



## **AAMA 506 TEST REPORT**

**Report No.:** G0434.01-501-44

**Rendered to:**

VEKA INC.  
Fombell, Pennsylvania

**PRODUCT TYPE:** PVC Double Hung Window  
**SERIES/MODEL:** DH57WW/AL-Insert

**Test Date(s):** 06/28/16

**Report Date:** 07/12/16

**Test Record Retention End Date:** 06/28/20



**1.0 Report Issued To:** Veka Inc.  
100 Veka Drive  
Fombell, Pennsylvania 16123-0250

**2.0 Test Laboratory:** Architectural Testing, Inc.,  
a subsidiary of Intertek (Intertek-ATI)  
1140 Lincoln Avenue  
Springdale, Pennsylvania 15144  
724-275-7100

**3.0 Project Summary:**

**3.1 Product Type:** PVC Double Hung Window

**3.2 Series/Model:** DH57WW/AL-Insert

**3.3 Compliance Statement:** Results obtained are tested values and were secured by using the designated test method(s). The samples tested met the performance requirements set forth in the referenced test procedures for a  $\pm 2400$  Pa ( $\pm 50.13$  psf) Design Pressure with missile impacts corresponding to Missile Level D and Wind Zone 3.

**3.4 Test Date(s):** 06/28/16

**3.5 Test Record Retention End Date:** All test records for this report will be retained until June 28, 2020.

**3.6 Test Location:** Intertek-ATI test facility in Springdale, Pennsylvania.

**3.7 Test Specimen Source:** The test specimen(s) were provided by the client. Representative samples of the test specimen(s) will be retained by Intertek-ATI for a minimum of four years from the test completion date.

**3.8 Drawing Reference:** The test specimen drawings have been reviewed by Intertek-ATI and are representative of the test specimen(s) reported herein. Test specimen construction was verified by Architectural Testing per the drawings located in Appendix B. Any deviations are documented herein or on the drawings.

**3.9 List of Official Observers:**

<u>Name</u>	<u>Company</u>
Cornell Charles	Veka Inc.
Joe Allison	Intertek-ATI
Joshua Barone	Intertek-ATI

#### 4.0 Test Specification(s):

AAMA 506-11, *Voluntary Specifications for Impact and Cycle Testing of Fenestration Products.*

ASTM E 1886-05, *Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials*

ASTM E 1996-12, *Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes*

#### 5.0 Test Specimen Description:

##### 5.1 Product Sizes:

###### Test Specimens #1 - #3:

Overall Area: 1.9 m <sup>2</sup> (20.2 ft <sup>2</sup> )	Width		Height	
	millimeters	inches	millimeters	inches
Overall size	1016	40	1854	73
Exterior sash size	930	36-5/8	891	35-1/16
Interior sash size	962	37-7/8	924	36-3/8

##### 5.2 Frame Construction:

Frame Member	Material	Description
Head, sill, jambs, and head insert	PVC	Extruded
Sill insert	Aluminum	Extruded

	Joinery Type	Detail
All corners	Mitered	Thermally welded
Head insert	Square-cut	Snap-fit
Sill insert	Square-cut	Sealed with silicone sealant and secured with four #8 x 2" long truss head screws, evenly spaced through the sill and into the wood buck.

## 5.0 Test Specimen Description: (Continued)

### 5.3 Sash Construction:

Sash Member	Material	Description
All rails and stiles	PVC	Extruded

	Joinery Type	Detail
All corners	Mitered	Thermally welded

### 5.4 Weatherstripping:

Description	Quantity	Location
0.480" high center fin pile with kerf mount offset base	1 Row	Exterior meeting rail (interior)
0.187" backed by 0.300" high center fin pile	1 Row	Head, sill
0.187" backed by 0.270" high center fin pile	1 Row	Lock rail
0.187" backed by 0.270" high center fin pile	2 Rows	All stiles, bottom rail

### 5.5 Glazing: *No conclusions of any kind regarding the adequacy or inadequacy of the glass in any glazed test specimen(s) can be made.*

Glass Type	Spacer Type	Interior Lite	Exterior Lite	Glazing Method
3/4" IG	Rectangular-shaped aluminum, single sealed	1/8" annealed glass / 0.090" thick Solutia Saflex® PVB inner layer / 1/8" annealed glass	1/8" annealed glass	The glass was set from the exterior against a PECORA® 896-HIS silicone sealant and secured with rigid vinyl glazing beads.

## 5.0 Test Specimen Description: (Continued)

### 5.5 Glazing: (Continued)

Location	Quantity	Daylight Opening		Glass Bite
		millimeters	inches	
Exterior sash	1	870 x 832	34-1/4 x 32-3/4	1/2"
Interior sash	1	872 x 832	34-5/16 x 32-3/4	1/2"

### 5.6 Drainage:

Drainage Method	Size	Quantity	Location
Weepslot with flap	1" wide by 1/4" high	2	Exterior sill face, one 3-1/2" in from each end
Weepslot	1" wide by 3/16" high	2	Intermediate sill wall, one at each end.
Weepslot	1" wide by 3/16" deep	2	Exterior sill track, one at each end
Weepslot	1" wide by 3/16" high	2	Exterior sill face at screen track, one at each end
Weephole	3/8" wide by 1/8" deep	2	Exterior meeting rail bottom surface, one at each end

### 5.7 Hardware:

Description	Quantity	Location
Composite cam lock	2	Lock stile, one 7-1/4" from each end, with mating keeper on the exterior meeting rail
Constant force balance system with locking pivot shoe	4	Two per jamb
Composite top mount tilt latch	2	Lock rail, one at each end
Flush mount plastic tilt latch	2	Top rail, one at each end
Interlocking metal pivot bar	4	Bottom rail and exterior meeting rail, one at each end
Metal tilt latch hook	2	Midspan of jambs, one at each end at the lock rail

## 5.0 Test Specimen Description: (Continued)

### 5.8 Reinforcement:

Drawing Number	Location	Material
RF SE4545 AOM	Bottom sash stiles, and bottom rail	Extruded aluminum
RF SE4546 AOM	Lock rail	Extruded aluminum
S-050	Top sash stiles, and rails	Extruded aluminum

**5.9 Screen Construction:** No screen was utilized.

### 6.0 Installation:

The specimen was installed into a Spruce-Pine-Fir wood buck. The rough opening allowed for a 1/8" shim space. The nail fin perimeter of the window was sealed with a silicone sealant.

Location	Anchor Description	Anchor Location
Integral nail fin	#8 x 2" truss head screw	Nominally spaced at 9" on center, and beginning in each corner
Jambs	#8 x 2" long truss head screw	One at midspan of each jamb (2)

**7.0 Test Results:** The results are tabulated as follows:

**ASTM E 1886, Large Missile Impact**

**Conditioning Temperature:** 26°C (78°F)

**Missile Weight:** 4037 g (8.90 lbs)

**Missile Length:** 2.4 m (94")

**Muzzle Distance from Test Specimen:** 5.2 m (17' 0")

**Test Unit #1:** Orientation within  $\pm 5^\circ$  of horizontal

Impact #1: Missile Velocity: 15.4 m/s (50.4 fps)	
<b>Impact Area:</b>	Exterior center of bottom sash
<b>Observations:</b>	Missile hit target area, broke exterior annealed lite and fractured interior laminated lite
<b>Results:</b>	Pass

**Note:** See Architectural Testing Sketch #1 for impact locations.

**Test Unit #2:** Orientation within  $\pm 5^\circ$  of horizontal

Impact #1: Missile Velocity: 15.4 m/s (50.6 fps)	
<b>Impact Area:</b>	Exterior lower left corner of bottom sash
<b>Observations:</b>	Missile hit target area, broke exterior annealed lite and fractured interior laminated lite
<b>Results:</b>	Pass

**Note:** See Architectural Testing Sketch #2 for impact locations.

## 7.0 Test Results: (Continued)

### **ASTM E 1886, Large Missile Impact**

**Conditioning Temperature:** 26°C (78°F)

**Missile Weight:** 4037 g (8.90 lbs)

**Missile Length:** 2.4 m (94")

**Muzzle Distance from Test Specimen:** 5.2 m (17'0")

**Test Unit #3:** Orientation within  $\pm 5^\circ$  of horizontal

<b>Impact #1: Missile Velocity: 15.5 m/s (50.9 fps)</b>	
<b>Impact Area:</b>	Exterior upper right corner of bottom sash
<b>Observations:</b>	Missile hit target area, broke exterior annealed lite and fractured interior laminated lite
<b>Results:</b>	Pass

**Note:** See Architectural Testing Sketch #3 for impact locations.



## 7.0 Test Results: (Continued)

### ASTM E 1886, Air Pressure Cycling

#### Test Unit #1

**Design Pressure:**  $\pm 2400$  Pa ( $\pm 50.13$  psf)

#### POSITIVE PRESSURE

Pressure Range Pa (psf)	Number of Cycles	Average Cycle Time (seconds)	Observations
480 to 1200 (10.03 to 25.06)	3500	1.38	No additional deformation observed
0 to 1440 (0.0 to 30.08)	300	1.43	
1200 to 1920 (25.06 to 40.10)	600	1.31	
720 to 2400 (15.04 to 50.13)	100	1.73	

#### NEGATIVE PRESSURE

Pressure Range Pa (psf)	Number of Cycles	Average Cycle Time (seconds)	Observations
720 to 2400 (15.04 to 50.13)	50	1.74	No additional deformation observed
1200 to 1920 (25.06 to 40.10)	1050	1.40	
0 to 1440 (0.0 to 30.08)	50	2.07	
480 to 1200 (10.03 to 25.06)	3350	1.36	

**Result:** Pass

**Note:** Test Specimens #1, #2, and #3 were cycled in a common chamber.

## 7.0 Test Results: (Continued)

### ASTM E 1886, Air Pressure Cycling

#### Test Unit #2

Design Pressure:  $\pm 2400$  Pa ( $\pm 50.13$  psf)

#### POSITIVE PRESSURE

Pressure Range Pa (psf)	Number of Cycles	Average Cycle Time (seconds)	Observations
480 to 1200 (10.03 to 25.06)	3500	1.38	No additional deformation observed
0 to 1440 (0.0 to 30.08)	300	1.43	
1200 to 1920 (25.06 to 40.10)	600	1.31	
720 to 2400 (15.04 to 50.13)	100	1.73	

#### NEGATIVE PRESSURE

Pressure Range Pa (psf)	Number of Cycles	Average Cycle Time (seconds)	Observations
720 to 2400 (15.04 to 50.13)	50	1.74	No additional deformation observed
1200 to 1920 (25.06 to 40.10)	1050	1.40	
0 to 1440 (0.0 to 30.08)	50	2.07	
480 to 1200 (10.03 to 25.06)	3350	1.36	

**Result:** Pass

**Note:** Test Specimens #1, #2, and #3 were cycled in a common chamber.

## 7.0 Test Results: (Continued)

### ASTM E 1886, Air Pressure Cycling

**Test Unit #3**

**Design Pressure:**  $\pm 2400$  Pa ( $\pm 50.13$  psf)

#### POSITIVE PRESSURE

Pressure Range Pa (psf)	Number of Cycles	Average Cycle Time (seconds)	Observations
480 to 1200 (10.03 to 25.06)	3500	1.38	No additional deformation observed
0 to 1440 (0.0 to 30.08)	300	1.43	
1200 to 1920 (25.06 to 40.10)	600	1.31	
720 to 2400 (15.04 to 50.13)	100	1.73	

#### NEGATIVE PRESSURE

Pressure Range Pa (psf)	Number of Cycles	Average Cycle Time (seconds)	Observations
720 to 2400 (15.04 to 50.13)	50	1.74	No additional deformation observed
1200 to 1920 (25.06 to 40.10)	1050	1.40	
0 to 1440 (0.0 to 30.08)	50	2.07	
480 to 1200 (10.03 to 25.06)	3350	1.36	

**Result:** Pass

**Note:** Test Specimens #1, #2, and #3 were cycled in a common chamber.

**General Note:** *Upon completion of testing, the specimens met the requirements of Section 7 of ASTM E 1996.*

## **8.0 Test Equipment:**

**Cannon:** Constructed from steel piping utilizing compressed air to propel the missile

**Missile:** 2x4 Southern Pine

**Timing Device:** Electronic Beam Type

**Cycling Mechanism:** Computer controlled centrifugal blower with electronic pressure measuring device

Tape and film were used to seal against air leakage during structural testing.



Architectural Testing will service this report for the entire test record retention period. Test records such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation, will be retained by Architectural Testing, Inc. for the entire test record retention period.

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For ARCHITECTURAL TESTING, Inc.

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Joshua Barone  
Technician

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Lynn George  
Director

JB:sld

Attachments (pages): This report is complete only when all attachments listed are included.

Appendix-A: Sketch(es) (3)

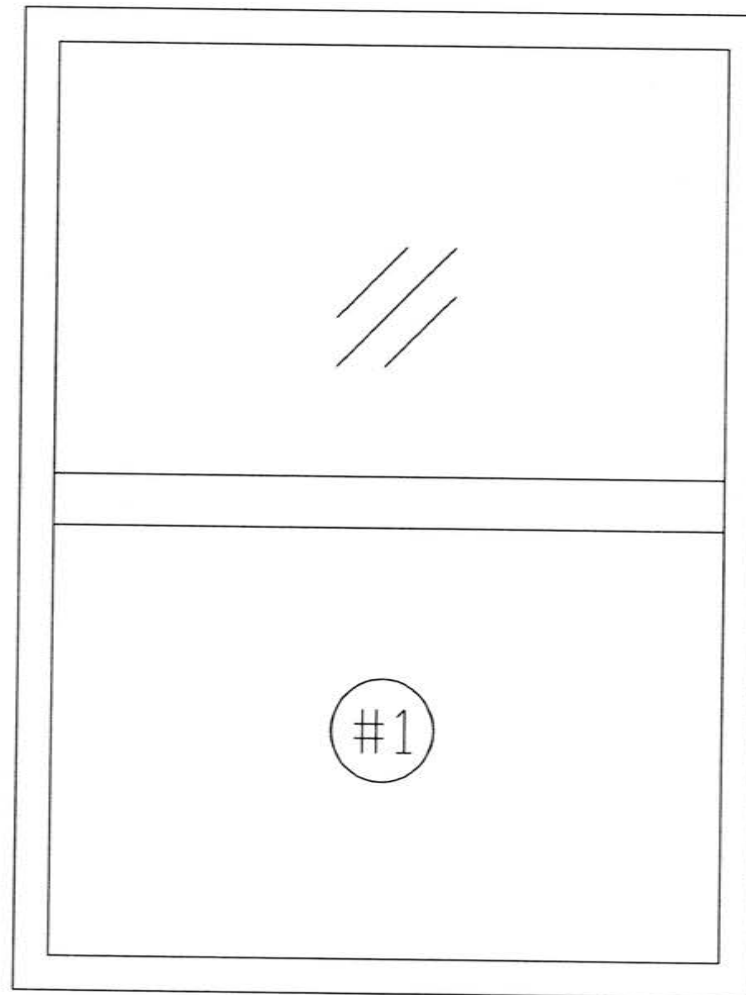
Appendix-B: Drawing(s) (2) Complete drawings packet on file with Intertek-ATI




## **Appendix A**

### **Sketch(es)**

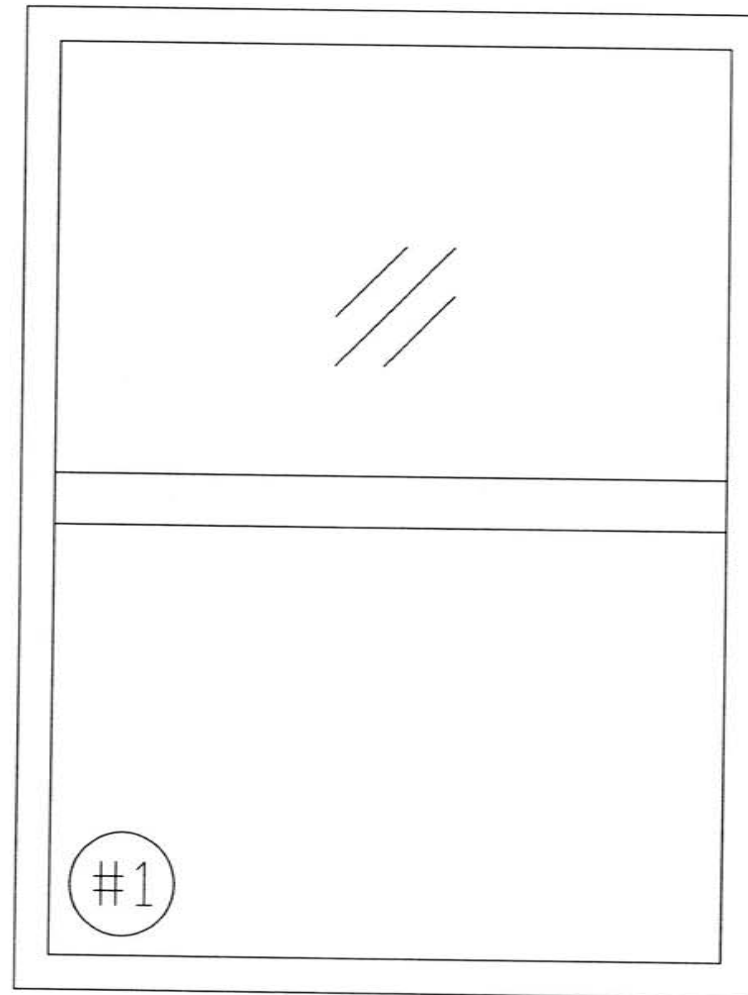
REV	DATE	DESCRIPTION	BY
			LG




Impact Locations

PROJECT NO. G0434.01.01 501-44	PROJECT NAME: DH57WW CLIENT: Veka	 Architectural Testing	DRAWING  Sketch #1 (Impacts)	DWG. BY: LG DATE: 7-7-16	SHEET 1 OF 3
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REV	DATE	DESCRIPTION	BY
			LG

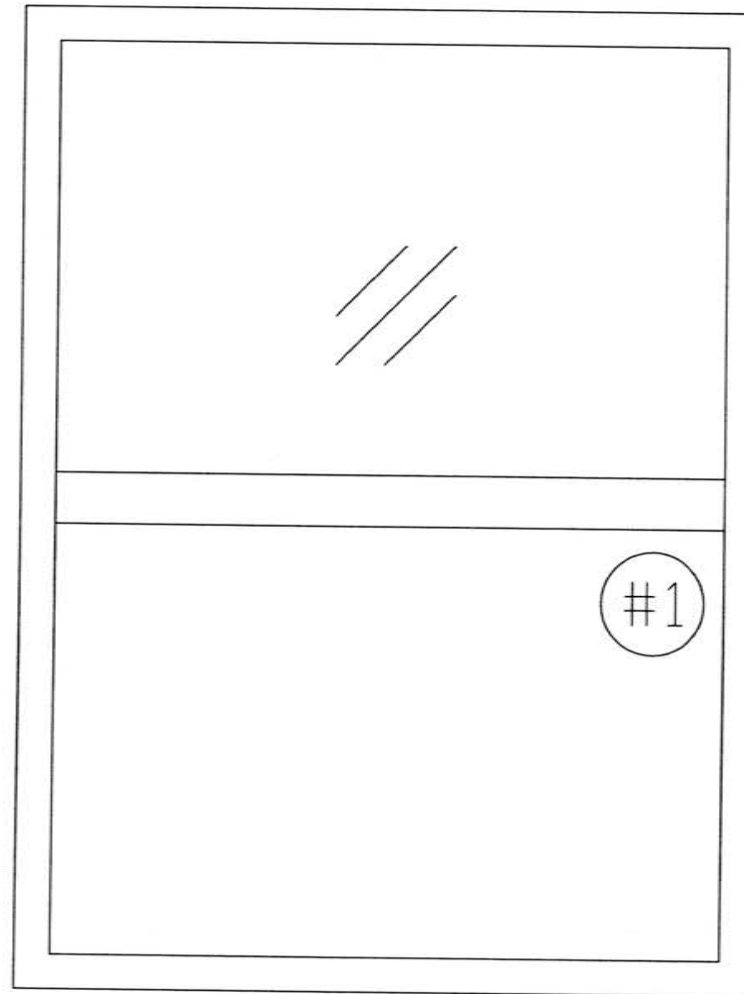


Impact Locations


PROJECT NO. G0434.01 501-44	PROJECT NAME: DH57WW CLIENT: Veka	 Architectural Testing	DRAWING Sketch 2 (Impact locations)	DWG. BY: LG DATE: 7-7-16	SHEET 2 OF 3
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REV	DATE	DESCRIPTION	BY
			LG



Impact Locations

PROJECT NO. G0434.01 501-44	PROJECT NAME: DH57WW CLIENT: Veka	 Architectural Testing	DRAWING Sketch #3 (Impacts)	DWG. BY: LG DATE: 7-7-16	SHEET 3 OF 3
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## **Appendix B**

### **Drawing(s)**

*Note: Complete drawings packet on file with Intertek-ATI*



Architectural Testing

Test sample complies with these details.  
Deviations are noted.

Report# F3070

Date 4/30/15

Tech JTB

S-047  
A20115XX168.0000

BV162

V-713

S-050  
A20118XX168.0000

V-717

V-717

V-724

V-712

SE4646

ALUMINUM BAR  
.188" X .875"

RFSE4646 ADM

3/4" IG

SE4647

RFSHA2105ADM

DH5701



Architectural Testing

Test sample complies with these details.  
Deviations are noted.

Report# G04134.01-501-44

Date 6-19-16 Tech JTB

NOTE:  
FOR OTHER PROFILE, GLAZING BEAD,  
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VEKA INC.  
100 VEKA DRIVE  
FOMBELL, PA 16123

DRAWN: T.J.F.	CHK'D:	APP'VD:
DATE: 25 FEB 2015	DATE:	DATE:
TITLE DOUBLE HUNG (DH57WV IMPACT) VERTICAL ASSEMBLY		DWG. # DH57WV Impact

REVISIONS

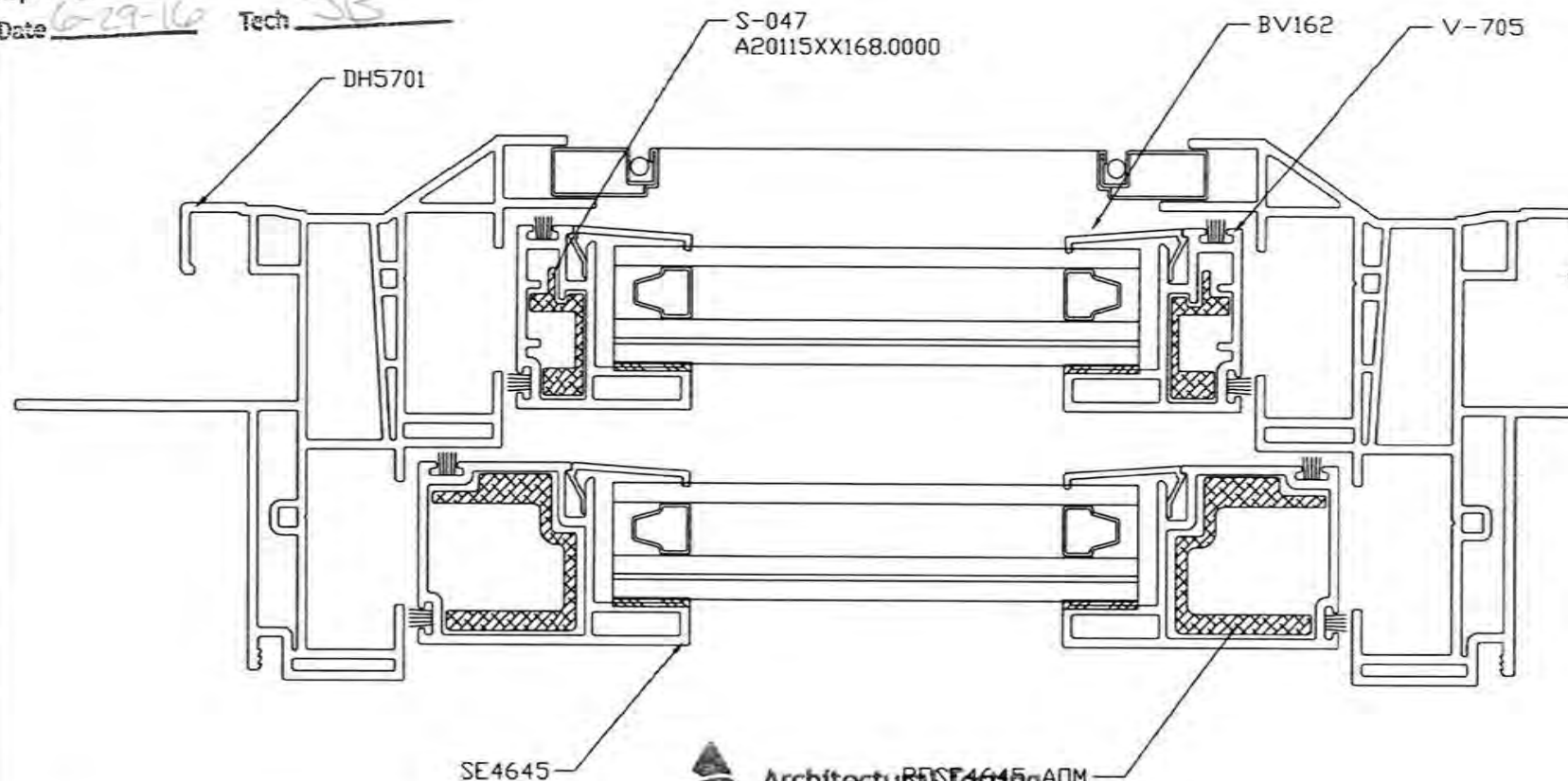
DATE



# Architectural Testing

Test sample complies with these details.  
Deviations are noted.

Report# 60434.01-501-44  
Date 6-29-16 Tech JB



## Architectural Testing

Test sample complies with these details.  
Deviations are noted.

Report# F3070  
Date 11/30/15 Tech JAN

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FOMBELL, PA 16123

		DRAWN: TJF	CHK'D:	APPVD:
		DATE: 25 FEB 2015	DATE:	DATE:
		TITLE DOUBLE HUNG (DH57WW IMPACT) HORIZONTAL ASSEMBLY		DWG. # DH57WW Impact
	REVISIONS	DATE		