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Title:

EXTENDED APPLICATION REPORT IN ACCORDANCE WITH BS EN 15725 & EN/TS 15117

Notified Body No:

0833

Product Names:

"Novelis ff2®/ff3®"

Report No:

WF 423884

Issue No:

1

Prepared for:

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Date:

27th March 2020

1. Introduction

This report extends the field of application of test results obtained for “Novelis ff2®/ff3®”, a family of coated Aluminium panels. Extended application enables the prediction of fire performance, on the basis of one or more test results to the same test standard and enables the classification of product range and product families.

2. Details of Product Range

A product range 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 range, for which extended application is to be used is for “Novelis ff2®/ff3®”, a family of coated Aluminium panels. All of the products listed above belong to the same generic family, differences relate only to:

1) Coating system (“System 1” OR “System 2”)
2) Six colour options for the top coat within the “System 2” coating system
3) Two different manufacturers within the “System 2” coating system
4) Air gap width
5) End use substrate (Non-FR 10mm Particleboard OR “6mm UCO Superflex” fibre cement board)

All product properties have been assessed to determine their influence on the fire performance of the product when tested in accordance with BS EN 13823 and EN ISO 1716, and classified in accordance with BS EN 13501-1:2018.

2.1 Product description

The products contained within the range are fully described below and in the test reports provided in support of classification listed in Clause 3.1.

System 1

General description		Coated Aluminium sheet
Product reference of overall composite		"Novelis ff2®/ff3®"
Name of manufacturer of overall composite		Novelis Deutschland GmbH
Thickness of overall composite		2-3mm (2mm as tested)
Density of overall composite		2700 kg/m^3
Top coat (Test face)	Generic type	Fluropolymer based top coating
	Product reference	"FP-1"
	Name of manufacturer	Beckers
	Colour reference	"Signalweiss (19Z4-30)" (stated by sponsor) "Cream" (determined by Warringtonfire)
	Number of coats	One
	Density	1.88 g/ ml
	Thickness	20 um
	Application method	Roller applied liquid
	Application rate	0.0376 kg/m^2
	Curing process per coat	Oven
	Trade name of flame retardant	**See Note 1**
	Generic type of flame retardant	**See Note 1**
	Amount of flame retardant	**See Note 1**
Primer	Generic type	Polyester based primer coating
	Product reference	"PP-29"
	Name of manufacturer	Beckers
	Thickness	4um
	Density	1.74 g / ml
	Application rate	0.00696 kg/m^2
	Colour reference	"19N1-80"
	Trade name of flame retardant	**See Note 1**
	Generic type of flame retardant	**See Note 1**
	Amount of flame retardant	**See Note 1**
Aluminium sheet	Generic type	Aluminium sheet
	Name of manufacturer	Novelis Deutschland GmbH
	Colour reference	Silver / Alloy AlMg3 (5754)
	Density	2700 kg/m^3
	Thickness	2-3mm (2mm as tested)
	Trade name of flame retardant	**See Note 1**
	Generic type of flame retardant	**See Note 1**
	Amount of flame retardant	**See Note 1**

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Protective epoxy back coating	Generic type	Epoxy based protective back coat
	Product reference	Epoxi
	Name of manufacturer	Beckers
	Colour reference	“29K9-25”
	Number of coats	One
	Density	1.38 g /ml
	Thickness	3 um
	Application rate	0.00414 kg/m^2
	Application method	Roller applied liquid
	Curing process per coat	Oven
	Trade name of flame retardant	**See Note 1**
	Generic type of flame retardant	**See Note 1**
	Amount of flame retardant	**See Note 1**
Brief description of manufacturing process of coatings		Formally tested attached with screws to non-FR treated Particleboard substrate which complied with EN 13238. Also tested indicatively with no fixings applied with a 40mm air gap between the back of the specimen and the substrate, both non-FR treated Particleboard and “6mm UCO Superflex” fibre cement board

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

System 2

General description		Coated Aluminium sheet
Product reference of overall composite		“Novelis ff2®/ff3®”
Name of manufacturer of overall composite		Novelis Deutschland GmbH
Thickness of overall composite		2-3mm
Density of overall composite		2700 kg/m^3
Top coat (Test face)	Generic type	Polyvinylidene fluoride based top coating
	Product reference	“PVDF-25” “PVDF-12” “PVDF-12” “PVDF-12” “PVDF-12” “PVDF-25”
	Name of manufacturer	“PVDF-25” = Sherwin Williams “PVDF-12” = Beckers
	Colour reference	“Anthrazitgrau (1729-20)” / “Dark Grey” OR “Verkehrsweiss (19A9-20)” / “Bright White” OR “Perlweiss (1934-20)” / “Cream” OR “Sunrise Silver (2980-30)” / “Light Grey” OR “Lichtblaumetallic (2506-30)” / “Light Blue” OR “Polarmeerblaumetalilc (2534-20)” / “Silvery Blue”
	Number of coats	One
	Density	1.90 g/ ml - “Anthrazitgrau” PVDF-25 1.99 g/ml - “Verkehrsweiss” PVDF-12 1.91 g/ml - “Perlweiss” PVDF-12 1.66 g/ml - “Sunrise Silver” PVDF-12 1.58 g/ml – “Lichtblaumetallic” PVDF-12 1.69 g/ml - “Polarmeerblaumetalilc” PVDF-25

	Thickness	20um - "Anthrazitgrau" PVDF-25 20um - "Verkehrsweiss" PVDF-12 20um - "Perlweiss" PVDF-12 20um - "Sunrise Silver" PVDF-12 20um - "Lichtblaumetallic" PVDF-12 19um - "Polarmeerblaumetalilc" PVDF-25
	Application method	Roller applied liquid
	Application rate	0.038 kg/m^2 "Anthrazitgrau (1729-20)" 0.040 kg/m^2 "Verkehrsweiss (19A9-20)" 0.038 kg/m^2 "Perlweiss (1934-20)" 0.033 kg/m^2 "Sunrise Silver (2980-30)" 0.032 kg/m^2 "Lichtblaumetallic (2506-30)" 0.032 kg/m^2 "Polarmeerblaumetalilc (2534-20)"
	Curing process per coat	Oven
	Trade name of flame retardant	**See Note 1**
	Generic type of flame retardant	**See Note 1**
	Amount of flame retardant	**See Note 1**
Primer	Product reference	"PP-51" "ACPR-7" "ACPR-7" "ACPR-3" "ACPR-3" "PP-51"
	Name of manufacturer	"PP-51" = Sherwin Williams "ACPR-7" = Beckers "ACPR-3" = Beckers
	Thickness	4um - "PP-51 (19Z3-10)" 4um - "ACPR-7 (17P3-20)" 4um - "ACPR-7 (17P3-20)" 4um - "ACPR-3 (17M2-10)" 4um - "ACPR-3 (17M2-10)" 5um - "PP-51 (19Z3-10)"
	Density	1.70 g / ml "PP-51 (19Z3-10)" 1.68 g / ml "ACPR-7 (17P3-20)" 1.68 g / ml "ACPR-7 (17P3-20)" 2.24 g / ml "ACPR-3 (17M2-10)" 2.24 g / ml "ACPR-3 (17M2-10)" 1.70 g / ml "PP-51 (19Z3-10)"
	Application rate	0.0068 kg/m^2 "PP-51 (19Z3-10)" 0.00672 kg/m^2 "ACPR-7 (17P3-20)" 0.00672 kg/m^2 "ACPR-7 (17P3-20)" 0.00896 kg/m^2 "ACPR-3 (17M2-10)" 0.00896 kg/m^2 "ACPR-3 (17M2-10)" 0.0085 kg/m^2 "PP-51 (19Z3-10)"
	Colour reference	"19Z3-10" (PP-51) "17P3-20" (ACPR-7) "17M2-10" (ACPR-3)

	Trade name of flame retardant	**See Note 1**
	Generic type of flame retardant	**See Note 1**
	Amount of flame retardant	**See Note 1**
Aluminium sheet	Generic type	Aluminium sheet
	Name of manufacturer	Novelis Deutschland GmbH
	Colour reference	Silver / Alloy AlMg3 (5754)
	Density	2700 kg/m^3
	Thickness	2-3mm (2mm as tested)
	Trade name of flame retardant	**See Note 1**
	Generic type of flame retardant	**See Note 1**
	Amount of flame retardant	**See Note 1**
Protective epoxy back Coating	Generic type	Epoxy based protective back coat
	Product reference	Epoxi
	Name of manufacturer	Beckers
	Colour reference	29K9-25
	Number of coats	One
	Density	1.38 g /ml
	Thickness	3 um
	Application rate	0.00414 kg/m^2
	Application method	Roller applied liquid
	Curing process per coat	Oven
	Trade name of flame retardant	**See Note 1**
	Generic type of flame retardant	**See Note 1**
	Amount of flame retardant	**See Note 1**
Brief description of manufacturing process of coatings		Formally tested attached with screws to non-FR treated Particleboard substrate which complied with EN 13238. Also tested indicatively with no fixings applied with a 40mm air gap between the back of the specimen and the substrate, both non-FR treated Particleboard and “6mm UCO Superflex” fibre cement board

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

3. Test reports / classification reports & test results in support of classification

3.1 Test reports / classification reports

Name of Laboratory	Name of sponsor	Test reports Nos.	Test method
Warringtonfire	Silevon Ltd	WF 424694 WF 424695 WF 426551 WF 426552 WF 426553-Issue 2	EN ISO 1716
Applus Laboratories	Novelis Deutschland GmbH	18/18448-2270 Part 1	EN ISO 1716
Applus Laboratories	Novelis Deutschland GmbH	18/18448-2270 Part 1 (full)	BS EN 13823 - Formal
Applus Laboratories	Novelis Deutschland GmbH	18/18448-2270 Part 1 (full)	BS EN 13823 - Indicative
Warringtonfire	Silevon Ltd	WF 423641 WF 423643 WF 423644 WF 424363	BS EN 13823 - Indicative
Warringtonfire	Silevon Ltd	WF 423882 WF 424266	EN 13501-1
Applus Laboratories	Novelis Deutschland GmbH	18/18448-2270 Part 2 M1	EN 13501-1

3.2 Test results

Test method & test number	Parameter		No. tests	Results	
				Continuous parameter - Max/ Mean (m)	**Compliance with parameters**
BS EN 13823*	$FIGRA_{0.2MJ}$		3 (full) 1 (indic)	0.93 W/s (full) 0.00, 0.00, 6.23, 0.00, 7.53 W/s (indic)	-
	$FIGRA_{0.4MJ}$			0.93 W/S (full) 0.00, 0.00, 6.23, 0.00, 7.53 W/S (indic)	-
	THR_{600s}			0.41 MJ (full) 0.09, 0.53, 0.74, 0.03, 1.23 MJ (indic)	-
	SMOGRA			0.00 m^2s^2 (full) 0.00, 0.00, 0.00, 0.00, 0.00 m^2s^2 (indic)	-
	TSP_{600s}			20.10 m^2 (full) 18.75, 13.29, 6.67, 2.31, 7.17 m^2 (indic)	-
	LFS			-	Compliant
	Flaming droplets lasting > 10s			-	Compliant
EN ISO	"System 1"	"FP-1" Top Coating - PCS (b)	3	0.46 MJ/m^2	-

1716		"PP-29" Primer – PCS (b)		0.11 MJ/m^2	-
		Aluminium – PCS (a)	Deemed to satisfy (0.00 MJ/kg)		-
		Protective Epoxy back coating – PCS (b)	3	0.11 MJ/m^2	-
		For the product as a whole – PCS (e)	N/a	0.13 MJ/kg	-
	"System 2"	"PVDF – 25" Top Coat - PCS (b)	3	0.5102 MJ/m^2	-
		"PVDF – 12" Top Coat - PCS (b)		0.7204 MJ/m^2	-
		PP - 51 Primer - PCS (b)		0.1585 MJ/m^2	-
		ACPR - 3 Primer - PCS (b)		0.1800 MJ/m^2	-
		ACPR - 7 Primer - PCS (b)		0.1516 MJ/m^2	-
		Aluminium – PCS (a)	Deemed to satisfy (0.00 MJ/kg)		-
		Protective Epoxy back coating – PCS (b)	3	0.11 MJ/m^2	-
		For the product as a whole – PCS (e)	N/a	0.1877 MJ/kg	-

* Although no EN 1182 test was conducted on the product, the "Novelis ff2® /ff3®" product family referenced is deemed to be Euroclass A1 in accordance with EN 13501-1. This is because the PCS (MJ/m^2) value for the external non-substantial components are all shown to be <2.0 MJ/m^2.

EN ISO 1716 : 2018 and EN 13501-1 : 2018 state that two or more non-substantial layers that are adjacent to each other (ie with no substantial component(s) in between the layers) are regarded as one non-substantial component when they collectively comply with the requirements for a layer being a non-substantial component. As a result of this, the sum of the PCS contributions for any primer+top coat configuration in System 1 and 2 have also been assessed and have demonstrated a PCS < 2.0 MJ/m^2 and are therefore found to be A1 compliant.

The BS EN 13823 tests, formal and indicative, consistently demonstrated parameters which complied with A1 Classification. This criteria is FIGRA <20 W/s, THR_{600s} <4.0 MJ, LFS < End of Specimen and compliance with the s1 and d0 criteria.

4. Classification and field of application

4.1 Definition of Limits of Extended Application

One formal test has been conducted in accordance with BS EN 13823 and eight have been conducted in accordance with EN ISO 1716. Initially, two indicative BS EN 13823 tests were conducted on each coating system within the product family ("System 1" and "System 2") to investigate what influence the coating system had on the fire performance of the product. These BS EN 13823 tests were conducted by Applus Laboratories at an air gap of 20mm over EN 13238 standardised non-FR Particleboard substrate. The colour of the tested "System 1" coating system was "Signalweiss (19Z4-30)", or Cream, and the colour of the tested "System 2" coating system was "Anthrazitgrau (1729-20)", or Dark Grey. The colour "Anthrazitgrau (1729-20)" was selected from the colour range in the "System 2" system due to it being the colour with the highest organic content. The coating system with the worst BS EN 13823 performance ("System 1") underwent a formal full BS EN 13823 test.

Two further indicative BS EN 13823 tests were carried out by Warringtonfire on each coating system with identical colours as tested previously with the only difference being an air gap of 40mm instead of 20mm to determine whether the increased air gap width had an effect on the fire performance of the product family. An additional indicative BS EN 13823 test was conducted on an otherwise identical "System 2" system with the colour "Verkehrsweiss (19A9-20)", or Bright White, to ensure that colour and manufacturer variation within the "System 2" coating system did not have any influence on the fire performance. A final indicative BS EN 13823 test was

conducted on the worst performing coating system ("FP") applied over the "6mm UCO Superflex" fibre cement board substrate to investigate whether the specific substrate affected the fire performance of the "Novelis ff2®/ff3®" product family.

As the product family is non-homogeneous, formal EN ISO 1716 tests were conducted on each component within both coating systems to ensure that every component met the A1 requirements for EN 13501-1.

EN ISO 1716 tests on the primer and top coat within the "System 1" coating system were conducted by Applus Laboratories. EN ISO 1716 tests were conducted on all three primer options within the "System 2" coating system, "PP - 51", "ACPR-3" and "ACPR-7", by Warringtonfire to ensure they were all consistent with A1 classification criteria. EN ISO 1716 tests were also conducted by Warringtonfire on the most organic top coats supplied by each manufacturer across the "System 2" colour range ("Anthrazitgrau (1729-20)" and "Verkehrsweiss (19A9-20)" as confirmed by the manufacturer) to ensure all top coat options supplied by both manufacturers were compliant with the EN ISO 1716 classification criteria for A1 in the application rates stated.

Calculations were conducted taking into account each components PCS (MJ/kg) value and maximum application rate (kg/m^2) to identify the worst performing configuration of top coats and primers across both Systems and subsequently confirm that all coating configurations met the EN ISO 1716 PCS requirements for A1 Classification as a whole (e).

4.2 BS 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).

These parameters were evaluated to assess what influence product coating system has on the fire performance of "Novelis ff2®/ff3®", a family of coated Aluminium panels. This evidence is shown in Figures 1 and 2.

The highest FIGRA value was approximately 62.4% below the maximum value allowed for Class A1, (EN 13501-1). The highest THR600s value was at least 83.6% below the maximum value allowed for Class A1, (EN 13501-1).

The measured results relating to smoke parameters, SMOGRA and TSP600s, also fall within the s1 criteria, with the highest smoke value being approximately 55.9% below the maximum allowed for s1 (EN 13501-1).

Flaming droplets lasting more than 10s were not seen during the tests, thus this family of products is compliant for d0.

4.3 EN ISO 1716

In accordance with the test requirements of EN ISO 1716 a product is to be categorised in to one of three component families, a homogenous product or a substantial component of a non-homogenous product, an external non-substantial component of a non-homogenous product or an internal non-substantial component of a non-homogenous product.

The products in product family "Novelis ff2®/ff3®" are identified as non-homogenous. Both coating systems within the product family were tested were tested and assessed in accordance with the relevant classification criteria, as specified in EN 13501-1. The highest Gross Calorific Value (PCS) was 64% below the maximum criteria for class A1. Each coating system therefore is shown to comply with the same Euroclass.

4.4 Reference of classification

This classification has been carried out in accordance with clause 8 of BS EN 13501-1:2018, EN 15725 and EN/TS 15117.

4.5 Classification

The product family, "Novelis ff2®/ff3®", a family of coated Aluminium panels, in relation to their reaction to fire behaviour are classified:

Reaction to fire classification: A1

4.6 Extended Field of application

This classification is valid for the following end use applications:

i) Construction applications applied over any substrate with a minimum density of 680kg/m^3, having a minimum thickness of 10mm and a fire performance of D-s2,d0 or better, in addition to all standard EN 13238 substrates with a fire performance of A1 or A2-s1,d0.
ii) Construction applications applied over the "6mm UCO Superflex" fibre cement board substrate with a density of 1522kg/m^3 and a thickness of 6mm
iii) Air gap details – Any air gap width between the back of the product and the substrate allowed

This classification is also valid for the following product parameters:

Coating Systems allowed	"System 1" or "System 2" only as described above
Coating application rate	Tested values (kg/m^2) or below allowed
Top coat colour	
a) System 1	"Signalweiss (19Z4-30)" / "Cream" only
b) System 2	"Anthrazitgrau (1729-20)" / "Dark Grey" OR "Verkehrsweiss (19A9-20)" / "Bright White" OR "Perlweiss (1934-20)" / "Cream" OR "Sunrise Silver (2980-30)" / "Light Grey" OR "Polarmeerblaumetalilc (2534-20)" / "Silvery Blue" "Lichtblaumetallic (2506-30)" / "Light Blue"

Aluminium thickness	2mm and greater allowed
Aluminium density	2700kg/m^3 and greater allowed
Product composition	No further variation allowed
Product construction	No further variation allowed
Mounting and fixing method	No variation allowed
Air gap details	Any air gap allowed

5. Limitations

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

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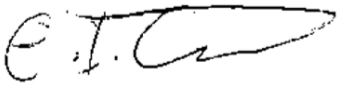

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Euan Gardner
Certification Engineer
Technical Department

APPROVED

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Stacey Deeming
Principal Engineer
Technical Department
on behalf of Warringtonfire

Figure 1 - Effect of varying the product specification on FIGRA (W/s) and TSP (m2/s2)

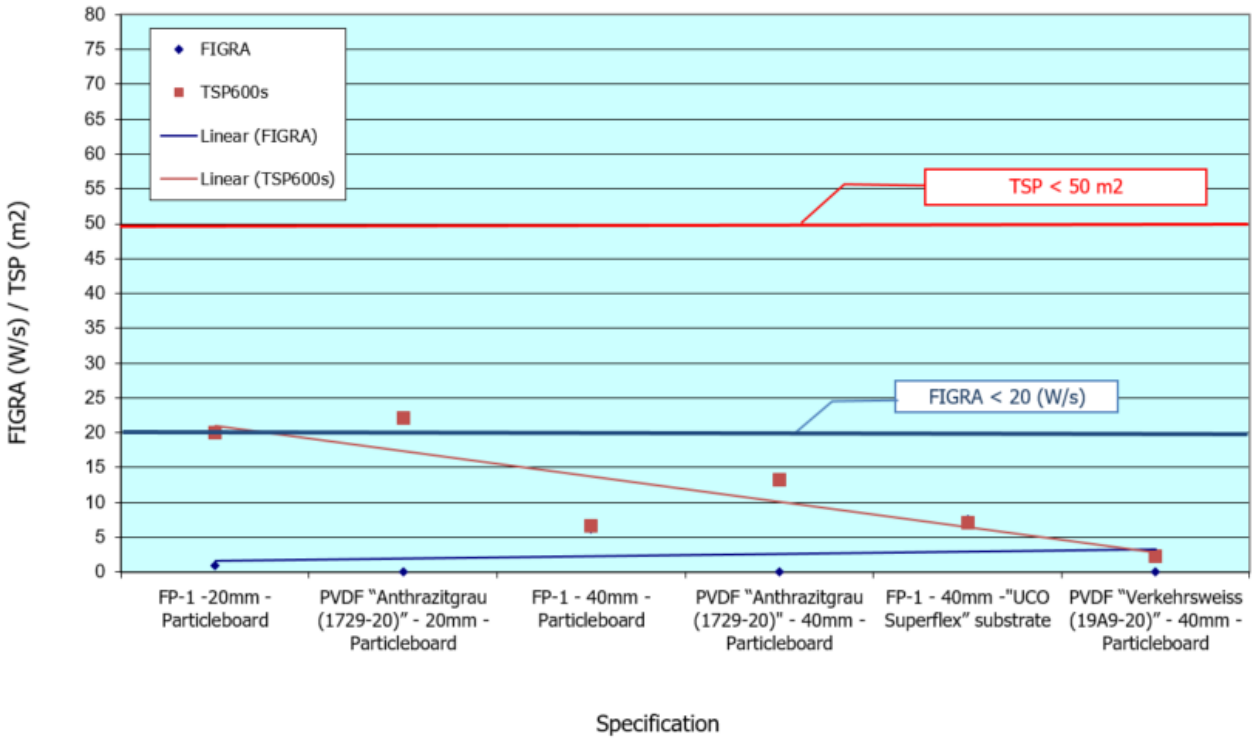

Figure 2 - Effect of varying the product specification on THR600s and SMOGRA