

3M Turkey Laboratory Report

Istanbul Application Development Lab

Report Number: IATD1803

Date: 2018-Jan-12

Customer: Albond

Sales Rep: Meriç Budulgan

Application: Aluminium Panel Bonding

Products tested: 3M VHB 4991

Test Date: 2018-Jan-12

Tests / Test Methods:

All substrates are sent by the customer. Dynamic Overlap Shear Test (ASTM D-1002) and 90° Peel Test (ASTM D3330) are performed for each substrate and the results are compared to each other.

Substrates: Original black, PVDF coated, HDPE coated, Mix black, Chrome free, Uncoated aluminum panels

Tape: 3M VHB 4991

Dwell time: 3 days at room temperature

Surface preparation:

- Cleaning with IPA on all surfaces
- Priming with Universal Primer on all surfaces

Cycle conditioning: 3M internal standard:

- 4 hours @ T= - 40°C
- 16 hours @ T= 38°C, %98 relative humidity
- 4 hours @ T= 90 °C

Test continues for 14 days.

Spec: Dynamic overlap shear test (ASTM D-1002) @ RT and 1.3 mm/min

Adhesive Strength of Tapes by 90° Peel Test @ RT and 300 mm/min (ASTM D3330)

Acceptance criteria: All surfaces except uncoated aluminum should have close peel and overlap shear performances.



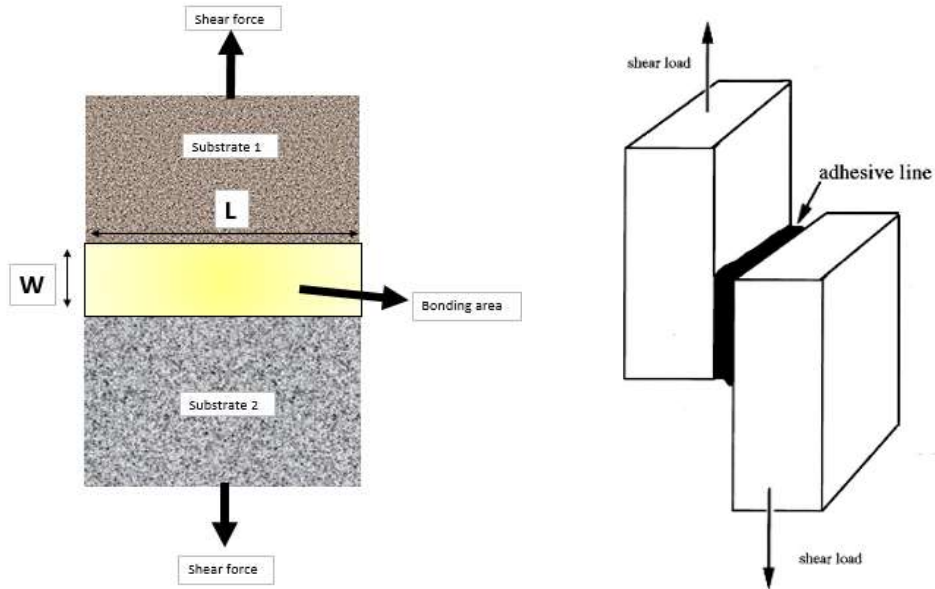
90° Peel Test

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Shear Test

Test Results:

All tests are performed after cycle conditioning.

Overlap shear test results:

Same substrates are bonded to each other for Overlap Shear Test.

Sample	Avg. Load at Break (kPa)	Failure Mode
Original Black	492,0	Cohesion
PVDF Coated	508,0	Cohesion
HDPE Coated	512,8	Cohesion
Mix Black	476,5	Cohesion
Chrome free	597,5	Cohesion
Uncoated	726,1	Cohesion

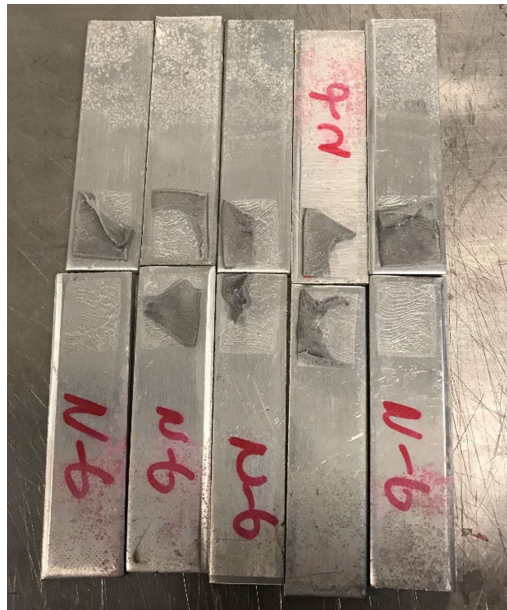
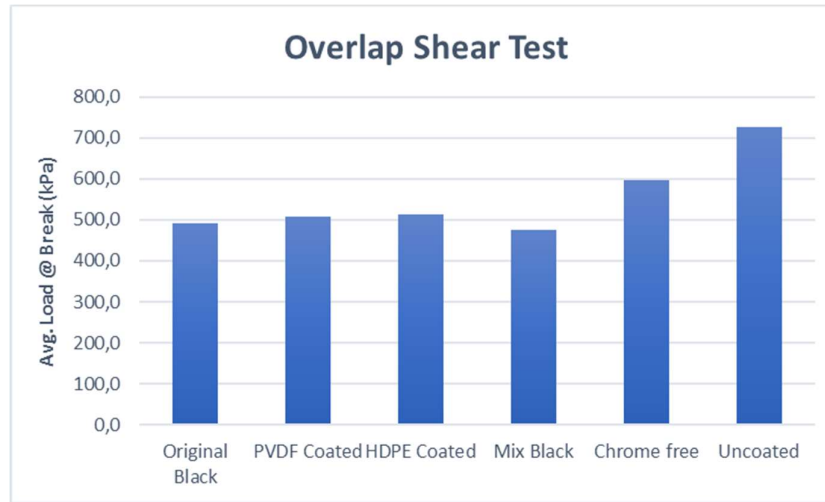
Width: 25mm; Length: 19mm; Test velocity: 13 mm/min

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Overlap shear test samples of uncoated aluminum substrate

90° Peel Test Results:

Sample	Avg. Peel Force (N/cm)	Failure Mode
Original Black	55,24	Adhesion+Cohesion
PVDF Coated	40,09	Adhesion
HDPE Coated	46,69	Adhesion+Cohesion
Mix Black	43,76	Adhesion+Cohesion
Chrome Free	42,69	Adhesion+Cohesion
Uncoated	41,68	Adhesion+Cohesion

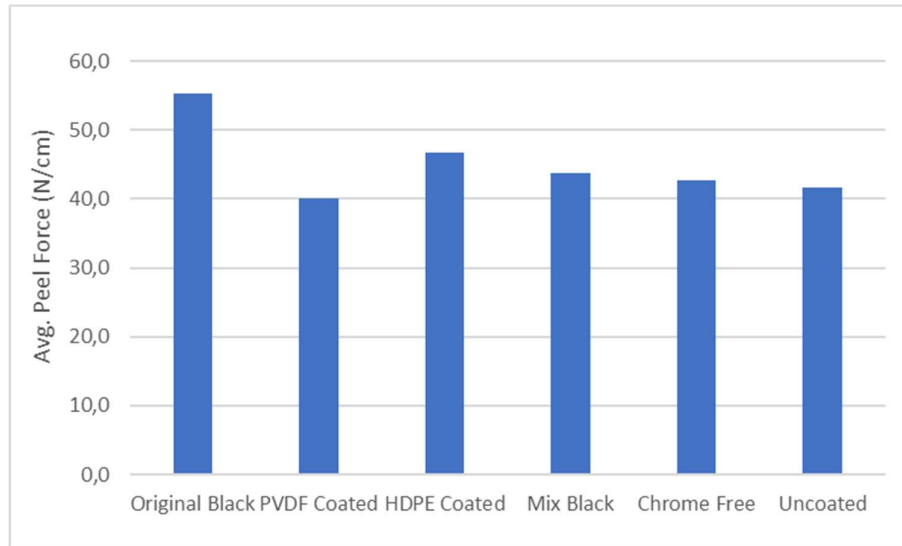
Width: 19mm, Length: 100 mm; Test velocity: 300 mm/min

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Peel test samples of chrome free aluminum substrate

Conclusion:

Adhesion tests have been performed on 3M VHB 4991 bonds of original black, PVDF coated, HDPE coated, mix black, chrome free, uncoated aluminum panels.

Overlap shear test:

Highest shear test results belongs to uncoated aluminium. All samples' test results are above the acceptance criteria. Tests result in cohesion failure.

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90° Peel Test

Average 90° Peel Test results of 3M VHB 4991 is best at original black surface except uncoated aluminum. For the other substrates results are very close.

Final evaluation of the results and trials should be considered by the customer.



Merve BAŞDEMİR

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IMPORTANT NOTICE

Please note that under laboratory test conditions we cannot take into account all the relevant factors that can affect the use and performance of the tested 3M product. Therefore, statements in this letter are based on our experience and may not have been verified with tests specific to the user's application. Given the variety of factors, such as the materials to be bonded with the 3M product, the surface preparation, the conditions in which the product is used, some of which are uniquely within the user's knowledge and control, it is essential that the user determine the suitability of the 3M product for the intended use and the user's method of application. Please carefully read and follow our application bulletins. All questions of liability relating to the 3M product are governed by the terms of the sale subject, where applicable, to the prevailing law.