

BRE Global Test Report

BS 476-6: 1989 + A1: 2009 Fire propagation test on 5160 Line 2

Prepared for: Celotex Ltd
Date: 25 January 2018
Report Number: P107614-1020 Issue: 1

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Prepared for:
Saint-Gobain Construction Products UK
Trading as Celotex Ltd
Lady Lane Industrial Estate
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Prepared by

Name B Gohil

Position Laboratory Technician

Signature

A handwritten signature in blue ink that reads "B. Gohil".

Authorised by

Name J Hunter

Position Section Leader, Reaction to Fire

Date 25 January 2018

Signature

A handwritten signature in blue ink that reads "J. Hunter".

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1 Objective

To determine the fire propagation index of the sample specified in Section 2 using the test method specified in British Standard 476: Part 6: 1989 + A1: 2009.

2 Sample

2.1 Traceability

The test samples were supplied by the test sponsor. BRE Global were not involved in the sample selection process and therefore cannot comment upon the relationship between the samples supplied for test and the product supplied to market.

2.2 Description of sample and test format.

Unless otherwise stated all measurements are nominal.

Test Sponsor	Saint-Gobain Construction Products UK, Trading as CelotexLtd Lady Lane Industrial Estate, Hadleigh, Ipswich, Suffolk, IP7 6BA
Manufacturer of sample	As above
Sample name/reference	5160 – Line 2
Sample description (as provided by test sponsor/manufacturer)	Celotex 5160 insulation (Line 2) with foam core (28-038) and Stucco Aluminium facers (38-172). Manufacture stamp 09/03/2017; 15:39
Description of sample (as received)	Foam core with aluminium facers on both side. (For testing the specimens were obtained by cutting away the unexposed face of the product to reduce the thickness to 50 mm as required by the standard.)
Mean weight per unit area (kg/m ²)	5.28
Mean thickness (mm)	158.2
Sample receipt date	26 October 2017 (BRE Ref E10326)
Test face	Foil face
Test format	No air gap
Date of test	05-12-13 October 2017



3 Conditioning

The specimens were conditioned as required by the standard.

4 Results

4.1 Temperature measurement

Table 1 shows the Temperature rise for calibration sheet and specimens

Table 2 shows the Index of performance for each specimen

Table 1 – temperature rise

Time t min	Temperature rise - °C					
	Calibration	Specimen	Calibration	Specimen	Calibration	Specimen
	a	a	b	b	c	C
0.5	14.6	19.8	15.7	19.5	14.6	18.1
1	21.2	26.0	21.4	27.0	21.5	22.1
1.5	26.0	32.3	25.7	33.0	26.6	27.5
2	30.1	34.6	29.9	35.6	30.8	31.5
2.5	33.5	38.9	33.1	40.8	35.0	35.8
3	38.9	42.7	36.5	43.6	38.7	40.3
4	68.0	72.1	65.9	75.0	67.4	70.2
5	102.5	130.4	98.2	113.8	103.0	105.5
6	132.6	173.6	128.1	151.8	134.6	137.8
7	152.5	206.3	150.6	177.1	153.7	179.9
8	168.8	223.5	167.6	196.7	170.6	208.3
9	181.5	241.8	181.9	210.1	186.2	229.2
10	191.9	252.2	192.4	226.0	197.7	246.7
12	207.1	264.8	208.6	249.3	212.8	273.9
14	218.7	268.9	221.9	286.1	223.7	299.7
16	229.9	260.9	231.3	304.4	232.0	314.3
18	236.7	252.1	236.1	301.5	238.7	323.0
20	244.3	244.7	242.6	282.9	241.6	324.2

Three different calibration were used because the test were conducted on different days.

t - time in minutes from the time at which the gas jets were ignited.

a, b and c - represent individual specimens giving valid test results.

**Table 2 Index of performance**

Specimen	S	s ₁	s ₂	s ₃
a	7.7	2.5	4.1	1.1
b	6.7	2.6	2.3	1.8
c	5.3	0.9	2	2.4

4.2 Observations

No intumescence or deformation of any specimen occurred that affected the required gas input.

No melting or slumping occurred that prevented the material from being exposed to the heating conditions.

Air flow through the apparatus was not restricted by fallen material or by soot accumulation in the chimney.

5 Conclusions

A sample as described in this report, when tested in accordance with BS 476: Part 6: 1989 + A1: 2009, achieved:

fire propagation index I = 6.6
 sub-indices i₁ = 2.0
 i₂ = 2.8
 i₃ = 1.7

BS 476: Part 6: 1989 + A1: 2009 does not contain acceptance criteria and therefore this test report does not indicate a pass or fail of the product.

6 Validity

The test results relate only to behaviour of the test specimens of the product under the particular conditions of test, they are not intended to be the sole criteria for assessing the potential fire hazard of the product in use.

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 5 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.



7 Reference

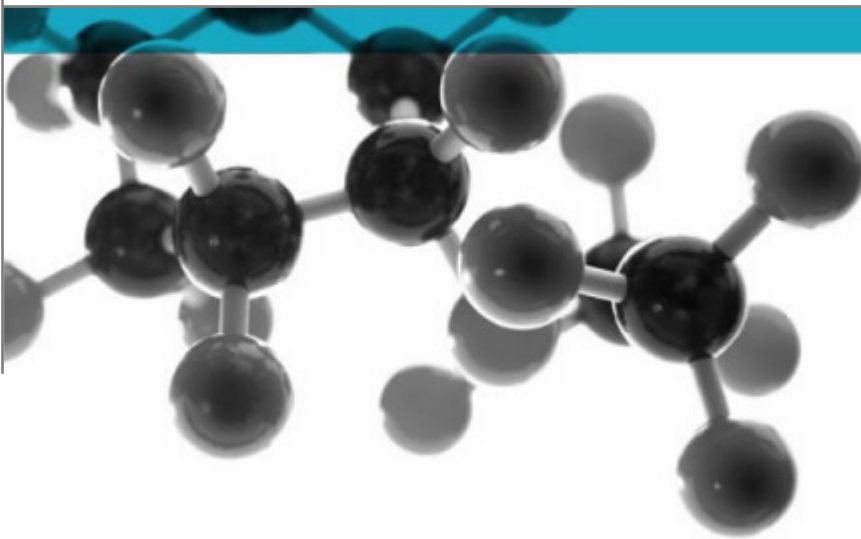
- 1 British Standard 476: Part 6: 1989 + A1: 2009 Fire tests on building materials and structures. Part 6. Incorporating Corrigendum No 1:2014. Fire propagation test for products. British Standards Institution, London 2009.

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BS 476: Part 7: 1997



Method For Classification Of The Surface Spread Of Flame Of Products

A Report To: Celotex Limited

Document Reference: 388962

Date: 1st November 2017

Issue No.: 1

Page 1

Testing
Advising
Assuring



Executive Summary

Objective To determine the surface spread of flame classification of the following product when tested in accordance with BS 476: Part 7: 1997.

Generic Description	Product reference	Thickness	Weight per unit area or density
Aluminium foil faced and backed polyisocyanurate (PIR) insulation	"Celotex 5050 Line 1"	50mm	32kg/m ³
Individual components used to manufacture composite:			
Foil facing	"FSS 38-172"	Confidential	Confidential
Insulation	"CP400E 28-028"	50mm	32kg/m ³
Foil facing	"FSS 38-172"	Confidential	Confidential
Please see page 5 of this test report for the full description of the product tested			


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


Test Results: **Class 1**

An uncertainty of measurement estimation has been conducted in relation to the distance travelled by the flame front and the findings are as detailed on page 8.

Date of Test 18th September 2017

Signatories


Responsible Officer C. Meachin * Technical Officer


Authorised T. Mort * Senior Technical Officer

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

Report Issued: 1 st November 2017
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Test Details

Purpose of test	To determine the performance of a product when it is subjected to the conditions of the test specified in BS 476: Part 7: 1997, "Fire tests on building materials and structures, method for classification of the surface spread of flame of products". This test was therefore performed in accordance with the procedure specified in BS 476: Part 7: 1997 and this report should be read in conjunction with that British Standard.
Scope of test	BS 476: Part 7: 1997 specifies a method of test for measuring the lateral spread of flame along the surface of a specimen of a product orientated in the vertical position, and a classification system based on the rate and extent of flame spread. It provides data suitable for comparing the performances of essentially flat materials, composites, or assemblies, which are used primarily as the exposed surfaces of walls or ceilings.
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 18 th September 2017 at the request of Celotex Limited, 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 8 th September 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.
Form in which the specimens were tested	Composite - Combination of materials which are generally recognised in building constructions as discrete entities e.g. coated or laminated materials. Each specimen was tested in direct contact with a nominally 12mm thick non-combustible backing board.
Exposed face	The aluminium foil face of the specimens was exposed to the heating conditions of the test.

Description of Test Specimens

The description of the specimens given below has been prepared from information provided by the sponsor of the test. This information has not been independently verified by **Exova Warringtonfire**. All values quoted are nominal, unless tolerances are given.

General description		Aluminium foil faced and backed polyisocyanurate (PIR) insulation
Product reference		"Celotex 5050 Line 1"
Name of manufacturer		Saint-Gobain Construction Products – Trading as Celotex
Overall thickness		50mm (stated by sponsor) 51.12mm (determined by Exova Warringtonfire)
Overall density		32kg/m ³ (stated by sponsor) 33.07kg/m ³ (determined by Exova Warringtonfire)
Foil	Generic type	Embossed aluminium foil with internal primer
	Product reference	"FSS 38-172"
	Name of manufacturer	See Note 1 below
	Thickness	See Note 1 below
	Weight per unit area	See Note 1 below
	Colour reference	"Silver"
Flame retardant details		See Note 2 below
Insulation	Generic type	Polyisocyanurate (PIR) insulation foam core
	Product reference	"CP400E 28-028"
	Detailed description / composition details	See Note 1 below
	Name of manufacturer	Saint-Gobain Construction Products – Trading as Celotex
	Thickness	50mm
	Density	32kg/m ³
	Colour reference	"Yellow" (observed by Exova Warringtonfire)
Flame retardant details		See Note 3 below
Foil	Generic type	Embossed aluminium foil with internal primer
	Product reference	"FSS 38-172"
	Name of manufacturer	See Note 1 below
	Thickness	See Note 1 below
	Weight per unit area	See Note 1 below
	Colour reference	"Silver"
Flame retardant details		See Note 2 below
Brief description of manufacturing process		Continuous auto-adhesive lamination

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 of the test has confirmed that no flame retardant additives were utilised in the production of the component.

Note 3. The sponsor was unwilling to provide this information.

Test Results

Results and observations

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 Appendix 1.

Classification

In accordance with the class definitions given in BS 476: Part 7: 1997; the specimens tested are classified as Class 1.

An uncertainty of measurement estimation has been conducted in relation to the distance travelled by the flame front and the findings are as detailed on page 8.

Criteria for classification

If the prefix 'D' or suffix 'R' or 'Y' is included in the classification, this indicates that the results should be treated with caution. An explanation of the reason for the prefix and suffixes is given in Appendix 2, together with the classification limits specified in the Standard.

Applicability of test result

The test results relate only to the behaviour of the test specimens of the product under the particular conditions of test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.

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.

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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Appendix 1 – Test Results

SPECIMEN No.	1	2	3	4	5	6
Maximum distance travelled at 1.5 minutes (mm)	65	65	65	65	65	65
Distance (mm)	Time to travel to indicated distance (minutes : seconds)					
75						
165						
190						
215						
240						
265						
290						
375						
455						
500						
525						
600						
675						
710						
750						
785						
825						
Time to reach maximum distance travelled	1:02	1:01	1:02	1:01	1:00	1:00
Maximum distance travelled in 10 minutes (mm)	65	65	65	65	65	65

Note: Six specimens are usually tested. If the test on any specimen is deemed to be invalid, as defined in the Standard, it is permissible for up to a maximum of nine specimens to be tested in order to obtain the six valid test results.

Observations made during test and comments on any difficulties encountered during the test:

None

**Uncertainty of
 measurement**

Specimen No.	1	2	3	4	5	6
Maximum distance travelled at 1.5 minutes (mm)	±4	±4	±4	±4	±4	±4
Maximum distance travelled in 10 minutes (mm)	±4	±4	±4	±4	±4	±4

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.

Appendix 2 – Classification Criteria

Classification of spread of flame

Classification	Spread of Flame at 1.5 min		Final Spread of Flame	
	Limit (mm)	Limit for one specimen (mm)	Limit (mm)	Limit for one specimen (mm)
Class 1	165	165 + 25	165	165 + 25
Class 2	215	215 + 25	455	455 + 45
Class 3	265	265 + 25	710	710 + 75
Class 4	Exceeding the limits for class 3			

Explanation of prefix and suffixes which may be added to the classification

1. A suffix R is added to the classification if more than six specimens are required in order to obtain six valid test results (e.g. class 2R).
2. A prefix D is added to the classification of any product which does not comply with the surface characteristics specified in the Standard and has therefore been tested in a modified form (e.g. class D3).
3. A suffix Y is added to the classification if any softening and/or other behaviour that may affect the flame spread occurs (e.g. class 3Y).

For example, a classification of D3RY could be achieved indicating (a) a modified surface has been used; (b) a class 3 result has been obtained; (c) additional specimens have been used to obtain 6 valid results and; (d) softening and/or other behaviour has occurred which is considered to have affected the test result.

Revision History

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

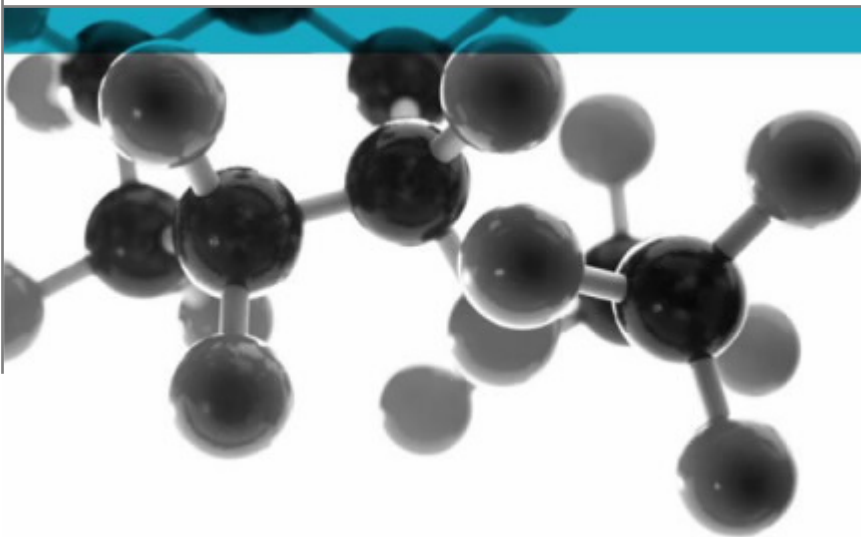
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BS 476: Part 7: 1997



Method For Classification Of The Surface Spread Of Flame Of Products

A Report To: Celotex Limited

Document Reference: 388964

Date: 1st November 2017

Issue No.: 1

Page 1

Testing
Advising
Assuring



Executive Summary

Objective To determine the surface spread of flame classification of the following product when tested in accordance with BS 476: Part 7: 1997.

Generic Description	Product reference	Thickness	Weight per unit area or density
Aluminium foil faced and backed polyisocyanurate (PIR) insulation	"Celotex 5050 Line 2"	50mm	32kg/m ³
Individual components used to manufacture composite:			
Foil facing	"FSS 38-172"	Confidential	Confidential
Insulation	"HP400E 28-038"	50mm	32kg/m ³
Foil facing	"FSS 38-172"	Confidential	Confidential
Please see page 5 of this test report for the full description of the product tested			


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


Test Results: **Class 1**

An uncertainty of measurement estimation has been conducted in relation to the distance travelled by the flame front and the findings are as detailed on page 8.

Date of Test 18th September 2017

Signatories


Responsible Officer C. Meachin * Technical Officer


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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 18 th September 2017 at the request of Celotex Limited, 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 8 th September 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.
Form in which the specimens were tested	Composite - Combination of materials which are generally recognised in building constructions as discrete entities e.g. coated or laminated materials. Each specimen was tested in direct contact with a nominally 12mm thick non-combustible backing board.
Exposed face	The aluminium foil face of the specimens was exposed to the heating conditions of the test.

Description of Test Specimens

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General description		Aluminium foil faced and backed polyisocyanurate (PIR) insulation
Product reference		"Celotex 5050 Line 2"
Name of manufacturer		Saint-Gobain Construction Products – Trading as Celotex
Overall thickness		50mm (stated by sponsor) 49.74mm (determined by Exova Warringtonfire)
Overall density		32kg/m ³ (stated by sponsor) 37.56kg/m ³ (determined by Exova Warringtonfire)
Foil	Generic type	Embossed aluminium foil with internal primer
	Product reference	"FSS 38-172"
	Name of manufacturer	See Note 1 below
	Thickness	See Note 1 below
	Weight per unit area	See Note 1 below
	Colour reference	"Silver"
	Flame retardant details	See Note 2 below
Insulation	Generic type	Polyisocyanurate PIR insulation foam core
	Product reference	"HP400E 28-038"
	Detailed description / composition details	See Note 1 below
	Name of manufacturer	Saint-Gobain Construction Products – Trading as Celotex
	Thickness	50mm
	Density	32kg/m ³
	Colour reference	"Yellow" (observed by Exova Warringtonfire)
Flame retardant details	See Note 3 below	
Foil	Generic type	Embossed aluminium foil with internal primer
	Product reference	"FSS 38-172"
	Name of manufacturer	See Note 1 below
	Thickness	See Note 1 below
	Wight per unit area	See Note 1 below
	Colour reference	"Silver"
	Flame retardant details	See Note 2 below
Brief description of manufacturing process		Continuous auto-adhesive lamination

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 of the test has confirmed that no flame retardant additives were utilised in the production of the component.

Note 3. The sponsor was unwilling to provide this information.

Test Results

Results and observations

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 Appendix 1.

Classification

In accordance with the class definitions given in BS 476: Part 7: 1997; the specimens tested are classified as Class 1.

An uncertainty of measurement estimation has been conducted in relation to the distance travelled by the flame front and the findings are as detailed on page 8.

Criteria for classification

If the prefix 'D' or suffix 'R' or 'Y' is included in the classification, this indicates that the results should be treated with caution. An explanation of the reason for the prefix and suffixes is given in Appendix 2, together with the classification limits specified in the Standard.

Applicability of test result

The test results relate only to the behaviour of the test specimens of the product under the particular conditions of test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.

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.

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Appendix 1 – Test Results

SPECIMEN No.	1	2	3	4	5	6
Maximum distance travelled at 1.5 minutes (mm)	70	65	65	65	65	65
Distance (mm)	Time to travel to indicated distance (minutes : seconds)					
75						
165						
190						
215						
240						
265						
290						
375						
455						
500						
525						
600						
675						
710						
750						
785						
825						
Time to reach maximum distance travelled	1:00	1:00	1:00	1:00	1:00	1:00
Maximum distance travelled in 10 minutes (mm)	70	65	65	65	65	65

Note: Six specimens are usually tested. If the test on any specimen is deemed to be invalid, as defined in the Standard, it is permissible for up to a maximum of nine specimens to be tested in order to obtain the six valid test results.

Observations made during test and comments on any difficulties encountered during the test:

None

**Uncertainty of
 measurement**

Specimen No.	1	2	3	4	5	6
Maximum distance travelled at 1.5 minutes (mm)	±4	±4	±4	±4	±4	±4
Maximum distance travelled in 10 minutes (mm)	±4	±4	±4	±4	±4	±4

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.

Appendix 2 – Classification Criteria

Classification of spread of flame

Classification	Spread of Flame at 1.5 min		Final Spread of Flame	
	Limit (mm)	Limit for one specimen (mm)	Limit (mm)	Limit for one specimen (mm)
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Class 3	265	265 + 25	710	710 + 75
Class 4	Exceeding the limits for class 3			

Explanation of prefix and suffixes which may be added to the classification

1. A suffix R is added to the classification if more than six specimens are required in order to obtain six valid test results (e.g. class 2R).
2. A prefix D is added to the classification of any product which does not comply with the surface characteristics specified in the Standard and has therefore been tested in a modified form (e.g. class D3).
3. A suffix Y is added to the classification if any softening and/or other behaviour that may affect the flame spread occurs (e.g. class 3Y).

For example, a classification of D3RY could be achieved indicating (a) a modified surface has been used; (b) a class 3 result has been obtained; (c) additional specimens have been used to obtain 6 valid results and; (d) softening and/or other behaviour has occurred which is considered to have affected the test result.

Revision History

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Reason for Revision:	

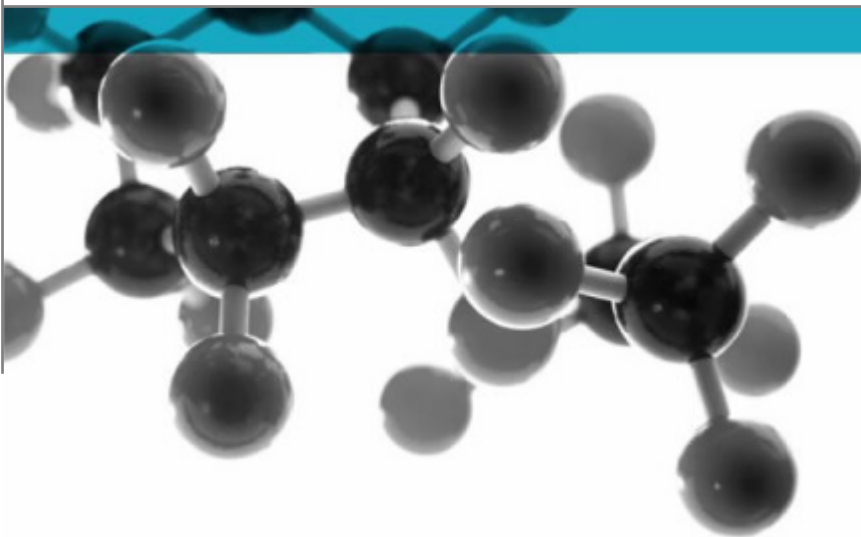
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BS 476: Part 7: 1997



Method For Classification Of The Surface Spread Of Flame Of Products

A Report To: Celotex Limited

Document Reference: 388968

Date: 1st November 2017

Issue No.: 1

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Testing
Advising
Assuring



Executive Summary

Objective To determine the surface spread of flame classification of the following product when tested in accordance with BS 476: Part 7: 1997.

Generic Description	Product reference	Thickness	Weight per unit area or density
Aluminium foil faced and backed polyisocyanurate (PIR) insulation	"Celotex 5160 Line 2"	160mm	32kg/m ³
Individual components used to manufacture composite:			
Aluminium foil facing	"FSS 38-172"	Confidential	Confidential
Insulation	"HP400E 28-038"	160mm	32kg/m ³
Aluminium foil facing	"FSS 38-172"	Confidential	Confidential
Please see page 5 of this test report for the full description of the product tested			


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


Test Results: **Class 1**

An uncertainty of measurement estimation has been conducted in relation to the distance travelled by the flame front and the findings are as detailed on page 8.

Date of Test 18th September 2017

Signatories


Responsible Officer C. Meachin * Technical Officer


Authorised T. Mort * Senior Technical Officer

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

Report Issued: 1st Nov3ember 2017

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Test Details

Purpose of test	To determine the performance of a product when it is subjected to the conditions of the test specified in BS 476: Part 7: 1997, "Fire tests on building materials and structures, method for classification of the surface spread of flame of products". This test was therefore performed in accordance with the procedure specified in BS 476: Part 7: 1997 and this report should be read in conjunction with that British Standard.
Scope of test	BS 476: Part 7: 1997 specifies a method of test for measuring the lateral spread of flame along the surface of a specimen of a product orientated in the vertical position, and a classification system based on the rate and extent of flame spread. It provides data suitable for comparing the performances of essentially flat materials, composites, or assemblies, which are used primarily as the exposed surfaces of walls or ceilings.
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 18 th September 2017 at the request of Celotex Limited, 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 8 th September 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.
Form in which the specimens were tested	Composite - Combination of materials which are generally recognised in building constructions as discrete entities e.g. coated or laminated materials. Each specimen was tested in direct contact with a nominally 12mm thick non-combustible backing board.
Exposed face	The aluminium foil face of the specimens was exposed to the heating conditions of the test.

Description of Test Specimens

The description of the specimens given below has been prepared from information provided by the sponsor of the test. This information has not been independently verified by **Exova Warringtonfire**. All values quoted are nominal, unless tolerances are given.

General description		Aluminium foil faced and backed polyisocyanurate (PIR) insulation
Product reference		"Celotex 5160 Line 2"
Name of manufacturer		Saint-Gobain Construction Products – Trading as Celotex
Overall thickness		160mm (stated by sponsor) 162mm (determined by Exova Warringtonfire)
Overall density		32kg/m ³ (stated by sponsor) 33.35kg/m ³ (determined by Exova Warringtonfire)
Foil	Generic type	Embossed aluminium foil with internal primer
	Product reference	"FSS 38-172"
	Name of manufacturer	See Note 1 below
	Thickness	See Note 1 below
	Weight per unit area	See Note 1 below
	Colour reference	"Silver"
	Flame retardant details	See Note 2 below
Insulation	Generic type	Polyisocyanurate (PIR) insulation foam core
	Product reference	"HP400E 28-038"
	Detailed description / composition details	See Note 1 below
	Name of manufacturer	Saint-Gobain Construction Products – Trading as Celotex
	Thickness	160mm
	Density	32kg/m ³
	Colour reference	"Yellow" (observed by Exova Warringtonfire)
	Flame retardant details	See Note 3 below
Foil	Generic type	Embossed aluminium foil with internal primer
	Product reference	"FSS 38-172"
	Name of manufacturer	See Note 1 below
	Thickness	See Note 1 below
	Weight per unit area	See Note 1 below
	Colour reference	"Silver"
	Flame retardant details	See Note 2 below
Brief description of manufacturing process		Continuous auto-adhesive lamination

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 of the test has confirmed that no flame retardant additives were utilised in the production of the component.

Note 3. The sponsor was unwilling to provide this information.

Test Results

Results and observations

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 Appendix 1.

Classification

In accordance with the class definitions given in BS 476: Part 7: 1997; the specimens tested are classified as Class 1.

An uncertainty of measurement estimation has been conducted in relation to the distance travelled by the flame front and the findings are as detailed on page 8.

Criteria for classification

If the prefix 'D' or suffix 'R' or 'Y' is included in the classification, this indicates that the results should be treated with caution. An explanation of the reason for the prefix and suffixes is given in Appendix 2, together with the classification limits specified in the Standard.

Applicability of test result

The test results relate only to the behaviour of the test specimens of the product under the particular conditions of test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.

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.

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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Appendix 1 – Test Results

SPECIMEN No.	1	2	3	4	5	6
Maximum distance travelled at 1.5 minutes (mm)	65	65	65	65	60	60
Distance (mm)	Time to travel to indicated distance (minutes : seconds)					
75						
165						
190						
215						
240						
265						
290						
375						
455						
500						
525						
600						
675						
710						
750						
785						
825						
Time to reach maximum distance travelled	1:00	1:00	1:00	1:00	1:00	1:00
Maximum distance travelled in 10 minutes (mm)	65	65	65	65	60	60

Note: Six specimens are usually tested. If the test on any specimen is deemed to be invalid, as defined in the Standard, it is permissible for up to a maximum of nine specimens to be tested in order to obtain the six valid test results.

Observations made during test and comments on any difficulties encountered during the test:

None

**Uncertainty of
 measurement**

Specimen No.	1	2	3	4	5	6
Maximum distance travelled at 1.5 minutes (mm)	±4	±4	±4	±4	±4	±4
Maximum distance travelled in 10 minutes (mm)	±4	±4	±4	±4	±4	±4

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.

Appendix 2 – Classification Criteria

Classification of spread of flame

Classification	Spread of Flame at 1.5 min		Final Spread of Flame	
	Limit (mm)	Limit for one specimen (mm)	Limit (mm)	Limit for one specimen (mm)
Class 1	165	165 + 25	165	165 + 25
Class 2	215	215 + 25	455	455 + 45
Class 3	265	265 + 25	710	710 + 75
Class 4	Exceeding the limits for class 3			

Explanation of prefix and suffixes which may be added to the classification

1. A suffix R is added to the classification if more than six specimens are required in order to obtain six valid test results (e.g. class 2R).
2. A prefix D is added to the classification of any product which does not comply with the surface characteristics specified in the Standard and has therefore been tested in a modified form (e.g. class D3).
3. A suffix Y is added to the classification if any softening and/or other behaviour that may affect the flame spread occurs (e.g. class 3Y).

For example, a classification of D3RY could be achieved indicating (a) a modified surface has been used; (b) a class 3 result has been obtained; (c) additional specimens have been used to obtain 6 valid results and; (d) softening and/or other behaviour has occurred which is considered to have affected the test result.

Revision History

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

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

BRE Global Test Report

BS 476-7: 1997 Surface spread of flame test on RS5100 – Line 2

Prepared for: Celotex Ltd
Date: 25 January 2018
Report Number: P107614-1006 Issue 1

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Prepared by

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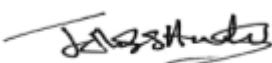
Signature 

Authorised by

Name J Hunter

Position Section Leader, Reaction to Fire

Date 25 January 2018

Signature 

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1 Objective

To classify the surface spread of flame characteristics of the sample described in Section 2 using the test method and criteria specified in British Standard 476: Part 7: 1997.

2 Sample

2.1 Traceability

The test samples were supplied by the test sponsor. BRE Global were not involved in the sample selection process and therefore cannot comment upon the relationship between samples supplied for test and the product supplied to market.

2.2 Description of sample and test format

Unless otherwise stated all measurements are nominal.

Test Sponsor	Saint-Gobain Construction Products UK Trading as Celotex Ltd Lady Lane Industrial Estate, Hadleigh, Ipswich, Suffolk, IP7 6BA
Manufacturer of sample	Saint-Gobain Construction Products UK Trading as Celotex Ltd Lady Lane Industrial Estate, Hadleigh, Ipswich, Suffolk, IP7 6BA
Sample name/reference	RS5100 – Line 2
Sample description (as provided by test sponsor/manufacturer)	Celotex PIR FR5050 insulation with foam core (28-038) and Stucco Aluminium facers (38-172).
Description of sample (as received)	Off white rigid foam with silver foil facer on each face. Marked on one face with 'M, Direction RS5100 0641 prod 10/04/17'. Sample thickness had to be reduced to <50mm as required by standard to fit into test rig. This was done by removing material from the unexposed face, leaving only the test face with silver foil facer. Mass and dimensions of specimens were recorded following this material removal.
Mean sample weight per unit area (kg/m ²)	1.68
Sample thickness (mm)	47.44
Sample receipt date	18 April 2017
Test face	Foil Faced
Test format	The specimens were tested with 12mm calcium silicate boards behind.
Date of test	26 June 2017



3 Conditioning

The specimens were conditioned as required by the standard.

4 Results

4.1 Flame spread data

Table 1 shows the observed spread of flame for each specimen at 1.5 minutes, 10 minutes and time to reach maximum flame spread distance.

Table 2 shows the time it takes to reach each reference point in minutes and seconds if applicable.

Table 1

Specimen E9931	Flame spread distance at 1.5 minutes (mm)	Flame spread distance at 10 minutes (mm)	Time to reach maximum flame spread distance (minutes : seconds)
E9931-1	70	70	0:40
E9931-3	75	75	0:29
E9931-4	60	60	0:10
E9931-5	60	60	0:15
E9931-6	75	75	0:54
E9931-7	60	60	0:15



4.2 Observations

Specimen	Observations (Minutes:Seconds)
E9931	
E9931-1	Transient flaming from 1:09 until 5:44. Flaming became sustained until 9:03, then transient end of test.
E9931-3	Transient flaming from 1:04 until 4:14. Flaming became sustained until 6:12, then transient end of test.
E9931-4	Transient flaming from 1:06 until 3:44. Flaming became sustained until 4:12, then transient end of test.
E9931-5	Transient flaming from 1:04 until end of test.
E9931-6	Transient flaming from 1:10 until 4:49. Flaming became sustained until 5:02, then transient end of test.
E9931-7	Transient flaming from 1:08 until end of test.

5 Classification

Exposed surfaces of materials used as linings for walls and ceilings are classified in Section 11 of the standard according to the rate and distance of spread of flame as shown in Table 3.

Table 3

Classification	Spread of flame at 1.5min		Final spread of flame	
	Limit	Limit for one specimen in sample	Limit	Limit for one specimen in sample
	mm	mm	mm	mm
Class 1	165	165 + 25	165	165 + 25
Class 2	215	215 + 25	455	455 + 45
Class 3	265	265 + 25	710	710 + 75
Class 4	Exceeding the limits of Class 3			



6 Conclusion

The results show that the sample described in Section 2 of this report, when tested and classified in accordance with BS 476: Part 7: 1997, achieved **Class 1**.

7 Validity

The test results relate only to behaviour of the test specimens of the product under the particular conditions of test, they are not intended to be the sole criteria for assessing the potential fire hazard of the product in use.

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 5 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.

8 Reference

- 1 British Standard 476: Part 7: 1997. Fire tests on building materials and structures. Part 7 Method of test to determine the classification of the surface spread of flame of products. British Standards Institution, London 2014.

BRE Global Test Report

BS 476-7: 1997 Surface spread of flame test on RS5160 – Line 2

Prepared for: Celotex Ltd
Date: 25 January 2018
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Date 25 January 2018

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1 Objective

To classify the surface spread of flame characteristics of the sample described in Section 2 using the test method and criteria specified in British Standard 476: Part 7: 1997.

2 Sample

2.1 Traceability

The test samples were supplied by the test sponsor. BRE Global were not involved in the sample selection process and therefore cannot comment upon the relationship between samples supplied for test and the product supplied to market.

2.2 Description of sample and test format

Unless otherwise stated all measurements are nominal.

Test Sponsor	Saint-Gobain Construction Products UK Trading as Celotex Ltd Lady Lane Industrial Estate, Hadleigh, Ipswich, Suffolk, IP7 6BA
Manufacturer of sample	Saint-Gobain Construction Products UK Trading as Celotex Ltd Lady Lane Industrial Estate, Hadleigh, Ipswich, Suffolk, IP7 6BA
Sample name/reference	RS5160 – Line 2
Sample description (as provided by test sponsor/manufacturer)	Celotex PIR FR5050 insulation with foam core (28-038) and Stucco Aluminium facers (38-172).
Description of sample (as received)	Off white rigid foam with silver foil facer on each face. Marked on one face with 'M, Direction RS5160 1540 prod 13/03/17'. Sample thickness had to be reduced to <50mm as required by standard to fit into test rig. This was done by removing material from the unexposed face, leaving only the test face with silver foil facer. Mass and dimensions of specimens were recorded following this material removal.
Mean sample weight per unit area (kg/m ²)	1.72
Sample thickness (mm)	47.39
Sample receipt date	18 April 2017
Test face	Foil Faced
Test format	The specimens were tested with 12mm calcium silicate boards behind.
Date of test	26 June 2017



3 Conditioning

The specimens were conditioned as required by the standard.

4 Results

4.1 Flame spread data

Table 1 shows the observed spread of flame for each specimen at 1.5 minutes, 10 minutes and time to reach maximum flame spread distance.

Table 2 shows the time it takes to reach each reference point in minutes and seconds if applicable.

Table 1

Specimen E9933	Flame spread distance at 1.5 minutes (mm)	Flame spread distance at 10 minutes (mm)	Time to reach maximum flame spread distance (minutes : seconds)
E9933-2	60	60	0:15
E9933-3	60	60	0:10
E9933-4	50	50	0:05
E9933-5	50	50	0:05
E9933-6	50	50	0:07
E9933-7	60	60	0:20



4.2 Observations

Specimen	Observations (Minutes:Seconds)
E9933	
E9933-2	Transient flaming from 1:06 until 5:45. Flaming became sustained until 7:04, then transient end of test.
E9933-3	Transient flaming from 1:05 until 4:48. Flaming became sustained until 6:15, then transient end of test.
E9933-4	Transient flaming from 1:00 until end of test.
E9933-5	Transient flaming from 1:00 until 5:48. Flaming became sustained until 7:15, then transient end of test.
E9933-6	Transient flaming from 1:04 until 4:46. Flaming became sustained until 6:55, then transient end of test.
E9933-7	Transient flaming from 1:06 until end of test.

5 Classification

Exposed surfaces of materials used as linings for walls and ceilings are classified in Section 11 of the standard according to the rate and distance of spread of flame as shown in Table 3.

Table 3

Classification	Spread of flame at 1.5min		Final spread of flame	
	Limit	Limit for one specimen in sample	Limit	Limit for one specimen in sample
	mm	mm	mm	mm
Class 1	165	165 + 25	165	165 + 25
Class 2	215	215 + 25	455	455 + 45
Class 3	265	265 + 25	710	710 + 75
Class 4	Exceeding the limits of Class 3			



6 Conclusion

The results show that the sample described in Section 2 of this report, when tested and classified in accordance with BS 476: Part 7: 1997, achieved **Class 1**.

7 Validity

The test results relate only to behaviour of the test specimens of the product under the particular conditions of test, they are not intended to be the sole criteria for assessing the potential fire hazard of the product in use.

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 5 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.

8 Reference

- 1 British Standard 476: Part 7: 1997. Fire tests on building materials and structures. Part 7 Method of test to determine the classification of the surface spread of flame of products. British Standards Institution, London 2014.

BRE Global Test Report

BS 476-7: 1997 Surface spread of flame test on FR5100 – Line 2

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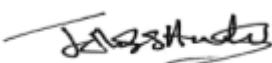
Signature 

Authorised by

Name J Hunter

Position Section Leader, Reaction to Fire

Date 25 January 2018

Signature 

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1 Objective

To classify the surface spread of flame characteristics of the sample described in Section 2 using the test method and criteria specified in British Standard 476: Part 7: 1997.

2 Sample

2.1 Traceability

The test samples were supplied by the test sponsor. BRE Global were not involved in the sample selection process and therefore cannot comment upon the relationship between samples supplied for test and the product supplied to market.

2.2 Description of sample and test format

Unless otherwise stated all measurements are nominal.

Test Sponsor	Saint-Gobain Construction Products UK Trading as Celotex Ltd Lady Lane Industrial Estate, Hadleigh, Ipswich, Suffolk, IP7 6BA
Manufacturer of sample	Saint-Gobain Construction Products UK Trading as Celotex Ltd Lady Lane Industrial Estate, Hadleigh, Ipswich, Suffolk, IP7 6BA
Sample name/reference	FR5100 – Line 2
Sample description (as provided by test sponsor/manufacturer)	Celotex PIR FR5050 insulation with foam core (28-038) and Stucco Aluminium facers (38-172).
Description of sample (as received)	Off white rigid foam with silver foil facer on each face. Marked on one face with 'M, Direction FR5100 1156 prod 06/04/17'. Sample thickness had to be reduced to <50mm as required by standard to fit into test rig. This was done by removing material from the unexposed face, leaving only the test face with silver foil facer. Mass and dimensions of specimens were recorded following this material removal.
Mean sample weight per unit area (kg/m ²)	1.94
Sample thickness (mm)	47.19
Sample receipt date	18 April 2017
Test face	Foil Faced
Test format	The specimens were tested with 12mm calcium silicate boards behind.
Date of test	26 June 2017



3 Conditioning

The specimens were conditioned as required by the standard.

4 Results

4.1 Flame spread data

Table 1 shows the observed spread of flame for each specimen at 1.5 minutes, 10 minutes and time to reach maximum flame spread distance.

Table 2 shows the time it takes to reach each reference point in minutes and seconds if applicable.

Table 1

Specimen E9937	Flame spread distance at 1.5 minutes (mm)	Flame spread distance at 10 minutes (mm)	Time to reach maximum flame spread distance (minutes : seconds)
E9937-1	60	60	0:15
E9937-2	60	60	0:20
E9937-3	75	75	0:32
E9937-4	70	70	0:10
E9937-5	60	60	0:15
E9937-6	50	50	0:07



4.2 Observations

Specimen	Observations (Minutes:Seconds)
E9937	
E9937-1	Transient flaming from 1:05 until 4:35. Flaming became sustained until 7:20, then transient end of test.
E9937-2	Transient flaming from 1:07 until 4:45. Flaming became sustained until 5:28, then transient end of test.
E9937-3	Transient flaming from 1:00 until 3:50. Flaming became sustained until 6:27, then transient end of test.
E9937-4	Transient flaming from 1:37 until end of test.
E9937-5	Transient flaming from 1:13 until 4:10. Flaming became sustained until 7:15, then transient end of test.
E9937-6	Transient flaming from 1:00 until 2:33. Flaming became sustained until 3:03, then transient end of test.

5 Classification

Exposed surfaces of materials used as linings for walls and ceilings are classified in Section 11 of the standard according to the rate and distance of spread of flame as shown in Table 3.

Table 3

Classification	Spread of flame at 1.5min		Final spread of flame	
	Limit	Limit for one specimen in sample	Limit	Limit for one specimen in sample
	mm	mm	mm	mm
Class 1	165	165 + 25	165	165 + 25
Class 2	215	215 + 25	455	455 + 45
Class 3	265	265 + 25	710	710 + 75
Class 4	Exceeding the limits of Class 3			



6 Conclusion

The results show that the sample described in Section 2 of this report, when tested and classified in accordance with BS 476: Part 7: 1997, achieved **Class 1**.

7 Validity

The test results relate only to behaviour of the test specimens of the product under the particular conditions of test, they are not intended to be the sole criteria for assessing the potential fire hazard of the product in use.

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 5 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.

8 Reference

- 1 British Standard 476: Part 7: 1997. Fire tests on building materials and structures. Part 7 Method of test to determine the classification of the surface spread of flame of products. British Standards Institution, London 2014.

BRE Global Test Report

BS 476-6: 1989 + A1: 2009 Fire propagation test on “Celotex 5050 Line 1”

Prepared for: Celotex Ltd
Date: 02 July 2018
Report Number: P107614-1018 Issue: 2

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Prepared by

Name B Gohil

Position Laboratory Technician

Signature

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Authorised by

Name J Hunter

Position Section Leader, Reaction to Fire

Date 02 July 2018

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1 Objective

To determine the fire propagation index of the sample specified in Section 2 using the test method specified in British Standard 476: Part 6: 1989 + A1: 2009.

2 Sample

2.1 Traceability

The test samples were supplied by the test sponsor. BRE Global were not involved in the sample selection process and therefore cannot comment upon the relationship between the samples supplied for test and the product supplied to market.

2.2 Description of sample and test format.

Unless otherwise stated all measurements are nominal.

Test Sponsor	Saint-Gobain Construction Products UK, Trading as CelotexLtd Lady Lane Industrial Estate, Hadleigh, Ipswich, Suffolk, IP7 6BA
Manufacturer of sample	As above.
Sample name/reference	"Celotex 5050 Line 1"
Sample description (as provided by test sponsor/manufacturer)	Aluminium foil faced and backed polyisocyanate (PIR) insulation. Nominal thickness 50 mm, nominal density 32 kg/m ³ . Insulation, "CP400E 28-028". Foil facings, "FSS 38-172". Manufacture stamp 29/08/2017; 15:17
Description of sample (as received)	Foam core with aluminium facers on both sides.
Mean weight per unit area (kg/m ²)	1.69
Mean thickness (mm)	49.8
Sample receipt date	26 September 2017 (BRE Ref E10324)
Test face	Foil face.
Test format	No air gap
Date of test	13-16 October 2017



3 Conditioning

The specimens were conditioned as required by the standard.

4 Results

4.1 Temperature measurement

Table 1 shows the Temperature rise for calibration sheet and specimens

Table 2 shows the Index of performance for each specimen

Table 1 – temperature rise

Time t min	Temperature rise - °C			
	Calibration sheet	Specimens		
		a	b	c
0.5	14.6	16.3	17.2	18.8
1	21.5	22.8	23.5	22.9
1.5	26.6	29.1	28.5	28.3
2	30.8	33.0	32.2	32.8
2.5	35.0	36.8	36.4	37.5
3	38.7	41.0	40.7	42.0
4	67.4	75.0	71.9	72.0
5	103.0	127.4	119.3	117.3
6	134.6	188.6	156.3	172.6
7	153.7	211.4	200.1	215.1
8	170.6	244.5	224.8	251.7
9	186.2	258.4	239.6	278.3
10	197.7	268.2	249.0	290.0
12	212.8	287.5	265.9	301.5
14	223.7	293.1	276.2	293.3
16	232.0	286.6	273.8	277.4
18	238.7	276.6	270.2	268.4
20	241.6	265.5	267.4	260.3

t - time in minutes from the time at which the gas jets were ignited.

a, b and c - represent individual specimens giving valid test results.

**Table 2 Index of performance**

Specimen	S	s ₁	s ₂	s ₃
a	7.5	0.9	4.8	1.8
b	5.6	1	3.2	1.4
c	8.1	1.4	4.9	1.8

4.2 Observations

No intumescence or deformation of any specimen occurred that affected the required gas input.

No melting or slumping occurred that prevented the material from being exposed to the heating conditions.

Air flow through the apparatus was not restricted by fallen material or by soot accumulation in the chimney.

5 Conclusions

A sample as described in this report, when tested in accordance with BS 476: Part 6: 1989 + A1: 2009, achieved:

fire propagation index I = 7.1
 sub-indices i₁ = 1.1
 i₂ = 4.3
 i₃ = 1.7

BS 476: Part 6: 1989 + A1: 2009 does not contain acceptance criteria and therefore this test report does not indicate a pass or fail of the product.

6 Validity

This report is Issue 2 of BRE Global report P107614-1000 dated 25 January 2018. Revisions to the product name and references have been made in this report. BRE Global report P107614-1000 dated 25 January 2018 has been withdrawn with effect from the date of this report.

The test results relate only to behaviour of the test specimens of the product under the particular conditions of test, they are not intended to be the sole criteria for assessing the potential fire hazard of the product in use.

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 5 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.



7 Reference

- 1 British Standard 476: Part 6: 1989 + A1: 2009 Fire tests on building materials and structures. Part 6. Incorporating Corrigendum No 1:2014. Fire propagation test for products. British Standards Institution, London 2009.

BRE Global Test Report

BS 476-6: 1989 + A1: 2009 Fire propagation test on 5050 Line 2

Prepared for: Celotex Ltd
Date: 25 January 2018
Report Number: P107614-1019 Issue: 1

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Name J Hunter

Position Section Leader, Reaction to Fire

Date 25 January 2018

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BRE Global's liability in respect of this report and reliance thereupon shall be as per the terms and conditions of contract with the client and BRE Global shall have no liability to third parties to the extent permitted in law.

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1 Objective

To determine the fire propagation index of the sample specified in Section 2 using the test method specified in British Standard 476: Part 6: 1989 + A1: 2009.

2 Sample

2.1 Traceability

The test samples were supplied by the test sponsor. BRE Global were not involved in the sample selection process and therefore cannot comment upon the relationship between the samples supplied for test and the product supplied to market.

2.2 Description of sample and test format.

Unless otherwise stated all measurements are nominal.

Test Sponsor	Saint-Gobain Construction Products UK, Trading as CelotexLtd Lady Lane Industrial Estate, Hadleigh, Ipswich, Suffolk, IP7 6BA
Manufacturer of sample	As above
Sample name/reference	5050 Line 2
Sample description (as provided by test sponsor/manufacturer)	Celotex 5050 insulation (Line 2) with foam core (28-038) and Stucco aluminium facers (38-172). Manufacture stamp 31/08/2017; 21:02
Description of sample (as received)	Foam core with aluminium facers on both sides.
Mean weight per unit area (kg/m ²)	1.92
Mean thickness (mm)	50
Sample receipt date	26 October 2017 (BRE Ref E10325)
Test face	Foil face
Test format	No air gap
Date of test	05-13 October 2017



3 Conditioning

The specimens were conditioned as required by the standard.

4 Results

4.1 Temperature measurement

Table 1 shows the Temperature rise for calibration sheet and specimens

Table 2 shows the Index of performance for each specimen

Table 1 – temperature rise

Time t min	Temperature rise - °C				
	Calibration	Specimens	Calibration	Specimens	Specimens
	Sheet a	a	Sheet b&c	b	c
0.5	14.6	20.2	14.6	28.0	17.1
1	21.2	26.9	21.5	42.0	23.1
1.5	26.0	36.1	26.6	52.1	27.3
2	30.1	41.2	30.8	52.3	32.2
2.5	33.5	45.4	35.0	57.8	36.6
3	38.9	49.8	38.7	61.9	41.1
4	68.0	82.7	67.4	90.0	69.5
5	102.5	132.9	103.0	127.7	113.8
6	132.6	172.5	134.6	169.7	147.9
7	152.5	218.6	153.7	220.6	183.1
8	168.8	246.7	170.6	253.8	216.8
9	181.5	264.7	186.2	265.0	249.8
10	191.9	274.4	197.7	269.7	263.1
12	207.1	283.8	212.8	268.5	298.3
14	218.7	282.2	223.7	266.9	300.5
16	229.9	271.2	232.0	268.4	289.0
18	236.7	254.1	238.7	268.5	271.6
20	244.3	239.0	241.6	258.2	259.4

Two different calibrations were used because the test were conducted on different days

t - time in minutes from the time at which the gas jets were ignited.

a, b and c - represent individual specimens giving valid test results.

**Table 2 Index of performance**

Specimen	S	s ₁	s ₂	s ₃
a	10.5	3.8	5.3	1.4
b	15.6	9.2	5.2	1.2
c	5.6	0.9	2.8	1.9

4.2 Observations

No intumescence or deformation of any specimen occurred that affected the required gas input.

No melting or slumping occurred that prevented the material from being exposed to the heating conditions.

Air flow through the apparatus was not restricted by fallen material or by soot accumulation in the chimney.

5 Conclusions

A sample as described in this report, when tested in accordance with BS 476: Part 6: 1989 + A1: 2009, achieved:

fire propagation index I = 10.5
 sub-indices $i_1 = 4.6$
 $i_2 = 4.4$
 $i_3 = 1.5$

BS 476: Part 6: 1989 + A1: 2009 does not contain acceptance criteria and therefore this test report does not indicate a pass or fail of the product.

6 Validity

The test results relate only to behaviour of the test specimens of the product under the particular conditions of test, they are not intended to be the sole criteria for assessing the potential fire hazard of the product in use.

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 5 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.



7 Reference

- 1 British Standard 476: Part 6: 1989 + A1: 2009 Fire tests on building materials and structures. Part 6. Incorporating Corrigendum No 1:2014. Fire propagation test for products. British Standards Institution, London 2009.