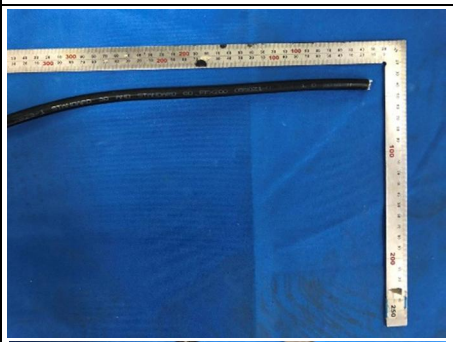
Report No. **TC.18.05.002604**

Date of Issue **08/16/2018**

Applicant: **Caledonian Cables Limited**

Applicant address: **1/F., CMA Building, 64-66 Connaught Road Central, Hong Kong**

Description of the test subject:

Sample	Description	Photo
001	Name: Fire Resistant Electric Cables Style No: FFX200 05SOZ1-U Ratings: 2C×1.0mm^2 Brand name: CALEDONIAN	 

Receipt Date of Sample: **07/27/2018**

Date of Testing: **From 07/27/2018 to 08/16/2018**

Sample submitted: **The sample(s) was (were) submitted by applicant and identified.**

Conclusion:

Test Items			Conclusion
No.	**Items**	**Standard**	
1	Vertically-mounted bunched wires or cables burn testing	IEC 60332-3-24:2009	Pass
2	Smoke density testing	IEC 61034-2:2013	Pass

Note: (1) General Terms & Conditions as mentioned overleaf,(2)The results relate only to the items tested,(3)The test report shall not be reproduced except in full without the written approval of the company. (4) Samples are tested as received.

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3	Determination of the halogen acid gas content	IEC 60754-1:2011	Pass
4	Determination of acidity (by PH measurement) and conductivity	IEC 60754-2:2011	Pass
5	Test method for resistance to fire of cables required to maintain circuit integrity under fire conditions	BS 6387:2013	Pass
6	Method of test for resistance to fire of unprotected small cables for use in emergency circuits	EN 50200:2015	Pass

Test Results

1. IEC 60332-3-24:2009 Tests on electric and optical fibre cables under fire conditions — Part 3-24: Test for vertical flame spread of vertically-mounted bunched wires or cables — Category C

1.1 Sample details

Specimen size	3.5m
Cable diameter	10mm
Conductor diameter	1.6mm

Precondition	Temperature (℃)	Humidity (%)	Duration(h)
	20±10	50±20	16

1.2 Test results

Measurements/ observation	Result
The extent of damage	2.34m

Requirement: The maximum extent of the charred portion measured on the sample shall not have reached a height exceeding 2.5m above the bottom edge of the burner.

Conclusion: Pass

2. IEC 61034-2:2013 Measurement of smoke density of cables burning under defined conditions Part 2: Test procedure and requirements

2.1 Sample details

Diameter	10mm

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Pre-conditioning	Indoor		Duration
	Temp: 23±2℃	Humidity: 50±5%	16 h
Ignition Source	Fire source 1		

2.2 Test Result

The minimum light transmittance within 40 minutes; (%)	97.2

Requirement: Within the first 40 minutes, the light transmittance shall not drop to below 60%.

Conclusion: Pass

3. IEC 60754-1:2011 Test on gases evolved during combustion of materials from cables - Part 1: Determination of the halogen acid gas content

3.1 Sample details

Weight	Sheath:1.0006 g Insulation:1.0009 g

Precondition	Temperature (℃)	Humidity (%)	Duration(h)
	23±2	50±5	16

3.2 Test Result

	Gas (mg)	1	2	3	Average
Sheath	HF	0.2	0.4	0.2	0.3
	HCl	0.4	0.4	0.5	0.4

	Gas (mg)	1	2	3	Average
Insulation	HF	0.3	0.2	0.3	0.3
	HCl	0.4	0.6	0.6	0.5

Clients' requirement: < 5mg/g

Conclusion: Pass

4. IEC 60754-2:2011 Test on gases evolved during combustion of materials from cables—part 2: Determination of acidity (by PH measurement) and conductivity

4.1 Sample details

Sample name	Cable

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Precondition	Temperature (℃)	Humidity (%)	Duration(h)
	21±2	50±5	24

4.2 Test Result

Test Item(Sheath)	Result			Average
PH	7.87	7.85	7.88	7.87
Conductivity(μs/mm)	0.4	0.4	0.4	0.4

Test Item(Insulation)	Result			Average
PH	6.47	6.51	6.49	6.49
Conductivity(μs/mm)	0.4	0.4	0.4	0.4

Requirement: PH ≥ 4.3, Conductivity ≤10 μs/mm

Conclusion: Pass

5. BS 6387:2013 Test method for resistance to fire of cables required to maintain circuit integrity under fire conditions

5.1.1 Sample details

Specimen size	1200mm
Number of cores	2
Voltage	1000V
Category	Protocol C for resistance to fire alone
Temperature attack	950℃±40℃
Test time	3h
Atmosphere	10℃-40℃

5.1.2 Test Result

Sample / Phenomenon	1st
Fuses ruptures, lamps is extinguished（Y/N）	N

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Remark: If the sample fails to meet these criteria, two further samples shall be prepared and tested. If both these samples meet these criteria, the cable shall be deemed to have passed the test. If one or both samples fail to meet the criteria, the cable shall be deemed to have failed.

Requirement: If, when the cable sample is tested, none of the fuses ruptures and none of the lamps is extinguished during the period of the test the cable shall be deemed to have passed the test.

Conclusion: Pass

5.2.1 Sample details

Specimen size	1500mm
Number of cores	2
Voltage	1000V
Category	Protocol W for resistance to fire with water
Temperature attack	650℃±40℃
Rate of water application in the vicinity of the cable	0.25 L/m^2/s and 0.3 L/m^2/s
Test time	Flame apply for 15min+Water spray 15min (Continue the flame the same time unless the application of the water extinguished the flame)
Atmosphere	10℃-40℃

5.2.2 Test Result

Sample / Phenomenon	1st
Fuses ruptures, lamps is extinguished（Y/N）	N

Remark: If the sample fails to meet these criteria, two further samples shall be prepared and tested. If both these samples meet these criteria, the cable shall be deemed to have passed the test. If one or both samples fail to meet the criteria, the cable shall be deemed to have failed.

Requirement: If, when the cable sample is tested, none of the fuses ruptures and none of the lamps is extinguished during the period of the test the cable shall be deemed to have passed the test.

Conclusion: Pass

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5.3.1 Sample details

Specimen size	1200mm
Number of cores	2
Voltage	1000V
Category	Protocol Z for resistance to fire with mechanical shock
Temperature attack	950℃±40℃
Shock time	Once every 30s±2s
Test time	15min
Atmosphere	10℃-40℃

5.3.2 Test Result

Sample / Phenomenon	1st
Fuses ruptures, lamps is extinguished（Y/N）	N

Remark: If the sample fails to meet these criteria, two further samples shall be prepared and tested. If both these samples meet these criteria, the cable shall be deemed to have passed the test. If one or both samples fail to meet the criteria, the cable shall be deemed to have failed.

Requirement: If, when the cable sample is tested, none of the fuses ruptures and none of the lamps is extinguished during the period of the test the cable shall be deemed to have passed the test.

Conclusion: Pass

6. EN 50200:2015 Method of test for resistance to fire of unprotected small cables for use in emergency circuits

6.1 Heat + Shock

Specimen size	1200mm
Number of cores	2
Voltage	1000V
Category	Heat + Shock
Temperature attack	830^{+40}_{0} ℃

Shock time	5min±10s intervals
Test time	120min
Atmosphere	10℃-40℃

Sample / Phenomenon	1st
Fuses ruptures, lamps is extinguished（Y/N）	N

6.2 Heat + Shock+ Water spray

Specimen size	1200mm
Number of cores	2
Voltage	1000V
Category	Heat + Shock+ Water spray
Temperature attack	830^{+40}_{0} ℃
Shock time	5min±10s intervals
Water spray time	Last 15min of the test
Test time	30min
Atmosphere	10℃-40℃

Sample / Phenomenon	1st
Fuses ruptures, lamps is extinguished（Y/N）	N

Requirement: If, when the cable sample is tested, none of the fuses ruptures and none of the lamps is extinguished during the period of the test the cable shall be deemed to have passed the test.

Conclusion: Pass

Statement：The test results relate to the behaviour of the test specimens of a product under the particular conditions of the test; they are not intended to the sole criterion for assessing the potential smoke and toxicity hazard of the product in use.

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-End of Report-

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