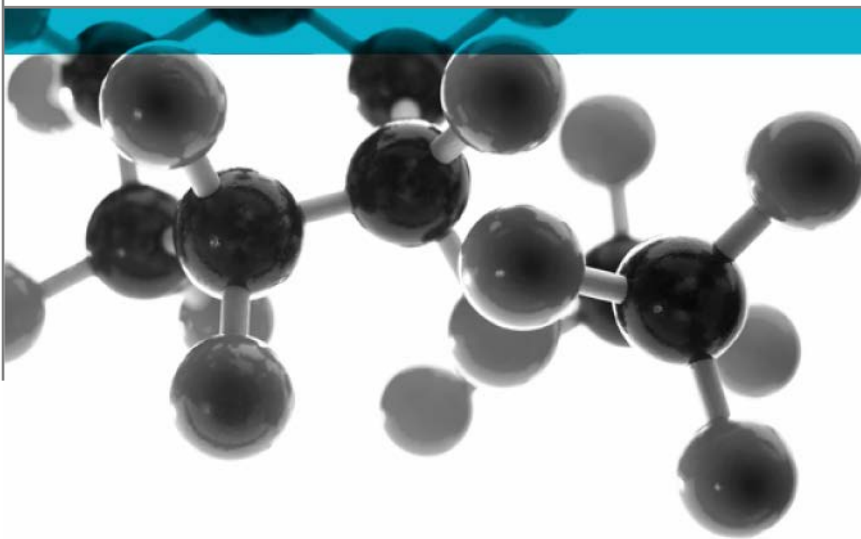


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NFP 92-501:1995



Epiradiateur Test

A Report To: Multipanel UK Ltd

Document Reference: 379549

Date: 14th February 2017

Issue No.: 1

Page 1

Testing
Advising
Assuring



Executive Summary

Objective To determine the performance of the following composite when tested in accordance with NFP 92-501:1995.



Generic Description	Product reference	Thickness	Weight per unit area or density
Coated aluminium composite panel	"Alupanel"	3mm	3.83kg/m ²
Individual components used to manufacture composite:			
Coating (test face)	"Polyester Resin Coating"	18 microns	Not stated
Aluminium	"Aluminium"	0.3mm	2740 tonnes / m ³
Adhesive	"3400F"	Not stated	0.1kg/m ²
Core	"Recycled Polyethylene"	2.4mm	0.93 tonnes/m ³
Please see pages 5 and 6 of this test report for the full description of the product tested			

Test Sponsor Multipanel UK Limited, Unit 6, Site 2, Oak Business Units, Thornverton Road, Matford, Exeter, Devon EX 2 8FS

Test Results: The results of this test, when assessed in accordance with the stipulations of the order from the Ministere de l'Industrie et de la Decentralisation, dated 28th August 1991 relating to reaction to fire, indicate that the specimens, as tested, are classified as M1.

Date of Test 9th February 2017

Signatories

	
Responsible Officer C. Jacques * Technical Officer	Authorised T. Mort * Senior Technical Officer

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

Report Issued: 14th February 2017

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Test Details

Purpose of test	<p>To determine the performance of specimens of a product when they are subjected to the conditions of the test specified in the "Epiradiateur test", NFP 92-501:1995, "Test procedure for the classification of rigid materials or materials on rigid substrates of all thicknesses and flexible materials over 5 mm thick".</p> <p>The test was performed in accordance with the procedure specified in NFP 92-501:1995 and this report should be read in conjunction with that Standard. The specimens were not subjected to the accelerated ageing test.</p>
Fire test study group/EGOLF	<p>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 has 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.</p>
Instruction to test	<p>The test was conducted on the 9th February 2017 at the request of Multipanel UK Limited, the sponsor of the test.</p>
Provision of test specimens	<p>The specimens were supplied by the sponsor of the test. Exova Warringtonfire was not involved in any selection or sampling procedure.</p>
Conditioning of specimens	<p>The specimens were received on the 6th February 2017.</p> <p>Prior to testing the specimens were conditioned to constant mass at a temperature of $23 \pm 3^{\circ}\text{C}$ and a relative humidity of $50 \pm 10\%$.</p>
Specimen orientation	<p>One of two identical faces were exposed to the radiant heat of the test when the specimens were mounted in the test position.</p>

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		Coated aluminium composite panel
Product reference of composite		"Alupanel"
Name of manufacturer of composite		Multipanel UK Ltd
Thickness of composite		3mm (stated by sponsor) 3.19mm (determined by Exova Warringtonfire)
Weight per unit area of composite		3.83kg/m ² (stated by sponsor) 3.77kg/m ² (determined by Exova Warringtonfire)
Coating (test face)	Generic type	Polyester resin coating
	Product reference	"Polyester Coating"
	Name of manufacturer	Jiangyin Tianhong
	Colour reference	"White"
	Number of coats	One
	Thickness	18microns
	Specific gravity	1.00
	Application method	Continuous coil coating process
	Flame retardant details	See Note 1 below
	Curing process	Hot air oven
Aluminium	Generic type	Aluminium coiled sheet
	Product reference	"Aluminium"
	Detailed description	Aluminium alloy coil
	Name of manufacturer	Jiangyin Tianhong
	Thickness	0.3mm
	Density	2740tonnes/m ³
	Colour reference	"Silver"
	Flame retardant details	This component is inherently flame retardant
Adhesive	Generic type	Co-extrudable adhesive resin
	Product reference	"3400F"
	Name of manufacturer	ShinKwang Hotmelt Co., Ltd.
	Colour reference	"White"
	Application rate	0.1kg/m ²
	Application method	Co-extrusion
	Flame retardant details	See Note 1 below
Curing process	Hot lamination under high pressure	

Continued on next page

Core	Generic type	Low density polyethylene material
	Product reference	"Recycled Polyethylene"
	Name of manufacturer	MDS
	Thickness	2.4mm
	Density	0.93tonnes/m ³
	Colour reference	"Dark Grey"
	Flame retardant details	See Note 1 below
Adhesive	Generic type	Co-extrudable adhesive resin
	Product reference	"3400F"
	Name of manufacturer	ShinKwang Hotmelt Co., Ltd.
	Colour reference	"White"
	Application rate	0.1kg/m ²
	Application method	Co-extrusion
	Flame retardant details	See Note 1 below
Curing process	Hot lamination under high pressure	
Aluminium	Generic type	Aluminium coiled sheet
	Product reference	"Aluminium"
	Detailed description	Aluminium alloy coil
	Name of manufacturer	Jiangyin Tianhong
	Thickness	0.20mm
	Density	2740tonnes/m ³
	Colour reference	"Silver"
Flame retardant details	This component is inherently flame retardant	
Coating	Generic type	Polyester resin coating
	Product reference	"Polyester Coating"
	Name of manufacturer	Jiangyin Tianhong
	Colour reference	"White"
	Number of coats	One
	Thickness	18microns
	Specific gravity	1.00
	Application method	Continuous coil coating process
	Flame retardant details	See Note 1 below
Curing process	Hot air oven	
Brief description of manufacturing process		Automated production line. After core materials have been heated and mixed they are co-extruded with the adhesive in to compounding rollers between the two aluminium skins. The compositing line runs through a cooling system and then easy-peel protective film is attached to the surface before the material is finally cut to size by the computer-controlled guillotine.

Note 1: The sponsor of the test has confirmed that no flame retardant additives were utilised in the production of the component.

Test Results

Test results	The results of the tests are given in Table 1 and the derived indices are given in Table 2.
Observations taken during the test	None
Classification	<p>The results of this test, when assessed in accordance with the stipulations of the order from the Ministère de l'Industrie et de la Décentralisation, dated 28th August 1991 relating to reaction to fire, indicate that the specimens, as tested, are classified as M1.</p> <p>The indicated classification in no way prejudices the conformity of the materials commercialised to the samples submitted to the tests and can in no way be considered as a certificate of qualification as defined by the act of 10th January 1978. This conformity can be tested by the certificates of qualification acknowledged by the "Ministère de l'Industrie" and notably by the NF quality mark Réaction au feu.</p> <p>The test procedures for classifying rigid materials and flexible materials of greater than 5mm thickness are detailed in Appendix 1 to this report.</p>
Durability of classification	The accelerated aging test has not been conducted.
Applicability of test result	<p>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.</p> <p>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.</p>
Validity	<p>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.</p> <p>This report may only be reproduced in full. Extracts or abridgements shall not be published without permission of Exova Warringtonfire.</p>

Table 1

Specimen Number	Exposed Face				Unexposed Face				Δt
	t_i	i_1	e_1	Δt_1	t_{i2}	i_2	e_2	Δt_2	
1	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
2	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
3	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
4	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

All measurements are recorded in seconds.

- t_i : Time taken in seconds for the test piece to ignite on exposed face after it has been placed in the cabinet.
 i_1 : Time of ignition occurring above the upper limit of the plane section of the radiating surface on the exposed face.
 e_1 : Time of extinction of flaming occurring above the upper limit of the plane section of the radiating surface on the exposed face.
 Δt_1 : Duration of flaming with or without interruption above the upper limit of the plane section of the radiating surface on the face exposed to the heating conditions of the test.
 t_{i2} : Time in seconds for the test piece to ignite on the unexposed face after it has been placed in the cabinet.
 i_2 : Time of ignition occurring above the upper limit of the plane section of the radiating surface on the unexposed face.
 e_2 : Time of extinction of flame occurring above the upper limit of the plane section of the radiating surface on the unexposed face.
 Δt_2 : Duration of flaming with or without interruption above the upper limit of the plane section of the radiating surface on the unexposed face.
 Δt : The duration of flaming with or without interruption above the upper limit of the plane section of the radiating surface on each face.

Table 2

SPECIMEN NUMBER	$\sum h$	ΔT	$q = \frac{100 \sum h}{ti \sqrt{\Delta T}}$	$\bar{q} = \frac{\sum q}{n}$
1	Nil	Nil	Nil	Nil
2	Nil	Nil	Nil	
3	Nil	Nil	Nil	
4	Nil	Nil	Nil	

- $\sum h$: Is the sum of the maximum height of the flames (h) reached in every 30 second period (in centimetres) during each test
 ΔT : The total duration of flaming combustion above the top of the radiator (it is calculated whether either one or both faces of the specimen flame)
 q : Is the classification index obtained from the data derived from each test
 \bar{q} : Is the arithmetic mean of the q indices
 n : The number of tests

Table 3

Specimen number	Mass before test (g)	Mass after test (g)	Mass loss (g)
1	441.44	441.12	0.32
2	444.87	444.39	0.48
3	445.24	445.07	0.17
4	444.54	444.21	0.35

Appendix 1

Test Procedures For Classifying Rigid Materials And Flexible Materials Over 5 mm Thick

Heat Radiation Test

These tests consist in submitting the samples, in clearly defined conditions, to the action of a radiating heat source and producing:

- (Articles 26 to 42)
- a) Ignition of the gases released, if it occurs,
 - b) Flame propagation.

The test sample (30 x 40 cm) inclined at 45° is submitted to a clearly defined radiation, emitted by an electric radiator, whose surface is 3.0 cm below the surface of the test sample. The gases released pass in contact with gas igniters located on either side of the test sample.

The duration of the test is 20 minutes.

Complementary Tests

Article 42: The materials which display very special behaviour during the tests are submitted to complementary tests.

Tests on Fusible Materials (Articles 43 to 45)

70 mm side square samples, so as to obtain a weight of over 2 g, are installed on a clearly defined metal grid, and submitted to the radiation of a radiator located 3.0 cm above. On each ignition it is moved aside and replaced after extinction, during the first 5 minutes; then for 5 further minutes, it remains in position.

The determining elements are:

- The presence or not of burning drops
- The ignition of the cellulose wool placed under the test sample.

Flame Propagation Tests (Articles 46 to 48)

The test sample (400 x 35 mm), placed horizontally on edge, is submitted to the action of a small burner flame described in ISO 6940. The non-persistence or non-propagation of the flame is checked with the possible speed of propagation between 2 marks 25 cm apart.

Conditioning of the Samples

The samples submitted with normal dimensions are kept in a conditioned enclosure (23°C ± 3°C and 50% ± 10% relative humidity) until their mass has stabilised.

Classification of Materials

These are established subsequent to the above tests. Combustible materials are classified M.1, M.2, M.3, M.4. Only those materials classified M.1 can claim to M.0 classification (P.C.S. < 2500 kJ/kg, i.e. 600 kcal/kg).

(Articles 65 to 86)

Revision History

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

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