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Testing. Advising. Assuring.

Title:

CLASSIFICATION OF
REACTION TO FIRE
PERFORMANCE
IN ACCORDANCE WITH
EN 13501-1:2007+A1: 2009.

Notified Body No:

0833

Product Name:

"RS5000 Series - Line 2"

Report No:

WF 383675

Issue No:

1

Prepared for:

Celotex
Lady Lane Industrial Estate
Lady Lane
Hadleigh
Suffolk
IP7 6BA

Date:

17th August 2017



1. Introduction

This classification report defines the classification assigned to "RS5000 Series - Line 2", a foil faced PIR insulation family, in line with the procedures given in EN 13501-1:2007+A1: 2009.

2. Details of classified product

2.1 General

The product, "RS5000 Series - Line 2", a foil faced PIR insulation family, is defined as being suitable for construction applications, excluding flooring.

2.2 Product description

The product, "RS5000 Series - Line 2", a foil faced PIR insulation family, is fully described below and in the test reports provided in support of classification listed in Clause 3.1.

General description		Foil faced PIR insulation
Name of manufacturer		Saint-Gobain Construction Products UK Limited – Trading as Celotex
Trade names		"RS5000 Series - Line 2" (last 3 digits of product reference denotes foam thickness in mm eg. "RS5100 – Line 2" denotes foam thickness of 100mm)
Thickness of composite		100mm to 160mm
Weight per unit area of composite		3.30 kg/m ² to 5.29kg/m ²
Aluminium foil	Product reference	"FSS 38-172"
	Generic type	Aluminium foil (embossed)
	Name of manufacturer	See Note 1 below
	Weight per unit area	See Note 1 below
	Thickness	See Note 1 below
	Colour	"Silver"
	Flame retardant details	This component is inherently flame retardant
Foam	Product reference	"HP400E 28-038"
	Generic type	PIR insulation foam core
	Name of manufacturer	Saint-Gobain Construction Products UK Limited – trading as Celotex
	Thickness	100mm to 160mm
	Density	32 kg/m ³
	Flame retardant details	See Note 2 below

Continued on next page

Aluminium foil	Product reference	"FSS 38-172"
	Generic type	Aluminium foil (embossed)
	Name of manufacturer	See Note 1 below
	Weight per unit area	See Note 1 below
	Thickness	See Note 1 below
	Colour	"Silver"
	Flame retardant details	This component is inherently flame retardant
Joint Details		Long wing: one horizontal at 500mm of specimen height, vertical 200mm in from corner line - Short wing one horizontal joint at 500mm height. As per EN 13823 5.2.2
Substrate	Product reference	"Promat – Brandschutzbauplatten; Promatect-H"
	Generic type	Calcium Silicate based board
	Name of manufacturer	Promat
	Thickness	12mm
	Density	870kg/m ³
Flame retardant details		The substrate is inherently flame retardant
Brief description of manufacturing process		Facing is auto adhesively bonded to foam during the manufacturing process.

Note 1: 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.

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

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

3.1 Test reports/extended application reports

Name of Laboratory	Name of sponsor	Test reports/extended application report Nos.	Test method / extended application rules & date
Exova warringtonfire	Celotex	WF 381760	EN ISO 11925-2
Exova warringtonfire	Celotex	WF 381753, 381758	EN 13823
Exova warringtonfire	Celotex	WF 383674	EN/TS 15117

3.2 Test results

Test method & test number	Parameter	No. tests	Results	
			Continuous parameter - mean (m)	Compliance parameters
EN ISO 11925-2 (30s exposure - surface)	F _s	6	Nil	Compliant
	Flaming droplets/ particles		None	Compliant
EN ISO 11925-2 (30s exposure - edge)	F _s	6	41.7	Compliant
	Flaming droplets/ particles		None	Compliant
EN ISO 11925-2 (30s exposure - edge turned at 90 degrees)	F _s	6	91.7	Compliant
	Flaming droplets/ particles		None	Compliant
EN 13823	FIGRA _{0.2MJ}	100mm product	222.39	Compliant
		160mm product	320.07	
	FIGRA _{0.4MJ}	100mm product	193.26	Compliant
		160mm product	292.81	
	THR _{600s}	100mm product	5.09	Compliant
		160mm product	5.96	
	LFS	100mm product	None	Compliant
		160mm product	None	
	SMOGRA	100mm product	49.50	Compliant
		160mm product	83.26	
	TSP _{600s}	100mm product	69.93	Compliant
		160mm product	90.71	

4. Classification and field of application

4.1 Reference of classification

This classification has been carried out in accordance with clause 8 of EN 13501-1:2007+A1:2009.

4.2 Classification

The product, "RS5000 Series - Line 2", a foil faced PIR insulation family, in relation to its reaction to fire behaviour is classified:

D

The additional classification in relation to smoke production is:

s2

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	
D	-	s	2	,	d	0

i.e. **D – s2 , d0**

Reaction to fire classification: D – s2, d0

4.3 Field of application

This classification is valid for the following end use applications:

- i) Construction applications used over any substrate with a density equal to or greater than 870kg/m^3 , having a minimum thickness of 12mm and a fire performance of A2 or better (excluding paper faced gypsum plasterboard).

This classification is also valid for the following product parameters:

Product thickness	100mm to 160mm
Insulation thickness	100mm to 160mm
Product weight per unit area	3.30 kg/m^2 to 5.29kg/m^2
Insulation density	Tested density $\pm 15\%$
Thickness and weight per unit area of facings	For the tested thickness only. The test result obtained for Euroclass A1 and A2 facings will also be valid for thicker facings of the same type.
Product composition	No variation allowed
Product construction	No variation allowed

5. Limitations

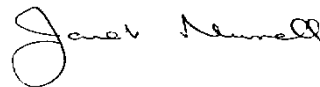
This document does not represent type approval or certification of the product.

SIGNED



.....
Jennifer Lucas-Cox
Certification Engineer
Technical Department

APPROVED



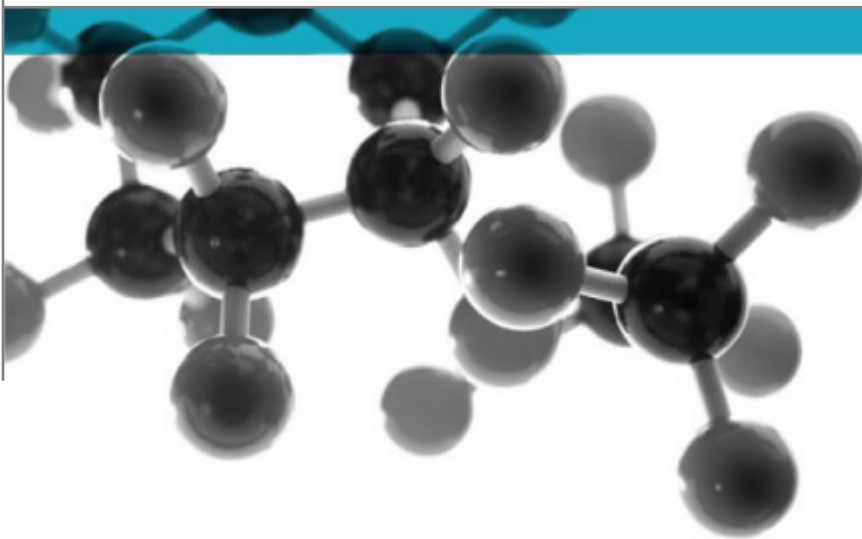
.....
Janet Murrell
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BS EN 13823:2010+A1:2014



**Reaction to Fire Tests for Building Products -
Building Products Excluding Floorings Exposed to
the Thermal Attack by a Single Burning Item**

A Report To: Celotex

Document Reference: 381749

Date: 17th August 2017

Issue No.: 2

Page 1

Testing
Advising
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Executive Summary

Objective To determine the fire performance of the following product when tested in accordance with BS EN 13823:2010+A1:2014.

Generic Description	Product reference	Thickness	Weight per unit area or density
Foil faced PIR insulation	"RS5025"	25mm	1.03 kg/m ² *
Individual components used to manufacture composite:			
Aluminium foil	"FSS 38-172"	Confidential	Confidential
Foam	"CP400E 28-028"	25mm	32 kg/m ³
Aluminium foil	"FSS 38-172"	Confidential	Confidential
*determined by Exova Warringtonfire			
Please see page 5 and 6 of this test report for the full description of the product tested			

Test Sponsor Celotex, Lady Lane Industrial Estate, Lady Lane, Hadleigh, Suffolk, IP7 6BA

Test Results (average) :

FIGRA (w/s)		THR 600s (MJ)	SMOGRA (m ² /s ²)	TSP 600s (m ²)
(0.2MJ)	(0.4MJ)	3.27	Recalculated	Recalculated
302.89	285.76		42.82	42.50


Lateral Flame Spread to End of Specimen? **None**


Fall of Flaming Drop/Particle? **None**

Flaming of Fallen Particle Exceeding 10s? **None**

Date of Test: 27th and 31st March 2017

Signatories


Responsible Officer K. Hughes * Technical Officer


Authorised S. Deeming* Business Unit Head

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

Report Issued: 17th August 2017

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Test Details

Purpose of test	To provide data which, in conjunction with data from other test methods, will enable building products excluding floorings, to be classified in accordance with the Classification requirements specified in BS EN 13501-1:2007+A1:2009. The test was performed in accordance with the procedure specified in BS EN 13823:2010+A1:2014 and this report should be read in conjunction with that standard.
Scope of test	To determine the reaction-to-fire performance of construction products, excluding floorings and excluding products which are indicated in the EC Decision 2000/147/EC, when exposed to thermal attack by a single burning item (SBI) utilising the test procedures defined in BS EN 13823:2010+A1:2014.
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 27 th and 31 st March 2017 at the request of Celotex, the sponsor of the test.
Provision of test specimens	The specimens were 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 17 th March 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.
Intended application	Thermal insulation for walls and ceilings.
Test facility	The Single Burning Item (SBI) test facility at Exova Warringtonfire is constructed in accordance with the specifications detailed in BS EN 13823:2010+A1:2014.
Deviations from the test standard	None.
Exposed face	The foil face of the specimens was exposed to the heating conditions of the test when the specimens were mounted in the test position.

Description of Test Specimens

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.

The test specimen comprised two walls (or wings) mounted into an aperture in a specimen trolley such that they formed a vertical 90° corner. The dimensions of the walls were as follows:

Short wall	-	495 ± 5 mm long x 1500 ± 5 mm high
Long wall	-	1000 ± 5 mm long x 1500 ± 5 mm high

Each wall (or wing) consisted of the following product:

General description		Foil faced PIR insulation
Name of manufacturer		Saint-Gobain Construction Products UK Limited – Trading as Celotex
Trade names		“RS5025”
Batch reference		“21-03-17 15:31-15:32 Line 1”
Thickness of composite		25 mm (stated by sponsor) 25.56mm (determined by Exova Warringtonfire)
Weight per unit area of composite		1.03 kg/m ² (determined by Exova Warringtonfire)
Aluminium foil	Product reference	“FSS 38-172”
	Generic type	Aluminium foil (embossed)
	Name of manufacturer	See Note 1 below
	Weight per unit area	See Note 1 below
	Thickness	See Note 1 below
	Colour	“Silver”
	Flame retardant details	This component is inherently flame retardant
Foam	Product reference	“CP400E 28-028”
	Generic type	PIR insulation foam core
	Name of manufacturer	Saint-Gobain Construction Products UK Limited – trading as Celotex
	Thickness	25 mm
	Density	32 kg/m ³
	Flame retardant details	See Note 2 below
Aluminium foil	Product reference	“FSS 38-172”
	Generic type	Aluminium foil (embossed)
	Name of manufacturer	See Note 1 below
	Weight per unit area	See Note 1 below
	Thickness	See Note 1 below
	Colour	“Silver”
	Flame retardant details	This component is inherently flame retardant

Joint Details		Long wing: one horizontal at 500mm of specimen height, vertical 200mm in from corner line - Short wing one horizontal joint at 500mm height. As per EN 13823 5.2.2
Substrate	Product reference	"Promat – Brandschutzbauplatten; Promatect-H"
	Generic type	Calcium Silicate based board
	Name of manufacturer	Promat
	Thickness	12mm
	Density	870kg/m ³
	Flame retardant details	The substrate is inherently flame retardant
Brief description of manufacturing process		Facing is auto adhesively bonded to foam during the manufacturing process.

Note 1: 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.

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

The specimen walls (or wings) were placed in the trolley in accordance with the requirements of section 5.3 of the Standard.

Photographs of the installed product are appended as Plates 1 and 2 in Appendix 1 of this report.

Each wing was retained in the trolley using mechanical clamps which pushed the wing against a lip at the top and bottom of the aperture in the trolley.

The trolley incorporated a triangular propane sand burner of side length 250mm, which was positioned in the base of the corner formed by the two wings of the test specimen, with a horizontal separation of 40mm between the edge of the burner and the lower edges of the wings. The burner is referred to as the primary burner and has an output of 30kW. A secondary propane sand burner was attached to the fixed frame, beneath the hood but at the furthest possible distance from the specimen when the trolley was in place. The purpose of this burner is to obtain base line data without affecting the assembled specimen. The trolley incorporated a grill in its base and this was the sole source of ventilation for the test enclosure whilst the test was in progress.

Test Results

Results and observations

The test results relate to the behaviour of the test specimens of a product under the particular conditions of the 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.

A total of three specimens were tested. The results obtained, relevant to the 'Euroclassification' of Building Products are given in Table 1.

Observations made during the test and comments on any difficulties encountered during the test are given in Table 2.

Table 1

Parameter	Result			
	Specimen 1	Specimen 2	Specimen 3	Mean
FIGRA (W/s) (<i>THR(t) threshold of 0.2MJ</i>)	339.93	314.45	254.28	302.89
FIGRA (W/S) (<i>THR(t) threshold of 0.4MJ</i>)	314.67	299.50	243.10	285.76
THR 600s (MJ)	2.84	3.54	3.43	3.27
SMOGRA (m ² /s ²) (Recalculated results)	40.69	43.27	44.49	42.82
TSP 600s (m ²) (Recalculated results)	37.27	41.66	48.58	42.50
Lateral Flame Spread to End of Specimen?	None	None	None	-
Fall of Flaming Drop/Particle?	None	None	None	-
Flaming of Fallen Particle Exceeding 10s?	None	None	None	-

Curves of time averaged rate of heat release contribution of the specimen (HRR_{av}(t)), cumulative heat release (THR(t)), and Fire Growth Rate (FIGRA) are appended as Figures 1 to 3. Curves of time averaged rate of smoke production (SPR_{av}(t)), cumulative smoke production (TSP(t)) and smoke growth rate (SMOGRA) are appended as Figures 4 to 6 in appendix 2 of this report.

Interpretation of the test results given above in the context of Euroclassification of building products should be carried out using BS EN 13501-1:2007+A1:2009.

Table 2

Time		Observations during test of Specimen 1
min	Sec	
00	00	Pre-checks performed on analysers
02	00	Auxiliary burner switched on to check correct burner operating conditions
05	00	Gas flow switched from auxiliary burner to main burner & test flames impinge on specimen
05	06	Discolouration of the surface of the product occurred in the region of the burner
05	15	Flaming on the surface of the product occurred in the region of the burner
26	00	End of test conditions. All flaming ceased.

Time		Observations during test of Specimen 2
min	Sec	
00	00	Pre-checks performed on analysers
02	00	Auxiliary burner switched on to check correct burner operating conditions
05	00	Gas flow switched from auxiliary burner to main burner & test flames impinge on specimen
05	06	Discolouration of the surface of the product occurred in the region of the burner
05	18	Flaming on the surface of the product occurred in the region of the burner
26	00	End of test conditions. All flaming ceased.

Time		Observations during test of Specimen 3
min	Sec	
00	00	Pre-checks performed on analysers
02	00	Auxiliary burner switched on to check correct burner operating conditions
05	00	Gas flow switched from auxiliary burner to main burner & test flames impinge on specimen
05	06	Discolouration of the surface of the product occurred in the region of the burner
05	09	Flaming on the surface of the product occurred in the region of the burner
26	00	End of test conditions. All flaming ceased.

Note: Impingement of the burner flame onto all three specimens commenced at 5 minutes.

Validity

The specification and interpretation of fire test methods is 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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Appendix 1

Photographs

Plate 1: Total View of the exposed surface of the long wing.



Plate 2: Close up view of the vertical outer edge of the long wing at a height of 500mm



Appendix 2

Graphs

Figure 1. $HRR_{av}(t)$ (kW)

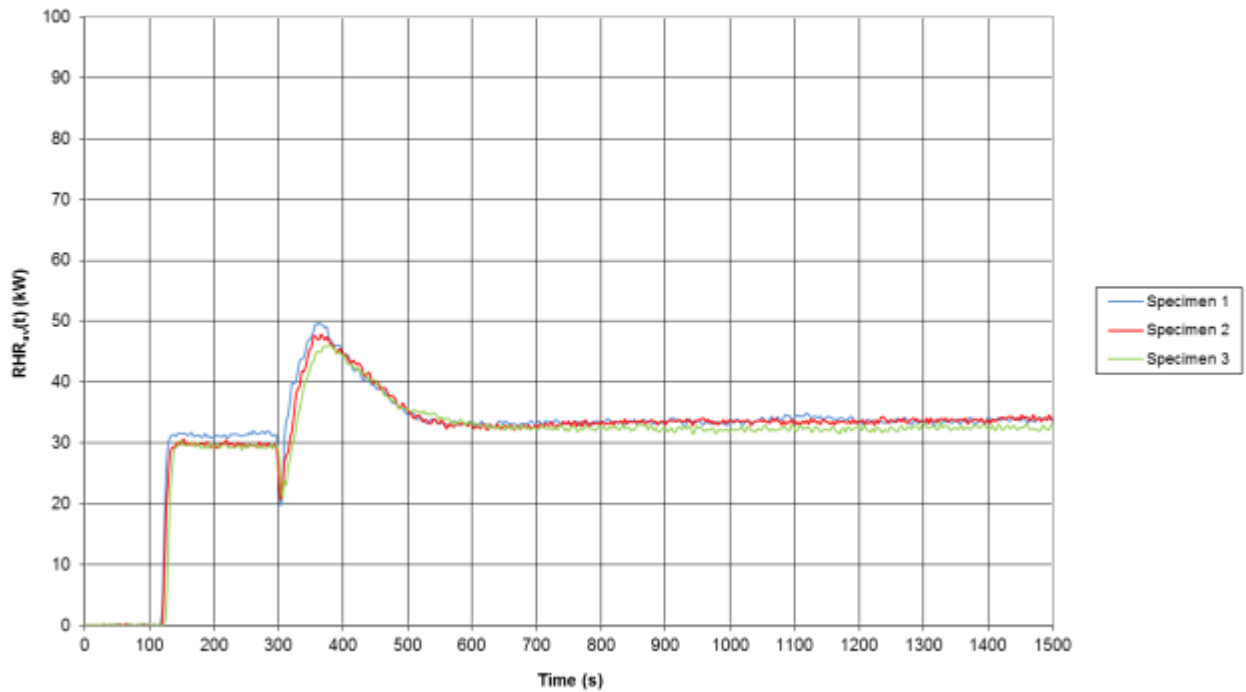


Figure 2. $THR(t)$ (MJ)

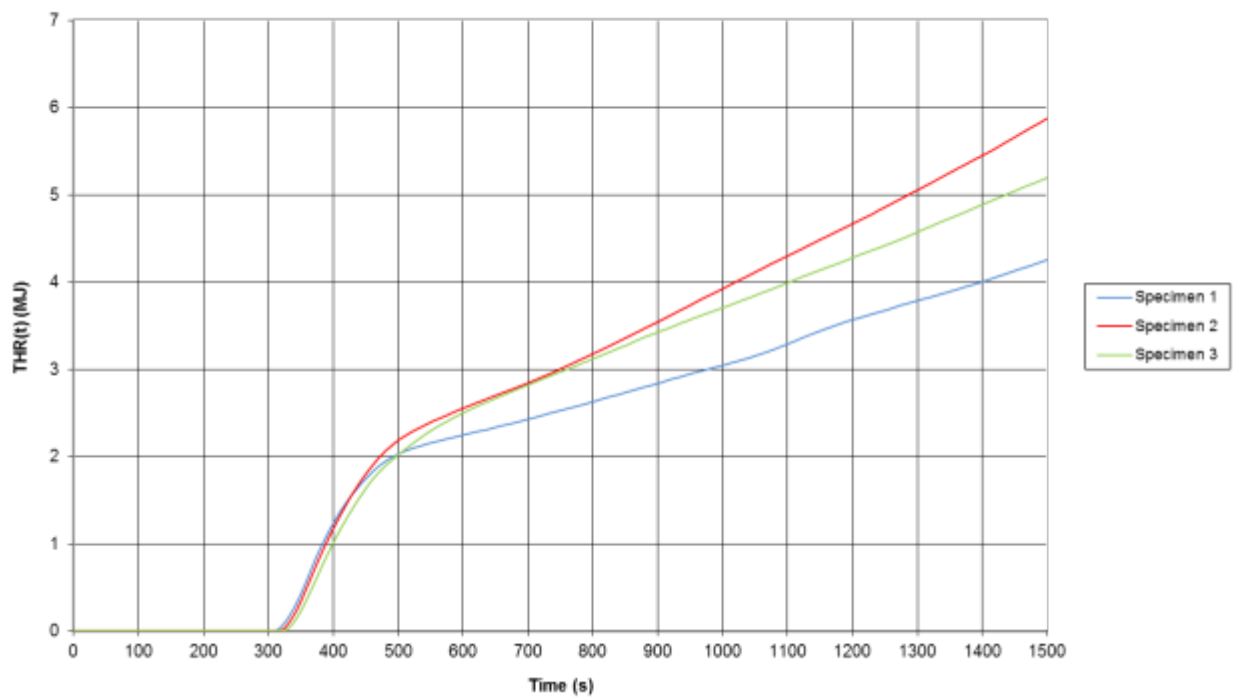


Figure 3. FIGRA

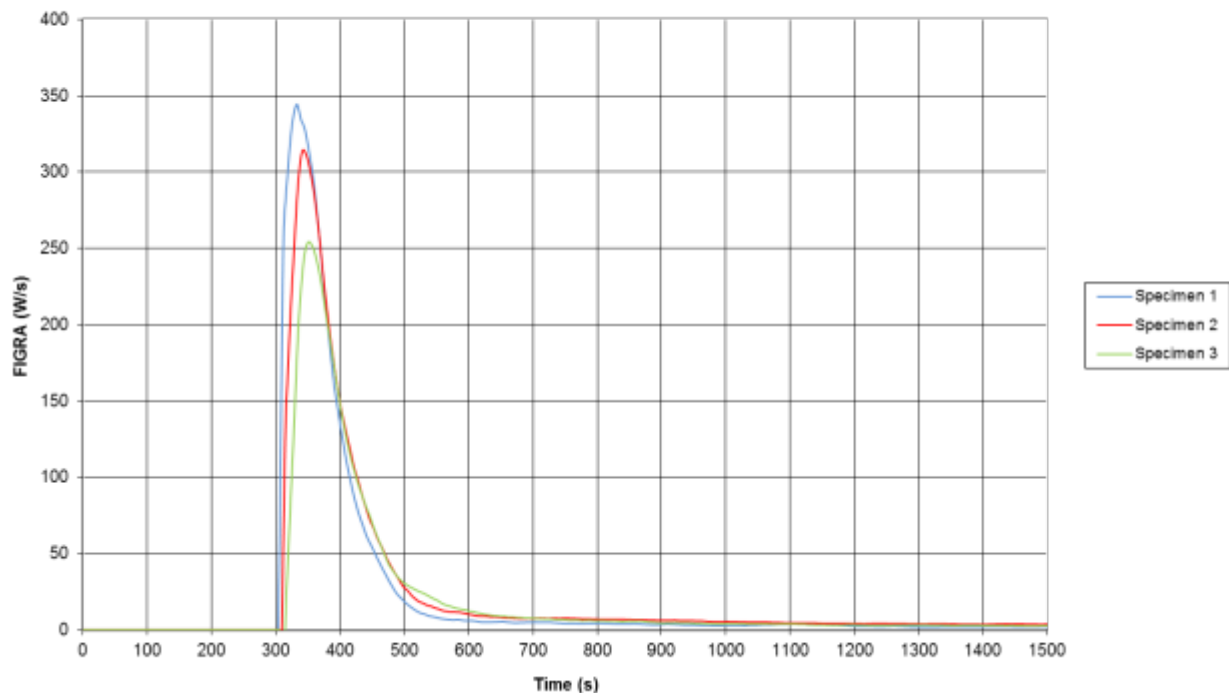


Figure 4. $SPR_{av}(t)$ (m^2/s)

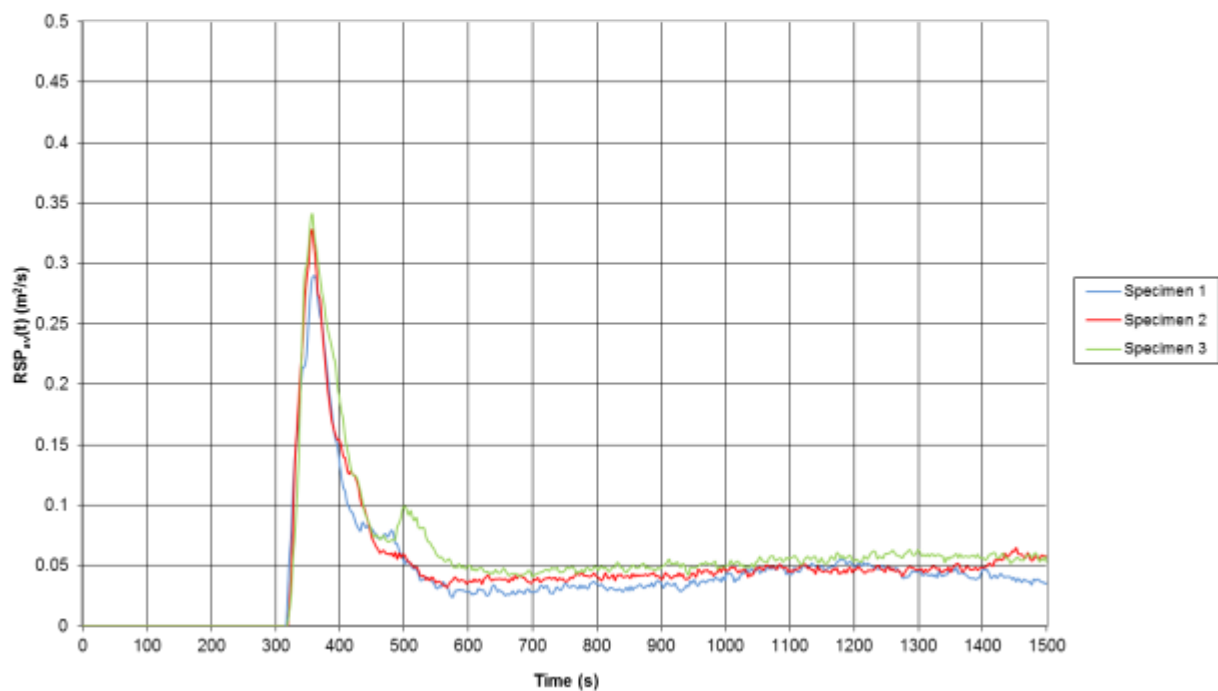


Figure 5. TSP(t) (m²)

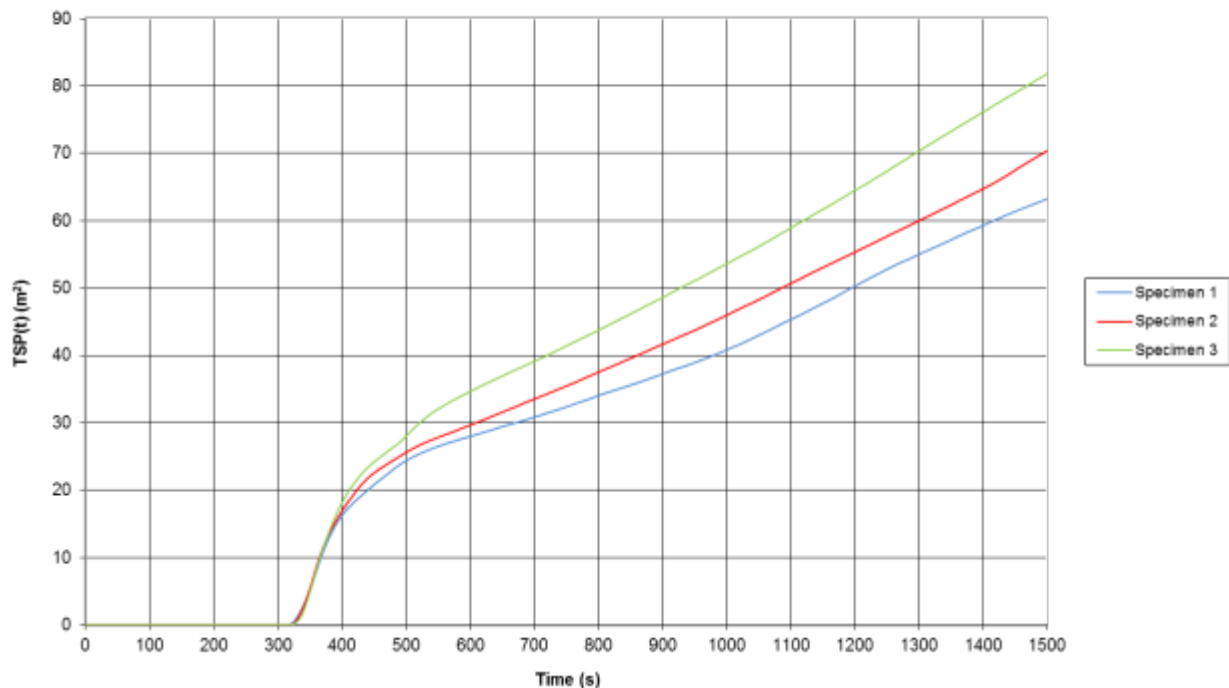
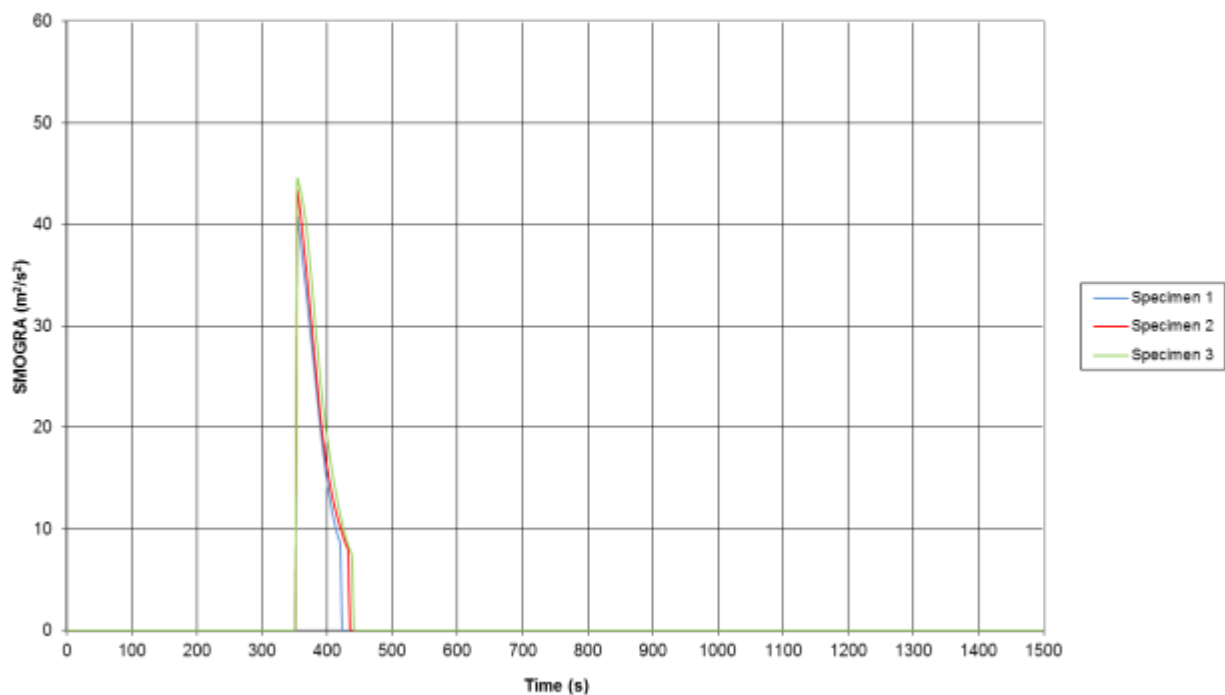


Figure 6. SMOGRA Graph.



Revision History

Issue No : 2	Re-issue Date: 17 th August 2017
Revised By: J. Lucas-Cox	Authorised By: S. Deeming
Reason for Revision: This document replaces issue 1 (dated 15 th May 2017) of the same number which has now been withdrawn. Additional information has been included and amended throughout the assessment at the request of the sponsor.	

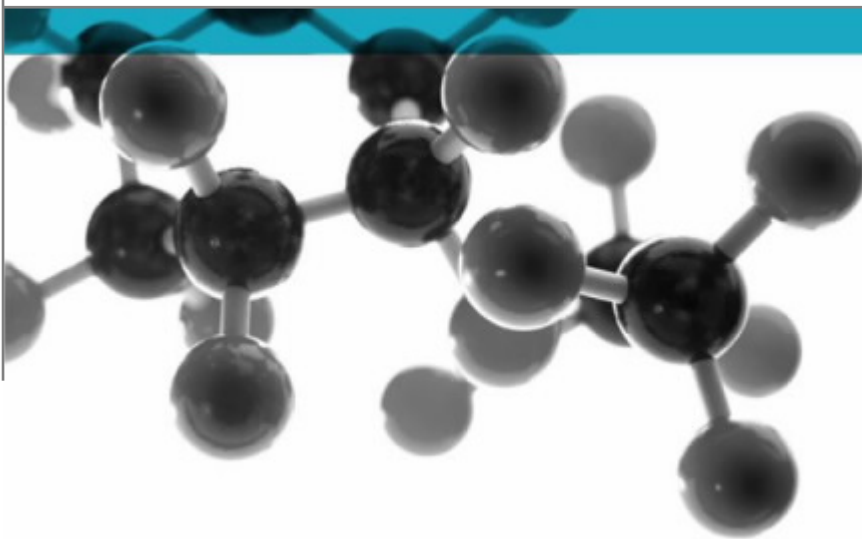
Issue No :	Re-issue Date:
Revised By:	Authorised By:
Reason for Revision:	

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BS EN ISO 11925-2: 2010



Ignitability Of Building Products Subjected To Direct Impingement Of Flame Part 2: Single Flame Source Test

A Report To: Celotex

Document Reference: 381750

Date: 17th August 2017

Issue No.: 2

Page 1

Testing
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Executive Summary

Objective To determine the performance of the following product when tested in accordance with BS EN ISO 11925-2:2010.

Generic Description	Product reference	Thickness	Weight per unit area or density
Foil faced PIR insulation	"RS5025"	25mm	1.03 kg/m ^{2*}
Individual components used to manufacture composite:			
Aluminium foil	"FSS 38-172"	Confidential	Confidential
Foam	"CP400E 28-028"	25mm	32 kg/m ³
Aluminium foil	"FSS 38-172"	Confidential	Confidential
*determined by Exova Warringtonfire			
Please see page 5 and 6 of this test report for the full description of the product tested			

Test Sponsor Celotex, Lady Lane Industrial Estate, Lady Lane, Hadleigh, Suffolk, IP76BA

Test Results: On the set of six specimens which were subject to surface application, the maximum flame height reached was observed to be 60 ± 0.9 mm



On the set of six specimens which were subject to edge application, the maximum flame height reached was observed to be 40 ± 0.9 mm

On the set of six specimens which were turned around at 90° with foam edge exposed, the maximum flame height reached was observed to be 100 ± 0.9 mm

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

Date of Test 5th April 2017

Signatories

	
Responsible Officer K. Hughes * Technical Officer	Authorised S. Deeming* Business Unit Head

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

Report Issued: 17th August 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 BS EN ISO 11925-2:2010 "Reaction to Fire tests - Ignitability Of Building Products Subjected to Direct Impingement of Flame – Part 2: Single Flame Source Test".</p> <p>The test was performed in accordance with the procedure specified in BS EN ISO 11925-2:2010 Reaction to Fire Tests - Ignitability of Building Products subjected to direct impingement of flame – Part 2: Single Flame Source Test, and this report should be read in conjunction with that BS EN ISO Standard.</p>
Scope of test	BS EN ISO 11925-2 specifies a method of test for determining the ignitability of building products by direct small flame impingement under zero impressed irradiance using specimens tested in a vertical orientation.
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 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.
Instruction to test	The test was conducted on the 5 th April 2017 at the request of Celotex, the sponsor of the test.
Provision of test specimens	The specimens were supplied by the sponsor of the test. Exova Warringtonfire was not involved in any selection or sampling procedure.
Conditioning of specimens	<p>The specimens were received on the 17th March 2017.</p> <p>Prior to test the specimens were stored for 2 days in a standard atmosphere as defined in BS EN 13238:2010 Conditioning Procedures and General Rules for selection of substrates until constant mass was achieved.</p>
Intended application	Thermal insulation for walls and ceilings.
Substrate	The specimens were tested with a calcium silicate substrate.
Flame application time	The flame was applied for 30 seconds.

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		Foil faced PIR insulation
Name of manufacturer		Saint-Gobain Construction Products UK Limited – Trading as Celotex
Trade names		“RS5025”
Batch reference		“21-03-17 15:31-15:32 Line 1”
Thickness of composite		25 mm (stated by sponsor) 25.56mm (determined by Exova Warringtonfire)
Weight per unit area of composite		1.03 kg/m ² (determined by Exova Warringtonfire)
Aluminium foil	Product reference	“FSS 38-172”
	Generic type	Aluminium foil (embossed)
	Name of manufacturer	See Note 1 below
	Weight per unit area	See Note 1 below
	Thickness	See Note 1 below
	Colour	“Silver”
Flame retardant details		This component is inherently flame retardant
Foam	Product reference	“CP400E 28-028”
	Generic type	PIR insulation foam core
	Name of manufacturer	Saint-Gobain Construction Products UK Limited – trading as Celotex
	Thickness	25 mm
	Density	32 kg/m ³
	Colour reference	“Yellow”
Flame retardant details		See Note 2 below
Aluminium foil	Product reference	“FSS 38-172”
	Generic type	Aluminium foil (embossed)
	Name of manufacturer	See Note 1 below
	Weight per unit area	See Note 1 below
	Thickness	See Note 1 below
	Colour	“Silver”
Flame retardant details		This component is inherently flame retardant
Substrate	Product reference	“Promat – Brandschultzbauplatten; Promatect-H”
	Generic type	Calcium Silicate based board
	Name of manufacturer	Promat
	Thickness	12mm
	Density	870kg/m ³
	Flame retardant details	The substrate is inherently flame retardant
Brief description of manufacturing process		Facing is auto adhesively bonded to foam during the manufacturing process.

Note 1: 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.

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

Test Results

Number of specimens tested

Six specimens were tested, each of which were subjected to surface exposure to flame with the foil face exposed.

Six specimens were tested, each of which were subjected to edge exposure to flame with the foil face exposed.

Six specimens were tested, each of which were subjected to edge exposure to flame with the specimen turned at 90° round its vertical axis and the foam face exposed.

Applicability of test results

The test results relate to the behaviour of the test specimens of a product under the particular conditions of the 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.

The test results for the individual specimens, together with observations made during the test and comments on any difficulties encountered during the test are given in Tables 1, 2 and 3.

On the set of six specimens which were subject to surface application, the maximum flame height reached was observed to be $60 \pm 0.9\text{mm}$

On the set of six specimens which were subject to edge application, the maximum flame height reached was observed to be $40 \pm 0.9\text{mm}$

On the set of six specimens which were turned around at 90° with foam edge exposed, the maximum flame height reached was observed to be $100 \pm 0.9\text{mm}$

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

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
Test Flame Application Position - Surface of foil face

Specimen No.	Ignition Yes/No	Time from start of test for flame tip to reach 150mm (seconds)	Extent of Flame Spread (mm)	Flaming Debris	Glowing	Extent of Damaged Area (mm)	
						Height	Width
1	Yes	Did not reach	50	None	None	63	38
2	Yes	Did not reach	60	None	None	50	38
3	Yes	Did not reach	50	None	None	58	30
4	Yes	Did not reach	50	None	None	54	32
5	Yes	Did not reach	40	None	None	51	33
6	Yes	Did not reach	50	None	None	54	37

Table 2
Test Flame Application Position - Edge of foil face

Specimen No.	Ignition Yes/No	Time from start of test for flame tip to reach 150mm (seconds)	Extent of Flame Spread (mm)	Flaming Debris	Glowing	Extent of Damaged Area (mm)	
						Height	Width
1	Yes	Did not reach	40	None	None	54	32
2	Yes	Did not reach	40	None	None	50	35
3	Yes	Did not reach	30	None	None	52	37
4	Yes	Did not reach	30	None	None	54	32
5	Yes	Did not reach	40	None	None	57	34
6	Yes	Did not reach	40	None	None	50	30

Table 3
Test Flame Application Position - Edge Of The Specimen Turned At 90° Round Its Vertical Axis And The Insulation Face Exposed.

Specimen No.	Ignition Yes/No	Time from start of test for flame tip to reach 150mm (seconds)	Extent of Flame Spread (mm)	Flaming Debris	Glowing	Extent of Damaged Area (mm)	
						Height	Width
1	Yes	Did not reach	100	None	None	95	17
2	Yes	Did not reach	90	None	None	90	18
3	Yes	Did not reach	90	None	None	93	20
4	Yes	Did not reach	90	None	None	95	17
5	Yes	Did not reach	100	None	None	92	16
6	Yes	Did not reach	100	None	None	91	17

Revision History

Issue No : 2	Re-issue Date : 17 th August 2017
Revised By: J. Lucas-Cox	Approved By: S. Deeming
Reason for Revision: This document replaces issue 1 (dated 15 th May 2017) of the same number which has now been replaced and superseded. Additional information has been included and amended throughout the assessment at the request of the sponsor.	

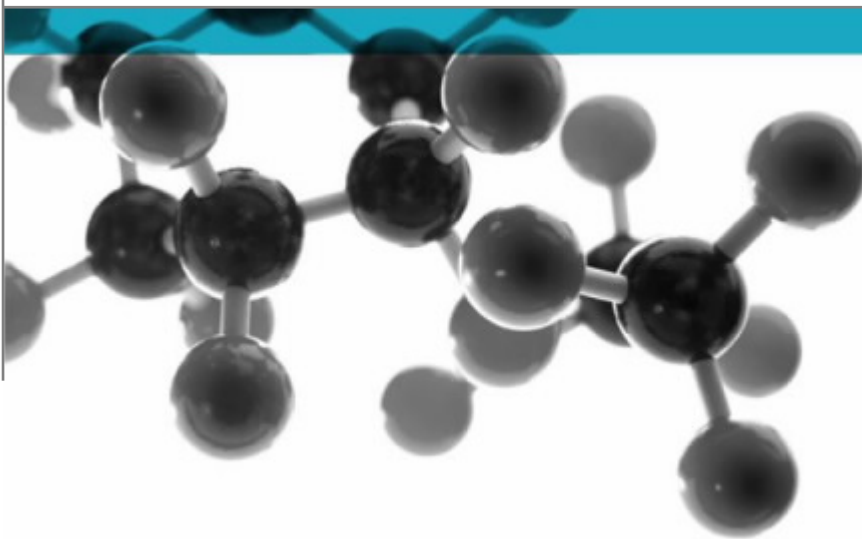
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Revised By:	Approved By:
Reason for Revision:	

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BS EN 13823:2010+A1:2014



**Reaction to Fire Tests for Building Products -
Building Products Excluding Floorings Exposed to
the Thermal Attack by a Single Burning Item**

A Report To: Celotex

Document Reference: 381751

Date: 17th August 2017

Issue No.: 2

Page 1

Testing
Advising
Assuring



Executive Summary

Objective To determine the fire performance of the following product when tested in accordance with BS EN 13823:2010+A1:2014.

Generic Description	Product reference	Thickness	Weight per unit area or density
Foil faced PIR insulation	"RS5100"	100mm	3.33 kg/m ² *
Individual components used to manufacture composite:			
Aluminium foil	"FSS 38-172"	Confidential	Confidential
Foam	"CP400E 28-028"	100mm	32 kg/m ³
Aluminium foil	"FSS 38-172"	Confidential	Confidential
*determined by Exova Warringtonfire			
Please see page 5 and 6 of this test report for the full description of the product tested			

Test Sponsor Celotex, Lady Lane Industrial Estate, Lady Lane, Hadleigh, Suffolk, IP7 6BA


Test Results (average) :


FIGRA (w/s)		THR 600s (MJ)	SMOGRA (m ² /s ²)	TSP 600s (m ²)
(0.2MJ)	(0.4MJ)	5.26	Recalculated	Recalculated
249.41	224.66		51.35	71.64

Lateral Flame Spread to End of Specimen? **None**
 Fall of Flaming Drop/Particle? **None**
 Flaming of Fallen Particle Exceeding 10s? **Non**

Date of Test: 3rd April 2017

Signatories


Responsible Officer K. Hughes * Technical Officer


Authorised S. Deeming* Business Unit Head

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

Report Issued: 17th August 2017

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EXECUTIVE SUMMARY	2
SIGNATORIES	3
TEST DETAILS	5
DESCRIPTION OF TEST SPECIMENS	6
TEST RESULTS	8
APPENDIX 2	11
REVISION HISTORY	14

Test Details

Purpose of test	To provide data which, in conjunction with data from other test methods, will enable building products excluding floorings, to be classified in accordance with the Classification requirements specified in BS EN 13501-1:2007+A1:2009. The test was performed in accordance with the procedure specified in BS EN 13823:2010+A1:2014 and this report should be read in conjunction with that standard.
Scope of test	To determine the reaction-to-fire performance of construction products, excluding floorings and excluding products which are indicated in the EC Decision 2000/147/EC, when exposed to thermal attack by a single burning item (SBI) utilising the test procedures defined in BS EN 13823:2010+A1:2014.
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 3 rd April 2017 at the request of Celotex, the sponsor of the test.
Provision of test specimens	The specimens were 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 17 th March 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.
Intended application	Thermal insulation for walls and ceilings.
Test facility	The Single Burning Item (SBI) test facility at Exova Warringtonfire is constructed in accordance with the specifications detailed in BS EN 13823:2010+A1:2014.
Deviations from the test standard	None.
Exposed face	The foil face of the specimens was exposed to the heating conditions of the test when the specimens were mounted in the test position.

Description of Test Specimens

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.

The test specimen comprised two walls (or wings) mounted into an aperture in a specimen trolley such that they formed a vertical 90° corner. The dimensions of the walls were as follows:

Short wall	-	495 ± 5 mm long x 1500 ± 5 mm high
Long wall	-	1000 ± 5 mm long x 1500 ± 5 mm high

Each wall (or wing) consisted of the following product:

General description		Foil faced PIR insulation
Name of manufacturer		Saint-Gobain Construction Products UK Limited – Trading as Celotex
Trade names		“RS5100”
Batch reference		“08-03-17 17:13-17:14 Line 1”
Thickness of composite		100 mm (stated by sponsor) 99mm (determined by Exova Warringtonfire)
Weight per unit area of composite		3.33 kg/m ² (determined by Exova Warringtonfire)
Aluminium foil	Product reference	“FSS 38-172”
	Generic type	Aluminium foil (embossed)
	Name of manufacturer	See Note 1 below
	Weight per unit area	See Note 1 below
	Thickness	See Note 1 below
	Colour	“Silver”
	Flame retardant details	This component is inherently flame retardant
Foam	Product reference	“CP400E 28-028”
	Generic type	PIR insulation foam core
	Name of manufacturer	Saint-Gobain Construction Products UK Limited – trading as Celotex
	Thickness	100 mm
	Density	32 kg/m ³
	Flame retardant details	See Note 2 below
Aluminium foil	Product reference	“FSS 38-172”
	Generic type	Aluminium foil (embossed)
	Name of manufacturer	See Note 1 below
	Weight per unit area	See Note 1 below
	Thickness	See Note 1 below
	Colour	“Silver”
	Flame retardant details	This component is inherently flame retardant

Joint Details		Long wing: one horizontal at 500mm of specimen height, vertical 200mm in from corner line - Short wing one horizontal joint at 500mm height. As per EN 13823 5.2.2
Substrate	Product reference	"Promat – Brandschutzbauplatten; Promatect-H"
	Generic type	Calcium Silicate based board
	Name of manufacturer	Promat
	Thickness	12mm
	Density	870kg/m ³
	Flame retardant details	The substrate is inherently flame retardant
Brief description of manufacturing process		Facing is auto adhesively bonded to foam during the manufacturing process.

Note 1: 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.

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

The specimen walls (or wings) were placed in the trolley in accordance with the requirements of section 5.3 of the Standard.

Photographs of the installed product are appended as Plates 1 and 2 in Appendix 1 of this report.

Each wing was retained in the trolley using mechanical clamps which pushed the wing against a lip at the top and bottom of the aperture in the trolley.

The trolley incorporated a triangular propane sand burner of side length 250mm, which was positioned in the base of the corner formed by the two wings of the test specimen, with a horizontal separation of 40mm between the edge of the burner and the lower edges of the wings. The burner is referred to as the primary burner and has an output of 30kW. A secondary propane sand burner was attached to the fixed frame, beneath the hood but at the furthest possible distance from the specimen when the trolley was in place. The purpose of this burner is to obtain base line data without affecting the assembled specimen. The trolley incorporated a grill in its base and this was the sole source of ventilation for the test enclosure whilst the test was in progress.

Test Results

Results and observations

The test results relate to the behaviour of the test specimens of a product under the particular conditions of the 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.

A total of three specimens were tested. The results obtained, relevant to the 'Euroclassification' of Building Products are given in Table 1.

Observations made during the test and comments on any difficulties encountered during the test are given in Table 2.

Table 1

Parameter	Result			
	Specimen 1	Specimen 2	Specimen 3	Mean
FIGRA (W/s) (<i>THR(t) threshold of 0.2MJ</i>)	186.63	316.40	245.19	249.41
FIGRA (W/S) (<i>THR(t) threshold of 0.4MJ</i>)	156.39	283.86	233.74	224.66
THR 600s (MJ)	5.02	5.41	5.35	5.26
SMOGRA (m ² /s ²) (Recalculated results)	41.02	66.09	46.93	51.35
TSP 600s (m ²) (Recalculated results)	68.00	75.72	71.21	71.64
Lateral Flame Spread to End of Specimen?	None	None	None	-
Fall of Flaming Drop/Particle?	None	None	None	-
Flaming of Fallen Particle Exceeding 10s?	None	None	None	-

Curves of time averaged rate of heat release contribution of the specimen (HRR_{av}(t)), cumulative heat release (THR(t)), and Fire Growth Rate (FIGRA) are appended as Figures 1 to 3. Curves of time averaged rate of smoke production (SPR_{av}(t)), cumulative smoke production (TSP(t)) and smoke growth rate (SMOGRA) are appended as Figures 4 to 6 in appendix 2 of this report.

Interpretation of the test results given above in the context of Euroclassification of building products should be carried out using BS EN 13501-1:2007+A1:2009.

Table 2

Time		Observations during test of Specimen 1
min	Sec	
00	00	Pre-checks performed on analysers
02	00	Auxiliary burner switched on to check correct burner operating conditions
05	00	Gas flow switched from auxiliary burner to main burner & test flames impinge on specimen
05	06	Discolouration of the surface of the product occurred in the region of the burner
05	18	Flaming on the surface of the product occurred in the region of the burner
26	00	End of test conditions. Flaming continued to the end of the test.

Time		Observations during test of Specimen 2
min	Sec	
00	00	Pre-checks performed on analysers
02	00	Auxiliary burner switched on to check correct burner operating conditions
05	00	Gas flow switched from auxiliary burner to main burner & test flames impinge on specimen
05	12	Discolouration of the surface of the product occurred in the region of the burner
05	15	Flaming on the surface of the product occurred in the region of the burner
26	00	End of test conditions. Flaming continued to the end of the test.

Time		Observations during test of Specimen 3
min	Sec	
00	00	Pre-checks performed on analysers
02	00	Auxiliary burner switched on to check correct burner operating conditions
05	00	Gas flow switched from auxiliary burner to main burner & test flames impinge on specimen
05	09	Discolouration of the surface of the product occurred in the region of the burner
05	09	Flaming on the surface of the product occurred in the region of the burner
26	00	End of test conditions. Flaming continued to the end of the test.

Note: Impingement of the burner flame onto all three specimens commenced at 5 minutes.

Validity

The specification and interpretation of fire test methods is 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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Photographs

Plate 1: Total View of the exposed surface of the long wing.



Plate 2: Close up view of the vertical outer edge of the long wing at a height of 500mm



Appendix 2

Graphs

Figure 1. $HRR_{av}(t)$ (kW)

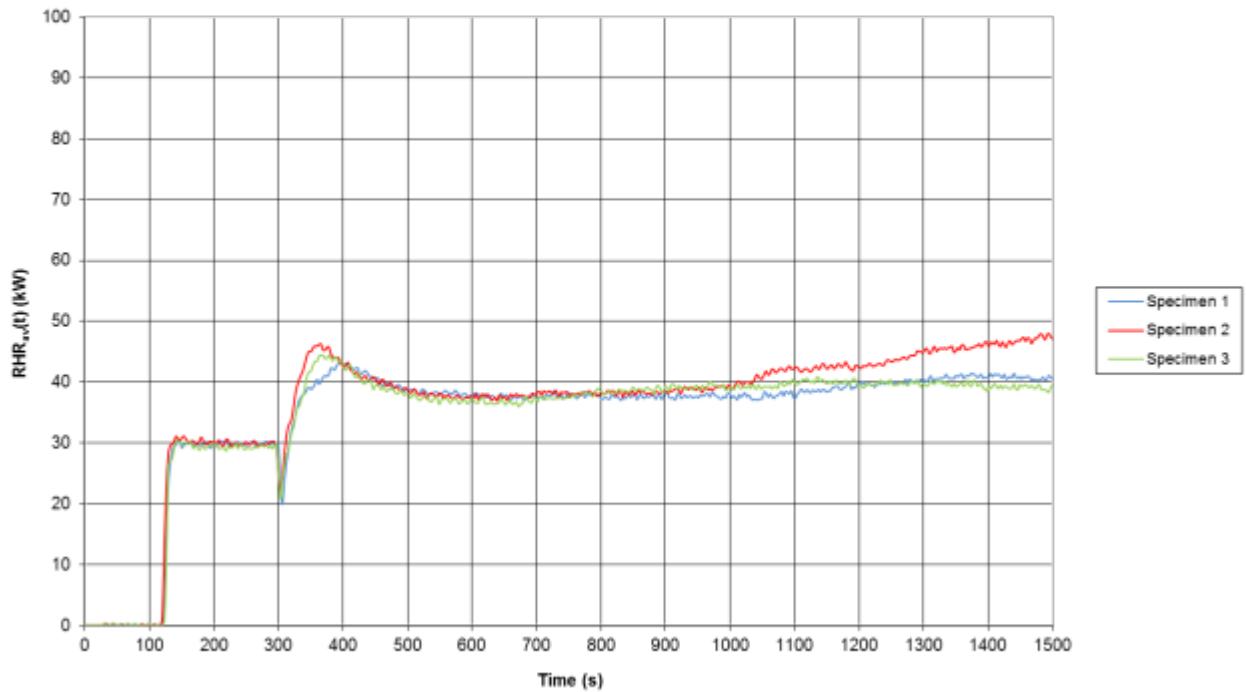


Figure 2. $THR(t)$ (MJ)

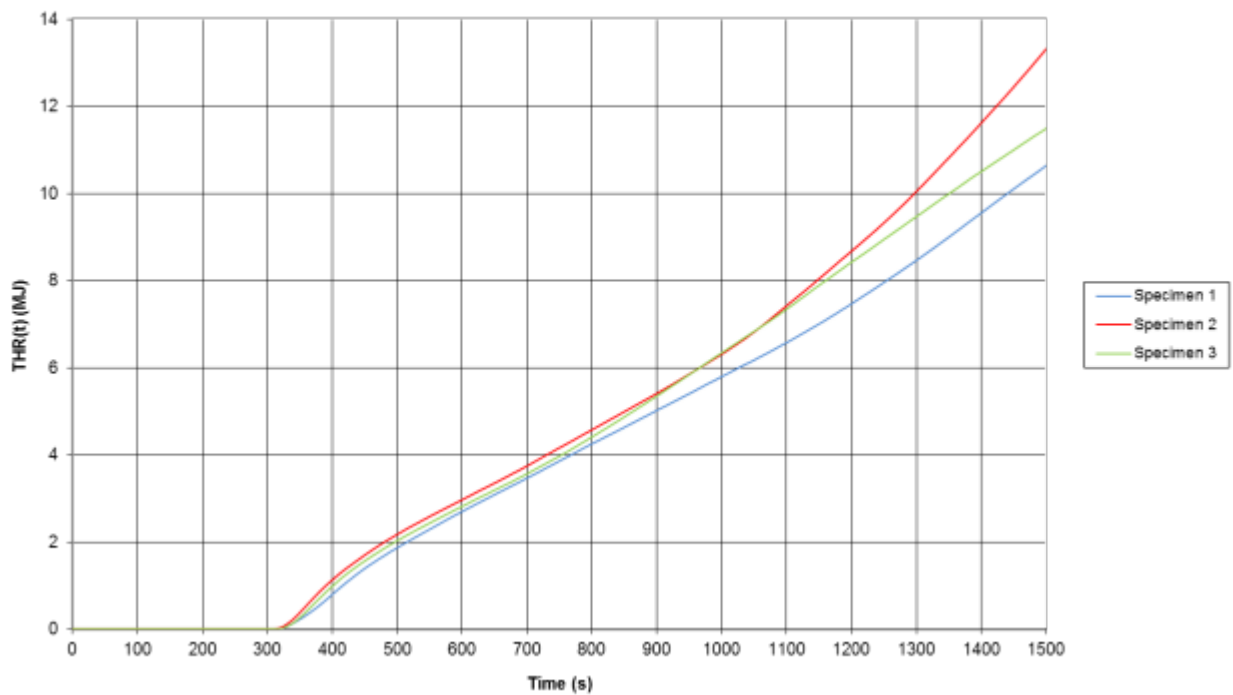


Figure 3. FIGRA

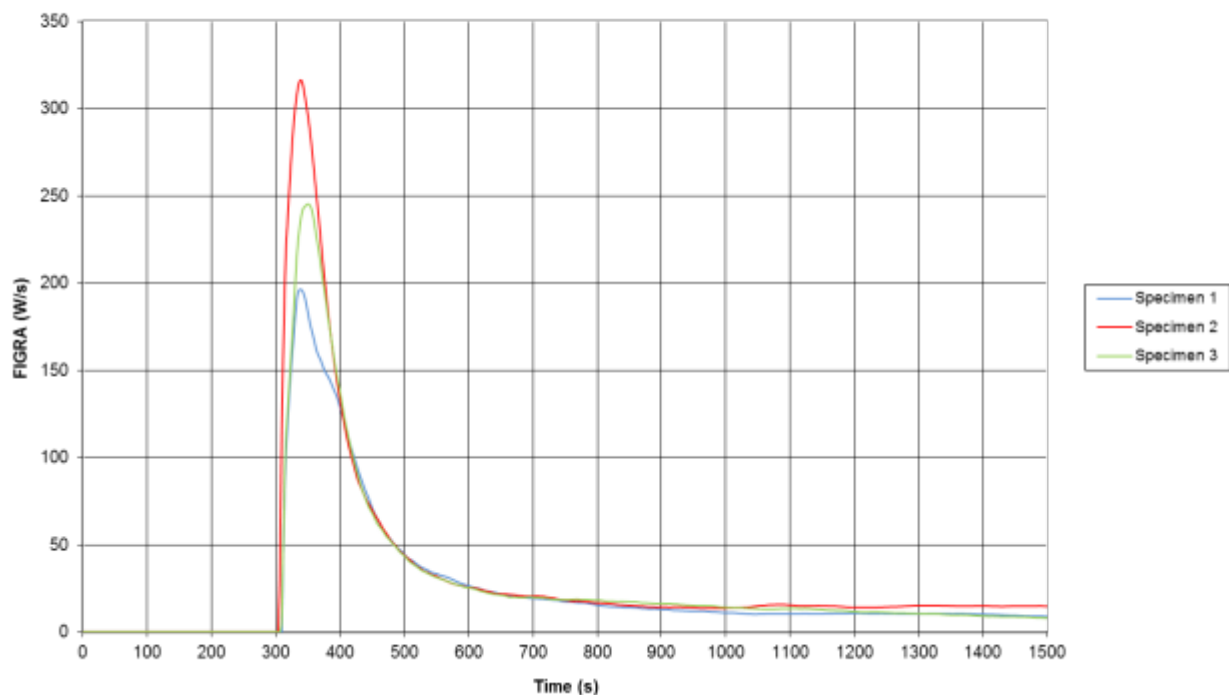


Figure 4. $SPR_{av}(t)$ (m^2/s)

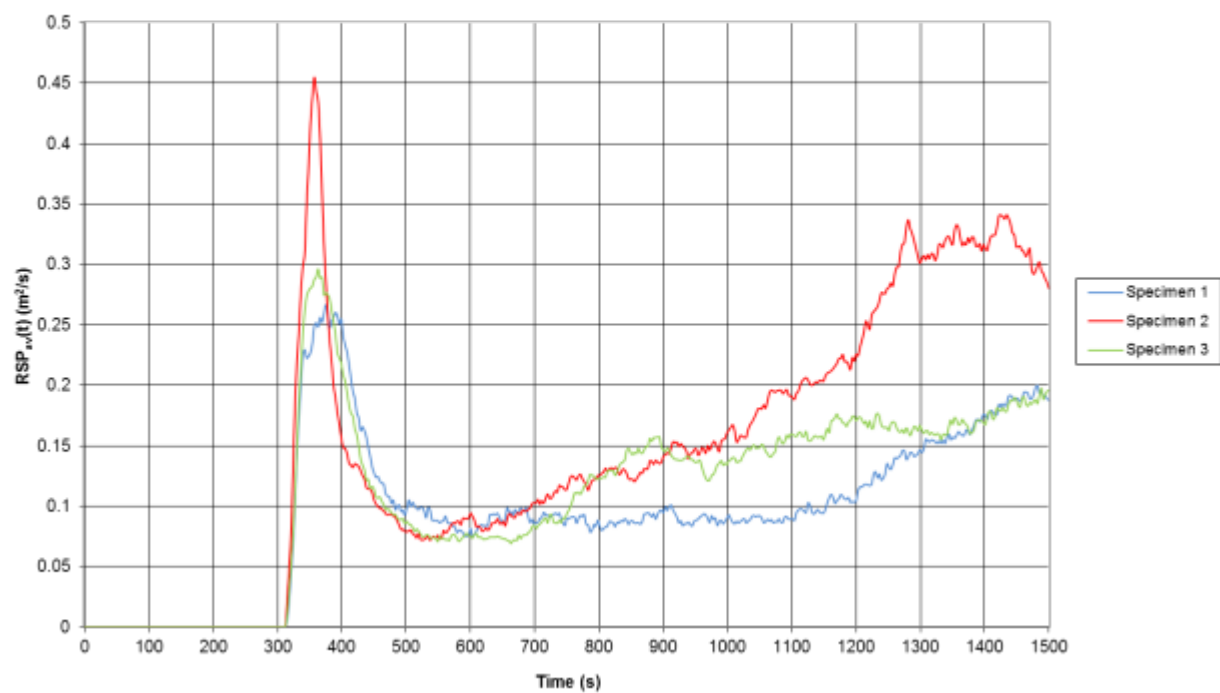


Figure 5. TSP(t) (m²)

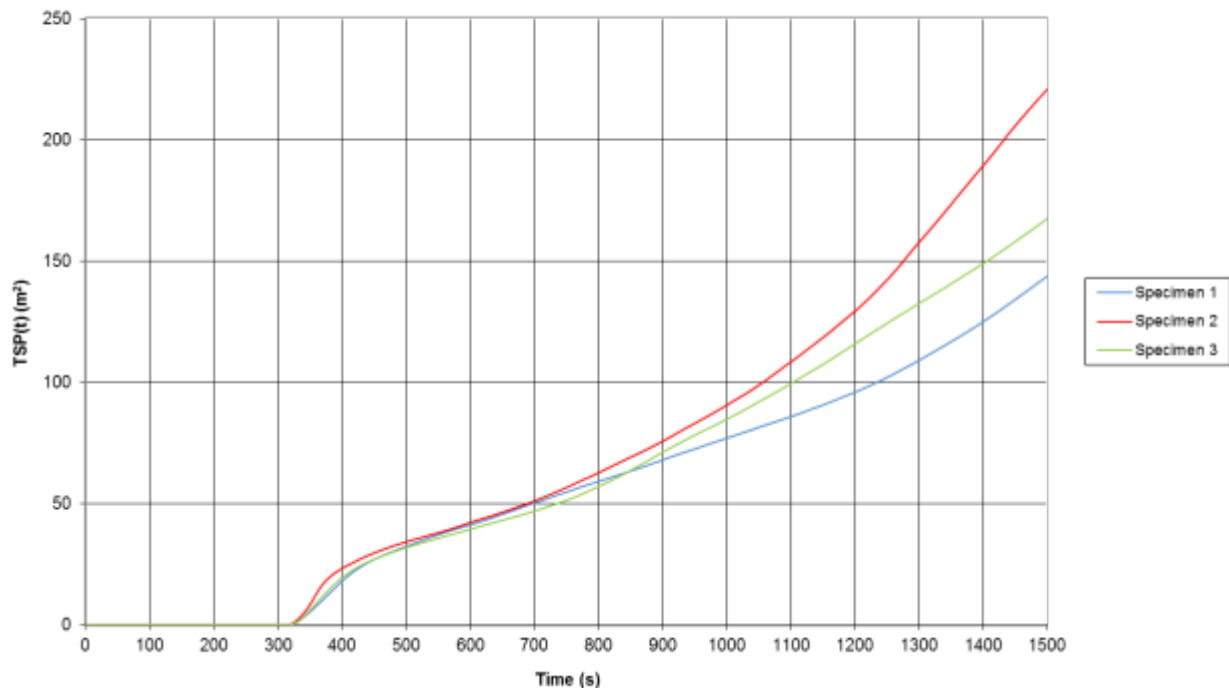
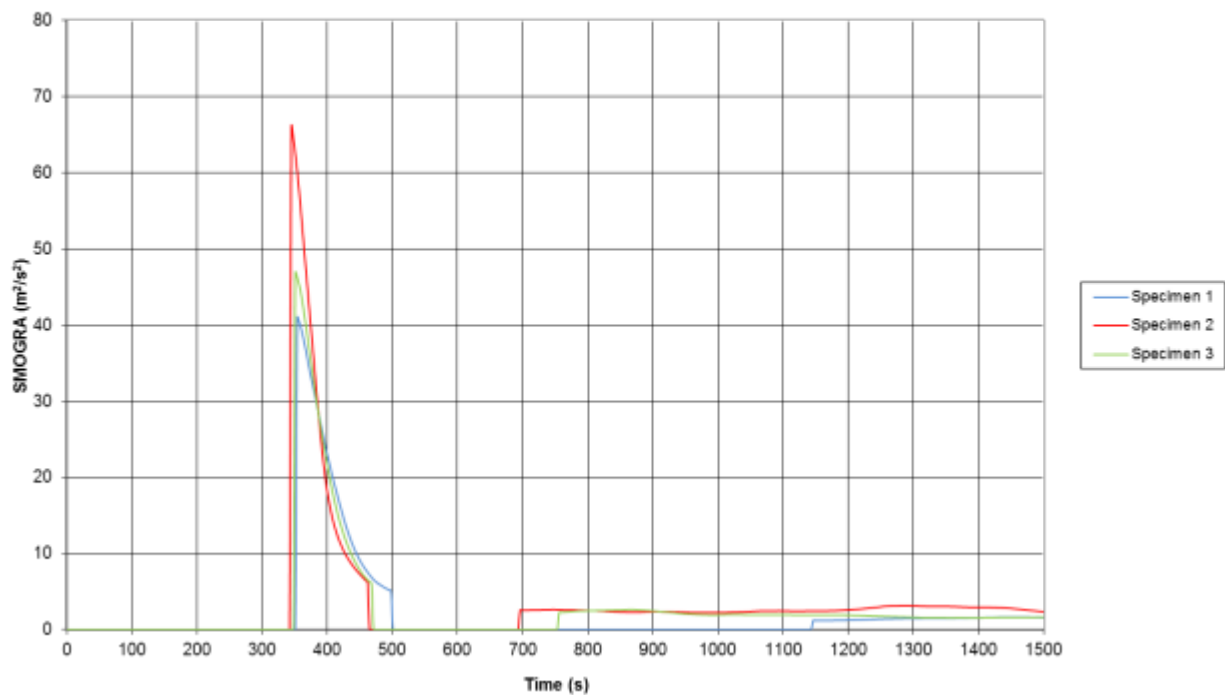


Figure 6. SMOGRA Graph.



Revision History

Issue No : 2	Re-issue Date: 17 th August 2017
Revised By: J. Lucas-Cox	Authorised By: S. Deeming
Reason for Revision: This document replaces issue 1 (dated 15 th May 2017) of the same number which has now been replaced and superseded. Additional information has been included and amended throughout the assessment at the request of the sponsor.	

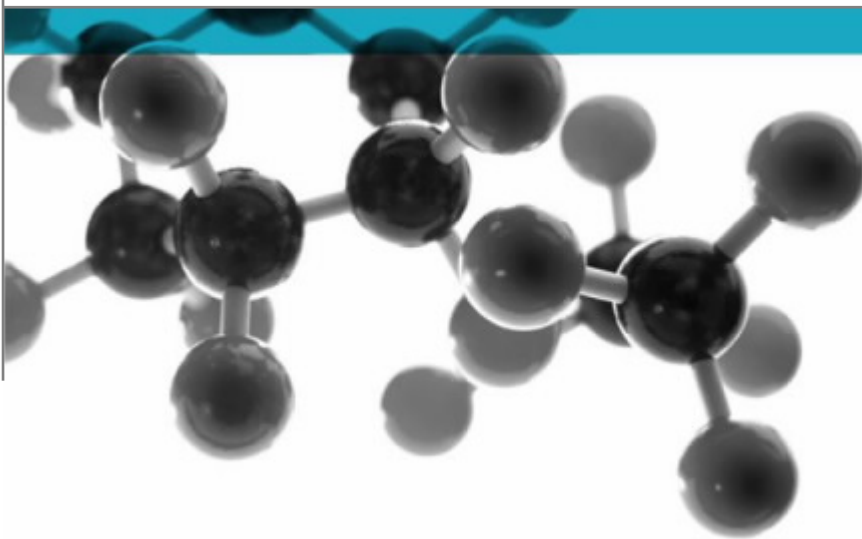
Issue No :	Re-issue Date:
Revised By:	Authorised By:
Reason for Revision:	

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BS EN 13823:2010+A1:2014



**Reaction to Fire Tests for Building Products -
Building Products Excluding Floorings Exposed to
the Thermal Attack by a Single Burning Item**

A Report To: Celotex

Document Reference: 381753

Date: 17th August 2017

Issue No.: 2

Page 1

Testing
Advising
Assuring



Executive Summary

Objective To determine the fire performance of the following product when tested in accordance with BS EN 13823:2010+A1:2014.

Generic Description	Product reference	Thickness	Weight per unit area or density
Foil faced PIR insulation	"RS5100"	100mm	3.30 kg/m ² *
Individual components used to manufacture composite:			
Aluminium foil	"FSS 38-172"	Confidential	Confidential
Foam	"HP400E 28-038"	100mm	32 kg/m ³
Aluminium foil	"FSS 38-172"	Confidential	Confidential
*determined by Exova Warringtonfire			
Please see page 5 and 6 of this test report for the full description of the product tested			

Test Sponsor Celotex, Lady Lane Industrial Estate, Lady Lane, Hadleigh, Suffolk, IP7 6BA


Test Results (average) :


FIGRA (w/s)		THR 600s (MJ)	SMOGRA (m ² /s ²)	TSP 600s (m ²)
(0.2MJ)	(0.4MJ)	5.09	Recalculated	Recalculated
222.39	193.26		49.50	69.93

Lateral Flame Spread to End of Specimen? **None**
 Fall of Flaming Drop/Particle? **None**
 Flaming of Fallen Particle Exceeding 10s? **Non**

Date of Test: 3rd, 4th and 5th April 2017

Signatories


Responsible Officer K. Hughes * Technical Officer


Authorised S. Deeming* Business Unit Head

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

Report Issued: 17 th August 2017

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REVISION HISTORY	14



Test Details

Purpose of test	To provide data which, in conjunction with data from other test methods, will enable building products excluding floorings, to be classified in accordance with the Classification requirements specified in BS EN 13501-1:2007+A1:2009. The test was performed in accordance with the procedure specified in BS EN 13823:2010+A1:2014 and this report should be read in conjunction with that standard.
Scope of test	To determine the reaction-to-fire performance of construction products, excluding floorings and excluding products which are indicated in the EC Decision 2000/147/EC, when exposed to thermal attack by a single burning item (SBI) utilising the test procedures defined in BS EN 13823:2010+A1:2014.
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 3 rd , 4 th , and 5 th April 2017 at the request of Celotex, the sponsor of the test.
Provision of test specimens	The specimens were 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 17 th March 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.
Intended application	Thermal insulation for walls and ceilings.
Test facility	The Single Burning Item (SBI) test facility at Exova Warringtonfire is constructed in accordance with the specifications detailed in BS EN 13823:2010+A1:2014.
Deviations from the test standard	None.
Exposed face	The foil face of the specimens was exposed to the heating conditions of the test when the specimens were mounted in the test position.

Description of Test Specimens

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.

The test specimen comprised two walls (or wings) mounted into an aperture in a specimen trolley such that they formed a vertical 90° corner. The dimensions of the walls were as follows:

Short wall	-	495 ± 5 mm long x 1500 ± 5 mm high
Long wall	-	1000 ± 5 mm long x 1500 ± 5 mm high

Each wall (or wing) consisted of the following product:

General description		Foil faced PIR insulation
Name of manufacturer		Saint-Gobain Construction Products UK Limited – Trading as Celotex
Trade names		“RS5100”
Batch reference		“09-03-17 17:31-17:32 Line 2”
Thickness of composite		100 mm (stated by sponsor) 100mm (determined by Exova Warringtonfire)
Weight per unit area of composite		3.30 kg/m ² (determined by Exova Warringtonfire)
Aluminium foil	Product reference	“FSS 38-172”
	Generic type	Aluminium foil (embossed)
	Name of manufacturer	See Note 1 below
	Weight per unit area	See Note 1 below
	Thickness	See Note 1 below
	Colour	“Silver”
Foam	Flame retardant details	This component is inherently flame retardant
	Product reference	“HP400E 28-038”
	Generic type	PIR insulation foam core
	Name of manufacturer	Saint-Gobain Construction Products UK Limited – trading as Celotex
	Thickness	100 mm
	Density	32 kg/m ³
Aluminium foil	Flame retardant details	See Note 2 below
	Product reference	“FSS 38-172”
	Generic type	Aluminium foil (embossed)
	Name of manufacturer	See Note 1 below
	Weight per unit area	See Note 1 below
	Thickness	See Note 1 below
	Colour	“Silver”
Flame retardant details	This component is inherently flame retardant	

Joint Details		Long wing: one horizontal at 500mm of specimen height, vertical 200mm in from corner line - Short wing one horizontal joint at 500mm height. As per EN 13823 5.2.2
Substrate	Product reference	"Promat – Brandschutzbauplatten; Promatect-H"
	Generic type	Calcium Silicate based board
	Name of manufacturer	Promat
	Thickness	12mm
	Density	870kg/m ³
	Flame retardant details	The substrate is inherently flame retardant
Brief description of manufacturing process		Facing is auto adhesively bonded to foam during the manufacturing process.

Note 1: 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.

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

The specimen walls (or wings) were placed in the trolley in accordance with the requirements of section 5.3 of the Standard.

Photographs of the installed product are appended as Plates 1 and 2 in Appendix 1 of this report.

Each wing was retained in the trolley using mechanical clamps which pushed the wing against a lip at the top and bottom of the aperture in the trolley.

The trolley incorporated a triangular propane sand burner of side length 250mm, which was positioned in the base of the corner formed by the two wings of the test specimen, with a horizontal separation of 40mm between the edge of the burner and the lower edges of the wings. The burner is referred to as the primary burner and has an output of 30kW. A secondary propane sand burner was attached to the fixed frame, beneath the hood but at the furthest possible distance from the specimen when the trolley was in place. The purpose of this burner is to obtain base line data without affecting the assembled specimen. The trolley incorporated a grill in its base and this was the sole source of ventilation for the test enclosure whilst the test was in progress.

Test Results

Results and observations

The test results relate to the behaviour of the test specimens of a product under the particular conditions of the 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.

A total of three specimens were tested. The results obtained, relevant to the 'Euroclassification' of Building Products are given in Table 1.

Observations made during the test and comments on any difficulties encountered during the test are given in Table 2.

Table 1

Parameter	Result			
	Specimen 1	Specimen 2	Specimen 3	Mean
FIGRA (W/s) (<i>THR(t) threshold of 0.2MJ</i>)	246.17	224.10	196.90	222.39
FIGRA (W/S) (<i>THR(t) threshold of 0.4MJ</i>)	216.47	201.87	161.45	193.26
THR 600s (MJ)	4.96	5.34	4.97	5.09
SMOGRA (m ² /s ²) (Recalculated results)	48.80	45.46	54.24	49.50
TSP 600s (m ²) (Recalculated results)	64.70	68.18	76.90	69.93
Lateral Flame Spread to End of Specimen?	None	None	None	-
Fall of Flaming Drop/Particle?	None	None	None	-
Flaming of Fallen Particle Exceeding 10s?	None	None	None	-

Curves of time averaged rate of heat release contribution of the specimen (HRRav(t)), cumulative heat release (THR(t)), and Fire Growth Rate (FIGRA) are appended as Figures 1 to 3. Curves of time averaged rate of smoke production (SPRav(t)), cumulative smoke production (TSP(t)) and smoke growth rate (SMOGRA) are appended as Figures 4 to 6 in appendix 2 of this report.

Interpretation of the test results given above in the context of Euroclassification of building products should be carried out using BS EN 13501-1:2007+A1:2009.

Table 2

Time		Observations during test of Specimen 1
min	Sec	
00	00	Pre-checks performed on analysers
02	00	Auxiliary burner switched on to check correct burner operating conditions
05	00	Gas flow switched from auxiliary burner to main burner & test flames impinge on specimen
05	06	Discolouration of the surface of the product occurred in the region of the burner
05	12	Flaming on the surface of the product occurred in the region of the burner
26	00	End of test conditions. Flaming continued to the end of the test.

Time		Observations during test of Specimen 2
min	Sec	
00	00	Pre-checks performed on analysers
02	00	Auxiliary burner switched on to check correct burner operating conditions
05	00	Gas flow switched from auxiliary burner to main burner & test flames impinge on specimen
05	09	Discolouration of the surface of the product occurred in the region of the burner
05	17	Flaming on the surface of the product occurred in the region of the burner
26	00	End of test conditions. Flaming continued to the end of the test.

Time		Observations during test of Specimen 3
min	Sec	
00	00	Pre-checks performed on analysers
02	00	Auxiliary burner switched on to check correct burner operating conditions
05	00	Gas flow switched from auxiliary burner to main burner & test flames impinge on specimen
05	06	Discolouration of the surface of the product occurred in the region of the burner
05	15	Flaming on the surface of the product occurred in the region of the burner
26	00	End of test conditions. Flaming continued to the end of the test.

Note: Impingement of the burner flame onto all three specimens commenced at 5 minutes.

Validity

The specification and interpretation of fire test methods is 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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Photographs

Plate 1: Total View of the exposed surface of the long wing.



Plate 2: Close up view of the vertical outer edge of the long wing at a height of 500mm



Appendix 2

Graphs

Figure 1. $HRR_{av}(t)$ (kW)

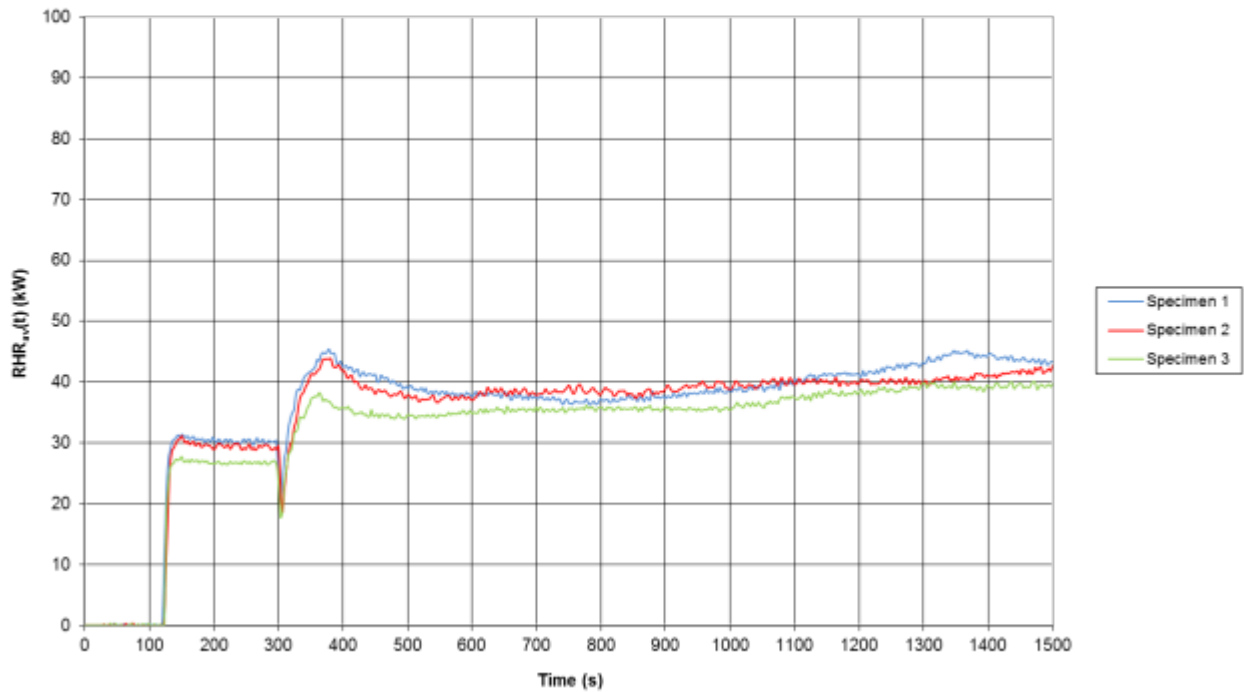


Figure 2. $THR(t)$ (MJ)

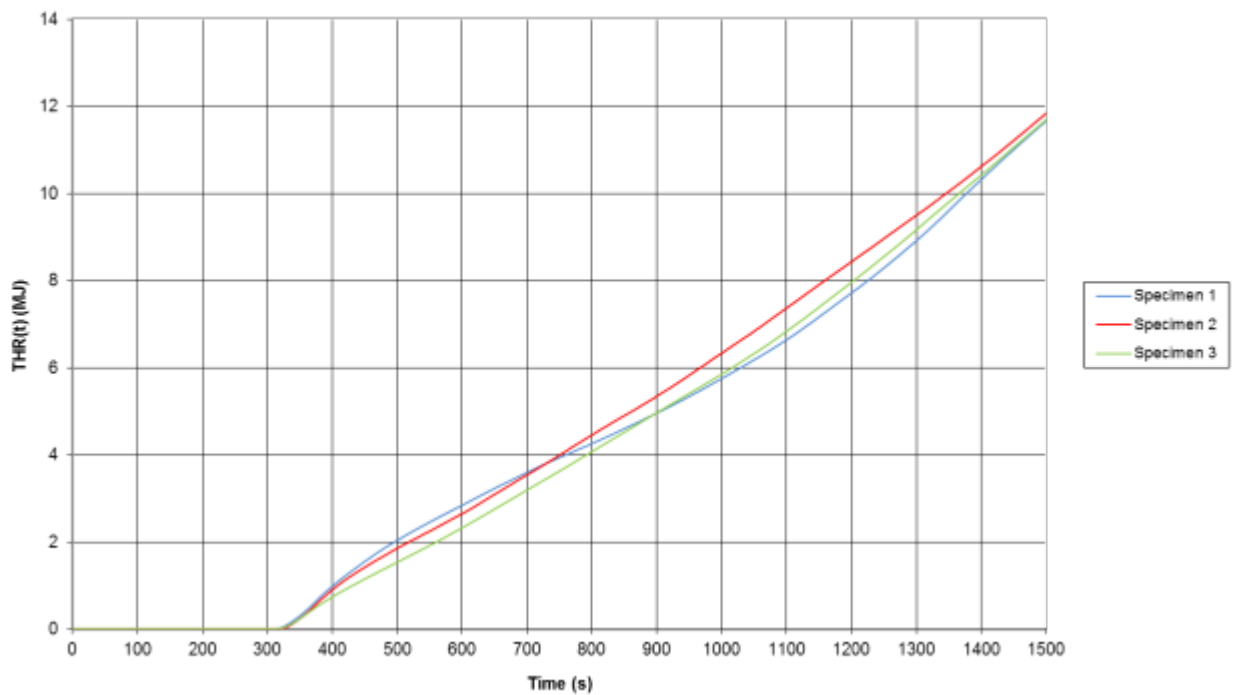


Figure 3. FIGRA

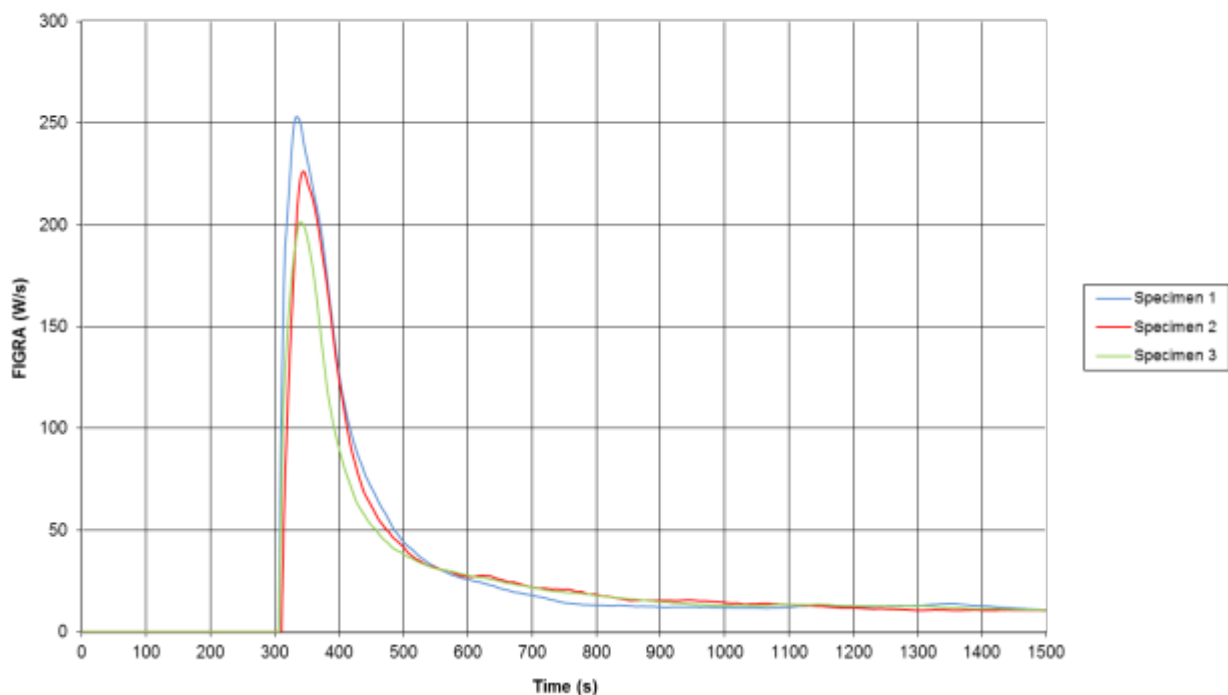


Figure 4. $SPR_{av}(t)$ (m^2/s)

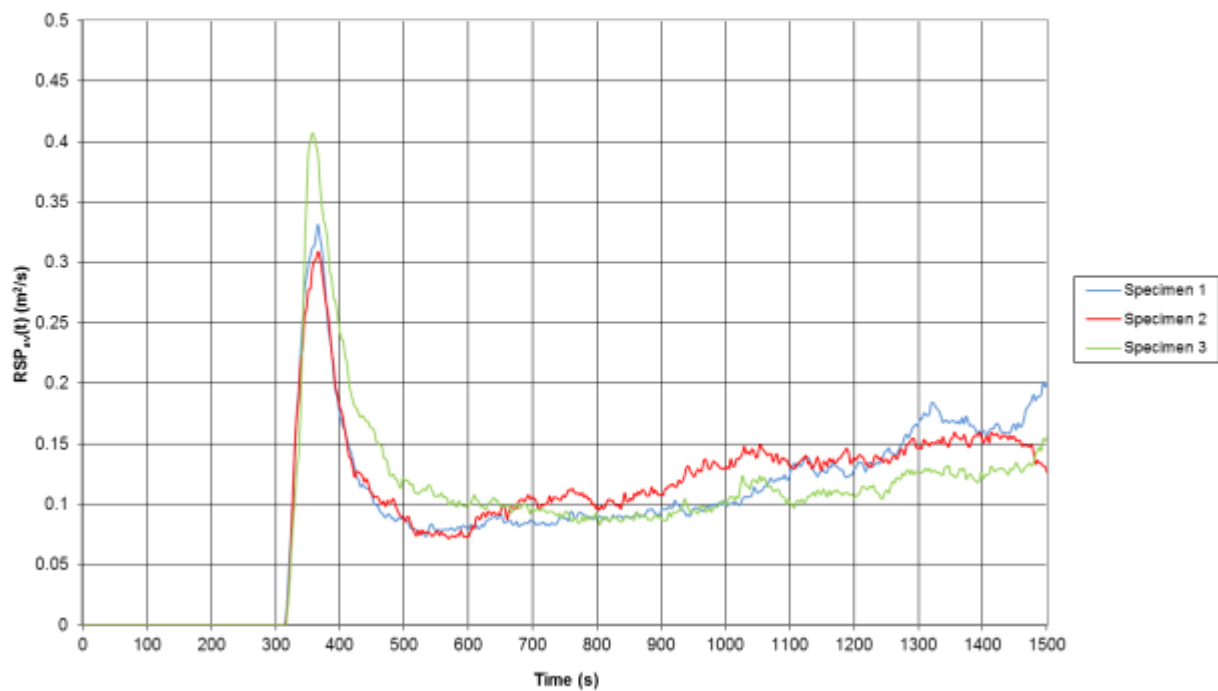


Figure 5. TSP(t) (m²)

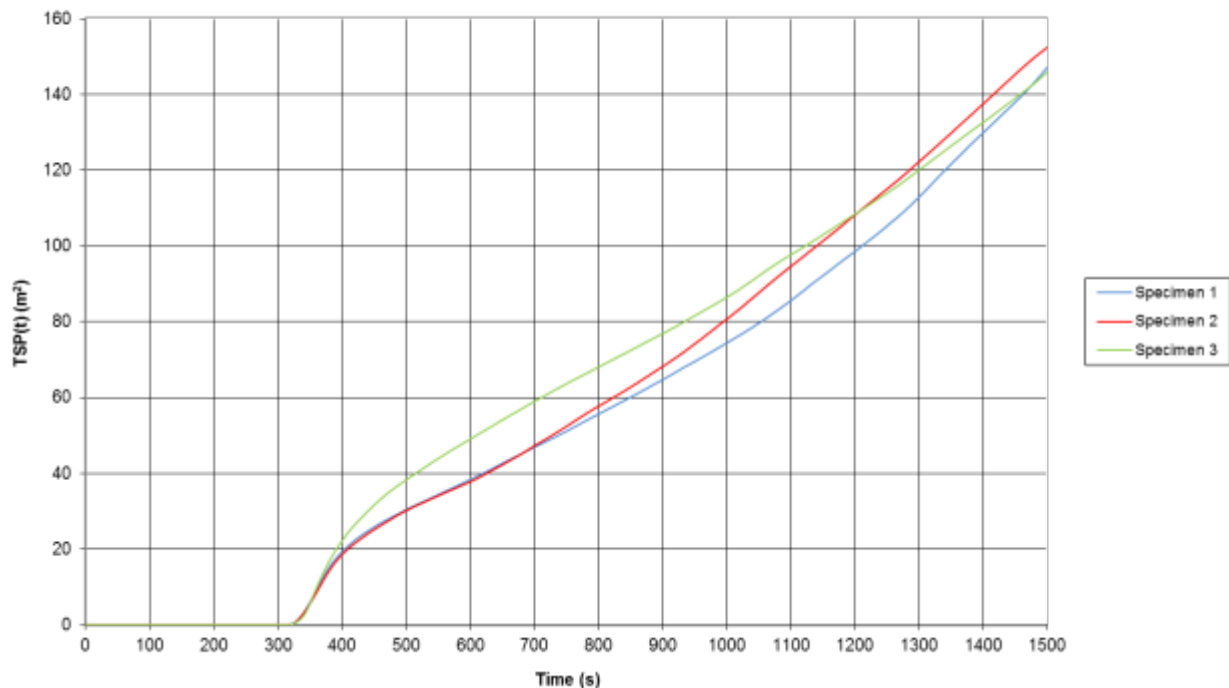
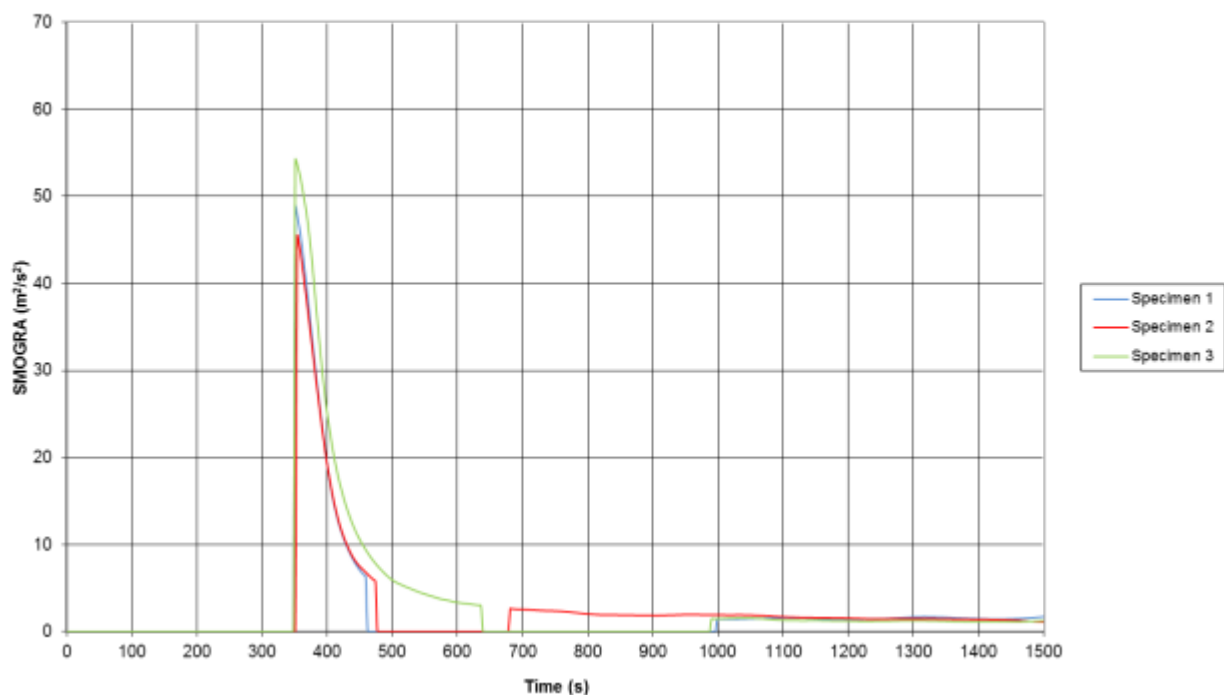


Figure 6. SMOGRA Graph.



Revision History

Issue No : 2	Re-issue Date: 17 th August 2017
Revised By: J. Lucas-Cox	Authorised By: S. Deeming
Reason for Revision: This document replaces issue 1 (dated 15 th May 2017) of the same number which has now been withdrawn. Additional information has been included and amended throughout the assessment at the request of the sponsor.	

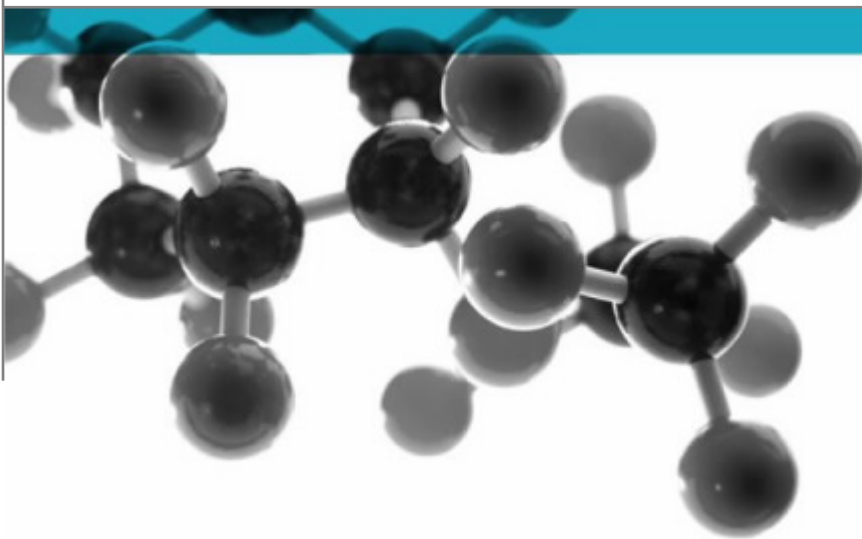
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Revised By:	Authorised By:
Reason for Revision:	

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BS EN 13823:2010+A1:2014



**Reaction to Fire Tests for Building Products -
Building Products Excluding Floorings Exposed to
the Thermal Attack by a Single Burning Item**

A Report To: Celotex

Document Reference: 381758

Date: 17th August 2017

Issue No.: 2

Page 1

Testing
Advising
Assuring



Executive Summary

Objective To determine the fire performance of the following product when tested in accordance with BS EN 13823:2010+A1:2014.

Generic Description	Product reference	Thickness	Weight per unit area or density
Foil faced PIR insulation	"RS5160"	160mm	5.29 kg/m ² *
Individual components used to manufacture composite:			
Aluminium foil	"FSS 38-172"	Confidential	Confidential
Foam	"HP400E 28-038"	160mm	32 kg/m ³
Aluminium foil	"FSS 38-172"	Confidential	Confidential
*determined by Exova Warringtonfire			
Please see page 5 and 6 of this test report for the full description of the product tested			

Test Sponsor Celotex, Lady Lane Industrial Estate, Lady Lane, Hadleigh, Suffolk, IP7 6BA


Test Results (average) :


FIGRA (w/s)		THR 600s (MJ)	SMOGRA (m ² /s ²)	TSP 600s (m ²)
(0.2MJ)	(0.4MJ)	5.96	Recalculated	Recalculated
320.07	292.81		83.26	90.71

Lateral Flame Spread to End of Specimen? **None**
 Fall of Flaming Drop/Particle? **None**
 Flaming of Fallen Particle Exceeding 10s? **Non**

Date of Test: 5th April 2017

Signatories


Responsible Officer K. Hughes * Technical Officer


Authorised S. Deeming* Business Unit Head

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

Report Issued: 17 th August 2017

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TEST DETAILS	5
DESCRIPTION OF TEST SPECIMENS	6
TEST RESULTS	8
APPENDIX 1	10
APPENDIX 2	11
REVISION HISTORY	14



Test Details

Purpose of test	To provide data which, in conjunction with data from other test methods, will enable building products excluding floorings, to be classified in accordance with the Classification requirements specified in BS EN 13501-1:2007+A1:2009. The test was performed in accordance with the procedure specified in BS EN 13823:2010+A1:2014 and this report should be read in conjunction with that standard.
Scope of test	To determine the reaction-to-fire performance of construction products, excluding floorings and excluding products which are indicated in the EC Decision 2000/147/EC, when exposed to thermal attack by a single burning item (SBI) utilising the test procedures defined in BS EN 13823:2010+A1:2014.
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 5 th April 2017 at the request of Celotex, the sponsor of the test.
Provision of test specimens	The specimens were 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 17 th March 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.
Intended application	Thermal insulation for walls and ceilings.
Test facility	The Single Burning Item (SBI) test facility at Exova Warringtonfire is constructed in accordance with the specifications detailed in BS EN 13823:2010+A1:2014.
Deviations from the test standard	None.
Exposed face	The foil face of the specimens was exposed to the heating conditions of the test when the specimens were mounted in the test position.

Description of Test Specimens

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.

The test specimen comprised two walls (or wings) mounted into an aperture in a specimen trolley such that they formed a vertical 90° corner. The dimensions of the walls were as follows:

Short wall	-	495 ± 5 mm long x 1500 ± 5 mm high
Long wall	-	1000 ± 5 mm long x 1500 ± 5 mm high

Each wall (or wing) consisted of the following product:

General description		Foil faced PIR insulation
Name of manufacturer		Saint-Gobain Construction Products UK Limited – Trading as Celotex
Trade names		“RS5160”
Batch reference		“09-03-17 15:38-15:39 Line 2”
Thickness of composite		160 mm (stated by sponsor) 160mm (determined by Exova Warringtonfire)
Weight per unit area of composite		5.29 kg/m ² (determined by Exova Warringtonfire)
Aluminium foil	Product reference	“FSS 38-172”
	Generic type	Aluminium foil (embossed)
	Name of manufacturer	See Note 1 below
	Weight per unit area	See Note 1 below
	Thickness	See Note 1 below
	Colour	“Silver”
Foam	Flame retardant details	This component is inherently flame retardant
	Product reference	“HP400E 28-038”
	Generic type	PIR insulation foam core
	Name of manufacturer	Saint-Gobain Construction Products UK Limited – trading as Celotex
	Thickness	160 mm
	Density	32 kg/m ³
Aluminium foil	Flame retardant details	See Note 2 below
	Product reference	“FSS 38-172”
	Generic type	Aluminium foil (embossed)
	Name of manufacturer	See Note 1 below
	Weight per unit area	See Note 1 below
	Thickness	See Note 1 below
Aluminium foil	Colour	“Silver”
	Flame retardant details	This component is inherently flame retardant

Joint Details		Long wing: one horizontal at 500mm of specimen height, vertical 200mm in from corner line - Short wing one horizontal joint at 500mm height. As per EN 13823 5.2.2
Substrate	Product reference	"Promat – Brandschutzbauplatten; Promatect-H"
	Generic type	Calcium Silicate based board
	Name of manufacturer	Promat
	Thickness	12mm
	Density	870kg/m ³
	Flame retardant details	The substrate is inherently flame retardant
Brief description of manufacturing process		Facing is auto adhesively bonded to foam during the manufacturing process.

Note 1: 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.

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

The specimen walls (or wings) were placed in the trolley in accordance with the requirements of section 5.3 of the Standard.

Photographs of the installed product are appended as Plates 1 and 2 in Appendix 1 of this report.

Each wing was retained in the trolley using mechanical clamps which pushed the wing against a lip at the top and bottom of the aperture in the trolley.

The trolley incorporated a triangular propane sand burner of side length 250mm, which was positioned in the base of the corner formed by the two wings of the test specimen, with a horizontal separation of 40mm between the edge of the burner and the lower edges of the wings. The burner is referred to as the primary burner and has an output of 30kW. A secondary propane sand burner was attached to the fixed frame, beneath the hood but at the furthest possible distance from the specimen when the trolley was in place. The purpose of this burner is to obtain base line data without affecting the assembled specimen. The trolley incorporated a grill in its base and this was the sole source of ventilation for the test enclosure whilst the test was in progress.

Test Results

Results and observations

The test results relate to the behaviour of the test specimens of a product under the particular conditions of the 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.

A total of three specimens were tested. The results obtained, relevant to the 'Euroclassification' of Building Products are given in Table 1.

Observations made during the test and comments on any difficulties encountered during the test are given in Table 2.

Table 1

Parameter	Result			
	Specimen 1	Specimen 2	Specimen 3	Mean
FIGRA (W/s) (<i>THR(t) threshold of 0.2MJ</i>)	257.21	341.95	361.04	320.07
FIGRA (W/S) (<i>THR(t) threshold of 0.4MJ</i>)	253.07	300.59	324.78	292.81
THR 600s (MJ)	6.10	6.20	5.59	5.96
SMOGRA (m ² /s ²) (Recalculated results)	91.53	64.48	93.77	83.26
TSP 600s (m ²) (Recalculated results)	101.25	84.40	86.49	90.71
Lateral Flame Spread to End of Specimen?	None	None	None	-
Fall of Flaming Drop/Particle?	None	None	None	-
Flaming of Fallen Particle Exceeding 10s?	None	None	None	-

Curves of time averaged rate of heat release contribution of the specimen (HRRav(t)), cumulative heat release (THR(t)), and Fire Growth Rate (FIGRA) are appended as Figures 1 to 3. Curves of time averaged rate of smoke production (SPRav(t)), cumulative smoke production (TSP(t)) and smoke growth rate (SMOGRA) are appended as Figures 4 to 6 in appendix 2 of this report.

Interpretation of the test results given above in the context of Euroclassification of building products should be carried out using BS EN 13501-1:2007+A1:2009.

Table 2

Time		Observations during test of Specimen 1
min	Sec	
00	00	Pre-checks performed on analysers
02	00	Auxiliary burner switched on to check correct burner operating conditions
05	00	Gas flow switched from auxiliary burner to main burner & test flames impinge on specimen
05	06	Discolouration of the surface of the product occurred in the region of the burner
05	21	Flaming on the surface of the product occurred in the region of the burner
26	00	End of test conditions. Flaming continued to the end of the test.

Time		Observations during test of Specimen 2
min	Sec	
00	00	Pre-checks performed on analysers
02	00	Auxiliary burner switched on to check correct burner operating conditions
05	00	Gas flow switched from auxiliary burner to main burner & test flames impinge on specimen
05	06	Discolouration of the surface of the product occurred in the region of the burner
05	15	Flaming on the surface of the product occurred in the region of the burner
26	00	End of test conditions. Flaming continued to the end of the test.

Time		Observations during test of Specimen 3
min	Sec	
00	00	Pre-checks performed on analysers
02	00	Auxiliary burner switched on to check correct burner operating conditions
05	00	Gas flow switched from auxiliary burner to main burner & test flames impinge on specimen
05	06	Discolouration of the surface of the product occurred in the region of the burner
05	18	Flaming on the surface of the product occurred in the region of the burner
26	00	End of test conditions. Flaming continued to the end of the test.

Note: Impingement of the burner flame onto all three specimens commenced at 5 minutes.

Validity

The specification and interpretation of fire test methods is 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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Appendix 1

Photographs

Plate 1: Total View of the exposed surface of the long wing.



Plate 2: Close up view of the vertical outer edge of the long wing at a height of 500mm



Appendix 2

Graphs

Figure 1. $HRR_{av}(t)$ (kW)

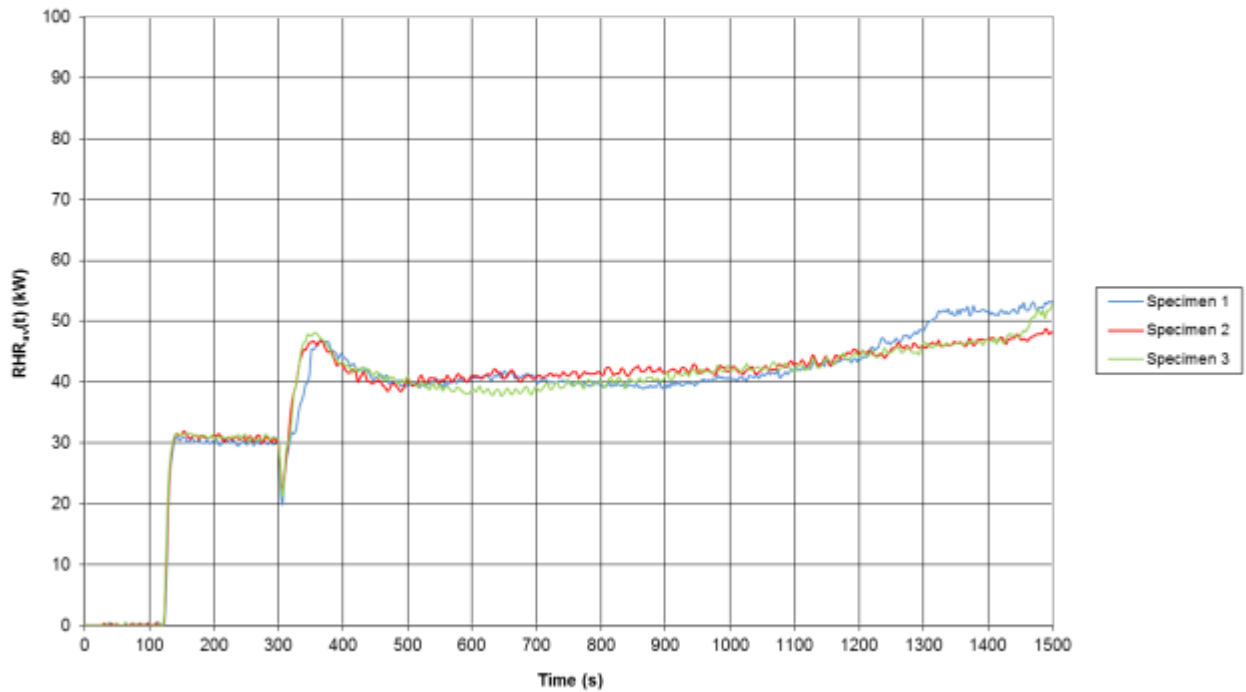


Figure 2. $THR(t)$ (MJ)

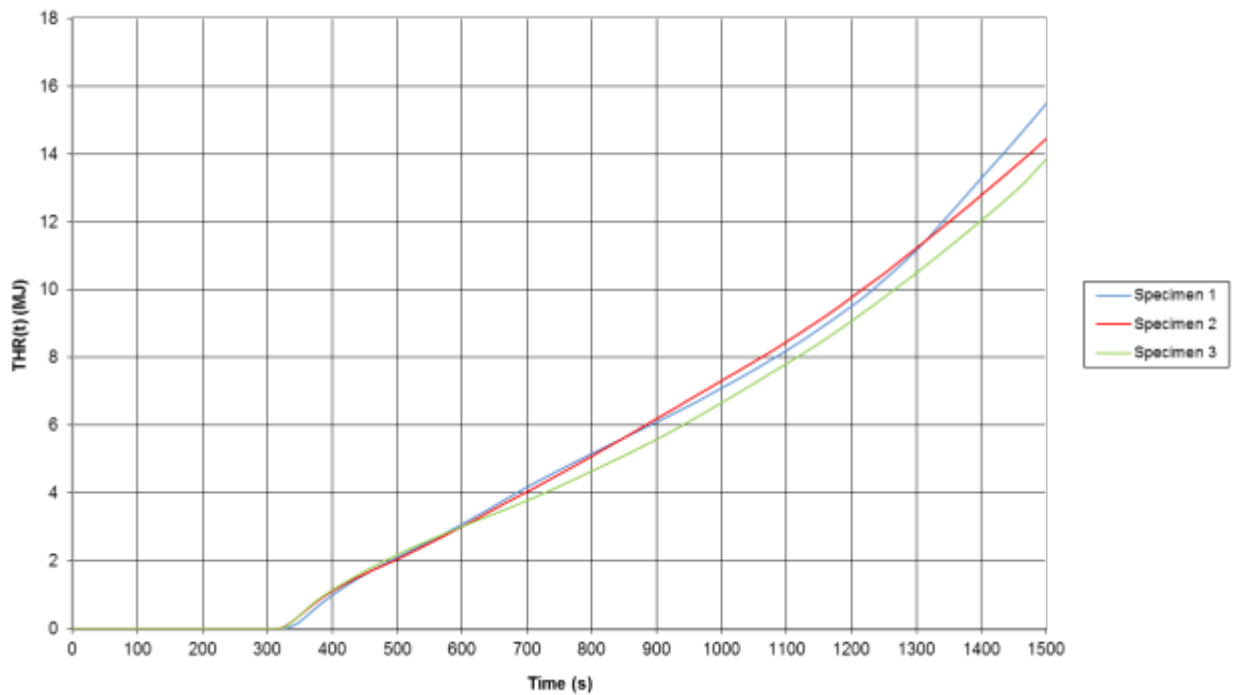


Figure 3. FIGRA

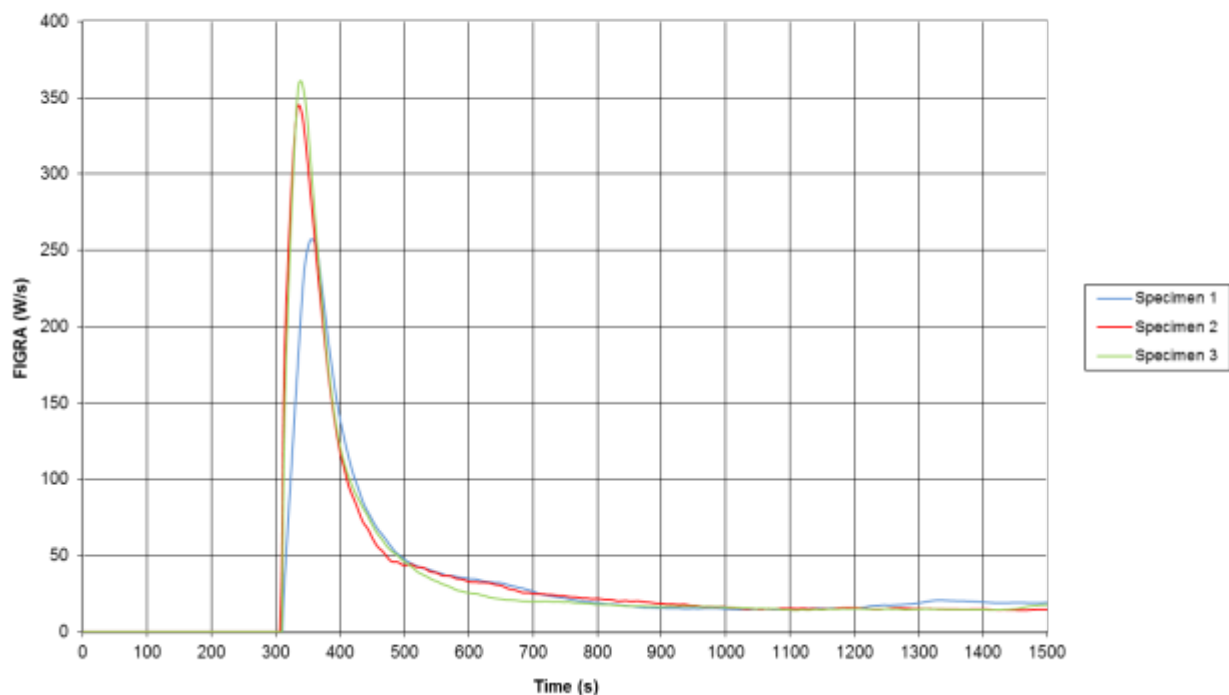


Figure 4. $SPR_{av}(t)$ (m^2/s)

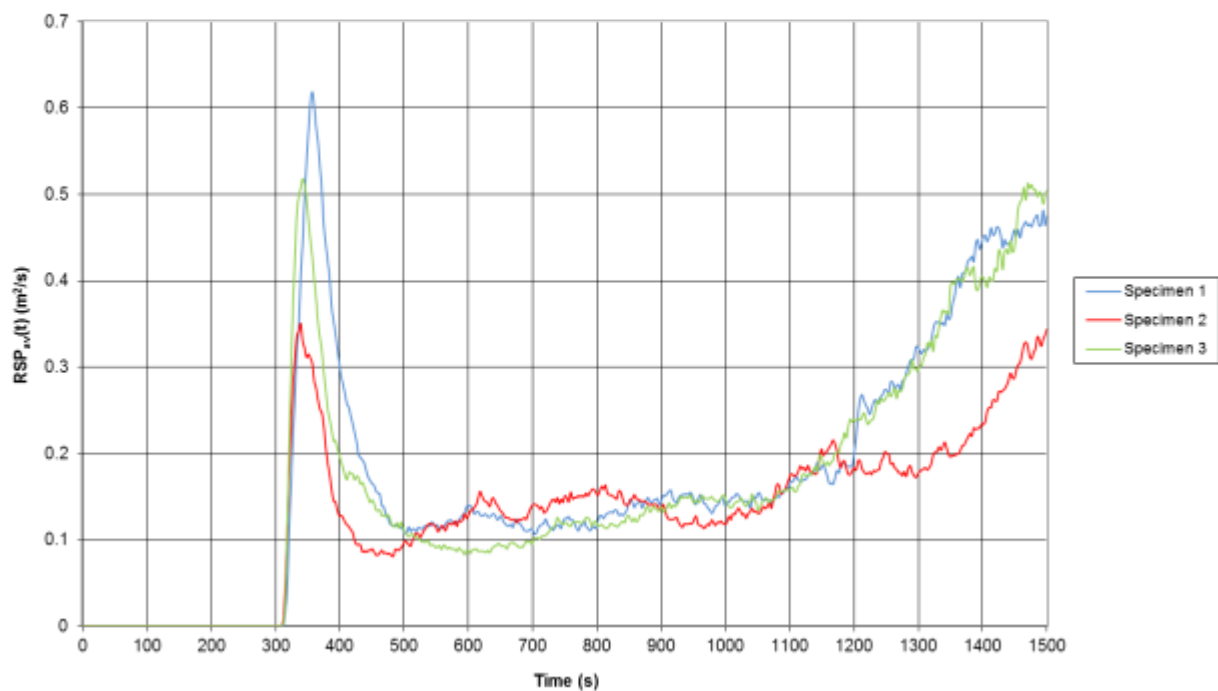


Figure 5. TSP(t) (m²)

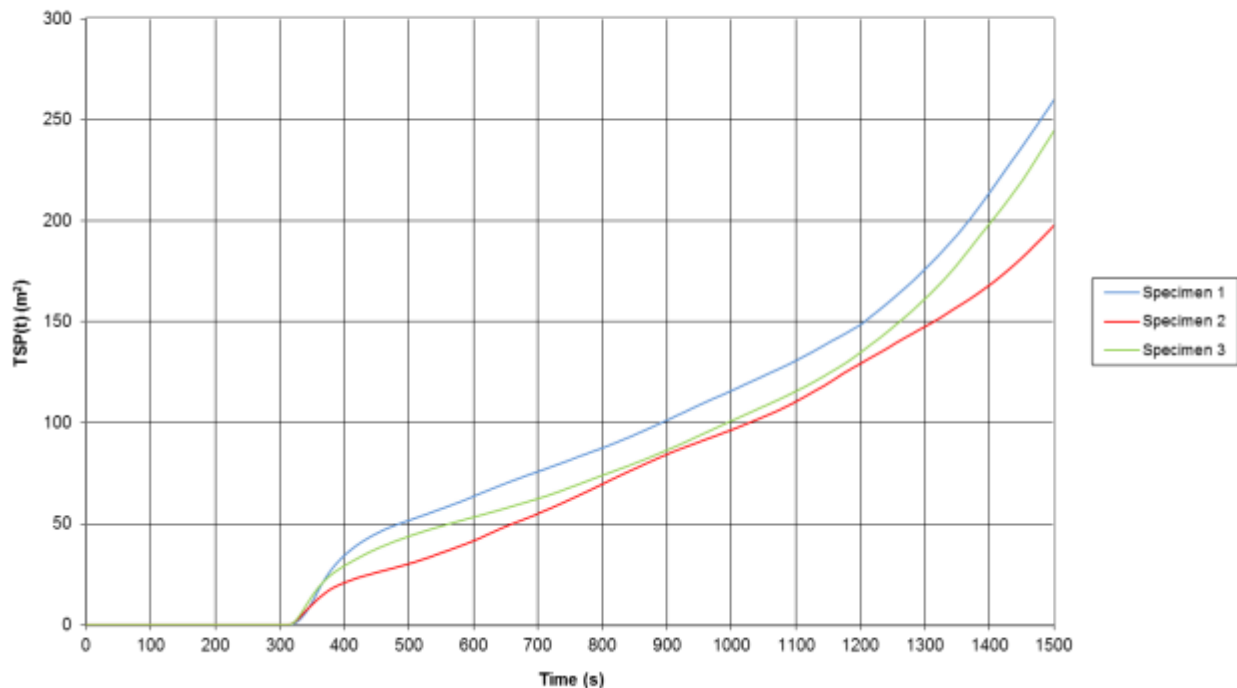
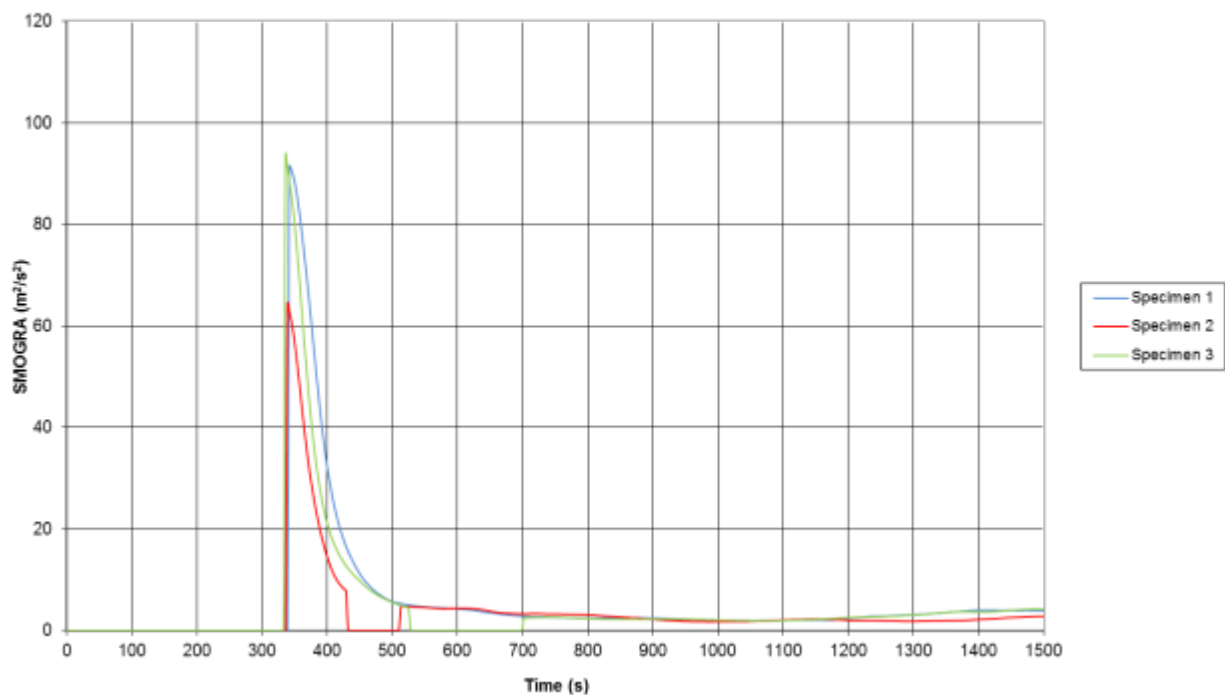


Figure 6. SMOGRA Graph.



Revision History

Issue No : 2	Re-issue Date: 17 th August 2017
Revised By: J. Lucas-Cox	Authorised By: S. Deeming
Reason for Revision: This document replaces issue 1 (dated 15 th May 2017) of the same number which has now been withdrawn. Additional information has been included and amended throughout the assessment at the request of the sponsor.	

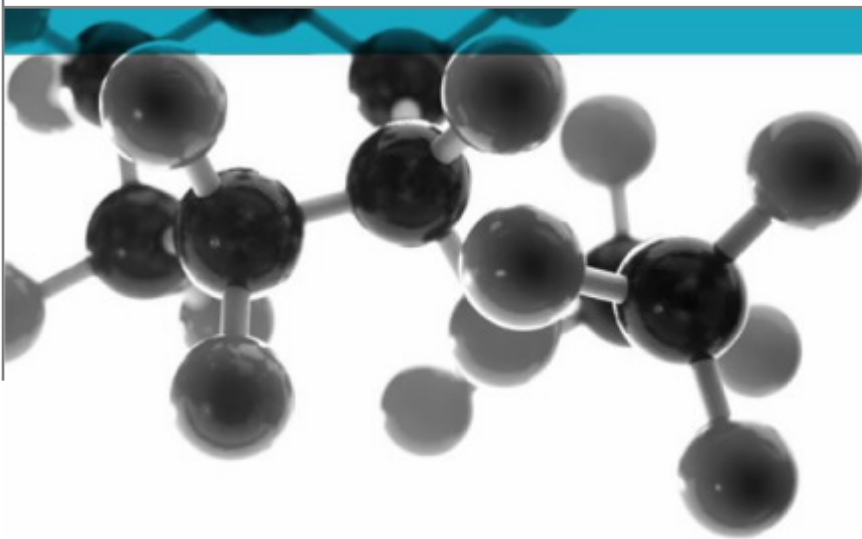
Issue No :	Re-issue Date:
Revised By:	Authorised By:
Reason for Revision:	

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BS EN ISO 11925-2: 2010



Ignitability Of Building Products Subjected To Direct Impingement Of Flame Part 2: Single Flame Source Test

A Report To: Celotex

Document Reference: 381760

Date: 17th August 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 EN ISO 11925-2:2010.

Generic Description	Product reference	Thickness	Weight per unit area or density
Foil faced PIR insulation	"RS5160"	160mm (in practice) 160mm (as tested))	5.29 kg/m ² *
Individual components used to manufacture composite:			
Aluminium foil	"FSS 38-172"	Confidential	Confidential
Foam	"HP400E 28-038"	160mm	32 kg/m ³
Aluminium foil	"FSS 38-172"	Confidential	Confidential
*determined by Exova Warringtonfire			
Please see page 5 and 6 of this test report for the full description of the product tested			

Test Sponsor Celotex, Lady Lane Industrial Estate, Lady Lane, Hadleigh, Suffolk, IP7 6BA

Test Results: On the set of six specimens which were subject to surface application, the maximum flame height reached was observed to be 0mm.



On the set of six specimens which were subject to edge application, the maximum flame height reached was observed to be 50 ± 0.9mm

On the set of six specimens which were turned around at 90° with foam edge exposed, the maximum flame height reached was observed to be 100 ± 0.9mm

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

Date of Test 5th April 2017

Signatories

	
Responsible Officer K. Hughes * Technical Officer	Authorised S. Deeming* Business Unit Head

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

Report Issued: 17th August 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 BS EN ISO 11925-2:2010 "Reaction to Fire tests - Ignitability Of Building Products Subjected to Direct Impingement of Flame – Part 2: Single Flame Source Test".</p> <p>The test was performed in accordance with the procedure specified in BS EN ISO 11925-2:2010 Reaction to Fire Tests - Ignitability of Building Products subjected to direct impingement of flame – Part 2: Single Flame Source Test, and this report should be read in conjunction with that BS EN ISO Standard.</p>
Scope of test	BS EN ISO 11925-2 specifies a method of test for determining the ignitability of building products by direct small flame impingement under zero impressed irradiance using specimens tested in a vertical orientation.
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 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.
Instruction to test	The test was conducted on the 5 th April 2017 at the request of Celotex, the sponsor of the test.
Provision of test specimens	The specimens were supplied by the sponsor of the test. Exova Warringtonfire was not involved in any selection or sampling procedure.
Conditioning of specimens	<p>The specimens were received on the 17th March 2017.</p> <p>Prior to test the specimens were stored for 2 days in a standard atmosphere as defined in BS EN 13238:2010 Conditioning Procedures and General Rules for selection of substrates until constant mass was achieved.</p>
Intended application	Thermal insulation for walls and ceilings.
Substrate	The specimens were tested without a substrate present.
Flame application time	The flame was applied for 30 seconds.

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		Foil faced PIR insulation
Name of manufacturer		Saint-Gobain Construction Products UK Limited – Trading as Celotex
Trade names		“RS5160”
Batch reference		“09-03-17 15:38-15:39 Line 2”
Thickness of composite		160mm (in practice) 60mm (as tested) In accordance with the standard, the maximum thickness of specimen that can be tested is 60mm. If the normal thickness of a specimen exceeds 60mm, it is necessary to reduce the thickness of the specimen to a maximum of 60mm by cutting away material from the unexposed surface.
Weight per unit area of composite		5.29 kg/m ² (determined by Exova Warringtonfire)
Aluminium foil	Product reference	“FSS 38-172”
	Generic type	Aluminium foil (embossed)
	Name of manufacturer	See Note 1 below
	Weight per unit area	See Note 1 below
	Thickness	See Note 1 below
	Colour	“Silver”
	Flame retardant details	This component is inherently flame retardant
Foam	Product reference	“HP400E 28-038”
	Generic type	PIR insulation foam core
	Name of manufacturer	Saint-Gobain Construction Products UK Limited – trading as Celotex
	Thickness	160 mm
	Density	32 kg/m ³
	Flame retardant details	See Note 2 below
Aluminium foil	Product reference	“FSS 38-172”
	Generic type	Aluminium foil (embossed)
	Name of manufacturer	See Note 1 below
	Weight per unit area	See Note 1 below
	Thickness	See Note 1 below
	Colour	“Silver”
Flame retardant details		This component is inherently flame retardant
Brief description of manufacturing process		Facing is auto adhesively bonded to foam during the manufacturing process.

Note 1: 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.

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

Test Results

Number of specimens tested

Six specimens were tested, each of which were subjected to surface exposure to flame with the foil face exposed.

Six specimens were tested, each of which were subjected to edge exposure to flame with the foil face exposed.

Six specimens were tested, each of which were subjected to edge exposure to flame with the specimen turned at 90° round its vertical axis and the foam face exposed.

Applicability of test results

The test results relate to the behaviour of the test specimens of a product under the particular conditions of the 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.

The test results for the individual specimens, together with observations made during the test and comments on any difficulties encountered during the test are given in Tables 1, 2 and 3.

On the set of six specimens which were subject to surface application, the maximum flame height reached was observed to be 0mm.

On the set of six specimens which were subject to edge application, the maximum flame height reached was observed to be 50 ± 0.9mm

On the set of six specimens which were turned around at 90° with foam edge exposed, the maximum flame height reached was observed to be 100 ± 0.9mm

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

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
Test Flame Application Position - Surface of foil face

Specimen No.	Ignition Yes/No	Time from start of test for flame tip to reach 150mm (seconds)	Extent of Flame Spread (mm)	Flaming Debris	Glowing	Extent of Damaged Area (mm)	
						Height	Width
1	No	Did not reach	Nil	None	None	41	27
2	No	Did not reach	Nil	None	None	38	24
3	No	Did not reach	Nil	None	None	37	24
4	No	Did not reach	Nil	None	None	40	29
5	No	Did not reach	Nil	None	None	43	26
6	No	Did not reach	Nil	None	None	37	29

Table 2
Test Flame Application Position - Edge of foil face

Specimen No.	Ignition Yes/No	Time from start of test for flame tip to reach 150mm (seconds)	Extent of Flame Spread (mm)	Flaming Debris	Glowing	Extent of Damaged Area (mm)	
						Height	Width
1	Yes	Did not reach	40	None	None	85	25
2	Yes	Did not reach	40	None	None	87	26
3	Yes	Did not reach	40	None	None	87	28
4	Yes	Did not reach	40	None	None	83	30
5	Yes	Did not reach	50	None	None	81	28
6	Yes	Did not reach	40	None	None	86	31

Table 3
Test Flame Application Position - Edge Of The Specimen Turned At 90° Round Its Vertical Axis And The Insulation Face Exposed.

Specimen No.	Ignition Yes/No	Time from start of test for flame tip to reach 150mm (seconds)	Extent of Flame Spread (mm)	Flaming Debris	Glowing	Extent of Damaged Area (mm)	
						Height	Width
1	Yes	Did not reach	90	None	None	89	17
2	Yes	Did not reach	90	None	None	80	16
3	Yes	Did not reach	90	None	None	85	19
4	Yes	Did not reach	90	None	None	85	17
5	Yes	Did not reach	100	None	None	88	20
6	Yes	Did not reach	90	None	None	83	15

Revision History

Issue No : 2	Re-issue Date : 17 th August 2017
Revised By: J. Lucas-Cox	Approved By: S. Deeming
Reason for Revision: This document replaces issue 1 (dated 15 th May 2017) of the same number which has now been withdrawn. Additional information has been included and amended throughout the assessment at the request of the sponsor.	

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

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Testing. Advising. Assuring.

Title:

EXTENDED APPLICATION
REPORT IN ACCORDANCE
WITH EN/TS 15117:2005

Notified Body No:

0833

Product Name:

"RS5000 Series - Line 1"

Report No:

WF 383671

Issue No:

1

Prepared for:

Celotex
Lady Lane Industrial Estate
Lady Lane
Hadleigh
Suffolk
IP7 6BA

Date:

17th August 2017

1. Introduction

This report extends the field of application of test results obtained for "RS5000 Series - Line 1", a foil faced PIR insulation family. 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 "RS5000 Series - Line 1", a foil faced PIR insulation family. There is one product property which varies within this product family, thickness of insulation. This property was assessed to determine its 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 family, "RS5000 Series - Line 1", a foil faced PIR insulation family, is fully described below and in the test reports provided in support of classification listed in Clause 3.1.

General description		Foil faced PIR insulation
Name of manufacturer		Saint-Gobain Construction Products UK Limited – Trading as Celotex
Trade names		"RS5000 Series - Line 1" (last 3 digits of product reference denotes foam thickness in mm eg. "RS5025 – Line 1" denotes foam thickness of 25mm)
Thickness of composite		25mm to 100mm
Weight per unit area of composite		1.03 kg/m ² to 3.33kg/m ²
Aluminium foil	Product reference	"FSS 38-172"
	Generic type	Aluminium foil (embossed)
	Name of manufacturer	See Note 1 below
	Weight per unit area	See Note 1 below
	Thickness	See Note 1 below
	Colour	"Silver"
	Flame retardant details	This component is inherently flame retardant
Foam	Product reference	"CP400E 28–028"
	Generic type	PIR insulation foam core
	Name of manufacturer	Saint-Gobain Construction Products UK Limited – trading as Celotex
	Thickness	25mm to 100mm
	Density	32 kg/m ³
	Flame retardant details	See Note 2 below

Continued on next page

Aluminium foil	Product reference	"FSS 38-172"
	Generic type	Aluminium foil (embossed)
	Name of manufacturer	See Note 1 below
	Weight per unit area	See Note 1 below
	Thickness	See Note 1 below
	Colour	"Silver"
	Flame retardant details	This component is inherently flame retardant
Joint Details		Long wing: one horizontal at 500mm of specimen height, vertical 200mm in from corner line - Short wing one horizontal joint at 500mm height. As per EN 13823 5.2.2
Substrate	Product reference	"Promat – Brandschutzbauplatten; Promatect-H"
	Generic type	Calcium Silicate based board
	Name of manufacturer	Promat
	Thickness	12mm
	Density	870kg/m ³
Flame retardant details		The substrate is inherently flame retardant
Brief description of manufacturing process		Facing is auto adhesively bonded to foam during the manufacturing process.

Note 1: 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.

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
Exova warringtonfire	Celotex	WF 381750	EN ISO 11925-2
Exova warringtonfire	Celotex	WF 381749, 381751	EN 13823
Exova warringtonfire	Celotex	WF 383672	EN 13501

3.2 Test results

Test method & test number	Parameter	No. tests	Results	
			Continuous parameter - mean (m)	Compliance parameters
EN ISO 11925-2 (30s exposure - surface)	F _s	6	50	Compliant
	Flaming droplets/ particles		None	Compliant
EN ISO 11925-2 (30s exposure - edge)	F _s	6	36.7	Compliant
	Flaming droplets/ particles		None	Compliant
EN ISO 11925-2 (30s exposure - edge turned at 90 degrees)	F _s	6	95	Compliant
	Flaming droplets/ particles		None	Compliant
EN 13823	FIGRA _{0.2MJ}	25mm product	302.89	Compliant
		100mm product	249.41	
	FIGRA _{0.4MJ}	25mm product	285.76	Compliant
		100mm product	224.66	
	THR _{600s}	25mm product	3.27	Compliant
		100mm product	5.26	
	LFS	25mm product	None	Compliant
		100mm product	None	
	SMOGRA	25mm product	42.82	Compliant
		100mm product	51.35	
TSP _{600s}	25mm product	42.50	Compliant	
	100mm product	71.64		

4. Classification and field of application

4.1 Definition of Limits of Extended Application

Two tests were conducted in accordance with EN 13823 and one in accordance with EN ISO 11925-2. The initial assessment of this product family was conducted, and the data generated has been used to determine which product specifications gave the worst performance. To determine the effect on the fire performance of the product family, formal EN 13823 tests were conducted on the thinnest (25mm) and thickest (100mm) products within the family. The specification with the worst set of results (25mm) was tested formally in accordance with EN ISO 11925-2.

4.2 EN ISO 11925-2

From the data generated during the EN 13823 testing it was apparent which product specification gave the worst fire performance. This product was tested formally in accordance with EN ISO 11925-2 using surface, edge flame application and edge turned at 90 degrees flame application. No flame spread from the point of flame application travelled further than 100mm. The highest average flame front was 35% below the maximum value allowed for Class D, (EN 13501-1).

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 product thickness has on the fire performance of "RS5000 Series - Line 1", a foil faced PIR insulation family. This evidence is shown in Figures 1 and 2.

The highest FIGRA value (25mm product) fell within Class D (EN 13501-1).

The measured results relating to smoke parameters, SMOGRA and TSP600s, also fall within the s2 criteria, with the highest smoke value being approximately 64% below the maximum allowed or s2, (EN 13501-1).

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

4.4 Reference of classification

This classification has been carried out in accordance with EN 13501-1:2007+A1: 2009 and EN/TS 15117.

4.5 Classification

The products, "RS5000 Series - Line 1", a foil faced PIR insulation family, in relation to its reaction to fire behaviour is classified:

D

The additional classification in relation to smoke production is:

s2

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	
D	-	s	2	,	d	0

i.e. D – s2 , d0

Reaction to fire classification: D – s2, d0

4.6 Extended Field of application

This classification is valid for the following end use applications:

- i) Construction applications used over any substrate with a density equal to or greater than 870kg/m³, having a minimum thickness of 12mm and a fire performance of A2 or better (excluding paper faced gypsum plasterboard).

This classification is also valid for the following product parameters:

Product thickness	25mm to 100mm
Insulation thickness	25mm to 100mm
Product weight per unit area	1.03 kg/m ² to 3.33kg/m ²
Insulation density	Tested density ± 15%
Thickness and weight per unit area of facings	For the tested thickness only. The test result obtained for Euroclass A1 and A2 facings will also be valid for thicker facings of the same type.
Product composition	No variation allowed
Product construction	No variation allowed

5. Limitations

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

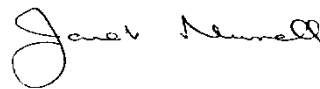
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Jennifer Lucas-Cox
Certification Engineer
Technical Department

APPROVED



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Janet Murrell
Technical Manager
Technical Department
on behalf of **Exova warringtonfire**

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

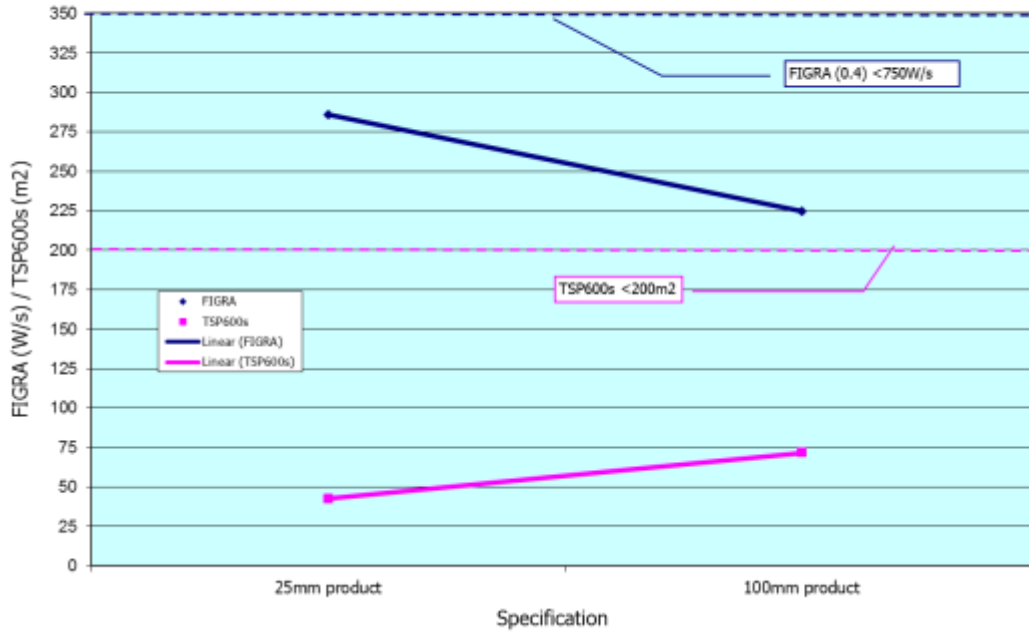
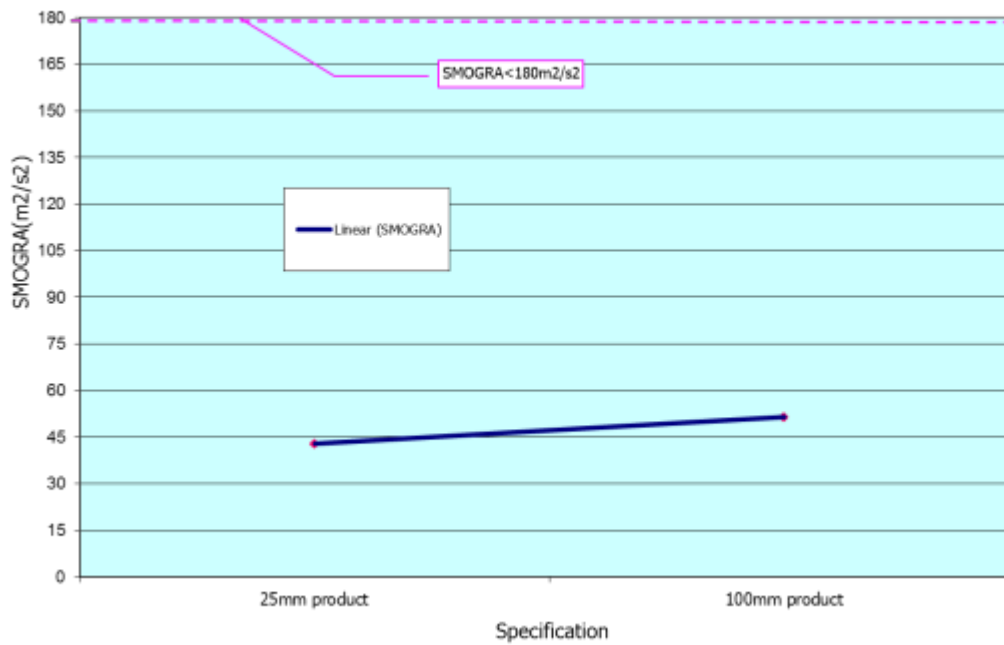


Figure 2 - Effect of varying the product specification on SMOGRA



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Title:

CLASSIFICATION OF
REACTION TO FIRE
PERFORMANCE
IN ACCORDANCE WITH
EN 13501-1:2007+A1: 2009.

Notified Body No:

0833

Product Name:

"RS5000 Series - Line 1"

Report No:

WF 383672

Issue No:

1

Prepared for:

Celotex
Lady Lane Industrial Estate
Lady Lane
Hadleigh
Suffolk
IP7 6BA

Date:

17th August 2017



1. Introduction

This classification report defines the classification assigned to "RS5000 Series - Line 1", a foil faced PIR insulation family, in line with the procedures given in EN 13501-1:2007+A1: 2009.

2. Details of classified product

2.1 General

The product, "RS5000 Series - Line 1", a foil faced PIR insulation family, is defined as being suitable for construction applications, excluding flooring.

2.2 Product description

The product, "RS5000 Series - Line 1", a foil faced PIR insulation family, is fully described below and in the test reports provided in support of classification listed in Clause 3.1.

General description		Foil faced PIR insulation
Name of manufacturer		Saint-Gobain Construction Products UK Limited – Trading as Celotex
Trade name of family		"RS5000 Series - Line 1" (last 3 digits of product reference denotes foam thickness in mm eg. "RS5025 – Line 1" denotes foam thickness of 25mm)
Thickness of composite		25mm to 100mm
Weight per unit area of composite		1.03 kg/m ² to 3.33 kg/m ²
Aluminium foil	Product reference	"FSS 38-172"
	Generic type	Aluminium foil (embossed)
	Name of manufacturer	See Note 1 below
	Weight per unit area	See Note 1 below
	Thickness	See Note 1 below
	Colour	"Silver"
	Flame retardant details	This component is inherently flame retardant
Foam	Product reference	"CP400E 28-028"
	Generic type	PIR insulation foam core
	Name of manufacturer	Saint-Gobain Construction Products UK Limited – trading as Celotex
	Thickness	25mm to 100mm
	Density	32 kg/m ³
	Flame retardant details	See Note 2 below

Continued on next page

Aluminium foil	Product reference	"FSS 38-172"
	Generic type	Aluminium foil (embossed)
	Name of manufacturer	See Note 1 below
	Weight per unit area	See Note 1 below
	Thickness	See Note 1 below
	Colour	"Silver"
	Flame retardant details	This component is inherently flame retardant
Joint Details		Long wing: one horizontal at 500mm of specimen height, vertical 200mm in from corner line - Short wing one horizontal joint at 500mm height. As per EN 13823 5.2.2
Substrate	Product reference	"Promat – Brandschutzbauplatten; Promatect-H"
	Generic type	Calcium Silicate based board
	Name of manufacturer	Promat
	Thickness	12mm
	Density	870kg/m ³
Flame retardant details		The substrate is inherently flame retardant
Brief description of manufacturing process		Facing is auto adhesively bonded to foam during the manufacturing process.

Note 1: 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.

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

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

3.1 Test reports/extended application reports

Name of Laboratory	Name of sponsor	Test reports/extended application report Nos.	Test method / extended application rules & date
Exova warringtonfire	Celotex	WF 381750	EN ISO 11925-2
Exova warringtonfire	Celotex	WF 381749, 381751	EN 13823
Exova warringtonfire	Celotex	WF 383671	EN/TS 15117

3.2 Test results

Test method & test number	Parameter	No. tests	Results	
			Continuous parameter - mean (m)	Compliance parameters
EN ISO 11925-2 (30s exposure - surface)	F _s	6	50	Compliant
	Flaming droplets/ particles		None	Compliant
EN ISO 11925-2 (30s exposure - edge)	F _s	6	36.7	Compliant
	Flaming droplets/ particles		None	Compliant
EN ISO 11925-2 (30s exposure - edge turned at 90 degrees)	F _s	6	95	Compliant
	Flaming droplets/ particles		None	Compliant
EN 13823	FIGRA _{0.2MJ}	25mm product	302.89	Compliant
		100mm product	249.41	
	FIGRA _{0.4MJ}	25mm product	285.76	Compliant
		100mm product	224.66	
	THR _{600s}	25mm product	3.27	Compliant
		100mm product	5.26	
	LFS	25mm product	None	Compliant
		100mm product	None	
	SMOGRA	25mm product	42.82	Compliant
		100mm product	51.35	
	TSP _{600s}	25mm product	42.50	Compliant
		100mm product	71.64	

4. Classification and field of application

4.1 Reference of classification

This classification has been carried out in accordance with clause 8 of EN 13501-1:2007+A1:2009.

4.2 Classification

The product, "RS5000 Series - Line 1", a foil faced PIR insulation family, in relation to its reaction to fire behaviour is classified:

D

The additional classification in relation to smoke production is:

s2

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
D	-	s	2	, d 0

i.e. **D – s2 , d0**

Reaction to fire classification: D – s2, d0

4.3 Field of application

This classification is valid for the following end use applications:

- i) Construction applications used over any substrate with a density equal to or greater than 870kg/m³, having a minimum thickness of 12mm and a fire performance of A2 or better (excluding paper faced gypsum plasterboard).

This classification is also valid for the following product parameters:

Product thickness	25mm to 100mm
Insulation thickness	25mm to 100mm
Product weight per unit area	1.03 kg/m ² to 3.33kg/m ²
Insulation density	Tested density ± 15%
Thickness and weight per unit area of facings	For the tested thickness only. The test result obtained for Euroclass A1 and A2 facings will also be valid for thicker facings of the same type.
Product composition	No variation allowed
Product construction	No variation allowed

5. Limitations

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

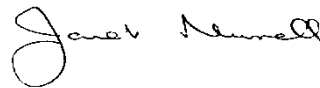
SIGNED



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Jennifer Lucas-Cox
Certification Engineer
Technical Department

APPROVED



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Janet Murrell
Technical Manager
Technical Department
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Testing. Advising. Assuring.

Title:

EXTENDED APPLICATION
REPORT IN ACCORDANCE
WITH EN/TS 15117:2005

Notified Body No:

0833

Product Name:

"RS5000 Series - Line 2"

Report No:

WF 383674

Issue No:

1

Prepared for:

Celotex
Lady Lane Industrial Estate
Lady Lane
Hadleigh
Suffolk
IP7 6BA

Date:

17th August 2017

1. Introduction

This report extends the field of application of test results obtained for "RS5000 Series - Line 2", a foil faced PIR insulation family. 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 "RS5000 Series - Line 2", a foil faced PIR insulation family. There is one product property which varies within this product family, thickness of insulation. This property was assessed to determine its 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 family, "RS5000 Series - Line 2", a foil faced PIR insulation family, is fully described below and in the test reports provided in support of classification listed in Clause 3.1.

General description		Foil faced PIR insulation
Name of manufacturer		Saint-Gobain Construction Products UK Limited – Trading as Celotex
Trade names		"RS5000 Series - Line 2" (last 3 digits of product reference denotes foam thickness in mm eg. "RS5100 – Line 2" denotes foam thickness of 100mm)
Thickness of composite		100mm to 160mm
Weight per unit area of composite		3.30 kg/m ² to 5.29kg/m ²
Aluminium foil	Product reference	"FSS 38-172"
	Generic type	Aluminium foil (embossed)
	Name of manufacturer	See Note 1 below
	Weight per unit area	See Note 1 below
	Thickness	See Note 1 below
	Colour	"Silver"
	Flame retardant details	This component is inherently flame retardant

Continued on next page

Foam	Product reference	"HP400E 28-038"
	Generic type	PIR insulation foam core
	Name of manufacturer	Saint-Gobain Construction Products UK Limited – trading as Celotex
	Thickness	100mm to 160mm
	Density	32 kg/m ³
	Flame retardant details	See Note 2 below
Aluminium foil	Product reference	"FSS 38-172"
	Generic type	Aluminium foil (embossed)
	Name of manufacturer	See Note 1 below
	Weight per unit area	See Note 1 below
	Thickness	See Note 1 below
	Colour	"Silver"
Flame retardant details		This component is inherently flame retardant
Joint Details		Long wing: one horizontal at 500mm of specimen height, vertical 200mm in from corner line - Short wing one horizontal joint at 500mm height. As per EN 13823 5.2.2
Substrate	Product reference	"Promat – Brandschutzbauplatten; Promatect-H"
	Generic type	Calcium Silicate based board
	Name of manufacturer	Promat
	Thickness	12mm
	Density	870kg/m ³
Flame retardant details		The substrate is inherently flame retardant
Brief description of manufacturing process		Facing is auto adhesively bonded to foam during the manufacturing process.

Note 1: 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.

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
Exova warringtonfire	Celotex	WF 381760	EN ISO 11925-2
Exova warringtonfire	Celotex	WF 381753, 381758	EN 13823
Exova warringtonfire	Celotex	WF 383675	EN 13501

3.2 Test results

Test method & test number	Parameter	No. tests	Results	
			Continuous parameter - mean (m)	Compliance parameters
EN ISO 11925-2 (30s exposure - surface)	F _s	6	Nil	Compliant
	Flaming droplets/ particles		None	Compliant
EN ISO 11925-2 (30s exposure - edge)	F _s	6	41.7	Compliant
	Flaming droplets/ particles		None	Compliant
EN ISO 11925-2 (30s exposure - edge turned at 90 degrees)	F _s	6	91.7	Compliant
	Flaming droplets/ particles		None	Compliant
EN 13823	FIGRA _{0.2MJ}	100mm product	222.39	Compliant
		160mm product	320.07	
	FIGRA _{0.4MJ}	100mm product	193.26	Compliant
		160mm product	292.81	
	THR _{600s}	100mm product	5.09	Compliant
		160mm product	5.96	
	LFS	100mm product	None	Compliant
		160mm product	None	
	SMOGRA	100mm product	49.50	Compliant
		160mm product	83.26	
	TSP _{600s}	100mm product	69.93	Compliant
		160mm product	90.71	

4. Classification and field of application

4.1 Definition of Limits of Extended Application

Two tests were conducted in accordance with EN 13823 and one in accordance with EN ISO 11925-2. The initial assessment of this product family was conducted, and the data generated has been used to determine which product specifications gave the worst performance. To determine the effect on the fire performance of the product family, formal EN 13823 tests were conducted on the thinnest (100mm) and thickest (160mm) products within the family. The specification with the worst set of results (160mm) was tested formally in accordance with EN ISO 11925-2.

4.2 EN ISO 11925-2

From the data generated during the EN 13823 testing it was apparent which product specification gave the worst fire performance. This product was tested formally in accordance with EN ISO 11925-2 using surface, edge flame application and edge turned at 90 degrees flame application. No flame spread from the point of flame application travelled further than 100mm. The highest average flame front was 38% below the maximum value allowed for Class D, (EN 13501-1).

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 product thickness has on the fire performance of "RS5000 Series - Line 2", a foil faced PIR insulation family. This evidence is shown in Figures 1 and 2.

The highest FIGRA value (160mm product) fell within Class D (EN 13501-1).

The measured results relating to smoke parameters, SMOGRA and TSP600s, also fall within the s2 criteria, with the highest smoke value being approximately 53% below the maximum allowed or s2, (EN 13501-1).

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

4.4 Reference of classification

This classification has been carried out in accordance with EN 13501-1:2007+A1: 2009 and EN/TS 15117.

4.5 Classification

The products, "RS5000 Series - Line 2", a foil faced PIR insulation family, in relation to its reaction to fire behaviour is classified:

D

The additional classification in relation to smoke production is:

s2

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
D	-	s	2	d 0

i.e. **D – s2 , d0**

Reaction to fire classification: **D – s2, d0**

4.6 Extended Field of application

This classification is valid for the following end use applications:

- i) Construction applications used over any substrate with a density equal to or greater than 870kg/m³, having a minimum thickness of 12mm and a fire performance of A2 or better (excluding paper faced gypsum plasterboard).

This classification is also valid for the following product parameters:

Product thickness	100mm to 160mm
Insulation thickness	100mm to 160mm
Product weight per unit area	3.30 kg/m ² to 5.29kg/m ²
Insulation density	Tested density ± 15%
Thickness and weight per unit area of facings	For the tested thickness only. The test result obtained for Euroclass A1 and A2 facings will also be valid for thicker facings of the same type.
Product composition	No variation allowed
Product construction	No variation allowed

5. Limitations

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

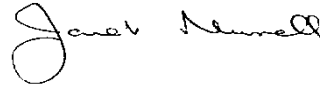
SIGNED



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Jennifer Lucas-Cox
Certification Engineer
Technical Department

APPROVED



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Janet Murrell
Technical Manager
Technical Department
on behalf of **Exova warringtonfire**

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

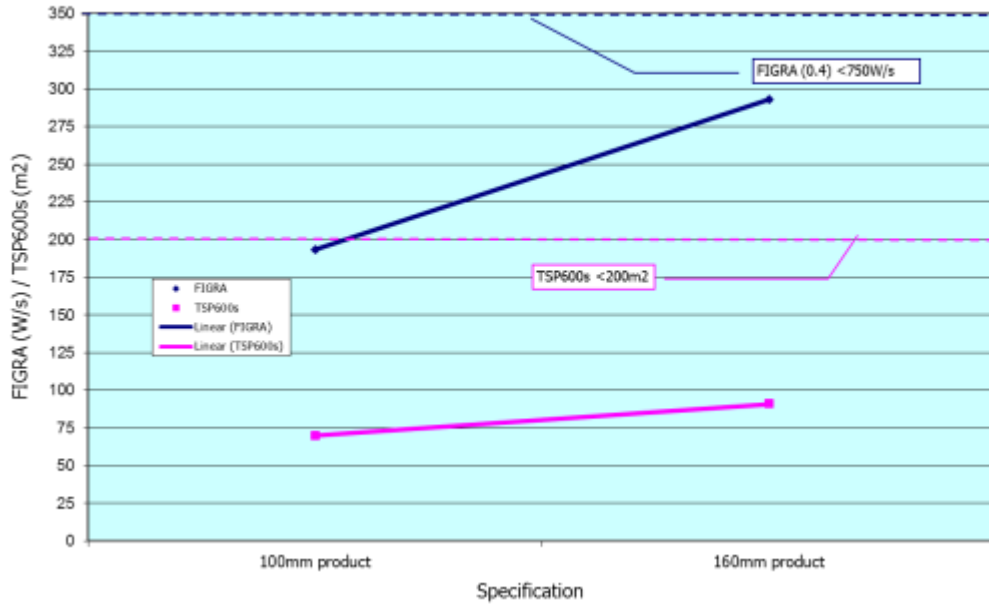


Figure 2 - Effect of varying the product specification on SMOGRA

