

TEST REPORT FOR REACTION TO FIRE

Test Sponsor:

Al Rayyan Building Insulation Company for Industry
St. 34, 1st Industrial, Alahsa City,
Al Oyun, Saudi Arabia
T: +974 558 30355
Website: www.gwalls.sa

Test Specimen:

64 mm thick GWALLS – ORYX BLOCK

Test Standard:

ASTM E84 – 23d: Standard Test Method for Surface Burning Characteristics of Building Materials



Test Reference No.: YI018-1
Test Date: 23-Jan-25
Issue Date: 11-Mar-25

Thomas Bell-Wright International Consultants (Dubai Branch)
Plot 599 8987, Corner of 46th and 47th Streets, Jebel Ali Industrial Area 1, Dubai, U.A.E
T: +971 4 821 5777 | fire@bell-wright.com | www.bell-wright.com
UAE • KSA • Qatar • UK



Accreditation

ISO/IEC 17025 General requirements for the competence of testing and calibrating laboratories with:

United Kingdom Accreditation Service (UKAS) - Testing Laboratory: **4439**
www.ukas.com



Memberships

Members of European Group of Organization for Fire Testing, Inspection and Certification
www.egolf.org.uk

Member of Association for Specialist Fire Protection
www.asfp.org.uk

Member of Centre for Window and Cladding Technology
www.cwct.co.uk



The work which is the subject of this report falls within the scope of the listed ISO/IEC 17025 accreditation above.

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1. INTRODUCTION

Determination of the flame spread index and the smoke developed index of a 64 mm thick GWALLS – ORYX BLOCK as per:

ASTM E84 – 23d; Standard Test Method for Surface Burning Characteristics of Building Materials.

2. SPONSOR

Name: Al Rayyan Building Insulation Company for Industry
Address: St. 34, 1st Industrial, Alahsa City,
 Al Oyun, Saudi Arabia
 T: +974 558 30355
 Website: www.gwalls.sa

3. TESTING LABORATORY

Name: Thomas Bell-Wright International Consultants (TBWIC)
Address: Corner of 46th and 47th streets, Jebel Ali Industrial Area 1
 P.O. Box 26385, Dubai, U.A.E.
 T: +971 (0) 4 821 5777, F: +971 (0) 4 333 26 93
 www.bell-wright.com

4. DATE OF TEST & WITNESSES

The test was conducted on 23-Jan-25 and has not been witnessed by the Sponsor.

5. TEST SAMPLES

5.1. Product Details

Product Details			
Product Tested	64 mm thick GWALLS – ORYX BLOCK		
Product Name/Brand	GWALLS – ORYX BLOCK		
Product Description	ICF Insulated concrete foam		
Fire side	Top surface		
Product Details	Fiber Mesh	Product name	Meshfix MF60
		Manufacturer	DMC Finishing Systems
		Thickness	3 mm (stated)
		Area Weight	Note 1
		Density	Note 1
	Base Coat	Product name	Styrofix SF100
		Manufacturer	DMC Finishing Systems
		Thickness, DFT	4 mm (stated)
		Area Weight	Note 1
		Density	Note 1
	EPS (Polystyrene) Foam	Product name	Sabic EPS55OFF
		Manufacturer	Sabic
		Thickness-	60 mm (stated)
Area Weight		Note 1	
		Density	16-30 kg/m ³ (stated)
Dimensions per panel	3660 x 605 x 64 mm (l x w x t) (measured by TBWIC)		
Quantity of panels	2 Nos.		

Total dimension	7320 x 605 x 64 mm (l x w x t) (measured by TBWIC)
Area Weight	7.78 kg/m ³
Specimen placement	The 2 panels of 64 mm thick GWALLS – ORYX BLOCK were butt jointed end-to-end. The test specimen was placed directly to the tunnel ledges with the (fire side) towards the flame source.
Specimen preparation	Refer to next section.

5.2. Standard Specific Conditions

With respect to §6.8 and 11.1.4.3 of ASTM E84-23d, the specimen was prepared by the Sponsor and directly mounted to the tunnel ledges.

In accordance with §6.1 of ASTM E84-23d, the specimen was representative of the materials which the test was intended to examine, as informed by the sponsor of the test.

With respect to, and in accordance with, §6.2 of ASTM E84-23d, the specimen was delivered to the lab and tested as multiple lengths butt-jointed together at their ends. There were a total 2 Nos. of sections forming aggregate dimensions of 7320 x 605 x 64 mm (l x w x t).

Also in accordance with §6.2 of ASTM E84-23d, the specimen was placed in the ceiling position of the ASTM E84 furnace, supported on the ledged of the tunnel lid. The fire side was exposed, face down to the ignition source during the 10:00 minute test duration.

In accordance with §5.1.5.3 of ASTM E84-23d, several sections of cement board with aggregate dimensions of 7350 x 600mm (l x w) were placed along the back (non-fire side) of the specimen to protect the furnace lid.

6. SPECIMEN DEFINITION & VERIFICATION

6.1. Specimen Definition & Verification of the Test Specimen

The choice and design and the definition of the specimen have been made by Al Rayyan Building Insulation Company for Industry, and TBWIC testing laboratory has not been involved in the selection or design of the specimen. Similarly, the results of the test apply only to the samples as received.

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 TBWIC bears no liability for the legitimacy of the submitted information.

6.2. Specimen Conditioning

In accordance with §6.4 of ASTM E84-23d, after delivery of the specimen on 17-Jan-25, the specimen was placed in a conditioned spaced for 6 days where temperature and relative humidity were maintained between $23 \pm 2.8^{\circ}\text{C}$ and $50 \pm 5\%$, respectively, until constant weight was achieved.

7. METHOD OF TEST

7.1. Test Procedure

The test was conducted in accordance with the procedures outlined in §8 of ASTM E84-23d and both flame spread and smoke density were recorded. The results of both flame spread and smoke density were compared against the standard calibration materials of fiber cement board, heptane, and Red Oak outlined in §7 of ASTM E84-23d.

7.2. Performance Criteria

The ASTM E84-23d standard collects data on two metrics, the Flame Spread Index (FSI) and Smoke Development Index (SDI), but does not itself outline performance criteria, a result classification, or specific guidance on a formal fire rating.

However, and to provide context on use, the FSI and SDI information from the ASTM E84 test are often used by regulatory agencies to approve materials for various applications. For example, the International Building Code (IBC) 2021, §803.1.2 requires that:

Interior wall and ceiling finish materials shall be classified in accordance with ASTM E84 or UL 723 11th Edition 2021. Such interior finish materials shall be grouped in the following classes in accordance with their flame spread and smoke-developed indices:

- Class A: Flame spread index 0 - 25; smoke-developed index 0 - 450.
- Class B: Flame spread index 26 - 75; smoke-developed index 0 - 450.
- Class C: Flame spread index 76 - 200; smoke-developed index 0 - 450.

The above criteria is an example of the IBC requirements for wall and ceiling finished only. The application and requirements of the tested specimen may differ.

7.3. Method Variations

There were deviations observed in the temperature and relative humidity in 4 separate probes of thermo-hygrometer in our conditioning room, however the average values were within the limit.

8. FIRE TEST

8.1. Observations & Measurements

Observations	Results
Ignition Time (mm:ss)	2:56
Time to maximum flame front advance (mm:ss)	6:23
Maximum flame spread (ft)	6.3
Time to end of tunnel reached (mm:ss)	Not Reached
Maximum temp recorded at the exposed thermocouple located near the end of the tunnel (°C/°F)	342 °C / 648 °F
Dripping (mm:ss)	None
Flaming on the floor (mm:ss)	None
After flame on the top (mm:ss)	None
After flame on the floor (mm:ss)	None
Delamination (mm:ss)	None
Sagging (mm:ss)	None
Shrinkage (mm:ss)	None
Fallout (mm:ss)	None
FS*Time Area (ft*min)	32.92
Smoke Area (%A*min)	64.06
Heptane Smoke Area (%A*min)	86.8

9. SUMMARY OF RESULTS

The test specimen has been evaluated in accordance with ASTM E84-23d; *Standard Test Method for Surface Burning Characteristics of Building Materials*.

The test results are as follows:

Flame Spread Index (FSI)	15
Smoke Developed Index (SDI)	75

Results are valid for the tested configuration only.

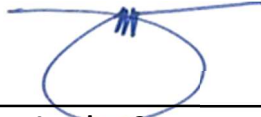
9.1. Limitation

Testing of materials that melt, drip, or delaminate to such a degree that the continuity of the flame front is destroyed, results in low flame spread indices that do not relate directly to indices obtained by the testing materials that remain in place.

This report and all records of the test to which it relates may not be retained by TBWIC beyond 5 years from the date of testing.

This test report is respectfully submitted by: Thomas Bell-Wright International Consultants.

Tested By:



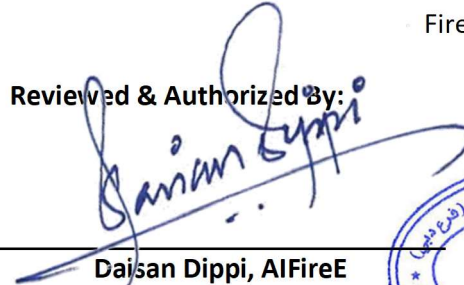
Jocelyn Cruz
Fire Testing Engineer

Prepared By:



Fredilyn Paragoso
Fire Testing Support Engineer

Reviewed & Authorized By:



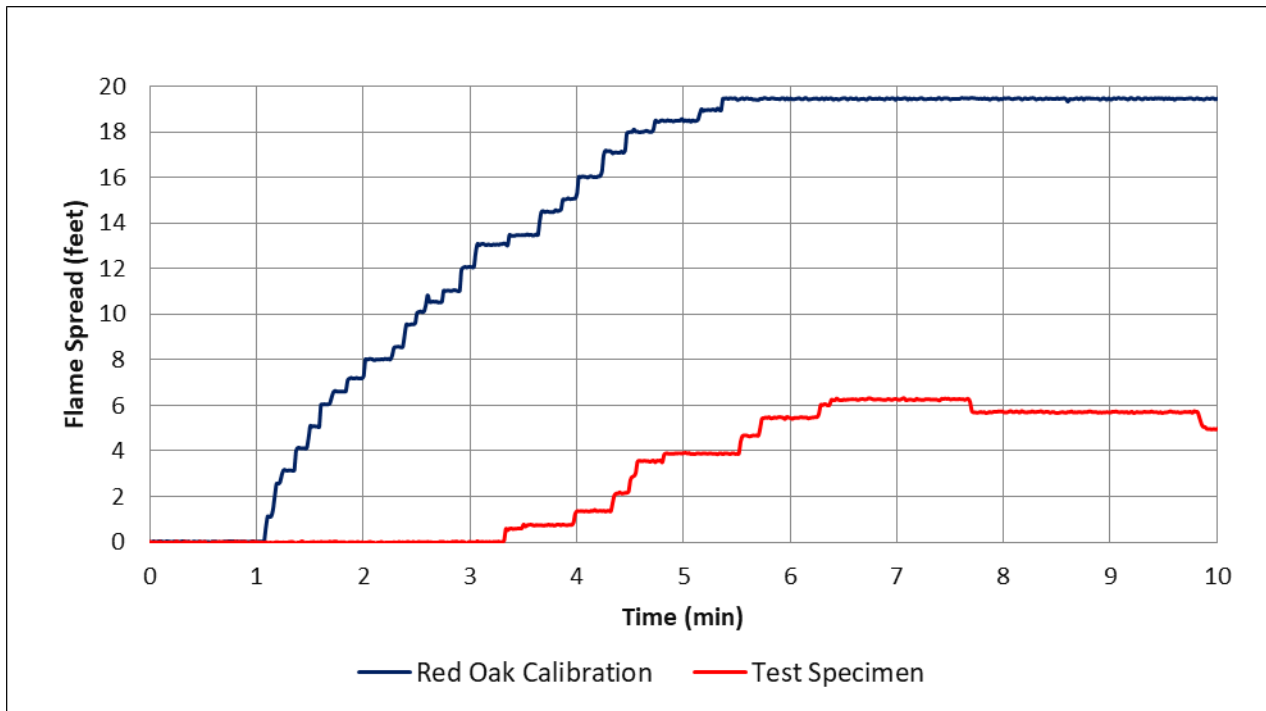
Daisan Dippi, AIFireE
Fire Testing Director



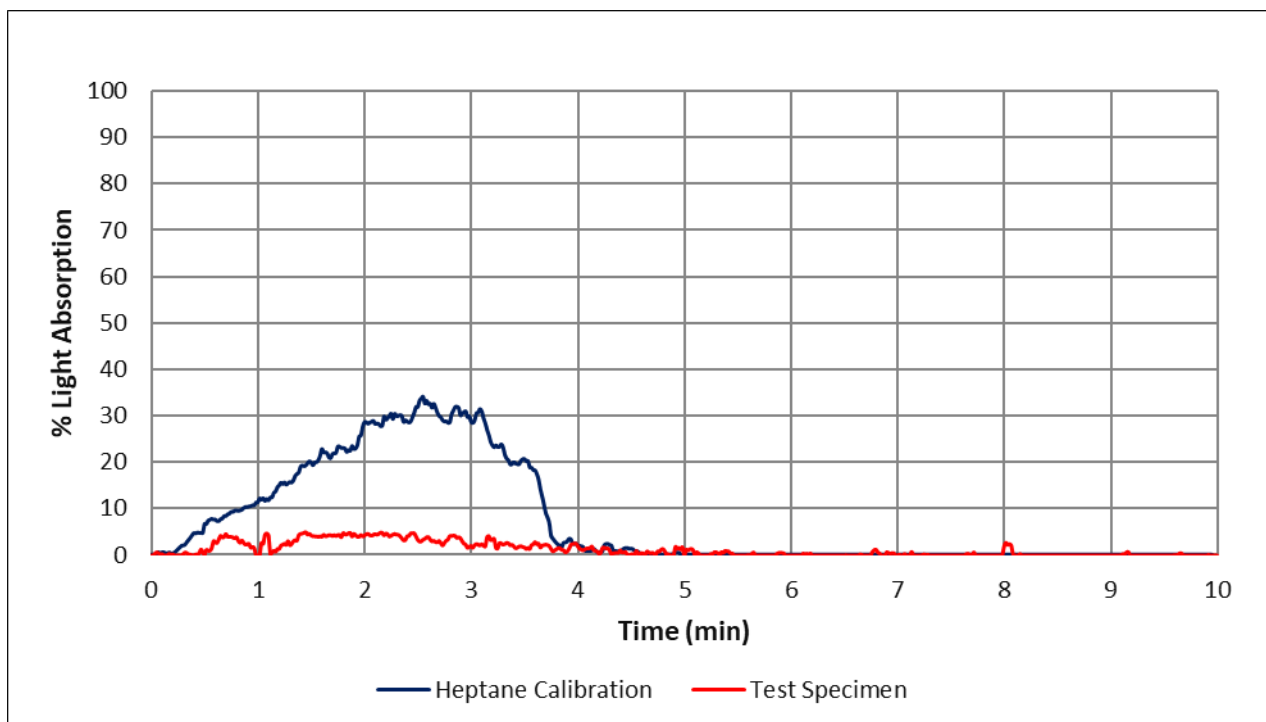
Report Revision Tracking

Revision No.	Date Issued	Notes & Amendments
Rev. 00	11-Mar-25	This is the first issue of the report. No revisions are included.

10. APPENDIX 1 – GRAPHS



Graph 1: Flame Spread Index (FSI)



Graph 2: Smoke Developed Index (SDI)

11. APPENDIX 2 – PICTURES



**Photo 1: Specimen before the test.
(Non-Fire Side)**



**Photo 2: Specimen before the test.
(Fire Side)**



**Photo 3: Specimen after the test.
(As seen from the fire-end)**



**Photo 4: Specimen after the test.
(As seen from the exhaust end)**

----- End of Test Report -----