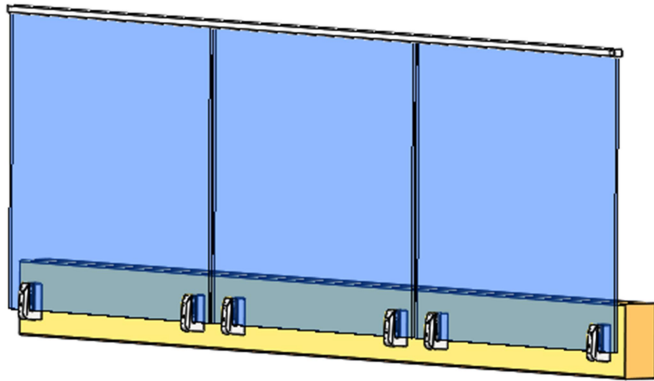


OFFICIAL TEST REPORT

(FBC, IBC: 2012, 2015, 2018, ANSI Z97.1, ASTM E2353 – E2358)



February 21, 2020

Report Number: ViewRail-03-2020

Manufacturer: ViewRail

Test Location: 2436 Dierdorf Road  
Goshen, IN 46526

Product Under Test: H&G Side Mount Talons

Test Witnessed By: Michael Hudson, P.E.  
JJ. Johnson (Manufacturer)

The Talon System is an interior glass rail/ guard/balustrade assembly with full view glazing material that is point supported with a structural top rail.

**Notes**

This report does not purport to address all possible impact and load cases that could result in railing system or glazing failure. If additional load or impact case testing is required by the qualified licensed engineer, please contact the Manufacturer.

For external installations the wind loads and glass stress must be calculated and accounted for by a qualified licensed engineer in charge of the fixed work. Further, If the system will be installed in exterior locations, corrosion and deterioration testing is required.

The test results herein are intended to assist a qualified licensed engineer in developing a code compliant guard that meets the applicable requirements of 2012, 2015, and 2018 International Building Code and state codes adopted from the IBC codes. This report is not intended to demonstrate the code compliance of an installation but is only to be utilized by the qualified licensed engineer in charge in analyzing the glass stresses and anchorage.

## H&G Side Mount Talon Glass Baluster Test Report

### Signature Page

Michael Hudson, PE  
1725 Unicoi Road  
Nashville, NC 27856

252-382-1884  
mHUDSON.bsme@yahoo.com

## Referenced Codes and Standards



### ASTM International

- E2353 - 16 *Standard Test Methods for Performance of Glazing in Permanent Railing Systems, Guards, and Balustrades*<sup>1</sup>
- E935 - 13<sup>ε1</sup> *Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings*<sup>2</sup>
- E2358 - 17 *Standard Specification for Performance of Glazing in Permanent Railing Systems, Guards, and Balustrades*<sup>4</sup>
- E2025 - 99 *Standard Test Method for Evaluating Fenestration Components and Assemblies for Resistance to Impact Energies*<sup>3</sup>
1. This standard is issued under the fixed designation E2353; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval. Current edition approved Feb. 15, 2016. Published March 2016. Originally approved in 2004. Last previous edition approved in 2014 as E2353 - 14. DOI:10.1520/E2353-16.
  2. This standard is issued under the fixed designation E935; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.  
ε1 NOTE—Section 1.2 was editorially revised in October 2013.
  3. This standard is issued under the fixed designation E2025; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.  
(Reapproved 2006)  
**NOTICE: This standard has been withdrawn, however other active standards still reference this standard.**
  4. This standard is issued under the fixed designation E2358; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval. This specification is under the jurisdiction of ASTM Committee E06 on Performance of Buildings and is the direct responsibility of Subcommittee E06.56 on Performance of Railing Systems and Glass for Floors and Stairs. Current edition approved Aug. 1, 2017. Published September 2017. Originally approved in 2004. Last previous edition approved in 2010 as E2358 - 04(2010). DOI: 10.1520/E2358-17.



### American National Standards Institute

- Z97.1-2015 *For safety glazing materials used in buildings –safety performance specifications and methods of test*



### Consumer Product Safety Commission

- 16 CFR Ch. II  
(1-1-12 Edition) *Part 1201 – Safety Standard for Architectural Glazing Materials*



### International Code Council

- 2018, 2015, and 2012 International Building Code® (IBC)  
2018, 2015, and 2012 International Residential Code® (IRC)

### Railing System Components and Hardware

#### Glazing Material

<b>Manufacturer:</b>	ViewRail – Goshen, Indiana
<b>Overall Glazing Thickness:</b>	½" (Nominal)
<b>Glazing Type:</b>	Tempered Transparent Glass (TTG)
<b>Thickness Standard:</b>	ASTM C1036
<b>CPSC 16 CFR Part 1201 Category:</b>	II <sup>1</sup>
<b>ANSI Z97.1 Class:</b>	A <sup>1</sup>

<sup>1</sup> Intertek Test Report Number K1004.02-119-37 (See Appendix A)

Glazing material has been tested and shown to meet the following minimum material requirements:

Category II (CPSC 16 CFR Part 1201)  
Class A (ANSI Z97.1 Class)

As required by:

Section 2407.1 of IBC (2018, 2015, 2012)  
Section R308.4 of IRC (2018, 2015, 2012)  
Section 3.3.1 of ICC-ES AC439

Substitution Note: In accordance with ASTM E2358-17, section 8:

#### **8. Permissible Variations and Substitutions:**

**8.2** Laminated glass shall be permitted to be substituted for tempered glass provided the structural loads (frame loads) are met and the nominal thickness is achieved with a minimum interlayer capable of passing ANSI Z97.1 Class A.

#### Components and Hardware

Component and assembly drawings contained in Appendix B. The glass rail, guard, and balustrade assembly was installed in the test fixture in accordance with the manufacturers written installation instructions as contained in Appendix C. All test specimens were conditioned as required by ASTM E2353-16 prior to testing.

Substitution Note: In accordance with ASTM E2358-17, section 8:

#### **8. Permissible Variations and Substitutions:**

**8.4** Larger systems shall qualify smaller systems provided there is no change to the attachment, anchoring or any other property that would decrease the structural performance of the system.



## ASTM System Classification

The H&G Side Mount Talon system is a hybrid classification of Type V (FIG 7b) and Type VI (FIG 8) systems as defined by ASTM E2358-17

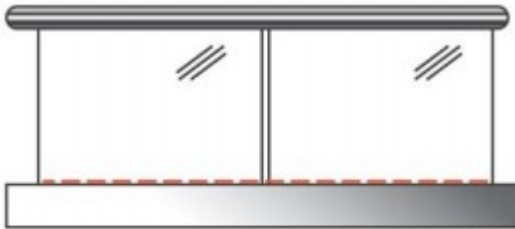


FIG. 7 b Type V: One-side Support with Protective Top Rail—  
Glazing as Structural Member *(continued)*

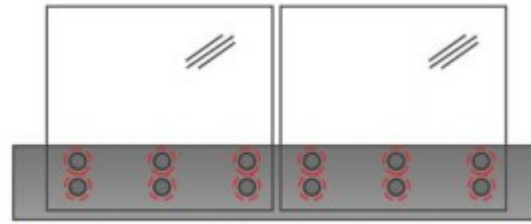
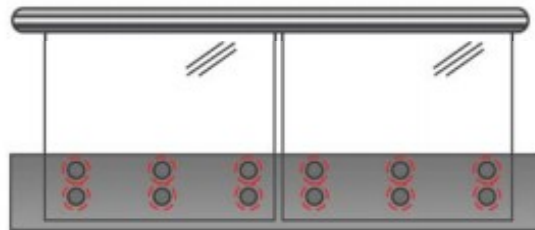


FIG. 8 Type VI: Point Supported Only—Glazing as  
Structural Member

H&G Side Mount Talons create a type of **Point Supported** system with a **Protective Structural Top Rail**.



## Instrumentation

Equipment Description	Manufacturer	Model/Part Number
Load Cell	Zemic	H3-C3-1.5t-3B
Digital Readout	Scientific Industries	FB 10k
Laser Deflection Sensor	Keyence	IL-300
Actuator	McMaster-Carr	6211K74

### Note

All test instruments were calibrated and are traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST) or another National Measurement Institute or through consensus standards. ViewRail calibration providers meet the requirements of ISO 17025:2005.

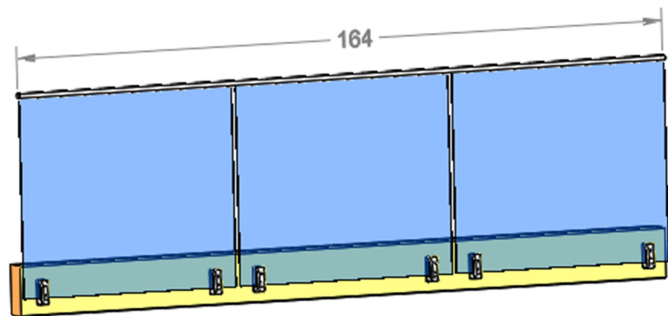
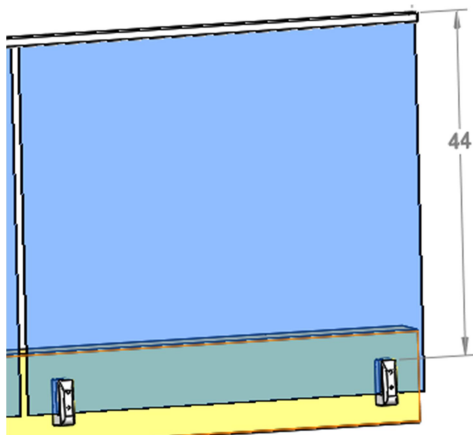
## Testing Preparation

**Test Sequence** (All tests performed on a single specimen in the order specified by ASTM E2353-16 and ASTM E935-13)

1. Infill Load Test
  - Vertical Edge of Center Lite
    - i. 4" x 4"
    - ii. 12" x 12"
2. Concentrated Load Test
  - Horizontal - Mid-Span of Handrail

## Calculated Permissible Deflection

Permissible deflection under load per ASTM 2358-17 calculated under worst case conditions (minimize  $h$  or  $l$  value):



### Maximum Permissible Deflection

Horizontal Load Applied at Rail  
Mid-Span

$$\begin{aligned} & h/24 + l/96 \\ & (44''/24 + 164''/96) \\ & 1.83'' + 1.70'' \\ & 3.53'' \end{aligned}$$

### Maximum Permissible Deflection

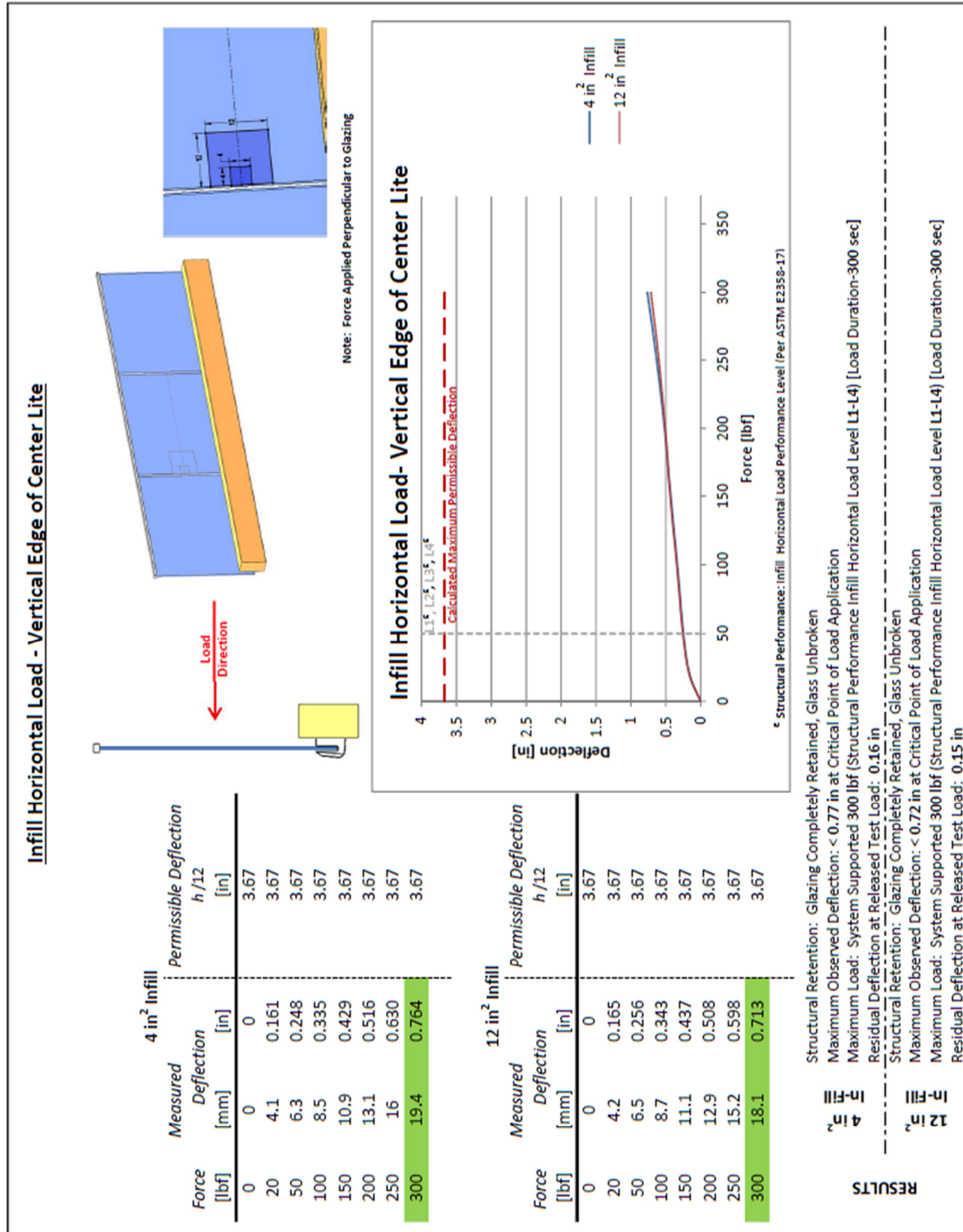
Load Applied at the Line of  
Vertical Support

$$\begin{aligned} & h/12 \\ & 44''/12 \\ & 3.67'' \end{aligned}$$

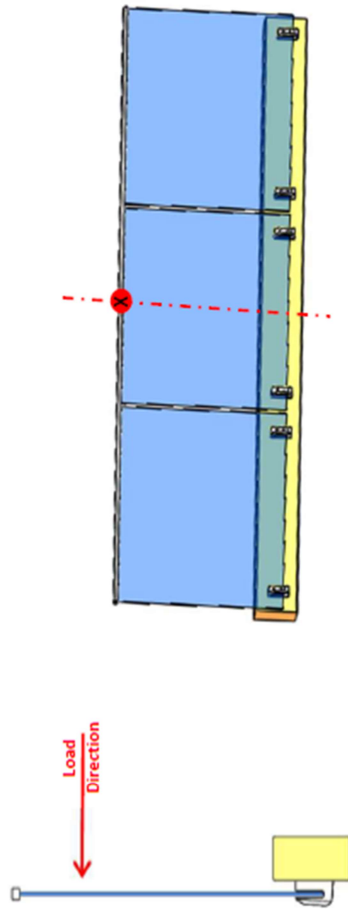
**Maximum Permissible Deflection**  
Vertical Load Applied at Rail Mid-Span

$$\begin{aligned} & l/96 \\ & 164''/96 \\ & 1.7'' \end{aligned}$$

## Testing: Results



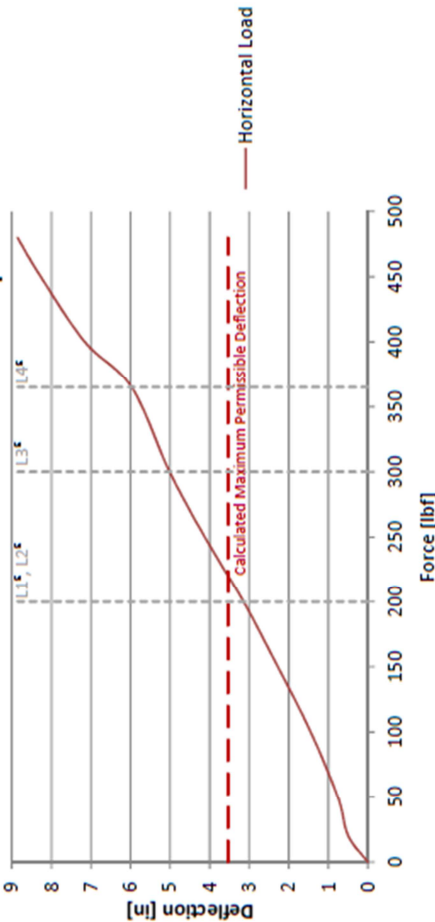
## Concentrated Horizontal Load: Rail Mid-span



Note: Force Applied Perpendicular to Rail at Mid-Span

Force [lbf]	Horizontal Load		Permissible Deflection $h/24 \pm /96$ [in]
	Measured Deflection [mm]	Deflection [in]	
0	0	0	3.53
20	12.6	0.496	3.53
50	19.3	0.760	3.53
100	36.7	1.445	3.53
150	57.8	2.276	3.53
200	79.8	3.142	3.53
250	104.7	4.122	3.53
300	127.3	5.012	3.53
365	151.7	5.972	3.53
400	181.7	7.154	3.53
450	210	8.268	3.53
480	225	8.858	3.53

## Concentrated Horizontal Load: Rail Mid-span



\* Structural Performance: Concentrated Load Performance Level (Per ASTM E2358-17)

## RESULTS

Structural Retention: Glazing Completely Retained, Glass Unbroken @ 200 lbf Glazing Not Retained, Glass Broken @ 480 lbf  
 Maximum Observed Deflection: < 3.2 at Critical Point of Load Application (@ 200 lbf)  
 Maximum Load: System Supported 200 lbf (Structural Performance Concentrated Load L1-L2) [Load Duration-300 sec]  
 Residual Deflection at Released Test Load: 0.63 in

Appendix A – Glazing Impact Test Report



# VIEWRAIL TEST REPORT

SCOPE OF WORK  
IMPACT TESTING ON TEMPERED TRANSPARENT SAFETY GLAZING MATERIAL

REPORT NUMBER  
K1004.02-119-37

TEST DATE(S)  
08/28/19

ISSUE DATE  
09/03/19

PAGES  
5

DOCUMENT CONTROL NUMBER  
RT-R-AMER-Test-2881 (02/25/19)  
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**TEST REPORT FOR VIEWRAIL**  
Report No.: K1004.02-119-37  
Date: 09/03/19

130 Derry Court  
York, Pennsylvania 17406

Telephone: 717-764-7700  
Facsimile: 717-764-4129  
www.intertek.com/building

## REPORT ISSUED TO

**VIEWRAIL**  
1755 Ardmore Court  
Goshen, Indiana 46526

## SECTION 1

### SCOPE

Intertek Building & Construction (B&C) was contracted by Viewrail - Goshen, Indiana to perform safety glazing impact testing in accordance with ANSI Z97.1, CAN/CGSB 12.1, and CPSC 16 CFR 1201 on tempered transparent glass. Results obtained are tested values and were secured by using the designated test methods. Testing was conducted at the Intertek B&C test facility in York, Pennsylvania.

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. Intertek will service this report for the entire test record retention period. The test record retention period ends four years after the test date. Test records, such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation, will be retained for the entire test record retention period.

## SECTION 2

### SUMMARY OF TEST RESULTS

SPECIMEN NUMBER	1	2	3	4
IMPACT TEST RESULTS	Pass	Pass	Pass	Pass
THICKNESS COMPLIANCE	Pass	Pass	Pass	Pass

For INTERTEK B&C:

**COMPLETED BY:** Todd M. Wilt  
**TITLE:** Lead Technician

**SIGNATURE:**   
Digitally signed by: Todd M. Wilt on 09/03/19  
**DATE:** 09/03/19  
tmw:vtm/aas

**REVIEWED BY:** Virgal T. Mickley, Jr., P.E.  
**TITLE:** Senior Staff Engineer

**SIGNATURE:**   
Digitally signed by: Virgal Thomas Mickley, Jr. on 09/03/19  
**DATE:** 09/03/19



2019.09.04 10:20:13 -04'00'

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York, Pennsylvania 17406  
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www.intertek.com/building

TEST REPORT FOR VIEWRAIL  
Report No.: K1004.02-119-37  
Date: 09/03/19

## SECTION 3 TEST METHODS

The specimens were evaluated in accordance with the following:

ANSI Z97.1-2015, *For safety glazing materials used in buildings - safety performance specifications and methods of test*, American National Standard

CAN/CGSB 12.1-2017, *Safety Glazing*, National Standard of Canada

CPSC 16 CFR 1201, *Safety Standard for Architectural Glazing Materials*, Consumer Product Safety Commission (Version: 2012; Source: 42 FR 1441, Jan. 16, 1977)

## SECTION 4 MATERIAL SOURCE

Test samples were obtained from the manufacturer. The specimens were received on 08/23/19, in good condition and suitable for testing unless noted otherwise.

## SECTION 5 SAMPLE RETENTION

All test specimens were destroyed by test or by personnel and have been disposed of as trash. Representative sections of the samples will be retained for up to 30 days from the date of report issuance. After 30 days, representative samples will be automatically discarded.

## SECTION 6 LIST OF OFFICIAL OBSERVERS

NAME	COMPANY
Todd M. Wilt	Intertek B&C





Total Quality. Assured.

TEST REPORT FOR VIEWRAIL  
Report No.: K1004.02-119-37  
Date: 09/03/19

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## SECTION 7

### TEST PROCEDURE

#### Overview

All specimens were impacted once from the select drop height unless noted otherwise. Specimens which were not broken after impact from the designated drop height were broken in accordance with the Center Punch Fragmentation Test per ANSI Z97.1-2015.

#### Drop Height Classification

All specimens were impacted once from a drop height of 48 inches.

DROP HEIGHT CLASSIFICATION			
ANSI	CGSB	CPSC	DROP HEIGHT
Class A	Class A	Category II	48 in.

## SECTION 8

### TEST SPECIMEN DESCRIPTION

Manufacturer: Viewrail - Goshen, Indiana

Glazing Product Designation: Prototype

Overall Glazing Thickness: 1/2" (nominal)

Glazing Type: Tempered Transparent Glass (TTG)

Sample Dimensions: Impact: 34" wide x 76" high ( $\pm 1/8"$ )

Size Classification: Unlimited

Thickness Standard: ASTM C1036

## SECTION 9

### TEST RESULTS

Lab Temperature: 71°F

Duration of Pre-Conditioning @ 65 - 85°F: 24 Hours

#### Impact Test Results

SPECIMEN NUMBER	THICKNESS (inches)	TEST RESULTS (grams)	CENTER PUNCH (YES/NO)	ACCEPTANCE CRITERIA (grams)	RESULT (PASS/FAIL)
1	0.498	23	Yes	205	Pass
2	0.500	31	Yes	206	Pass
3	0.499	25	Yes	206	Pass
4	0.500	22	Yes	206	Pass

Acceptance Criteria: The 10 largest crack-free particles collected after specimen breakage shall weigh no more than 10 sq. in. of the original specimen.



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TEST REPORT FOR VIEWRAIL  
Report No.: K1004.02-119-37  
Date: 09/03/19

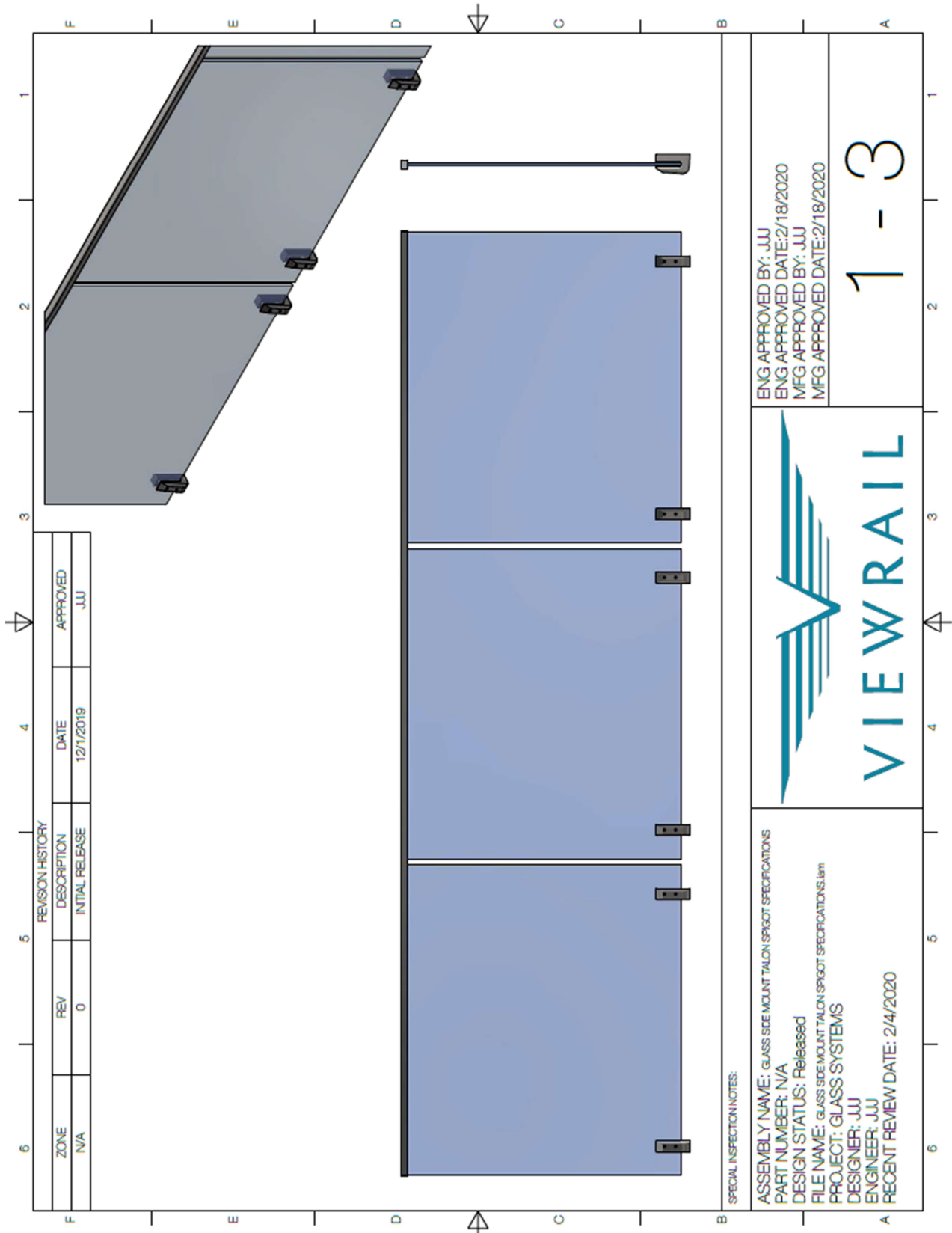
## SECTION 10 CONCLUSION

The specimens meet the test requirements of the referenced standards for the size classification listed.

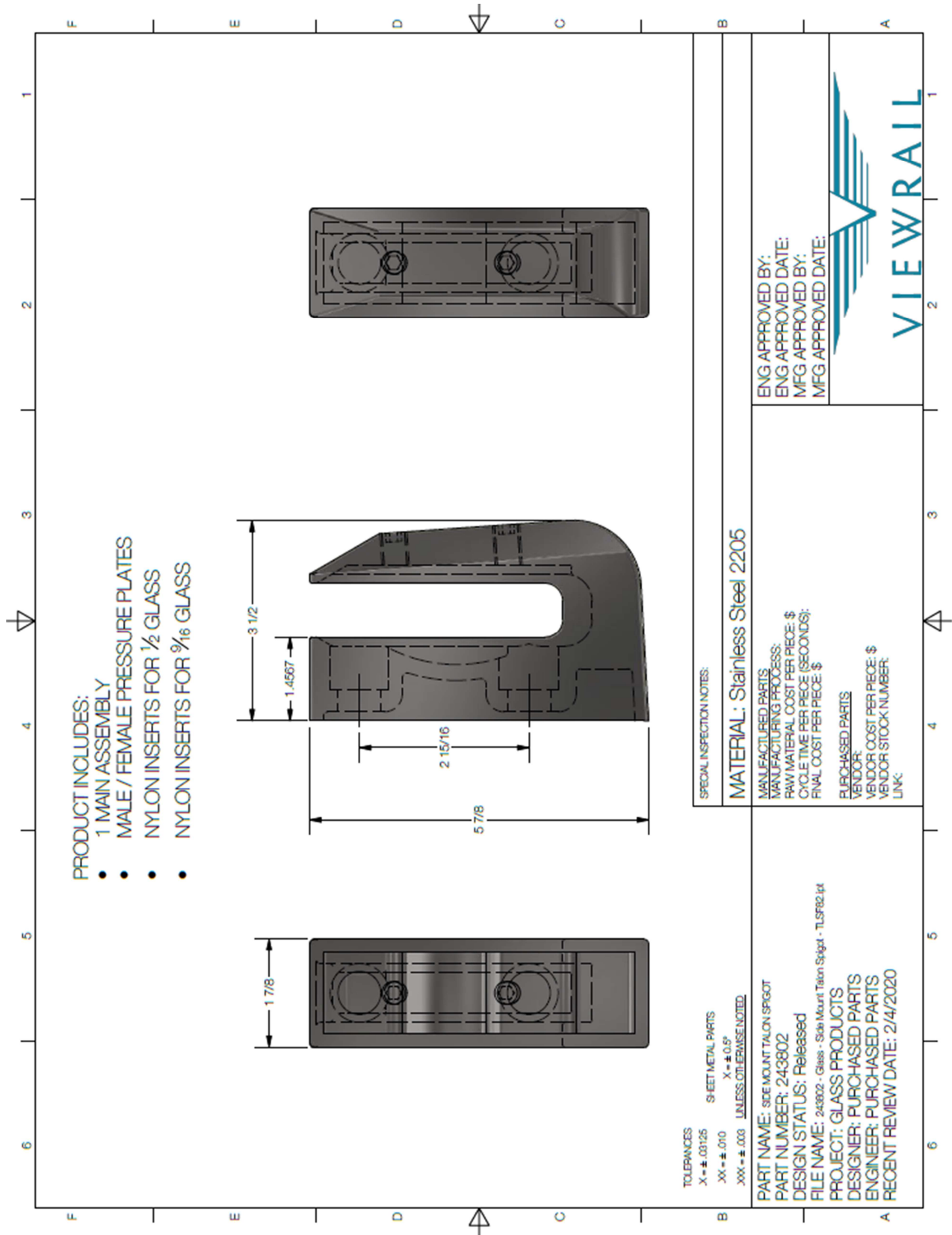
## SECTION 11 REVISION LOG

	DATE	PAGES	REVISION
0	09/03/19	N/A	Original Report Issue

## Appendix B: System Components and Drawings




# H&G Side Mount Talon Glass Baluster Test Report



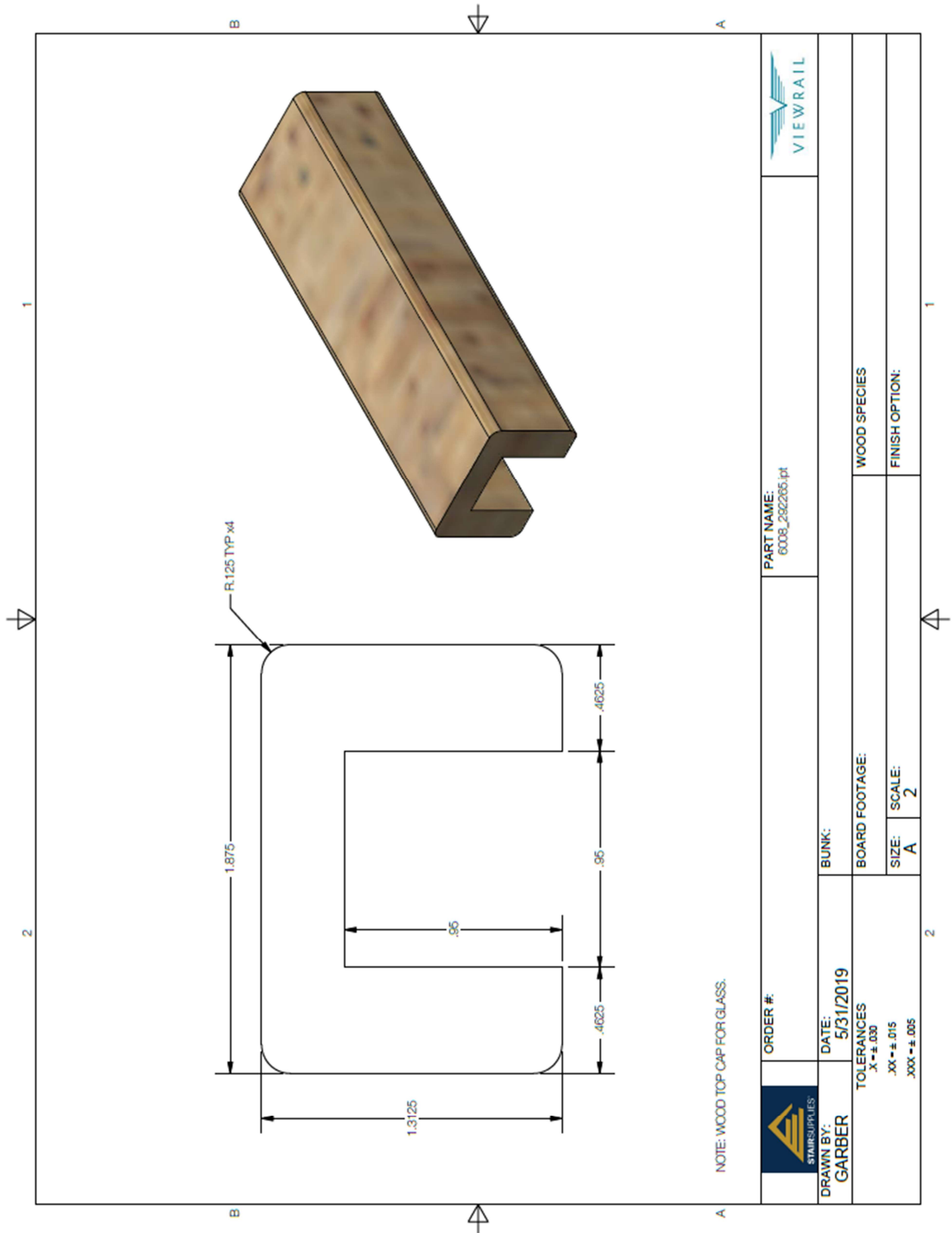


# H&G Side Mount Talon Glass Baluster Test Report

		<b>GLASS</b>		ORDER # <b>211418</b>	GLASS PANEL NUMBER 15-18	NUMBER OF PANELS LIKE THIS 4	TOTAL NUMBER OF PANELS IN ORDER 26	DATE <b>12/13/19</b>	ENGINEER AJO	<b>TYPE OF GLASS</b>		TEMPERED	LAMINATED	<b>THICKNESS OF GLASS</b>		9/16" GLASS	1/2" GLASS	3/8" GLASS	<b>ADDITIONAL GLASS INFO</b>		LOW IRON	EVA	PVB	SGP	TINTED	FROSTED
<div style="border: 1px solid black; height: 500px; width: 100%; position: relative;"> <div style="position: absolute; top: 10px; left: 10px; width: 100px; height: 100px; border: 1px solid black; display: flex; align-items: center; justify-content: center;"> <div style="text-align: center;"> <div style="color: blue; font-weight: bold;">48<sup>5</sup><sub>16</sub></div> <div style="color: blue; font-weight: bold;">[48.3209]</div> </div> </div> <div style="position: absolute; bottom: 10px; right: 10px; width: 100px; height: 100px; border: 1px solid black; display: flex; align-items: center; justify-content: center;"> <div style="text-align: center;"> <div style="color: orange; font-weight: bold;">54</div> <div style="color: orange; font-weight: bold;">[54.0000]</div> </div> </div> <div style="position: absolute; top: 50px; right: 50px; font-size: 2em; font-weight: bold;">           AREA: 18.1204         </div> </div>																										
PRODUCTION ALERT NOTE																										

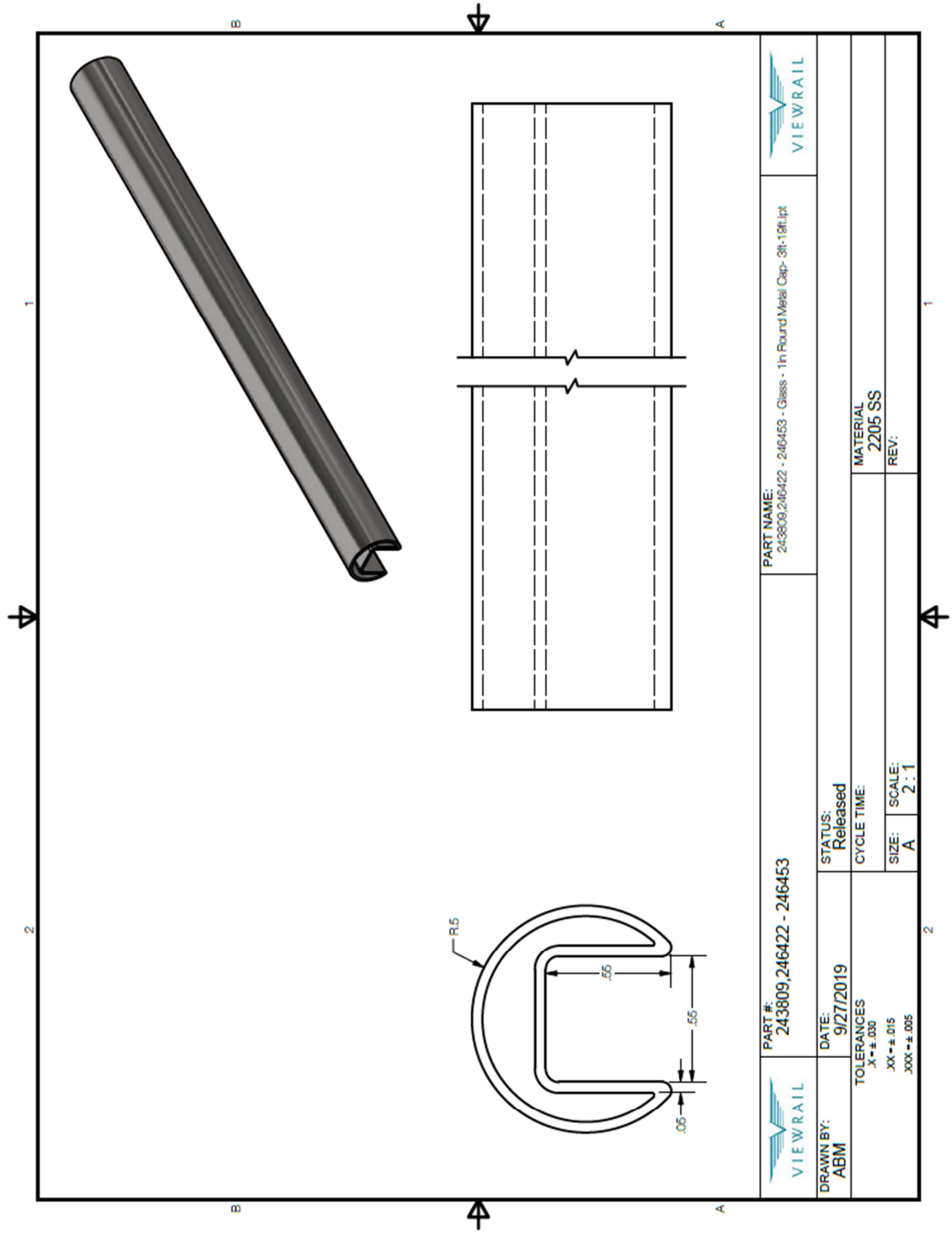


## H&G Side Mount Talon Glass Baluster Test Report

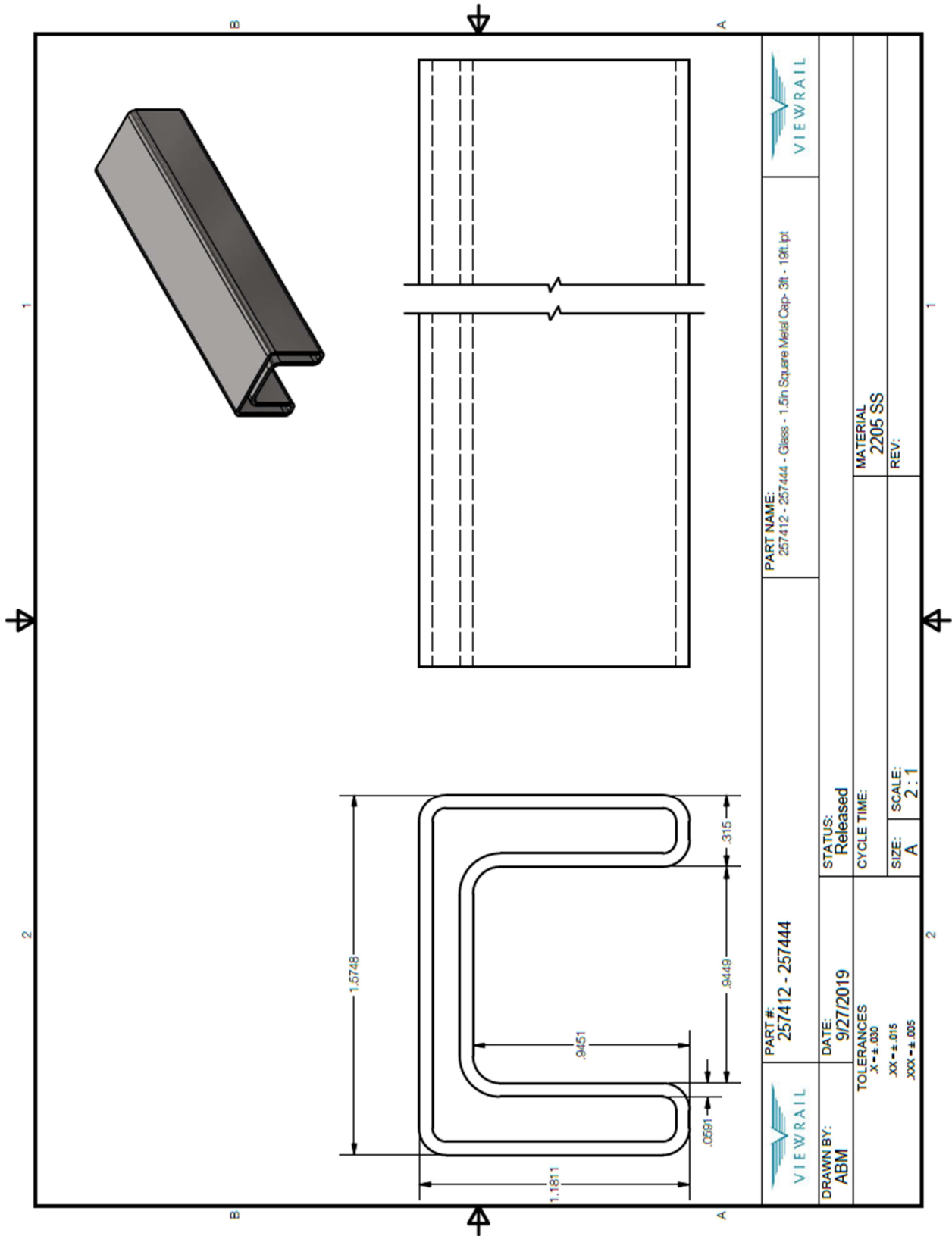




# H&G Side Mount Talon Glass Baluster Test Report



# H&G Side Mount Talon Glass Baluster Test Report



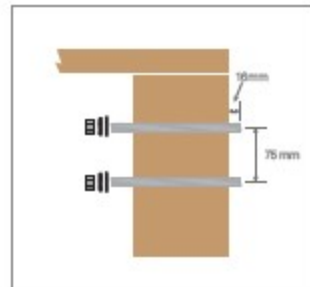
## Appendix C: Manufacturer's Published Installation Instructions



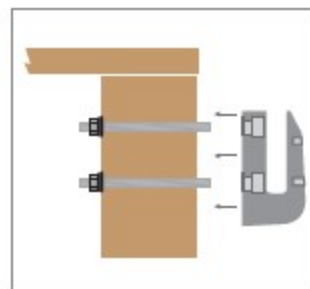
### Side Mount Talon Spigot Installation

**Side Mount Talon Spigots must be mounted through a triple header, or threaded studs must mount 4" deep into concrete. Wood must be equal to or harder than Southern Yellow Pine.**

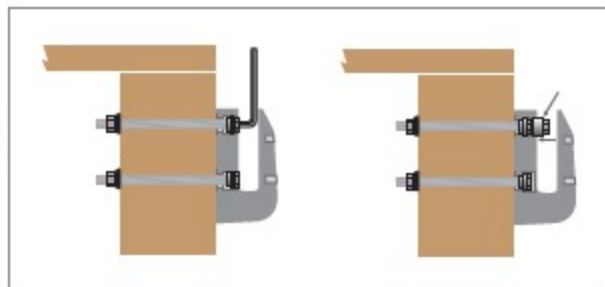
1. Determine the mounting position for the spigots. Drill 2 holes for the threaded studs. Distance between holes is 75mm on center. Once holes are drilled and studs inserted, add a washer, lock washer, and nut to the back side of each of the studs. Adjust fasteners so that only 10mm of each stud protrudes from the front of the holes. (see fig. A)



2. Slide the spigot onto the studs.



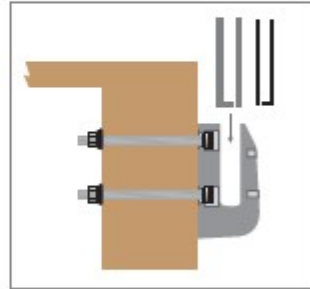
3. Add the special nut to each stud, then hand-tighten or use a short allen wrench to tighten until the special nut is recessed far enough to allow room for the special socket. Use the special socket and an open end wrench to finish tightening the special nut on each stud.



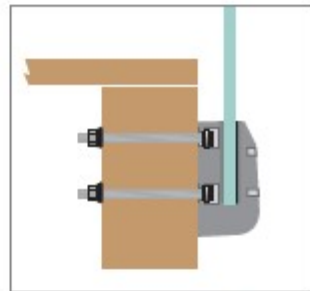


4. Once the spigot is secure, install the press plate and plastic lining.

REPEAT STEPS 1-4 UNTIL ENOUGH SPIGOTS ARE IN PLACE TO HOLD A GLASS PANEL.



5. Carefully place glass panel onto plastic lining inside the spigots.



6. Use the allen screws on the front of the spigot to gently secure the glass panel. These screw adjustments also control the Tilt-Lock feature, allowing the glass panels to be tilted in or out for alignment purposes.



To tilt glass in,  
turn the top nut  
clockwise and  
turn the bottom  
nut counter-  
clockwise.



To tilt glass out,  
turn the top nut  
counter-clock-  
wise and turn  
the bottom nut  
clockwise.

