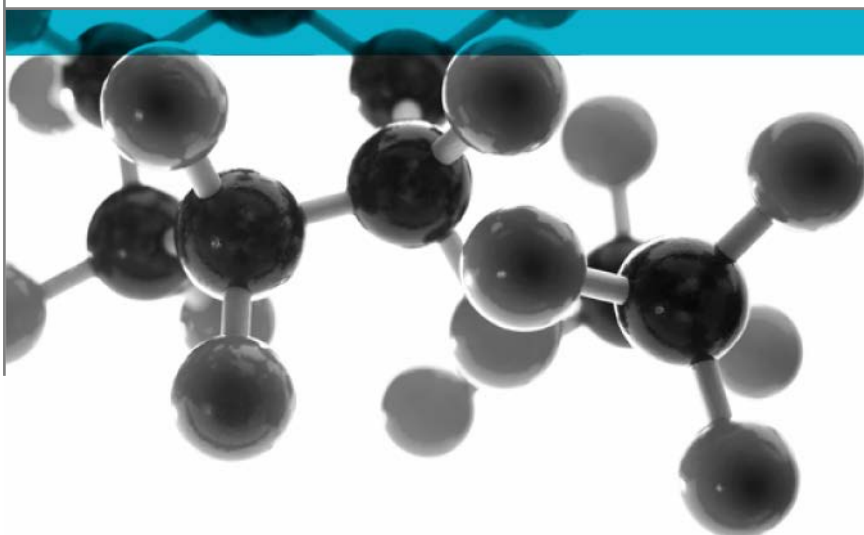


# BS 476: Part 6: 1989+A1:2009



## Method Of Test For Fire Propagation For Products

A Report To: K-FLEX POLSKA Sp. z.o.o.

Document Reference: 413290

Date: 31<sup>st</sup> May 2019

Issue No.: 1

Page 1



## Executive Summary

**Objective** To determine the performance of the following product when tested in accordance with BS 476: Part 6: 1989+A1: 2009.

Generic Description	Product reference	Thickness	Weight per unit area or density
Nitrile rubber sound insulation applied to a steel substrate	"K-Fonik GK"	4.30mm*	3258kg/m <sup>3</sup> *
<b>Individual components used to manufacture composite:</b>			
Facing	"K-Fonik GK"	3mm	1400kg/m <sup>3</sup>
Substrate	Unwilling to provide	1mm	14.80kg/m <sup>2</sup>
*Determined by <a href="#">Warringtonfire</a>			
<b>Please see page 5 of this test report for the full description of the product tested</b>			

**Test Sponsor** K-FLEX POLSKA Sp. z.o.o., Ul. Pucka 112, 81-154 Gdynia, Poland



**Test Results:**

Fire propagation index, I	=	4.7R
Sub index, i <sub>1</sub>	=	0.0
Sub index, i <sub>2</sub>	=	2.2
Sub index, i <sub>3</sub>	=	2.5

An uncertainty of measurement estimation has been conducted in relation to the fire propagation index, I and the sub index, i<sub>1</sub>. The findings are as detailed in Annex A of this report.

**Date of Test** 30<sup>th</sup> April 2019

## Signatories

	
Responsible Officer C. Jacques * Senior Technical Officer	Authorised T. Mort * Senior Technical Officer

\* For and on behalf of [Warringtonfire](#).

Report Issued: 31<sup>st</sup> May 2019

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Document No.: 413290  
Author: C Jacques  
Client: K-FLEX POLSKA Sp. z.o.o.

Page No.: 2 of 13  
Issue Date: 31<sup>st</sup> May 2019  
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<b>CONTENTS</b>	<b>PAGE NO.</b>
<b>EXECUTIVE SUMMARY .....</b>	<b>2</b>
<b>SIGNATORIES.....</b>	<b>2</b>
<b>TEST DETAILS.....</b>	<b>4</b>
<b>DESCRIPTION OF TEST SPECIMENS.....</b>	<b>5</b>
<b>TEST RESULTS .....</b>	<b>6</b>
<b>TABLE 1.....</b>	<b>7</b>
<b>TABLE 2.....</b>	<b>8</b>
<b>TABLE 3.....</b>	<b>9</b>
<b>ANNEX A .....</b>	<b>12</b>
<b>REVISION HISTORY .....</b>	<b>13</b>

## Test Details

<b>Purpose of test</b>	<p>To determine the performance of a product when it is subjected to the conditions of the test specified in BS 476: Part 6: 1989+A1: 2009, "Fire tests on building materials and structures, method for fire propagation for products".</p> <p>The test was performed in accordance with the procedure specified in BS 476: Part 6: 1989+A1: 2009, and this report should be read in conjunction with that British Standard.</p>
<b>Scope of test</b>	<p>BS 476: Part 6: 1989+A1: 2009 specifies a method of test, the result being expressed as a fire propagation index, that provides a comparative measure of the contribution to the growth of fire made by an essentially flat material, composite or assembly. It is primarily intended for the assessment of the performance of internal wall and ceiling linings.</p>
<b>Fire test study group/EGOLF</b>	<p>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.</p>
<b>Instruction to test</b>	<p>The test was conducted on the 30<sup>th</sup> April 2019 at the request of L'Isolante K-Flex S.p.A., a representative of the sponsor of the test.</p>
<b>Provision of test specimens</b>	<p>The specimens were supplied by the sponsor of the test. Warringtonfire was not involved in any selection or sampling procedure.</p>
<b>Conditioning of specimens</b>	<p>The specimens for testing to BS 476: Part 6: 1989+A1: 2009 together with the specimens for testing to BS 476: Part 7: 1997 were received on the 17<sup>th</sup> April 2019.</p> <p>Prior to the tests, all of the specimens were conditioned to constant mass at a temperature of <math>23 \pm 2^{\circ}\text{C}</math> and a relative humidity of <math>50 \pm 5\%</math>. One specimen from the total sample submitted for test was selected for constant mass verification.</p>
<b>Form in which the specimens were tested</b>	<p>Composite - Combination of materials which are generally recognised in building constructions as discrete entities e.g. coated or laminated materials.</p>
<b>Exposed face</b>	<p>The decorative face of the specimens was exposed to the heating conditions of the test.</p>

## 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 [Warringtonfire](#). All values quoted are nominal, unless tolerances are given.

General description		Nitrile rubber sound insulation applied to a steel substrate
Product reference of overall composite		"K-Fonik GK"
Name of manufacturer of overall composite		L'Isolante K-Flex SpA
Thickness of overall composite		4.30mm (determined by <a href="#">Warringtonfire</a> )
Overall density		3258.05kg/m <sup>3</sup> (determined by <a href="#">Warringtonfire</a> )
Facing	Generic type	Polymeric based rubber foil
	Product reference	"K-Fonik GK"
	Name of manufacturer	L'Isolante K-Flex SpA
	Colour reference	Black
	Thickness	3mm
	Density	1400kg/m <sup>3</sup>
	Flame retardant details	<b>See Note 1 Below</b>
Substrate	Generic type	Steel
	Product reference	<b>See Note 1 Below</b>
	Detailed description	<b>See Note 1 Below</b>
	Name of manufacturer	F.Ili SALA
	Thickness	1mm
	Weight per unit area	14.80kg/m <sup>2</sup>
	Colour reference	"Silver"
	Flame retardant details	The substrate is inherently flame retardant
Brief description of manufacturing process		<b>See Note 1 Below</b>

**Note 1: The sponsor of the test was unwilling to provide this information.**

## Test Results

### Results

A total of five specimens were tested. The laboratory record sheet relating to each of the test specimens is appended to this report (refer to Tables 1, 2, 3, 4 and 5).

Throughout the test on each specimen careful observation was made of the product's behaviour within the apparatus and special note was taken of any of the phenomena listed in clause 9.2 of the Standard. In the case of specimens 1 and 3 the test was deemed invalid due to air flow through the apparatus being restricted owing to obstruction of the inlet port by soot accumulation in the chimney at 14 minutes into the test. In the case of specimens 2, 4 and 5 none of the listed phenomena was observed and the test results on these three specimens tested were valid.

**The following test results were obtained for the product.**

<b>Fire propagation index, I</b>	<b>=</b>	<b>4.7R</b>
<b>Sub index, <math>i_1</math></b>	<b>=</b>	<b>0.0</b>
<b>Sub index, <math>i_2</math></b>	<b>=</b>	<b>2.2</b>
<b>Sub index, <math>i_3</math></b>	<b>=</b>	<b>2.5</b>

**An uncertainty of measurement estimation has been conducted in relation to the fire propagation index, I and the sub index,  $i_1$ . The findings are as detailed in Annex A of this report.**

**NOTE:** If a suffix 'R' is included in the above fire propagation index, I, then this indicates that the results should be treated with caution.

### 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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Table 1

Laboratory Record Sheet

## FIRE PROPAGATION TEST - BS476:PART 6:1989+A1:2009

Specimen No. : 1

Date : 30-Apr-19

Time mins t	Specimen Temperature Deg C Ts	Calibration Temperature Deg C Tc	Ts- Tc/10t	Sub Index Of Performance
0.50	14	15	0.00	
1.00	22	21	0.10	
1.50	29	27	0.13	
2.00	34	32	0.10	
2.50	37	36	0.04	
3.00	42	39	0.10	0.47
4.00	70	70	0.00	
5.00	108	105	0.06	
6.00	144	134	0.17	
7.00	179	156	0.33	
8.00	0	172	0.00	
9.00	0	185	0.00	
10.00	0	197	0.00	0.56
12.00	0	212	0.00	
14.00	0	224	0.00	
16.00	0	233	0.00	
18.00	0	239	0.00	
20.00	0	244	0.00	0.00
Total Index of Performance S			=	1.03

SubIndex s1 0.47

SubIndex s2 0.56

SubIndex s3 0.00

Index of Performance S 1.03

**Note: Test was  
deemed to be invalid  
at a time of 8 minutes**

Table 2

Laboratory Record Sheet

## FIRE PROPAGATION TEST - BS476:PART 6:1989+A1:2009

Specimen No. : 2

Date : 30-Apr-19

Time mins t	Specimen Temperature Deg C Ts	Calibration Temperature Deg C Tc	Ts- Tc/10t	Sub Index Of Performance
0.50	9	10	0.00	
1.00	13	15	0.00	
1.50	17	19	0.00	
2.00	21	24	0.00	
2.50	26	29	0.00	
3.00	32	33	0.00	0.00
4.00	64	64	0.00	
5.00	108	101	0.14	
6.00	145	131	0.23	
7.00	178	153	0.36	
8.00	209	169	0.50	
9.00	229	185	0.49	
10.00	243	194	0.49	2.21
12.00	271	211	0.50	
14.00	310	222	0.63	
16.00	327	234	0.58	
18.00	341	241	0.56	
20.00	328	246	0.41	2.68
Total Index of Performance S			=	4.88

SubIndex s1                      0.00

SubIndex s2                      2.21

SubIndex s3                      2.68

Index of Performance S        4.88



Table 3

**Laboratory Record Sheet**

**FIRE PROPAGATION TEST - BS476:PART 6:1989+A1:2009**

**Specimen No. : 3**

**Date : 30-Apr-19**

Time mins t	Specimen Temperature Deg C Ts	Calibration Temperature Deg C Tc	Ts- Tc/10t	Sub Index Of Performance
0.50	13	15	0.00	
1.00	21	21	0.00	
1.50	28	27	0.07	
2.00	34	32	0.10	
2.50	38	36	0.08	
3.00	41	39	0.07	0.31
4.00	62	70	0.00	
5.00	94	105	0.00	
6.00	0	134	0.00	
7.00	0	156	0.00	
8.00	0	172	0.00	
9.00	0	185	0.00	
10.00	0	197	0.00	0.00
12.00	0	212	0.00	
14.00	0	224	0.00	
16.00	0	233	0.00	
18.00	0	239	0.00	
20.00	0	244	0.00	0.00
<b>Total Index of Performance S</b>			<b>=</b>	<b>0.31</b>

**SubIndex s1                      0.31**

**SubIndex s2                      0.00**

**SubIndex s3                      0.00**

**Index of Performance S        0.31**

**Note: Test was  
deemed to be invalid  
at a time of 4 minutes**

Table 4

**Laboratory Record Sheet****FIRE PROPAGATION TEST - BS476:PART 6:1989+A1:2009**

Specimen No. : 4

Date : 30-Apr-19

Time mins t	Specimen Temperature Deg C Ts	Calibration Temperature Deg C Tc	Ts- Tc/10t	Sub Index Of Performance
0.50	10	10	0.00	
1.00	15	15	0.00	
1.50	18	19	0.00	
2.00	23	24	0.00	
2.50	27	29	0.00	
3.00	33	33	0.00	0.00
4.00	67	64	0.08	
5.00	116	101	0.30	
6.00	153	131	0.37	
7.00	177	153	0.34	
8.00	191	169	0.28	
9.00	215	185	0.33	
10.00	237	194	0.43	2.12
12.00	268	211	0.48	
14.00	286	222	0.46	
16.00	304	234	0.44	
18.00	317	241	0.42	
20.00	215	246	0.00	1.79
<b>Total Index of Performance S</b>			<b>=</b>	<b>3.91</b>

SubIndex s1 0.00

SubIndex s2 2.12

SubIndex s3 1.79

Index of Performance S 3.91

Table 5

Laboratory Record Sheet**FIRE PROPAGATION TEST - BS476:PART 6:1989+A1:2009**

Specimen No. : 5

Date : 30-Apr-19

Time mins t	Specimen Temperature Deg C Ts	Calibration Temperature Deg C Tc	Ts- Tc/10t	Sub Index Of Performance
0.50	8	10	0.00	
1.00	13	15	0.00	
1.50	17	21	0.00	
2.00	22	25	0.00	
2.50	26	29	0.00	
3.00	31	33	0.00	0.00
4.00	67	65	0.05	
5.00	120	103	0.34	
6.00	146	131	0.25	
7.00	175	154	0.30	
8.00	189	173	0.20	
9.00	233	188	0.50	
10.00	255	199	0.56	2.20
12.00	299	217	0.68	
14.00	340	231	0.78	
16.00	340	241	0.62	
18.00	343	246	0.54	
20.00	337	254	0.42	3.03
<b>Total Index of Performance S</b>			<b>=</b>	<b>5.23</b>

SubIndex s1 0.00

SubIndex s2 2.20

SubIndex s3 3.03

Index of Performance S 5.23

## Annex A

### Uncertainty of measurement

Specimen No.	2	4	5	Average
Fire propagation index, I	+0.47 -0.12	+0.29 -0.13	+0.29 -0.13	+0.35 -0.13
Sub index $i_1$	+0.45 -0.00	+0.25 -0.00	+0.25 -0.00	+0.32 -0.00

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.

## Revision History

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

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Revised By:	Approved By:
Reason for Revision:	