



Dr. Suresh Neelakantan
Associate Professor

भारतीय प्रौद्योगिकी संस्थान दिल्ली
INDIAN INSTITUTE OF TECHNOLOGY DELHI

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Test Report

14/06/2024

Mr. Prashant Sawant
M/s. 4MANN Industries Pvt., Ltd.,
404 / 405, Ashok Premises, Old Nagardas Cross Road,
Mogra Village, Opp. Saraswati Towers,
Andheri [E] Mumbai – 400069.

Your Ref. No: Your email dated 02/04/2024

Our Ref. No.: FT/11/113/2021/4Mann-24

Sample Received: 30/05/2024, Testing Dates: 4th June to 14th June 2024

Product Detail: ACP Panel Sample

Test No.	Colour	Sample Type	Sample Code	Size and Qty of Sample
Test-01	White	ACP Panel	MA-908-4F	1' X 1', 3 ACP and 1 Coil
Test-02	Red	ACP Panel	MA-107-4P	1' X 1', 3 ACP and 1 Coil
Test-03	Red	ACP Panel	MA-107-3R	1' X 1', 3 ACP and 1 Coil

Subject: - **Testing and investigation of aluminium composite materials (ACM) properties as per ASTM standards as specified.**

Dear Sir,

Find herewith the test report for the testing of paint coated Panel Sample. Further, samples testing results and details along with photographs are enclosed.



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Results:

TEST-01 – White - MA-908-4F			
S. No.	Test Parameters	Test Method	Result
A. PROPERTIES OF ACP			
1	ACP Thickness	Visual Check/Measurement as per QAP	4.00 mm
2	Weight of ACP	Visual Check/Measurement as per QAP	5.86 Kg/m ²
3	Density of ACP	ASTM D1505	1.429 (gm/cc)
4	Polyethylene Core Density	ASTM D1505	1.044 (gm/cc)
5	Bond Integrity (Peel Strength)	ASTM D 1781 or ASTM D 903	7.37 N/mm
6	Tensile Strength of ACP	ASTM E8	44.2 ± 4 MPa
7	Yield Strength of ACP	ASTM E8	40 ± 4 MPa
8	% Elongation of ACP	ASTM E8	16.6%
9	Flexural Strength	ASTM D790	120.4 MPa
B. PROPERTIES OF ALUMINUM SKIN			
10	Skin Thickness	Visual Check/Measurement as per QAP	0.5 ± 0.02 mm
11	Tensile Strength	ASTM E8	163.5 MPa
12	Yield Strength	ASTM E8	155.9 MPa
13	% Elongation	ASTM E8	4.73%
C. PAINT FINISH AND TEST PROPERTIES			
14	Coating Thickness (DFT)	ASTM D 1400 or ECCA T1	29.9 µm
15	Gloss of 60 Degrees Angle	ASTM D523 or ECCA T2	31.9 %
16	Reverse Impact	ASTM D2794	Passes 27J without visible damage
17	Cross Hatch	ASTM D3359 or ECCA T6	Pass
18	Pencil Hardness	ASTM D3363	3H
19	Solvent Resistance	ASTM D5402	No Visual Damage
20	5% HCl	AAMA 2605	No Visual Damage

Test results pertain only to samples submitted to us.

(Dr. Suresh Neelakantan)

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(Dr. Jayant Jain)
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TEST-02 – Red - MA-107-4P			
S. No	Test Parameters	Test Method	Result
A. PROPERTIES OF ACP			
1	ACP Thickness	Visual Check/Measurement as per QAP	4.023 mm
2	Weight of ACP	Visual Check/Measurement as per QAP	5.11 Kg/m ²
3	Density of ACP	ASTM D1505	1.232 (gm/cc)
4	Polyethylene Core Density	ASTM D1505	1.047 (gm/cc)
5	Bond Integrity (Peel Strength)	ASTM D 1781 or ASTM D 903	5.70 N/mm
6	Tensile Strength of ACP	ASTM E8	26.7 MPa
7	Yield Strength of ACP	ASTM E8	23.3 MPa
8	% Elongation of ACP	ASTM E8	12.1%
9	Flexural Strength	ASTM D790	58.8 MPa
B. PROPERTIES OF ALUMINUM SKIN			
10	Skin Thickness	Visual Check/Measurement as per QAP	0.25 ± 0.02 mm
11	Tensile Strength	ASTM E8	140.0 ± 11 MPa
12	Yield Strength	ASTM E8	118.1 MPa
13	% Elongation	ASTM E8	6.6%
C. PAINT FINISH AND TEST PROPERTIES			
14	Coating Thickness (DFT)	ASTM D 1400 or ECCA T1	30.4 µm
15	Gloss of 60 Degrees Angle	ASTM D523 or ECCA T2	40 ± 4 %
16	Reverse Impact	ASTM D2794	Passes 27J without visible damage
17	Cross Hatch	ASTM D3359 or ECCA T6	Pass
18	Pencil Hardness	ASTM D3363	3H
19	Solvent Resistance	ASTM D5402	No Visual Damage
20	5% HCl	AAMA 2605	No Visual Damage

Test results pertain only to samples submitted to us.

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TEST-03 – Red - MA-107-3R			
S. No	Test Parameters	Test Method	Result
A. PROPERTIES OF ACP			
1	ACP Thickness	Visual Check/Measurement as per QAP	3.035 mm
2	Weight of ACP	Visual Check/Measurement as per QAP	3.85 Kg/m ²
3	Density of ACP	ASTM D1505	1.292 (gm/cc)
4	Polyethylene Core Density	ASTM D1505	1.048 (gm/cc)
5	Bond Integrity (Peel Strength)	ASTM D 1781 or ASTM D 903	5.84 N/mm
6	Tensile Strength of ACP	ASTM E8	32.1 MPa
7	Yield Strength of ACP	ASTM E8	28.0 MPa
8	% Elongation of ACP	ASTM E8	10.8%
9	Flexural Strength	ASTM D790	77.9 MPa
B. PROPERTIES OF ALUMINUM SKIN			
10	Skin Thickness	Visual Check/Measurement as per QAP	0.25 ± 0.02 mm
11	Tensile Strength	ASTM E8	140.0 ± 11 MPa
12	Yield Strength	ASTM E8	118.1 MPa
13	% Elongation	ASTM E8	6.5%
C. PAINT FINISH AND TEST PROPERTIES			
14	Coating Thickness (DFT)	ASTM D 1400 or ECCA T1	29.8 µm
15	Gloss of 60 Degrees Angle	ASTM D523 or ECCA T2	39.8 ± 1 %
16	Reverse Impact	ASTM D2794	Passes 27J without visible damage
17	Cross Hatch	ASTM D3359 or ECCA T6	Pass
18	Pencil Hardness	ASTM D3363	3H
19	Solvent Resistance	ASTM D5402	No Visual Damage
20	5% HCl	AAMA 2605	No Visual Damage

Test results pertain only to samples submitted to us.

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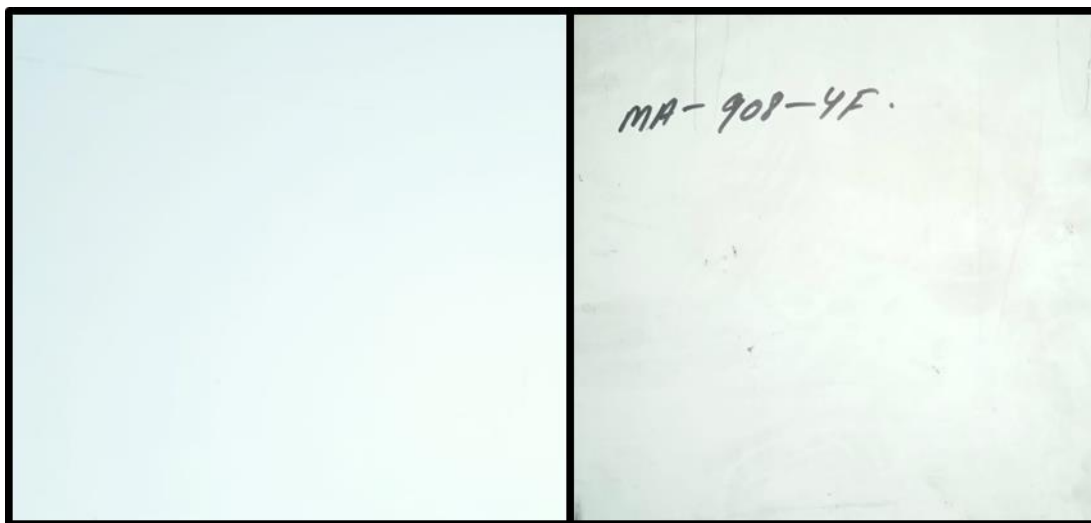
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Photograph of the Received Samples: -

Test-01 : MA 908-4F



Front

Back

Test-02 : MA 107-4P



Front

Back



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Test-03 : MA 107-3R



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END OF THE REPORT—