



Postal Address:
 Suite 2002a, 44 Market Street
 Sydney, New South Wales 2000
 Australia

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Report Sponsor	Issue Date
Henry Cables Limited 508 Yishan Road, Jinghong Bldg., Suite 6H Shanghai China 200235	13/03/14

Fire-resistance Test on an Electrical Wiring System

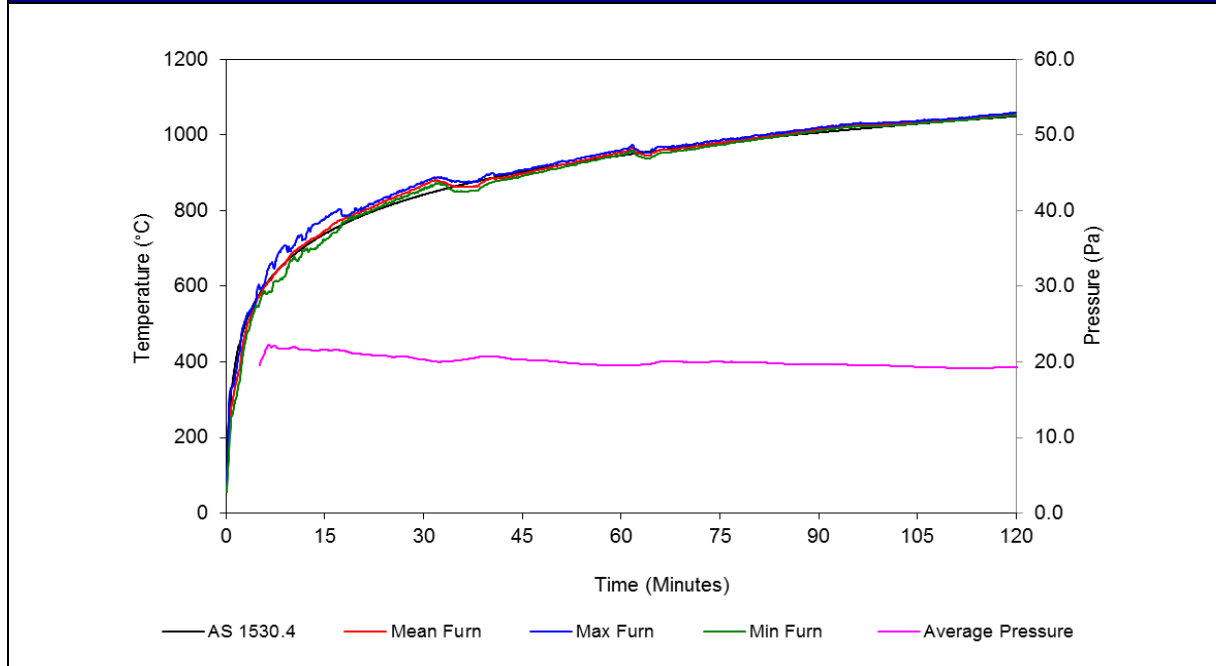
Objective

This test report confirms that the construction described below has been tested by Exova Warringtonfire Aus Pty Ltd and achieved the stated performance when subjected to the nominated testing regime.

Test Reference	Test Date
EWFA 27326200	03/02/2014

Test Method	Supplementary Standards	Variation from Test Method
AS/NZS 3013:2005, Appendix A & B.	AS 1530.4-2005	-

Furnace Temperatures/Pressure



TESTING AUTHORITY	Exova Warringtonfire Aus Pty Ltd	
Address	PO Box 4282 DANDENONG SOUTH VIC 3164 Unit 2, 409-411 Hammond Road DANDENONG VIC 3175	
Phone / Fax	61 (0)3 9767 1000 / 61 (0)3 9767 1001	
ABN	81 050 241 524	
Email / Home Page	www.exova.com	
Authorisation	Prepared By:	Reviewed By:
	<i>Patrick Chan</i>	<i>Chad McLean</i>
	Patrick Chan	Chad McLean



Test Configuration

The cable was positioned in the cable tray as shown in Figure 1. The cable tray was 450mm wide × 50mm high × 1mm thick steel, that was supported in the centre with a 40mm × 40mm × 1mm thick “U” steel section that had two lengths of 10mm diameter threaded rod that were supported through the concrete slab to the unexposed side.

The tested cable had two bends of 90° at the bending radius as specified in Table 1 with a metallic cable tie fixing the cable to the tray at the centre of the two directional changes. The cable was otherwise fixed to the cable tray with plastic cable ties.

Table 1. Cable bending radius.

Cable Number	Cable diameter	Tested bending radius
1	Nominal 21.5mm - measured	180mm on inside of bend.

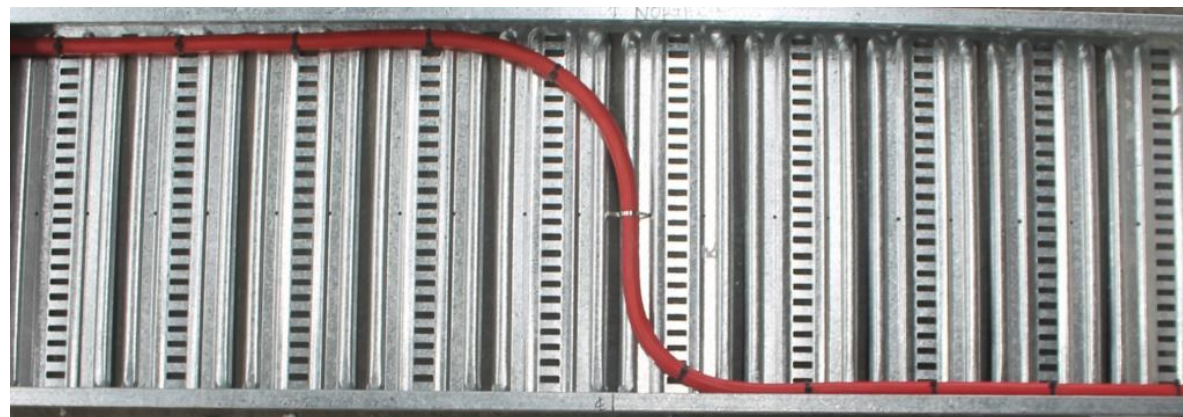


Figure 1

Product Description Cable 1

(All dimensions have been measured)

Description: Flexible fire rated 3 × 10mm² Core + 4mm² Earth Cable

Product Code: FRM3CE10

Cores:

Conductor: 10mm² core, comprising 140/0.3 mm diameter plain annealed copper wires.

Overall Conductor Diameter: 3.9mm in diameter

Mica Tape: 3-off layers of glass tape wound at the same direction. The tape was 0.14mm thick × 21.5mm wide with 12mm overlap.

Insulation: X-HF-110 coloured white, blue and red with a nominal wall thickness of 1mm.

Earth:

Conductor: 4mm² core, comprising 56/0.3mm diameter plain annealed copper wires

Overall Conductor Diameter: 2.5mm in diameter

Mica Tape: 3-off layers of glass tape wound at the same direction. The tape was 0.14mm thick × 11mm wide with 3.4mm overlap.

Insulation; X-HF-110 coloured green with yellow stripe with a nominal wall thickness of 1mm

Sheath: HFS-110-TP coloured red with a nominal wall thickness of 2.0mm.

Cable Overall Outer Diameter: Nominal 21.5mm.

Table 2: Circuit Designation

Circuit Description		
Cable Number	Cable colour	Globe No.
1	Red	1
	Blue	2
	White	3

Fire Resistance Test

Control of the furnace temperature was conducted in accordance with AS/NZS 3013:2005 and was maintained within the prescribed limits of variance from the time/temperature curve that is specified in AS 1530.4-2005 for the duration of the test period. The furnace pressure was measured at a position approximately 100mm below the soffit of the specimen mounting slab in the centre and was maintained at approximately 20 Pa above the laboratory atmospheric pressure for the duration of the fire resistance test.

The electrical power cables were connected to a 240/415V 3 phase electrical circuit integrity monitoring system as depicted in AS/NZS 3013:2005, Figure A1(a). This monitoring system provided each electrical circuit with 240 volts through a 60 watt tungsten lamp, a 4 amp HRC fuse and a neon indicator lamp.

The fire resistance test was terminated at 120 minutes.

The observations of the fire resistance test are below with results shown in Table 3.

Observations		
Time		Observation
Min	Sec	
0	00	Start of Fire Resistance Test. Lamps 1, 2 & 3 lit.
30	00	Electrical circuits 1, 2 & 3 were intact and conducting the supplied current.
60	00	Electrical circuits 1, 2 & 3 were intact and conducting the supplied current.
90	00	Electrical circuits 1, 2 & 3 were intact and conducting the supplied current.
120	00	Fire resistance test terminated. Lamps 1, 2 & 3 remain lit and conducting the supplied current.

Table 3: Summary Fire-resistance Test

Fire Resistance Test Results			
Cable number	Cable group ¹	Cable configuration	Circuit Integrity
1	2	Single	120 minutes

¹As defined in Appendix A AS/NZS 3013:2005.

Water Spray Test

The Water Spray Test was conducted in accordance with AS/NZS 3013:2005 Appendix B, using a ½” BSP male brass nozzle with a water spray cone of 90° that was positioned centrally, nominally 500mm below the soffit of the specimen mounting slab. The Water Spray Test was conducted within 10 minutes of the completion of the Fire Resistance Test for a duration of 3 minutes. The observations of the water spray test are shown on the next section and the results are shown in Table 4.

Water Spray Observation		
Time		Observation
Min	Sec	
122	05	Start of Water Spray Test. Lamps 1, 2 & 3 lit.
125	05	End of water spray test. Lamps 1, 2 & 3 remain lit and conducting the supplied current

Table 4: Summary of Cable Classification in Accordance with AS/NZS 3013:2005

Wiring System Classification		
Cable	Cable group ¹	Cable classification
1	2	WS5XW

¹As defined in Appendix A AS/NZS 3013:2005.

Application of Test Results

AS/NZS 3013:2005 applies only to the testing and classification of wiring systems elements that are in all other respects safe and suitable for their intended use and comply with other relevant Standards.

A wiring system is then assembled using the individual elements and a fire and mechanical performance classification for the assembled system is established.

The fire protection classification of a wiring system shall not be greater than the fire protection classification of its lowest classified element.

The mechanical protection classification of an assembled wiring system shall not be less than the mechanical protection classification of its highest classified element. For example, if a cable of low classification is protected by an enclosure of higher classification the assembled system is assigned the classification of the enclosure.

The use of wiring system elements tested in accordance with AS/NZS 3013:2005 may not be necessary where parts (or components) of building construction provide satisfactory protection against fire conditions and mechanical damage.

The degree of protection against fire conditions and mechanical damage required of a wiring system or its elements is dependent on the application. Appendix F of AS/NZS 3013:2005 describes methods of protection of wiring system elements against the fire conditions and mechanical damage for which testing may not be considered necessary.

Conditions/Validity

- This report may only be reproduced in full without modifications. Extracts or abridgements of reports shall not be published without permission of Exova Warringtonfire Aus Pty Ltd.
- This test report is based on the results of a fire resistance test, as referenced in Tables 3 & 4, performed by Exova Warringtonfire Aus Pty Ltd.
- This test report does not provide an endorsement by Exova Warringtonfire Aus Pty Ltd of the performance of the actual products supplied.
- The conclusions in this test report relate to the configurations as detailed, and should not be applied to any other configuration or other cable construction or type.
- The results of these tests may be used to directly assess fire hazard, but it should be recognised that a single test method will not provide a full assessment of fire hazard under all conditions.