Test Report Issue To:
Astroforme India Pvt. Ltd.
Bldg. No. P3, Rajlaxmi Hitech Textile Park, Off Mumbai-Nashik Highway, Village Sonale, Tal. Bhiwandi, Dist. Thane- 421302, Maharashtra

Test Report No : I250710001-2
Date of Issue: 19/08/2025
Sample Booking/Receipt : 10/07/2025
Date of Start of Testing: 26/07/2025
Date of Completion of Test: 26/07/2025

Customer Relationship Number : **A1120873**

Sample Description :
MELAMINE FOAM

Kind Attention: Savio Dsouza
E-Mail: savio@astroforme.com
Contact No: 9619013314

Customer Reference Number :

Sample Drawn By : Test Sponsor

Laboratory certified by CERTIFER

ilac-MRA

TC-10383

ULR No: TC1038325000000414F

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Kaushal Kumar Thakur
Reviewed & Authorized By

This is Digitally Signed Report and hence doesn't require Physical Signature

1. INTRODUCTION

Determination of compliance of **MELAMINE FOAM** by performing tests as per various test methods referred by **R1** Category of **EN 45545-2:2020+A1 2023** Requirements for fire behaviour of materials and components.

2. DOCUMENTS REFERRED

EN 45545-2:2020+A1 2023; Requirements for fire behavior of materials and components.
ISO 5659-2:2017; Determination of optical density by a single-chamber test.
ISO 5660-1:2015/Amd.1:2019; Heat Release rate (cone calorimeter method) and smoke production rate (dynamic measurement).
ISO 5658-2:2006/Amd. 1:2011; Determination of lateral spread of flame along the surface of a specimen of a product orientated in the vertical position.
EN 17084:2018/AC:2020; Railway applications - Fire protection on railway vehicles - Toxicity test of materials and components.

3. LOCATION AT WHICH TEST IS PERFORMED

Domkan, Anangpur, Faridabad,
Haryana-121003, INDIA

4. SPECIMEN DETAIL

The testing laboratory has not been involved in the sampling of the test specimen.
All details given in this clause are declared by test sponsor.

Name of Product	**MELAMINE FOAM**
Trade Name	VIXUM®
Manufacture name and address	Dongsung Chemical Co. Ltd 19, Asinbeonyeongro, Saha-gu, Busan 49470, Korea
Composition or Generic Identification	100% Melamine Foam
Thickness of each component	5mm
Overall Density	9.5 kg/m^3
Density of each component	Not Applicable
Color	Light Grey
Overall Nominal thickness of specimen	5mm
Substrate	Not Applicable
Coverage Rate of coating	Not Applicable
Method of Application of coating	Not Applicable
Type of coats	Not Applicable
Number of coats	Not Applicable

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5. TEST CONDITION & SPECIMEN CONDITIONING

The specimens were conditioned at 23±2°C and 50±5% RH till constant mass.

6. SPECIMEN PREPARATION

Specimens were prepared by test sponsor; laboratory was not involved in specimen preparation. Details of specimen preparation was not shared by test sponsor.

Instrument Details

Instrument	Certificate Number	Issue Date	Due Date
Smoke Density & Toxicity Chamber	2502/97/035, 024, 037,038,039,040, EI/FF/5590,5589,5591	20.11.2024	19.11.2025
Cone Calorimeter	2502/97/034, 028, 033, 029, 030, 031, EI/FF/5584, 5595, 5583	20.11.2024	19.11.2025
Lateral Spread of Flame Tester	EI/FF/5588,5585,5586, 5587	20.11.2024	19.11.2025

7. TEST PROCEDURES & RESULT

7.1 Parameter: MARHE (Maximum average rate of heat emission)

Test Method: T03.01 (ISO 5660-1: 50 kW/m^2)

1 specimen of Size 100mm in length and 100mm in width wrapped with Aluminium foil has been fixed into the specimen holder and placed 25mm below the irradiance- controlled system which is set at an irradiance of 50 kW/m^2 with an electric igniter above the top of retainer frame. Oxygen Analyzer output has been set to 20.95±0.01%. Burning of specimen reduces the percentage of oxygen, which gives rise in Heat Release Rate (HRR) value and related parameters. HRR and ARHE values were recorded during test. Test for 2 more specimens performed in same manner and results were recorded.

Wire Grid Used (Yes/No)	Yes
Specimen Mounting	Horizontally Face Upwards
Face Tested	Both faces were similar, one of the faces was exposed to fire
Orifice flow rate calibration constant, C	0.046 $m^{1/2}g^{1/2}K^{1/2}$
Thickness of Specimen	5mm
Date of Test	26.07.2025
Separation, in mm	25
Number of Replicate Tested	3
Ambient laboratory condition	24.7°C and 53% RH

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Parameter	Specimen			Mean
	1	2	3	
Mode of Testing, in kW/m²	50	50	50	**50**
Mass of Specimen (g)	0.38	0.37	0.39	**0.38**
Thickness(mm)	5	5	5	**5**
Exhaust system flow rate(m^3/s)	0.024	0.024	0.024	**0.024**
MARHE (kW/m²)	0	0	0	-
qA, max(kW/m²)	0	0	0	-
qA,180 (kW/m²)	0	0	0	-
qA,300 (kW/m²)	0	0	0	-
Total heat release for each sample (MJ/m²)	*	*	*	-
ms : weight of the sample at sustained flame for each sample (g)	*	*	*	-
mf : residual weight of the sample after test for each sample (g)	*	*	*	-
Weight loss for each sample (g/m²)	*	*	*	-
Average weight loss rate (g/m².s)	*	*	*	-
mA,10-90 : average weight loss rate between 10% and 90% of the weight loss for each sample (g/m².s)	*	*	*	-
Average duration of the test (s)	1200	1200	1200	**1200.00**
Issues during the tests if any	Shrinkage	Shrinkage	Shrinkage	-
SA,1: quantity of smoke per surface unit during the non-flame time for each sample	4.305	3.856	4.597	**4.253**
SA,2: quantity of smoke per surface unit during the flame time for each sample	3.793	4.928	4.687	**4.469**
SA: total quantity of smoke per surface unit for each sample (=SA,1+SA,2)	8.098	8.784	9.284	**8.722**
Surface of exposed area of the sample, m2	0.00884	0.00884	0.00884	**0.00884**
Time to Sustained Flaming(s)	No Ignition	No Ignition	No Ignition	-
Transitory Flaming or Flashing or any additional observation	No	No	No	-
Meeting Fire Integrity as per Clause 5.3.7	Yes	Yes	Yes	-

* No Ignition Occurred

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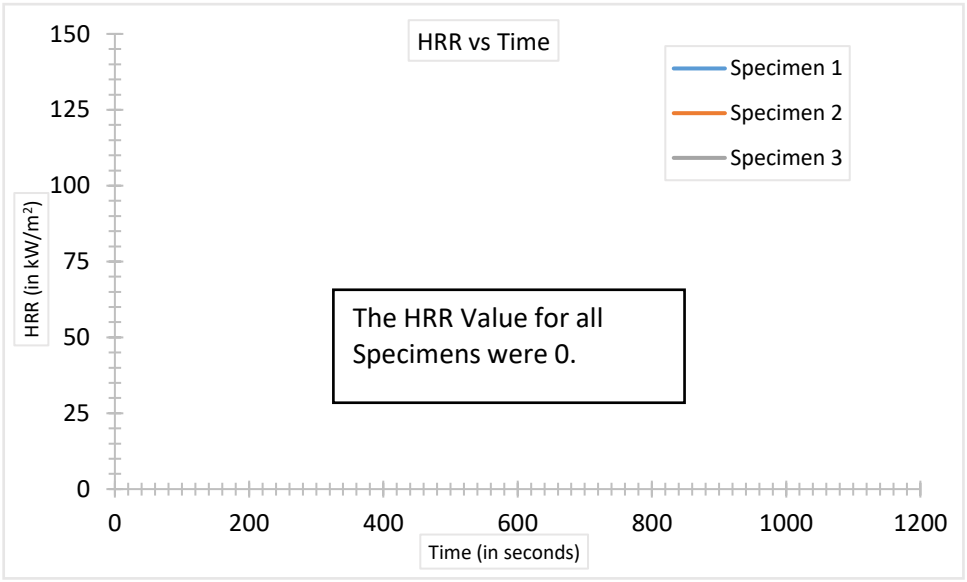

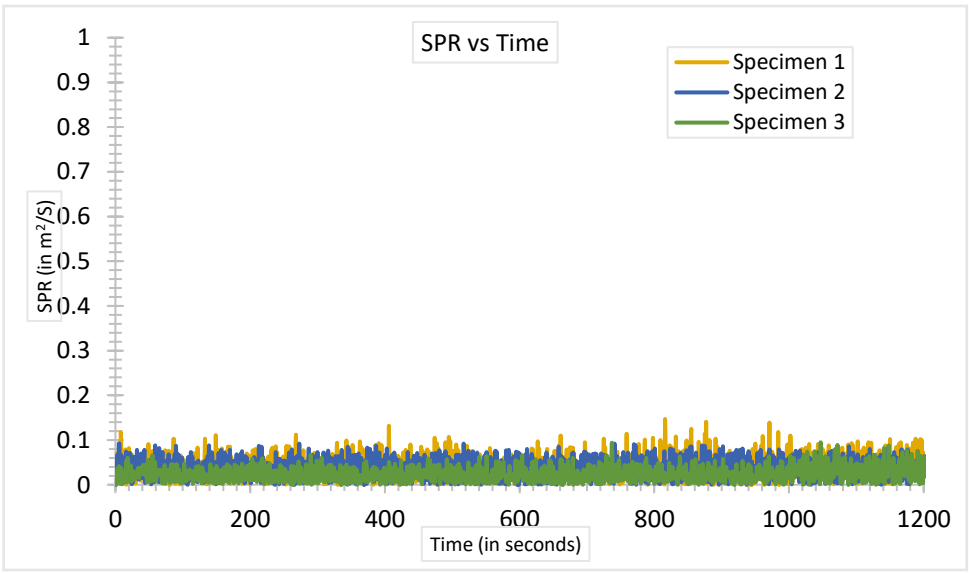

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7.2 Parameter: DsMax, Ds (4), VOF4 & CIT_g

Test Method: T10.01, T10.02, T10.04 (EN ISO 5659-2: 50 kW/m^2) and EN 17084

1 specimen of size 75mm in length and 75mm in width wrapped with Aluminium foil has placed over refractory fiber blanket and fixed into the specimen holder, holder is then placed 25 mm below the irradiance- controlled system which is set at an irradiance of 50 kW/m^2 in the equipment called Smoke density chamber fitted with FTIR Light Transmittance has been set to 100%. Burning of specimen reduces the percentage of light transmittance, which give rise in specific optical density and related parameters. All the parameter like DsMax, Ds (4), VOF_4, CITg 240 sec and CITg 480 sec were recorded during test. Test for 2 more specimens performed in same manner and results were recorded. Clear beam correction factor is not recorded for individual test specimen as it was less than 5% of DsMax. Correction factor Cf not applicable hence it is not recorded and reported.

Wire Grid Used (Yes/No)	No
Face Tested/ Exposed Face	Both faces were similar, one of the faces was to exposed to fire
Distance between specimen and source of radiation, in mm	25
Date of Test	26.07.2025
Thickness of Specimen	5mm
Number of Replicate Tested	3
Apparatus used	Smoke Density chamber with FTIR
Substrate Used	No substrate used
Method of fixing the specimen on the substrate	Not applicable
Preconditioning condition of specimens	23±2°C and 50±5% RH till constant mass for 48 hours
Ambient laboratory condition	24.8°C and 53% RH

Apparatus Used:

Sr. No.	Name of Apparatus
1	Smoke Chamber with FTIR

Gas	Detected Concentration (PPM) at 240 seconds			Detected Concentration (PPM) at 480 seconds		
	S1	S2	S3	S1	S2	S3
HCN	0.7	1	0.4	2	3.1	2.5
SO2	2.8	2.1	2.9	6.1	5.9	8
NOx	5.7	6.7	7.5	10.4	11.5	13.4
CO	194	202	198	379	402	387
CO2	19028	17158	20168	35498	31058	35108
HBr	0	0	0	0	0	0
HCl	0	0	0	0.5	0.9	0
HF	0	0	0	1.1	2.1	1.8
CITg	**0.07**	**0.07**	**0.08**	**0.14**	**0.14**	**0.15**

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Gas	Detected Concentration (mg/m^3) at 240 seconds			Detected Concentration (mg/m^3) at 480 seconds		
	S1	S2	S3	S1	S2	S3
HCN	0.7	1.0	0.4	2.1	3.2	2.6
SO2	6.8	5.1	7.1	14.9	14.4	19.5
NOx	10.0	11.7	13.1	18.2	20.1	23.5
CO	206.8	215.3	211.1	404.0	428.6	412.6
CO2	31872.4	28740.1	33781.9	59460.0	52022.9	58806.7
HBr	0.0	0.0	0.0	0.0	0.0	0.0
HCl	0.0	0.0	0.0	0.7	1.2	0.0
HF	0.0	0.0	0.0	0.8	1.6	1.4

Parameter	Specimen			Mean
	1	2	3	
Mode of Testing, in kW/m^2	50	50	50	**50**
Pilot Flame Used (Yes/No)	No	No	No	-
Mass of Specimen Before test (g)	0.21	0.21	0.3	**0.24**
Mass of Specimen After test(g)	0.0	0.0	0.0	**0.0**
Mass lost(g)	0.21	0.21	0.3	**0.24**
Thickness of specimen(mm)	5	5	5	**5**
D_s10	8.5	7.6	7.6	**7.9**
D_s Max.	40.2	44.2	35.4	**39.9**
D_s (4)	12.1	10.9	11.3	**11.4**
VOF_4, in min	49.9	51	54.1	**51.7**
CITg, 240s	0.07	0.07	0.08	**0.07**
CITg, 480s	0.14	0.14	0.15	**0.14**
Delamination/Intumescence/Shrinkage/ Melting/Collapse	Shrinkage	Shrinkage	Shrinkage	-
Time (in sec) of Delamination/Intumescence/Shrinkage/ Melting/Collapse	No	No	No	-
Any Unusual Behaviour	No	No	No	-
Time of Ignition(s)	No Ignition	No Ignition	No Ignition	-
End of Flaming(s)	No	No	No	-
Duration of Flaming(s)	No	No	No	-
Test duration (s)	600	600	600	**600**

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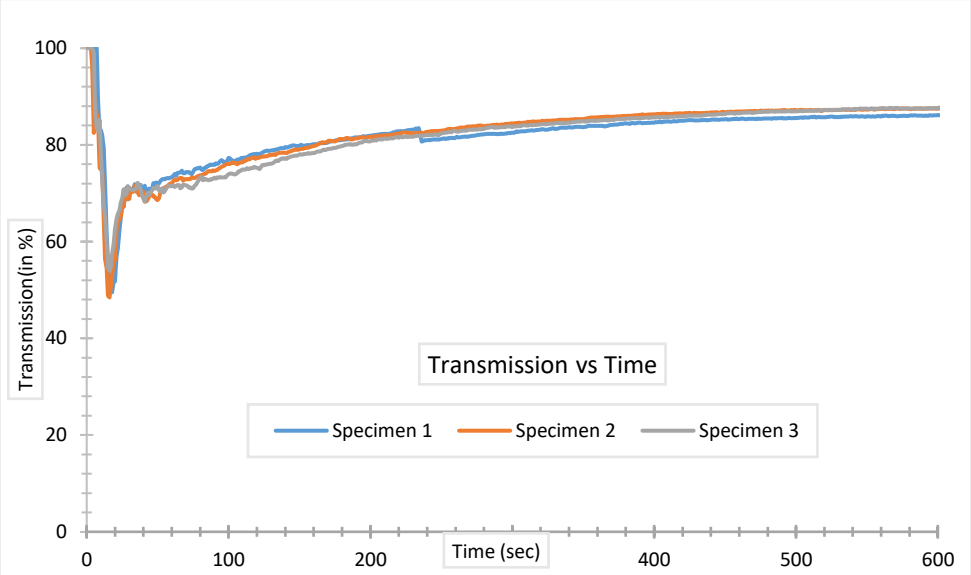

7.3 Parameter: CFE

Test Method: T02 (EN ISO 5658-2)

1 specimen of size 800mm in length and 155mm in width wrapped with Aluminium- foil has been fixed into the specimen holder and placed at an angle of 15^0 from the radiant heat panel system which is set at an irradiance defined in table 1 of ISO 5658-2:2006. Flame spread profile is recorded for each 50mm marked position and CFE value is calculated from calibration curve. Test for 2 more specimens performed in same manner and results were recorded.

Number of specimens tested	3
Gas used in Pilot Flame	Methane
Product tested with Air gap or Without Air gap	Without Airgap
Orientation of tested product	Lateral
Face Tested/ Exposed Face	Both faces were similar, one of the faces was exposed to fire
Thickness of Specimen	5mm
Date of Test	26.07.2025
Substrate Used	No substrate used
Method of fixing the specimen on the substrate	Not applicable
Number of joints constructed in testing	No joints
Ambient laboratory condition	25.8°C and 58% RH

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Distance, in mm	Time to cross reference mark, in seconds		
	S1	S2	S3
50	4	3	3
100	5	5	4
150	7	5	7
200	10	8	7
250	11	10	8
300	-	-	-
350	-	-	-
400	-	-	-
450	-	-	-
500	-	-	-
550	-	-	-
600	-	-	-
650	-	-	-
700	-	-	-
750	-	-	-
800	-	-	-

Parameter	Test Specimen			Mean
	S1	S2	S3	
Mass of Specimen, in g	4.7	4.5	4.7	**4.6**
Thickness of specimen, in mm	5	5	5	**5**
Maximum Flame Front, in mm	250	250	260	**253.3**
Ignition Time, in seconds	4	3	2	**3**
Any Softening, melting or Delamination resulting in the specimen sagging out of the specimen holder	No	No	No	-
Detachment of the facing from the substrate	No	No	No	-
Flashing /Transitory Flaming	No	No	No	-
Falling Debris	No	No	No	-
Duration of flaming debris, in seconds	No	No	No	-
Intumescence/deformation/separation/spalling/ fissures/cracks/sparks/melting/change in form etc.	No	No	No	-
Test Duration, in minute	30	30	30	**30**
Average heat for sustained burning, Qsb	0.26	0.21	0.20	**0.22**
CFE, in kW/m²	37.8	37.8	36.42	**37.34**

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8. CONFORMITY

Tested specimen meets the Requirements of **R1 HL3 of EN 45545-2:2020+ A1 2023.**

Parameter	Test Method	Requirements of R1 HL3 of EN 45545-2:2020+ A1 2023	Observed Results	Conformity (Confirms/Does not confirms)
CFE (kW/m^2)	**T02 (EN ISO 5658-2)**	Minimum 20	**37.34**	**Confirms**
MARHE (kW/m^2)	**T03.01 (ISO 5660-1: 50 kW/m^2)**	Maximum 60	**0**	**Confirms**
D_s (4)	**T10.01 (EN ISO 5659-2: 50 kW/m^2)**	Maximum 150	**11.4**	**Confirms**
VOF_4, in min	**T10.02 (EN ISO 5659-2: 50 kW/m^2)**	Maximum 300	**51.7**	**Confirms**
CIT_G	**T11.01 (EN 17084 Method 1: 50 kW/m^2)**	Maximum 0.75	**0.14**	**Confirms**

Classification Achieved: **R1 HL3 of EN 45545-2:2020+ A1 2023**

9. LIMITATION

The results only relate to the behavior of the specimen of the element of construction under the particular conditions of test; they are not intended to be the sole criteria of accessing the potential fire performance of the element in use nor do they reflect the actual behavior in fires.

10. PHOTOS

Sample Before Test (ISO 5660-1)

Sample After Test (ISO 5660-1)

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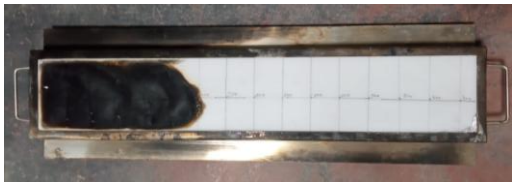
Sample Before Test (ISO 5659-2)

Sample After Test (ISO 5659-2)

Sample Before Test (ISO 5658-2)



Sample After Test (ISO 5658-2)

Sample During Test (ISO 5658-2)

----------End of Test Report----------

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Terms & Condition:

- The results are related only to the items Tested
- Total Liability of our Laboratory is limited to the invoiced Amount. No Liability will be accepted after Sample is taken back
- The Sample Description is given "As desired by the customers". Sample not drawn by us & Analysis Conducted on Received sample unless specified otherwise.
- Retained sample will be destroyed after 30 days from the date of issue of the test report unless instructed otherwise.
- Any Complaints or Retest request should be communicated within 15 days from the issue of the Test report.
- Test Report shall not be reproduced except in full, without Written approval of the Laboratory
- The Test report is not to be reproduced wholly or in parts & cannot be used as an evidence in a court of law & shall not be used in advertising media without our permission in writing.

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