# Test Report



**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.

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**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



1/F,1st Building,European Industrial Park,No.1 Shunhe South Road,Wusha Section,Dalang Town,Shunde,Foshan,Guangdong,China 528333 t (86–757)22805888 f (86–757)22805858 www.sgsgroup.com.cn
中国·广东·佛山市顺德区大良街道办事处五沙顺和南路1号欧洲工业园一号厂房首层 邮编: 528333 t (86–757)22805888 f (86–757)22805858 sgs.china@sgs.com

## I. Description of Test specimens

| | |
|---|---|
| Sample Description | Sample A： PCB Board<br>Sample B： Electric wire<br>Sample C： Electric wire |
| Color | Sample A： Colorized<br>Sample B： Red + Black<br>Sample C： Black + Yellow +Red |

## II. Summary of test results

| Requirement set (used for) | Test method reference | Parameter Unit | Test results * |
|---|---|---|---|
| R24 | T01<br>EN ISO 4589-2:<br>OI | Oxygen content<br>% | Sample A： >60.0<br>Sample B： 30.9<br>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<br>EN ISO 4589-2:<br>OI | Oxygen content % | Minimum | 28 | 28 | 32 |

**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)



1/F,1st Building,European Industrial Park,No.1 Shunhe South Road,Wusha Section,Dalang Town,Shunde,Foshan,Guangdong,China 528333 t (86–757)22805888 f (86–757)22805858 www.sgsgroup.com.cn
中国·广东·佛山市顺德区大良街道办事处五沙顺和南路1号欧洲工业园一号厂房首层 邮编: 528333 t (86–757)22805888 f (86–757)22805858 sgs.china@sgs.com

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) *cf* | | | | |
| 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 = *C*f + kd = 30.8+ (0.83×0.2)

= 30.9 % (to one decimal place)

= 30.97 % (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 ≤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]

| *Parameter* | $N_T$ series measurements | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | NL series measurements (8.6.1 and 8.6.2) | | | | | | (According to the 8.6.3) *cf* | | | | |
| 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 = *C*f + kd = 28.8+ (-0.14×0.2)

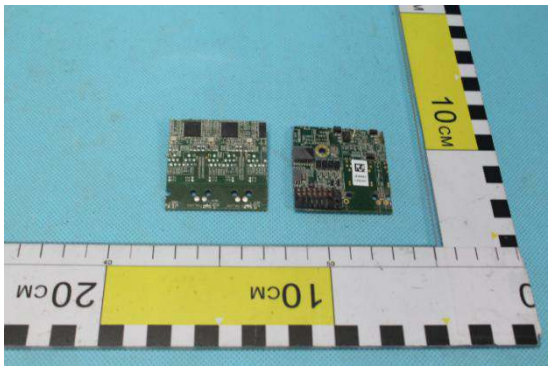
= 28.7 % (to one decimal place)

= 28.77% (to two decimal places)

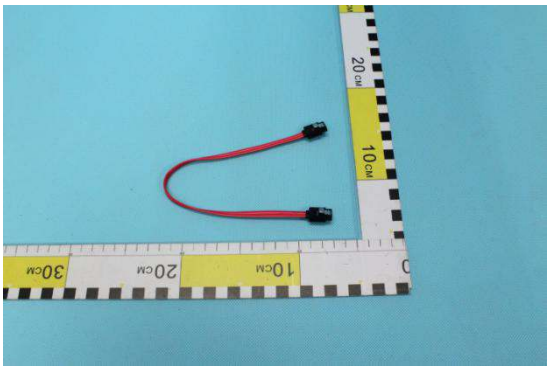
Standard deviation $\hat{\sigma}$： 0.161

Burning behavior: Charring

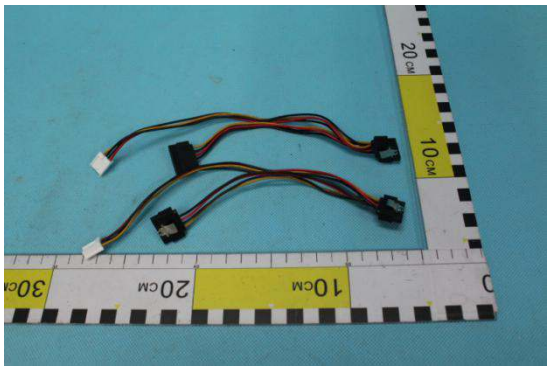
**Photo Appendix:**




Sample A




Sample B




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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