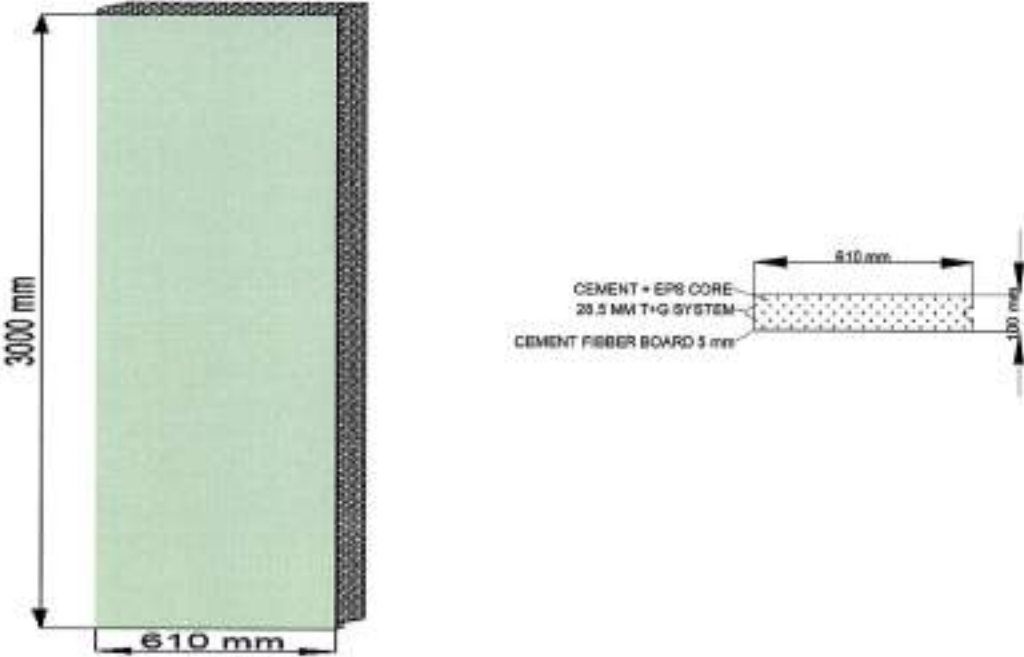


8. DESCRIPTION OF TEST SPECIMEN ASSEMBLY

Overall Specimen Assembly	
Type:	4-inch Thickness, Non-Load Bearing ECO Wall Panel Assembly
Dimensions:	3000 mm * 3000 mm *100 mm
The 100 mm thick ECO wall panels assembly has overall dimensions of 3000 mm × 3000 mm. The panels are fixed to the supportive construction using steel rod supports and are interlocked with each other through a tongue-and-groove mechanism with a 20 mm overlap.	
	

Screw and Studs			
Manufacturer:	N/P	Size/Dimensions:	M 8 x 7.2 mm
Material:	Stainless steel	Quantity:	27
Fixing Method:	Self-Drilling		



ECO Wall Panel	
Dimension:	3000 mm x 610 mm x100 mm (H*W*T)
Density:	550 to 600 kg/m ³ (stated)
Thickness:	88 mm
Moisture:	0.11% (stated)
Manufacturer:	AL WATHNA GREEN CONSTRUCTION TECHNOLOGY
No's of panels used:	5
	

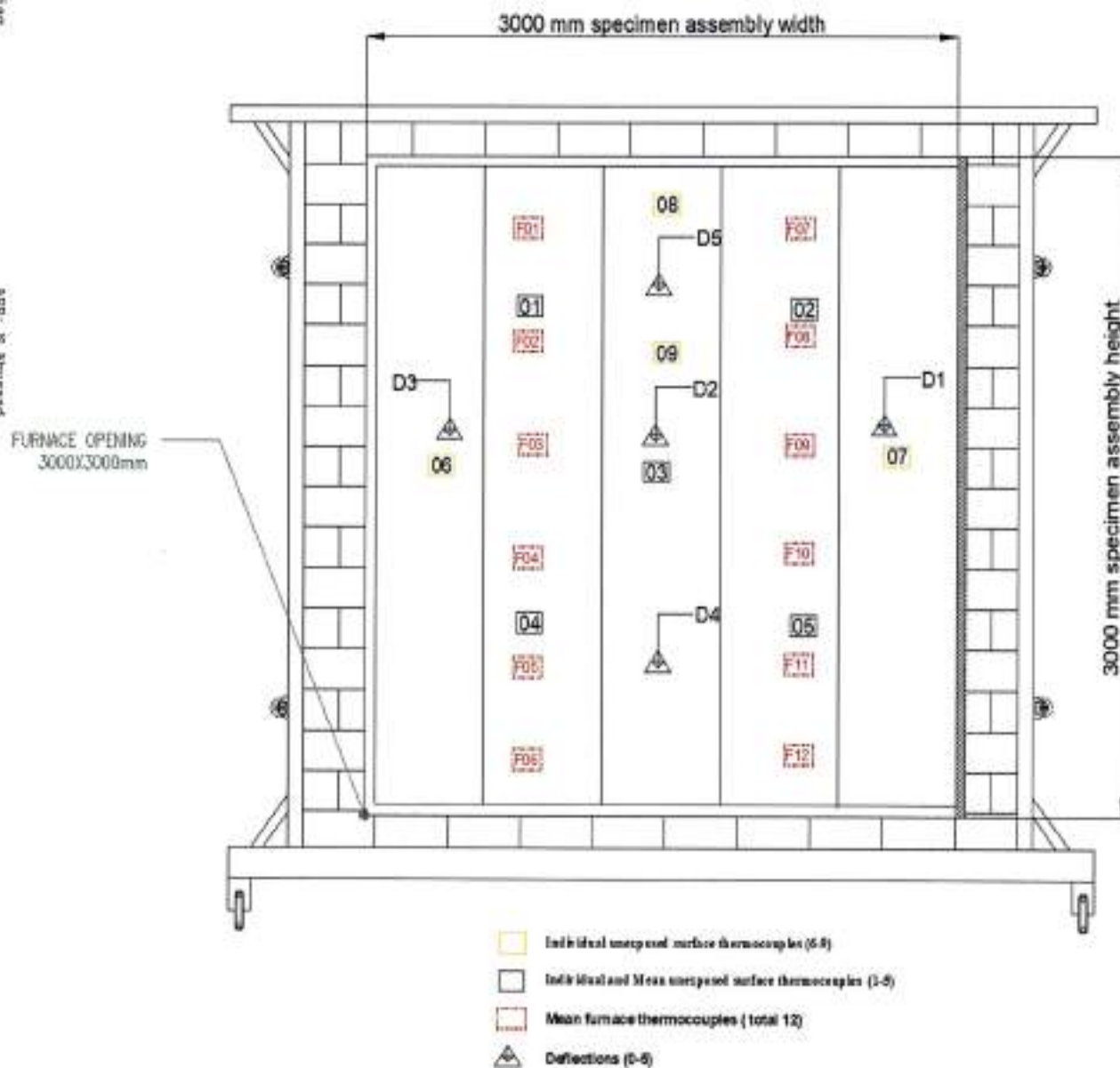
Ceramic Fiber Blankets	
Material:	Ceramic Fiber
Manufacturer:	Morgan Thermal Ceramics
Manufacture Reference:	Cera Blanket 1260°C
Dimension:	25 mm thick
Fixing Method & Application:	The ceramic fiber blanket was used to fill the 50 mm free edge gap, that establish between the left un-restraint vertical edge end and supportive



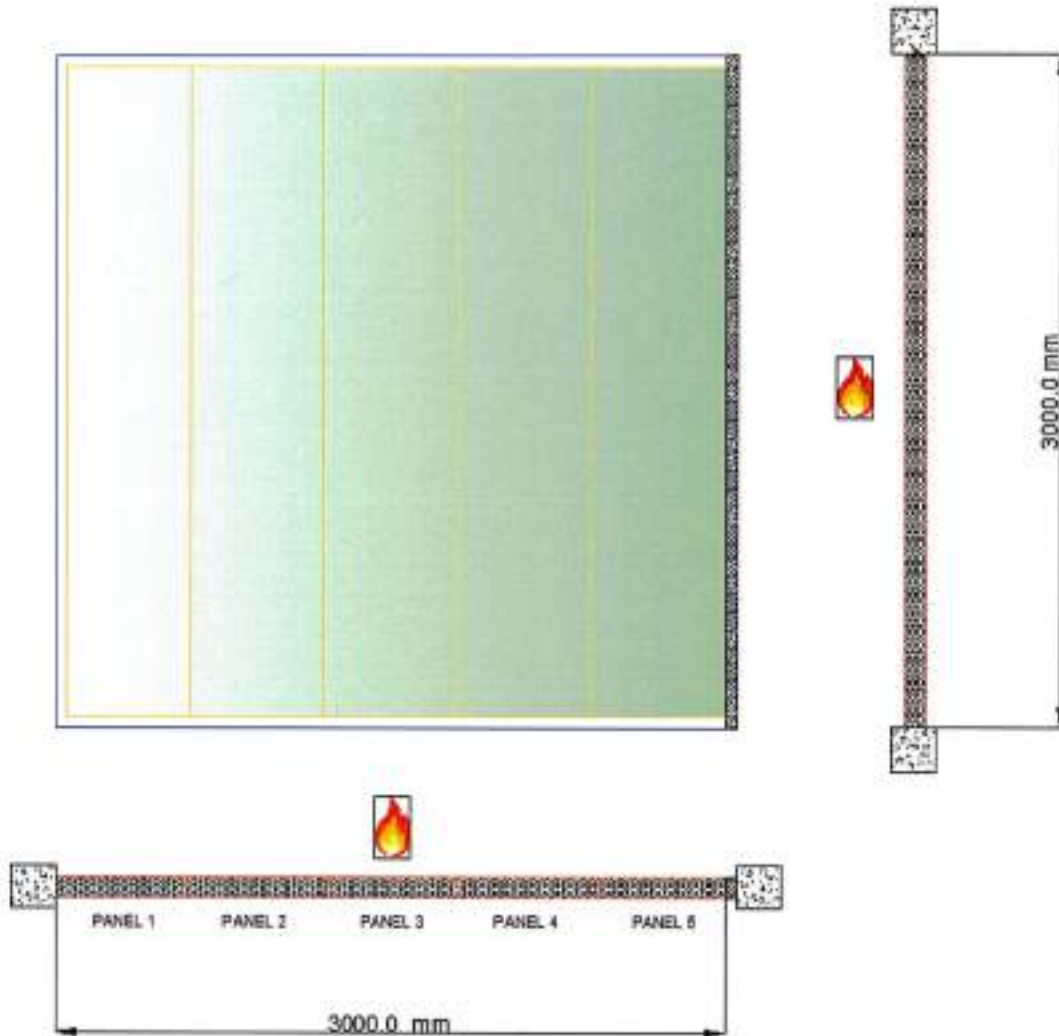
RAW MATERIAL DETAILS	
1. Fiber Cement Board- (Exterior facing and Internal facing)	
Material:	Fiber cement board
Manufacturer:	Shandong Green Building Material Import & Export Co., Ltd
Density:	1300 kg/m ³ (Stated)
Color:	White off (Stated)
Thickness:	5 mm
2. EPS	
Manufacturer:	TAITA CHEMICAL COMPANY
Density:	12 – 15 kg/m ³
3. Cement	
Type of Cement:	Ordinary Portland cement (OPC)
Manufacturer:	Qatar National Cement Company
Strength:	33 MPa
Density:	3.1~ 3.25 g/cm ³
4. Sand	
Type of sand:	Washed sand
Manufacturer:	Qatar National Cement Company
Specific gravity	2.60
Mixing Method	1:4
5. Special panel adhesive	
Type:	Hydroxypropyl Methyl Cellulose (HPMC)
Manufacturer:	HEBEI YIDA CELULOSE CO.LTD
Curing Method:	Dissolution & Hydration
6. Admixture	
Material:	Wayter Reducer
Manufacturer:	Chinese Institute of Chemical



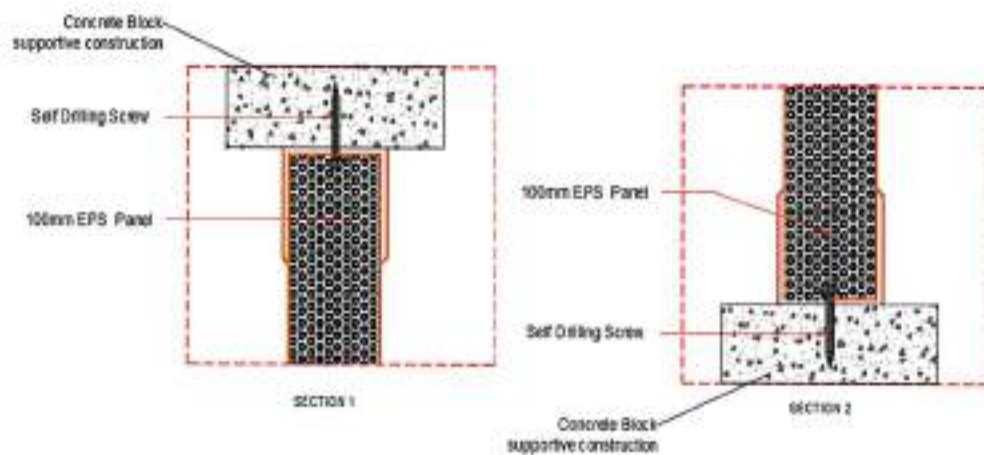
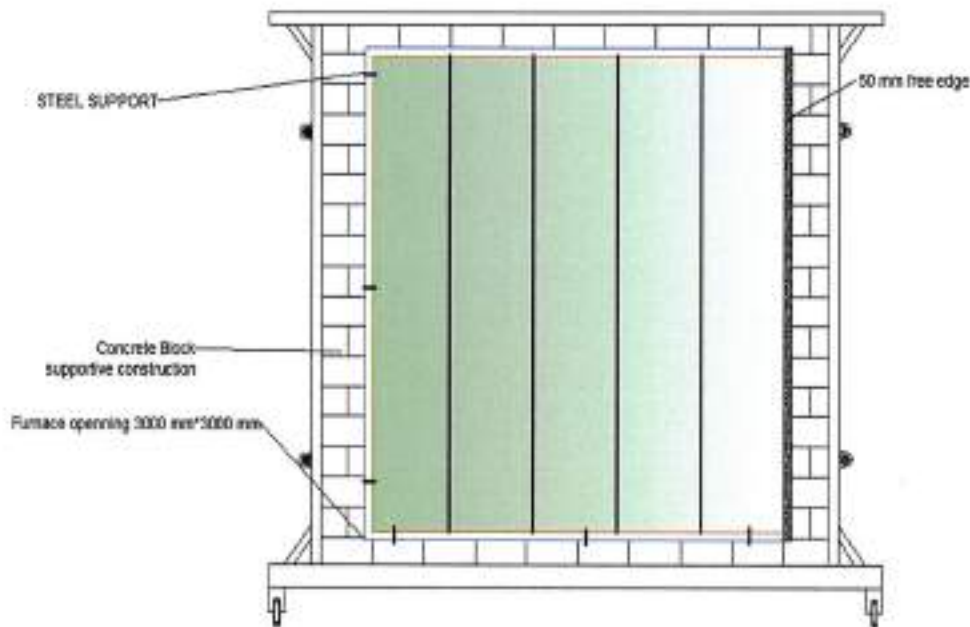
9. TEST DRAWING FIGURES



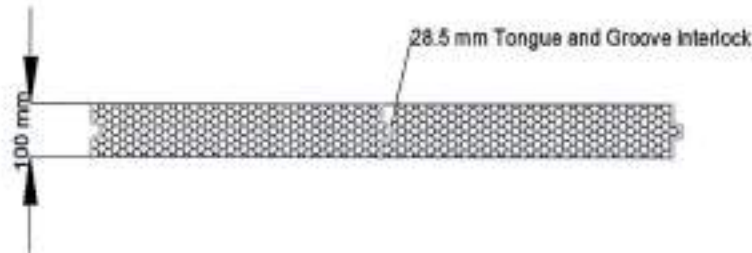
Test set-up and thermocouples location Figure:1



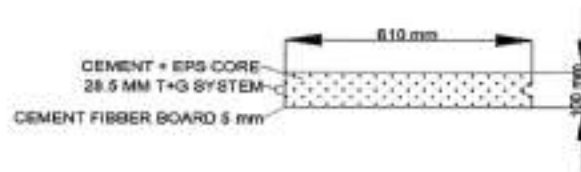
Front/Side/Top Elevation Figure 2



Specimen Fixation
(figure 3)



Panel Interlock figure:4



ECO wall panel Figure:5



10. SPECIMEN TEST PHOTOS



The exposed face of the specimen before the test



The unexposed face of the specimen at commencement of the test



*FINAL DOCUMENT BY N. Alhussein
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CITE: J. Saeed

APR: N. Alhussein



The specimen at 21 minutes: 57 seconds of the testing



The specimen at 47 minutes: 12 seconds of the testing

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CHK: J. Gantlay
ATTN: DOCTOR by H. Almaraz
or stamp on the report did not indicate any accountability on ACES.

APP: H. Almaraz

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The specimen at 66 minutes: 13 seconds of the testing



The specimen at 76 minutes: 34 seconds of the testing

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477901 DOCUMENT BY N. Alkandak
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APP: N. Alkandak
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The specimen at 120 minutes: 34 seconds of the testing



The specimen at 138 minutes: 29 seconds of the testing

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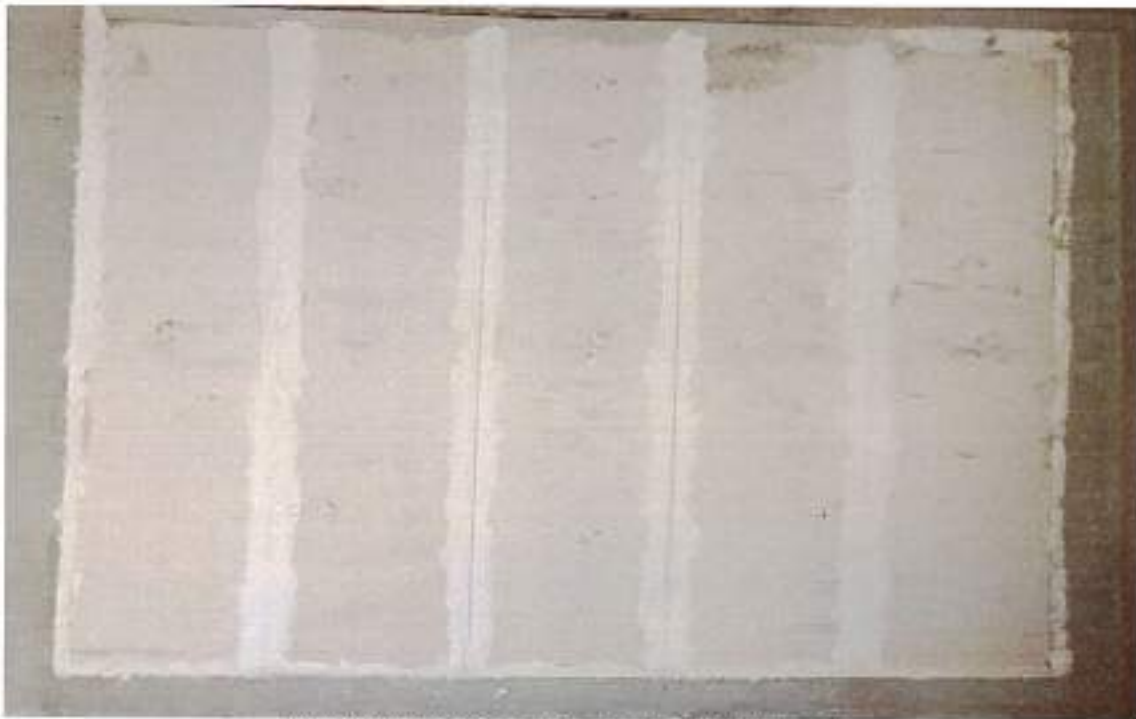
The specimen at 163 minutes: 45 seconds of the testing



The specimen at 180 minutes: 11 seconds of the testing



CR: J. Soudki
SR: N. Alnassir
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The unexposed face of the specimen after the test



The unexposed face of the specimen after the test

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11. SYSTEM GENERATED DATA AND GRAPH RECORDS

Deflection of the Specimen

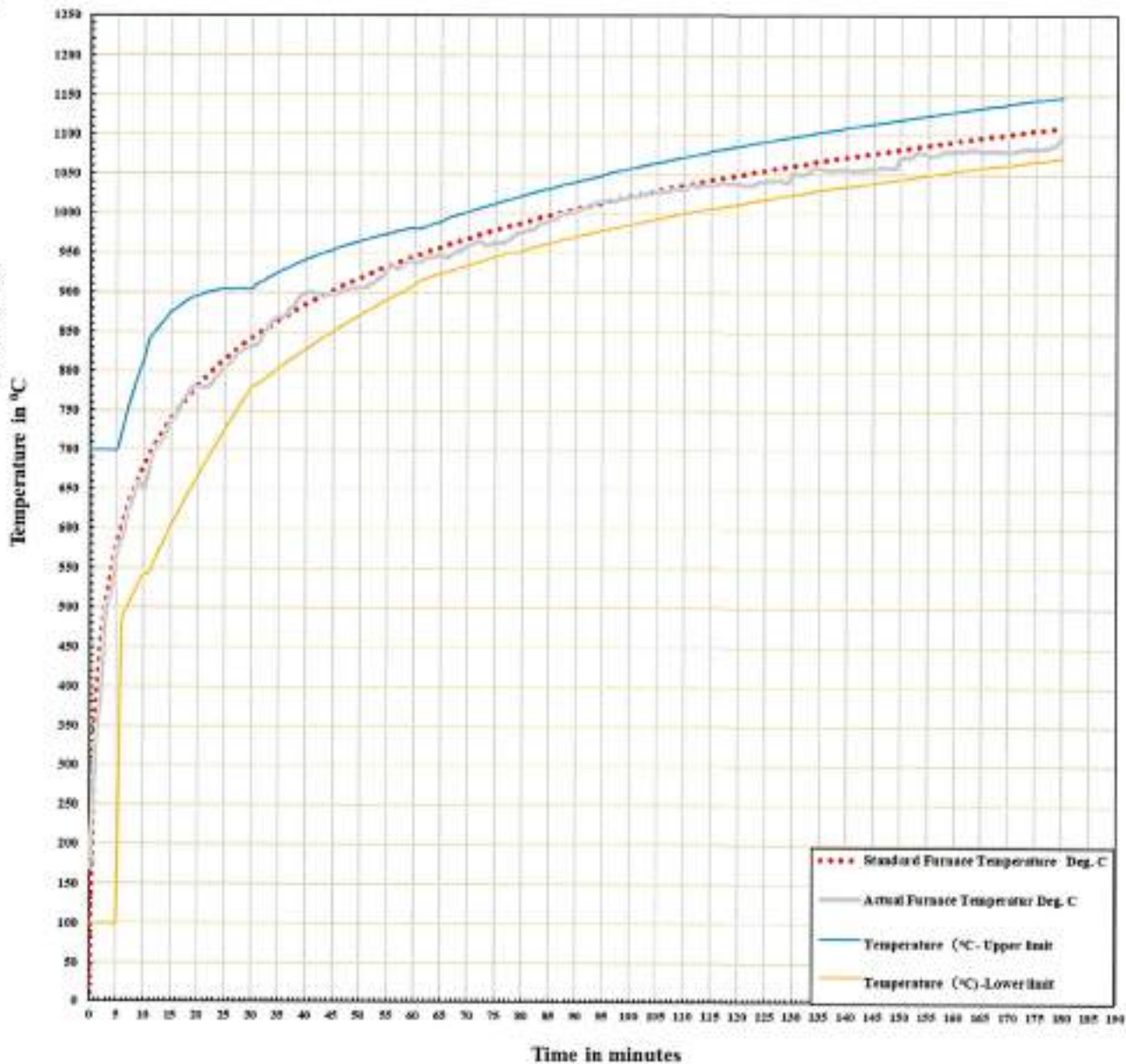
(-) mm are for measurement's going into furnace

(+) mm are for measurement's coming out of furnace

Time minutes	D1	D2	D3	D4	D5
0	0.0	0.0	0.0	0.0	0.0
10	-0.6	-0.5	-0.7	-0.4	-0.5
20	-1.9	-1.8	-2.0	-1.7	-1.6
30	-2.1	-1.9	-2.2	-2.0	-1.8
40	-2.0	-1.7	-2.1	-1.9	-1.8
50	-2.2	-1.9	-2.1	-2.0	-1.9
60	-2.3	-1.8	-2.2	-2.1	-1.9
70	2.6	2.3	2.7	2.5	2.4
80	2.7	2.5	2.9	2.6	2.4
90	3.1	2.8	3.2	3.0	2.9
100	3.3	3.0	3.4	3.2	3.1
110	3.4	3.1	4.5	3.3	3.2
120	4.2	3.9	4.3	4.0	3.8
130	5.2	4.8	5.3	5.0	4.9
140	5.6	5.2	5.7	5.4	5.1
150	7.4	7.0	7.6	7.3	6.9
160	12.8	15.3	13.0	15.6	14.1
170	17.0	16.3	17.2	16.8	16.2
180	26.6	25.7	26.9	26.4	25.5



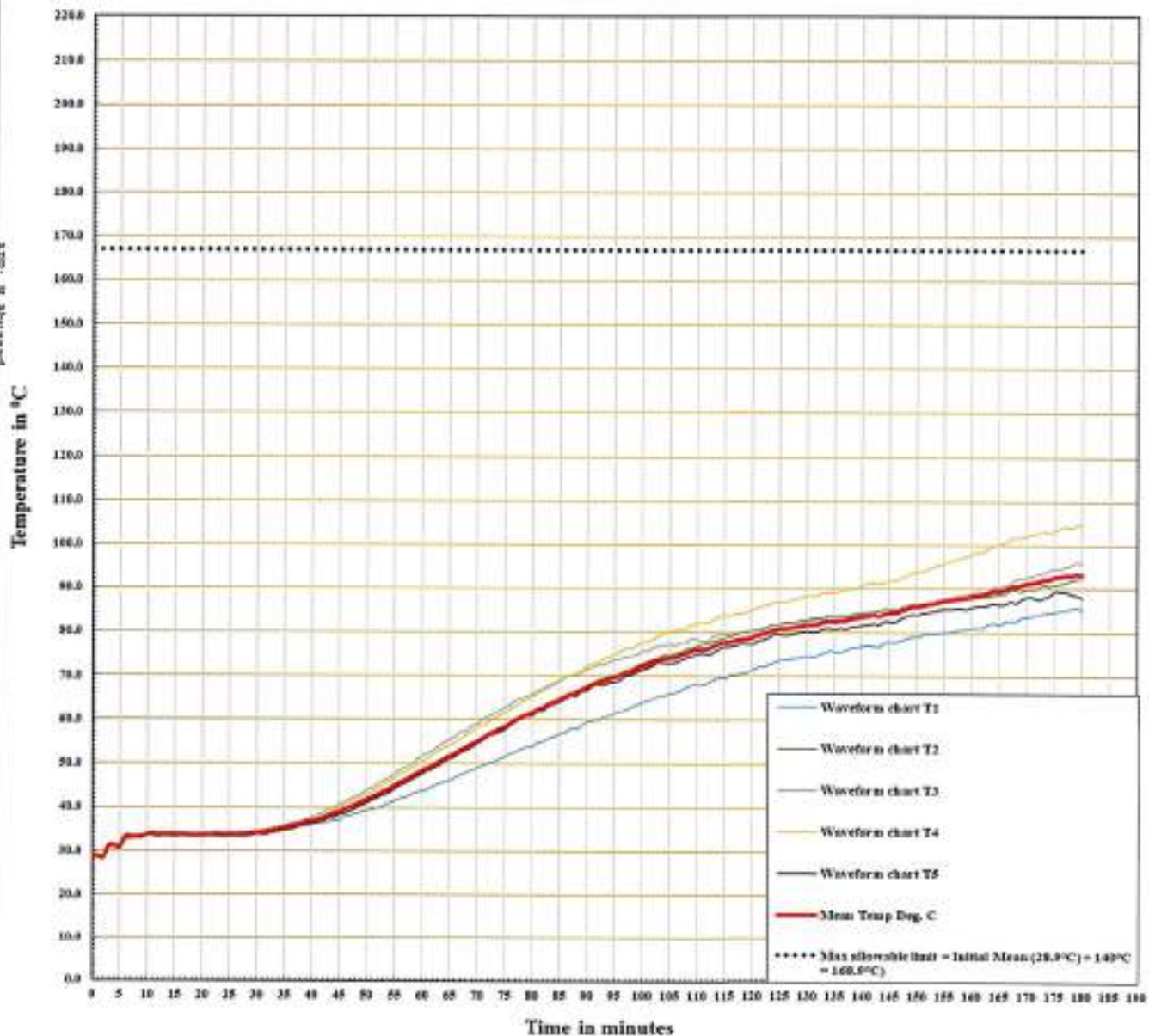
Graph Data for Mean furnace temperature, together with the temperature/time relationship specified in the standard





CHN: J. Saniya
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Graph Data
Individual and Mean unexposed surface thermocouples temperatures (1-5)



MSF: M. Alkumari

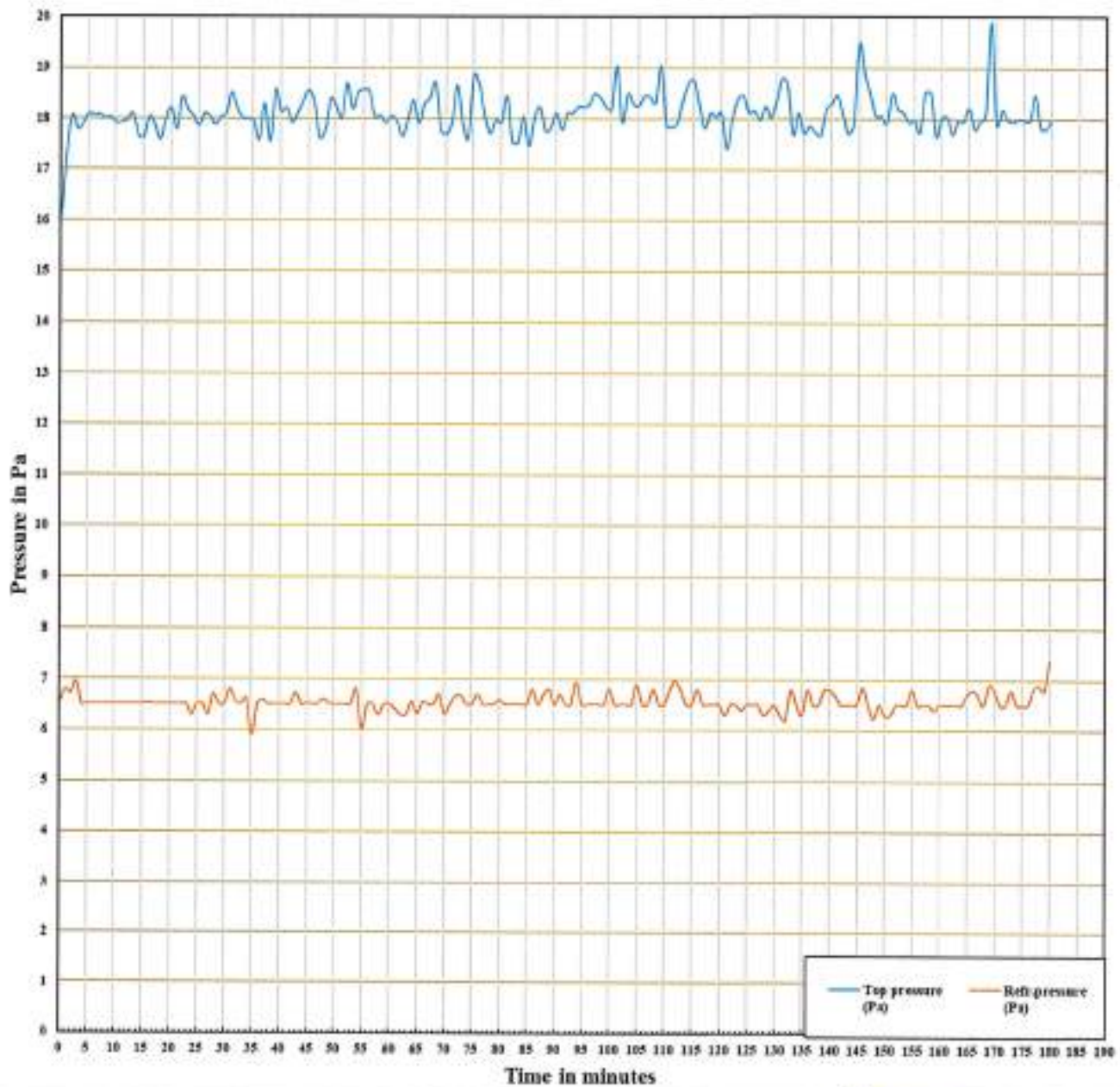


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CHRI: J. Senthil
 APPI: W. Abuasad
 FINAL DOCUMENT BY H. Abuasad This is an electronically generated report and does not require a signature. It's valid and verified only with the QR code shown on the top; any manual signature or stamp on the report did not indicate any authenticity on ACES.

Furnace pressure graph





12. PERFORMANCE CRITERIA AND TEST RESULTS

The specimen complied with the manufacture product declared fire resistance criteria, exhibiting neither integrity nor insulation failure throughout the test duration.

PARAMETER	RESULTS IN MINUTES
Integrity:	180 minutes
Insulation:	No failure

Note:

*No insulation failure as the transmission of heat through the specimen assembly during the fire resistance test did not raise the mean temperature on the unexposed surface by more than 140°C from the initial temperature, and it did not raise the maximum temperature on the unexposed surface by more than 180°C from the initial temperature.

*The test was terminated after 180 minutes upon meeting the test sponsor's declared fire resistance product requirements.

13. ONGOING IMPLICATIONS

The report provides information on the fire resistance of a specific element of construction, which is ECO wall panel assembly (100 mm-thick). The results of the test indicate that this element can provide a level of fire resistance integrity for 180 minutes, which meets the standards outlined in the report.

However, it is important to note that the results only apply to the specific conditions of the test, and any deviation from these conditions is not covered by the report. Additionally, the results do not provide a stated degree of accuracy and should not be considered as the sole criteria for assessing the potential fire performance of the element in use.

Evaluation of the ECO wall panel (100 mm thick) demonstrated fulfillment of the fire resistance objectives of BS 476-20:1987 and BS 476-22:1987, Section 5, for a duration of 180 minutes, subject to the limitations described herein.

14. CONCLUSION

The tested assembly provides a verified level of fire resistance integrity for 180 minutes. Application of the results is strictly limited to the test configuration and conditions.

The findings do not represent an absolute performance guarantee and should not serve as the sole criterion for assessing in-service behavior of the assembly. Assessment for construction use should consider both the demonstrated fire performance and the limitations detailed in this report.

Where implemented in building construction, the ECO wall panel assembly offers reliable guidance regarding fire resistance performance; however, actual behavior under fire conditions may vary depending on installation, environmental factors, and deviations from tested conditions.



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TEST CERTIFICATE OF ECO WALL PANEL

ACES Client	AL WATHNA FOR GREEN CONSTRUCTION TECHNOLOGY	Report No.	DA.MMR25036992.Rev.3
Owner	N/A	Date Reported	03-11-25
PMC	N/A	Sample No.	DA.MMS25012439
Project Client	N/A	Request No.	DA.MMO25008634
Contractor	UCC/ MAGNUM TRADING AND CONTRACTING (W.L.L)	Client Reference	-
Consultant	N/A	Project No.	-
Project Name	Private		
Sample Description	Eco Wall Panel - 100mm Thickness	Sample Located By	CLIENT'S REP.
Source / Supplier	N.P.	Sampled By	CLIENT'S REP.
Sample Location	N.P.	Sampling Date	09-09-25
Sample Location Coordinates (QND)	E: 51.5741724, N: 25.0045127	Sampling Cert.	N/A
Lot No.	N/A	Sampling Method	N/A
IR No.	N.P.	Sample Size	As Below
Test Method	As Below	Sample Brt. in By	CLIENT'S REP.
Test Method Var.	Nil	Dated Received	13-09-25
Tested By	Arif & Firoz	Dated Tested	14-09-25
Test Location	ACES Lab St. 41 Industrial Area	Testing Location Coordinates (QND)	E: 221671 - N: 379307

Test Results:

Test	Units	Test Method	Average Test Results
Tensile Strength	Kpa	BS EN 1607:1997	112
Coefficient of Water Absorption	kg/(m ² .min ^{0.5})	Internal Procedure	1.1
Moisture Content	%	Internal Procedure	9.38
Thermal Conductivity at 25°C	W/m.K	ASTM C518-21	0.1837
Thermal Resistance (R-Value) at 25°C	m ² .K/w		0.544
Compressive Strength	MPa	BS EN 772-1:2011+A1:2015	1.84
Gross Dry Density	Kg/m ³	BS EN 772-13:2000	515.43
Net Dry Density			515.43
Pull Out	kN	BS 8539:2012+A1:2021	26.6
Hanging Force	-	In House Procedure	No Crack at 150 kg

Remarks:

- The test results related only to the specimen(s) tested.
- This test report shall not be reproduced except in full, without written approval from ACES.
- ACES is responsible for all information provided in the report that resulted from our activities except for any information provided by the Customer or resulted from activities performed by another entity.
- In case ACES is not provided with a specific decision rule, the conformity statement, if included in the test reports, will be based on the Simple Acceptance Rule.
- Conformity provided is specific only to the tested items and testing results and does not entail any additional judgment under the responsibility of ACES.
- The test witnessed by contractor's representative.
- This report supersedes our report with reference no. DA.MMR25036992, Rev.2 dated 02-11-25, which shall be considered void.
- Report revised to add the Hanging Force results.



* 0 2 2 - 0 0 5 - 0 0 0 0 0 0 8 4 5 5 2 6 5 *



**LABORATORY MEASUREMENT OF AIRBORNE SOUND INSULATION OF
 ECO WALL PANEL-100mm THICKNESS
 TEST REPORT**



ARAB CENTER FOR ENGINEERING STUDIES

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- ◆ ACES Client : AL WATHNA FOR GREEN CONSTRUCTION TECHNOLOGY
- ◆ Owner : N/A
- ◆ Consultant : N/A
- ◆ Contractor : N/A
- ◆ Project : Private

Request No.	M	M	O	2	5	0	0	9	3	5	6
Report No.	M	M	R	2	5	0	3	6	9	9	3



Arab Center للمركز الهندسي
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Order No. DA. MMO25009356

18th October 2025

Report No. DA. MMR25036993

Rev.0

Client : AL WATHNA FOR GREEN CONSTRUCTION TECHNOLOGY
Project : Evaluation of Material
Subject : Laboratory Measurement of Airborne Sound Insulation of Eco Wall Panel – 100mm Thickness

Dear Sir,

Arab Center for Engineering Studies is pleased to submit this factual report of Acoustic test for **Eco Wall Panel – 100mm Thickness** conducted on 27th of Sept, 2025.

This report was carried out according to our proposal no. DA. MMP2500030 Rev.5 dated August 11th, 2025

This report includes testing methodology, and test results including pictures taken during the acoustic monitoring.

In the event that additional information or clarifications are required, please contact our office at your convenience. We would like to take this opportunity to thank you for your confidence and look forward to be of service to you in the future.

Best Regards,

SINCERELY YOURS

**ARAB CENTER FOR ENGINEERING STUDIES
MATERIAL DEPARTMENT**



Arab Center المركز العربي
For Engineering Studies الدراسات الهندسية
Page 1 of 11



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1.0 INTRODUCTION

The sound insulation test which includes the measurement of the sound reduction index for **Eco Wall Panel – 100mm Thickness** and the full detailed report were undertaken by ACES in accordance with BS EN ISO 10140-2 "Laboratory measurements of airborne sound insulation of building elements" and the procedures are described in clause 6.

The Eco Wall Panel system was installed in the opening test and tested in respect for airborne sound insulation. For this purpose, the construction had to be installed in the test opening with the dimensions of 2400 mm width x 2530 mm height with suppressed flanking transmission according to BS EN ISO 10140-5.

Please note that, from these measurements the required results have been derived and are presented in both tabular and graphic form in Appendix A.

2.0 REFERENCE STANDARDS

BS EN ISO 10140-2 Acoustics — Laboratory measurement of sound insulation of building elements Part 2: Measurement of airborne sound insulation

BS EN ISO 10140-5 Acoustics — Laboratory measurement of sound insulation of building elements — Part 5: Requirements for test facilities and equipment

BS EN ISO 717-1 Acoustics — rating of sound insulation in buildings and of building elements — Part 1: Airborne sound insulation

3.0 METHODOLOGY

3.1. Airborne Tests

High volume "pink" noise was generated from single loudspeaker in the source room, positioned to obtain a diffuse sound field. A spatial average of the resulting one-third octave band noise levels between 100 Hz and 3150 Hz was obtained by using a moving microphone technique over a minimum period of 15 seconds at each position.

The same measurement procedure was used in the receiver room.
The results of the tests were rated in accordance with BS EN ISO 717-1 "Rating of sound insulation in buildings and of building elements, Part 1 "Airborne sound insulation"

3.2. Reverberation Time

Reverberation time measurements were taken following the procedure described below in order to correct the receiver levels for room characteristics.

The source is moved to the receiver room and "pink noise" was generated and stopped instantaneously in order to measure the reverberation time in each of the one- third octave bands between 100 Hz and 3150 Hz. The internal programmer of the  is used to measure the decay time of the sound in the room. This was repeated nine times in the receiving room in order to obtain an average result.

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3.3. Background Noise

The background noise levels in the receiving room was measured during the tests and the receiving room levels are corrected in accordance with BS EN ISO 1040-2. The dominant source of background noise observed during the tests was road traffic noise from adjacent roads.

4.0. INSTRUMENTATION

The main details of instrumentation and equipment used during the sound insulation tests are given in Table No.1

Table No.1 – Instruments used during the test

Instrument	Manufacturer and Type	Serial Number
Sound level meter & analyzer	SVANTEK 979 Sound & analyzer Calibration No: 69414	69414
Omni-directional mid frequency sound source. (Loudspeaker)	Qsources BVBA Type Qohm	8109B
Qam Measurement power amplifier.	Qsources BVBA-INTRA	3130
Pink Noise Source	L, linear output between 45-20000 Hz	3130
Calibrator	Acoustic Calibrator SV 35A class I IEC 60942:2003 Calibration Number: 48982	58074
Specialist Software	Savan Pc++	ACES 3.3.0

5.0 PRODUCT IDENTIFICATION

The test sample consists of **Eco Wall Panel – 100mm Thickness** having the physical characteristics stated in the Table No.2

Table No.2 – Physical characteristic of product

Sample Description	Width (m)	Height (m)	Nominal Thickness (mm)	Mass per unit area (analytical determination) (kg/m ²)
Eco Wall Panel – 100mm Thickness	2,400	2,530	100	52

- The **Eco Wall Panel – 100mm Thickness** is a green building material, which can be used for commercial, industrial and residential construction. It has density 520 kg per m³.

6.0. MEASUREMENT OF SOUND TRANSMISSION IN ACCORDANCE WITH BS EN ISO 10140-2.

In the laboratory, airborne sound transmission is determined from the difference in sound pressure levels measured across a test sample installed between two reverberant rooms. The difference in measured sound pressure levels is corrected for the amount of absorption in the receiving room. The test is done under conditions which restrict the transmission of sound by paths other than directly through the sample. The source sound field is randomly incident on the sample.

The test sample is located and sealed in an aperture within double wall between the two rectangular reverberant rooms, both of which are constructed from solid block with reinforced concrete floors and roofs. The partition wall has a dimension of 2.4m wide x 2.5m high and 410mm nominal thickness and forms the whole aperture of the common area between the two rooms.

One of the rooms is used as the receiving room and has a volume of 77.5 cubic meters. It is isolated from the surrounding structure and the adjoining room by the use of resilient mountings and seals ensuring good acoustic isolation. The adjoining source room has a volume of 63.3 cubic meters.

Broad band noise is produced in the source room from an electronic generator, power amplifier and loudspeaker. The resulting sound pressure levels in both rooms are sampled using a moving microphone with sweep radius 1 m and connected to a real time analyzer. The signal is filtered into one third octave band widths, integrated and averaged. The value obtained at each frequency is known as the average sound pressure level for either the source or the receiving room.



The change in level across the test sample is termed 95 the sound pressure level difference:

$$D = L1 - L2$$

Where:

D: is the equivalent Sound Pressure level difference in dB

L1: is the equivalent Sound Pressure level in the source room in dB

L2: is the equivalent Sound Pressure level in the receiving room in dB

The Sound Reduction Index (R) also known by the American terminology Sound-Transmission Loss is defined as the number of decibels by which sound energy randomly incident on the test sample is reduced in transmitting through it and is given by the formula:

$$R = D + 10 \log_{10} S/A \text{ in decibels}$$

Where:

S: is the area of the sample

A: is the total absorption in the receiving room

The Sound Reduction Index is an expression of the laboratory sound transmission performance of a particular element or construction. It is a function of the mass, thickness, sealing method of mounting etc. and is independent of the overall area of the sample.

However, when an example of this partition is installed on site, the sound insulation obtained will depend upon its surface area, as well as the absorption in the receiving room. The larger area allows to greater sound energy transmitted. Also, the overall sound insulation is affected by the sound transmission through other building elements, some of which may have an inferior performance to the sample tested. In practice, therefore, the potential sound reduction index of a construction is not fully realized on site. Furthermore, the sound reduction index of a particular sample of that construction can only be measured accurately in a laboratory, because only under such controlled conditions can the sound transmission path be limited to the sample under test.

Rw, C and C_{tr} have been calculated in accordance with the relevant section of BS EN ISO 717-1, from the results of laboratory tests carried out in accordance with BS EN ISO 10140-2

7.0 TEST ITEM SETUP AND INSTALLATION

The test element was installed by the builders of the manufacturer for the determination of the airborne sound insulation and this is done using high acoustical materials between sample and borders of separation wall to suppress the flanking and indirect transmission.

8.0. TEST ROOMS AND MEASURING CONDITIONS

All the rooms tested were in a finished state, with doors fitted, walls painted and all sockets installed.



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Table No.3 – Details of Lab. Rooms

Test Element	Volume Source Room (m ³)	Volume Receiving Room (m ³)	Test Area (m ²)	Temp. °C	Relative humidity %
Eco Wall Panel – 100mm Thickness	63.3	77.5	6.0	23.1	52.3

9.0 RESULTS

9.1 Sound Reduction index,

The sound reduction insulation is determined according to BS EN ISO 10140-2. The single number quantity R_w and the corresponding spectrum adaption terms are determined according to EN ISO 717-1.

The results of testing are summarized in the tables below, for airborne tests, the higher the value, the better the performance.

Table No.4 – Result of Sound Reduction Index measurement

Test Specimen	Mass per unit Area (analytical determination) (kg/m ²)	Sound reduction index, R_w	Spectrum adaption terms (C_1, C_2)	Minimum Requirement, R_w
Eco Wall Panel – 100mm Thickness	52	40	-1, -3	-

The sound reduction index R_w per one third octave band from 100HZ to 5000 HZ is shown in tabular form and graphically on graph sheet

10.0 Measurement of flanking transmission for the acoustic laboratory

This is calculated by covering the specimen on both sides with additional flexible layers, by 13 mm gypsum board on a separate frame at a distance which gives a resonance frequency of the system of layer and airspace well below the frequency range of interest. The airspace contains sound-absorbing material. With this measurement W_{Df} , W_{Df} and W_{Fd} are suppressed.

Table No.5- Determination of flanking transmission

Material	Sample size, m	Spectrum adaption terms (C_1, C_2)	$R'_{w,fl}$
Specimen covered by 13 mm gypsum board and rock wall material on both sides	2.4x2.5	-1, -3	 Arab Center For Engineering Studies للمركز الهندسي



APPENDIX – A

Sound reduction index according to ISO 10140-2
Laboratory measurements of airborne sound insulation between rooms

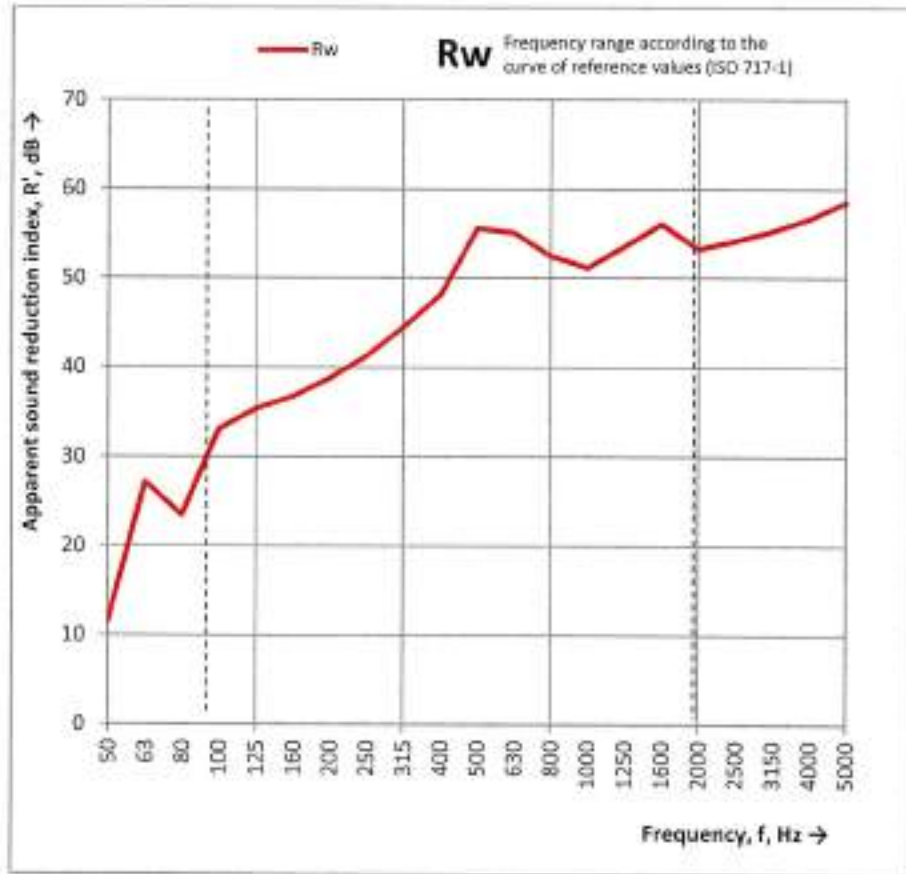
Client: AL WATHNA FOR GREEN CONSTRUCTION TECHNOLOGY

Date of test: 27-09-2025

Description and identification of the test sample: Eco Wall Panel – 100mm Thickness

Area S of separating element: 6.0 m²
Source room volume: 63.3 m³
Receiving room volume: 77.5 m³

Frequency f Hz	R _w (one-third octave) dB
50	12.0
63	17.0
80	18.0
100	20.0
125	24.0
160	28.0
200	32.0
250	35.0
315	37.0
400	39.0
500	41.0
630	43.0
800	44.0
1000	45.0
1250	64.0
1600	47.0
2000	47.0
2500	46.0
3150	45.0
4000	44.0
5000	44.0



Rating according to ISO 717-1

R_s (C; C_s) = 40 (-1; -3) dB

C₅₀₋₅₀₀ = -1 dB

C₅₀₋₁₀₀₀ = 0 dB

C₁₂₅₀₋₅₀₀₀ = 0 dB

Evaluation based on Laboratory measurement results obtained by an engineering method

C₅₀₋₃₁₅₀ = -3 dB

C₅₀₋₁₀₀₀₀ = -3 dB

C₁₂₅₀₋₁₀₀₀₀ = -3 dB

No. of test report:

Date: 1-10-2025

Name of test institution: **ACES**

Signature: **المركز العربي للمرجز**
For Engineering Studies: **للدراسات الهندسية**



APPENDIX - B

1. Construction and Testing





APPENDIX - C: Calibration Certificate



Al Bader Nuclear Gauge & Equipment Service Centre

مركز البدر لخدمة الأجهزة والمقاييس النووية

Calibration Certificate

Form No. BQ/005/1/04/0102/02 Revision 04 (Date: 2019/001) Page 1/1



Name of Customer: Arab Center for Engineering Studies (ACES) Industrial Area Zone No. 57, Street No. 41, Gate No. 471 P.O. Box. 4887140, Doha, Qatar		Certificate No. 01110015 Date of Issue 06.10.2024 Date of Calibration 07.12.2024 Calibration Due Date 06.12.2025 Calibrated By S. Kottick	
Base Of Receipt/Ref. No. 25.11.2024 (31 Lab Calibration) / Service Request No. 24-0426		Identification No. USV-010 Sound Level Calibrator Serial No. 0801 Sound Level Meter Serial No. 0801 Instrument Description Sound & Vibration Analyzer Visual Inspection Satisfactory Sound Level Calibrator Make/Model Omnicheck / Class 1 Sound Level Meter Make/Model Omnicheck / 959 Received Condition In Tolerance Returned Condition In Tolerance	
Details of Observation of Unit Under Calibration Range 94-114 Sound Level Meter Resolution 0.1 dB Average 115 dB Acceptance Criteria 115 dB			

Results of Calibration

Range of UUC	Input Sound given by reference sound level calibrator @ 1 kHz in dB	Reading Observed by UUC in dB	Error in dB	Tolerance Limit in dB		Acceptance Limit in dB		Uncertainty in dB	Result
				Lower	Upper	Lower	Upper		
25 to 110 dB	94	93.8	-0.2	93.5	95.5	93.30	94.30	0.00	Pass
	114	114.0	0.0	112.5	115.5	113.30	114.30	0.00	Pass

Sound Level Calibrator

Range of UUC	Input Sound given by UUC sound level calibrator @ 1 kHz in dB	Average Reading Observed by Master Reference in dB	Error in dB	Tolerance Limit in dB		Acceptance Limit in dB		Uncertainty in dB	Result
				Lower	Upper	Lower	Upper		
94 to 114 dB	94	93.3	-0.7	92.5	95.5	91.9	94.2	1.5	Pass*
	114	110.4	-4.0	102.5	118.5	103.8	114.2	1.5	Pass*

Remarks:

ISO 9001:2015/8.5.3 requires, in Section 8.5.3.2, that, "When statements of conformance are made, the accuracy of measurement shall be taken into account." The valid way of complying with this requirement is applying a guard band (GB) to the device's tolerance. (Acceptance Limit (AL) = Tolerance Limit (TL) + guard band (GB)). The use of the guard band in the decision process is designed to reduce the probability of a false acceptance (FPA) or a false failure, to 0.25 or less. The method and equations use the introduction of the guard band comply with the requirements of JAC Guide 08/09/2008.

Pass = the measured result is below the acceptance limit, [AL - TL + w].

Fail* = the measured result is inside the guard band and below the limit, in the interval [TL + w, AL].

Fail = the measured result is above the tolerance limit added to the guard band, [TL + w].

Fail* = the measured result is above the tolerance limit but below the tolerance limit added to the guard band, in the interval [TL + w, AL].

UUC = Unit Under Calibration.

Accuracy of reference: Our readings are reported.

Calibration status & calibration due date are given based on customer requirements.

Calibration results issued in the form of calibration only.

After reported reading are % of adjustment. The user should determine the suitability of the device for its intended use.

These results are obtained at the time of calibration and for the instrument supplied only and they do not carry any implication regarding long term stability of the instrument.

This report may not be reproduced, except in full, without permission from the laboratory.

Environmental condition during calibration: 25 ± 2°C, 50 ± 10% RH.

Uncertainty of measurement at 94 dB calibration level is at coverage factor k = 2.

Reference calibration method no. 15-0400-PS-00-000 A 16-0400-PS-00-000.

Accuracy, Tolerance & Acceptance Criteria stated as per customer requirements.

Details Of Reference standards Instrument Used For Calibration

Name	Sound Level Calibrator	Sound Level Meter	Thermohygrometer
Identification No.	000250C/SLC/040	004250C/SLM/005	000250C/TH/1700
Serial No.	1137394	1401705	2 43041
Range	94 dB and 114 dB	30 to 130 dB	30 to 50 °C / 100 to 90 °F
Resolution	0.1 dB	0.1 dB	0.1 °C / 0.2 °F
Valid Up to	06.05.2026	05.05.2025	14.07.2025
System Certificate No.	Certificate no. & Traceability of reference standard with international standards		
100	Sound Level Calibrator is calibrated and traceable to International Standard through ISO 9001:2015 accredited Laboratory (Certificate No. 05666/01/001/001).		
002	Sound Level Meter is calibrated and traceable to International Standard through ISO 9001:2015 accredited Laboratory (Certificate No. 05666/01/001/001).		
1117	Thermohygrometer is calibrated and traceable to International Standard through ISO 9001:2015 accredited Laboratory (Certificate No. 05666/01/001/001).		

Checked By	Reviewed By

Arab Center for Engineering Studies
For Engineering Studies



APPENDIX - D

Acoustic specialist training certificate



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