



中国认可
国际互认
检测
TESTING
CNAS L6069




Report No. TC.19.07.005027

Date of Issue 07/30/2019

Applicant: Caledonian Cables Limited

Applicant address: Marchants Industrial Centre, Mill Lane Laughton, Lewes, East Sussex, BN8 6AJ, UK

Description of the test subject:

Sample	Description	Photo
001	<p>Sample Description: Rolling Stock Coaxial Cables</p> <p>Style No.: 5D-FB</p> <p>Manufacturer: Caledonian Cables Limited</p>	

Receipt Date of Sample: 07/22/2019

Date of Testing: From 07/22/2019 to 07/30/2019

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

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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Conclusion:

Test Items			Result					
			R15			R16		
No.	Items	Test method	HL1	HL2	HL3	HL1	HL2	HL3
1	Single wire or cable burn testing	EN 45545-2:2013+A1:2015 EN 60332-1-2:2004+A1:2015	Pass	Pass	Pass	Pass	Pass	Pass
2	Vertically-mounted bunched wires or cables burn testing	EN 45545-2:2013+A1:2015 EN 50305:2002	Pass	Pass	Pass	Pass	Pass	Pass
3	Smoke density testing	EN 45545-2:2013+A1:2015 EN 61034-2:2005	Pass	Pass	Pass	*	Pass	Pass
4	Smoke toxicity testing	EN 45545-2:2013+A1:2015 EN 50305 :2002	Pass	Pass	Pass	Pass	Pass	Pass

Note: *=Standards are not required

Test Results

EN 45545-2:2013+A1:2015 Railway applications-Fire protection on railway vehiclesPart2: Requirements for fire behaviour of materials and components

1. EN 60332-1-2-2004+A1:2015 Tests on electric and optical fiber cables under fire conditions —Part 1-2: Test for vertical flame propagation for a single insulated wire or cable —Procedure for 1 kW pre-mixed flame

1.1 Sample details

Diameter	9.0mm
Specimen size	600mm
Time for flame application	60s

Precondition	Temperature (°C)	Humidity (%)	Duration(h)
	23±5	50±20	16

1.2 Test results

Measurements/ observation	1 st Test
The distance between the lower edge of the top support and the onset of charring (mm)	390

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The distance between the lower edge of the top support and the charring downwards (mm)	485
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Note: If a failure is recorded, two more tests shall be carried out. If both tests result in passes, the single insulated conductor or cable shall be deemed to have passed the test.

2. EN 50305:2002 Railway applications —Railway rolling stock cables having special fire performance — Test methods

2.1 Sample details

Specimen size	3.5m
Cable diameter	9.0mm
Conductor diameter	1.8mm
Number of bundles	12
Number of strands in the bundle	1
The method of mounting	Touching

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

2.2 Test results

Measurements/ observation	Result
The extent of damage	2.0m

3. EN 61034-2:2005 Measurement of smoke density of cables burning under defined conditions Part 2: Test procedure and requirements

3.1 Sample details

Diameter	9.0mm
Number of bundles	5
Number of strands in the bundle	1

Pre-conditioning	Indoor		Duration
	Temp: 23±2°C	Humidity: 50±5%	16 h

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Ignition Source	Fire source 1
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3.2 Test Result

The minimum light transmittance within 40 minutes; (%)	80.9
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4. EN 50305:2002 Railway applications — Railway rolling stock cables having special fire performance — Test methods

4.1 Sample details

Weight (g)	Sheath: S1: <u>1.0212</u> g; S2: <u>1.0098</u> g; S3: <u>1.0131</u> g Insulation: S1: <u>1.0149</u> g; S2: <u>1.0079</u> g; S3: <u>1.0083</u> g		
Conditioning	Temperature (°C)	Humidity (%)	Duration (h)
	23±2	50±5	At least 48

4.2 Test results

Gas (Sheath)	1	2	3	Average
Carbon Monoxide (CO)	13.7	15.1	14.2	14.4
Carbon Dioxide (CO ₂)	187.2	172.8	172.8	177.6
Sulphur Dioxide (SO ₂)	ND	ND	ND	ND
Nitrogen Dioxide (NO ₂)	ND	ND	ND	ND
Hydrogen Cyanide (HCN)	ND	ND	ND	ND

Gas (Sheath)	CCz; mg/m ³	Mz; mg	$\frac{Mz}{CCz}$
Carbon Monoxide (CO)	1750	14.4	0.008
Carbon Dioxide (CO ₂)	90000	177.6	0.002
Sulphur Dioxide (SO ₂)	260	0	0
Nitrogen Dioxide (NO ₂)	90	0	0
Hydrogen Cyanide (HCN)	55	0	0

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ITC	1.0
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Gas (Insulation)	1	2	3	Average
Carbon Monoxide (CO)	14.2	16.0	15.1	15.1
Carbon Dioxide (CO ₂)	93.6	122.4	115.2	110.4
Sulphur Dioxide (SO ₂)	ND	ND	ND	ND
Nitrogen Dioxide (NO ₂)	ND	ND	ND	ND
Hydrogen Cyanide (HCN)	ND	ND	ND	ND

Gas (Insulation)	CCz; mg/m ³	Mz; mg	$\frac{Mz}{CCz}$
Carbon Monoxide (CO)	1750	15.1	0.009
Carbon Dioxide (CO ₂)	90000	110.4	0.001
Sulphur Dioxide (SO ₂)	260	0	0
Nitrogen Dioxide (NO ₂)	90	0	0
Hydrogen Cyanide (HCN)	55	0	0
ITC			1.0

The toxicity index (ITC) shall be calculated using the following formula:

$$ITC = \frac{100}{m} \sum \frac{Mz}{CCz}$$

Where,

M = weight of the sample, g;

Mz = weight of gas Z produced by the sample combustion, mg;

CCz = critical concentration for a 30 min exposure for gas z, mg/m³.

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Sheath: The ITC Value determined was 1.0.

Insulation: The ITC Value determined was 1.0.

Requirement (EN 45545-2:2013+A1:2015):

	Items	Test method	Parameter	HL1	HL2	HL3
R15 cables for interior	single wire or cable burn testing	EN 45545-2:2013+A1:2015 EN 60332-1-2:2004	Unburned length, mm (Min.)	Burned part ≤540 and unburned part >50	Burned part ≤540 and unburned part >50	Burned part ≤540 and unburned part >50
	vertically-mounted bunched wires or cables burn testing	EN 45545-2:2013+A1:2015 EN 60332-3-24:2009 (d ≥12mm)	Burned length, m (Max.)	2.5	2.5	2.5
		EN 50305:2002 (6mm <d <12mm)		2.5	2.5	2.5
		EN 50305:2002 (d ≤ 6 mm)		1.5	1.5	1.5
	Smoke density testing	EN 45545-2:2013+A1:2015 EN 61034-2:2005	Transmission, % (Min.)	25	50	70
	Smoke toxicity testing	EN 45545-2:2013+A1:2015 EN 50305:2002	ITC (Max.)	10	10	6

	Items	Test method	Parameter	HL1	HL2	HL3
R16 cables for exterior	single wire or cable burn testing	EN 45545-2:2013+A1:2015 EN 60332-1-2:2004	Unburned length, mm (Min.)	Burned part ≤540 and unburned part >50	Burned part ≤540 and unburned part >50	Burned part ≤540 and unburned part >50
	vertically-mounted bunched wires or cables burn testing	EN 45545-2:2013+A1:2015 EN 60332-3-24:2009 (d ≥12mm)	Burned length, m (Max.)	2.5	2.5	2.5

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		EN 50305:2002 (6mm <d <12mm)		2.5	2.5	2.5
		EN 50305:2002 (d ≤ 6 mm)		1.5	1.5	1.5
	Smoke density testing	EN 45545-2:2013+A1:2015 EN 61034-2:2005	Transmission, % (Min.)	-	25	50
	Smoke toxicity testing	EN 45545-2:2013+A1:2015 EN 50305:2002	ITC (Max.)	10	10	6

Comprehensive:

No.	Items	Parameter	Record	R15			R16		
				HL1	HL2	HL3	HL1	HL2	HL3
1	single wire or cable burn testing	Unburned length, mm	390	Pass	Pass	Pass	Pass	Pass	Pass
2	vertically-mounted bunched wires or cables burn testing	Burned length, m	2.0	Pass	Pass	Pass	Pass	Pass	Pass
3	Smoke density testing	Transmission %	80.9	Pass	Pass	Pass	*	Pass	Pass
4	Smoke toxicity testing	ITC	Sheath	1.0	Pass	Pass	Pass	Pass	Pass
			Insulation	1.0					

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 be the sole criterion for assessing the potential smoke and toxicity hazard of the product in use

Changzhou Jinbiao Railway Transportation Technical Service Co., Ltd.

Drafted by:

Lynn liu

Approved by:

Shen hui

-End of Report-

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