

TEST REPORT REACTION TO FIRE TEST

Test Sponsor:

International Development Company Metal Industries – Sole Proprietorship L.L.C.
(IDCMI)

Al Mafrag

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Abu Dhabi, United Arab Emirates

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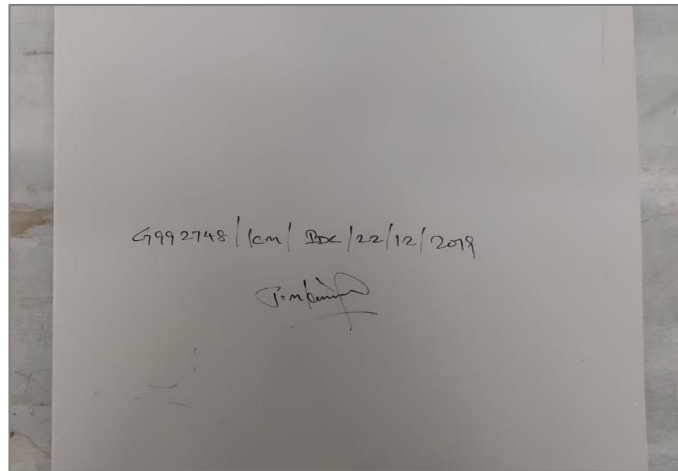
Website: www.idcuae.com

Test Material / Assembly:

4mm thick Aluclad Aluminium Composite Panel with PVDF Coating

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: 26-Jan-20
Issue Date: 26-Feb-20
Test Reference No: TF180-1

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DUBAI

ABU DHABI

DOHA



Accreditation

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 International Trade Council

www.thetradecouncil.com

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 wholly or partly under the accreditations of **ISO 17025** **UKAS**.



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1. INTRODUCTION

Determination of the calorific potential of 4mm Aluclad Aluminium Composite Panel with PVDF Coating 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: International Development Company Metal Industries – Sole Proprietorship L.L.C.
(IDCMI)

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Abu Dhabi, United Arab Emirates
T: +971 2 505 6300 | F: +971 2 582 3088
Website: www.idcuae.com

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: 13-Jan-20
Test date: 26-Jan-20

The test was not witnessed by the client.

5. SPECIMEN DESCRIPTION

As the 4mm thick Aluclad Aluminium Composite Panel with PVDF Coating was a non-homogenous product, the coating was tested separately to obtain the calorific value of the whole assembly. The product had a total of 8 layers, out of which 2 layers were not tested because it was metal. In accordance with section 7.1 of ISO 1716:2018, which governs substantial and non-substantial layers, the results from the test were used in the calculation of the calorific value of the entire product. The table below explains the test component layers details.

Layer	Layer Type	Material	Test No.
1	External Non-substantial	Topcoat	1
2	External Non-substantial	Primer	2
3	Substantial	Aluminium Skin	N/A
4	Internal Non-substantial	Adhesive	3
5	Substantial	Mineral Core	4
6	Internal Non-substantial	Adhesive	3
7	Substantial	Aluminium Skin	N/A
8	External Non-substantial	Service Coat	5

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.*



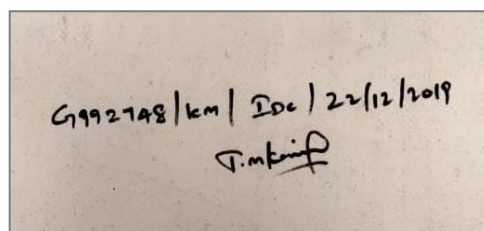
Product Description		4mm thick Aluclad Aluminium Composite Panel with PVDF Coating	
Manufacturer		International Development Company Metal Industries LLC	
Thickness		4mm (Measured by TBWIC)	
Area Density		8.37 kg/m ² (Measured by TBWIC)	
Product Details	Layer 1	Product Description	Topcoat
		Material	Polyvinylidene flouride (PVDF)* (stated)
		Manufacturer	Good Luck Decorative Materials Manufacturer LLC* (stated)
		Colour	Silver* (stated)
		Thickness	0.02mm* (stated)
		Area Density	0.055 kg/m ² * (stated)
	Layer 2	Product Description	Primer
		Material	Polyester* (stated)
		Manufacturer	Good Luck Decorative Materials Manufacturer LLC* (stated)
		Colour	White* (stated)
		Thickness	0.006mm* (stated)
		Area Density	0.007 kg/m ² * (stated)
	Layer 3	Product Description	Top Skin
		Material	Aluminium* (stated)
		Manufacturer	Good Luck Decorative Materials Manufacturer LLC* (stated)
		Alloy Grade	3003-H16* (stated)
		Thickness	0.5mm* (stated)
		Density	2710 kg/m ³ * (stated)
	Layer 4	Area Density	1.355 kg/m ² * (calculated from stated value)
		Product Description	Adhesive
		Material	Maleic Anhydride Modified Polyethylene* (stated)
		Manufacturer	Emirates Panel Plastic Industries* (stated)
		Colour Code	Ivory* (stated)
		Thickness	0.08mm* (stated)
	Layer 5	Area Density	0.084 kg/m ² * (stated)
Product Description		Core	
Material		Non-combustible Mineral-filled Core* (stated)	
Manufacturer		Alubotec* (stated)	
Thickness		3.1mm (Measured by TBWIC)	
	Area Density	5.61 kg/m ² (Measured by TBWIC)	



	Layer 6	Product Description	Adhesive
		Material	Maleic Anhydride Modified Polyethylene* (stated)
		Manufacturer	Emirates Panel Plastic Industries* (stated)
		Colour Code	Ivory* (stated)
		Thickness	0.08mm* (stated)
		Area Density	0.084 kg/m ² * (stated)
	Layer 7	Product Description	Bottom Skin
		Material	Aluminium* (stated)
		Manufacturer	Jiangsu Metcoplus* (stated)
		Alloy Grade	3003-H16* (stated)
		Thickness	0.5mm* (stated)
		Density	2710 kg/m ³ * (stated)
	Layer 8	Product Description	Service coat
		Material	Polyester* (stated)
		Manufacturer	Jiangsu Metcoplus* (stated)
		Colour Code	Grey* (stated)
		Thickness	0.006mm* (stated)
		Area Density	0.007 kg/m ² * (stated)
Specimen placement	Three test specimens of each layer were tested using the crucible method. The mixture of the specimen and benzoic acid were inserted into the crucible. The firing wire was then connected to the two electrodes and was looped down to touch the mixture in the crucible, placed inside the calorimetric bomb. 1 ml of de-ionized water was introduced to the bomb and it was pressurized with 3.0 - 3.5 MPa of Oxygen.		

6. SPECIMEN VERIFICATION

TBWIC testing laboratory has not been involved in the selection or design of the specimen. However, the panels were selected, marked, and signed by Mr. Kamil Mohamed from Intertek Certification (Certification Body) on 22-Dec-19 as shown below. The results apply to the sample 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 7.2.1 of ISO 1716, 50g of each substantial component and 10g of each non-substantial component were prepared and provided by the sponsor. Each sample was ground and conditioned as per sections 7.4 and 7.6 of ISO 1716:2018, respectively. Samples which could not be ground were reduced to small granules and treated as a powder. Liquid applied products were prepared and cured by the manufacturer in accordance with section 7.2.3 of ISO 1716:2018.

8. METHOD OF TEST

8.1. Test Procedure

The specimens were tested using benzoic acid, an additional combustible substance of known and high calorific value. The specimens were tested using the crucible method in a bomb calorimeter.

The water equivalent (E) of the bomb calorimeter was 0.005694 MJ/K for the most recent calibration.

8.2. Conditioning

After delivery on 13-Jan-20, the specimen was stored in the conditioning room prior to the test at 21 to 25°C and 45 to 55% relative humidity.

9. SUMMARY OF RESULTS

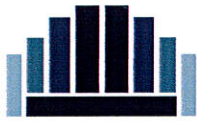
The test specimen has been evaluated in accordance with BS EN ISO-1716:2018 Reaction to fire tests for products -Determination of the gross heat of combustion (Calorific Value).

The test results are:

Gross Calorific Value of Each Layer								
		Aluminium Skin	Mineral Core	Top coat	Primer	Service coat	Adhesive	
	No. of Tests	0	3	3	3	3	3	
Trial 1	Specimen weight (g)	N/A	0.2013	0.0506	0.0519	0.0508	0.0503	
	Gross calorific value (MJ/kg)		0.6	18.6	13.0	7.9	44.2	
Trial 2	Specimen weight (g)		0.2010	0.0510	0.0522	0.1075	0.0532	
	Gross calorific value (MJ/kg)		0.5	19.5	13.1	8.0	43.8	
Trial 3	Specimen weight (g)		0.2003	0.0510	0.0514	0.1004	0.0506	
	Gross calorific value (MJ/kg)		0.5	19.1	13.0	7.9	43.6	
	Average Gross Calorific Value (MJ/kg)		0	0.5	19.1	13.0	7.9	43.9
	Area weight (kg/m ²)		1.355*	5.61	0.055*	0.007*	0.007*	0.084*
	Average Gross Calorific Value (MJ/m²)		0	2.7	1.1	0.1	0.1	3.7



Gross Calorific Value of the Whole Product					
Component	Layers	Thickness (mm)	Area weight (kg/m ²)	Gross Heat of Combustion (MJ/kg)	Q _{pcs} (MJ/m ²)
1	[Layer 1 (<i>Top Coat</i>) + Layer 2 (<i>Primer</i>)] External Non-substantial Layer	0.026*	0.062*	32.1	1.2
2	Layer 3 (<i>Aluminium Top Skin</i>) Substantial Layer	0.5*	1.355*	0.0	0.0
3	Layer 4 (<i>Adhesive</i>) Internal Non-substantial Layer	0.08*	0.084*	43.9	3.7
4	Layer 5 (<i>Core</i>) Substantial Layer	3.1	5.61	0.5	2.7
5	Layer 6 (<i>Adhesive</i>) Internal Non-substantial Layer	0.08*	0.084*	43.9	3.7
6	Layer 7 (<i>Aluminium Bottom Skin</i>) Substantial Layer	0.5*	1.355*	0.0	0.0
7	Layer 8 (<i>Service Coat</i>) External Non-substantial Layer	0.006*	0.007*	7.9	0.1
(A) Sum of Q _{pcs} , MJ/m ²					11.4
(B) Sum of Area weights, kg/m ²					8.370
Gross heat of combustion of the whole product (PCS), in MJ/kg: Q_{pcs} (A/B)					1.4



10. LIMITATION

“The test results relate only to the behaviour of the test specimens of a product under the particular conditions and they are not intended to be the sole criterion for assessing the potential hazard of the material” – Clause 10q, BS EN ISO 1716:2018.

This report and all records of the test to which it relates may be 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:

Sam Sancho Thomas
Fire Compliance Engineer

Reviewed & Approved by:

Suketa Tyagi
Reaction to Fire - Manager



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