

TEST REPORT

REACTION TO FIRE TEST

Test Sponsor:

Wellbond Aluminium Composite Panel Co.
22 Ahmed Tayseer Street
El Marwa Buildings, Heliopolis
Cairo, Egypt
T: +201 2 27765519
Website: www.wellbond.com.eg

Test Material:

4mm thick Aluminium Composite Panel – “10th of Ramadan Railway Project LRT”

Test Standard

BS EN ISO-1716:2018 Reaction to Fire Tests for Products - Determination of the Gross Heat of Combustion (Calorific Value)



THOMAS BELL-WRIGHT
INTERNATIONAL CONSULTANTS

Test Date: 12-Dec-21
Issue Date: 18-Jan-22
Test Reference No: VJ062-1

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DUBAI

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Accreditation

Testing

ISO/IEC 17025: General requirements for the competence of testing and calibration 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 under the accreditations of **ISO 17025 UKAS**.



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1. INTRODUCTION

Determination of the calorific potential of 4mm Aluminium Composite Panel (ACP) during combustion in accordance with BS EN ISO 1716:2018; Reaction to fire tests for products - Determination of the Gross Heat of Combustion (Calorific Value).

2. SPONSOR

Name: Wellbond Aluminium Composite Panel Co.
Address: 22 Ahmed Tayseer Street
El Marwa Buildings, Heliopolis
Cairo, Egypt
T: +201 2 27765519
Website: www.wellbond.com.eg

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
www.bell-wright.com

4. DATE OF TEST

Sample received: 25-Nov-21
Test date: 12-Dec-21

The test has been witnessed by:

Name	Company	Contact Number
Ms. Shaimaa Sayed	Wellbond	+201227765519
Mr. Magdy Ahmed ElAzab	K&A	-
Mr. Ezzat Mohammed	NAT	-
Mr. Mohamed Talaat	Arab Cont.	-
Mr. Khaled Ayad	NAT	-
Mr. Khaled Senosy	CAC	-
Mr. Ihab Ayoub	CAC	-



5. SPECIMEN DESCRIPTION

Note: The testing laboratory does not hold any responsibility for the information that has been provided by the test sponsor which could not be verified by the testing laboratory, as this could affect the validity of the test result. All information that could not be verified will be indicated by an asterisk () mark.*

Product Description		4mm thick Aluminium Composite Panel* (stated)	
Product Reference		4mm thick Aluminium Composite Panel – “10 th of Ramadan Railway Project LRT”* (stated)	
Manufacturer		Wellbond Aluminium Composite Panel Co.* (stated)	
Thickness		4mm* (stated)	
Area Weight		8.5 kg/m ² * (stated) 8.15 kg/m ² (Measured by TBWIC)	
Product Details	Top Coat (Fire side)	Material	PVDF Coating* (stated)
		Manufacturer	PPG* (stated)
		Colour Tested	White (observed)
		Dry Film Thickness	0.03mm* (stated)
		Area Weight	0.04 kg/m ² * (stated)
		Dry Density	1333 kg/m ³ * (stated)
	Aluminium Skin (Top)	Material	Aluminium* (stated)
		Manufacturer	Baililai decorative material Co., Ltd* (stated)
		Alloy Grade	Alloy 3003 H16* (stated)
		Thickness	0.5mm* (stated)
		Area wieght	1.3645 kg/m ² * (stated)
		Density	2710 kg/m ³ * (stated)
	Adhesive	Material	Bonding film* (stated)
		Manufacturer	Heyuan PLG New Materials co., Ltd* (stated)
		Film Thickness	0.05mm* (stated)
		Area Weight	0.0465 kg/m ² * (stated)
		Dry Density	930 kg/m ³ * (stated)
	Core	Material	Mineral Core* (stated)
		Manufacturer	Jiangsu Harwal Technology Co. Ltd.* (stated)
		Thickness	3.0mm* (stated)
		Area Weight	5.7 kg/m ² * (stated)
		Density	1900 kg/m ³ * (stated)
	Adhesive	Material	Bonding film* (stated)
		Manufacturer	Heyuan PLG New Materials co., Ltd* (stated)
Film Thickness		0.05mm* (stated)	



		Area Weight	0.0465 kg/m ² * (stated)
		Dry Density	930 kg/m ³ * (stated)
	Aluminium Skin (Bottom)	Material	Aluminium* (stated)
		Manufacturer	Baililai decorative material Co., Ltd* (stated)
		Alloy Grade	Alloy 3003 H16* (stated)
		Thickness	0.5mm* (stated)
		Density	1.3645 kg/m ² * (stated)
	Back Coat	Material	Polyester coating (PE)* * (stated)
		Manufacturer	PPG* (stated)
		Colour	Gray* (stated)
		Dry Film Thickness	0.008mm* (stated)
Area Weight		0.016 kg/m ² * (stated)	
Specimen placement	A minimum of three test specimens were tested using the crucible method in accordance with Clause 7.9 of BS EN ISO 1716:2018 test standard.		

6. SPECIMEN VERIFICATION

The choice, design and definition of the specimen have been made by Wellbond Aluminium Composite Panel Co., and TBWIC Testing Laboratory has not been involved in the selection or design of the specimen. The results apply to the samples as received.

Note: 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.

7. SPECIMEN PREPARATION PROCEDURE

In accordance with section 7.2 of BS EN ISO 1716:2018, a minimum mass of 50g was taken from substantial component of the non-homogenous product) and a minimum mass of 10g was taken from the non-substantial components of the non-homogeneous product.

The samples were prepared as per sections 7.4 of BS EN ISO 1716:2018. Samples were ground and reduced to small granules and treated as powder as per section 7.4 of BS EN ISO 1716:2018.



8. METHOD OF TEST

8.1. Test Procedure

The test was carried out using the crucible method in accordance with Clause 7.9 of BS EN ISO 1716:2018 test standard - *Reaction to fire tests for products - Determination of the Gross Heat of Combustion (Calorific Value)*.

The combustion was facilitated using a combustion aid, benzoic acid; an additional combustible substance of known and high calorific value. The water equivalent (E) of Bomb 1 was 0.005650 MJ/K as per the latest calibration.

In accordance with section 8.3 of BS EN ISO 1716:2018, Aluminium or other metallic component of the product was not tested in the bomb calorimeter, as it carries the risk of serious injury to the operator due to overheating and/or overpressure causing the bomb calorimeter to explode.

8.2. Conditioning

After delivery on 25-Nov-21, the specimen was conditioned at 21 to 25 °C and 45 to 55% relative humidity in accordance with EN 13238:2010, *Reaction to fire tests for building products – Conditioning procedures and general rules for selection of substrates*.

Note: 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 standard limits.

9. SUMMARY OF RESULTS

The test specimen has been evaluated in accordance with BS EN ISO 1716:2018, *Reaction to fire tests for products - Determination of the Gross Heat of Combustion (Calorific Value)*.

Deviations: There were no deviations from the test standard.

9.1. Tabulated data

The test results are:

		Topcoat	Aluminium Skin	Adhesive	Mineral Core	Back coat
	No. of Tests:	3	0	3	3	3
Test 1	Specimen weight (g)	0.2009	-	0.1041	0.1005	0.2004
	Gross calorific value (MJ/kg)	16.8	-	44.7	-0.5	14.8
Test 2	Specimen weight (g)	0.2034	-	0.1007	0.1002	0.2051
	Gross calorific value (MJ/kg)	17.4	-	44.1	-0.1	15.6
Test 3	Specimen weight (g)	0.2025	-	0.1021	0.1000	0.2003
	Gross calorific value (MJ/kg)	16.9	-	44.4	-0.4	15.7
Average Gross calorific value (QPCS) in MJ/kg		17.0	0.0	44.4	-0.3	15.4
Area Weight (kg/m²)		0.040*	1.355*	0.047*	5.7*	0.016*
Average Gross calorific value in MJ/m²		0.7	0.0	2.1	0.0	0.2



Gross Calorific Value of the Whole Product

Layer	Component		Thickness (mm)	Area density (kg/m ²)	Gross Heat of Combustion Q _{PCS} (MJ/kg)	Gross Heat of Combustion Q _{PCS} (MJ/m ²)
1	Component 1 (External non-substantial layer)	Top coat	0.030	0.040	17.0	0.7
2	Component 2 (Substantial layer)	Aluminium Top skin	0.500	1.355	0.0	0.0
3	Component 3 (Internal non-substantial layer)	Adhesive	0.050	0.047	44.4	2.1
4	Component 4 (Substantial layer)	Core	3.000	5.700	-0.3	0.0
5	Component 5 (Internal non-substantial layer)	Adhesive	0.050	0.047	44.4	2.1
6	Component 6 (Substantial layer)	Aluminium Bottom skin	0.500	1.355	0.0	0.0
7	Component 1 (External non-substantial layer)	Back coat	0.008	0.016	15.4	0.2
(A) Sum of calorific values, MJ/m ²						5.1
(B) Sum of Area weights, kg/m ²						8.6
Gross heat of combustion of the whole product (PCS), in MJ/kg: Q_{pcs} (A/B)						0.6

9.2. Observations

In accordance with Section 8.3.11 of BS EN ISO 1716:2018, specimens were observed to be completely combusted.

10. VALIDATION OF THE TEST RESULTS

To be validated, the test results shall comply with the criteria specified in Clause 11 of. The following criteria apply.

Gross heat of combustion	Acceptance criteria	Range of validity
Q _{PCS} (MJ/kg)	≤0.2 MJ/kg	From any negative value to 3.2 MJ/kg
	Within 5% of the average of the 3 results	From 3.2 MJ/kg to 20.0 MJ/kg
	Within 10% of the average of the 3 results	Greater than 20.0 MJ/kg
Q _{PCS} (MJ/m ²) ^a	≤0.1 MJ/m ²	From any negative value to 4.1 MJ/m ²
	Within 5% of the average of the 3 results	From 4.1 MJ/m ² to 20 MJ/m ²
	Within 10% of the average of the 3 results	Greater than 20 MJ/m ²

^a For non-substantial components only.



10.1. Validity

The differences between the maximum and minimum Q_{PCS} values were within the range of validity specified in Clause 11 of BS EN ISO 1716:2018.


11. LIMITATION

"The test results relate to the behavior of the test specimens of a product under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use."- Clause 10q of BS EN ISO 1716:2018 test standard.

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


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

Prepared by:


Sarah Shaheir
Fire Testing Engineer



Reviewed & Approved by:


Suketa Tyagi
Manager - Reaction to Fire

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