

# TEST REPORT

## REACTION TO FIRE TEST

### Test Sponsor:

Alstone Manufacturing Pvt. Ltd.  
15th Floor, Vijaya Building  
Barakhamba Road, Connaught Place  
New Delhi - 110001, India  
T: +91 011 41232400  
Website: [www.alstoneindia.com](http://www.alstoneindia.com)

### Test Material:

25mm thick Alstone Honeycomb Panel

### 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: 04-Oct-22  
Issue Date: 17-Oct-22  
Test Reference No: WH174-1

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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](http://www.ukas.com)



## Memberships

Members of European Group of Organization for Fire Testing, Inspection and Certification

[www.egolf.org.uk](http://www.egolf.org.uk)

Member of Association for Specialist Fire Protection

[www.asfp.org.uk](http://www.asfp.org.uk)

Member of Centre for Window and Cladding Technology

[www.cwct.co.uk](http://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 25mm thick Alstone Honeycomb Panel 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: Alstone Manufacturing Pvt. Ltd.  
Address: 15th Floor, Vijaya Building  
Barakhamba Road, Connaught Place  
New Delhi - 110001, India  
T: +91 011 41232400  
Website: www.alstoneindia.com

## 3. MANUFACTURER

Name: Alstone Manufacturing Pvt. Ltd.  
Address: Khasra No: 1393, Langha Road Industrial Area  
Village Chharba, P.O. Sahaspur, Dehradun 248197  
Uttarakhand, India

## 4. LABORATORY

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

## 5. DATE OF TEST

Sample Received: 26-Sep-22  
Test date: 04-Oct-22

The test was not witnessed by the sponsor.



## 6. 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.*

<b>Product Description</b>		25mm thick metal honeycomb sandwich panel		
<b>Product Reference</b>		Alstone Honeycomb Panel*		
<b>Manufacturer</b>		Alstone Manufacturing Pvt. Ltd. *		
<b>Thickness</b>		24.8mm (measured by TBWIC)		
<b>Area Weight</b>		4.3 kg/m <sup>2</sup> (measured by TBWIC)		
<b>Product Details</b>	<b>Top coat (Fire Side)</b>	Material	PVDF*	
		Reference	Kynar 500 PVDF*	
		Manufacturer	Deju*	
		Colours Tested	White (observed by TBWIC)	
		Dry Film Thickness	20µm* (stated)	
		Area Weight	0.032 kg/m <sup>2</sup> * (stated)	
		Dry Density	1610 kg/m <sup>3</sup> * (stated)	
	<b>Primer</b>	Material	Polyester*	
		Manufacturer	Deju*	
		Dry Film Thickness	5µm* (stated)	
		Area Weight	0.008 kg/m <sup>2</sup> * (stated)	
		Dry Density	1610 kg/m <sup>3</sup> * (stated)	
	<b>Metal top skin</b>	Material	Aluminium*	
		Alloy Grade	AA3003*	
		Thickness	0.7mm*	
		Density	2710 kg/m <sup>3</sup> *	
	<b>Adhesive</b>	Material	Polyfine film*	
		Manufacturer	Ecoplast*	
		Dry Film Thickness	80µm* (stated)	
		Area Weight	0.074 kg/m <sup>2</sup> * (stated)	
		Dry Density	930 kg/m <sup>3</sup> * (stated)	
	<b>Honeycomb core</b>	Material	Aluminium Honeycomb*	
		Reference	Honeycomb Cell (Hexagonal)*	
		Manufacturer	Suzhou Bee Core Honeycomb Materials Co.*	
		Alloy Grade	AA3003*	
		Thickness	Metal Sheet	0.05mm* (stated)
Layer			23.8mm* (stated)	
Area Weight		1.3 kg/m <sup>2</sup> @ 25mm* (stated)		
<b>Adhesive</b>	Material	Polyfine film*		



		Manufacturer	Ecoplast*
		Dry Film Thickness	80µm* (stated)
		Area Weight	0.074 kg/m <sup>2</sup> * (stated)
		Dry Density	930 kg/m <sup>3</sup> * (stated)
	<b>Metal bottom skin</b>	Material	Aluminium*
		Alloy Grade	AA3003*
		Thickness	0.5mm*
		Density	2710 kg/m <sup>3</sup> *
	<b>Back coat</b>	Material	Polyester*
		Manufacturer	Deju*
		Dry Film Thickness	5µm* (stated)
		Area Weight	0.008 kg/m <sup>2</sup> * (stated)
		Dry Density	1610 kg/m <sup>3</sup> * (stated)
	<b>Specimen placement</b>	A minimum of three test specimens of each layer were tested using the crucible method in accordance with Clause 7.9 of BS EN ISO 1716:2018 test standard.	

## 7. SPECIMEN VERIFICATION

The choice, design and definition of the specimen have been made by Alstone Manufacturing Pvt. Ltd., 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.*

## 8. SPECIMEN PREPARATION PROCEDURE

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

The sample was prepared as per sections 7.2.3 and 7.4 of BS EN ISO 1716:2018. Sample was ground and reduced to small granules and treated as powder.

## 9. METHOD OF TEST

### 9.1. 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 0.005695 MJ/K & Bomb 2 was 0.005678 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.



## 9.2. Conditioning

After delivery on 26-Sep-22, the specimen was conditioned at 21 to 25 °C and 45 to 55% relative humidity as per EN 13238, *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 the thermo-hygrometer in our conditioning room. However, the average values were within standard limits.

## 10. 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.

### 10.1. Tabulated data

The complete test result for the individual layers are:

Parameters		Topcoat (White)	Primer	Adhesive	Aluminium Top Skin	Aluminium Bottom Skin	Aluminium Honeycomb Core
<b>No. of Tests</b>		3	3	3	0	0	0
Test 1	Specimen weight, g	0.2004	0.2007	0.1013	--	--	--
	Gross calorific value, MJ/kg	13.5	18.1	43.6	--	--	--
Test 2	Specimen weight, g	0.2011	0.2001	0.1012	--	--	--
	Gross calorific value, MJ/kg	12.7	17.0	43.9	--	--	--
Test 3	Specimen weight, g	0.2005	0.2007	0.1003	--	--	--
	Gross calorific value, MJ/kg	12.6	18.2	44.1	--	--	--
Average Gross Calorific Value, (MJ/kg)		12.9	17.8	43.9	0.0	0.0	0.0
Area Density (kg/m <sup>2</sup> )		0.032*	0.008*	0.074*	1.90*	1.36*	64.5*
Average Gross Calorific Value, (MJ/m <sup>2</sup> )		0.4	0.1	3.3	0.0	0.0	0.0

The complete test results for the product is:

Layer	Component	Thickness (mm)	Area density, (kg/m <sup>2</sup> )	Gross Heat of Combustion, Q <sub>PCS</sub> (MJ/kg)	Gross Heat of Combustion, Q <sub>PCS</sub> (MJ/m <sup>2</sup> )	
1	Component 1 (External non-substantial layer)	Top coat	0.02*	0.032*	12.9	0.4
		Primer	0.005*	0.008*	17.8	0.1
2	Component 2 (Substantial layer)	Aluminium top skin	0.7*	1.9*	0.0	0.0
3	Component 3 (Internal non-substantial layer)	Adhesive	0.08*	0.074*	43.9	3.3



4	Component 4 (Substantial layer)	Aluminium honeycomb core	23.8*	64.5*	0.0	0.0
5	Component 5 (Internal non-substantial layer)	Adhesive	0.08*	0.074*	43.9	3.3
6	Component 6 (Substantial layer)	Aluminium bottom skin	0.5*	1.36*	0.0	0.0
7	Component 7 (External non-substantial layer)	Service coat	0.005*	0.008*	17.8	0.1
(A) Sum of calorific values, MJ/m <sup>2</sup>						7.2
(B) Sum of Area weights, kg/m <sup>2</sup>						4.3 (Measured)
<b>Gross heat of combustion of the whole product (PCS), in MJ/kg: Q<sub>pcs</sub> (A/B)</b>						1.7

## 10.2. Observations

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

## 11. VALIDATION OF THE TEST RESULTS

To be validated, the test results shall comply with the criteria specified in Clause 11 of BS EN ISO 1716. The following criteria apply.

Gross heat of combustion	Acceptance criteria	Range of validity
Q <sub>PCS</sub> (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 <sub>PCS</sub> (MJ/m <sup>2</sup> ) <sup>a</sup>	≤0.1 MJ/m <sup>2</sup>	From any negative value to 4.1 MJ/m <sup>2</sup>
	Within 5% of the average of the 3 results	From 4.1 MJ/m <sup>2</sup> to 20 MJ/m <sup>2</sup>
	Within 10% of the average of the 3 results	Greater than 20 MJ/m <sup>2</sup>

<sup>a</sup> For non-substantial components only.

### 11.1. Validity

The differences between the maximum and minimum Q<sub>PCS</sub> values were within the range of validity specified in Clause 11 of the test standard.





## 12. 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:

Sam Sancho Thomas  
Fire Testing Engineer

Reviewed & Authorized by:

Suketa Tyagi  
Manager - Reaction to Fire



Report Revision Tracking		
Revision No.	Date Issued	Notes & Amendments
Rev. 00	17-Oct-22	This is the first issue of the report. No revisions are included.

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