




PASSION FOR POWER.

DK-Cable Junction Boxes

Test Report
Insulation Integrity BS 50200



HENSEL
FK 9025
IP 65



Testing. Advising. Assuring.

Mr B Hiltenkamp
Gustav Hensel GmbH & Co. KG
Gustav Hensel Straße 6
Lennestadt 57368
Germany

16th May 2016

Dear Mr Hiltenkamp,

Re: FK 9025, FK 9105 and FK 9255

With reference to the above mentioned products the sponsor, Gustav Hensel GmbH & Co. KG, approached **Exova Warringtonfire** and requested that a cost effective series of tests be conducted to demonstrate that their different sized cable junction boxes comply with the general requirements of BS 5839-1: 2013. It was agreed that smallest and largest boxes within the product range would be tested and the results of these tests can be found in test reports WF No. 347846 (issue 2) and WF No. 358409. Comprehensive details relating to the composition of the product within the range are also given in these reports. Information provided by the sponsor in writing prior to this assessment being conducted indicated that the only variable within the product range is the size of the junction box.

On the basis of the information which has been generated during the test programme which is described in these reports, it is the opinion of Exova Warringtonfire that all products within the range manufactured to the specifications described in this report will achieve a similar level of performance when tested using the principles of BS 5839-1: 2013 Section 26.2 e).

The above opinion relates only to specimens of the product in the form described in those reports and is based on information and experience available at the time of preparation of the report. Small differences in the composition of the cable junction box may significantly affect the performance during the test and will therefore invalidate the test results. It is the responsibility of the supplier of the product to ensure that the product specification which is supplied is identical to the specification described in the reports. Any doubts and further testing is recommended.

This letter should be read in conjunction with WF No. 347846 (issue 2) and WF No. 358409.

Please do not hesitate to contact me if I can be of any further assistance.

Yours sincerely

A handwritten signature in black ink, appearing to read "C Meachin".

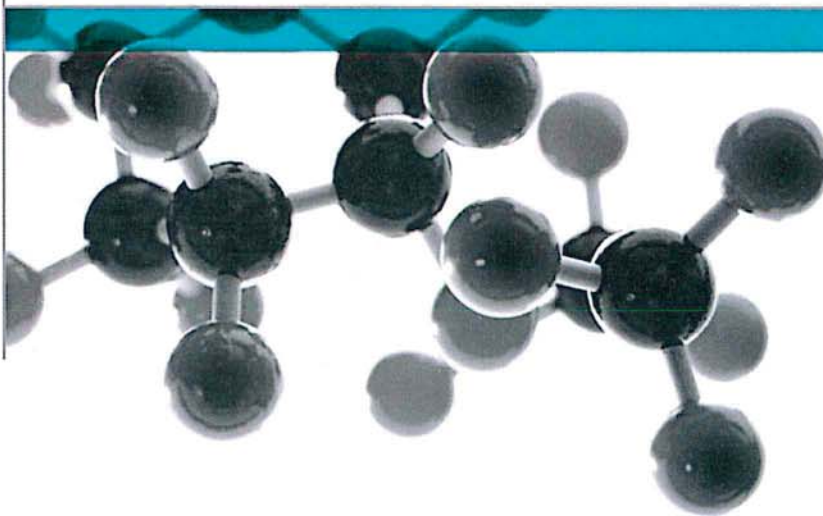
C. Meachin
Technical Officer
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Ad-hoc BS 5839-1: 2013 Section 26.2 e)



Ad-hoc investigation to determine the fire performance of a cable junction box, using the principles of BS 5839-1: 2013 Section 26.2 e)

A Report To: Gustav Hensel GmbH & Co. KG

Document Reference: 347846

Date: 9th January 2015

Issue No.: 2

Page 1

Testing
Advising
Assuring

Executive Summary

Objective To determine the fire performance of a cable junction box, using the principles of BS 5839-1: 2013 Section 26.2 e)

Generic Description		Product reference	Thickness diameter	Weight per unit area / length / density
Cable junction box		"HENSEL FK 9025"	Not stated	Not stated
Individual components used to manufacture composite:				
Junction box	Coating product	Unable to provide	Unable to provide	Unable to provide
	Steel	Unable to provide	Unable to provide	Unable to provide
Cable		Unable to provide	13.5mm *	297g/m *
• Outer sheath		Unable to provide	1.52mm *	1.01g/cm ³ *
• Foil		Unable to provide	0.53mm *	0.17g/cm ³ *
• Glass fabric		Unable to provide	0.21mm *	0.14g/cm ³ *
• Drain wire		Unable to provide	0.87mm *	Not stated
• Clear film		Unable to provide	0.08mm *	0.06g/cm ³ *
• Conductor insulation		Unable to provide	1mm *	Unable to provide
• Conductors		Unable to provide	0.87mm *	Not stated
*Determined by Exova Warringtonfire				
Please see pages 6, 7 & 8 of this test report for the full description of the product tested				



Test Sponsor Gustav Hensel GmbH & Co. KG, Gustav Hensel Straße 6, Lennestadt 57368, Germany.

Test Results: When tested using the general principles of BS 5839-1 Section 26.2 e), the cable junction box maintained its integrity for the duration of the tests.

Date of Test 2nd & 3rd December 2014

Reason for revision This document replaces issue 1 (dated 5th January 2015) of the same number which has been withdrawn. The sponsor name details have been amended.

Signatories

	
Responsible Officer C. Meachin * Technical Officer	Authorised S. Deeming * Operations Manager

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

Report Issued: 9th January 2015

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Document No.:	347846	Page No.:	2 of 12
Author:	C. Meachin	Issue Date:	9 th January 2015
Client:	Gustav Hensel GmbH & Co. KG	Issue No.:	2

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Test Details

Introduction

The sponsor, Gustav Hensel GmbH & Co. KG, approached **Exova Warringtonfire** and requested that a series of tests be conducted to demonstrate that their cable junction box comply with the requirements of BS 5839-1: 2013.

Section 26.2 e) of BS 5839-1 states:-

"Methods of cable support should be such that circuit integrity will not be reduced below that afforded by the cable used, and should withstand a similar temperature and duration to that of the cable, while maintaining adequate support".

In order to demonstrate that the cable junction box meets the above requirements, it was used in conjunction with standard fire resisting cables whilst they were exposed to the test conditions given in BS 5839-1: 2013 Section 26.2 e).

Purpose of test

To determine the performance of cable junction box when it is subjected to the conditions of test specified in BS 5839-1: 2013, Section 26.2 e) and hence to demonstrate that they meet the requirements specified in Section 26.2 f). The purpose of the test methods are to determine whether a cable can maintain circuit integrity when it is exposed to the fire conditions described within the methods.

The tests were performed using the general principles of the procedures specified in BS 5839-1: 2013 Section 26.2 e), BS EN 50200: 2006 and BS 8434-2: 2003 + A2 2009 and this report should be read in conjunction with those standards.

Scope of test

Section 26.2 e) of BS 5839-1 describes two methods of test for standard fire resisting cables :-

a) The cable should meet the PH 120 classification when tested in accordance with BS EN 50200.

The PH 120 classification for the continuity of power supply is defined in the Interpretative Document No. 2 of the Construction Products Directive. Two results in which the measured duration of survival equals or exceeds the stated classification (i.e. 120 minutes) are needed to obtain the classification.

And

b) The cable should maintain circuit integrity when exposed to the following test:

'A sample of the cable is simultaneously exposed to a flame at a temperature of 930 (+40 -0°C) and mechanical shock for 60 minutes, followed by simultaneous exposure to water spray and mechanical shock for a further 60 minutes.' At the specific request of the sponsor, the cable junction box was then exposed to fire alone for 1 further hour.

Compliance with this requirement is demonstrated using the test method described in BS 8434-2: 2003 + A2 2009.

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Client:	Gustav Hensel GmbH & Co. KG	Issue No.:	2

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 tests were conducted on the 2 nd & 3 rd December 2014 at the request of Gustav Hensel GmbH & Co. KG, 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	<p>The specimens were received on the 27th November 2014.</p> <p>Prior to the test the specimens were conditioned for at least 16 hours in an atmosphere having a temperature of $23 \pm 2^{\circ}\text{C}$ and a relative humidity of $50 \pm 5\%$.</p>
Form in which the specimens were tested	The cable junction box was mounted to a nominally 10mm thick calcium silicate backing board and used the standard cable supplied and described below. The entry point of the cable to the junction box was sealed using standard brass flanges and stoppers.

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		Cable junction box
Product reference of cable junction box		"HENSEL FK 9025"
Name of manufacturer		Gustav Hensel GmbH & Co. KG
Dimension of cable junction box		
<p>Dimension drawing</p>		
Coating product	Generic type	Powder coating
	Product reference	See Note 1 below
	Name of manufacturer	
	Colour reference	"Orange, RAL 2003"
	Number of coats	See Note 1 below
	Application rate / thickness per coat	See Note 1 below
	Density / specific gravity	See Note 1 below
	Application method	See Note 1 below
Flame retardant details	See Note 1 below	
Steel	Generic type	Steel
	Product reference	See Note 1 below
	Name of manufacturer	See Note 1 below
	Thickness	See Note 1 below
	Density / weight per unit area	See Note 1 below
	Colour reference	See Note 1 below
	Flame retardant details	This component is inherently flame retardant
Brief description of manufacturing process		See Note 1 below
The cable was joined to the junction box using standard brass flanges and stoppers		
General description		Lighting cable
Product reference of cable		See Note 1 below
Name of manufacturer of cable		See Note 1 below
Diameter of cable		13.5mm (determined by Exova Warringtonfire)
Weight per unit length of cable		297g/m (determined by Exova Warringtonfire)
Cable marking		TW950E + TRATOS + BS 7629-1 BS 6387 CWZ LPC B2226-01 BS 5039-1 PH120 3 x 4 E LOT 0136/9
Cable function		Lighting cable
Number of cores		Three
Voltage rating		See Note 1 below

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Author: C. Meachin

Issue Date: 9th January 2015

Client: Gustav Hensel GmbH &
Co. KG

Issue No.: 2

Outer sheath	Trade name / product reference	See Note 1 below
	Generic type	See Note 1 below
	Name of manufacturer	See Note 1 below
	Colour	"Red" (observed by Exova Warringtonfire)
	Thickness	1.52mm (determined by Exova Warringtonfire)
	Density	1.01g/cm ³ (determined by Exova Warringtonfire)
	Flame retardant details	See Note 1 below
Foil	Trade name / product reference	See Note 1 below
	Generic type	See Note 1 below
	Name of manufacturer	See Note 1 below
	Colour	"Silver/Blue" (observed by Exova Warringtonfire)
	Thickness	0.53mm (determined by Exova Warringtonfire)
	Density	0.17g/cm ³ (determined by Exova Warringtonfire)
	Flame retardant details	See Note 1 below
Glass fabric	Generic type	See Note 1 below
	Product reference	See Note 1 below
	Name of manufacturer	See Note 1 below
	Thickness	0.21mm (determined by Exova Warringtonfire)
	Density	0.14g/cm ³ (determined by Exova Warringtonfire)
	Colour reference	"White" (observed by Exova Warringtonfire)
	Flame retardant details	See Note 1 below
Drain wire	Trade name / product reference	See Note 1 below
	Generic type	See Note 1 below
	Name of manufacturer	See Note 1 below
	Diameter	0.87mm (determined by Exova Warringtonfire)
	Number of strands	7 (determined by Exova Warringtonfire)
Clear film	Generic type	See Note 1 below
	Product reference	See Note 1 below
	Name of manufacturer	See Note 1 below
	Thickness	0.08mm (determined by Exova Warringtonfire)
	Density	0.06g/cm ³ (determined by Exova Warringtonfire)
	Flame retardant details	See Note 1 below
Conductor insulation	Trade name / product reference	See Note 1 below
	Generic type	See Note 1 below
	Name of manufacturer	See Note 1 below
	Colour	"Brown, Light Grey, Dark Grey" (observed by Exova Warringtonfire)
	Thickness	1mm (determined by Exova Warringtonfire)
	Density / weight per unit area	See Note 1 below
	Flame retardant details	See Note 1 below

Continued on next page

Document No.: 347846

Page No.: 7 of 12

Author: C. Meachin

Issue Date: 9th January 2015

Client: Gustav Hensel GmbH & Co. KG

Issue No.: 2

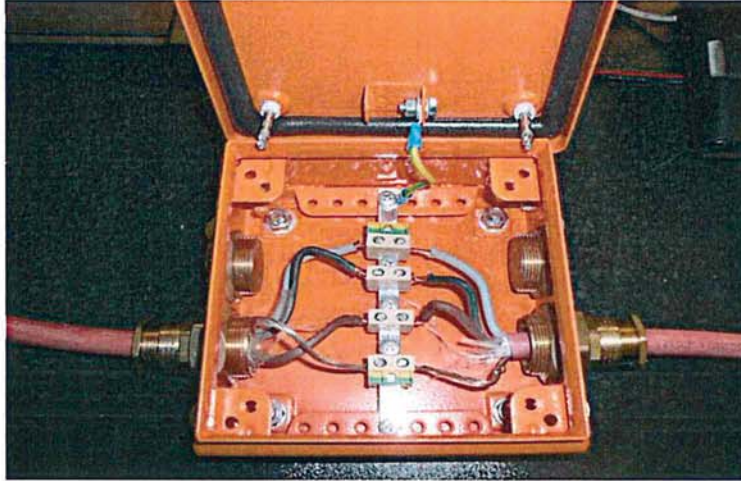
Conductors	Trade name / product reference	See Note 1 below
	Generic type	See Note 1 below
	Name of manufacturer	See Note 1 below
	Diameter	0.87mm (determined by Exova Warringtonfire)
	Number of strands per conductor	7 (determined by Exova Warringtonfire)
Brief description of manufacturing process		See Note 1 below

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

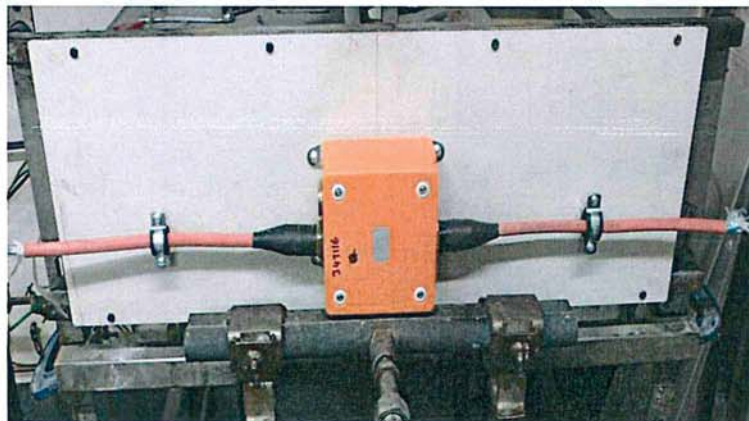
The sponsor has confirmed that some of the components were manufactured by other parties. They have also confirmed that they were not able to obtain from the manufacturers some details that would normally be included in Exova Warringtonfire test reports. The description of the specimens given above is therefore, not as complete as would normally be the case for descriptions included in Exova Warringtonfire test reports, and the description may not fully comply with the requirements of the standard. In all other respects, however, the tests were conducted fully in accordance with the requirements of the standard and the test results are valid.

Photographs of Test Specimens

Cable set-up



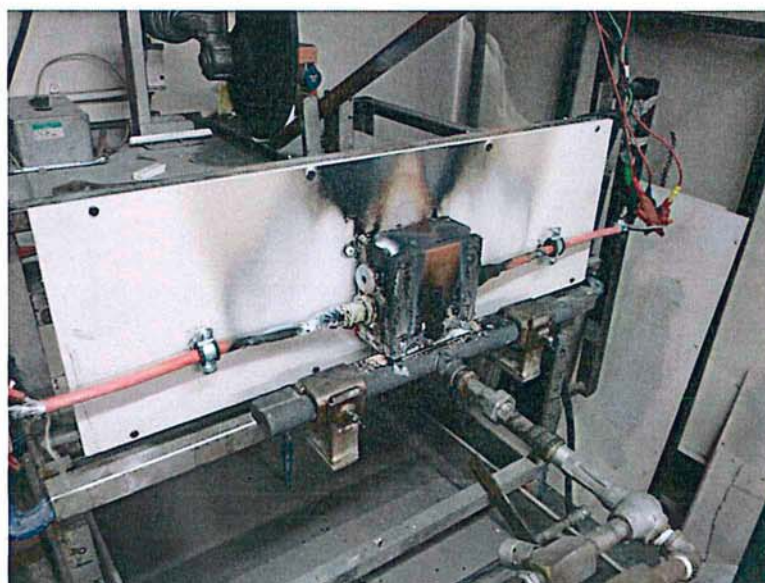
Before test



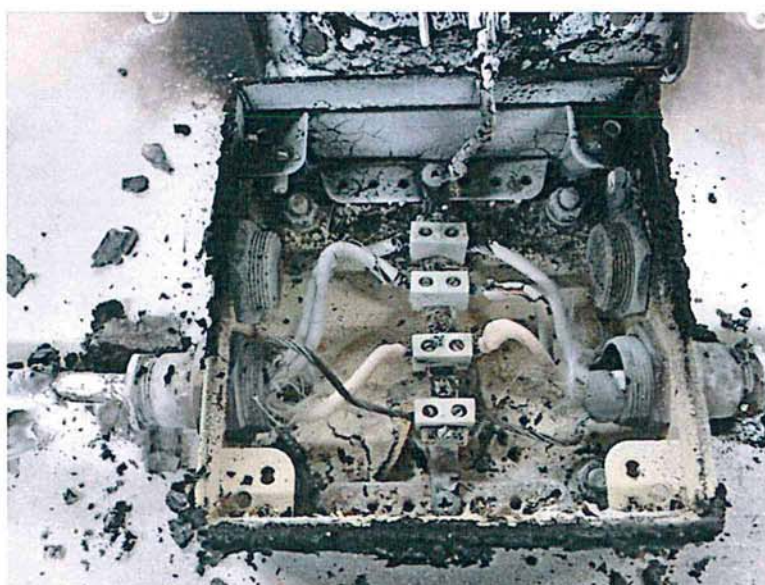
During test



After test



After test close-up



Test Results

Results

BS EN 50200: 2006 (Resistance to fire with mechanical shock)

When two specimens of the cable junction box utilising the standard cable supplied with the entry point of the cable to the junction box being sealed utilising standard brass flanges and stoppers, were tested using the principles of the procedure specified in BS EN 50200: 2006, for a period of 120 minutes at a temperature of 830 (+40 –0) °C and a rated voltage of 250V-rms, both the cable specimens and junction boxes maintained their circuit integrity.

BS 8434-2: 2003 + A2 2009 (Resistance to fire with mechanical shock and water spray)

When a specimen of the cable junction box utilising the standard cable supplied with the entry point of the cable to the junction box being sealed utilising standard brass flanges and stoppers, was tested using the principles of the procedure specified in BS 8434-2: 2003 + A2 2009, at a temperature of 930 (+40 –0) °C and a rated voltage of 250V-rms, but with an exposure time of 180 minutes comprising 60 minutes fire and shock, 60 minutes fire shock and water and 60 minutes fire alone, both the cable specimens and junction boxes maintained their circuit integrity

Conclusion

When tested using the general principles of BS 5839-1 Section 26.2 e), the cable junction box maintained its integrity for the duration of the tests.

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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Author: C. Meachin

Issue Date: 9th January 2015

Client: Gustav Hensel GmbH & Co. KG

Issue No.: 2

Revision History

Issue No : 2	Re-issue Date: 9 th January 2015
Revised By: C Meachin	Approved By: S Deeming
Reason for Revision: This document replaces issue 1 (dated 5 th January 2015) of the same number which has been withdrawn. The sponsor name details have been amended.	

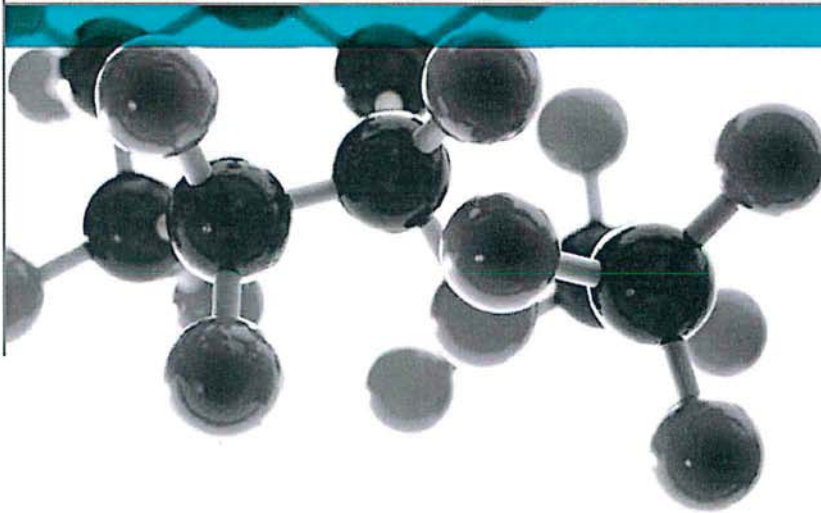
Issue No :	Re-issue Date:
Revised By:	Approved By:
Reason for Revision:	

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Ad-hoc BS 5839-1: 2013 Section 26.2 e)



Ad-hoc investigation to determine the fire performance of a cable junction box, using the principles of BS 5839-1: 2013 Section 26.2 e)

A Report To: Gustav Hensel GmbH & Co. KG

Document Reference: 358409

Date: 7th December 2015

Issue No.: 1

Page 1

Testing
Advising
Assuring

Registered Office: Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian EH28 8PL United Kingdom. Reg No.SC 70429

This report is issued in accordance with our terms and conditions, a copy of which is available on request.

Executive Summary

Objective To determine the fire performance of a cable junction box, using the principles of BS 5839-1: 2013 Section 26.2 e)


Generic Description	Product reference	Thickness	Weight per unit area
Cable junction box	"HENSEL FK 9255"	Not stated	Not stated
Please see pages 6 & 7 of this test report for the full description of the product tested			

Test Sponsor Gustav Hensel GmbH & Co. KG, Gustav Hensel Straße 6, Lennestadt 57368, Germany.


Test Results: When tested using the general principles of BS 5839-1 Section 26.2 e), the cable junction box maintained its integrity for the duration of the tests.

Date of Test 24th & 26th November 2015

Signatories



Responsible Officer
 C. Meachin *
 Technical Officer



Authorised
 S. Deeming *
 Business Unit Head

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

Report Issued: 7th December 2015

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Test Details

Introduction

The sponsor, Gustav Hensel GmbH & Co. KG, approached **Exova Warringtonfire** and requested that a series of tests be conducted to demonstrate that their cable junction box comply with the requirements of BS 5839-1: 2013.

Section 26.2 e) of BS 5839-1 states:-

"Methods of cable support should be such that circuit integrity will not be reduced below that afforded by the cable used, and should withstand a similar temperature and duration to that of the cable, while maintaining adequate support".

In order to demonstrate that the cable junction box meets the above requirements, it was used in conjunction with standard fire resisting cables whilst they were exposed to the test conditions given in BS 5839-1: 2013 Section 26.2 e).

Purpose of test

To determine the performance of cable junction box when it is subjected to the conditions of test specified in BS 5839-1: 2013, Section 26.2 e) and hence to demonstrate that they meet the requirements specified in Section 26.2 f). The purpose of the test methods are to determine whether a cable can maintain circuit integrity when it is exposed to the fire conditions described within the methods.

The tests were performed using the general principles of the procedures specified in BS 5839-1: 2013 Section 26.2 e), BS EN 50200: 2006 and BS 8434-2: 2003 + A2 2009 and this report should be read in conjunction with those standards.

Scope of test

Section 26.2 e) of BS 5839-1 describes two methods of test for standard fire resisting cables :-

a) The cable should meet the PH 120 classification when tested in accordance with BS EN 50200.

The PH 120 classification for the continuity of power supply is defined in the Interpretative Document No. 2 of the Construction Products Directive. Two results in which the measured duration of survival equals or exceeds the stated classification (i.e. 120 minutes) are needed to obtain the classification.

And

b) The cable should maintain circuit integrity when exposed to the following test:

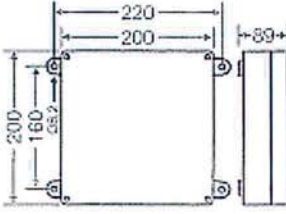
'A sample of the cable is simultaneously exposed to a flame at a temperature of 930 (+40 -0°C) and mechanical shock for 60 minutes, followed by simultaneous exposure to water spray and mechanical shock for a further 60 minutes.' At the specific request of the sponsor, the cable junction box was then exposed to fire alone for 1 further hour.

Compliance with this requirement is demonstrated using the test method described in BS 8434-2: 2003 + A2 2009.


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 tests were conducted on the 24 th & 26 th November 2015 at the request of Gustav Hensel GmbH & Co. KG, 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	<p>The specimens were received on the 2nd November 2015.</p> <p>Prior to the test the specimens were conditioned for at least 16 hours in an atmosphere having a temperature of $23 \pm 2^{\circ}\text{C}$ and a relative humidity of $50 \pm 5\%$.</p>
Form in which the specimens were tested	The cable junction box was mounted to a nominally 10mm thick calcium silicate backing board and used the standard cable supplied and described below. The entry point of the cable to the junction box was sealed using standard brass flanges and stoppers.

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		Cable junction box
Product reference of cable junction box		"HENSEL FK 9255"
Name of manufacturer		Gustav Hensel GmbH & Co. KG
Dimension of cable junction box		
		
Coating product	Generic type	Powder coating
	Product reference	See Note 1 below
	Name of manufacturer	
	Colour reference	"Orange, RAL 2003"
	Number of coats	See Note 1 below
	Application rate / thickness per coat	See Note 1 below
	Density / specific gravity	See Note 1 below
	Application method	See Note 1 below
	Flame retardant details	See Note 1 below
Steel	Generic type	Steel
	Product reference	See Note 1 below
	Name of manufacturer	See Note 1 below
	Thickness	See Note 1 below
	Density / weight per unit area	See Note 1 below
	Colour reference	See Note 1 below
	Flame retardant details	This component is inherently flame retardant
Brief description of manufacturing process		See Note 1 below
The cable was joined to the junction box using standard brass flanges and stoppers		

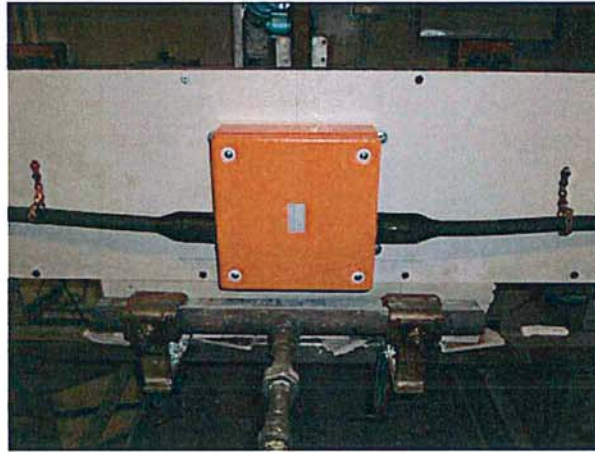
Continued on next page

General description	Armoured power cable
Product reference	See Note 1 below
Name of manufacturer	Draka
Diameter	20.42mm (determined by Exova Warringtonfire)
Weight per unit length	789.7kg/km (determined by Exova Warringtonfire)
Cable marking	DRAKA UK (B)FTP120 BS7846 – F120 ELECTRIC CABLE 600/1000V MADE IN UK 2015 4 x 4mm ²
Cable function	Power cable
Colour	"Black"
Number of cores x core size	4 x 4.5mm ²
Voltage rating	600/1000v
Cable configuration	<ul style="list-style-type: none"> • Outer sheath • Armour reinforcement • Core filler • Conductor insulation • Conductors
Photograph of cable	
The sponsor was unable to provide any further information regarding the cable	
Brief description of manufacturing process	See Note 1 below

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

Photographs of Test Specimens

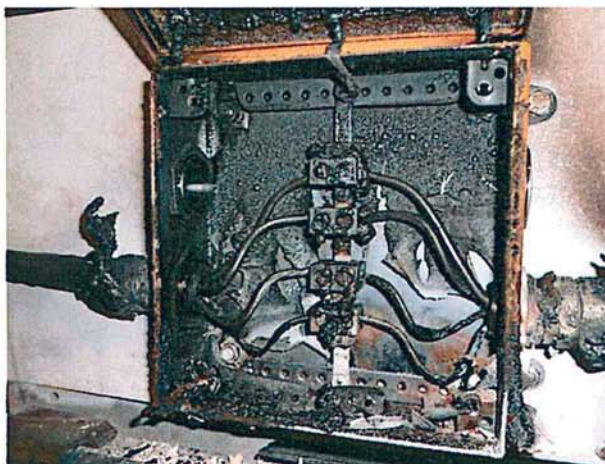
Before test



After test



After test inside box



Test Results

Results

BS EN 50200: 2006 (Resistance to fire with mechanical shock)

When two specimens of the cable junction box utilising the standard cable supplied with the entry point of the cable to the junction box being sealed utilising standard brass flanges and stoppers, were tested using the principles of the procedure specified in BS EN 50200: 2006, for a period of 120 minutes at a temperature of 830 (+40 –0) °C and a rated voltage of 1000V-rms, in the case of the first specimen tested the cable failed to maintain its integrity at a time of 1 hour 5 minutes (as a result of being insufficiently secured, such that movement under softening occurred) but the cable junction box maintained its integrity for the duration of the test (as demonstrated by a subsequent continuity check at the end of the test). In the case of second specimen tested both the cable specimen and junction box maintained their circuit integrity for the duration of the test.

BS 8434-2: 2003 + A2 2009 (Resistance to fire with mechanical shock and water spray)

When a specimen of the cable junction box utilising the standard cable supplied with the entry point of the cable to the junction box being sealed utilising standard brass flanges and stoppers, was tested using the principles of the procedure specified in BS 8434-2: 2003 + A2 2009, at a temperature of 930 (+40 –0) °C and a rated voltage of 1000V-rms, but with an exposure time of 180 minutes comprising 60 minutes fire and shock, 60 minutes fire shock and water and 60 minutes fire alone, both the cable specimen and junction box maintained their circuit integrity.

Conclusion

When tested using the general principles of BS 5839-1 Section 26.2 e), the cable junction box maintained its integrity for the duration of the tests.

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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Revision History

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

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Reason for Revision:	



Gustav HENSEL GmbH & Co. KG
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