HMG Powder Coatings Limited
Dill Road, Castlereagh Industrial Estate, Belfast, BT6 9HU
Tel. +44 (028) 9079 4930 Fax. +44 (028) 9040 1187
www.hmgpowdercoatings.com
sales@hmgpowdercoatings.co.uk

European Specification EN 13501-1: Reaction to Fire

Testing

This standard provides the reaction to fire classification procedure for all construction products. The classification is achieved by carrying out two tests.

- EN 13823 – Single Burning Item (SBI) Test
  - This test provides data on heat release, surface spread of flame properties and smoke production when exposed to a thermal attack by an SBI representative of a waste-paper basket or small chair fire.
- ISO 1716 – Bomb Calorimeter
  - Provides a method to measure the gross heat of combustion from a material.

The classification is provided in three components

1. Combustibility – **A2** is the highest available classification for organic coatings. **A2** means non-combustible.
2. Smoke Emission – **s1** is best, **s3** is worst.
3. Release of flaming droplets or particles – **d0** means no flaming droplets

All HMG Powder Coatings Polyester products were tested. The full range of products is listed below:

- **827** – Architectural
- **837** – Industrial
- **924** – Ultradurable
- **828, 836, 839** – Ripple, Hammer and Fine Texture
- **727** – High Reactivity (Low Bake)
- **916** – Metallic Effect
- **877** – Nylon Modified
- **967** – Anti-Microbial

Classification

All HMG Polyester systems achieved Reaction to Fire Classification (EN13501-1):

A2 – s1, d0

HMG Powder Coatings

Warringtonfire
Holmesfield Road
Warrington
WA1 2DS

T: +44 (0)1925 655 116
info.warrington@warringtonfire.com
warringtonfire.com

Title:

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

Notified Body No:

0833

Product Names:

"Polyester Powder Coating (827, 828, 836, 837, 727, 839, 877, 916, 924 & 967 series)"

Report No:

WF 429496

Issue No:

1

Prepared for:

HMG Powder Coatings
Dill Road
Castlereagh Industrial Estate
Belfast
BT6 9HU

Date:

18th September 2020

1. Introduction

This report extends the field of application of test results obtained for "Polyester Powder Coating (827, 828, 836, 837, 727, 839, 877, 916, 924 & 967 series)", a family of Polyester based powder coating products applied to an aluminium substrate. Extended application enables the prediction of fire performance, on the basis of one or more test results to the same test standards and enables the classification of product ranges and product families.

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 "Polyester Powder Coating (827, 828, 836, 837, 727, 839, 877, 916, 924 & 967 series)", a family of Polyester based powder coating products applied to an aluminium substrate.

There are primarily two product properties which vary within this product family; colour and additive / organic content, as described below.

Product	Series Reference	Detail
Polyester (basic)	827	Maximum binder levels, maximum organic content. All colours and clear
Ripple Texture	828	Less binder. Removal of levelling agent – lower organic content than 827 series. All colours
Hammer Texture	836	Less binder. Removal of levelling agent – lower organic content than 827 series. All colours
Industrial	837	Less binder – lower organic content than 827 series. All colours and clear
High Reactivity	727	As per industrial; Less binder – lower organic content than 827 series. All colours and clear
Fine Texture	839	Less binder - Addition of 0.2 – 0.4% PTFE, removal of levelling agent. Lower organic content than 827 series. All colours
Nylon-modified	877	Less binder than 827 series. Addition of nylon (2-4%). All colours
Metallic effect	916	As per industrial; Less binder – lower organic content than 827 series - addition of aluminium powder (1-5%) for metallic lustre. Shades of grey from white to black.
Ultradurable	924	As per 827 series (high organic content) but different polyester backbone. All colours
Antimicrobial	967	As per industrial; Less binder – lower organic content than 827 series. Addition of a silver ion antimicrobial agent (0.3%) All colours and clear

These properties were assessed to determine its influence on the fire performance of the product when tested in accordance with EN 13823 and EN ISO 1716, and classified in accordance with EN 13501-1.

2.1 Product description

The product family, Polyester Powder Coating (827, 828, 836, 837, 727, 839, 877, 916, 924 & 967 series)", a family of Polyester based powder coating products applied to an aluminium substrate, is fully described below and in the test reports provided in support of classification listed in Clause 3.1.

827 Series – Polyester (basic)

General description		Polyester powder coating (827 Series) applied to an aluminium substrate
Product reference of coating system		"827 Series"
Name of manufacturer		HMG Powder Coatings Ltd
Overall thickness		1.79mm (determined by Warringtonfire)
Overall weight per unit area		4.65kg/m^2 (determined by Warringtonfire)
Coating product (Test face)	Generic type	Polyester powder coating (827 Series)
	Product reference	"827-0R910C-4056" (Pure White) / "827-0R320C-876" (Traffic Red) / "827-0R905C-1244" (Jet Black) / "827-0S600P-1946" (Clear)
	Name of manufacturer	HMG Powder Coatings Ltd
	Colour	All colours including clear
	Number of coats	One
	Application thickness	80 ±10 microns
	Application rate	96 ±12g/m^2 - 128±16g/m^2
	Specific gravity	1.2 - 1.6
	Application method	Electrostatic spray
	Flame retardant details	**See Note 1 below**
	Curing process	Gas-fired oven: 10 mins @ 180°C
Substrate	Generic type	Aluminium sheet
	Product reference	"Alloy 1050A H14"
	Name of manufacturer	Aalco
	Thickness	1.6mm
	Weight per unit area	4336g/m^2
	Flame retardant details	**See Note 1 below**
Mounting details		The product was mounted with a 40mm ventilated cavity with plywood to the rear
Brief description of manufacturing process of coatings		Dry mixing, extrusion and milling of mixture of resins, pigments and additives

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

Note 2: The sponsor was unable to provide this information.

828 Series – Ripple texture

General description		Polyester ripple structured effect powder coating (828 Series) applied to an aluminium substrate
Product reference of coating system		"828 Series"
Name of manufacturer		HMG Powder Coatings Ltd
Coating product (Test face)	Generic type	Polyester powder coating (828 Series)
	Product reference	"828-1R910C-1715" (Pure White) / "828-1R320C-920" (Traffic Red) / "828-0R905C-4242" (Jet Black)
	Name of manufacturer	HMG Powder Coatings Ltd
	Colour	All colours
	Number of coats	One
	Application thickness	80 ±10 microns
	Application rate	118 ±16g/m^2 - 141±18g/m^2
	Specific gravity	1.5- 1.76
	Application method	Electrostatic spray
	Flame retardant details	**See Note 1 below**
	Curing process	Gas-fired oven: 10 mins @ 180°C
Substrate	Generic type	Aluminium sheet
	Product reference	"Alloy 1050A H14"
	Name of manufacturer	Aalco
	Thickness	1.6mm
	Weight per unit area	4336g/m^2
	Flame retardant details	**See Note 1 below**
Mounting details		The product was mounted with a 40mm ventilated cavity with plywood to the rear
Brief description of manufacturing process of coatings		Dry mixing, extrusion and milling of mixture of resins, pigments and additives

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

Note 2: The sponsor was unable to provide this information.

836 Series – Hammer texture

General description		Polyester hammer structured effect powder coating (828 Series) applied to an aluminium substrate
Product reference of coating system		"836 Series"
Name of manufacturer		HMG Powder Coatings Ltd
Coating product (Test face)	Generic type	Polyester powder coating (836 Series)
	Product reference	"836-15600P-2211" (Silver White) / "836-0S600P-5497" (Gold Red) / "836-0S095P-2117" (Black)
	Name of manufacturer	HMG Powder Coatings Ltd
	Colour	All colours
	Number of coats	One
	Application thickness	80 ±10 microns
	Application rate	96 ±12g/m^2 - 104±13g/m^2

Continued on next page

Coating product (continued)	Specific gravity	1.2-1.3
	Application method	Electrostatic spray
	Flame retardant details	**See Note 1 below**
	Curing process	Gas-fired oven: 10 mins @ 180°C
Substrate	Generic type	Aluminium sheet
	Product reference	"Alloy 1050A H14"
	Name of manufacturer	Aalco
	Thickness	1.6mm
	Weight per unit area	4336g/m^2
	Flame retardant details	**See Note 1 below**
Mounting details		The product was mounted with a 40mm ventilated cavity with plywood to the rear
Brief description of manufacturing process of coatings		Dry mixing, extrusion and milling of mixture of resins, pigments and additives

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

Note 2: The sponsor was unable to provide this information.

837 Series – Industrial

General description		Polyester powder coating (837 Series) applied to an aluminium substrate
Product reference of coating system		"837 Series"
Name of manufacturer		HMG Powder Coatings Ltd
Coating product (Test face)	Generic type	Polyester powder coating (827 Series)
	Product reference	"837-0R910C-155" (White) / "837-0R320C-592" (Traffic Red) / "837-1R905C-1438" (Jet Black)
	Name of manufacturer	HMG Powder Coatings Ltd
	Colour	All colours including clear
	Number of coats	One
	Application thickness	80 ±10 microns
	Application rate	96±12g/m^2 - 144±18g/m^2
	Specific gravity	1.2 - 1.8
	Application method	Electrostatic spray
	Flame retardant details	**See Note 1 below**
	Curing process	Gas-fired oven: 10 mins @ 180°C
Substrate	Generic type	Aluminium sheet
	Product reference	"Alloy 1050A H14"
	Name of manufacturer	Aalco
	Thickness	1.6mm
	Weight per unit area	4336g/m^2
	Flame retardant details	**See Note 1 below**
Mounting details		The product was mounted with a 40mm ventilated cavity with plywood to the rear
Brief description of manufacturing process of coatings		Dry mixing, extrusion and milling of mixture of resins, pigments and additives

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

Note 2: The sponsor was unable to provide this information.

727 Series – High Reactivity

General description		Polyester high reactivity powder coating (727 Series) applied to an aluminium substrate
Product reference of coating system		"727 Series"
Name of manufacturer		HMG Powder Coatings Ltd
Coating product (Test face)	Generic type	Polyester powder coating (727 Series)
	Product reference	"727-1R910C-139" (Pure White) / "727-0R320C-1308" (Traffic Red) / "727-0R905C-1731" (Jet Black) / "727-0S600P-459 (Clear)
	Name of manufacturer	HMG Powder Coatings Ltd
	Colour	All colours including clear
	Number of coats	One
	Application thickness	80 ±10 microns
	Application rate	96±12g/m^2 - 140±18g/m^2
	Specific gravity	1.2 - 1.75
	Application method	Electrostatic spray
	Flame retardant details	**See Note 1 below**
	Curing process	Gas-fired oven: 10 mins @ 180°C
Substrate	Generic type	Aluminium sheet
	Product reference	"Alloy 1050A H14"
	Name of manufacturer	Aalco
	Thickness	1.6mm
	Weight per unit area	4336g/m^2
	Flame retardant details	**See Note 1 below**
Mounting details		The product was mounted with a 40mm ventilated cavity with plywood to the rear
Brief description of manufacturing process of coatings		Dry mixing, extrusion and milling of mixture of resins, pigments and additives

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

Note 2: The sponsor was unable to provide this information.

839 Series – Fine texture

General description		Polyester fine texture powder coating (839 Series) applied to an aluminium substrate
Product reference of coating system		"839 Series"
Name of manufacturer		HMG Powder Coatings Ltd
Coating product (Test face)	Generic type	Polyester powder coating (839 Series)
	Product reference	"839-1R910C-4097" (Pure White) / "839-1R320C-2458" (Traffic Red) / "839-1S095P-867" (Jet Black)
	Name of manufacturer	HMG Powder Coatings Ltd
	Colour	All colours
	Number of coats	One
	Application thickness	80 ±10 microns
	Application rate	128±16g/m^2 - 140±18g/m^2
	Specific gravity	1.6 - 1.75

Continued on next page

Coating product (continued)	Application method	Electrostatic spray
	Flame retardant details	**See Note 1 below**
	Curing process	Gas-fired oven: 10 mins @ 180°C
Substrate	Generic type	Aluminium sheet
	Product reference	"Alloy 1050A H14"
	Name of manufacturer	Aalco
	Thickness	1.6mm
	Weight per unit area	4336g/m^2
	Flame retardant details	**See Note 1 below**
Mounting details		The product was mounted with a 40mm ventilated cavity with plywood to the rear
Brief description of manufacturing process of coatings		Dry mixing, extrusion and milling of mixture of resins, pigments and additives

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

Note 2: The sponsor was unable to provide this information.

877 Series – Nylon reinforced

General description		Nylon reinforced polyester powder coating (877 Series) applied to an aluminium substrate
Product reference of coating system		"877 Series"
Name of manufacturer		HMG Powder Coatings Ltd
Coating product (Test face)	Generic type	Polyester powder coating (877 Series)
	Product reference	"877-0R916C-4574" (White) / "XB20N125" (Traffic Red) / "877-0R905C-3850" (Jet Black)
	Name of manufacturer	HMG Powder Coatings Ltd
	Colour	All colours
	Number of coats	One
	Application thickness	80 ±10 microns
	Application rate	124±13g/m^2 - 136±17g/m^2
	Specific gravity	1.55- 1.7
	Application method	Electrostatic spray
	Flame retardant details	**See Note 1 below**
	Curing process	Gas-fired oven: 10 mins @ 180°C
Substrate	Generic type	Aluminium sheet
	Product reference	"Alloy 1050A H14"
	Name of manufacturer	Aalco
	Thickness	1.6mm
	Weight per unit area	4336g/m^2
	Flame retardant details	**See Note 1 below**
Mounting details		The product was mounted with a 40mm ventilated cavity with plywood to the rear
Brief description of manufacturing process of coatings		Dry mixing, extrusion and milling of mixture of resins, pigments and additives

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

Note 2: The sponsor was unable to provide this information.

916 Series – Metallic effect

General description		Polyester powder coating (916 Series) applied to an aluminium substrate
Product reference of coating system		"916 Series"
Name of manufacturer		HMG Powder Coatings Ltd
Coating product (Test face)	Generic type	Polyester powder coating (916 Series)
	Product reference	"XB20N07301" (Silver White) / "916-0S100P – 5098" (Jet Black)
	Name of manufacturer	HMG Powder Coatings Ltd
	Colour	All colours
	Number of coats	One
	Application thickness	80 ±10 microns
	Application rate	116±14.5g/m^2 - 136±17g/m^2
	Specific gravity	1.45- 1.7
	Application method	Electrostatic spray
	Flame retardant details	**See Note 1 below**
	Curing process	Gas-fired oven: 10 mins @ 180°C
Substrate	Generic type	Aluminium sheet
	Product reference	"Alloy 1050A H14"
	Name of manufacturer	Aalco
	Thickness	1.6mm
	Weight per unit area	4336g/m^2
	Flame retardant details	**See Note 1 below**
Mounting details		The product was mounted with a 40mm ventilated cavity with plywood to the rear
Brief description of manufacturing process of coatings		Dry mixing, extrusion and milling of mixture of resins, pigments and additives

Note 1: The sponsor of the test has confirmed that no flame retardant additives were utilised in the production of the component.
Note 2: The sponsor was unable to provide this information.

924 Series – Ultradurable

General description		Ultradurable polyester powder coating (924 Series) applied to an aluminium substrate
Product reference of coating system		"924 Series"
Name of manufacturer		HMG Powder Coatings Ltd
Coating product (Test face)	Generic type	Polyester powder coating (924 Series)
	Product reference	"924-0R916C-5505" (White) / "XB20N126" (Traffic Red) / "924-2R905C-5270" (Jet Black)
	Name of manufacturer	HMG Powder Coatings Ltd
	Colour	All colours
	Number of coats	One
	Application thickness	80 ±10 microns
	Application rate	118 ±15g/m^2 - 128±16g/m^2
	Specific gravity	1.5- 1.6
	Application method	Electrostatic spray
	Flame retardant details	**See Note 1 below**
	Curing process	Gas-fired oven: 10 mins @ 180°C

Continued on next page

Substrate	Generic type	Aluminium sheet
	Product reference	"Alloy 1050A H14"
	Name of manufacturer	Aalco
	Thickness	1.6mm
	Weight per unit area	4336g/m^2
	Flame retardant details	**See Note 1 below**
Mounting details		The product was mounted with a 40mm ventilated cavity with plywood to the rear
Brief description of manufacturing process of coatings		Dry mixing, extrusion and milling of mixture of resins, pigments and additives

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

Note 2: The sponsor was unable to provide this information.

967 Series – Antimicrobial

General description		Polyester antimicrobial powder coating (967 Series) applied to an aluminium substrate
Product reference of coating system		"967 Series"
Name of manufacturer		HMG Powder Coatings Ltd
Coating product (Test face)	Generic type	Polyester powder coating (967 Series)
	Product reference	"967-0R910C-5283" (Pure White) / "967-0R320C-3262" (Traffic Red) / "967-0R905C-629" (Jet Black) / "967-0S600P-5536" (Clear)
	Name of manufacturer	HMG Powder Coatings Ltd
	Colour	All colours including clear
	Number of coats	One
	Application thickness	80 ±10 microns
	Application rate	96±12g/m^2 - 144±18g/m^2
	Specific gravity	1.2- 1.8
	Application method	Electrostatic spray
	Flame retardant details	**See Note 1 below**
	Curing process	Gas-fired oven: 10 mins @ 180°C
Substrate	Generic type	Aluminium sheet
	Product reference	"Alloy 1050A H14"
	Name of manufacturer	Aalco
	Thickness	1.6mm
	Weight per unit area	4336g/m^2
	Flame retardant details	**See Note 1 below**
Mounting details		The product was mounted with a 40mm ventilated cavity with plywood to the rear
Brief description of manufacturing process of coatings		Dry mixing, extrusion and milling of mixture of resins, pigments and additives

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

Note 2: The sponsor was unable to provide this information.

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/extended application report Nos.	Test method / extended application rules & date
Warringtonfire	HMG Powder Coatings	Formal test: WF 430667 Indicative tests: WF 429433, WF 430665, WF 430666, WF 430668, WF 430670, WF 430672	EN ISO 1716: 2018
Warringtonfire	HMG Powder Coatings	WF 429449	EN ISO 1716: 2018 Composite summary report
Warringtonfire	HMG Powder Coatings	Formal test: WF 429432 Indicative tests: WF 424401, WF 424402, WF 424403, WF 424404, WF 429436, WF 429439, WF 429442, WF 429444	EN 13823: 2010 +A1: 2014
Warringtonfire	HMG Powder Coatings	WF 429495	EN 13501-1: 2018

3.2 Test results

Test method & test number	Parameter	No. tests	Results	
			Continuous parameter - mean (m)	Compliance parameters
EN 13823	FIGRA $_{0.2MJ}$	Formal – WF 429432	0.00 W/s	-
		Indicative – WF 424401	0.00 W/s	-
		Indicative – WF 424402	0.00 W/s	-
		Indicative – WF 424403	0.00 W/s	-
		Indicative – WF 424404	0.00 W/s	-
		Indicative – WF 429436	0.00 W/s	-
		Indicative – WF 429439	0.00 W/s	-
		Indicative – WF 429442	0.00 W/s	-
		Indicative – WF 429444	0.00 W/s	-
		Overall range of results	**0.00 W/s**	-
	FIGRA $_{0.4MJ}$	Formal – WF 429432	0.00 W/s	-
		Indicative – WF 424401	0.00 W/s	-
		Indicative – WF 424402	0.00 W/s	-
		Indicative – WF 424403	0.00 W/s	-
		Indicative – WF 424404	0.00 W/s	-
		Indicative – WF 429436	0.00 W/s	-
		Indicative – WF 429439	0.00 W/s	-
		Indicative – WF 429442	0.00 W/s	-
		Indicative – WF 429444	0.00 W/s	-
	THR $_{600s}$	Formal – WF 429432	0.33 MJ	-
		Indicative – WF 424401	0.01 MJ	-
		Indicative – WF 424402	0.03 MJ	-
		Indicative – WF 424403	0.49 MJ	-
		Indicative – WF 424404	0.22 MJ	-
		Indicative – WF 429436	0.09 MJ	-
		Indicative – WF 429439	0.64 MJ	-
		Indicative – WF 429442	0.59 MJ	-
		Indicative – WF 429444	0.58 MJ	-
		Overall range of results	**0.01 – 0.64 MJ**	-
	LFS	Formal – WF 429432	-	Compliant
		Indicative – WF 424401	-	Compliant
		Indicative – WF 424402	-	Compliant
		Indicative – WF 424403	-	Compliant
		Indicative – WF 424404	-	Compliant
		Indicative – WF 429436	-	Compliant
		Indicative – WF 429439	-	Compliant
		Indicative – WF 429442	-	Compliant
		Indicative – WF 429444	-	Compliant

Continued on next page

EN 13823 (continued)	SMOGRA	Formal – WF 429432	0.00 m^2s^2	-
		Indicative – WF 424401	0.00 m^2s^2	-
		Indicative – WF 424402	0.00 m^2s^2	-
		Indicative – WF 424403	0.00 m^2s^2	-
		Indicative – WF 424404	0.00 m^2s^2	-
		Indicative – WF 429436	0.00 m^2s^2	-
		Indicative – WF 429439	0.00 m^2s^2	-
		Indicative – WF 429442	0.00 m^2s^2	-
		Indicative – WF 429444	0.00 m^2s^2	-
		Overall range of results	**0.00 m^2s^2**	-
	TSP_{600s}	Formal – WF 429432	21.12 m^2	-
		Indicative – WF 424401	17.21 m^2	-
		Indicative – WF 424402	35.36 m^2	-
		Indicative – WF 424403	18.93 m^2	-
		Indicative – WF 424404	33.60 m^2	-
		Indicative – WF 429436	12.24 m^2	-
		Indicative – WF 429439	7.15 m^2	-
		Indicative – WF 429442	9.96 m^2	-
		Indicative – WF 429444	14.44 m^2	-
		Overall range of results	**7.15 – 35.36 m^2**	-
	Fall of Flaming Droplet/Particle?	Formal – WF 429432	-	Compliant
		Indicative – WF 424401	-	Compliant
		Indicative – WF 424402	-	Compliant
		Indicative – WF 424403	-	Compliant
		Indicative – WF 424404	-	Compliant
		Indicative – WF 429436	-	Compliant
		Indicative – WF 429439	-	Compliant
		Indicative – WF 429442	-	Compliant
		Indicative – WF 429444	-	Compliant
	Flaming of Fallen Particle Exceeding 10s?	Formal – WF 429432	-	Compliant
		Indicative – WF 424401	-	Compliant
		Indicative – WF 424402	-	Compliant
		Indicative – WF 424403	-	Compliant
		Indicative – WF 424404	-	Compliant
		Indicative – WF 429436	-	Compliant
		Indicative – WF 429439	-	Compliant
		Indicative – WF 429442	-	Compliant
		Indicative – WF 429444	-	Compliant

Continued on next page

EN ISO 1716	Coating – PCS (b)	Formal – WF 430667	26.4785 MJ/kg / 2.8597 MJ/m²	-
		Indicative – WF 429433	16.5208 MJ/kg / 2.3790 MJ/m²	-
		Indicative – WF 430665	20.1643 MJ/kg / 2.6314 MJ/m²	-
		Indicative – WF 430666	19.2723 MJ/kg / 2.5150 MJ/m²	-
		Indicative – WF 430668	17.4556 MJ/kg / 2.5136 MJ/m²	-
		Indicative – WF 430670	17.9778 MJ/kg / 2.5564 MJ/m²	-
		Indicative – WF 430672	16.4439 MJ/kg / 2.3679 MJ/m²	-
		Overall range of results	**16.4439-26.4785 MJ/kg / 2.3679 - 3.2666 MJ/m²**	-
	Aluminium - PCS (b)	Deemed to satisfy (0.00)		-
	For the product as a whole PCS (e)	**Summary result**	**0.5286 – 0.7262 MJ/Kg**	-

4. Classification and field of application

4.1 Definition of Limits of Extended Application

A total of nine tests were conducted in accordance with EN 13823 and seven in accordance with BS EN ISO 1716. The initial assessment of this product family was conducted to investigate the maximum and minimum binder levels (organic content), with additional tests to further assess the inclusion of organic additives at significant levels, for varying colours, and the data generated has been used to determine which product specification gave the worst performance. To cover the variations in product specification, the following tests were performed:

Polyester powder coating 827 series (system with the highest organic content -maximum binder- formulation) – initial colour assessment
Indicative tests:

- Clear – WF 424403 (EN 13823) / WF 430667 (1716)
- White – WF 424402 (EN 13823) / WF 429433 (1716)
- Red – WF 424401 (EN 13823) / WF 430665 (1716)
- Black – WF 424404 (EN 13823) / WF 430666 (1716)

This initial indicative EN 13238 and EN ISO 1716 tests showed the "White" to be the worst performing colour in the case of EN 13823 and "Clear" & "Red" to be the worst performing colours in the case of EN ISO 1716 (not all products are available in "Clear").

Specimens in these worst case colours were then used to further asses the change in specification of other key variants in the product family to ensure consistency of performance across the whole family:

Polyester powder coating 837 series (Industrial) (system with the minimum binder content formulation)
Indicative tests:

- White – WF 429436 (EN 13823)
- Red –WF 430668 (1716)

Nylon reinforced polyester powder coating 877 series (system with the minimum binder content formulation, and addition of nylon)
Indicative tests:

- White – WF 429439 (EN 13823)
- Red –WF 430670 (1716)

Polyester powder coating 916 series (Metallic) (system with the minimum binder content formulation, and addition of aluminium powder to produce metallic lustre)
Indicative tests:

- White – WF 429442 (EN 13823)

Ultradurable polyester powder coating 924 series (maximum binder content formulation as per 827 series, but with alternative polyester backbone)
Indicative tests:

- White – WF 429444 (EN 13823)
- Red – WF 430672 (1716)

Subsequent to the indicative tests described above, formal testing was completed on the specification providing the worst case test results as follows:

Polyester powder coating 827 series (system with the highest organic content -maximum binder- formulation)
Formal tests:

- Clear – WF 430667 (1716)
- White – WF 429432 (EN 13823) - using initial results from WF 424402

So 1716 calculations were then performed for the system using the worst case specimen configuration (detailed in WF 429449), and as a supplementary calculation for a theoretical worst case system (ie worst case Red colour at maximum possible application rate used across the range).

4.2 EN ISO 1716

Initial testing of differing colours in the system with the maximum binder content (827 Series), allowed the determination that the "Clear" (100% binder) and "Red" colours provided the highest PCS values. Following additional indicative testing on the other Series in the family (lower binder content but with additives) in these worst performing colours, it became apparent that these initial results were actually the worst case overall, with a formal test being conducted

on the 827 Series, "Clear" coating product, and this evidence being used in the ISO 1716 composite summary calculations to determined the PCS values for the worst performing system.

The worst case PCS (b) for the coatings (theoretical worst case) was 3.2666 MJ/m^2, approximately 18% below the requirements for an A2 system, and the worst case PCS (e) for the system was 0.7262 MJ/kg, approximately 76% below the requirements for an A2 system, with other variants in the product range producing lower results and therefore satisfying the A2 requirements across the range.

4.3 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 the product variations have on the fire performance of "Polyester Powder Coating (827, 828, 836, 837, 727, 839, 877, 916, 924 & 967 series)", a family of Polyester based powder coating products applied to an aluminium substrate. This evidence is shown in Figures 1 and 2.

The highest FIGRA value was at 100% below the maximum value allowed for Class A2, (EN 13501-1). The highest THR600s value was at least 29% below the maximum value allowed for Class A2, (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 29% below the maximum allowed for s1, (EN 13501-1).

In no instance were flaming droplets/particles in evidence during the fire tests, so all products are compliant for d0.

4.4 Reference of classification

This classification has been carried out in accordance with EN 13501-1:2018, BS EN 15725: 2010 and EN/TS 15117: 2005.

4.5 Classification

The products, "Polyester Powder Coating (827, 828, 836, 837, 727, 839, 877, 916, 924 & 967 series)", a family of Polyester based powder coating products applied to an aluminium substrate, in relation to their reaction to fire behaviour are classified:

A2

The additional classification in relation to smoke production is:

s1

The additional classification in relation to flaming droplets / particles is:

d0

The format of the reaction to fire classification for construction applications, excluding flooring and linear pipe thermal insulation is:

Fire Behaviour		Smoke Production			Flaming Droplets	
A2	**-**	**s**	**1**	**,**	**d**	**0**

i.e. A2 – s1 , d0

Reaction to fire classification: A2 – s1, d0

4.6 Extended Field of application

This classification is valid for the following end use applications:

i) Construction applications mounted with a minimum 40mm air gap over any substrate with a density equal to or greater than 450kg/m^3, having a minimum thickness of 9mm and a fire performance of D-s2,d0 or better.

This classification is also valid for the following product parameters:

Product thickness	No variation allowed
Coating application rate	Maximum application rate for clear coatings is 96±12g/m^2. Maximum application rate for other coatings is as per relevant description table above (max. of all systems: 144±18g/m^2).
Product colour	Any variation allowed as detailed above
Product composition	No variation allowed other than as described above
Product construction	No variation allowed

5. Limitations

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

SIGNED

.....

Stacey Deeming
Principal Engineer
Technical Department

APPROVED

.....

Matthew Dale
Principal Certification Engineer
Technical Department
on behalf of Warringtonfire

Figure 1 - Effect of varying the product specification on FIGRA and TSP600s

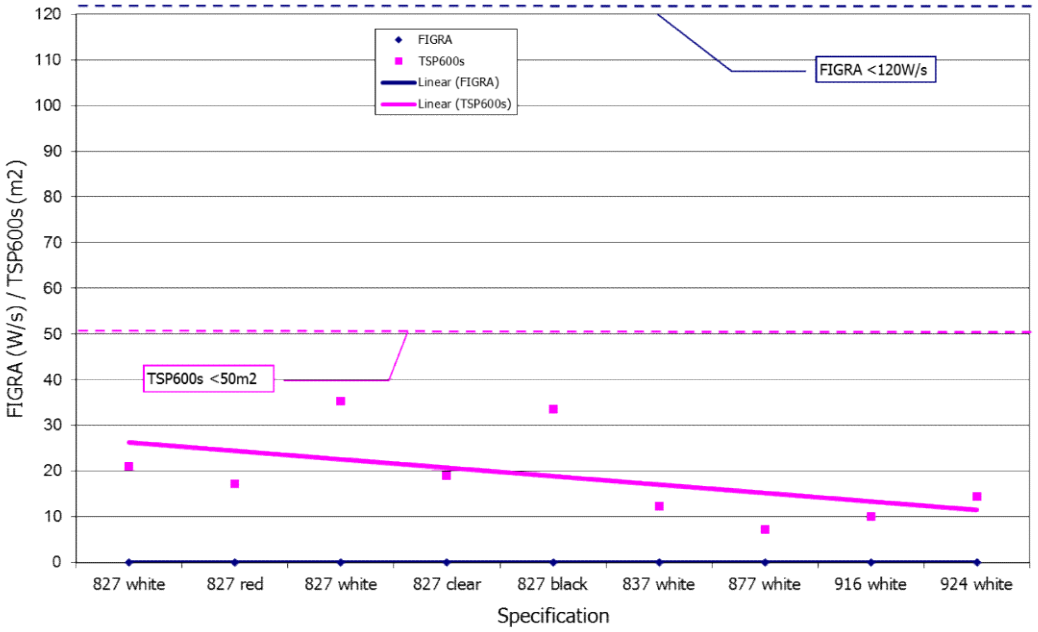

Figure 2 - Effect of varying the product specification on THR600s and SMOGRA