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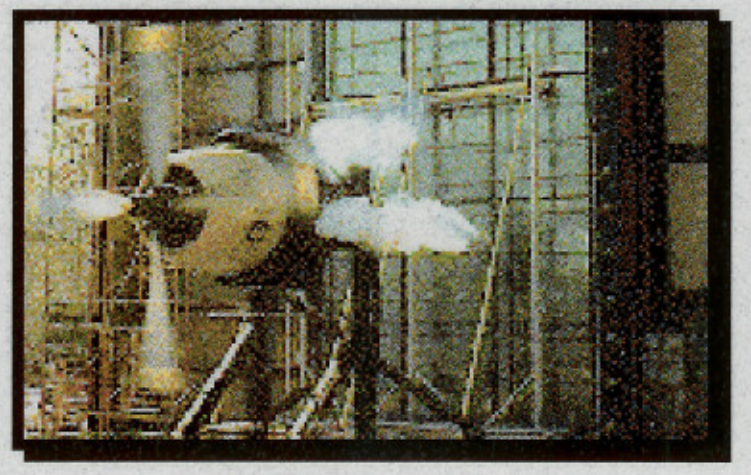

TEST REPORT:

UNITED STATES ALUMINUM PERFORMANCE TESTING
4250 T-THERMAL CURTAIN WALL SYSTEM

Prepared for:

U.S. ALUMINUM CORPORATION
200 Singleton Drive
Waxahachie, Texas 75165-5094

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)ate:	January 20, 1998
'roject:	US Aluminum Product Testing Series 4250 T-Thermal Curtainwall System Performance Testing
:ompletion Date:	July 21, 1997 thru August 13, 1997
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MOCK- UP DESCRIPTION:

The mock-up test specimen was the United States Aluminum, Series 4250 T-Thermal Curtainwall System.

The test specimen was an aluminum grid and glass curtainwall, three lites wide by seven lites high. Basically, a two and a half story system. The glass lites were all inside glazed, the vision lites were 1" sealed, insulated glass units, both inner and outer lites were ¼" tempered glass. The spandrel lites were ¼" thick single tempered glass. The setting profile of the glass was one horizontal band of spandrel glass with two horizontal bands of insulated vision lites above them, thus, repeating the pattern up the mock-up. The specimen was approximately 14'- 10" (4.52 m) wide by 30'- 8 ½" (9.36 m) high.

The system's internal drainage was provided with (2) weep slots per lite of glass, the weep holes were 3/16" x ½" in size and located at 14" from each mullion. The weep slots were backed up by a urethane baffle placed between the glass setting blocks and the back side of the weep slot. The spandrel glass areas had two - 5/16" diameter holes with baffles in the condensation leg for condensation weepage of the backside of the spandrel to exit into the exterior drainage area of the system. These weep holes were also located two per lite and 14" from the mullion. The snap-on exterior horizontal face caps had (1) 5/16" diameter hole located at the center of each member on the bottom flat area for drainage.

The ¼" spandrel glass required the use of aluminum adapters. They were sealed the full length with Dow Corning 795 Silicone, the top of the vertical adapters were sealed to the bottom of the aluminum horizontal above, and bottoms of the vertical adapters were sealed to EVA foam blocks with Dow Corning 795 Silicone.

All horizontals to vertical main frame intersections and jointery within the glazing pocket areas were sealed with Dow Corning 795 Silicone. A custom molded plastic block was installed at each end of all horizontal framing members and all edges and tops of the blocks were sealed, they serve as end dams. The ends of the horizontal framing members were sealed to the vertical face caps. All sealants were Dow Corning 795 Silicone.

A custom plastic cap was installed and sealed at the tops and bottoms of all the vertical mullions.

TEST EQUIPMENT:

1. Test chamber consisted of structural steel beams, columns and bulkheads and was accessible through a bulkhead door.

2. Water was applied to the specimen from a spray rack equipped with swirl-type nozzles spaced two feet on center, both vertically and horizontally, which, under controlled pressure, delivered a minimum of five gallons per square foot per hour on the specimen frontal.

3. Dynamic wind pressures were created by using a Curtis-Wright 3350 Radial Aircraft engine equipped with a four-blade, 13'-6" (4.11 m) propeller, placed approximately 20'-0" (6.10 m) in front of the test specimen.

4. Pressure differentials were created with reversible pumps for positive/negative loading.

5. Pressure differentials between the specimen interior and the atmosphere were measured with manometers.

6. Air infiltration was measured with a Meriam laminar flow element and a Dwyer inclined manometer.

7. Structural deflections and residual movements were measured with dial indicator gauges with maximum move "Stay-Set" follow up hands (maximum movement under load) and "Live Free Movement" active hands for the residual reading, (failure to return).

TESTING SEQUENCE AND PROCEDURES:

	TEST	TEST STANDARD
1.	Preload @ 12.5 psf (.60 kPa)	ASTM E330-96
2.	Air Infiltration Test @ 6.24 psf (.30 kPa)	ASTM E283-91
3.	Static Water Test @ 12.0 psf (.59 kPa)	ASTM E331-93
4.	Dynamic Water Penetration Test @ 12.0 psf (.59 kPa)	AAMA 501.1-94
5.	Uniform Structural Test @ 50% & 100% of Design Load	ASTM E330-96
6.	Air Infiltration Test @ 6.24 psf (.30 kPa)	ASTM E283-91
7.	Static Water Test @ 12.0 psf (.59 kPa)	ASTM E331-93
8.	Dynamic Water Penetration Test @ 12.0 psf (.59 kPa)	AAMA 501.1-94
9.	Inter-story Differential Movement - Phase I	.005 x Span
10.	Air Infiltration Test @ 6.24 psf (.30 kPa)	ASTM E283-91
11.	Static Water Test @ 12.0 psf (.30 kPa)	ASTM E331-93
12.	Dynamic Water Penetration Test @ 12.0 psf (.30 kPa)	AAMA 501.1-94
13.	Structural Proof Loading Test @ 150% of Design Load	ASTM E330-96
14.	Inter-story Differential Movement - Phase II	.010 x Span

Test Loads:

Design Load: 25.0 psf (1.20 kPa) positive **(Inward)** 25.0 psf (1.20 kPa) negative **(Outward)**
Proof Load: 37.5 psf (1.80 kPa) positive **(Inward)** 37.5 psf (1.80 kPa) negative **(Outward)**

TESTING PERFORMED AS FOLLOWS

Applied Pressures:

All positive pressures applied to the test specimen are considered to be **inward** acting and all negative pressures are considered to be **outward** acting. All location references or comments are as viewing the test specimen from the interior (room side) of the test chamber.

1. **Preload:** Per ASTM E330-96 @ 50% Design Load Positive Pressures.

Subject the test specimen to a static pressure differential of **12.5 psf (.60 kPa)**, 50% of full design load, in a positive pressure. This load was maintained for ten (10) seconds and released. An inspection was made to determine if any failure occurred.

Allowables:
No visible deformation in specimen nor loose or disengaged specimen materials after the applied load is released.

Results: No visible differences observed within the Specimen or test chamber, all materials intact.

2. **Air Infiltration Test:** Per ASTM E283-91

The specimen was completely covered with an impervious visqueen material and sealed at the perimeter with tape, thus allowing no movement of air through the specimen.

The exterior face of the specimen was subjected to a positive pressure differential of **6.24 psf (.30 kPa)** Air infiltration was measured and recorded, thus indicating the amount of infiltration through the chamber.

Chamber Reading: **50.5 CFM (.024 m^3/s)**

The visqueen material covering the specimen was removed and the exterior face of the specimen was subjected to a positive pressure differential of **6.24 psf (.30 kPa)**. Air infiltration was measured, thus indicating the amount of infiltration through the chamber and the specimen. Subtracting the previous reading (chamber only) from this reading yields the amount of infiltration through the specimen.

Chamber and Specimen Reading: **64.5 CFM (.030 m^3/s)**

Allowables:
Total amount of air infiltration shall not exceed **.06 CFM** per square foot of the wall area tested.

MAXIMUM ALLOWABLE: **28.22 CFM (.013 m^3/s)** (14'-10" x 31'-8 ½" x .06)

Results:

CHAMBER	SPECIMEN & CHAMBER	SPECIMEN ONLY (YIELD)	ALLOWABLE (NOT TO EXCEED)
50.5 CFM (.024 m^3/s)	64.5 CFM (.030 m^3/s)	14.0 CFM (.007 m^3/s)	28.22 CFM (.013 m^3/s)

3. **Static Water Test @ 12 psf (.50 kPa):** Per ASTM E331-93

Positive pressure differential of **12.0 psf (.59 kPa)**

Water was applied to the exterior face of the specimen at a minimum rate of five gallons per hour per square foot of panel area, in such a way as to completely and continuously cover the face of the specimen. Simultaneously, a positive **inward** differential static pressure of **12.0 psf (.59 kPa)** was applied against the face. The application of pressure and water was maintained for a period of fifteen (15) minutes, with observers inside the chamber checking for water penetration.

Allowables:
There shall be no uncontrolled water penetration during or at the conclusion of this test.

Note:
"Uncontrollable water" is defined as any uncontrolled water that appears on any normally exposed interior surfaces, that is not contained or drained back to the exterior, or that can cause damage to adjacent materials or finishes. Water contained within drained flashings, gutters, and sills is not considered water leakage. The collection of up to one half (1/2) ounce of water (14.8 cc) in a fifteen (15) minute test period on top of any interior stop or stool integral with the wall system shall not be considered water leakage.

Results: No leakage observed.

4. **Dynamic Water Penetration Test:** Similar to AAMA 501.1-94

65 -75 Miles per hour slipstream for 15 minutes @ 12 psf (.59 kPa)

Water was applied to the exterior face of the specimen at a minimum rate of five (5) gallons per hour per square foot of wall area, in such a way as to completely and continuously cover the face of the specimen.

Simultaneously, the wall was subjected to sufficient air flow from an aircraft engine with a four bladed propeller, approximately 13'-6" (4.11 m) in diameter, approximately 20'-0" (6.10 m) in front of the specimen. The application of air flow and water was maintained for a period of fifteen (15) minutes, with observers inside the chamber checking for water penetration.

Allowable:
There shall be no uncontrolled water penetration during or at the conclusion of this test.

Results: No leakage observed.

5. **Uniform Structural Test @ 50% & 100% of Design Load:** per ASTM E330-96

Dial indicators were installed to measure deflection and residuals at ends and mid spans of the typical framing members.

Test: With the specimen set in a positive mode, all indicators were set on zero. A positive pressure of **12.5 psf (.60 kPa) (inward)** equal to 50% of the design load, was applied and held for ten (10) seconds then released. The indicators were read and the data recorded.

Results: Refer to Structural Reading Chart.

Test: Pressure was increased to positive **25.0 psf (1.2 kPa) (inward)** equal to 100% of design load, applied and held for ten (10) seconds then released. The indicators were read and the data recorded.

Results: Refer to Structural Reading Chart.

The vacuum/blower pumps were reversed and set to perform in a negative mode. The test specimen was subjected to a negative pressure of **12.5 psf (.60 kPa) (outward)** equal to 50% of design load to set the specimen in a negative mode. The pressure was held for ten (10) seconds and released.

Test: With all indicators set on zero, the test specimen was subjected to a negative pressure of **12.5 psf (.60 kPa)**, **(outward)** equal to 50% of design load. The pressure was held for ten (10) seconds and released. The indicators were read and data recorded.

Results: Refer to Structural Reading Chart.

Test: Pressure was increased to negative **25.0 psf (1.2 kPa)** **(outward)** equal to 100% of the design load, held for ten (10) seconds and released. The indicators were read and data recorded.

Results: Refer to Structural Reading Chart.

Reset wall in a positive mode at **12.5 psf (.60 kPa)** - held for (10) seconds and released.

Allowable:
There shall be no system failure and deflection of aluminum members shall not exceed L/175 or .750" (19.0 mm) maximum, whichever is less.

Vertical Span 156"/175 = 0.891" (22.6 mm)
Vertical Maximum Allowable = 0.750" (19.0 mm)

Horizontal Span 56"/175 = 0.320" (8.1 mm)
Horizontal Maximum Allowable = 0.320". (8.1 mm)

STRUCTURAL READING CHART
(Deflections in Hundreds of an inch)

Indicator # Locator		Length of Span	Uniform Structural Test						Structural Proof Loading Test	
			50% Design Load		100% Design Load				150% Design Load	
			12.5 psf	Residual	25 psf	Residual	Net	Allowable	37.5 psf	Residual
#1	*Positive*		+0.00	+0.00	+0.00	+0.00			+0.00	+0.00
	Negative		-0.00	-0.00	-0.01	-0.00			-0.00	-0.00
#2	*Positive*		+0.00	+0.00	+0.02	+0.00			+0.07	+0.01
	Negative		-0.00	-0.00	-0.03	-0.02			-0.06	-0.03
#3	*Positive*		+.27	+0.02	+.62	+0.07	.58	.750	+.76	+0.09
	Negative		-.28	-0.02	-.65	-0.09	.61	.750	-.71	-.10
#4	*Positive*		+.19	+0.02	+.40	+0.04			+.46	+0.05
	Negative		-.19	-0.01	-.46	-0.06			-.49	-.11
#5	*Positive*		+.17	+0.02	+.39	+0.05			+.47	+0.07
	Negative		-.16	-0.01	-.31	-0.05			-.43	-.10
#6	*Positive*		+0.02	+0.00	+0.05	+0.00			+0.09	+0.02
	Negative		-0.01	-0.00	-0.05	-0.00			-.40	-0.08
#7	*Positive*		+.30	+0.00	+.66	+0.00	.62	.750	+.89	+0.04
	Negative		-.22	-0.01	-.55	-0.08	.52	.750	-.65	-0.00
#8	*Positive*		+0.00	+0.00	+0.00	+0.00			+0.01	+0.00
	Negative		-0.00	-0.00	-0.00	-0.00			-0.00	-0.00
#9	*Positive*		+0.00	+0.00	+0.00	+0.00			+0.00	+0.00
	Negative		-0.00	-0.00	-0.00	-0.00			-0.00	-0.00
#10	*Positive*		+.23	+0.00	+.40	+0.01			+.52	+0.01
	Negative		-.20	-0.00	-.37	-0.01			-.48	-0.01
#11	*Positive*		+0.01	+0.00	+0.02	+0.00			+0.05	+0.01
	Negative		-0.01	-0.00	-0.01	-0.00			-0.03	-0.01
#12	*Positive*		+.27	+0.01	+.53	+0.02			+.75	+0.03
	Negative		-.26	-0.01	-.49	-0.02			-.71	-0.03
#13	*Positive*		+0.01	+0.00	+0.02	+0.00			+0.03	+0.00
	Negative		-0.01	-0.00	-0.00	-0.00			-0.02	-0.00

STRUCTURAL READING CHART
(Deflections in Millimeters)

Indicator #		Length	Uniform Structural Test						Structural Proof Loading Test	
			50% Design Load		100% Design Load				150% Design Load	
Locator		of Span	.60 kPa	Residual	1.20 kPa	Residual	Net	Allowable	1.80 kPa	Residual
#1	*Positive*		+0.0	+0.0	+0.0	+0.0			+0.0	+0.0
	Negative		-0.0	-0.0	-0.25	-0.0			-0.0	-0.0
#2	*Positive*		+0.0	+0.0	+0.51	+0.0			+1.78	+0.25
	Negative		-0.0	-0.0	-0.76	-0.51			-1.52	-0.76
#3	*Positive*		+6.86	+0.51	+15.75	+1.78	14.7	19.0	+19.30	+2.27
	Negative		-7.11	-0.51	-16.51	-2.29	15.5	19.0	-18.03	-2.54
#4	*Positive*		+4.83	+0.51	+10.16	+1.02			+11.68	+2.67
	Negative		-4.83	-0.25	-11.68	-1.52			-12.44	-2.79
#5	*Positive*		+4.32	+0.51	+9.91	+1.27			+11.94	+1.78
	Negative		-4.06	-0.25	-7.87	-1.27			-10.92	-2.54
#6	*Positive*		+0.51	+0.0	+1.27	+0.0			+2.29	+0.51
	Negative		-0.25	-0.0	-1.27	-0.0			-3.56	-2.03
#7	*Positive*		+7.62	+0.0	+16.76	+0.0	15.7	19.0	+22.61	+1.02
	Negative		-5.59	-0.25	-13.97	-2.03	13.2	19.0	-16.51	-0.0
#8	*Positive*		+0.0	+0.0	+0.0	+0.0			+0.25	+0.0
	Negative		-0.0	-0.0	-0.0	-0.0			-0.0	-0.0
#9	*Positive*		+0.0	+0.0	+0.0	+0.0			+0.0	+0.0
	Negative		-0.0	-0.0	-0.0	-0.0			-0.0	-0.0
#10	*Positive*		+5.84	+0.0	+10.16	+0.25			+13.21	+0.25
	Negative		-5.08	-0.0	-9.40	-0.25			-12.91	-0.25
#11	*Positive*		+0.25	+0.0	+0.51	+0.0			+1.27	+0.25
	Negative		-0.25	-0.0	-0.25	-0.0			-0.76	-0.25
#12	*Positive*		+6.86	+0.25	+13.46	+0.51			+19.05	+0.76
	Negative		-6.60	-0.25	-12.44	-0.51			-18.03	-0.76
#13	*Positive*		+0.25	+0.0	+0.51	+0.0			+0.76	+0.0
	Negative		-0.25	-0.0	-0.0	-0.0			-0.51	-0.0

NR = No Reading

DIAL INDICATOR LOCATIONS AND DESCRIPTIONS

LOCATION OF DIAL INDICATORS	DESCRIPTION
1	Bottom of Mullion @ Sill Beam Connection
2	Lower Steel Beam Anchor Location of Mullion
3	Mid-Span of Lower Mullion Between Beam Anchors
4	Top of Mullion Below Structural Control Joint
5	Bottom of Mullion Above Structural Control Joint
6	Mid-Steel Beam Anchor Location
7	Mid-Span of Upper Mullion Between Beam Anchors
8	Upper Steel Beam Anchor Location of Mullion
9	Center Point of ¼" Spandrel Glass
10	Mid-Span of Horizontal 1" Vision over ¼" Spandrel (Net)
11	Center Point of 1" Vision Glass
12	Mid-Span of Horizontal 1" Vision over 1" Vision (Net)
13	Top of Mullion at Header Connection

See Appendix A for a diagram showing specific indicator locations.

6. **Air Infiltration Test:** Per ASTM E283-91 (Following Uniform Structural Loading)

The specimen was completely covered with an impervious visqueen material and sealed at the perimeter with tape, thus allowing no movement of air through the specimen.

The exterior face of the specimen was subjected to a positive pressure differential of **6.24 psf (.30 kPa)** Air infiltration was measured and recorded, thus indicating the amount of infiltration through the chamber.

Chamber Reading: **50 CFM (.024 m^3/s)**

The visqueen material covering the specimen was removed and the exterior face of the specimen was subjected to a positive pressure differential of **6.24 psf (.30 kPa)**. Air infiltration was measured, thus indicating the amount of infiltration through the chamber and the specimen. Subtracting the previous reading (chamber only) from this reading yields the amount of infiltration through the specimen.

Chamber & Specimen Reading: **58.0 CFM (.027 m^3/s)**

Allowable:
Total amount of air infiltration shall not exceed **.06 CFM** per square foot of the wall area tested.

MAXIMUM ALLOWABLE **28.22 CFM (.013 m^3/s)** (14'-10" x 31'-8 ½" x .06)

Results:

CHAMBER	SPECIMEN & CHAMBER	SPECIMEN ONLY (YIELD)	ALLOWABLE (NOT TO EXCEED)
50.0 CFM (.024 m^3/s)	58.0 CFM (.027 m^3/s)	8.0 CFM (.003 m^3/s)	28.22 CFM (.013 m^3/s)

7. **Static Water Test @ 12 psf (.59 kPa):** Per ASTM E331-93

Positive pressure differential of **12.0 psf (.59 kPa)**

Water was applied to the exterior face of the specimen at a minimum rate of five gallons per hour per square foot of panel area, in such a way as to completely and continuously cover the face of the specimen. Simultaneously, a positive **inward** differential static pressure of **12.0 psf (.59 kPa)** was applied against the face. The application of pressure and water was maintained for a period of fifteen (15) minutes, with observers inside the chamber checking for water penetration.

Allowables:
There shall be no uncontrolled water penetration during or at the conclusion of this test.

Note:
"Uncontrollable water" is defined as any uncontrolled water that appears on any normally exposed interior surfaces, that is not contained or drained back to the exterior, or that can cause damage to adjacent materials or finishes. Water contained within drained flashings, gutters, and sills is not considered water leakage. The collection of up to one half (1/2) ounce of water (14.8 cc) in a fifteen (15) minute test period on top of any interior stop or stool integral with the wall system shall not be considered water leakage.

Results: No uncontrolled water observed. One water leak was observed at the bottom right area of the sill beam. The water, approximately ¼ oz., had entered through the perimeter sealant joint at aluminum to sealant.

8. **Dynamic Water Penetration Test:** Similar to AAMA 501.1-94

65-75 Miles per hour slipstream for 15 minutes @ 12 psf (.59 kPa)

Water was applied to the exterior face of the specimen at a minimum rate of five (5) gallons per hour per square foot of wall area, in such a way as to completely and continuously cover the face of the specimen.

Simultaneously, the wall was subjected to sufficient air flow from an aircraft engine with a four bladed propeller, approximately 13'-6" (4.11 m) in diameter, approximately 20'-0" (6.10 m) in front of the specimen. The application of air flow and water was maintained for a period of fifteen (15) minutes, with observers inside the chamber checking for water penetration.

Allowable:
There shall be no uncontrolled water penetration during or at the conclusion of this test.

Results: No leakage observed.

9. **Inter-story Differential Movement Test - Phase I:**

The specimen is subjected to the movement of .005 x span for the following cycle:

Moved Lower Beam to the Left 3/8" (9.53 mm) from center.
Moved Upper Beam to the Right 3/8" (9.53 mm) from center.
Moved Upper Beam to the Left 3/8" (9.53 mm) past center.
Moved Lower Beam to the Right 3/8" (9.53 mm) past center.
Moved Lower Beam to the Left 3/8" (9.53 mm) past center.

Concluded One Cycle - Repeated for two more cycles.

Results: Specimen remained intact, no glass breakage or metal disengagement observed.

10. **Air Infiltration Test:** Per ASTM E283-91

The specimen was completely covered with an impervious visqueen material and sealed at the perimeter with tape, thus allowing no movement of air through the specimen.

The exterior face of the specimen was subjected to a positive pressure differential of **6.24 psf (.30 kPa)**. Air infiltration was measured and recorded, thus indicating the amount of infiltration through the chamber.

Chamber Reading: **50.0 CFM (.024 m^3/s)**

The visqueen material covering the specimen was removed and the exterior face of the specimen was subjected to a positive pressure differential of **6.24 psf (.30 kPa)**. Air infiltration was measured, thus indicating the amount of infiltration through the chamber and the specimen. Subtracting the previous reading (chamber only) from this reading yields the amount of infiltration through the specimen.

Chamber and Specimen Reading: **63.0 CFM (.030 m^3/s)**

Allowable:
Total amount of air infiltration shall not exceed **.06 CFM** per square foot of the wall area tested.

MAXIMUM ALLOWABLE **28.22 CFM (.013 m^3/s)** (14'-10" x 31'-8 ½" x .06)

Results:

CHAMBER	SPECIMEN & CHAMBER	SPECIMEN ONLY (YIELD)	ALLOWABLE (NOT TO EXCEED)
50.0 CFM (.024 m^3/s)	63.0 CFM (.030 m^3/s)	13.0 CFM (.006 m^3/s)	28.22 CFM (.013 m^3/s)

11. **Static Water Test @ 12 psf:** Per ASTM E331-93

Positive pressure differential of **12.0 psf (.59 kPa)**

Water was applied to the exterior face of the specimen at a minimum rate of five gallons per hour per square foot of panel area, in such a way as to completely and continuously cover the face of the specimen. Simultaneously, a positive **inward** differential static pressure of **12.0 psf (.59 kPa)** was applied against the face. The application of pressure and water was maintained for a period of fifteen (15) minutes, with observers inside the chamber checking for water penetration.

Allowables:
There shall be no uncontrolled water penetration during or at the conclusion of this test.

Note:
"Uncontrollable water" is defined as any uncontrolled water that appears on any normally exposed interior surfaces, that is not contained or drained back to the exterior, or that can cause damage to adjacent materials or finishes. Water contained within drained flashings, gutters, and sills is not considered water leakage. The collection of up to one half (1/2) ounce of water (14.8 cc) in a fifteen (15) minute test period on top of any interior stop or stool integral with the wall system shall not be considered water leakage.

Results: No uncontrolled water observed. A small leak developed at the right jamb mullion where the mullion control joint occurs.

12. **Dynamic Water Penetration Test:** Similar to AAMA 501.1-94

65-75 Miles per hour slipstream for 15 minutes @ 12 psf (.59 kPa)

Water was applied to the exterior face of the specimen at a minimum rate of five (5) gallons per hour per square foot of wall area, in such a way as to completely and continuously cover the face of the specimen.

Simultaneously, the wall was subjected to sufficient air flow from an aircraft engine with a four bladed propeller, approximately 13'-6" (4.11 m) in diameter, approximately 20'-0" (6.10 m) in front of the specimen. The application of air flow and water was maintained for a period of fifteen (15) minutes, with observers inside the chamber checking for water penetration.

Allowable:
There shall be no uncontrolled water penetration during or at the conclusion of this test.
Note:
"Uncontrollable water" is defined as any uncontrolled water that appears on any normally exposed interior surfaces, that is not contained or drained back to the exterior, or that can cause damage to adjacent materials or finishes. Water contained within drained flashings, gutters, and sills is not considered water leakage. The collection of up to one half (1/2) ounce of water (14.8 cc) in a fifteen (15) minute test period on top of any interior stop or stool integral with the wall system shall not be considered water leakage.

Results: No uncontrolled water observed. The only water observed was in the sill gutter of lite #11, spandrel glass. Approximately 1 oz. of water entered into the gutter area via the baffled weep holes.

13. **Uniform Structural Proof Load @ 150% of design load:** Per ASTM E330-96

150% of design load = **37.5 psf (1.80 kPa)** positive **37.5 psf (1.80 kPa)** negative

The test specimen was set in a positive testing mode by applying a positive load of **18.75 psf (.90 kPa)**, which equals 75% of design load.

Test: With all indicators set on zero, a positive pressure of **37.5 psf (1.80 kPa)**, 150% design load was applied and held for ten (10) seconds, then released, all dial indicators were read and recorded.

Results: Refer to Structural Reading Charts, pages 9 and 10.

The specimen was then set in a negative testing mode by applying a negative load of **18.75 psf (.90 kPa)**, which equals 75% of design load.

Test: With all indicators set on zero, a negative pressure of **37.5 psf (1.80 kPa)**, 150% of design load, was applied and held for ten (10) seconds, then released. All indicators were read and data recorded.

Results: Refer to Structural Reading Charts, pages 9 and 10.

Allowable:
No system failure or permanent set of framing members greater than .2% of clear span.

Vertical Span = 156" x .2% = 0.312" (7.92 mm)
Vertical Maximum Allowable = 0.312" (7.92 mm)

Horizontal Span = 56" x .2% = 0.112" (2.84 mm)
Horizontal Maximum Allowable = 0.112" (2.84 mm)

14. Inter-story Differential Movement Test - Phase II:

The specimen is subjected to the movement of .010 x span for the following cycle:

Moved Lower Beam to the Left 3/4" (19.0 mm) from center.
Moved Upper Beam to the Right 3/4" (19.0 mm) from center.
Moved Upper Beam to the Left 3/4" (19.0 mm) past center.
Moved Lower Beam to the Right 3/4" (19.0 mm) past center.
Moved Lower Beam to the Left 3/4" (19.0 mm) past center.

This completed one complete cycle. This was completed for two more cycles. Three cycles were completed.

Results: All of the specimen stayed intact, no glass breakage or metal disengagement observed.

CONCLUSION

Testing completed - The tested specimen performed within the specified criteria.

Respectfully submitted,

CONSTRUCTION CONSULTING LABORATORY, *INTERNATIONAL*

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JOSEPH P. SOLINSKI
PRESIDENT

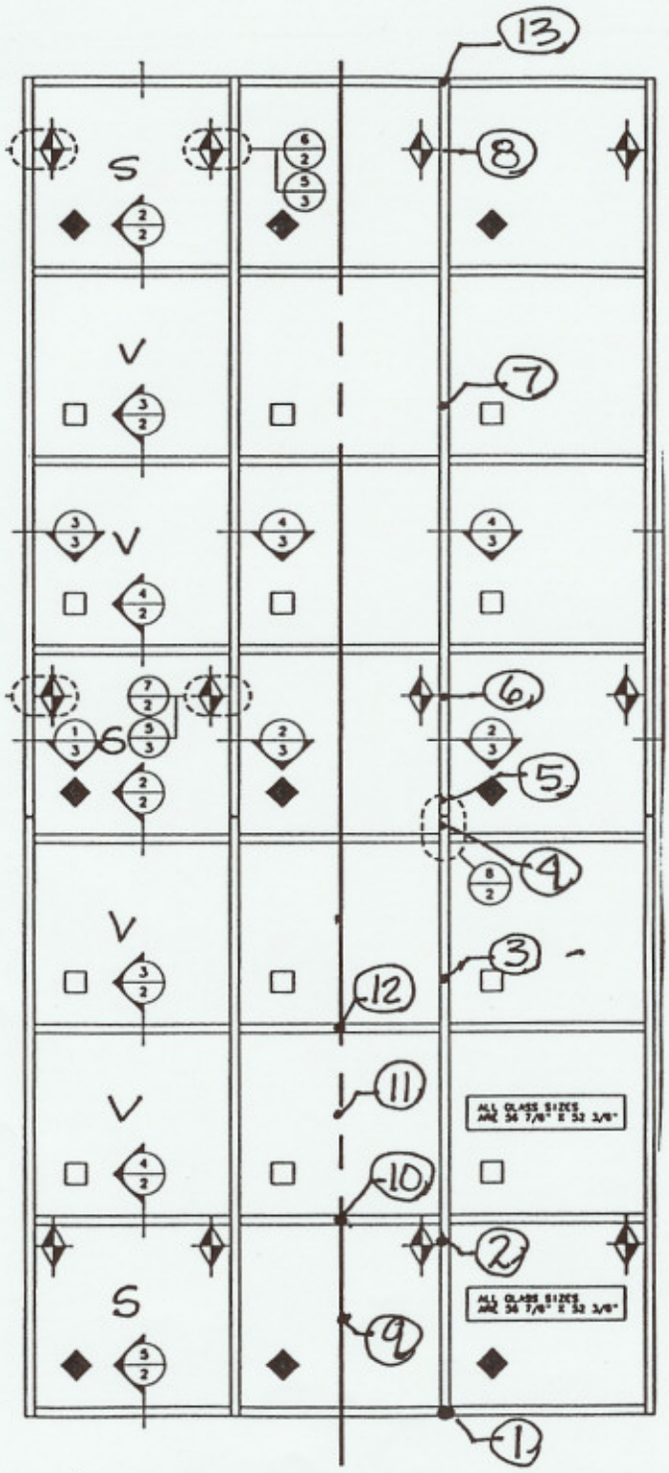
APPENDIX A

- **DIAL INDICATOR LOCATION DIAGRAM**

UNITED STATES ALUMINUM PERFORMANCE TESTING

4250 T-THERMAL CURTAIN WALL SYSTEM

January 20, 1998



S= ¼" Spandrel Tempered

V = 1" Vision Tempered Insulated

INTERIOR VIEW OF CURTAIN WALL
DIAL INDICATOR LOCATIONS