Bodycote

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BS 476: Part 6: 1989

Method Of Test For Fire Propagation For Products

WF Report Number:

175188

Date:

5th August 2008

Test Sponsor:

Yorkshire Plywood Limited

business partner
LABC

UKAS
TESTING
0249

warringtonfire
global safety

Bodycote warringtonfire Test Report No. 175188

BS 476: Part 6: 1989
Method Of Test For
Fire Propagation For Products

Sponsored By

Yorkshire Plywood Limited
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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 6: 1989, "Fire tests on building materials and structures, method for fire propagation for products". The test was performed in accordance with the procedure specified in BS 476: Part 6: 1989, and this report should be read in conjunction with that British Standard.
Scope of test	BS 476: Part 6: 1989 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.
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 23rd & 25th July 2008 at the request of Yorkshire Plywood Limited, the sponsor of the test.
Provision of test specimens	The specimens were supplied by the sponsor of the test. **Bodycote warringtonfire** was not involved in any selection or sampling procedure.
Conditioning of specimens	The specimens for testing to BS 476: Part 6: 1989 together with the specimens for testing to BS 476: Part 7: 1997 were received on the 15th July 2008. Prior to the tests, all of the specimens were conditioned to constant mass at a temperature of 23 ± 2°C and a relative humidity of 50 ± 5%. One specimen from the total sample submitted for test was selected for constant mass verification
Form in which the specimens were tested	Composite
Exposed face	The decorative film 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. All values quoted are nominal, unless tolerances are given.

General description		A textured vinyl film adhered to one face of a plasterboard substrate
Thickness of composite		12.28mm (stated by sponsor) 12.38mm (determined by **Bodycote warringtonfire**)
Weight per unit area of composite		8.5kg/m^2 (stated by sponsor) 8.09kg/m^2 (dteremined by **Bodycote warringtonfire**)
Vinyl film	Product reference	"Cova Dolomite"
	Generic type	Polyvinyl chloride (PVC)
	Name of manufacturer	Forbo
	Colour	"White"
	Thickness	100µm
	Weight per unit area	**See Note 1 below**
	Flame retardant details	**See Note 1 below**
Adhesive	Product reference	"464.6"
	Generic type	Water based adhesive
	Name of manufacturer	Kleibert
	Application rate	95g/m^2
	Application thickness	75µm
	Application method	Roller
	Flame retardant details	**See Note 2 below**
Substrate	Product reference	"Standard Plasterboard"
	Generic type	Gypsum plasterboard
	Name of manufacturer	Knauf
	Thickness	12mm
	Density	8.5kg/m^2
	Flame retardant details	The sponsor of the test was unable to provide this information
Brief description of manufacturing process		The sponsor of the test was unwilling to provide any information relating to the manufacturing process

Note 1. The sponsor of the test was unable to provide this information.

Note 2. The sponsor of the test has confirmed that no flame retardant additives were utilised in the production of the product / component.

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	=	**13.1**
Sub index, i_1	=	**6.3**
Sub index, i_2	=	**5.5**
Sub index, i_3	=	**1.3**

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 results

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.

Attention is drawn to Appendix 1, entitled 'Effect of thermal characteristics on the performance of assemblies'.

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.

Signatories

Responsible Officer
S. Deeming *

Approved
M. Dale *
Deputy Operations Manager

Authorised
C. Dean *
Operations Manager

* For and on behalf of **Bodycote warringtonfire.**

Report Issued: 5th August 2008

Table 1

Laboratory Record Sheet

FIRE PROPAGATION TEST - BS 476 : PART 6 : 1989

Specimen No. : 1 **Date : 23-Jul-08**

Time mins t	Specimen Temperature Deg C Ts	Calibration Temperature Deg C Tc	Ts-Tc/10t	Sub Index Of Performance
0.50	18	11	1.40	
1.00	27	16	1.10	
1.50	35	21	0.93	
2.00	51	27	1.20	
2.50	55	31	0.96	
3.00	57	35	0.73	6.33
4.00	100	70	0.75	
5.00	147	101	0.92	
6.00	174	119	0.92	
7.00	213	137	1.09	
8.00	221	160	0.76	
9.00	240	181	0.66	
10.00	259	196	0.63	5.72
12.00	269	230	0.33	
14.00	279	240	0.28	
16.00	282	246	0.23	
18.00	287	254	0.18	
20.00	288	260	0.14	1.15
Total Index of Performance S			=	**13.20**

SubIndex s1	**6.33**
SubIndex s2	**5.72**
SubIndex s3	**1.15**
Index of Performance S	**13.20**

Table 2

Laboratory Record Sheet

FIRE PROPAGATION TEST - BS 476 : PART 6 : 1989

Specimen No. : 2 **Date : 25-Jul-08**

Time mins t	Specimen Temperature Deg C Ts	Calibration Temperature Deg C Tc	Ts-Tc/10t	Sub Index Of Performance
0.50	19	11	1.60	
1.00	36	19	1.70	
1.50	43	26	1.13	
2.00	48	30	0.90	
2.50	52	34	0.72	
3.00	56	38	0.60	6.65
4.00	91	63	0.70	
5.00	130	102	0.56	
6.00	163	115	0.80	
7.00	188	129	0.84	
8.00	216	160	0.70	
9.00	226	184	0.47	
10.00	232	204	0.28	4.35
12.00	255	216	0.33	
14.00	275	230	0.32	
16.00	281	235	0.29	
18.00	288	243	0.25	
20.00	286	249	0.19	1.37
Total Index of Performance S			=	12.37

SubIndex s1 6.65

SubIndex s2 4.35

SubIndex s3 1.37

Index of Performance S 12.37

Table 3

Laboratory Record Sheet

FIRE PROPAGATION TEST - BS 476 : PART 6 : 1989

Specimen No. : 3 **Date : 25-Jul-08**

Time mins t	Specimen Temperature Deg C Ts	Calibration Temperature Deg C Tc	Ts-Tc/10t	Sub Index Of Performance
0.50	16	11	1.00	
1.00	27	19	0.80	
1.50	41	26	1.00	
2.00	55	30	1.25	
2.50	58	34	0.96	
3.00	63	38	0.83	5.84
4.00	102	63	0.98	
5.00	152	102	1.00	
6.00	164	115	0.82	
7.00	197	129	0.97	
8.00	241	160	1.01	
9.00	260	184	0.84	
10.00	274	204	0.70	6.32
12.00	275	216	0.49	
14.00	276	230	0.33	
16.00	279	235	0.28	
18.00	280	243	0.21	
20.00	287	249	0.19	1.49
Total Index of Performance S			=	13.65

SubIndex s1 5.84

SubIndex s2 6.32

SubIndex s3 1.49

Index of Performance S 13.65

Appendix 1

Effect of thermal characteristics on the performance of specimens

The result of a test in accordance with BS 476: Part 6: 1989 is applicable only to the specimens 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 result. It is important that the specimens which are tested fully represent the product which is supplied and the manner in which it will be used. This may require a product to be tested in a number of different ways to determine the classification which will be achieved in its different methods of use.

A surface coating, for example, may be applied to a selected substrate using a particular method and application rate. The test classification which is achieved for that set of specimens will be applicable only to that situation. If the substrate or method and rate of application in a particular practical situation are different from that which was tested, then it will be necessary to determine the classification which will be achieved for that situation. Similarly, specimens incorporating a wallcovering must be fully representative of the situation which occurs in practice and will normally consist of the wallcovering bonded to a chosen substrate with a chosen adhesive; the test result will only apply to that composite system. The same principle applies to any composite or assembly which is being investigated.

It is sometimes possible to assume a `worst case' situation which will enable a chosen set, or sets, of specimens to be constructed and tested to provide a foundation for the assessment of the probable performance of variations within the system. Similarly, it is sometimes possible to formulate a series of exploratory tests to investigate the effect of variations within a product or system, usually culminating in a series of formal tests to provide the basis for a composite assessment of pre-determined variables. In such cases, however, it is essential that careful planning of the programmes is undertaken by suitably qualified fire safety practitioners.

The following is re-produced from Appendix B of BS 476: Part 6: 1989:

With thin materials or composites, particularly those with a high thermal conductivity, the presence of an air gap and the nature of any underlying construction may significantly affect the ignition performance of the exposed surface. Increasing the thermal capacity of the underlying construction increases the "heat sink" effect and may delay ignition of the exposed surface. Any backing provided to the test specimen and in intimate contact with it, such as the non-combustible packing pieces, may alter this "heat sink" effect and may be fundamental to the test result itself. The influence of the underlying layers on the performance of the assembly should be understood and care should be taken to ensure that the result obtained on any assembly is relevant to its use in practice.

The following advice is offered on the construction and preparation of test specimens:

(a) Where the thermal properties of the product are such that no significant heat loss to the underlying layers can occur, e.g. a material/composite greater than approximately 6 mm thick of high thermal capacity and/or low thermal conductivity, then the product should be tested backed only by the specimen holder.

(b) Where the product is normally used as a free-standing sheet and the characteristics noted in (a) do not apply, then an airspace should be provided at the back of the product by testing over asbestos cement perimeter battens 20 mm wide and 12.5 mm thick.

(c) Where the product is to be used over a low density non-combustible substrate and the characteristics noted in (a) do not apply, then the product should be tested in conjunction with that substrate.

(d) Where the product is to be used over a combustible substrate and the characteristics noted in (a) do not apply, then the product should be tested in conjunction with that substrate.

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