中国认可
国际互认
检测
TESTING
CNAS L6069

Test Report

Report No. TC.25.05.001826

Date of Issue 2025-05-26

Applicant:	UPM Raflatac (China) Co., Ltd.
Applicant Address:	21/F Grand Gaterway Tower 2, 3 Hongqiao Road, 200030, Shanghai China
Sample Description:	Grafityp cast film+Lamination film(AE38P,AE38C,GT38SL,SC1000serials color film, etc. LAMx30,LAMx40,LAMx45, etc.)
Receipt Date of Sample:	Received on 2025-05-06
Date of Testing:	From 2025-05-06 to 2025-05-09
Sample Submitted:	The Sample(s) and Its (Their) Information(s) Was (Were) Submitted by Applicant and Identified.
Test Result:	Refer to Next Page.

TÜV SÜD SW Rail Transportation Technology (Jiangsu) Co., Ltd.

Prepared by:

Han fang

Feng Han

Approved by:

wayne

Wayne Wang

Note:
(1) Each order is subject to acceptance of our General Terms and Conditions and the TÜV SÜD Testing, Certification, Validation and Verification Regulation, in the version valid at the time the contract is concluded. For full version of above both documents, please visit the link to view.
(2) The results in this report are relevant only to the sample(s) tested.
(3) The test report shall not be reproduced except in full without the written approval of the laboratory.
(4) Disclaimer Measurement Uncertainty:
Unless otherwise stated, the decision rule for conformity reporting is based on Binary Statement for Simple Acceptance Rule (w=0) stated in ILAC-G8:09/2019 or CNAS-GL015:2022.

Regd. Office:
TÜV SÜD SW Rail Transportation Technology (Jiangsu) Co., Ltd.
Test location: Changzhou

Phone: +86/0519-81239872
Fax: +86/0519-81239872-123
E-mail: czx.qm@tuvsud.com
Web: http://www.tuvsud.com

Address:
Building 17, Innovative Industry Park, No. 377
Wuyinan Road, National High and New Technology &
Industry Development Zone, Wujin, 213015 P.R. China

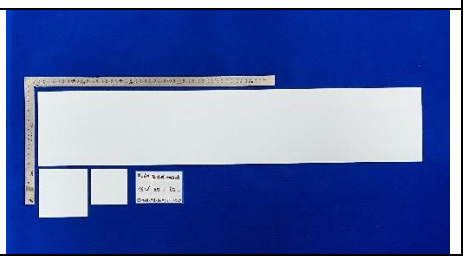
中国认可
国际互认
检测
TESTING
CNAS L6069

Test Report

Report No. TC.25.05.001826

Date of Issue 2025-05-26

Description of the test subject

Sample	Description	Picture of Sample
001	Grafityp cast film+Lamination film(AE38P,AE38C,GT38SL,SC1000serials color film, etc. LAMx30,LAMx40,LAMx45, etc.)	

Conclusion:

Test Items		Standard	R1	R2	R3	R7	R17
			HL3	HL3	HL3	HL3	HL3
1	Flame propagation	EN 45545-2:2020+A1:2023 ISO 5658-2:2006+A1:2011	Pass	Pass	Pass	Pass	Pass
2	Heat release rate	EN 45545-2:2020+A1:2023 ISO 5660-1:2015+A1:2019	Pass	Pass	/	Pass	Pass
3	Density of smoke	EN 45545-2:2020+A1:2023 EN ISO 5659-2:2017	Pass	Pass	Pass	Pass	Pass
4	Toxicity index	EN 45545-2:2020+A1:2023 EN 17084:2018	Pass	Pass	Pass	Pass	Pass

Regd. Office:
TÜV SÜD SW Rail Transportation Technology (Jiangsu) Co., Ltd.
Test location: Changzhou

Phone: +86/0519-81239872
Fax: +86/0519-81239872-123
E-mail: czx.qm@tuvsud.com
Web: http://www.tuvsud.com

Address:
Building 17, Innovative Industry Park, No. 377
Wuyinan Road, National High and New Technology &
Industry Development Zone, Wujin, 213015 P.R. China

Test Report

Report No. TC.25.05.001826

Date of Issue 2025-05-26

Test Results

EN 45545-2:2020+A1:2023 Railway applications-Fire protection on railway vehicles Part 2: Requirements for fire behaviour of materials and components

1. ISO 5658-2:2006+A1:2011 Reaction to fire tests-Spread of flame-Part 2: Lateral spread on building and transport products in vertical configuration

1.1 Sample details

Specimen size	800mm×155mm
Thickness	About 3.1 mm
Structure	Metal plate + coating

Precondition	Temperature	Relative humidity	Duration
	(23±2)°C	(50±5)%R.H.	≥24h

1.2 Test results

Specimen	1	2	3	Average
Ignition time (s)	--	--	--	--
Extinction time(s)	--	--	--	--
Length of terminate the test(mm)	0	0	0	0
Average heat for sustained burning(Qsb) (MJ/m^2)	--	--	--	--
CFE (kW/m^2)	50.0	50.0	50.0	50.0
Droplets/particles (Yes/No)	No	No	No	--
Droplets/particles burning time, s	--	--	--	--

Conclusion: CFE: **50.0** kW/m^2.

Test Report

Report No. TC.25.05.001826

Date of Issue 2025-05-26

2. ISO 5660-1:2015+A1:2019 Reaction-to-fire tests — Heat release, smoke production and mass loss rate — Part 1: Heat release rate (cone calorimeter method).

2.1 Sample details

Specimen size	100mm x 100mm
Thickness	About 3.1 mm
Structure	Metal plate + coating
Extraction flow	24L/s
Heat flux	50 kW/m^2
Orientation	Horizontal

Precondition	Temperature	Humidity	Duration
	(23±2)°C	(50±5)%R.H.	≥24h

2.2 Test results

Parameter		Specimens			Average
		1	2	3	
Sample exposed area	(m^2)	0.0088	0.0088	0.0088	0.0088
Time to ignition	(s)	--	--	--	--
Time to extinction	(s)	--	--	--	--
Time of flashing or transitory flaming	(s)	--	--	--	--
Re-Insert and power the igniter [a)]	(Yes/No)	No	No	No	--
End of test time	(s)	1200	1200	1200	1200
Initial mass	(g)	80.9	80.8	81.1	80.9
Total mass loss	(g)	3.6	3.6	1.3	2.8
Average rate of specimen mass loss	(g/s)	--	--	--	--
Total heat released	(MJ/m^2)	0	0	0	0
Average heat release rate	(kW/m^2)	--	--	--	--
Maximum heat release rate	(kW/m^2)	0	0	0	0
Average effective heat of combustion	(MJ/kg)	0	0	0	0
MARHE	(kW/m^2)	0	0	0	0
Heat released rate 180 s after ignition	(kW/m^2)	0	0	0	0
Heat released rate 300 s after ignition	(kW/m^2)	0	0	0	0

Test Report

Report No. TC.25.05.001826

Date of Issue 2025-05-26

Total smoke production	(m^2)	0	0	0	0
More than one hole	(Yes/No)	No			
This hole dimension in the plane of the test piece greater than 3mm	(Yes/No)	No			
Any observations during the test[b)]		--			
Special mounting procedures[c)]		See remark c-6			

Conclusion: the MARHE value is __0__ kW/m^2.

Remark:

MARHE = maximum average rate of heat emission during the time

a) If the flame extinguishes in less than 60s after turning the spark, re-insert the spark igniter and turn on the spark within 5s, do not remove the spark until the entire test is completed.

b) Observe and record physical changes to the sample such as melting, swelling, and cracking.

c) Any special mounting procedures were used:

1. Samples that intumesce or deform so that they contact the spark plug prior to ignition, or the underside of the cone heater after ignition, shall be tested with the separation of 60mm between the base plate of the cone heater and the upper surface of specimen. In this case the heater calibration shall be performed with the heat flux meter positioned 60mm below the cone heater base plate.
2. Other dimensionally unstable products, for example products that warp or shrink during testing, shall be restrained against excessive movement. This shall be accomplished with four tie wines. A tie wire is then looped around the sample holder and retainer frame assembly, so that it is parallel to any approximately 20mm away from one of the four sides of the assembly. The ends of the wire are twisted together such that the wire is pulled firmly against the retainer frame. Excess wire is trimmed from the twisted section before testing. The three remaining wires shall be fitted around the specimen holder and retainer frame assembly in a similar manner, parallel to the three remaining sides.
3. Materials that distort so extensively that they cannot be held by 4 wires should be tested using the fine wire grid made of (0.8±0.1) mm with wire spacing of (20±2) mm.
4. Materials that intumesce in a fluid phase such that molten materials overflows the edge frame or seep between the edge frame and the specimen holder invalidate the test. Therefore, such materials should be tested without the edge frame and should be housed in 0.1mm thick aluminium tray wrappings which extends 10mm above the top edge of the test specimen.
5. Materials, such as fibers, which need to be both physically restrained or compressed to be tested at installed densities should be tested in a wire cage structure made of (1.0±0.1) mm steel wire with (9±1) mm spacing, which provides appropriate artificial boundaries to enable the materials to be tested.
6. No any special mounting procedures were used.

Test Report

Report No. TC.25.05.001826

Date of Issue 2025-05-26

3. EN ISO 5659-2:2017 Plastics — Smoke generation —Part 2: Determination of optical density by a single-chamber test

3.1 Sample details

Specimen size	75 mm×75 mm
Thickness	About 3.1 mm
Structure	Metal plate + coating

Precondition	Temperature	Humidity	Duration
	(23±2)°C	(50±5)%R.H.	≥24h

3.2 Test results

Test mode	The heat flux was 50 kW/m^2 **without** pilot flame

Parameter	Specimens			Average
	1	2	3	
Ds(1.5)	0	0.2	0.4	0.2
Ds(4)	32.3	6.6	29.3	22.7
Ds(10)	76.3	60.2	62.9	66.5
Ds(max)	76.4	60.2	64.3	67.0
VOF4, min	32.8	5.3	31.2	23.1
T(Ds max), s	586	600	535	574

Note:

Ds(n): Specific optical density of smoke where n is the elapsed time since the start of testing in minutes.

VOF4: $\mathrm{VOF4} = [Ds(1) + Ds(2) + \mathrm{Ds}(3) + \frac{\mathrm{Ds}(4)}{2}] \times 1min$

Ds(max): For each specimen, produce a graph of light transmission against time and determine the minimum percentage transmission T_{min}. Covert T_{min} to the maximum specific density D_{smax} by calculation to two significant figures using the following equation. $\mathrm{Dsmax} = 132\log 10\frac{100}{\mathrm{Tmin}}$ Test duration is 10min.

T (Ds max): The time of the start of test at which the Ds(max) was made.

Conclusion:

Ds(4)	VOF4	Ds(max)
22.7	23.1	67.0

Test Report

Report No. TC.25.05.001826

Date of Issue 2025-05-26

4. EN 17084:2018 Railway applications- Fire protection in railway vehicles- Toxicity test of materials and components-Method 1

4.1 Sample details

Specimen size	75 mm×75 mm
Thickness	About 3.1 mm
Structure	Metal plate + coating

Precondition	Temperature	Humidity	Duration
	(23±2)°C	(50±5)%R.H.	≥24h

4.2 Test results

Test mode	The heat flux was 50 kW/m^2 **without** pilot flame.

1) 4 min after the test started

Gas	MDL	Sample 1	Sample 2	Sample 3	Average
Carbon Dioxide (CO_2)	50	2874.9	2716.5	2869.7	2820.4
Carbon Monoxide (CO)	10	271.8	250.6	277.3	266.6
Hydrogen Fluoride (HF)	5	ND	ND	ND	ND
Hydrogen Chloride (HCl)	10	ND	ND	ND	ND
Hydrogen Bromide (HBr)	15	ND	ND	ND	ND
Hydrogen Cyanide (HCN)	5	7.2	6.6	7.4	7.1
Nitrogen Oxides (NO_2)	5	ND	ND	ND	ND
Sulphur Dioxide (SO_2)	5	ND	ND	ND	ND

2) 8 min after the test started

Gas	MDL	Sample 1	Sample 2	Sample 3	Average
Carbon Dioxide (CO_2)	50	4011.6	3823.4	3936.5	3923.8
Carbon Monoxide (CO)	10	381.2	370.4	392.7	381.4
Hydrogen Fluoride (HF)	5	ND	ND	ND	ND
Hydrogen Chloride (HCl)	10	ND	ND	ND	ND
Hydrogen Bromide (HBr)	15	ND	ND	ND	ND
Hydrogen Cyanide (HCN)	5	9.5	8.8	9.2	9.2
Nitrogen Oxides (NO_2)	5	ND	ND	ND	ND

Sulphur Dioxide (SO_2)	5	ND	ND	ND	ND

Note: All values given are in ppm.
Where ND indicates Non-detected.
Where MDL indicates Method Detection Limit.

Calculate the CIT_G

Gas	Reference concentration; mg/m^3
Carbon Dioxide (CO_2)	72000
Carbon Monoxide (CO)	1380
Hydrogen Fluoride (HF)	25
Hydrogen Chloride (HCl)	75
Hydrogen Bromide (HBr)	99
Hydrogen Cyanide (HCN)	55
Nitrogen Oxides (NO_2)	38
Sulphur Dioxide (SO_2)	262

$$CIT = 0.0805 \cdot \sum_{i=1}^{i=8} \frac{c_i}{C_i}$$

Where,

CIT – Conventional Index of Toxicity;

c_i – Concentration of the i^{th} gas;

C_i – Reference concentration of the i^{th} gas.

CIT_4, CIT_8 - the value of CIT 4 min or 8 min after the test started;

CIT_4	0.03
CIT_8	0.05

Conclusion: the maximum CIT_G value is 0.05.

Test Report

Report No. TC.25.05.001826

Date of Issue 2025-05-26

Requirement of EN 45545-2:2020+A1:2023 R1

Items	Standard	Parameter	HL3
Flame propagation	EN 45545-2:2020+A1:2023 ISO 5658-2:2006+A1:2011	CFE(minimum), kW/m^2	20
Heat release rate	EN 45545-2:2020+A1:2023 ISO 5660-1:2015+A1:2019	MARHE(maximum), kW/m^2	60
Density of smoke	EN 45545-2:2020+A1:2023 EN ISO 5659-2:2017	Ds4(maximum), dimensionless	150
		VOF4 (maximum), min	300
Toxicity index	EN 45545-2:2020+A1:2023 EN 17084:2018	CIT_G(maximum), dimensionless	0.75

Requirement of EN 45545-2:2020+A1:2023 R2

Items	Standard	Parameter	HL3
Flame propagation	EN 45545-2:2020+A1:2023 ISO 5658-2:2006+A1:2011	CFE(minimum), kW/m^2	13
Heat release rate	EN 45545-2:2020+A1:2023 ISO 5660-1:2015+A1:2019	MARHE(maximum), kW/m^2	90
Density of smoke	EN 45545-2:2020+A1:2023 EN ISO 5659-2:2017	Ds4(maximum), dimensionless	150
		VOF4 (maximum), min	300
Flame propagation	EN 45545-2:2020+A1:2023 EN 17084:2018	CIT_G(maximum), dimensionless	0.75

Requirement of EN 45545-2:2020+A1:2023 R3

Items	Standard	Parameter	HL3
Flame propagation	EN 45545-2:2020+A1:2023 ISO 5658-2:2006+A1:2011	CFE(minimum), kW/m^2	13
Density of smoke	EN 45545-2:2020+A1:2023 EN ISO 5659-2:2017	Ds4(maximum), dimensionless	240
		VOF4 (maximum), min	480
Flame propagation	EN 45545-2:2020+A1:2023 EN 17084:2018	CIT_G(maximum), dimensionless	0.75

Requirement of EN 45545-2:2020+A1:2023 R7

Items	Standard	Parameter	HL3
Flame propagation	EN 45545-2:2020+A1:2023 ISO 5658-2:2006+A1:2011	CFE(minimum) kW/m^2	20
Heat release rate	EN 45545-2:2020+A1:2023 ISO 5660-1:2015+A1:2019	MARHE(maximum) kW/m^2	60
Density of smoke	EN 45545-2:2020+A1:2023 EN ISO 5659-2:2017	D_s max(maximum) dimensionless	300
Toxicity index	EN 45545-2:2020+A1:2023 EN 17084:2018	CIT_G (maximum) dimensionless	1.5

Test Report

Report No. TC.25.05.001826

Date of Issue 2025-05-26

Requirement of EN 45545-2:2020+A1:2023 R17

Items	Standard	Parameter	HL3
Flame propagation	EN 45545-2:2020+A1:2023 ISO 5658-2:2006+A1:2011	CFE(minimum) kW/m^2	13
Heat release rate	EN 45545-2:2020+A1:2023 ISO 5660-1:2015+A1:2019	MARHE(maximum) kW/m^2	60
Density of smoke	EN 45545-2:2020+A1:2023 EN ISO 5659-2:2017	D_s max(maximum) dimensionless	300
Toxicity index	EN 45545-2:2020+A1:2023 EN 17084:2018	CIT_G (maximum) dimensionless	1.5

Conclusion

Parameter	Record	R1	R2	R3	R7	R17
		HL3	HL3	HL3	HL3	HL3
CFE, kW/m^2	50.0	Pass	Pass	Pass	Pass	Pass
MARHE, kW/m^2	0	Pass	Pass	/	Pass	Pass
Ds4, dimensionless	22.7	Pass	Pass	Pass	Pass	Pass
VOF4, min	23.1					
Ds(max)	67.0					
CIT_G, dimensionless	0.05	Pass	Pass	Pass	Pass	Pass

Statement：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 the sole criterion for assessing the potential smoke and toxicity hazard of the product in use.

-End of Report-