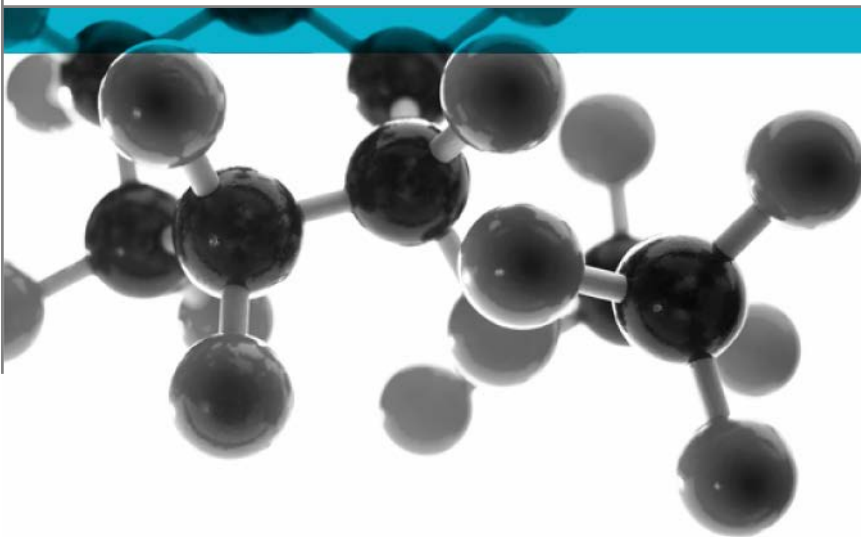


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BS 476: Part 6: 1989+A1:2009



Method Of Test For Fire Propagation For Products

A Report To: Aludecor Lamination Pvt. Ltd.

Document Reference: 382594

Date: 10th May 2017

Issue No.: 2

Page 1

Testing
Advising
Assuring



Executive Summary

Objective To determine the performance of the following product when tested in accordance with BS 476: Part 6: 1989+A1: 2009.

Generic Description	Product reference	Thickness / application rate	Weight per unit area or density
Fire rated aluminium composite panel	"ALUDECOR – Firewall"	3mm	5.2kg/m ²
Individual components used to manufacture composite:			
Top coat	"AD31"	25g/m ²	1.25kg/l
Primer	"PVDF Primer"	5.7g/m ²	1.14kg/l
Aluminium	"AA 3105"	0.3mm	2.72g/cm ³
Adhesive	"FR Adhesive Film"	65g/m ²	Not stated
Core	"FR-E"	2.4mm	1.48g/cm ³
Service coat	"Polyester"	11.97g/m ²	1.26kg/l
Please see pages 5 & 6 of this test report for the full description of the product tested			

Test Sponsor Aludecor Lamination Pvt. Ltd., I.R.N. Mukherjee Road, 5th Floor, Suite No.52, Kolkata 700 001, India


Test Results:

Fire propagation index, I	=	1.1
Sub index, i₁	=	0.0
Sub index, i₂	=	0.0
Sub index, i₃	=	1.1


Date of Test 20th April 2017

Reason for revision This document replaces issue 1 (dated 8th May 2017) of the same number which has been withdrawn. The sampling information performed by **Warrington Certification Ltd.** has been included.

Signatories



Responsible Officer
C. Meachin *
Technical Officer



Authorised
B. Dean *
Technical Leader

* For and on behalf of **Exova Warringtonfire.**

Report Issued: 10th May 2017

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CONTENTS	PAGE NO.
EXECUTIVE SUMMARY	2
SIGNATORIES.....	2
TEST DETAILS.....	4
DESCRIPTION OF TEST SPECIMENS.....	5
TEST RESULTS	7
TABLE 1.....	8
TABLE 2.....	9
TABLE 3.....	9
REVISION HISTORY	11



Test Details

Purpose of test	<p>To determine the performance of a product when it is subjected to the conditions of the test specified in BS 476: Part 6: 1989+A1: 2009, "Fire tests on building materials and structures, method for fire propagation for products".</p> <p>The test was performed in accordance with the procedure specified in BS 476: Part 6: 1989+A1: 2009, and this report should be read in conjunction with that British Standard.</p>
Scope of test	BS 476: Part 6: 1989+A1: 2009 specifies a method of test, the result being expressed as a fire propagation index, that provides a comparative measure of the contribution to the growth of fire made by an essentially flat material, composite or assembly. It is primarily intended for the assessment of the performance of internal wall and ceiling linings.
Fire test study group/EGOLF	Certain aspects of some fire test specifications are open to different interpretations. The Fire Test Study Group and EGOLF have identified a number of such areas and have agreed Resolutions which define common agreement of interpretations between fire test laboratories which are members of the Groups. Where such Resolutions are applicable to this test they have been followed.
Instruction to test	The test was conducted on the 20 th April 2017 at the request of Aludecor Lamination Pvt. Ltd., the sponsor of the test.
Provision of test specimens	The specimens were sampled by a representative of Warrington Certification Ltd. and these specimens were then supplied by the sponsor of the test. Exova Warringtonfire was not involved in any selection or sampling procedure.
Conditioning of specimens	The specimens were received on the 13 th April 2017 and were conditioned to constant mass at a temperature of $23 \pm 2^{\circ}\text{C}$ and a relative humidity of $50 \pm 5\%$ prior to testing.
Form in which the specimens were tested	Composite - Combination of materials which are generally recognised in building constructions as discrete entities e.g. coated or laminated materials.
Exposed face	The coated face of the specimens was exposed to the heating conditions of the test.

Description of Test Specimens

The description of the specimens given below has been prepared from information provided by the sponsor of the test. All values quoted are nominal, unless tolerances are given.

General description		Fire rated aluminium composite panel
Product reference		"ALUDECOR – Firewall"
Name of manufacturer		Aludecor Lamination Pvt. Ltd.
Thickness		3mm (stated by sponsor) 3.09mm (determined by Exova Warringtonfire)
Weight per unit area		5.2kg/m ² (stated by sponsor) 5.49kg/m ² (determined by Exova Warringtonfire)
Product configuration		<ul style="list-style-type: none"> • Top coat (test face) • Primer • Aluminium • Adhesive • Core • Adhesive • Aluminium • Service coat (back face)
Top coat (Test face)	Generic type	PVDF
	Product reference	"AD31"
	Name of manufacturer	Nippon
	Colour reference	"Black"
	Number of coats	One
	Application rate per coat	25g/m ²
	Density	1.25kg/l
	Application method	Coil coating
	Curing process per coat	Conventional oven
	Flame retardant details	See Note 1 below
First coat	Generic type	PVDF
	Product reference	"PVDF Primer"
	Name of manufacturer	Nippon
	Colour reference	"Yellow"
	Number of coats	One
	Application rate per coat	5.7g/m ²
	Density	1.14kg/l
	Application method	Coil coating
	Curing process per coat	Conventional oven
	Flame retardant details	See Note 1 below

Continued on next page

Aluminium	Generic type	Mill Finish Aluminium Coil
	Product reference	"AA 3105"
	Detailed description / composition details	Manganese Alloy for Architectural Usage
	Name of manufacturer	Hindalco
	Thickness	0.3mm
	Density	2.72g/cm ³
	Colour reference	"Mill Finish"
	Flame retardant details	This component is inherently flame retardant
Adhesive	Generic type	Low Density Polyethylene and Ethylene Acrylate Polymer mix
	Product reference	"FR Adhesive Film"
	Name of manufacturer	Ecoplast Ltd.
	Colour reference	"Semi-Translucent"
	Application rate	65g/m ²
	Application method	Hot roll lamination
	Flame retardant details	See Note 1 below
	Curing process	See Note 1 below
Core	Generic type	Magnesium Di Hydroxide
	Product reference	"FR-E"
	Detailed description / composition details	See Note 2 below
	Name of manufacturer	Aludecor Lamination Pvt. Ltd.
	Thickness	2.4mm
	Density	1.48g/cm ³
	Colour reference	"Off White"
	Trade name of flame retardant	"MDH"
	Generic type of flame retardant	Magnesium Di Hydroxide
Amount of flame retardant	See Note 2 below	
Service coat (Back face)	Generic type	Polyester service coat
	Product reference	"Polyester"
	Name of manufacturer	PPG
	Colour reference	"Light Grey"
	Number of coats	One
	Application rate per coat	11.97g/m ²
	Density	1.26kg/l
	Application method	Coil coating
	Curing process per coat	Conventional oven
Flame retardant details	See Note 1 below	
Brief description of manufacturing process		There are three processes involve in the production off aluminium composite panel 1 – Pre-treatment of Aluminium Coil 2 – Aluminium Coil Colour Coating 3 – Lamination of Colour Coated Aluminium Coil with Fire Rated Core

Note 1: The sponsor was unable to provide this information.

Note 2: The sponsor of the test has provided this information but at the specific request of the sponsor, these details have been omitted from the report and are instead held on the confidential file relating to this investigation.

Test Results

Results

A total of three specimens were tested. The laboratory record sheet relating to each of the test specimens is appended to this report (refer to Tables 1, 2 and 3).

Throughout the test on each specimen careful observation was made of the product's behaviour within the apparatus and special note was taken of any of the phenomena listed in clause 9.2 of the Standard. None of the listed phenomena was observed and the test results on all three specimens tested were valid.

The following test results were obtained for the product.

Fire propagation index, I	=	1.1
Sub index, i_1	=	0.0
Sub index, i_2	=	0.0
Sub index, i_3	=	1.1

NOTE: If a suffix 'R' is included in the above fire propagation index, I, then this indicates that the results should be treated with caution.

Applicability of test result

The test results relate only to the behaviour of the test specimens of the product under the particular conditions of test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.

The test results relate only to the specimens of the product in the form in which they were tested. Small differences in the composition or thickness of the product may significantly affect the performance during the test and may therefore invalidate the test results. Care should be taken to ensure that any product which is supplied or used is fully represented by the specimens which were tested.

Validity

The specification and interpretation of fire test methods are the subject of ongoing development and refinement. Changes in associated legislation may also occur. For these reasons it is recommended that the relevance of test reports over five years old should be considered by the user. The laboratory that issued the report will be able to offer, on behalf of the legal owner, a review of the procedures adopted for a particular test to ensure that they are consistent with current practices, and if required may endorse the test report.

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Table 1
Laboratory Record Sheet
FIRE PROPAGATION TEST - BS476:PART 6:1989+A1:2009
Specimen No. : 1
Date : 20-Apr-17

Time mins t	Specimen Temperature Deg C Ts	Calibration Temperature Deg C Tc	Ts- Tc/10t	Sub Index Of Performance
0.50	10	12	0.00	
1.00	16	17	0.00	
1.50	21	23	0.00	
2.00	25	28	0.00	
2.50	28	31	0.00	
3.00	31	38	0.00	0.00
4.00	59	70	0.00	
5.00	93	107	0.00	
6.00	121	137	0.00	
7.00	148	159	0.00	
8.00	167	176	0.00	
9.00	182	188	0.00	
10.00	193	198	0.00	0.00
12.00	210	215	0.00	
14.00	227	225	0.01	
16.00	268	231	0.23	
18.00	340	239	0.56	
20.00	409	242	0.84	1.64
Total Index of Performance S			=	1.64

SubIndex s1 0.00
SubIndex s2 0.00
SubIndex s3 1.64
Index of Performance S 1.64

Table 2
Laboratory Record Sheet
FIRE PROPAGATION TEST - BS476:PART 6:1989+A1:2009
Specimen No. : 2
Date : 20-Apr-17

Time mins t	Specimen Temperature Deg C Ts	Calibration Temperature Deg C Tc	Ts- Tc/10t	Sub Index Of Performance
0.50	8	11	0.00	
1.00	13	17	0.00	
1.50	17	22	0.00	
2.00	21	26	0.00	
2.50	24	28	0.00	
3.00	27	33	0.00	0.00
4.00	52	63	0.00	
5.00	93	99	0.00	
6.00	119	128	0.00	
7.00	143	148	0.00	
8.00	158	166	0.00	
9.00	173	187	0.00	
10.00	183	202	0.00	0.00
12.00	201	204	0.00	
14.00	210	211	0.00	
16.00	217	218	0.00	
18.00	235	223	0.07	
20.00	263	230	0.17	0.23
Total Index of Performance S			=	0.23

SubIndex s1 0.00
SubIndex s2 0.00
SubIndex s3 0.23
Index of Performance S 0.23

Table 3
Laboratory Record Sheet
FIRE PROPAGATION TEST - BS476:PART 6:1989+A1:2009
Specimen No. : 3
Date : 20-Apr-17

Time mins t	Specimen Temperature Deg C Ts	Calibration Temperature Deg C Tc	Ts- Tc/10t	Sub Index Of Performance
0.50	11	12	0.00	0.00
1.00	16	17	0.00	
1.50	21	23	0.00	
2.00	25	28	0.00	
2.50	29	31	0.00	
3.00	33	38	0.00	
4.00	60	70	0.00	0.00
5.00	92	107	0.00	
6.00	123	137	0.00	
7.00	147	159	0.00	
8.00	166	176	0.00	
9.00	182	188	0.00	
10.00	190	198	0.00	
12.00	209	215	0.00	
14.00	235	225	0.07	
16.00	271	231	0.25	
18.00	311	239	0.40	
20.00	376	242	0.67	1.39
Total Index of Performance S			=	1.39

SubIndex s1 0.00
SubIndex s2 0.00
SubIndex s3 1.39
Index of Performance S 1.39

Revision History

Issue No : 2	Re-issue Date: 10 th May 2017
Revised By: C. Meachin	Approved By: B. Dean
Reason for Revision: This document replaces issue 1 (dated 8 th May 2017) of the same number which has been withdrawn. The sampling information performed by Warrington Certification Ltd. has been included.	

Issue No :	Re-issue Date:
Revised By:	Approved By:
Reason for Revision:	