

Report No. TC.14.10.001093

Date of Issue 11/11/2014

Applicant: VIVOTEK INC.

Applicant address: 6F, No.192, Lien-Cheng Rd., Chung-Ho, New Taipei City, 235, Taiwan, R.O.C.

Description of the test subject:

Sample	Description	Photo
001	Name: Cable Type: 9090N-1647	

Receipt Date of Sample: 10/27/2014

Date of Testing: From 10/27/2014 to 11/05/2014

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

Conclusion:

Test Items			R15			R16		
No.	Items	Test method	HL1	HL2	HL3	HL1	HL2	HL3
1	single wire or cable burn testing	EN 45545-2:2013 EN 60332-1-2:2004	Pass	Pass	Pass	Pass	Pass	Pass
2	vertically-mounted bunched wires or cables burn testing	EN 45545-2:2013 EN 60332-3-24:2009	Pass	Pass	Pass	Pass	Pass	Pass
3	Smoke density testing	EN 45545-2:2013 EN 61034-2:2005	Pass	Fail	Fail	*	Pass	Fail
4	Smoke toxicity testing	EN 45545-2:2013 EN 50305 :2002	Pass	Pass	Fail	Pass	Pass	Fail

Remark: Pass=Meet Standard's Requirement
Fail= Below Standard's Requirement
* = No Specified Requirement.

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 laboratory. (4) Samples are tested as received.

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Test Results

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

1. EN 60332-1-2:2004 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	7mm
Specimen size(mm)	600mm

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)	415
The distance between the lower edge of the top support and the charring downwards (mm)	495
Burned part(mm)	80

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(m)	3.0m
Cable diameter (mm)	7mm
Conductor diameter(mm)	0.9mm

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

2.2 Test results

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Measurements/ observation	Result
The extent of damage(m)	0.43

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 (mm)	7.0mm		
Pre-conditioning	Indoor		Min. 72 h
	Temp : 23±2°C	Humidity : 50±5%	16 h
Ignition Source	Fire source 1		

3.2 Test Result

The minimum light transmittance within 40 minutes; (%)	40.32%
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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)	1.042g		
Conditioning	Temperature (°C)	Humidity (%)	Duration (h)
	23±2	50±5	At least 48h

4.2 Test results

Gas	1	2	3	Average
Carbon Monoxide (CO)	61.8	70.1	64.6	65.5
Carbon Dioxide (CO ₂)	659.5	673.3	661.7	664.8
Sulphur Dioxide (SO ₂)	0	0	0	0
Nitrogen Dioxide (NO ₂)	2.5	2.3	2.2	2.3
Hydrogen Cyanide (HCN)	1.7	1.1	1.3	1.4

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Gas	CCz; mg/m ³	Mz; mg	$\frac{Mz}{CCz}$
Carbon Monoxide (CO)	1750	65.5	0.037
Carbon Dioxide (CO ₂)	90000	664.8	0.0074
Sulphur Dioxide (SO ₂)	260	0	0
Nitrogen Dioxide (NO ₂)	90	2.3	0.026
Hydrogen Cyanide (HCN)	55	1.4	0.025
ITC			9.16

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.

The ITC Value determined was 9.16.

Comprehensive:

No.	Items	Parameter	Record	R15			R16		
				HL1	HL2	HL3	HL1	HL2	HL3
1	single wire or cable burn testing	Burned length, mm	80mm	Pass	Pass	Pass	Pass	Pass	Pass
2	vertically-mounted bunched wires or cables burn testing	Burned length, m	0.43m	Pass	Pass	Pass	Pass	Pass	Pass
3	Smoke density testing	Transmission, %	40.32%	Pass	Fail	Fail	*	Pass	Fail
4	Smoke toxicity testing	ITC	9.16	Pass	Pass	Fail	Pass	Pass	Fail

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ORIGINAL

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Requirement (EN 45545-2:2013):

	Items	Test method	Parameter	HL1	HL2	HL3
R15 cables for interior	single wire or cable burn testing	EN 45545-2:2013 EN 60332-1-2:2004	Unburned length, mm	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 EN 60332-3- 24:2009 (d ≥12mm)	Burned length, m	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 EN 61034-2:2005	Transmissi on, %	25	50	70
	Smoke toxicity testing	EN 45545-2:2013 EN 50305:2002	ITC	10	10	6

	Items	Test method	Parameter	HL1	HL2	HL3
R16 cables for exterior	single wire or cable burn testing	EN 45545-2:2013 EN 60332-1-2:2004	Unburned length, mm	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 EN 60332-3- 24:2009 (d ≥12mm)	Burned length, m	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 EN 61034-2:2005	Transmissi on, %	-	25	50

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	Smoke toxicity testing	EN 45545-2:2013 EN 50305:2002	ITC	10	10	6
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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

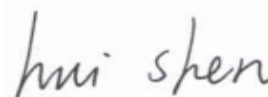
Changzhou Jinbiao Railway Transportation Technical Service Co., Ltd.

Drafted by:



Lynn liu

Approved by:



Shen hui

-End of Report-

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