



ULTRA BOND INC.
108 Briarwood Drive
Greentown PA 18426
Attn.: Richard Campfield

Test Report No: 3852296PP02R1

Date: 23 December 2015

This report supersedes previous report 3852296PP02 dated December 11, 2015. Comment added to Test Results for Three Point Bend on page 3.

**SAMPLE(S) SUBMITTED
BY THE CLIENT AS:**

Nine (9) 12" x 12" and Nine (9) 12" x 6" Laminated AS-1 Glass.

DATE OF RECEIPT:

24 September 2015

TEST PERIOD:

31 October – 9 December 2015

TEST(S) REQUESTED:

The submitted samples were tested in accordance with the procedures outlined for the following:

1. Visibility Distortion, ROLAGS Standard
2. Luminous Transmittance/ Haze (Before and After UV Exposure), ROLAGS Standard
3. UV Exposure, ASTM G154
4. Penetration Resistance, ROLAGS Standard
5. Three Point Bend, ROLAGS Standard
6. Resistance to Thermal Cycling, ROLAGS Standard

TEST RESULTS:

See Pages 2 - 4

PREPARED BY:

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PACKAGING & MATERIALS**

**SIGNED FOR AND ON BEHALF OF
SGS NORTH AMERICA INC.:**

**JASON SHERRIER, CPLP
LAB. MANAGER, PACKAGING & MATERIALS**

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CLIENT: Ultra Bond Inc

TEST RESULTS

1. VISIBILITY DISTORTION, ROLAGS STANDARD

<u>Resin</u>	<u>Results</u>
400	Less than 2 minutes of arc shift
400	Less than 2 minutes of arc shift
400	Less than 2 minutes of arc shift
1600	Less than 2 minutes of arc shift
1600	Less than 2 minutes of arc shift
1600	Less than 2 minutes of arc shift
Requirement	Less than 2 minutes of arc shift
Conclusion	PASS

Test Notes: Sample ID: 12" x 12" Laminated AS-1 Glass
Lab Environment: 73°F & 50% RH

2. LUMINOUS TRANSMITTANCE/HAZE, ROLAGS STANDARD

<u>Resin</u>	<u>BEFORE UV</u>		<u>AFTER UV</u>	
	<u>Luminous Transmittance</u>	<u>Haze</u>	<u>Luminous Transmittance</u>	<u>Haze</u>
	(%)	(%)	(%)	(%)
400	76.1	0.5	75.8	0.7
400	76.1	0.4	75.8	1.0
400	76.2	1.1	75.9	1.3
1600	75.7	0.3	75.6	2.0
1600	76.1	0.6	75.5	2.5
1600	75.7	1.5	75.6	1.5
Requirement	Retain 95% of transmittance. Shall not have more than 4% more haze than original			
Conclusion	PASS			

Test Notes: Sample ID: 12" x 12" Laminated AS-1 Glass
Exposure: Each resin was subjected to 500 hrs of UV Exposure with a UVA 340 bulb in the following orientation – 8 hrs UV plus condensation at 60°C, 4 hrs condensation at 50°C
Total Exposure: 500 hrs

CLIENT: Ultra Bond Inc

TEST RESULTS CONTINUED

3. PENETRATION RESISTANCE, ROLAGS STANDARD

<u>Resin</u>	<u>Results</u>
400	Ball did not pass through glass completely
400	Ball did not pass through glass completely
400	Ball did not pass through glass completely
1600	Ball did not pass through glass completely
1600	Ball did not pass through glass completely
1600	Ball did not pass through glass completely

Conclusion **PASS**

Test Notes: Sample ID: 12" x 12" Laminated AS-1 Glass
 Exposure: Each resin was subjected to 500 hrs of UV Exposure with a UVA 340 bulb in the following orientation – 8 hrs UV plus condensation at 60°C, 4 hrs condensation at 50°C
 Total Exposure: 500 hrs

4. MECHANICAL STRENGTH BY THREE POINT BEND, ROLAGS STANDARD

<u>Resin</u>	<u>Mechanical Strength (no UV)</u> (Newtons)	<u>Mechanical Strength (UV Exposure)</u> (Newtons)
Undamaged	304.8	
Undamaged	212.2	
Undamaged	345.8	
400	368.4	508.7
400	568.8	374.9
400	422.2	503.5
1600	478.0	401.2
1600	653.5	394.9
1600	509.5	518.3

Requirements Greater than 70% of the mean force required to produce cracks in undamaged test
Conclusion **PASS** – The repaired crack still remained intact; The glass broke but not the repair

Test Notes: Sample ID: 12" x 6" Laminated AS-1 Glass
 Exposure: Each resin was subjected to 500 hrs of UV Exposure with a UVA 340 bulb in the following orientation – 8 hrs UV plus condensation at 60°C, 4 hrs condensation at 50°C
 Total Exposure: 500 hrs

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TEST RESULTS CONTINUED

5. RESISTANCE TO THERMAL CYCLING, ROLAGS STANDARD

<u>Resin</u>	<u>Results</u>
400	No Failure Observed
400	No Failure Observed
400	No Failure Observed
45-1600	No Failure Observed
45-1600	No Failure Observed
45-1600	No Failure Observed
Conclusion	PASS

Test Notes: Sample ID : 12" x 6" Laminated AS-1 Glass

We trust the results will prove useful and informative.
Should you have any questions, please feel free to contact us.

End of Report