

**GUARDRAIL SYSTEM PERFORMANCE  
TEST REPORT**

**Rendered to:**

**CUSTOM DECORATIVE MOULDING  
PRODUCT: *Monumental* 12 ft. Polyurethane Guardrail System**

**Report No: 66634.01-119-19  
Report Date: 10/26/06**

## GUARDRAIL SYSTEM PERFORMANCE TEST REPORT

Rendered to:

CUSTOM DECORATIVE MOULDING  
12136 Sussex Highway  
Greenwood, Delaware 19950

Report No.: 66634.01-119-19  
Test Date: 07/19/06  
Report Date: 10/26/06

**Product:** *Monumental* 12 ft. Polyurethane Guardrail System

**Project Summary:** Architectural Testing, Inc. (ATI) was contracted by Custom Decorative Moulding to conduct structural performance tests on their *Monumental* Polyurethane guardrail system. The system was evaluated for the design load requirements of the following Acceptance Criteria:

ICC-ES AC174 (effective July 1, 2005) - *Acceptance Criteria for Deck Board Span Ratings and Guardrail Systems (Guards and Handrails)*

Testing was limited to satisfying the minimum load requirements of Section 3.5 *Guardrail System (Guard and Handrail) Performance Rating*.

All tests performed were to evaluate structural performance of the guardrail assembly to carry and transfer imposed loads to the supports. The test specimen evaluated included the balusters, rails and rail brackets. Support posts were not included in the test specimen. Tests specimens were provided by Custom Decorative Moulding.

**Test Specimen (Guardrail Assembly) Description:** The guardrail consisted of polyurethane foam top and bottom rails reinforced with G005 extruded aluminum U-channel with a nominal length of 12'. The top rail also utilized a 4" wide extruded aluminum Assembly Beam, which ran the entire length of the rail for additional reinforcement, see Photo No. 6. The guardrail measured 40.25" high overall bottom rail to top rail with a nominal height of 42" from the ground. Balusters, consisting of Polyurethane foam reinforced with hardwood, attached into the top and bottom rails with #12 x 4" screws at 6" off center. The rails were attached to 2" x 8" wood supports for testing. The top rail brackets were flat aluminum plates fastened by two (2) #10 x 2.5" stainless steel pan-head self-drilling screws to the wood supports and two (2) #10 x 1" flat head screws to the Top Rail Assembly Beam. The bottom rail brackets were aluminum L-brackets fastened by one (1) 5/16" x 3" lag screw to the wood supports and two (2) #8 x 3/4" stainless steel flat head self-tapping screws to the bottom rail U-channel. Refer to Photos No. 3 through No. 5.

**Equipment:** The guardrail assembly was tested in a self-contained structural frame designed to accommodate anchorage of the guardrail assembly and application of the required test loads. The specimen was loaded using an electric winch mounted to a rigid steel test frame. High strength steel cables, nylon lifting straps and load distribution beams were used to impose test loads on the specimen. Applied load was measured using an electronic load cell located in-line within the loading system.

**Set-Up:** The guardrail assembly was installed and tested as a single railing section by directly securing the rails onto the wooden supports that were clamped into the steel test frame. The test fixture rigidly restrained the supports from deflecting. The uniform distributed load test was simulated with 1/4-point loading. Refer to Photos No. 1 and No. 2.

**Test Procedure:** The test specimen was inspected prior to testing to verify size and general condition of the materials, assembly and installation. No potentially compromising defects were observed prior to the load test. After visual inspection, the specimen was brought to a load of 2.5 times the design load in a time span greater than ten seconds and held for duration of at least one minute. Applied load was continuously recorded during the tests.

**Test Results:** The following tests were performed on the guardrail assemblies for the design load requirements of AC174. All loads were horizontal. The test results apply only to the components tested, which include the top rail, bottom rail, rail brackets and balusters. Posts were not a tested component and were not included in the test specimens.

<b>12 ft x 42 in Guardrail</b> <b>Test No. 1 - 07/19/06</b> <b>Design Load: 50 lb / 1 Square Ft. of In-Fill at Center of Two Balusters</b>			
Load Level (lb)	Test Load (lb)	E.T. (min:sec)	Sustained load greater than 125 lb for a minimum of one minute.
2.5x Design Load = 125	131 - 164	0:29 - 1:58	

<b>12 ft x 42 in Guardrail</b> <b>Test No. 2 - 07/19/06</b> <b>Design Load: 50 lb / 1 Square Ft. of In-Fill at Bottom of Two Balusters</b>			
Load Level (lb)	Test Load (lb)	E.T. (min:sec)	Sustained load greater than 125 lb for a minimum of one minute.
2.5x Design Load = 125	126 - 136	0:16 - 1:57	

<b>12 ft x 42 in Guardrail</b> <b>Test No. 3 - 07/19/06</b> <b>Design Load: 50 lb per linear foot x 12 feet = 600 lb</b>			
Load Level (lb)	Test Load (lb)	E.T. (min:sec)	Sustained load greater than 1,500 lb for a minimum of one minute.
2.5x Design Load = 1,500	1,503 - 1,530	0:56 - 1:57	

**Summary and Conclusions:** The 12 ft *Monumental* Guardrail system and components tested and reported herein sustained loads equal to or greater than 2.5 times the design loads specified by the referenced Acceptance Criteria.

A copy of this report and all supporting data will be retained by ATI for a period of four years. This report is the exclusive property of the client so named herein and is applicable only to the sample tested. Results obtained are tested values and do not constitute an opinion or endorsement by this laboratory. This report may not be reproduced, except in full, without the written approval of Architectural Testing.

For ARCHITECTURAL TESTING, INC.

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Matthew D. Freeborn  
Technician

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David H. Forney, P.E.  
Senior Project Engineer

MDS:mds/nlb

Attachments (pages)

Appendix A - Drawings (7)

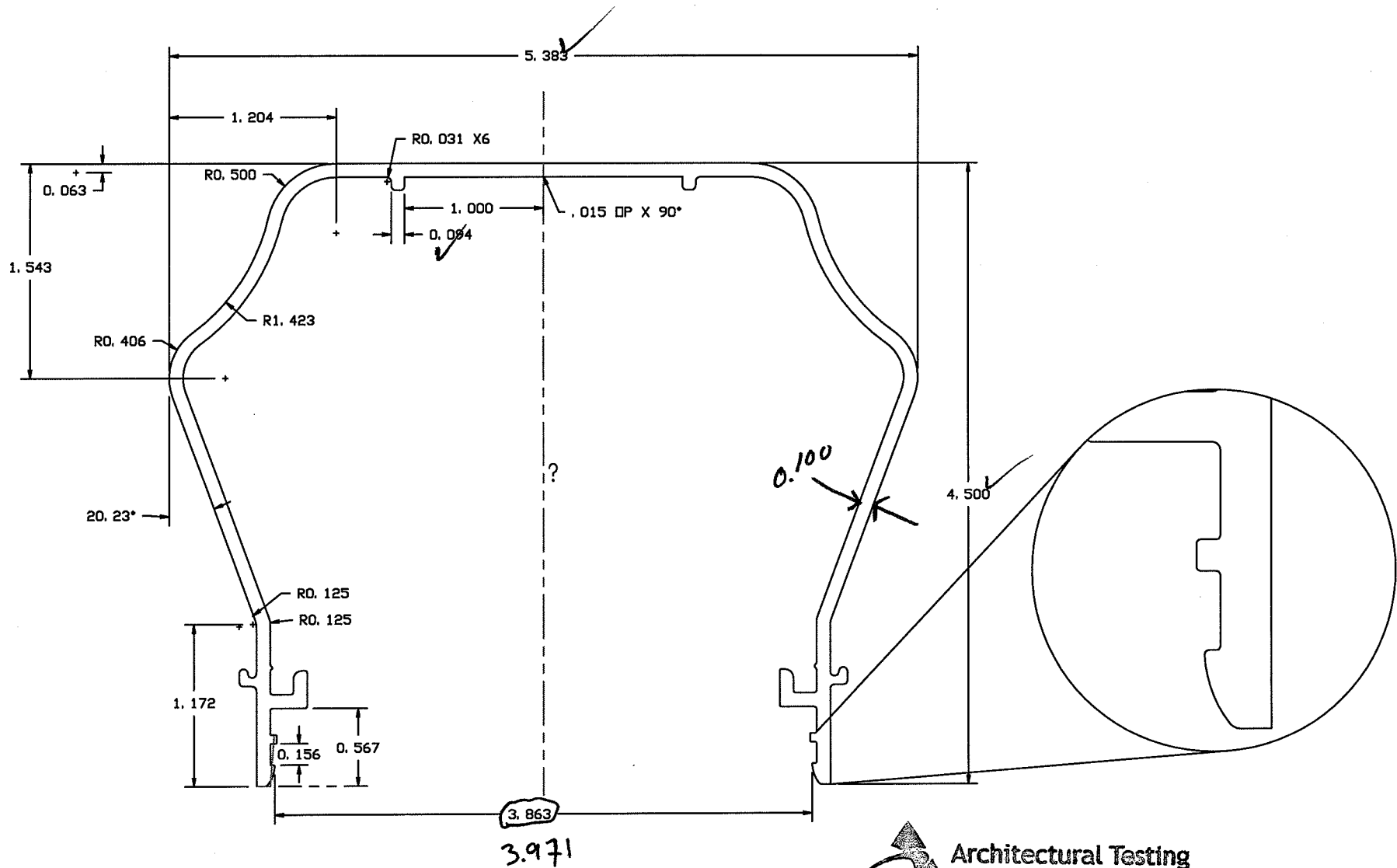
Appendix B - Photographs (3)

### Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
0	10/26/06	N/A	Original report issue

**APPENDIX A**

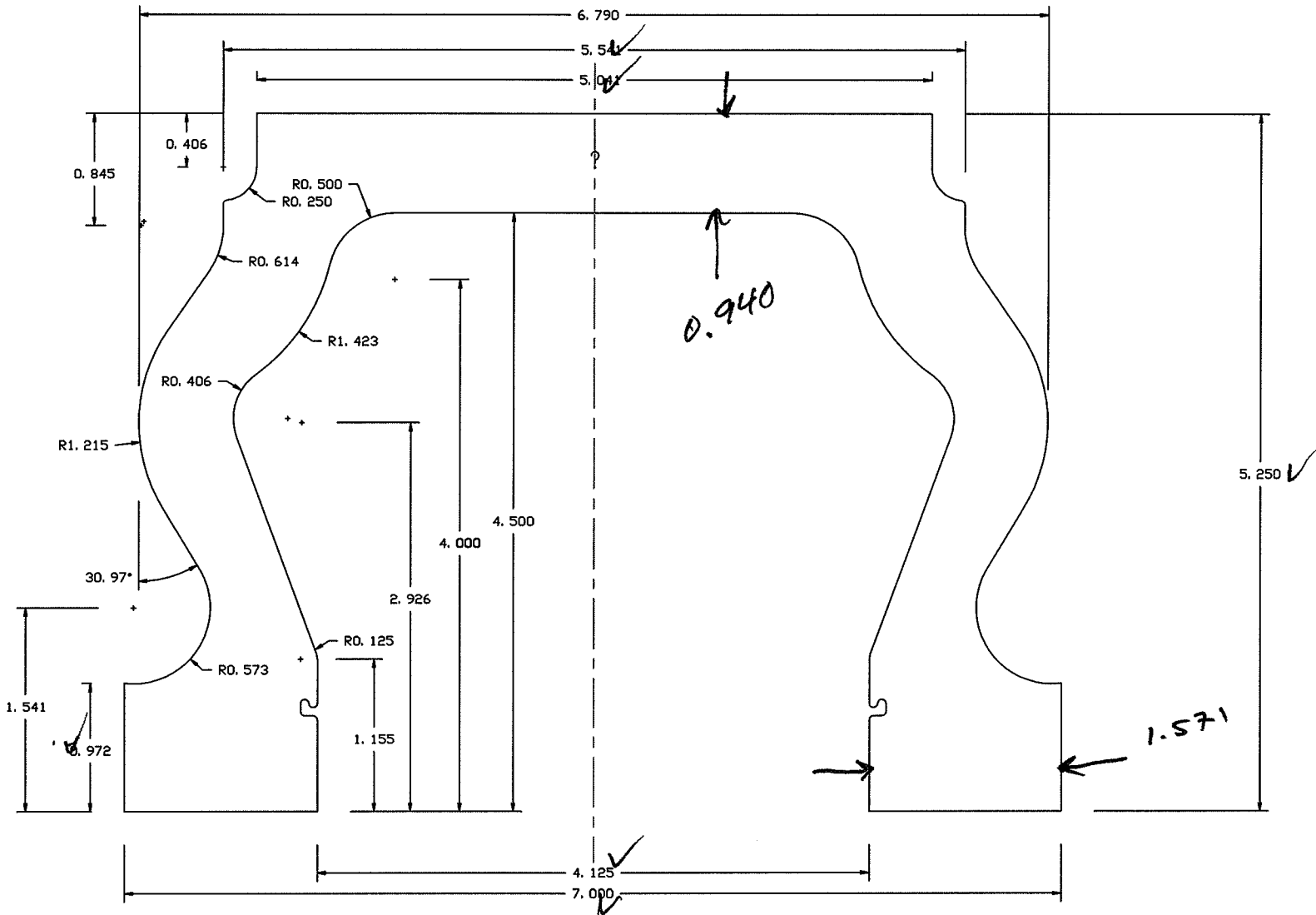
**Drawings**





 **Architectural Testing**

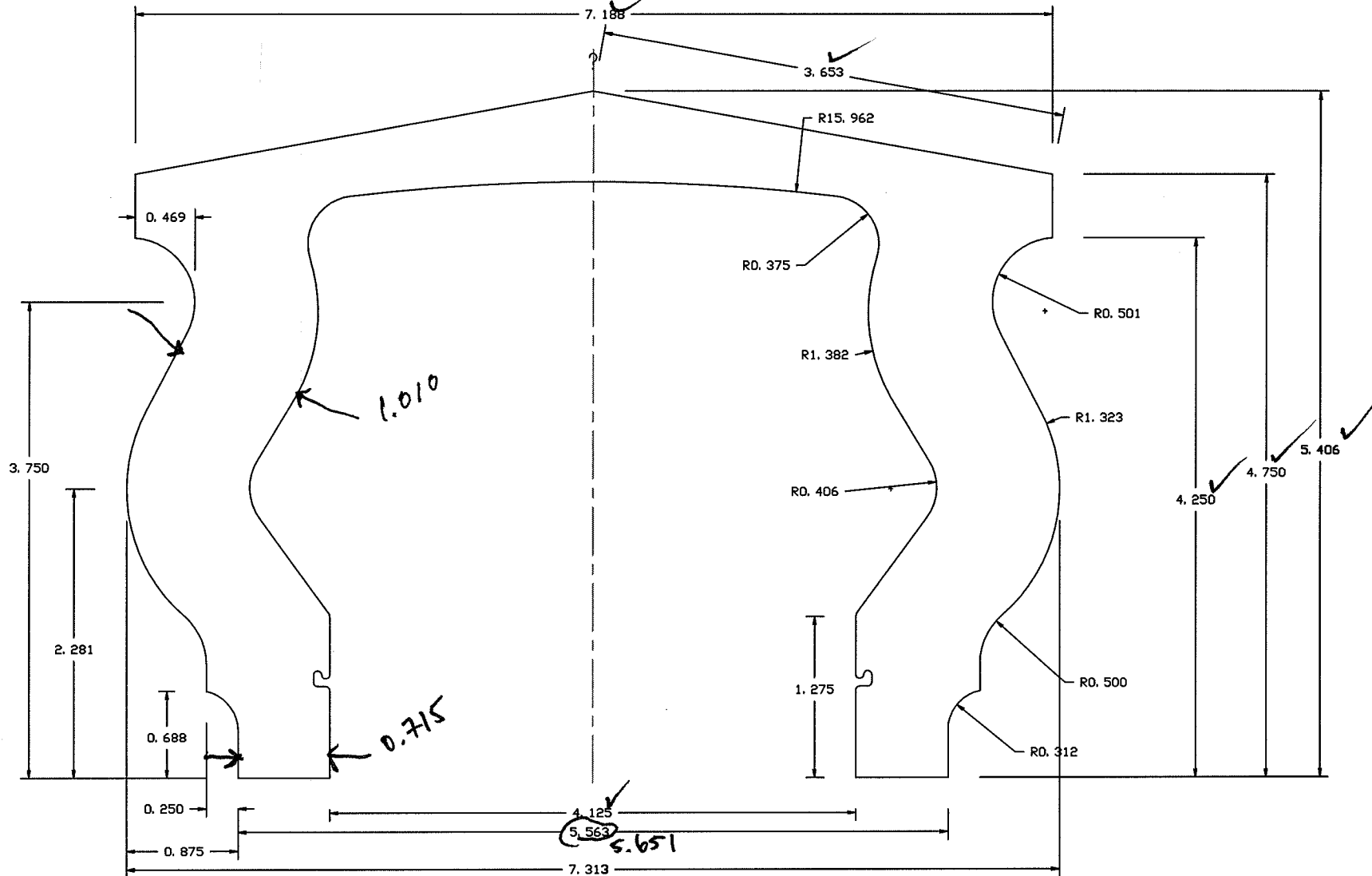
Test sample complies with these details.  
Deviations are noted.

Report# 66634.01-119-19  
Date 8/31/06 Tech MDF



Custom Decorative Mouldings 	DWG #: MRS-PBR		CDM #: MRS-PBR	
			INV #:	
	PROJECT: MONUMENTAL POLY BOTTOM RAIL			
	SCALE: 10"=1'		DATE: 06-16-2004	
	DRAWN BY: Craig H.		REVISED	INITIALS
	CHECKED BY:			
	MASTER FINISH DATE:			
	NOTE: 12.375 square in			

 **Architectural Testing**  
 Test sample complies with these details.  
 Deviations are noted.  
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 Date 8/31/06 Tech MDF



Custom Decorative  
Mouldings

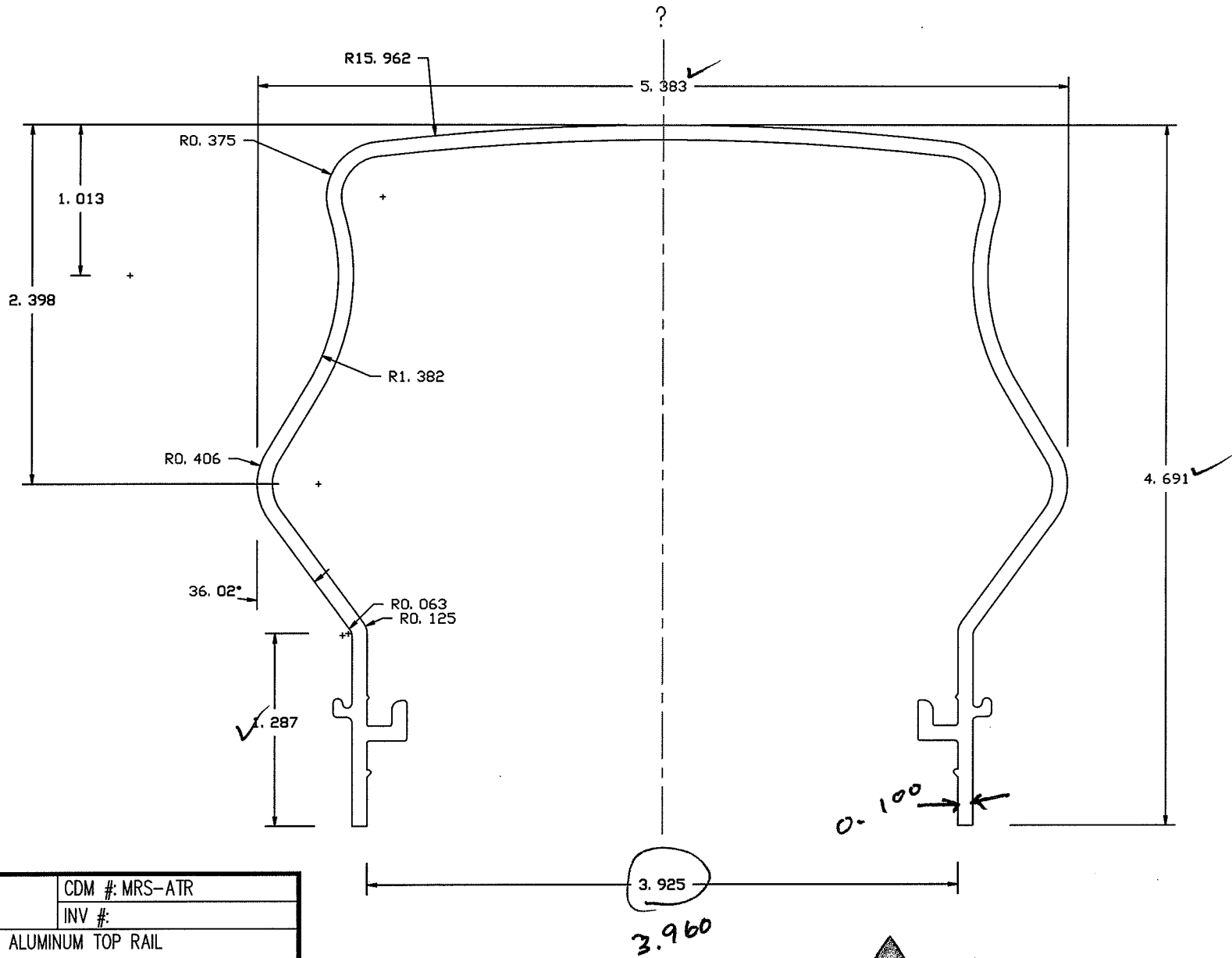
DWG #: MRS-PBR	CDM #: MRS-PBR
	INV #:
PROJECT: MONUMENTAL POLY TOP RAIL	
SCALE: 10"=1'	DATE: 06-16-2004
DRAWN BY: Craig H.	REVISED
CHECKED BY:	INITIALS
MASTER FINISH DATE:	
NOTE: 10.291 square in	



**Architectural Testing**

Test sample complies with these details.  
Deviations are noted.

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Date 8/31/06 Tech MDF

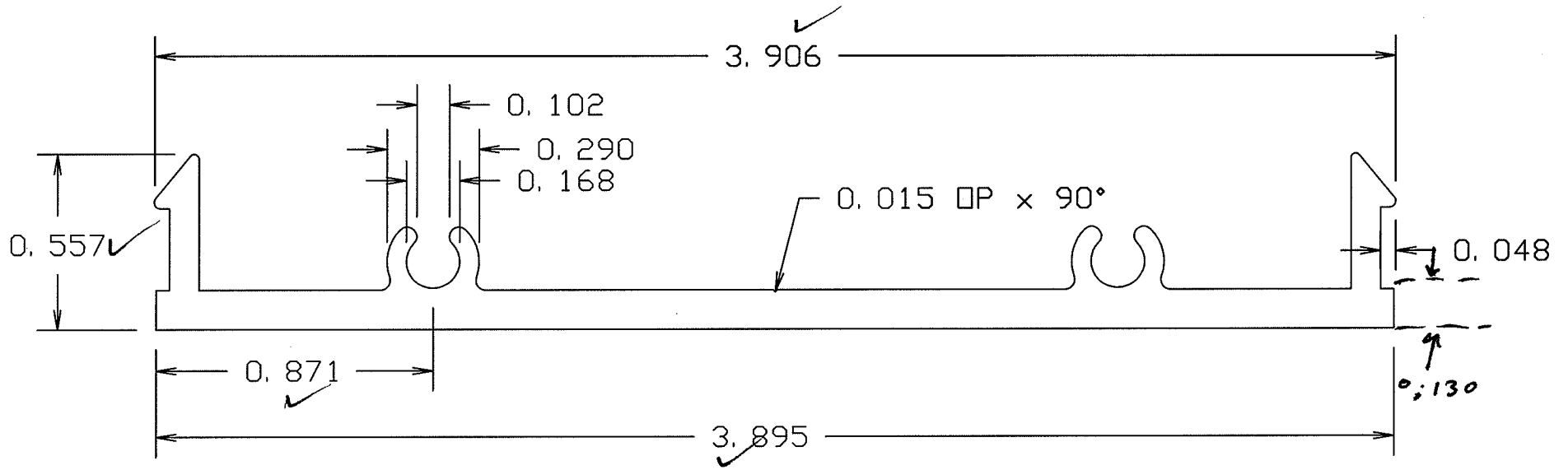


Custom Decorative Mouldings	DWG #: MRS-ATR	CDM #: MRS-ATR
		INV #:
	PROJECT: MONUMENTAL ALUMINUM TOP RAIL	
SCALE: 1"=1"	DATE: 06-16-2004	
DRAWN BY: Craig H.	REVISED	INITIALS
CHECKED BY:		
MASTER FINISH DATE:		
NOTE:		




Test sample complies with these details.  
 Deviations are noted.

Report# 66634.01-119-19  
 Date 0/31/06 Tech MDF



Test sample complies with these details.  
Deviations are noted.

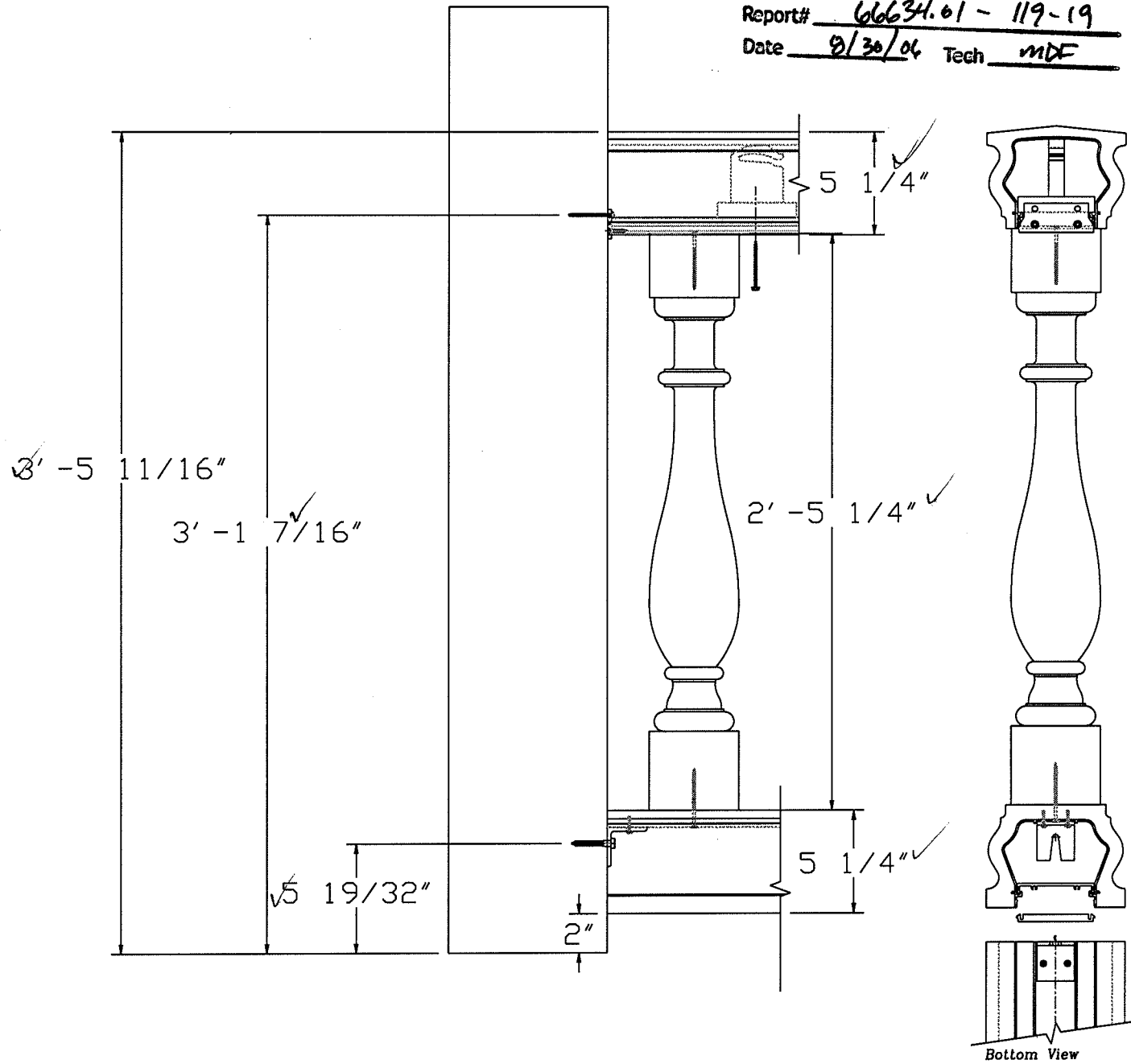
Report# 66634.01-119-19  
Date 8/31/06 Tech MDF


Custom Decorative Mouldings 	DWG #: MRS-AP	CDM #: MRS-AP/8,10,or12		
		INV #:		
	PROJECT: ALUMINUM TOP RAIL ASSEMBLY BEAM			
	SCALE: 2"=1"		DATE: 06-16-2004	
	DRAWN BY: Craig H.		REVISED	INITIALS
	CHECKED BY:			
	MASTER FINISH DATE:			
	NOTE:			

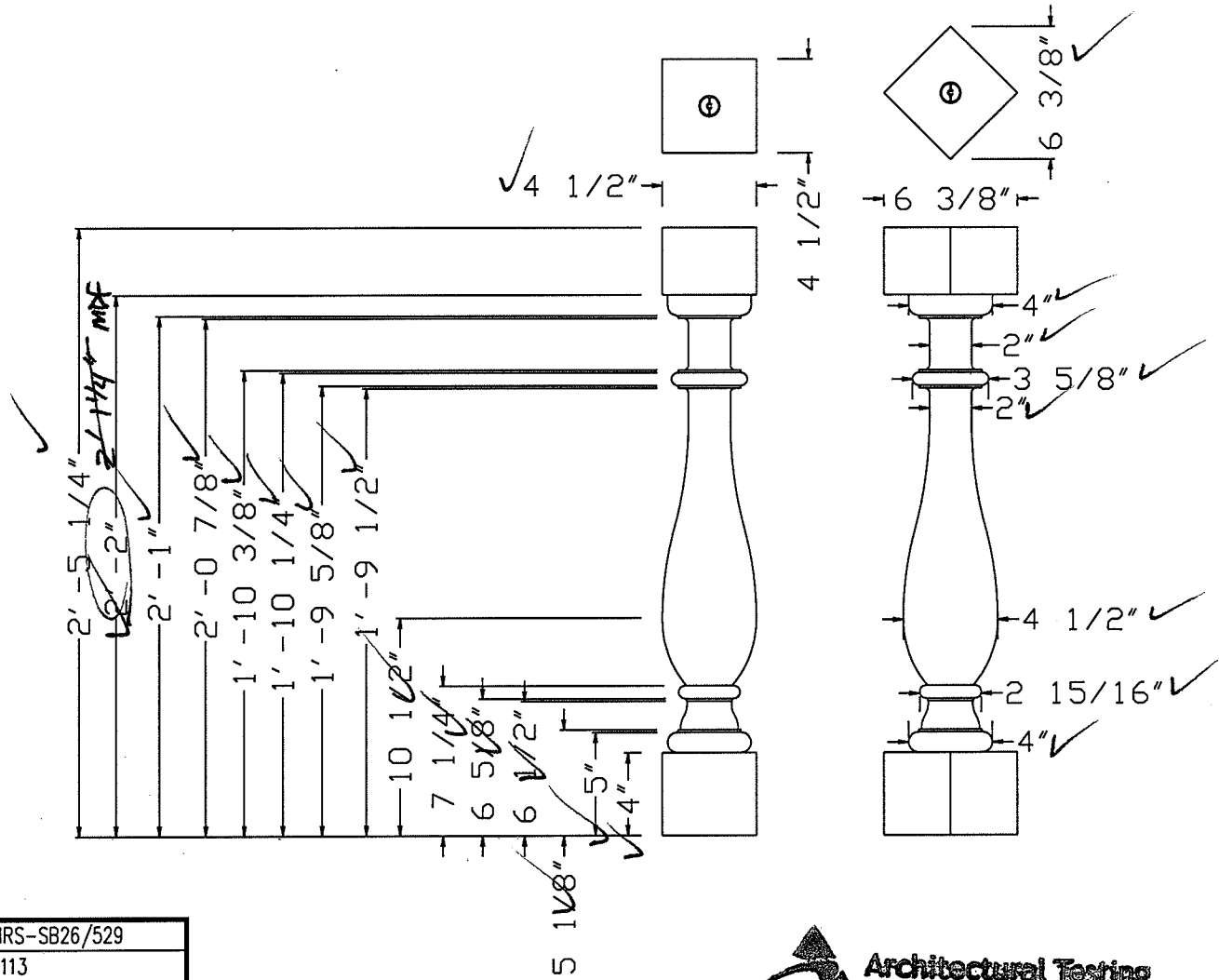
Test sample complies with these details.  
Deviations are noted.


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 Custom Decorative Mouldings	DWG #: 2300D	CDM #: MRS-SB26/529
		INV #: 12113
PROJECT: 4 1/2" x 29 1/4" SPINDLE		
SCALE: 1 1/2" = 1'	DATE: 03-19-2002	
DRAWN BY: Craig H.	REVISED	INITIALS
CHECKED BY:		
MASTER FINISH DATE:		
NOTE: DRAWING MAY DIFFER FROM ACTUAL PART.		




**Architectural Testing**  
 Test sample complies with these details.  
 Deviations are noted.  
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 Date 8/30/06 Tech MDF

**APPENDIX B**

**Photographs**



**Photo No. 1**  
**Bottom In-Fill Load Test**



**Photo No. 2**  
**Top Rail Horizontal Uniform Load Test**



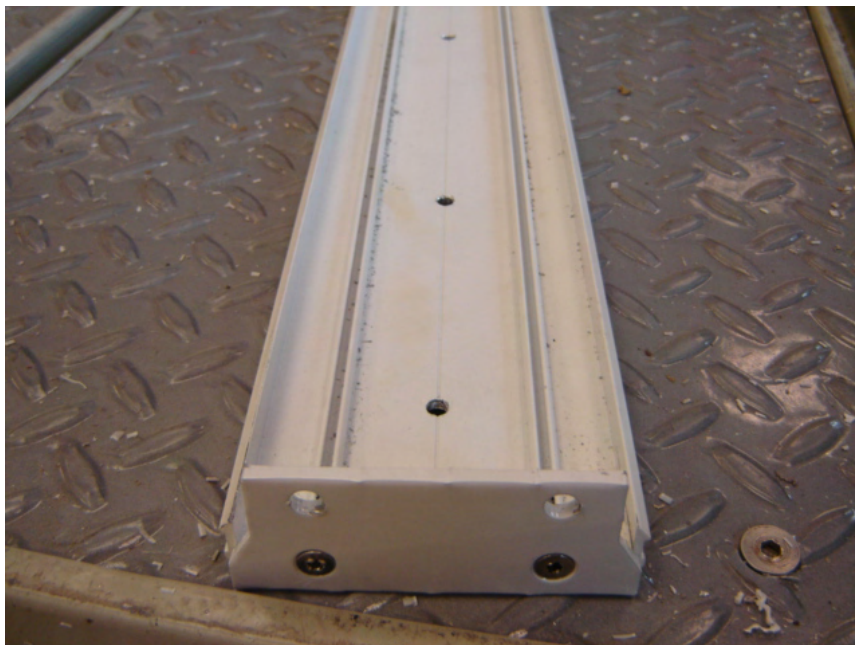
**Photo No. 3**  
**Top Rail Bracket Attachment into Wood Supports**



**Photo No. 4**  
**Top Rail w/Bracket**



**Photo No. 5**  
**Bottom Rail with Bracket**



**Photo No. 6**  
**Rail Assembly Beam**