



# United States Testing Company, Inc.

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## REPORT OF TEST

ULTRA BOND, INC.  
3696 Beatty Drive, Unit A  
Riverside, CA 92506

600080-1  
1/17/94

**SUBJECT - REPAIRED LAMINATED GLASS**

### REFERENCES:

1. Conferences and correspondence with Mr. Richard A. Campfield commencing November 16, 1993.
2. ANSI/SAE Z26.1-1990, "American National Standard for Safety Glazing Materials for Glazing Motor Vehicles and Motor Vehicle Equipment Operating on Land Highways - Safety Code".
3. Previous USTC Report Number 193128-2R dated January 10, 1994.

### SAMPLE DESCRIPTION:

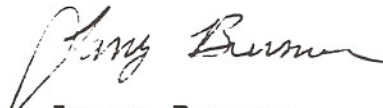
The following glass was submitted and identified by the Client as:


Three (3) pieces of 12 inch by 12 inch by 1/4 inch thick repaired laminated glass. Each specimen consisted of two 1/8 inch thick pieces of glass, and contained a repaired crack located on one side of the glass. Some cracks extended from the center to one edge, and some extended from edge to edge.

### OBJECTIVE:

The purpose of this project was to determine the effects of high humidity exposure on the submitted repaired laminated glass by performing penetration tests in accordance with Section 26 of ANSI/SAE Z26.1-1990.

Signed for the Company:

  
Larry Burmer  
Project Engineer

  
Michael Beaton, P.E.  
Branch Manager

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 Member of the SGS Group (Société Générale de Surveillance)

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## Procedure:

Three, 12 inch by 12 inch specimens subjected to humidity tests under our Test Report No. 193128-2R, in accordance with Section 3 of ANSI/SAE Z26.1-1990, were placed individually in the test frame with the repaired side face-down in the frame. The glass was then impacted once from a height of 12 feet using a 5 pound steel ball. Tests were performed on January 13, 1994.

## Requirements:

The impact may produce a large number of cracks in the glass and may cause tears in reinforcing interlayer material. The impact furthermore may produce a substantial permanent deformation in the shape of originally substantially flat specimen. However, with no more than two of the specimens shall the ball pass completely through the specimen within a 5-second interval after impact, either by what would be described as a puncture of the specimen or by means of the specimen fracturing into relatively large pieces that subsequently fold aside to permit passage of the ball.

When the specimen is clamped, the specimens during the test exhibiting more than 0.079-in (2mm) of movement at any point along the inside periphery of the frame shall be discarded and a new specimen substituted in its place.

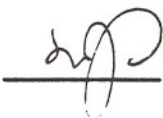
## Results:

For each of the three specimens tested, the ball did not pass through the specimens. The specimens did not move more than 0.079 inches at any point along the inside periphery of the frame. No separation or spalling of glass occurred at or near the repaired crack. The repaired crack remained intact in each of the three specimens tested.

## Conclusion:

The submitted repaired laminated glass subjected to high humidity conditions under our Test Report No. 193128-2R met the requirements of Section 26 of ANSI/SAE Z26.1-1990, Penetration Resistance.

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OBJECTIVE

The purpose of this project was to determine the physical characteristics of the submitted repaired laminated glass by performing humidity and boil tests in accordance with ANSI/SAE Z26.1-1990.


REFERENCES

1. Conferences and correspondence with Mr. Richard A. Campfield Commencing November 16, 1993.
2. ANSI/SAE Z26.1-1990, "American National Standard for Safety Glazing Materials for Glazing Motor Vehicles and Motor Vehicle Equipment Operating on Land Highways-Safety Code".

SAMPLE DESCRIPTION

The following glass was submitted and identified by the Client as:

33 pieces of 12 inch by 12 inch by 1/4 inch thick repaired laminated glass. Each specimen consisted of two 1/8 inch thick pieces of glass, and contained a repaired crack located on one side of the glass. Some cracks extended from the center to one edge, and some extended from edge to edge.



1. HUMIDITY, TEST 3  
PER ANSI/SAE Z26.1-1990

Procedure:

Three, 12 inch by 12 inch specimens were placed in a covered container over water for a period of two weeks. The air temperature in the container was maintained between 120°F and 130°F (49°C and 54°C)

Requirements:

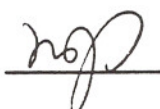
No separation of materials shall develop, except for occasional small spots, no one of which shall extend inward from the adjacent edge of the specimen to a depth of more the 1/4 inch (6.35mm).

Results:

No separation of materials occurred. No small spots extending from adjacent edges were observed. No separation or spalling of glass occurred at or near the repaired crack for each of the three specimens tested. The repaired crack remained intact and showed no signs of deterioration.

Conclusion:

The submitted repaired laminated glass met the requirements of Section 3 of ANSI/SAE Z26.1-1990, Humidity.

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2. BOIL, TEST 4  
PER ANSI/SAE Z26.1-1990

Procedure:

Three, 12 inch by 12 inch specimens were immersed vertically on edge in 150°F water for 3 minutes and then quickly transferred into boiling water. The specimens remained submerged in boiling for a period of 2 hours and then removed.

Requirements:

The glass itself may crack in this test, but no bubbles or other defects shall develop more than 1/2 inch (13mm) from the outer edge of the specimen or from any cracks that may develop. Any specimen in which the glass cracks to an extent confusing the result shall be discarded without prejudice, and another specimen shall be tested in its place.

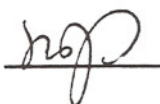
Results:

No cracks occurred on any of the three specimens tested. No bubbles or other defects were observed. No separation or spalling of glass occurred at or near the repaired crack for each of the three specimens tested. The repaired crack remained intact and showed no signs of deterioration.

Conclusion:

The submitted repaired laminated glass met the requirements of Section 4 of ANSI/SAE Z26.1-1990, Boil.

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