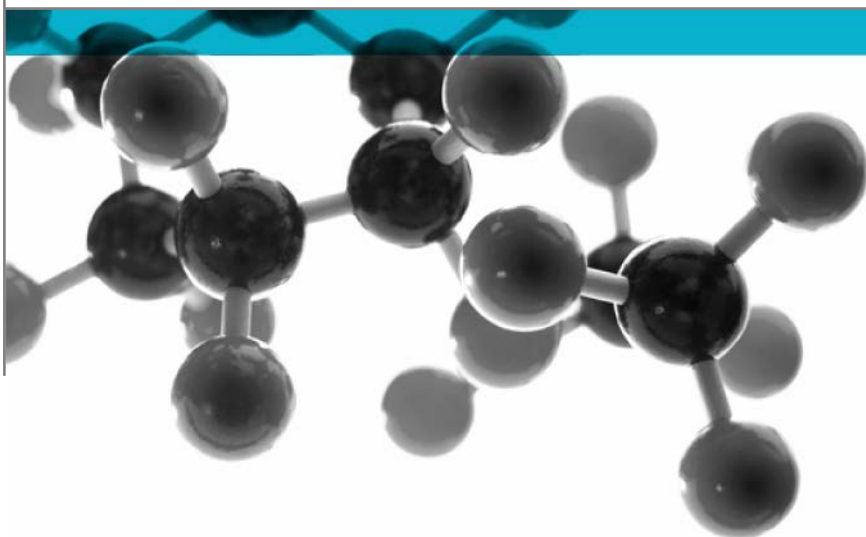


BS 476: Part 6: 1989+A1:2009



Method Of Test For Fire Propagation For Products

A Report To: L'ISOLANTE K-FLEX SPA

Document Reference: 521647

Date: 12th September 2022

Issue No.: 1

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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 based elastomeric foam insulation	"K-FLEX ST"	14.78mm*	8.58kg/m ² *
Individual components used to manufacture composite:			
Nitrile rubber based elastomeric foam insulation	"K-FLEX ST"	13mm	55±10kg/m ³
Cyanoacrylate adhesive	"Loctite Super Glue"	Unable to provide	Unable to provide
Steel	Unable to provide	1mm	14.8kg/m ²
*determined by Warringtonfire			
Please see page 5 of this test report for the full description of the product tested			

Test Sponsor L'ISOLANTE K-FLEX SPA, Via Son Locatelli 35, 20877 Roncello, Italy



Test Results:

Fire propagation index, I	=	9.9
Sub index, i ₁	=	5.4
Sub index, i ₂	=	3.7
Sub index, i ₃	=	0.8

An uncertainty of measurement estimation has been conducted in relation to the fire propagation index, I and the sub index, i₁. The findings are as detailed in Annex A of this report.

Date of Test 4th August 2022

Signatories

	
Responsible Officer D. Roberts* Testing Officer	Authorised C. Jacques * Senior Technical Officer

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

Report Issued: 12th September 2022

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Test Details

Purpose of test	<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>
Scope of test	<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>
Fire test study group/EGOLF	<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>
Instruction to test	<p>The test was conducted on the 4th August 2022 at the request of L'ISOLANTE K-FLEX SPA, the sponsor of the test.</p>
Provision of test specimens	<p>The specimens were supplied by the sponsor of the test. Warringtonfire was not involved in any selection or sampling procedure. The results stated in this report apply to the sample as received.</p>
Conditioning of specimens	<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 29th July 2022.</p> <p>Prior to the tests, all of the specimens were conditioned to constant mass at a temperature of $23 \pm 2^{\circ}\text{C}$ and a relative humidity of $50 \pm 5\%$. One specimen from the total sample submitted for test was selected for constant mass verification.</p>
Form in which the specimens were tested	<p>Composite - Combination of materials which are generally recognised in building constructions as discrete entities e.g. coated or laminated materials.</p>
Exposed face	<p>The foam face of the specimens was exposed to the heating conditions of the test.</p>

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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 based elastomeric foam insulation
Product reference		"K-FLEX ST"
Name of manufacturer		K-FLEX POLSKA SP. Z O.O.
Overall thickness		14.78mm (determined by Warringtonfire)
Overall weight per unit area / density		8.58kg/m ² (determined by Warringtonfire)
Foam	Generic type	Nitrile rubber based elastomeric foam insulation
	Product reference	"K-FLEX ST"
	Name of manufacturer	K-FLEX POLSKA SP. Z O.O.
	Thickness	13mm
	Density / weight per unit area	55±10kg/m ³
	Colour reference	"Black"
	Colour	Black
	Flame retardant details	See Note 1 below
Adhesive	Generic type	Cyanoacrylate adhesive
	Product reference	"Loctite Super Glue"
	Name of manufacturer	Loctite
	Application thickness / rate	See Note 1 below
	Specific gravity	See Note 1 below
	Application method	By brush
	Flame retardant details	See Note 1 below
Substrate	Generic type	Steel
	Product reference	See Note 1 below
	Name of manufacturer / supplier	F.Ili SALA
	Thickness	1mm
	Density / weight per unit area	14.80kg/m ²
	Flame retardant details	The substrate is inherently flame retardant
Brief description of manufacturing process		See Note 1 below

Note 1: The sponsor was unable to provide this information.

Test Results

Results

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

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. None of the listed phenomena was observed and the test results on all three specimens tested were valid.

The following test results were obtained for the product.

Fire propagation index, I	=	9.9
Sub index, i_1	=	5.4
Sub index, i_2	=	3.7
Sub index, i_3	=	0.8

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 : 4-Aug-22

Time mins t	Specimen Temperature Deg C Ts	Calibration Temperature Deg C Tc	Ts- Tc/10t	Sub Index Of Performance
0.50	17	14	0.60	
1.00	29	19	1.00	
1.50	38	24	0.93	
2.00	44	28	0.80	
2.50	48	33	0.60	
3.00	52	37	0.50	4.43
4.00	94	66	0.70	
5.00	155	103	1.04	
6.00	180	132	0.80	
7.00	195	154	0.59	
8.00	210	172	0.48	
9.00	220	185	0.39	
10.00	229	194	0.35	4.34
12.00	247	210	0.31	
14.00	259	221	0.27	
16.00	267	231	0.23	
18.00	266	239	0.15	
20.00	271	243	0.14	1.09
Total Index of Performance S			=	9.87

SubIndex s1 4.43

SubIndex s2 4.34

SubIndex s3 1.09

Index of Performance S 9.87

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Table 2

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

Specimen No. : 2

Date : 4-Aug-22

Time mins t	Specimen Temperature Deg C Ts	Calibration Temperature Deg C Tc	Ts-Tc/10t	Sub Index Of Performance
0.50	24	14	2.00	
1.00	31	21	1.00	
1.50	38	25	0.87	
2.00	41	30	0.55	
2.50	47	33	0.56	
3.00	59	38	0.70	5.68
4.00	103	70	0.83	
5.00	153	108	0.90	
6.00	188	138	0.83	
7.00	204	159	0.64	
8.00	217	177	0.50	
9.00	228	189	0.43	
10.00	235	199	0.36	4.49
12.00	248	218	0.25	
14.00	259	232	0.19	
16.00	271	241	0.19	
18.00	276	249	0.15	
20.00	279	254	0.13	0.91
Total Index of Performance S			=	11.08

SubIndex s1 5.68

SubIndex s2 4.49

SubIndex s3 0.91

Index of Performance S 11.08

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Table 3

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

Specimen No. : 3

Date : 4-Aug-22

Time mins t	Specimen Temperature Deg C Ts	Calibration Temperature Deg C Tc	Ts- Tc/10t	Sub Index Of Performance
0.50	21	10	2.20	
1.00	26	15	1.10	
1.50	31	19	0.80	
2.00	35	22	0.65	
2.50	40	25	0.60	
3.00	46	28	0.60	5.95
4.00	67	59	0.20	
5.00	130	99	0.62	
6.00	154	129	0.42	
7.00	177	152	0.36	
8.00	195	171	0.30	
9.00	203	183	0.22	
10.00	209	194	0.15	2.27
12.00	223	210	0.11	
14.00	232	221	0.08	
16.00	244	229	0.09	
18.00	247	234	0.07	
20.00	251	239	0.06	0.41
Total Index of Performance S			=	8.63

SubIndex s1 5.95

SubIndex s2 2.27

SubIndex s3 0.41

Index of Performance S 8.63

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Annex A

Uncertainty of measurement

Specimen No.	1	2	3	Average
Fire propagation index, I	+0.77 -0.76	±0.77	±0.77	±0.77
Sub index i_1	+0.76 -0.74	±0.76	±0.76	+0.76 -0.75

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

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Revised By:	Approved By:
Reason for Revision:	

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