

**BS 476: Part 12: 1991**

**Method Of Test For  
Ignitability Of Products  
By Direct Flame  
Impingement**

**WF Report Number:**

**167883**

**Date:**

**29<sup>th</sup> October 2007**

**Test Sponsor:**

**Custompac Limited**



**0249**

**Bodycote warringtonfire**

**Test Report No. 167883**

**BS 476: Part 12: 1991**

**Method Of Test For  
Ignitability Of Products  
By Direct Flame Impingement**

**Sponsored By**

**Custompac Limited  
Delta Works  
27 Methley Road  
Castleford  
WF10 1PA**

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## Test Details

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<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 British Standard 476: Part 12: 1991 'Fire tests on building materials and structures, method of test for ignitability of products by direct flame impingement'.</p> <p>The test was performed in accordance with the procedure specified in BS 476: Part 12: 1991 and this report should be read in conjunction with that British Standard.</p>
<b>Scope of test</b>	<p>BS 476: Part 12: 1991 specifies a method of test for the determination of the ignitability of materials, composites and assemblies subjected to direct impingement of flames of different size and intensity but without impressed irradiance.</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>Principal of the test</b>	<p>The principle of the test is defined in section 3 of the standard is as follows: -</p> <p>'Vertically held specimens are exposed to specified flames of different sizes and intensities and observation of their ignition behaviour is made. The flame is applied to the surface and/or bottom edge on different specimens.'</p>
<b>Instruction to test</b>	<p>The test was conducted on the 15<sup>th</sup> October 2007 at the request of Custompac Limited, the sponsor of the test.</p>
<b>Provision of Test Specimens</b>	<p>The specimens were supplied by the sponsor of the test. <b>Bodycote warringtonfire</b> not involved in any selection or sampling procedure.</p>
<b>Conditioning of specimens</b>	<p>The specimens were received on the 8<sup>th</sup> October 2007.</p> <p>Prior to test, 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 10\%</math>.</p>
<b>Exposed face</b>	<p>One of two identical faces of each specimen was exposed to the igniting flame.</p>



## 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	Expanded polystyrene which the sponsor of the test stated was used as beanbag filling.
Trade name / product reference	"Beanbag Filling"
Detailed description / composition details	Expanded polystyrene
Name of manufacturer	Custompac Ltd.
Density	9kg/m <sup>3</sup> (stated by the sponsor of the test) 9.11kg/m <sup>3</sup> (determined by <b>Bodycote warringtonfire</b> )
Thickness	For the purpose of the test, the material was sent in the form of a sheet having a thickness of 50mm (thickness determined by <b>Bodycote warringtonfire</b> )
Colour	White
Trade name of flame retardant	<b>See note 1 below</b>
Generic type of flame retardant	Brominated
Amount of flame retardant	<b>See note 1 below</b>
Brief description of manufacturing process	The beads are processed into products by pre expansion with steam to reach the required density.

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

## Ignition Sources

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Of the range of ignition sources specified in the Standard, the following was used during this investigation. The source was chosen with due regard to the envisaged ignition hazards to the product in its end-use. A listing of the approximate 'real' sources for each of the ignition sources given in BS 476: Part 12 is provided in Appendix 1 for information only.

**Ignition Source A** A stainless steel tube, 35 mm long, with an internal diameter of 0.8 mm. A flow of propane of  $25 \pm 2$  ml/min at 25°C is supplied to provide a flame height of approximately 12 mm.

### Conditioning of specimens

The specimens were received on the 8<sup>th</sup> October 2007.

Prior to test, the specimens were conditioned to constant mass at a temperature of  $23 \pm 2^\circ\text{C}$  and a relative humidity of  $50 \pm 10\%$ .

### Exposed face

One of two identical faces of each specimen was exposed to the igniting flame.

## Test Results

### 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.

### Expression of test results

The test results for each of the ignition tests which were conducted are shown in Appendix 2, together with observations on the behaviour of the specimen during the test. The test result is expressed as I, N or T, where:

I = Sustained ignition, defined as 'after withdrawal of the ignition source, the inception of a flame on the surface of the specimen that persists for at least 10 seconds'

T = Transient ignition, defined as 'after withdrawal of the ignition source, the appearance of flashes or flames which are not sustained for a continuous 10 seconds'

N = No sustained ignition or transient ignition.

The results are summarised in the table below:

IGNITION SOURCE	APPLICATION		RESULT (I/T/N)		
	Position	Time (Seconds)	Specimen 1	Specimen 2	Specimen 3
C	FACE	1	N	N	N
C	FACE	5	N	N	N
C	FACE	20	N	N	N
C	FACE	40	N	N	N
C	EDGE	1	N	N	N
C	EDGE	5	N	N	N
C	EDGE	20	N	N	N
C	EDGE	40	N	N	N



**Conclusion**

No sustained ignition occurred with ignition source C (chosen to represent possible end-use ignition hazard - i.e. Lighter) when the ignition source was applied to the surface of the specimen and the bottom edge of the specimen.

**Validity**

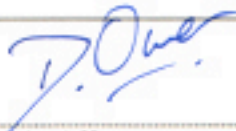
The specification and interpretation of fire test methods are the subject of ongoing development and refinement. Changes in associated legislation may also occur. For these reasons it is recommended that the relevance of test reports over five years old should be considered by the user. The laboratory 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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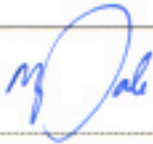


## Signatories

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Responsible Officer  
D. J. Owen \*



Approved  
M. Dale \*  
Deputy Operations Manager



Authorised  
C. Dean \*  
Operations Manager

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

Report Issued: 29<sup>th</sup> October 2007

## Appendix 1

BS 476: Part 12 was developed following a survey of 'real' ignition sources which are currently the main cause of fires in the UK <sup>(1)</sup>. As a result, each of the ignition sources detailed in the Standard was designed to represent a 'real' source. The following listing provides details of the type of source each represents.

Source A	-	First flame after electrical failure
Source B	-	Match flame
Source C	-	Cigarette lighter
Source D	-	Rolled-up newspaper
Source E	-	Chip pan fire (early stages, 2 - 3 minutes)
Source F	-	'D. I. Y.' or plumber's butane burner
Source G	-	Roofer's butane burner

(1) Home Office - U.K. Fire Statistics, published annually.

## Appendix 2

### Surface Application

The table below provides a detailed analysis of the ignitability behaviour of the specimens when subjected to ignition source C

#### Ignition Source C

Flame Application Time (s)	Duration of flaming after removal of ignition source (Seconds)			Observations
	Specimen No.			
	1	2	3	
1	N	N	N	None
5	N	N	N	None
20	N	N	N	None
40	N	N	N	None

### Bottom Edge Application

The table below provides a detailed analysis of the ignitability behaviour of the specimens when subjected to ignition source C

#### Ignition Source C

Flame Application Time (s)	Duration of flaming after removal of ignition source (Seconds)			Observations
	Specimen No.			
	1	2	3	
1	N	N	N	None
5	N	N	N	None
20	N	N	N	None
40	N	N	N	None