

**CLIENT:** Grand View Distribution Corp  
2386 Oak Street, Vancouver  
British Columbia, Canada, V6H 4J1

**Draft Report No: RJ5055P-2**

**Date: November 4, 2016**

**SUBJECT:** Climbing Drum Peel Test on Metal Composite Material.

**SAMPLE ID:** 4 mm thick injection molded metal composite material (MCM) core panels.

**SAMPLING DETAIL:** Test samples were submitted to the laboratory directly by the client. No special sampling conditions or sample preparation were observed by QAI.

**DATE OF RECEIPT:** Samples were received at QAI Laboratories on October 14, 2016.

**TESTING PERIOD:** October 18, 2016 – October 26, 2016.

**AUTHORIZATION:** QAI Test Proposal 16MM09291 signed by Cherie Ho on September 30, 2016.

**TESTS REQUESTED:** Climbing Drum Peel Test per ASTM D 1781– 98 (2004), *Test Method for Climbing Drum Peel for Adhesives*.

**TEST RESULTS:** Test results are provided on subsequent pages of this report.

**Prepared By**

**Signed for and on behalf of  
QAI Laboratories Inc.**



David Royer  
Physical Testing

**CLIMBING DRUM PEEL TEST PER ASTM D 1781**

**Test Procedure**

Testing was performed in accordance with ASTM D 1781– 98 (2004), *Test Method for Climbing Drum Peel for Adhesives*. The specimens were prepared in accordance with section 7 of ASTM D 1781. Six 3” x 12” test specimens were cut from three submitted sample panels, 3 panels were tested with the long dimension parallel to the length of the full size sandwich panel, and three specimens were prepared with the long dimension parallel to the short dimension of the full sized sandwich panel. Prior to testing the specimens were placed in a room kept at 73.4 ± 1.8°F and 50 ± 2% RH for a period of not less than 7 days. The specimens were individually placed in a climbing drum peel adhesion fixture complying with section 6 of ASTM D 1781-98 and mounted in a United Tension/Compression Machine. The aluminum skin was then peeled from the core at a constant rate of one inch per minute for a total of six inches. Photographs of the test set-up and typical failure modes are provided in the appendix of this report.

**Test Results**

Climbing Drum Peel Results								
Specimen	MD-1	MD-2	MD-3	CD-4	CD-5	CD-6	Average MD	Average CD
Minimum Force (lbs)	267	279	253	364	361	390	266	372
Maximum Force (lbs)	292	297	271	445	373	418	287	412
Fo (lbs)	35	35	35	35	35	35	35	35
Average Force (lbs)	284	287	261	413	367	404	277	395
Average Peel Torque (in-lbs/in) <sup>1</sup>	35	35	32	53	47	52	34	50
Failure Type	Adhesion to the Facing	Adhesion to the Facing	Adhesion to the Facing	Adhesion to the Facing	Adhesion to the Facing	Adhesion to the Facing	* * *	

<sup>1</sup> Average Peel Torque was calculated using the following formula:

$$\text{Average Peel Torque} = [(r_o - r_i)(F_p - F_o)]/W$$

Where:

r<sub>o</sub> = radius of flange

r<sub>i</sub> = radius of drum plus one half the thickness of the adherend being peeled

F<sub>p</sub> = average load required to bend and peel adherend plus the load required to overcome the resisting torque

F<sub>o</sub> = load required to overcome the resisting torque

W = Width of specimen

**Climbing Drum Peel Results (SI units)**

Specimen	MD-1	MD-2	MD-3	CD-4	CD-5	CD-6	Average MD	Average CD
Minimum Force (N)	1188	1241	1126	1619	1605	1735	1185	1653
Maximum Force (N)	1299	1320	1206	1979	1658	1861	1275	1833
F <sub>o</sub> (N)	156	156	156	156	156	156	156	156
Average Force (N)	1263	1277	1159	1837	1634	1795	1233	1755
Average Peel Torque (N mm/mm) <sup>1</sup>	123	125	112	187	164	182	120	178
Failure Type	Adhesion to the Facing	Adhesion to the Facing	Adhesion to the Facing	Adhesion to the Facing	Adhesion to the Facing	Adhesion to the Facing	* * *	

<sup>1</sup> Average Peel Torque was calculated using the following formula:

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F<sub>p</sub> = average load required to bend and peel adherend plus the load required to overcome the resisting torque

F<sub>o</sub> = load required to overcome the resisting torque

W = Width of specimen

**APPENDIX**



Photograph No.1  
Climbing drum peel test set-up

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**APPENDIX**



Photograph No.2  
Climbing drum peel test typical mode of failure

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

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