

TEST REPORT FOR REACTION TO FIRE

Test Sponsor:

Modern Industrial Co. Ltd
Sudair Industrial & Business City
Riyadh
Saudi Arabia
T: +966 920005774
Website: www.unibond.sa

Test Specimen:

3.5 mm thick "Unibond" FR-A2 Aluminium Composite Panel (Colour: Silver)

Test Standard:

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



Test Reference No: YI069-1
Test Date: 23-Jul-25
Issue Date: 13-Oct-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

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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 3.5 mm thick "Unibond" FR-A2 Aluminium Composite Panel (Colour: Silver) as per:

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

2. SPONSOR

Name: Modern Industrial Co. Ltd
Address: Sudair Industrial & Business City
Riyadh
Saudi Arabia
T: +966 920005774
Website: www.unibond.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-Jul-25 and was not witnessed by the sponsor.

5. TEST SAMPLES

5.1. Product Details

Product Tested		3.5 mm thick "Unibond" FR-A2 Aluminium Composite Panel (Colour: Silver)	
Product Name		Unibond	
Manufacturer		Modern Industrial Co. Ltd	
Total Thickness		3.5 mm (measured by TBWIC); 4 mm (stated)	
Fire Side		Top side	
Product Details	Top Coat PVDF (Front side coating, Fire side)	Reference	CF101 PVDF Ultramar Bright Silver., SI – G1545*
		Manufacturer	Spectrum Industries LLC*
		Colour	Bright Silver*
		No. of coats	2*
		Thickness, DFT	19 - 21 microns*(stated)
		Specific Gravity	1.12 - 1.18*(stated)
	Primer	Reference	Polyester*
		Manufacturer	Spectrum Industries LLC*
		Colour	CP445, Yellow*
		Thickness, DFT	5 - 8 microns*(stated)
		Specific Gravity	1.122*(stated)
	Top Aluminium Skin	Reference	Aluminum (Front side)*
		Manufacturer	Good Luck Decorative Materials Manufacturer LLC*
		Alloy	3003H46*
		Coated Thickness	0.5 ± 0.02 mm*(stated)

		Area weight	1.355 kg/m ² *(stated)
		Density	2710 kg/m ³ *(stated)
	Binder layer	Reference	Adhesive Film*
		Manufacturer	Rixin Plastic industries LLC*
		Thickness	0.08 mm (measured by TBWIC), 0.1 mm*(stated)
		Area weight	0.073 kg/m ² (measured by TBWIC), 0.093 mm*(stated)
		Density	926 kg/m ³ *(stated)
	Core	Reference	FR A2 (Fire Retardant A2) core*
		Manufacturer	Jiangsu Beike Decoration Materials Technology Co., Ltd.*
		Thickness	3.2 mm* (stated)
		Area weight	5.92 kg/m ² (stated)
		Density	1850 kg/m ³ (stated)
	Binder layer	Reference	Adhesive Film*
		Manufacturer	Rixin Plastic industries LLC*
		Thickness	0.08 mm (measured by TBWIC), 0.1 mm*(stated)
		Area weight	0.073 kg/m ² (measured by TBWIC), 0.093 mm*(stated)
		Density	926 kg/m ³ *(stated)
	Bottom Aluminium Skin	Reference	Aluminum (Back side)*
		Manufacturer	Good Luck Decorative Materials Manufacturer LLC*
		Alloy	3003H46*
		Coated Thickness	0.5 ± 0.02 mm*(stated)
		Area Weight	1.355 kg/m ² *(stated)
		Density	2710 kg/m ³ *(stated)
	Back Coat (Reserve side coating)	Reference	PE*
Manufacturer		Spectrum Industries LLC*	
Colour		Grey*	
No. of coats		1*	
Thickness, DFT		6 – 12 microns*(stated)	
Specific Gravity		1.22 – 1.30*(stated)	
Quantity of panels		3 Nos.	
Dimensions per panel		2445 x 600 x 3.5 mm (l x w x t) (measured by TBWIC)	
Total dimension		7335 x 600 x 3.5 mm (l x w x t) (measured by TBWIC)	
Area Weight		8.31 kg/m ² (measured by TBWIC)	
Specimen placement		The 3 panels of 3.5 mm thick “Unibond” FR-A2 Aluminium Composite Panel (Colour: Silver) were butt jointed end-to-end. The test specimen was placed directly to the tunnel ledges with the top layer (fire side) towards the flame source.	
Specimen preparation		Refer to next section.	

5.2. Standard Specific Conditions

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 3 Nos. of sections forming aggregate dimensions of 7335 x 600 x 3.5 mm (l x w x t).

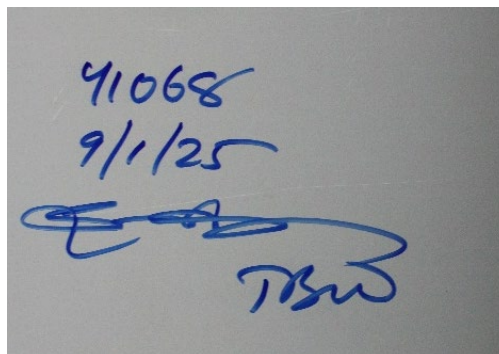
Also, in accordance with §6.2 of ASTM E84-23d, the specimen was placed in the ceiling position of the ASTM E84 furnace, supported on the ledged of the tunnel lid. The fire side was exposed, face down to the ignition source during the 10:00 minute test duration.

In accordance with §5.1.5.3 of ASTM E84-23d, several sections of cement board with aggregate dimensions of 7350 x 600 mm (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

TBWIC testing laboratory has not been involved in the selection or design of the specimen. However, the materials were selected, marked, and signed by a representative from TBWIC Certification (Certification Body) on 09-Jan-25 as shown below.



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 23-Jun-25, the specimen was placed in a conditioned spaced for 9 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) 2024, §803.1.2 requires that:

Interior wall and ceiling finish materials shall be classified in accordance with ASTM E84 or UL 723. 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

With respect to §6.2 *Specimen Conditioning* of this report, there were deviations observed in the consistency of the temperature and relative humidity in the four separate probes of monitoring equipment in the laboratory's conditioning room. However, the materials were still conditioned to constant mass, in accordance with the test standard, and it was agreed upon by both the laboratory and the sponsor to proceed with the test.

8. FIRE TEST

8.1. Observations & Measurements

Observations	Results
Ignition Time (mm:ss)	1:31
Time to maximum flame front advance (mm:ss)	None
Maximum flame spread (ft)	None
Time to end of tunnel reached (mm:ss)	Not Reached
Maximum temp recorded at the exposed thermocouple located near the end of the tunnel (°F/°C)	557 / 292
Dripping (mm:ss)	None
Flaming on the floor (mm:ss)	None
After flame on the top	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)	0
Smoke Area (%A*min)	9.32
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)	0
Smoke Developed Index (SDI)	10

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:



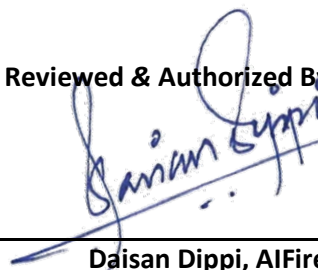
Isabelo Dulay
Fire Testing Technician

Prepared By:



Jocelyn Cruz Jarabelo
Fire Testing Engineer

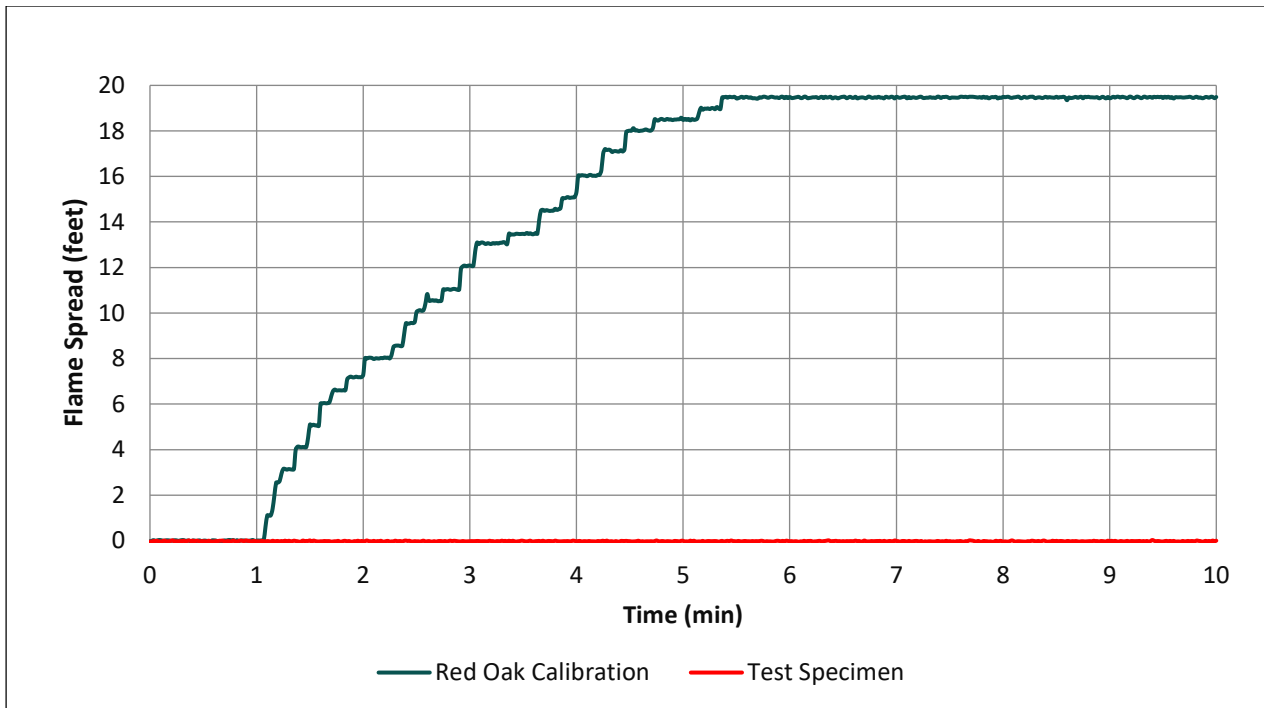
Reviewed & Authorized By:



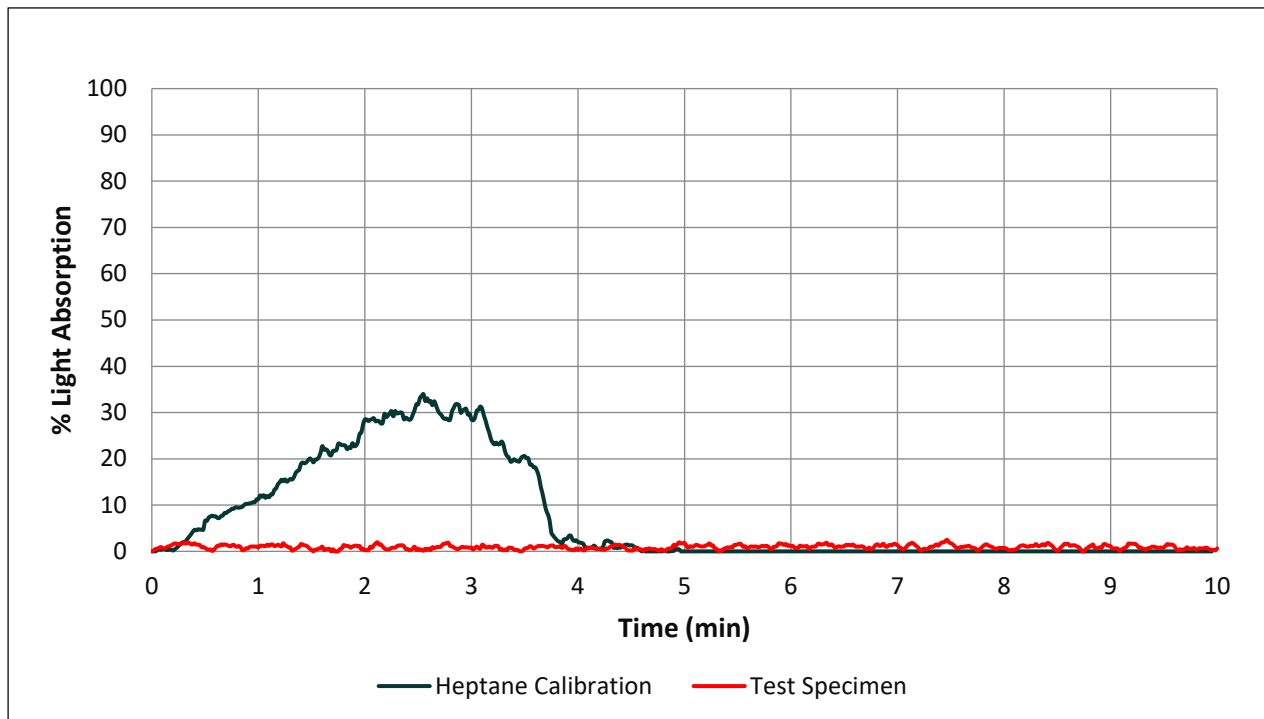

Daisan Dippi, AIFireE
Fire Testing Director

Report Revision Tracking		
Revision No.	Issue Date	Notes & Amendments
Rev. 00	13-Oct-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 -----