

Test Report

No. SDFS1908005491FF-02

Date: Jan.23, 2020

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VECOW CO.,LTD.

3F., NO.10, JIANKANG RD., ZHONGHE DIST., NEW TAIPEI CITY 23586, TAIWAN

Sample Description: PCB & ELECTRIC WIRE OF HIGH PERFORMANCE FANLESS EMBEDDED SYSTEM

Specification: IVH-9204MX-ICY

The above data and information was / were submitted and identified on behalf of the client. SGS is not responsible for the authenticity, integrity and results of the data and information and / or the validity of the conclusion. results apply to the sample as received.

SGS Ref No.: XMIN190701662CCM

Sample Receiving Date: Jul.22, 2019

Test Performing Date: Jul.22, 2019 to Aug.29, 2019

Test Requested:

EN 45545-2:2013+A1:2015 Railway applications—Fire protection on railway vehicles Part 2: Requirements for fire behaviour of materials and components, and testing according to Table 5 — Material requirement sets (R24)

Test Results: -- See attached sheet --

Signed for and on behalf of
Shunde Branch
SGS-CSTC Co., Ltd.

scan to see the report



SDFS1908005491FF-02

Daniel Guan
Approved signatory



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I. Description of Test specimens

Sample Description	Sample A: PCB Board Sample B: Electric wire Sample C: Electric wire
Color	Sample A: Colorized Sample B: Red + Black Sample C: Black + Yellow +Red

II. Summary of test results

Requirement set (used for)	Test method reference	Parameter Unit	Test results *
R24	T01 EN ISO 4589-2: OI	Oxygen content %	Sample A: >60.0 Sample B: 30.9 Sample C: 28.7

* For the test details, please see the appendix of this test report.

III. Conclusion

According to the test results, the submitted sample A **meets** the requirements of **R24** (detailed in Table 5 of EN 45545-2:2013+A1:2015) for a **HL1, HL2, HL3** Hazard Level Classification.

According to the test results, the submitted sample B **meets** the requirements of **R24** (detailed in Table 5 of EN 45545-2:2013+A1:2015) for a **HL1, HL2** Hazard Level Classification.

According to the test results, the submitted sample C **meets** the requirements of **R24** (detailed in Table 5 of EN 45545-2:2013+A1:2015) for a **HL1, HL2** Hazard Level Classification.

Test Criteria for EN 45545-2:2013+A1:2015 Table 5 Material requirement sets (R24)

Requirement set (used for)	Test method reference	Parameter Unit	Requirement Definition	HL1	HL2	HL3
R24	T01 EN ISO 4589-2: OI	Oxygen content %	Minimum	28	28	32



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Statements:

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 fire hazard of the product in use. The test results relate only to the specimens of the product in the form in which were tested. The specimen was supplied by the sponsor and SGS-CSTC SHUNDE Branch was not involved in any selection or sampling procedure.

APPENDIX 1: T01 EN ISO 4589-2:2017 Determination of burning behaviour by oxygen

Index Part 2: Ambient temperature test

1. Conditioning

T: (23±2)°C, R.H: (50±5)%, at least 88 h.

2. Test results

Sample A:

- a) Select initial oxygen concentration(in accordance with 8.1.3): 25%
- b) Determining the Preliminary Oxygen Concentration(Till pair of oxygen concentrations which gives opposite response differs by ≤1%, in accordance with 8.5)

Oxygen concentration, % (V/V)	25.0	45.0	60.0	60.0	60.0			
Length burnt (mm)	<50	<50	<50	<50	<50			
Response, ("X" or "O")	O	O	O	O	O			

OI >60.0

Sample B:

- c) Select initial oxygen concentration(in accordance with 8.1.3): 25%
- d) Determining the Preliminary Oxygen Concentration(Till pair of oxygen concentrations which gives opposite response differs by ≤1%, in accordance with 8.5)

Oxygen concentration, % (V/V)	25.0	27.0	30.0	31.0	32.0			
Length burnt (mm)	<50	<50	<50	<50	>50			
Response, ("X" or "O")	O	O	O	O	X			

Oxygen concentration of the "O" response for the pair =31.0% (this is the concentration to be used again for the first measurement in section below)



e) Determination of the oxygen index (in accordance with 8.6)

Step size to be used for successive changes d in oxygen concentration = 0.2 % [Initially to be 0.2% (V/V), unless otherwise instructed]

Parameter	N _T series measurements									
	NL series measurements (8.6.1 and 8.6.2)					(According to the 8.6.3) <i>cf</i>				
Oxygen concentration, % (V/V)	31.0	31.2				31.2	31.0	30.8	31.0	30.8
Length burnt (mm)	<50	>50				>50	>50	<50	>50	<50
Response ("X" or "O")	O	X				X	X	O	X	O
	k= 0.83									

$$OI = Cf + kd = 30.8 + (0.83 \times 0.2)$$

$$= \underline{30.9} \% \text{ (to one decimal place)}$$

$$= \underline{30.97} \% \text{ (to two decimal places)}$$

Standard deviation $\hat{\sigma}$: 0.161

Burning behavior: Charring

Sample C:

- f) Select initial oxygen concentration (in accordance with 8.1.3): 25%
- g) Determining the Preliminary Oxygen Concentration (Till pair of oxygen concentrations which gives opposite response differs by $\leq 1\%$, in accordance with 8.5)

Oxygen concentration, % (V/V)	25.0	28.0	29.0					
Length burnt (mm)	<50	<50	>50					
Response, ("X" or "O")	O	O	X					

Oxygen concentration of the "O" response for the pair = 28.0 % (this is the concentration to be used again for the first measurement in section below)

h) Determination of the oxygen index (in accordance with 8.6)

Step size to be used for successive changes d in oxygen concentration = 0.2 % [Initially to be 0.2% (V/V), unless otherwise instructed]



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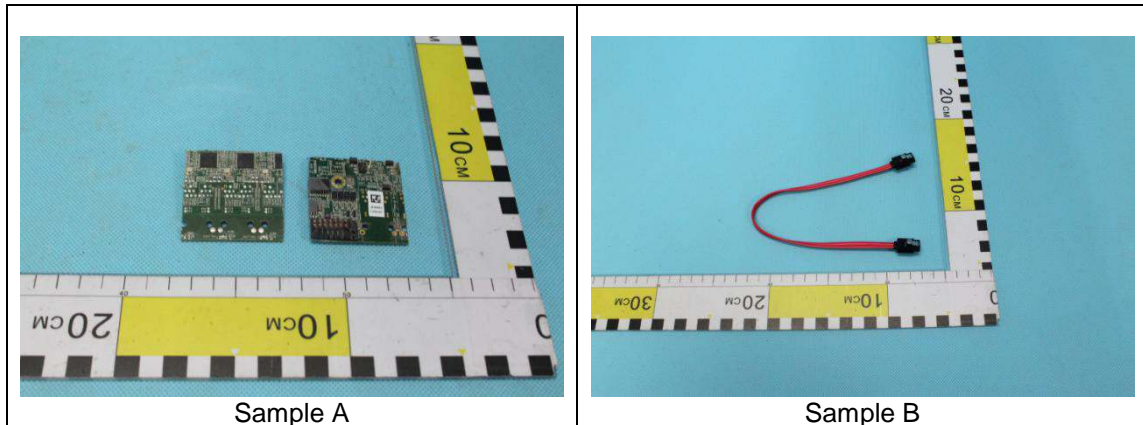
Parameter	N _T series measurements										
	NL series measurements (8.6.1 and 8.6.2)						(According to the 8.6.3)				
Oxygen concentration, % (V/V)	28.0	28.2	28.4	28.6	28.8		28.8	28.6	28.8	29.0	28.8
Length burnt (mm)	<50	<50	<50	<50	>50		>50	<50	<50	>50	>50
Response ("X" or "O")	O	O	O	O	X		X	O	O	X	X
	k= -0.14										

$OI = Cf + kd = 28.8 + (-0.14 \times 0.2)$
 $= 28.7\%$ (to one decimal place)
 $= 28.77\%$ (to two decimal places)

Standard deviation $\hat{\sigma}$: 0.161

Burning behavior: Charring

Photo Appendix:



Sample A

Sample B

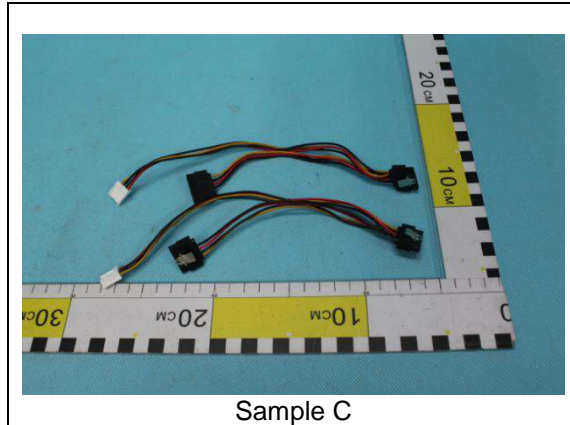
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Sample C

SGS authenticate the photo on original report only

Remark:

This test report is issued based on the modification of the original No. SDFS1908005491FF -01 test report issued on Sep.20, 2019. And the original test reports (paper and electronic) are invalid. According to applicant's requirements, following changes are included:

- a. Add the logo of CNAS.

End of Report



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