Test Report

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DONGGUAN GUANGMAI ELECTRONIC TECHNOLOGY CO., LTD

16B, INTERNATIONAL FINANCE IT RESEARCH AND DEVELOPMENT CENTER, NO.5 KEJI TEN ROAD, SONGSHAN LAKE HIGH-TECH INDUSTRIAL DEVELOPMENT ZONE, DONGGUAN, CHINA

The following sample(s) 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.

Sample Name: CELLULAR SILICONE FOAM

SGS Ref No.: GZAT1908014139NM

Color: GREY

Thickness: 0.80mm

Parts No.: GK-300

Addition Information: Product Thickness Range: 0.8-20mm

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 (R22)

Test Results: -- See attached sheet --

Test Period:

Sample Receiving Date	:	AUG.26, 2019
Test Performing Date	:	AUG.26, 2019 TO SEP.03, 2019

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

Allen Zou
Lab Manager

AJFS1908008432FF

SGS-CSTC Standards Technical Services Co., Ltd. Anji Branch Fire Technology Service

No. 301, Sunlight Road, 2 Block, Sunlight Industry Zone, Anji County, Zhejiang Province, China 313300 t (86-572) 5018825 f (86-572) 5018829 www.sgsgroup.com.cn
中国·浙江·安吉县阳光工业园二区阳光大道301号 邮编:313300 t (86-572) 5018825 f (86-572) 5018829 e sgs.china@sgs.com

I. Description of Test specimens

Sample Description	Cellular silicone foam
Color	Gray
Exposed (test) surface	Any surface
Size of specimens	T01 EN ISO 4589-2: 140mm×52mm×0.8mm
	T10.03 EN ISO 5659-2: 75mm×75mm×0.8mm
	T12 NF X70-100-1&-2: 1, 1.0030g 2,1.0015g 3, 1.0005g

II. Summary of test results

Requirement set (used for)	Test method reference	Parameter Unit	Test results *
R22 (IN16; EL2; EL6A; EL7A; M2)	T01 EN ISO 4589-2: OI	Oxygen content %	33.4
	T10.03 EN ISO 5659-2: 25 kW/m^2	Ds max. dimensionless	15.8
	T12 NF X 70-100-1 and -2 600℃	CIT_{NLP} dimensionless	0.03

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

III. Conclusion

According to the test results, the submitted sample **meets** the requirements of R22 (detailed in Table 5 of EN 45545-2:2013+A1:2015) for **HL3**Hazard Level Classification.

To be continued…

Test Criteria for EN 45545-2:2013+A1:2015 Table 5 Material requirement sets (R22)

Requirement set (used for)	Test method reference	Parameter Unit	Requirement Definition	HL1	HL2	HL3
R22 (IN16; EL2; EL6A; EL7A; M2)	T01 EN ISO 4589-2: OI	Oxygen content %	Minimum	28	28	32
	T10.03 EN ISO 5659-2: 25 kW/m^2	Ds max. dimensionless	Maximum	600	300	150
	T12 NF X 70-100-1 and -2 600℃	CIT_{NLP} dimensionless	Maximum	1.2	0.9	0.75

Statements:

This declaration of conformity is only based on the result of this laboratory activity, the impact of the uncertainty of the results was not included.

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.

To be continued…

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

a) Select initial oxygen concentration (in accordance with 8.2.3): 25%

b) Determining the Preliminary Oxygen Concentration (Till pair of oxygen concentrations which gives opposite response differs by ≤1%, in accordance with 8.6)

Oxygen concentration, % (*V/V*)	25	30	35	33	34	-	
Length burnt, mm	<50	<50	>50	<50	>50	-	
Response, (“X” or “O”)	O	O	X	O	X	-	

Oxygen concentration of the “O” response for the pair =33.0% (this is the concentration to be used again for the first measurement in section below)

c) Determination of the oxygen index (in accordance with 8.7)

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 (8.7.1 and 8.7.2)						(According to the 8.7.3) *cf*				
Oxygen concentration, % (V/V)	33.0	33.2	33.4	33.6	--	--	33.6	33.4	33.2	33.4	33.6
Length burnt, mm	<50	<50	<50	>50	--	--	>50	>50	<50	<50	>50
Response (“X” or “O”)	O	O	O	X	→	→	X	X	O	O	X
	Column (2, 3, 4 or 5): 4						Row (1 to 16): 10				
	k value from EN ISO 4589-2 table 4: -0.75										
	Hence k= -0.75										

OI = *C*f + kd =33.6+ (-0.75×0.2)

=33.4% (to one decimal place)

=33.45% (to two decimal places)

To be continued…

APPENDIX 2: T10.03 EN ISO 5659-2:2017 Plastics—Smoke generation — Part 2: Determination of optical density by a single- chamber test. Heat flux 25kW/m^2 with pilot flame, test duration is 10min.

1. Conditioning

T: 23±2 ºC, R.H: 50±5%, until the test sample was conditioned to constant mass.

2. Test Results

Parameters	1	2	3	Avg
Mass(g)	1.7	1.7	1.7	1.7
$D_{s\ (1.5)}$	6.0	5.7	5.9	5.9
$D_{s\ (4)}$	17.3	10.4	11.2	13.0
$D_{s\ (10)}$	5.3	7.7	7.9	7.0
VOF_4 min	32.4	23.6	24.7	26.9
$D_{s\ max}$	17.7	14.6	15.2	15.8
T ($D_{s\ max}$) s	241	294	303	279.3

NOTE:

$D_{s\ (n)}$ is the specific optical density at n^{th} min;

VOF_4 is the cumulative value of specific optical densities in the first 4 min of the test;

$D_{s\ max}$ is the maximum optical density in the test chamber.

To be continued…

APPENDIX 3: T12 NF X70-100-1:2006 Fire tests—Analysis of gaseous effluents—Part 1: Methods for analysing gases stemming from thermal degradation & NF X70-100-2:2006 Fire tests—Analysis of gaseous effluents—Part 2: Tubular furnace thermal degradation method. Furnace Temperature: 600℃, Toxic for non-listed products.

1. Conditioning

T: 23±2°C and R.H 50±5%, at least 48h and until the test sample was conditioned to constant mass.

2. Test results

Gas component [mg/g]	1	2	3	Avg	Reference concentration [mg/m^3]
CO	31.47	33.24	33.46	32.72	1380
CO_2	484.02	470.09	449.20	467.77	72000
HF	ND	ND	ND	--	25
HCl	ND	ND	ND	--	75
HBr	ND	ND	ND	--	99
HCN	ND	ND	ND	--	55
NO, NO_X	ND	ND	ND	--	38
SO2	ND	ND	ND	--	262

ND indicates Non-detected.

Calculations of CIT_{NLP}

$$CIT_{NLP} = 1\frac{g}{m^3}\sum_{i=1}^{i=8}\frac{Y_i}{C_i}$$

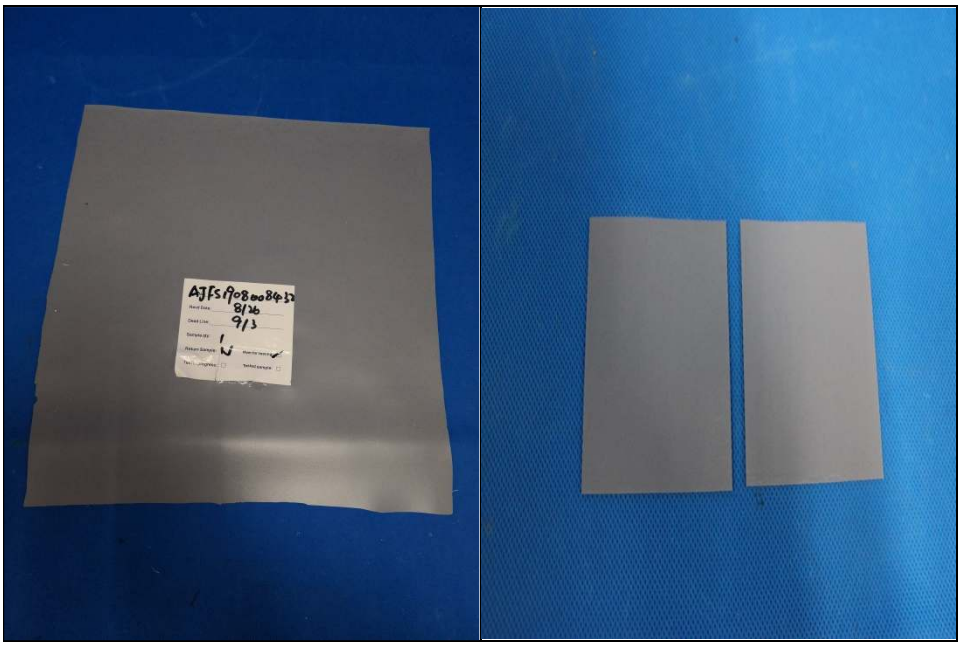
Y_i : is the yield of i^{th} gas in mg/g in the NF X70-100-1 tube furnace;

C_i : is the reference concentration of the i^{th} gas in mg/m^3.

CIT_{NLP} = 0.03

To be continued…

Photo Appendix:



SGS authenticate the photo on original report only

End of Report