

# TEST REPORT

No. : SZIN1803003833SC-01

Date : Aug 06, 2018

Page: 1 of 12

CUSTOMER NAME: DONGGUAN GUANG MAI ELECTRONIC TECHNOLOGY CO., LTD  
ADDRESS: 16 B BUILDING, INTERNATIONAL FINANCE IT RESEARCH AND DEVELOPMENT CENTER, NO.5 KE JI TEN ROAD, SONGSHAN LAKE HIGH-TECH INDUSTRIAL DEVELOPMENT ZONE, DONGGUAN CITY, CHINA

General Description : A CELLULAR SILICONE FOAM  
Trade Name : MICROES™  
Products Reference : GM-100/GM-200/GM-300/GM-400/GM-500/GM-600/GM-10/GM-20/GM-30/GM-40/GM-50/GM-60/JP-350  
Thicknesses : 0.8,1.59,2.38,3.18,4.76,6.35,9.53,12.7  
Material : POLYDIMETHYLSILOXANE FOAM  
Manufacturer : DONGGUAN GUANGMAI ELECTRONIC TECHNOLOGY CO., LTD  
Colour : GREY  
Other Information : LIQUID CAST AND CURING OF FOAM

Above information and sample(s) was/were submitted and confirmed by the client. SGS, however, assumes no responsibility to verify the accuracy, adequacy and completeness of the sample information provided by client.

\*\*\*\*\*

SGS Ref. No. : AJFS1804002798FF  
Date of Receipt : Mar 29, 2018  
Testing Start Date : Mar 29, 2018  
Testing End Date : May 17, 2018  
Test result(s) : For further details, please refer to the following page(s)  
(Unless otherwise stated the results shown in this test report refer only to the sample(s) tested)

Signed for  
SGS-CSTC Standards Technical  
Services Co., Ltd. Shenzhen Branch  
Testing Center

James Zheng  
Authorized signatory



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# TEST REPORT

No. : SZIN1803003833SC-01

Date : Aug 06, 2018

Page: 2 of 12

## Test Requested:

BS 6853:1999 *Incorporating Amendment No.1:2002*—Code of practice for fire precautions in the design and construction of passenger carrying trains, Clause 6.2 Control of reaction to fire, Table 1—Interior horizontal supine surfaces.

## I. Sample details

Sample description	Grey Foam	
Color	Gray	
Thickness	About 4.5 mm	
Specimen size	BS 476 Part 7:1997 <i>Incorporating Corrigendum No.1:2014</i> :	About 885mm×270mm
	BS 6853 Annex D 8.6:	About 600mm×600mm
	BS 6853 Annex B.2:	About 76mm×76mm

## II. Test conducted

BS 6853:1999 *Incorporating Amendment No.1:2002*—Code of practice for fire precautions in the design and construction of passenger carrying trains, Clause 6.2 Control of reaction to fire, Table 1—Interior horizontal supine surfaces. The tests were carried out to the following standards:

- 1) BS 476 Part 7:1997 *Incorporating Corrigendum No.1:2014* “Fire tests on building materials and structures Part 7: Method of test to determine the classification of the surface spread of flame of products”;
- 2) BS 6853:1999 *Incorporating Amendment No.1:2002* Annex B.2 (information)—Determination of weighted summation of toxic fume, R, Area based test method.
- 3) BS 6853:1999 *Incorporating Amendment No.1:2002* Annex D8.6—Methods for measuring smoke density — Flooring Test.

## III. Summary of test results

Test method	Parameter	Test results *
BS 476-7	Surface spread of flame	Class 2
Annex D Flooring test	A <sub>0</sub> (max)	26.663
Annex B.2	R (max)	0.12

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



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# TEST REPORT

No. : SZIN1803003833SC-01

Date : Aug 06, 2018

Page: 3 of 12

Test criteria, Specified in BS 6853:1999 Incorporating Amendment No.1:2002, Table1

Test method	Parameter	Vehicle Category		
		I <sub>a</sub>	I <sub>b</sub>	II
BS 476-7	Surface spread of flame (worst permissible class)	Class 2	Class 2	Class 2
Or				
BS EN ISO 9239-1	Critical radiant flux at extinguishment (min.)	7.5 kW/m <sup>2</sup>	7.5 kW/m <sup>2</sup>	7.5 kW/m <sup>2</sup>
Annex D Flooring test	A <sub>0</sub> (max.)	220	350	nc <sup>a</sup>
See Annex B	R (max.)	5.0	8.0	18.0
nc: no criterion.				
<sup>a</sup> The permissible level is outside of the measuring range of the method. The value is so high that it has been decided not to offer a numerical criterion.				

**Conclusion:** According to the test results, the submitted sample **meets** the requirements for vehicle category I<sub>a</sub>, I<sub>b</sub>, II for Interior horizontal supine surfaces (Table 1) defined in BS 6853:1999 Incorporating Amendment No.1:2002.

### 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. Small differences in the composition or thickness of the product may significantly affect the performance during the test and may therefore invalidate the test results. Care should be taken to ensure that any product, which is supplied or used, is fully represented by the specimens, which were tested.

The specimen was supplied by the sponsor and SGS-CSTC ANJI Branch was not involved in any selection or sampling procedure.



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# TEST REPORT

No. : SZIN1803003833SC-01

Date : Aug 06, 2018

Page: 4 of 12

## APPENDIX 1\_BS 476 Part 7:1997 Incorporating Corrigendum No.1:2014

### I. Test conducted

This test was performed in accordance with the procedure specified in BS 476 Part 7:1997 Incorporating Corrigendum No.1:2014 “Fire tests on building materials and structures Part 7. Method of test to determine the classification of the surface spread of flame of products”.

### II. Test details

Conditioning of specimens:	Prior to testing, the sample was conditioned to constant mass at a temperature of $23 \pm 2$ °C, and a relative humidity of $50 \pm 10$ %, and maintained in this condition until required for testing.
Exposed Face:	One surface

### Irradiance along horizontal reference line on the calibration board

Distance along reference line from inside edge of specimen holder	Irradiance kW/m <sup>2</sup>			
	mm	Specified	Min.	Max.
75		32.5	32.0	33.0
225		21.0	20.5	21.5
375		14.5	14.0	15.0
525		10.0	9.5	10.5
675		7.0	6.5	7.5
825		5.0	4.5	5.5



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# TEST REPORT

No. : SZIN1803003833SC-01

Date : Aug 06, 2018

Page: 5 of 12

### III. Test results

SPECIMEN No.	1	2	3	4	5	6
Distance (mm)	Time to travel to indicated distance (minutes:seconds)					
75	00:17	00:18	00:17	00:16	00:15	00:15
165	01:11	01:17	01:08	01:10	01:03	01:02
190	01:15	01:20	01:12	01:17	01:11	01:09
215	01:34	01:38	01:30	01:32	01:30	01:27
240	02:09	02:15	02:07	02:18	02:05	02:05
265	03:10	03:22	03:13	03:25	03:07	03:20
290	04:19	04:37	04:30	04:35	04:20	04:17
375	06:47	06:57	06:32	07:03	07:10	06:50
455	--	--	--	--	--	--
500	--	--	--	--	--	--
520	--	--	--	--	--	--
600	--	--	--	--	--	--
675	--	--	--	--	--	--
710	--	--	--	--	--	--
750	--	--	--	--	--	--
785	--	--	--	--	--	--
825	--	--	--	--	--	--
Maximum distance traveled at 1.5 minutes (mm)	208	206	215	212	215	217
Maximum distance traveled during the whole test (mm)	400	392	402	408	405	410
Time to reach maximum distance traveled	10min	10min	10min	10min	10min	10min



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# TEST REPORT

No. : SZIN1803003833SC-01

Date : Aug 06, 2018

Page: 6 of 12

Note: 1. "--" Not reached the reference line

- 2. Six specimens are usually tested. If the test on any specimen is deemed to be invalid, as defined in the standard, it is permissible for up to a maximum of nine specimens to be tested in order to obtain the six valid test results.

The classification limits specified in BS 476-7:1997 *Incorporating Corrigendum No.1:2014* are given in Appendix 1.

**Observations during test:** None



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# TEST REPORT

No. : SZIN1803003833SC-01

Date : Aug 06, 2018

Page: 7 of 12

### Criteria for classification:

If the prefix “D” or suffix “R” or “Y” is included in the classification, this indicates that the results should be treated with caution. An explanation of the reason for prefix and suffixes is given in Appendix 2

### Appendix 1 Classification of spread of flame

Classification	Spread of flame at 1.5 min		Final spread of flame	
	Limit (mm)	Limit for one specimen in	Limit (mm)	Limit for one specimen in sample(mm)
Class 1	165	165+25	165	165+25
Class 2	215	215+25	455	455+45
Class 3	265	265+25	710	710+75
Class 4	Exceeding the limits for class 3			

### Appendix 2 Explanation of prefix and suffixes which may be added to the classification

1. A suffix R is added to the classification if more than six specimens are required in order to obtain six valid test results (e.g. class 2R).
2. A prefix D is added to the classification of any product which does not conform to the surface characteristics specified in the standard and has therefore been tested in a modified form (e.g. class D3).
3. A suffix Y shall be added to the classification if any softening and/or other behaviour that may affect the flame spread occurs.

**Classification:** In accordance with the class definitions given in BS 476 Part 7:1997 *Incorporating Corrigendum No.1:2014*, the tested sample is classified as **Class 2**.



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# TEST REPORT

No. : SZIN1803003833SC-01

Date : Aug 06, 2018

Page: 8 of 12

## APPENDIX 2\_BS 6853 ANNEX D8.6

### I. Test conducted

This test was conducted in accordance with the procedure specified in BS 6853:1999 *Incorporating Amendment No.1:2002*— Code of practice for fire precautions in the design and construction of passenger carrying trains, Annex D 8.6—Methods for measuring smoke density — Flooring Test.

### II. Test details

Conditioning of specimens:	Prior to testing, the sample was conditioned, By maintaining them in door ambient conditions for at least 72 hours and then for at least 16 hours at 23±2 °C and at a relative humidity of 50±5%
Exposed Face:	One surface
Ignition source:	Fire source No.2—Charcoal
Test duration:	40 min

### III. Test results

Calculate the  $A_0$ , according to the following equation:  $A_0 = A_m \times V / (K \times l)$

Where,

$A_m$ - is the optical density measured in the cube;

$V$  - is the volume of the cube, in cubic meters, 27 m<sup>3</sup>

$l$  - is the length of the optical path between the windows, in meters, 3 meters;

$k$  - is the number of units of material consisting the test specimen, 0.04.

Specimen No.	$A_m$	$V$	$k$	$l$	$A_0$
1 <sup>st</sup>	0.123	27	0.04	3	27.675
2 <sup>nd</sup>	0.114	27	0.04	3	25.650
AVG					26.663



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# TEST REPORT

No. : SZIN1803003833SC-01

Date : Aug 06, 2018

Page: 9 of 12

## APPENDIX 3\_ BS 6853 Annex B.2

### I. Test conducted

This test was conducted in accordance with the procedure specified in BS 6853:1999 *Incorporating Amendment NO.1:2002*—Code of practice for fire precautions in the design and construction of passenger carrying trains, Annex B.2 (information), Determination of weighted summation of toxic fume, R, Area based test method.

This standard recommends that the test is carried out using the apparatus detailed in prEN 2824, but the ignition cone used should conform to the requirements given in BS EN ISO 5659-2 and that the quantitative determination of the gases emitted should be carried out in accordance with the procedure specified in prEN 2826.

### II. Test detail

Conditioning of specimens:	Prior to testing, the sample was conditioned, at least 24 hours at temperatures of 23±2°C and at a relative humidity of 50±5%.
Exposed Face:	One surface
Test mode:	Irradiance:25kW/m <sup>2</sup> , Flaming mode



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# TEST REPORT

No. : SZIN1803003833SC-01

Date : Aug 06, 2018

Page: 10 of 12

### III. Test results

- 1) One specimen was tested to determine the  $D_{s,max}$  and time to  $D_{s,max}$ . From the results of this test time to reach 85% of  $D_{s,max}$  was calculated. The results are given below:

$D_{s,max}$	74.1
Time to $D_{s,max}$ ( $T_{max}$ )	661s
Time to 85% of $D_{s,max}$ ( $T_{m, 85\%}$ )	198s

- 2) Three further specimens were then tested. As 85%  $D_{s,max}$  was reached in 3.3min, the gases generated were sampled at the same time. The quantitative determinations were then carried out using the procedures described. The test results obtained are given in Table 1.

Table 1

Gas	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	Average
Carbon Dioxide (CO <sub>2</sub> )	1027.25	967.13	954.67	983.02
Carbon Monoxide (CO)	6.46	5.29	4.99	5.58
Hydrogen Fluoride (HF)	ND	ND	ND	--
Hydrogen Chloride (HCl)	ND	ND	ND	--
Hydrogen Bromide (HBr)	ND	ND	ND	--
Hydrogen Cyanide (HCN)	0.22	0.16	0.11	0.16
Nitrogen Dioxide (NO <sub>2</sub> )	0.20	0.15	0.12	0.16
Sulphur Dioxide (SO <sub>2</sub> )	ND	ND	ND	--

Where,

ND indicates Non-detected.

Note: All values given are in g/m<sup>2</sup>.



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# TEST REPORT

No. : SZIN1803003833SC-01

Date : Aug 06, 2018

Page: 11 of 12

## Calculate the Weighted Summation Index of Toxic Fume. R

The test results obtained for toxicity measurements were used to calculate the weighted summation index, R, as described in BS 6853, clause B.4.2 and the reference values for gases is showed in Table 2.

$$r_x = \frac{C_x}{f_x}, \quad R = \sum r$$

Where,

- $C_x$ , is the emission of the  $x^{\text{th}}$  species, in the appropriate units;
- $f_x$ , is the reference value for the  $x^{\text{th}}$  species, as given in Table 2;
- $r_x$ , is the individual index for the  $x^{\text{th}}$  species.

Table 2

Gas	Reference value, f mg/g, or g/m <sup>2</sup>
Carbon Dioxide (CO <sub>2</sub> )	14 000
Carbon Monoxide (CO)	280
Hydrogen Fluoride (HF)	4.9
Hydrogen Chloride (HCl)	15
Hydrogen Bromide (HBr)	20
Hydrogen Cyanide (HCN)	11
Nitrogen Dioxide (NO <sub>2</sub> )	7.6
Sulphur Dioxide (SO <sub>2</sub> )	53

The R Value determined was 0.12



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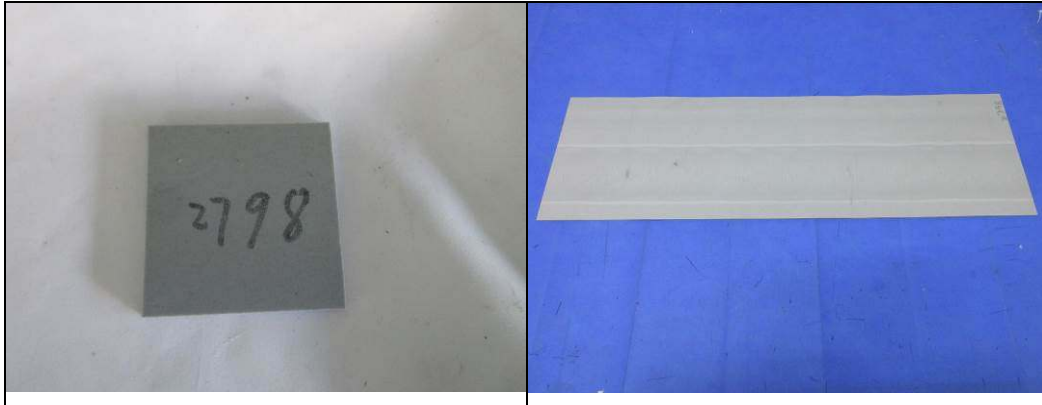
## TEST REPORT

No. : SZIN1803003833SC-01

Date : Aug 06, 2018

Page: 12 of 12

### Photo Appendix:



### Appendix information:

1. The above tests were carried out by SGS-CSTC Standards Technical Services Co., Ltd. AnJi Branch.
2. This report cancels and supersedes the report No. SZIN1803003833SC.

\*\*\*\*\* End of report\*\*\*\*\*



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