

WARRES REPORT No. 143612

**REACTION TO FIRE
EXTENDED APPLICATION REPORT
OF
ALPOLIC®/fr**

On behalf of

Mitsubishi Chemical Functional Products Inc

6th Floor Tekko Building

8-2 Marunouchi 1-Chome

Chiyoda-ku

Tokyo

100-0005

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1. Introduction

This report extends the field of application of test results obtained for "ALPOLIC®/fr". Extended application enables the prediction, for a variation of a products properties and/or its intended end use application(s), on the basis of one or more test results to the same test standard.

2. Details of Product Family

A product family is a group of products, which differ only in aspects that do not influence the properties required in the relevant product standard and, if relevant, end-use parameters, for which the reaction to fire performance remains unchanged (i.e. does not get worse).

The product family for which extended application is to be used is "ALPOLIC®/fr". There are three product properties that vary within this product family and they are thickness, colour and jointing options. These properties have been assessed to determine their influence on the fire performance of the product when tested in accordance with EN 13823 and EN ISO 11925-2, and classified in accordance with EN 13501-1.

2.1 Product Description

The product was "ALPOLIC®/fr", a composite cladding system, having a thickness of between 4 and 6mm and a weight per unit area of between 7.6 and 10.9kg/m². The product comprised a 'non-combustible' mineral filled core having a thickness of between 3 and 5mm, which was faced on both sides with a coated, 0.5mm thick aluminium alloy sheet (product reference '3105-H14').

Both aluminium facings were bonded to the core utilising a proprietary heat - adhesion system.

The external aluminium (test) face was coil coated as follows, one coat of a polyester primer applied to a dry film thickness of 5 microns, one coat of a fluorocarbon coating applied to a dry film thickness of 17 microns and one top coat of a fluorocarbon coating applied to a dry film thickness of 15 microns. The internal aluminium (reverse) face was coil coated with one coat a polyester coating applied to a dry film thickness of 5 microns.

Joints within the composite cladding system can be optionally packed utilising 15mm diameter, closed cell polyurethane foam, 'backing' rods. The 'backing' rods are sealed in place using silicone sealant.

Each specimen was mounted to a substrate of 12.5mm thick paper faced plasterboard having a density of 840kg/m³ utilising mechanical fixings as used in practice.

Due to the nature of the mechanical fixings utilised to construct the specimens, a 26mm non-ventilated cavity was situated between the reverse face of each specimen and the substrate.

Further details of the composition of the product have been provided and are held on our confidential file relating to this investigation.

3. Reports and Test Results in Support of this Extended Application

3.1 Reports

This extended application is based on the information contained in the following reports.

Name of Laboratory	Name of sponsor	Test reports/extended application report Nos.	Test method / extended application rules & date
Warrington Fire Research Centre	Mitsubishi Chemical Functional Products Inc	WARRES 137755, 137756, 143482, 143483	EN 13823
Warrington Fire Research Centre	Mitsubishi Chemical Functional Products Inc	WARRES 137757, 137758, 143484	EN ISO 11925-2
Warrington Fire Research Centre	Mitsubishi Chemical Functional Products Inc	WARRES 143611	EN 13501-1

3.2 Classification

The following classification, in accordance with EN 13501-1, has been achieved for "ALPOLIC®/fr".

4 to 6mm thick Champagne Metallic (with sealed joints)

Fire Behaviour		Smoke Production			Flaming Droplets	
B	-	s	2	,	d	0

6mm thick Sparkling Black (with sealed joints)

Fire Behaviour		Smoke Production			Flaming Droplets	
B	-	s	1	,	d	0

6mm thick Champagne Metallic (with open joints)

Fire Behaviour		Smoke Production			Flaming Droplets	
B	-	s	1	,	d	0

The purpose of this report is to extend the classification to cover all thicknesses, colours and jointing options within the product families identified above.

3.3 Test Results

Test method & test number	Parameter	No. tests	Results	
			Continuous parameter - mean (m)	Compliance with parameters
EN 13823 Champagne Metallic (with sealed joints) AP405/fr	FIGRA _{0.2MJ} LFS THR _{600s}	3	7.93 (-) 1.21	Compliant Compliant Compliant
	SMOGRA TSP _{600s}		5.95 58.0	Compliant Compliant
	Flaming droplets/ particles		None	Compliant
EN 13823 Champagne Metallic (with sealed joints) AP605/fr	FIGRA _{0.2MJ} LFS THR _{600s}	3	12.97 (-) 1.40	Compliant Compliant Compliant
	SMOGRA TSP _{600s}		4.64 48.74	Compliant Compliant
	Flaming droplets/ particles		None	Compliant
EN 13823 Sparkling Black (with sealed joints) AP605/fr	FIGRA _{0.2MJ} LFS THR _{600s}	3	12.53 (-) 1.36	Compliant Compliant Compliant
	SMOGRA TSP _{600s}		3.94 43.91	Compliant Compliant
	Flaming droplets/ particles		None	Compliant
EN 13823 Champagne Metallic (with open joints) AP605/fr	FIGRA _{0.2MJ} LFS THR _{600s}	1	11.95 (-) 1.24	Compliant Compliant Compliant
	SMOGRA TSP _{600s}		4.17 42.35	Compliant Compliant
	Flaming droplets/ particles		None	Compliant

EN ISO 11925-2 Champagne Metallic AP405/fr				
30s exposure surface (facing)	$F_s \leq 150\text{mm}$	6	0	Y
30s exposure edge (facing)	$F_s \leq 150\text{mm}$	6	0	Y
30s exposure edge (core)	$F_s \leq 150\text{mm}$	6	0	Y
flaming droplets/particles	Ignition of filter paper		N	Y
EN ISO 11925-2 Champagne Metallic AP605/fr				
30s exposure surface (facing)	$F_s \leq 150\text{mm}$	6	0	Y
30s exposure edge (facing)	$F_s \leq 150\text{mm}$	6	0	Y
30s exposure edge (core)	$F_s \leq 150\text{mm}$	6	0	Y
flaming droplets/particles	Ignition of filter paper		N	Y
EN ISO 11925-2 Sparkling Black AP605/fr				
30s exposure surface (facing)	$F_s \leq 150\text{mm}$	6	0	Y
30s exposure edge (facing)	$F_s \leq 150\text{mm}$	6	0	Y
30s exposure edge (core)	$F_s \leq 150\text{mm}$	6	0	Y
flaming droplets/particles	Ignition of filter paper		N	Y

4. Definition of Limits of Extended Application

Four tests have been conducted in accordance with EN 13823 and three in accordance with EN ISO 11925-2. The tests were conducted on two different thicknesses, two different colours and two different jointing options to assess what influence these product properties have on the fire performance of the “ALPOLIC®/fr”.

4.1 EN 11925-2

Two thicknesses and colours of “ALPOLIC®/fr” were tested using surface and edge flame application, no flame spread from the point of flame application was observed during any of the tests.

In accordance with clause 7.3.3.2.2 of EN ISO 11925-2, essentially flat or multilayer products greater than 3mm total thickness, the flame shall be applied to the centre of the width of the bottom edge of the test specimen 1.5mm behind the surface, no flame spread from the point of flame application was observed during any of the tests.

4.2 EN 13823

The SBI test measures the following fire parameters, Fire Growth Rate (FIGRA), Total Heat Release (THR600s), Smoke Growth Rate (SMOGRA) and Total Smoke Production (TSP600s). Each of these parameters are evaluated to demonstrate the influence that thickness, colour and the jointing options have on the “ALPOLIC®/fr” cladding system, the evidence is shown in Figures 1 to 6.

An increase in the thickness of the “ALPOLIC®/fr” cladding system results in a gradual increase in the FIGRA value, the average value was 85% below the maximum value allowed for Class B, (EN 13501-1) and the average THR600s value was 80% below the maximum value allowed for Class B, (EN 13501-1).

Verifying the colour extremities of the “ALPOLIC®/fr” cladding system results in a gradual decrease in the FIGRA value when the darkest colour in the range is tested. The average value was 85% below the maximum value allowed for Class B, (EN 13501-1) and the average THR600s value was 80% below the maximum value allowed for Class B, (EN 13501-1).

Joints within the “ALPOLIC®/fr” cladding system can either be sealed, in the reported manner, or left open, the results show a gradual decrease in the FIGRA value when the joints are not sealed. The average value was 85% below the maximum value allowed for Class B, (EN 13501-1) and the average THR600s value was 80% below the maximum value allowed for Class B, (EN 13501-1).

The parameters relating to smoke, SMOGRA and TSP600s for all thicknesses, colours and jointing options all fall within the s2 criteria.

In no instance were flaming droplets/particles in evidence during the fire tests.

4.3 Extended Field of Application

The classification, **B – s2, d0** is valid for the following end use conditions:

- i) Wall or Ceiling Applications used over any substrate with a minimum density of 840kg/m³, having a minimum thickness of 6mm and a fire performance of A2 or better.
- ii) Mechanically fastened, creating a non-ventilated cavity of between 24 and 26mm, on to any substrate with a minimum density of 840kg/m³, having a minimum thickness of 6mm and a fire performance of A2 or better.

This classification is also valid for the following product parameters:

Thickness	Between 4 and 6mm
Colour	Any colour variation allowed
Weight per unit area	Between 7.6 and 10.9kg/m ²
Core	No variation allowed
Paint system	No variation allowed from specified application rates
Jointing system	No variation allowed, if required
Mounting and fixing	No variation allowed

5. Restrictions

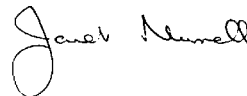
This classification document does not represent type approval or certification of the product.

SIGNED



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Leigh Hill
 Technical Officer
 Technical Department

APPROVED



.....
Janet Murrell
 Technical Manager
 Technical Department
 for and on behalf of
Warrington Fire Research Centre

