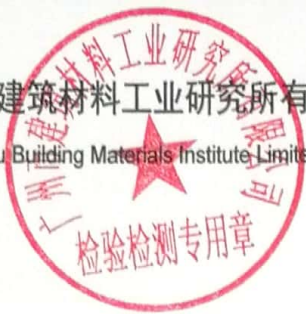




广州市建筑材料工业研究所有限公司  
Guangzhou Building Materials Institute Limited Company



中国认可  
国际互认  
检测  
TESTING  
CNAS L0057

GML-V029

# TEST REPORT

Fire Test: EN 45545-2:2013+A1:2015  
R4 HL3

Prepare for: Suzhou Omay optical materials Co., Ltd  
No.158-30,Huashan Road, Suzhou SND,  
China

Test Report No.: V03-1700776(E)

Issue Date: December 14, 2017





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Project Code:3FW2



**NOTICE:**

1. Test Report is Invalid without the Seal of "Special Stamp of Test Report" of the Centre.
2. No Test Report is Valid without the Signature of Persons for Test, Check and Certified.
3. Test Report is Invalid if Altered.
4. Test Report shall not be Reproduced except in Full, without the Written Approval of Our Centre.
5. Reproduced Report is Invalid without the Seal of Original "Special Stamp of Test Report" of the Centre.
6. Any Objection against to the Test Report Should be put forward to the Centre within 15 Days from the Day Receiving the Test Report.

# SUMMARY

**Objective:** To determine the fire behaviour of the test sample when it is tested in accordance with R4 of EN 45545 - 2:2013+A1:2015 "Railway applications - Fire protection of railway vehicles - Part 2: Requirement for fire behaviour of materials and components".

**Sample Description**  
 Product Name: PC SHEET;  
 Type No.: BLC(a)(b)F /RHA71/U43B/OMF11 ;  
 Composition: Polycarbonate;  
 Thickness: 3.0mm;  
 Density: 1.2g/cm<sup>3</sup> ;  
 Color: White.

**Prepare for:** Suzhou Omay optical materials Co., Ltd  
 No.158-30,Huashan Road, Suzhou SND, China

**Summary of Test** Tested according to EN 45545-2:2013+A1:2015, test results satisfy:

**HL3 for R4 Requirement**

**Test Result**

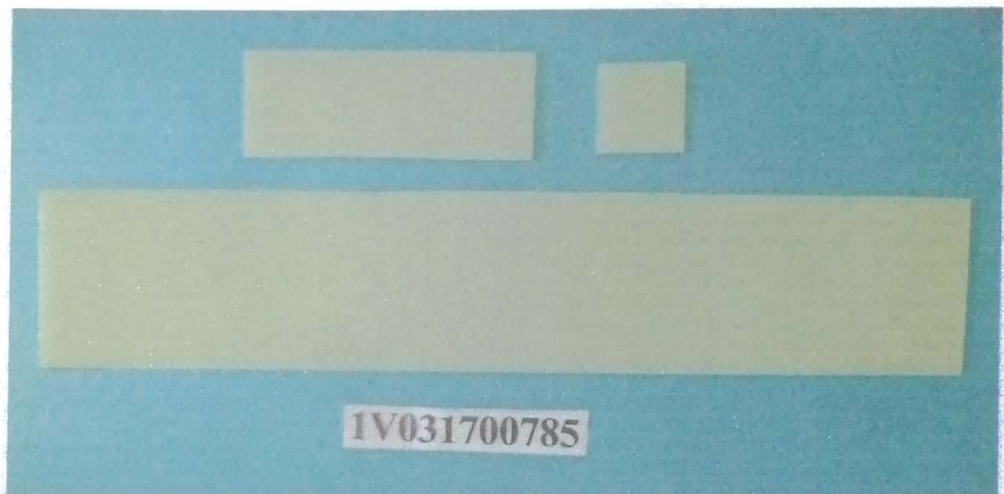
Requirement set (used for)	Test method reference	Parameter Unit	Test Results
R4 (IN3B)	T02 ISO 5658-2	CFE kWm <sup>-2</sup>	23.1
	T05 EN ISO 11925-2 30 s flame application	Flame spread mm	91
	T05 EN ISO 11925-2 30 s flame application	Flaming droplets	0
	T11.01 EN ISO 5659-2: 50 kWm <sup>-2</sup>	CIT <sub>G</sub> dimensionless	0.30



Test Requirement

Requirement set (used for)	Test Method Reference	Parameter and unit	Max. or Min.	HL1	HL2	HL3
R4 (IN3B)	T02 ISO 5658-2	CFE kWm <sup>-2</sup>	Min.	13	13	13
	T05 EN ISO 11925-2 30 s flame application	Flame spread mm	Max.	150 (within 60s)	150 (within 60s)	150 (within 60s)
	T05 EN ISO 11925-2 30 s flame application	Flaming droplets		0	0	0
	T11.01 EN ISO 5659-2: 50 kWm <sup>-2</sup>	CIT <sub>G</sub> dimensionless	Max.	1.2	0.9	0.75

Specimen Photo



Date of Test

December 12, 2017



# T02 TEST DETAILS

**Reference Standard** ISO 5658-2:2006, Reaction to fire tests — Spread of flame — Part 2: Lateral spread on building and transport products in vertical configuration

**Conditioning of specimens** The specimens were received on December 5, 2017.  
Prior to test the specimens were conditioned to constant mass at temperatures of  $23 \pm 3^{\circ}\text{C}$  and a relative humidity of  $50 \pm 5\% \text{RH}$ , for a period of 26 hours prior to testing.

**Details of the test** Specimen size: 800mm × 155mm;  
Thickness: 3.0mm.

Specimen	1	2	3	4	5	6	Average
Ignition time, s	38	36	34	-	-	-	-
Extinction time, s	1058	981	1012	-	-	-	-
Final Travel, mm	340	360	370	-	-	-	-
Average heat for sustained burning ( $Q_{sb}$ ), $\text{MJ/m}^2$	5.01	5.62	5.86	-	-	-	5.50
CFE, $\text{kW/m}^2$	25.3	22.8	21.1	-	-	-	23.1
Droplets/ particles (Y/N)	Y	Y	Y	-	-	-	Y

## T05 TEST DETAILS

**Reference Standard** EN ISO 11925-2:2010 Reaction to fire tests - Ignitability of products subjected to direct impingement of flame - Part 2: Single-flame source test.

**Conditioning of specimens** The specimens were received on December 5, 2017.  
Prior to test the specimens were conditioned to constant mass at temperatures of  $23 \pm 2^\circ\text{C}$  and a relative humidity of  $50 \pm 5\%RH$ , for a period of 52 hours prior to testing.

**Details of the test** Specimen size: 90mm×250mm;  
Thickness: 3.0mm;  
Exposure time: 30s;  
Exposure surface: Tests was conducted to both surface exposure and edge exposure.

Direction		Direction 1			Direction 2		
Test Specimen No.		1	2	3	1	2	3
Edge exposure	Ignition	No	No	No	-	-	-
	Flame spread within 60s, mm	61	60	56	-	-	-
	Flaming droplets	0	0	0	-	-	-
	Time of flame tip reach 150 mm	-	-	-	-	-	-
Surface exposure	Ignition	No	No	No	-	-	-
	Flame spread within 60s, mm	86	91	81	-	-	-
	Flaming droplets	0	0	0	-	-	-
	Time of flame tip reach 150 mm	-	-	-	-	-	-



# T11.01 TEST DETAILS

**Reference Standard** EN 45545 - 2:2013+A1:2015, Railway applications - Fire protection of railway vehicles - Part 2: Requirement for fire behaviour of materials and components

**Conditioning of specimens** The specimens were received on December 5, 2017.  
Prior to test the specimens were conditioned to constant mass at temperatures of  $23 \pm 2^\circ\text{C}$  and a relative humidity of  $50 \pm 5\%RH$ , for a period of 48 hours prior to testing.

**Details of the test** Specimen size: 75mm×75mm;  
Thickness: 3.0mm;  
Test mode: heat flux is  $50\text{kW/m}^2$ , without pilot flame, test duration is 10 minutes.  
Test result:

Specimen	1	2	3
CIT <sub>G</sub> (4min)	0.02	0.14	0.02
CIT <sub>G</sub> (8min)	0.03	0.04	0.04

Gases concentration at 4min after the test start.

Gases (ppm)	1	2	3	Average
Carbon dioxide (CO <sub>2</sub> )	6856.19	8822.48	10778.90	8819.19
Carbon monoxide (CO)	1543.89	1917.31	2377.25	1946.15
Hydrogen Bromide (HBr)	0.00	0.46	0.79	0.42
Hydrogen Chloride (HCl)	0.00	0.00	0.27	0.09
Hydrogen cyanide (HCN)	0.00	0.00	0.00	0.00
Hydrogen Fluoride (HF)	0.87	0.00	0.00	0.00
Nitrogen oxides (NO <sub>x</sub> )	2.71	9.21	8.39	6.77
Sulphur dioxide (SO <sub>2</sub> )	18.67	23.68	30.20	24.18

Gases concentration at 8min after the test start.

Gases (ppm)	1	2	3	Average
Carbon dioxide (CO <sub>2</sub> )	2288.74	21087.42	25924.30	23298.15
Carbon monoxide (CO)	3879.26	4003.24	4449.06	4110.52
Hydrogen Bromide (HBr)	1.76	0.61	0.70	1.02
Hydrogen Chloride (HCl)	0.00	0.00	0.00	0.00
Hydrogen cyanide (HCN)	0.00	0.00	0.00	0.00
Hydrogen Fluoride (HF)	0.00	0.00	0.00	0.00
Nitrogen oxides (NO <sub>x</sub> )	14.29	14.84	15.50	14.88
Sulphur dioxide (SO <sub>2</sub> )	46.93	47.13	45.36	46.47

Reference concentrations of the gas components

Gas component	Reference concentration mg/m <sup>3</sup>
Carbon dioxide (CO <sub>2</sub> )	72000
Carbon monoxide (CO)	1380
Hydrogen Bromide (HBr)	99
Hydrogen Chloride (HCl)	75
Hydrogen cyanide (HCN)	55
Hydrogen Fluoride (HF)	25
Nitrogen oxides (NO <sub>x</sub> )	38
Sulphur dioxide (SO <sub>2</sub> )	262

The toxicity index (CIT<sub>G</sub>) calculation:

$$CIT_G = 0,0805 \times \sum_{i=1}^{i=8} \frac{c_i}{C_i}$$

Where:

c<sub>i</sub> is the concentration measured in mgm<sup>-3</sup> of the i<sup>th</sup> gas in the EN ISO 5659-2 smoke chamber;

C<sub>i</sub> is the reference concentration measured in mgm<sup>-3</sup> of the i<sup>th</sup> gas.

\*\*\*End of Report\*\*\*





## 注 意 事 项 Notice

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1. 检验检测报告未加盖本机构“检验检测专用章”无效；  
Inspection Test Report is Invalid without the Seal of "Special Stamp of Inspection Test Report" of the Institution.
2. 检验检测报告无主检、无审核、无批准人签名无效；  
No Inspection Test Report is Valid without the Signature of Persons for Test, Check and Certification.
3. 检验检测报告涂改无效；  
Inspection Test Report is Invalid if Altered.
4. 未经本机构书面批准，不得部分复制检验检测报告（完整复制除外），复印检验检测报告未重新加盖“检验检测专用章”无效；  
Inspection Test Report shall not be Reproduced except in Full, without the Written Approval of Our Institution. Reproduced Report is Invalid without the Seal of "Special Stamp of Inspection Test Report" of the Institution.
5. 对检验检测报告若有异议应于收到检验检测报告之日起十五日内向本机构提出；  
Any Objection against to the Inspection Test Report Should be Put forward to the Institution Within 15 days from the Day Receiving the Inspection Test Report.
6. 除见证检验外，委托检验仅对来样负责。  
Except Sampling by Witness, the Inspection Test Report for the Samples Delivered by Client is Valid only for the Samples Tested.

**GML**