中国认可
国际互认
检测
TESTING
CNAS L6069

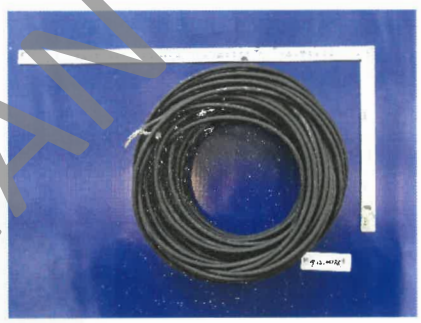
Report No. TC.19.12.007883

Date of Issue 12/17/2019

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	Sample Description: Caledonian Rolling Stock Category 5E Data Cables Style No.: FRL-Cat5E-4P/4C24AWG Manufacturer: Caledonian Cables Limited	

Receipt Date of Sample: 12/09/2019

Date of Testing: From 12/09/2019 to 12/17/2019

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

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

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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	6.7mm
Specimen size	600mm
Time for flame application	60s

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

1.2 Test results

Measurements/ observation	1st Test
The distance between the lower edge of the top support and the onset of charring (mm)	380
The distance between the lower edge of the top support and the charring downwards (mm)	505

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	6.7mm
Conductor diameter	1.02mm
Number of bundles	15
Number of strands in the bundle	1
The method of mounting	Touching

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

2.2 Test results

Measurements/ observation	Result
The extent of damage	0.80m

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	6.7mm
Number of bundles	6
Number of strands in the bundle	1

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

3.2 Test Result

The minimum light transmittance within 40 minutes; (%)	97.17

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

4.1 Sample details

Weight (g)	Sheath: S1: 1.0016 g; S2: 1.0008 g; S3: 1.0015 g Insulation: S1: 1.0011 g; S2: 1.0018 g; S3: 1.0008 g		
Conditioning	Temperature（℃）	Humidity（%）	Duration (h)
	23±2	50±5	At least 48

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4.2 Test results

Gas (Sheath)	MDL	1	2	3	Average
Carbon Monoxide (CO)	5	22.6	23.1	23.3	23.0
Carbon Dioxide (CO_2)	40	253.7	262.4	265.8	260.6
Sulphur Dioxide (SO_2)	0.1	ND	ND	ND	ND
Nitrogen Dioxide (NO_2)	0.5	ND	ND	ND	ND
Hydrogen Cyanide (HCN)	0.3	ND	ND	ND	ND

Gas (Sheath)	CCz; mg/m³	Mz; mg	$\frac{Mz}{CCz}$
Carbon Monoxide (CO)	1750	23.0	0.013
Carbon Dioxide (CO_2)	90000	260.6	0.003
Sulphur Dioxide (SO_2)	260	0	0
Nitrogen Dioxide (NO_2)	90	0	0
Hydrogen Cyanide (HCN)	55	0	0
ITC			1.60

Gas (Insulation)	MDL	1	2	3	Average
Carbon Monoxide (CO)	5	22.9	22.9	22.4	22.7
Carbon Dioxide (CO_2)	40	237.6	252.0	230.4	240.0
Sulphur Dioxide (SO_2)	0.1	ND	ND	ND	ND
Nitrogen Dioxide (NO_2)	0.5	ND	ND	ND	ND
Hydrogen Cyanide (HCN)	0.3	ND	ND	ND	ND

Gas (Insulation)	CCz; mg/m³	Mz; mg	$\frac{Mz}{CCz}$
Carbon Monoxide (CO)	1750	22.7	0.013

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Carbon Dioxide (CO_2)	90000	240.0	0.003
Sulphur Dioxide (SO_2)	260	0	0
Nitrogen Dioxide (NO_2)	90	0	0
Hydrogen Cyanide (HCN)	55	0	0
ITC			1.56

ND-Not Detected, MDL- Method detection limit

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/m^3.

Sheath: The ITC Value determined was 1.60.
Insulation: The ITC Value determined was 1.56.

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

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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	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
		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

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Comprehensive:

No.	Items	Parameter	Record		R15			R16		
					HL1	HL2	HL3	HL1	HL2	HL3
1	single wire or cable burn testing	Unburned length, mm	380		Pass	Pass	Pass	Pass	Pass	Pass
2	vertically-mounted bunched wires or cables burn testing	Burned length, m	0.80		Pass	Pass	Pass	Pass	Pass	Pass
3	Smoke density testing	Transmissio n%	97.17		Pass	Pass	Pass	*	Pass	Pass
4	Smoke toxicity testing	ITC	Sheath	1.60	Pass	Pass	Pass	Pass	Pass	Pass
			Insulation	1.56						

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

Test results are just for client internal reference.

Changzhou Jinbiao Railway Transportation Technical Service Co., Ltd.

Drafted by: Approved by:

Lynn liu Shen hui

-End of Report-

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