Intertek | Architectural Testing

TEST REPORT

Report No.: G9656.01-501-47

Rendered to:

VEKA INC.
Fombell, Pennsylvania

PRODUCT TYPE: PVC Single Hung Window
SERIES/MODEL: SHA4WW/Insert

SPECIFICATION(S): AAMA/WDMA/CSA 101/I.S.2/A440-11, *NAFS 2011 - North American Fenestration Standard/Specification for Windows, Doors, and Skylights*

AAMA/WDMA/CSA 101/I.S.2/A440-08, *NAFS - North American Fenestration Standard/Specification for Windows, Doors, and Skylights*

	Summary of Results	
Title	**Test Specimen #1** *Reinforced lock rail, fixed rail and stiles*	**Test Specimen #2** *Reinforced lock rail and fixed rail*
AAMA/WDMA/CSA 101/I.S.2/A440-08 and -11	Class R-PG40 1016 x 1829 (40 x 72) - H	Class R-PG45 1016 x 1600 (40 x 63) - H
Design Pressure	±2400 Pa (±50.13 psf)	±2400 Pa (±50.13 psf)
Air Infiltration	0.8 L/s/m^2 (0.15 cfm/ft^2)	0.9 L/s/m^2 (0.17 cfm/ft^2)
Canadian Air Infiltration/Exfiltration Level	A2	A2
Water Penetration Resistance Test Pressure	290 Pa (6.06 psf)	330 Pa (6.90 psf)

Test Completion Date: 03/24/17

Reference must be made to Report No. G9656.01-501-47, dated 04/12/17 for complete test specimen description and detailed test results.

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 Single Hung Window

3.2 Series/Model: SHA4WW/Insert

3.3 Compliance Statement: Results obtained are tested values and were secured by using the designated test method(s). The specimens tested successfully met the performance requirements for the following ratings:

Test Specimen(s)	Title	Summary of Results
1	101/I.S.2/A440-08 and -11	Class R-PG40 1016 x 1829 (40 x 72) - H
2	101/I.S.2/A440-08 and -11	Class R-PG45 1016 x 1600 (40 x 63) - H

3.4 Test Date(s): 03/23/17 - 03/24/17

3.5 Test Record Retention End Date: All test records for this report will be retained until March 24, 2021.

3.6 Test Location: Veka Inc. test facility in Fombell, Pennsylvania. Calibration of test equipment was performed by Intertek-ATI in accordance with AAMA 205-01 "In-Plant Testing Guidelines for Manufacturers and Independent Laboratories".

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 Intertek-ATI per the drawings located in Appendix C. Any deviations are documented herein or on the drawings.

3.9 List of Official Observers:

Name	Company
Doug Merry	Veka Inc.
Cornell Charles	Veka Inc.
Joe Allison	Intertek-ATI

4.0 Test Specification(s):

AAMA/WDMA/CSA 101/I.S.2/A440-11, *NAFS 2011 - North American Fenestration Standard/Specification for Windows, Doors, and Skylights*

AAMA/WDMA/CSA 101/I.S.2/A440-08, *NAFS - North American Fenestration Standard/Specification for Windows, Doors, and Skylights*

5.0 Test Specimen Description:

5.1 Product Sizes:

Test Specimen #1:

Overall Area: 1.9 m^2 (20.0 ft^2)	**Width**		**Height**	
	millimeters	**inches**	**millimeters**	**inches**
Overall size	1016	40	1829	72
Sash size	956	37-5/8	889	35
Screen size	908	35-3/4	841	33-1/8

Test Specimen #2:

Overall Area: 1.6 m^2 (17.5 ft^2)	**Width**		**Height**	
	millimeters	**inches**	**millimeters**	**inches**
Overall size	1016	40	1600	63
Sash size	956	37-5/8	775	30-1/2
Screen size	908	35-3/4	727	28-5/8

The following descriptions apply to all specimens.

5.2 Frame Construction:

Frame Member	**Material**	**Description**
Head, sill, jambs, and fixed meeting rail, sill insert	PVC	Extruded

5.0 Test Specimen Description: (Continued)

5.2 Frame Construction: (Continued)

	Joinery Type	Detail
All corners	Mitered	Thermally welded
Fixed rail	Coped butt type	The fixed rail was fastened to the jambs with four #8 x 2-1/4" truss head screws, two at each end. Each intersection was sealed with a silicone sealant.
Sill insert	Square-cut	Snap-fit, sealed at each end and along entire width with silicone sealant.

5.3 Sash Construction:

Sash Member	Material	Description
All rails and stiles	PVC	Extruded

	Joinery Type	Detail
All corners	Mitered	Thermally welded

5.4 Reinforcement:

Test specimen #1:

Drawing Number	Location	Material
RF SHA424 AOM	Fixed meeting rail	Extruded aluminum
RF SEA435 AOM	Lock rail, stiles	Extruded aluminum

Test specimen #2:

Drawing Number	Location	Material
RF SHA424 AOM	Fixed meeting rail	Extruded aluminum
RF SEA435 AOM	Lock rail	Extruded aluminum

5.0 Test Specimen Description: (Continued)

5.5 Weatherstripping:

Description	Quantity	Location
0.187" backed x 0.270" high center fin pile	1 Row	Lock rail
0.187" backed x 0.270" high center fin pile	2 Rows	Fixed meeting rail
0.187" backed x 0.270" high center fin pile	3 Rows	Stiles
0.450" diameter foam-filled vinyl bulb with fin and offset base	1 Row	Bottom rail
0.187" backed x 0.300" high foam-filled vinyl bulb	1 Row	Sill Insert

5.6 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	"U" shaped steel, single sealed	1/8" annealed	1/8" annealed	The sash was exterior glazed and the fixed lite was interior glazed. The glass was set against a double-sided adhesive tape and secured with rigid vinyl glazing beads.

Location	Quantity	Daylight Opening		Glass Bite
		millimeters	inches	
Specimen #1 sash	1	886 x 819	34-7/8 x 32-1/4	1/2"
Specimen #2 frame	1	886 x 819	34-7/8 x 32-1/4	1/2"
Specimen #1 sash	1	886 x 705	34-7/8 x 27-3/4	1/2"
Specimen #2 frame	1	886 x 705	34-7/8 x 27-3/4	1/2"

5.0 Test Specimen Description: (Continued)

5.7 Drainage:

Drainage Method	Size	Quantity	Location
Weepslot with flap	1-5/16" wide by 5/16" high	2	Exterior sill face, one 4" in from each end
Weepslot	1" wide by 3/16" high	4	Intermediate sill walls (2), one at each end
Weephole	1-1/4" deep by 1/2" wide	2	Sill/jamb intersection, one at each end
Weepslot	1/2" wide by 1/8" high	2	Exterior sill face through two walls draining glazing channel, one 3-1/2" from each end

5.8 Hardware:

Description	Quantity	Location
Composite sweep lock	2	Lock rail, one 8" in from each end engaging composite keepers on fixed rail
Recessed plastic tilt latch	2	Top corners of sash
Metal pivot bars	2	Bottom rail, one at each end
Constant force balance system with locking tilt shoes	2	One per jamb

5.9 Screen Construction:

Frame Material	Corner Construction	Mesh Type	Mesh Attachment Method
Formed aluminum	Miter-cut and secured with snap-in plastic corner keys	Fiber	Flexible vinyl spline

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 10" on center, and beginning at each corner

7.0 Test Results: The temperature during testing was 20°C (68°F). The results are tabulated as follows:

Test Specimen #1:

Title of Test	Results	Allowed	Note
Operating Force, per ASTM E 2068	Initiate motion: 155 N (35 lbf) Maintain motion: 151 N (34 lbf) Latches: 89 N (20 lbf) Locks: 22 N (5 lbf)	Report Only 155 N (35 lbf) max. 100 N (22.5 lbf) max. 100 N (22.5 lbf) max.	
Air Leakage, Infiltration per ASTM E 283 at 75 Pa (1.57 psf)	0.8 L/s/m^2 (0.15 cfm/ft^2)	1.5 L/s/m^2 (0.3 cfm/ft^2) max.	1
Air Leakage, Exfiltration per ASTM E 283 at 75 Pa (1.57 psf)	0.8 L/s/m^2 (0.16 cfm/ft^2)	1.5 L/s/m^2 (0.3 cfm/ft^2) max.	1
Canadian Air Infiltration/Exfiltration Level	A2	N/A	
Water Penetration, per ASTM E 547	N/A	N/A	4
Uniform Load Deflection, per ASTM E 330	N/A	N/A	4
Uniform Load Structural, per ASTM E 330	N/A	N/A	4
Forced Entry Resistance, per ASTM F 588, Type: A - Grade: 10	Pass	No entry	
Thermoplastic Corner Weld	Pass	Meets as stated	
Deglazing, per ASTM E 987 Operating direction, 320 N (72 lbf) Remaining direction, 230 N (52 lbf)	Pass Pass	Meets as stated Meets as stated	

7.0 Test Results: (Continued)

Test Specimen #1: (Continued)

Title of Test	Results	Allowed	Note
Optional Performance			
Water Penetration, per ASTM E 547 at 290 Pa (6.06 psf)	Pass	No leakage	3
Uniform Load Deflection, per ASTM E 330 Deflections taken at the meeting rail +2400 Pa (+50.14 psf) -2400 Pa (-50.14 psf)	 4.3 mm (0.17") 2.5 mm (0.10")	 Report Only	 5, 6, 7
Uniform Load Structural, per ASTM E 330 Permanent sets taken at the meeting rail +3600 Pa (+75.19 psf) -3600 Pa (-75.19 psf)	 0.5 mm (0.02") 0.5 mm (0.02")	 3.6 mm (0.14") max. 3.6 mm (0.14") max.	 6, 7

Test Specimen #2:

Title of Test	Results	Allowed	Note
Operating Force, per ASTM E 2068	Initiate motion: 133 N (30 lbf) Maintain motion: 133 N (30 lbf) Latches: 89 N (20 lbf) Locks: 22 N (5 lbf)	 Report Only 155 N (35 lbf) max. 100 N (22.5 lbf) max. 100 N (22.5 lbf) max.	
Air Leakage, Infiltration per ASTM E 283 at 75 Pa (1.57 psf)	0.9 L/s/m^2 (0.17 cfm/ft^2)	1.5 L/s/m^2 (0.3 cfm/ft^2) max.	1
Air Leakage, Exfiltration per ASTM E 283 at 75 Pa (1.57 psf)	0.8 L/s/m^2 (0.16 cfm/ft^2)	1.5 L/s/m^2 (0.3 cfm/ft^2) max.	1
Canadian Air Infiltration/Exfiltration Level	A2	N/A	
Water Penetration, per ASTM E 547	N/A	N/A	4

7.0 Test Results: (Continued)

Test Specimen #2: (Continued)

Title of Test	Results	Allowed	Note
Uniform Load Deflection, per ASTM E 330	N/A	N/A	4
Uniform Load Structural, per ASTM E 330	N/A	N/A	4
Forced Entry Resistance, per ASTM F 588, Type: A - Grade: 10	Pass	No entry	
Thermoplastic Corner Weld	Pass	Meets as stated	
Deglazing, per ASTM E 987 Operating direction, 320 N (72 lbf)	Pass	Meets as stated	
Remaining direction, 230 N (52 lbf)	Pass	Meets as stated	
Optional Performance			
Water Penetration, per ASTM E 547 at 330 Pa (6.90 psf)	Pass	No leakage	3
Uniform Load Deflection, per ASTM E 330 Deflections taken at the meeting rail			
+2400 Pa (+50.14 psf)	4.0 mm (0.16")		
-2400 Pa (-50.14 psf)	3.3 mm (0.13")	Report Only	5, 6, 7
Uniform Load Structural, per ASTM E 330 Permanent sets taken at the meeting rail			
+3600 Pa (+75.19 psf)	0.5 mm (0.02")	3.6 mm (0.14") max.	
-3600 Pa (-75.19 psf)	0.5 mm (0.02")	3.6 mm (0.14") max.	6, 7

7.0 Test Results: (Continued)

Note 1: The tested specimen meets (or exceeds) the performance levels specified in AAMA/WDMA/CSA 101/I.S.2/A440 for air leakage resistance.

Note 2: Test Date 03/23/17 .

Note 3: With and without insect screen.

Note 4: The client opted to start at a pressure higher than the minimum required. Test results are reported under Optional Performance.

Note 5: The deflections reported are not limited by AAMA/WDMA/CSA 101/I.S.2/A440 for this product designation. The deflection data is recorded in this report for special code compliance and information only.

Note 6: Loads were held for 10 seconds.

Note 7: Tape and film were used to seal against air leakage during structural testing. In our opinion, the tape and film did not influence the results of the test.

Intertek-ATI 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 Intertek-ATI for the entire test record retention period.

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimen(s) tested. This report may not be reproduced, except in full, without the written approval of Intertek-ATI.

For ARCHITECTURAL TESTING, Inc.

James P. Grippo /sld

Digitally Signed for: James P. Grippo by Sandy L. DiCaro

James P. Grippo
Technician

Joseph E. Allison

Digitally Signed by: Joseph E. Allison

Joseph E. Allison
Laboratory Supervisor

JEA:sld

Attachments (pages): This report is complete only when all attachments listed are included.
- Appendix-A: Alteration Addendum (1)
- Appendix-B: Location of Air Seal (1)
- Appendix-C: Drawing(s) (4) Complete drawings packet on file with Intertek-ATI.

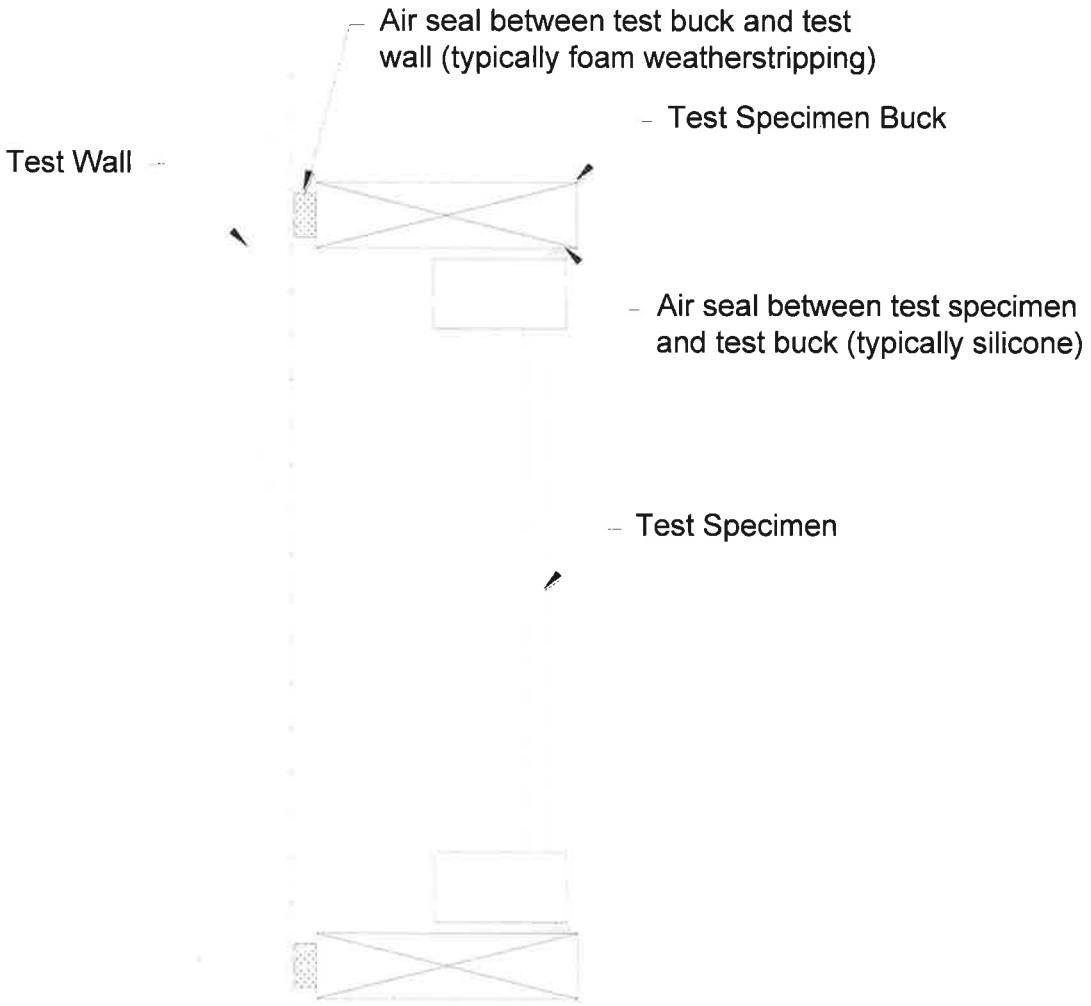
Appendix A

Alteration Addendum

***Note**: No alterations were required.*

Appendix B

Location of Air Seal: The air seal between the test specimen and the test wall is detailed below. The seal is made of foam weatherstripping and is attached to the edge of the test specimen buck. The test specimen buck is placed against the test wall and clamped in place, compressing the weatherstripping and creating a seal.



Appendix C

Drawing(s)

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

BILL OF MATERIALS

SINGLE HUNG (SHA4WW)
SILL INSERT SMALL SASH

NOTE: THIS BILL OF MATERIALS REFLECTS THE SYSTEM AS TESTED. DEVIATION FROM THE BILL OF MATERIALS IS NOT RECOMMENDED BY VEKA INC. AND MAY REDUCE THE PERFORMANCE OF THE FINISHED PRODUCT.

PVC PROFILES:	PART #	# PER UNIT	SOURCE
FRAME	SHA401F	4	VEKA
HEAD COVER	AC25	1	VEKA
SILL INSERT – INTERIOR	DH3306	1	VEKA
KEEPER RAIL	SHA424	1	VEKA
SASH STILE	SEA435/SEA735	2	VEKA
LOCK RAIL	SEA436/SEA736	1	VEKA
BOTTOM HANDLE RAIL	SEA437/SEA737	1	VEKA
GLAZING BEAD (1 1/8" GLASS)	BV56	8	VEKA
GLAZING BEAD (1" GLASS)	BV57	8	VEKA
GLAZING BEAD (7/8" GLASS)	BV58	8	VEKA
GLAZING BEAD (13/16" GLASS)	BV185	8	VEKA
GLAZING BEAD (3/4" GLASS)	BV137	8	VEKA
BALANCE COVER	UV17	2	VEKA

REINFORCING PROFILES: Refer to test report for specific reinforcing configurations.

KEEPER RAIL	RF SHA424 A0M	A/R	VEKA
LOCK RAIL	RF SEA435 A0M	A/R	VEKA
STILES	RF SEA435 A0M	A/R	VEKA
BOTTOM RAIL	RF SEA435 A0M	A/R	VEKA

HARDWARE:

LOCK	3003**	1-2	LAWRENCE
	3237**	1-2	VISION
KEEPER	3003-401**	1-2	LAWRENCE
	8253**	1-2	VISION
FLUSH MOUNT TILT LATCH ASSY	78037** LH	1	ASHLAND
	78137** RH	1	ASHLAND
BALANCE	G3 1/2" COIL	A/R	ASHLAND
BALANCE SHOE	81053-ANA-LA	2	ASHLAND
PIVOT BAR	12310-999	2	ASHLAND
VENT LATCH	1718**	2	VISION
WEEP COVER	1224**	2	VISION

WEATHERSTRIPPING:

BOTTOM SASH BULB		32684**	1	AMESBURY
KEEPER WEATHERPILE	.270-.187	27018745GYGF (Gray)	2	AMESBURY
LOCK RAIL	.270-.187	27018745GYGF (Gray)	A/R	AMESBURY
ALL OTHER WEATHERPILE	.270-.187	27018745GYGF (Gray)	A/R	AMESBURY

Intertek

Report #: G9656.01-501-47
Date: 04/042017
Verified by:

BILL OF MATERIALS

SINGLE HUNG (SHA4WW)
SILL INSERT SMALL SASH

NOTE: THIS BILL OF MATERIALS REFLECTS THE SYSTEM AS TESTED. DEVIATION FROM THE BILL OF MATERIALS IS NOT RECOMMENDED BY VEKA INC. AND MAY REDUCE THE PERFORMANCE OF THE FINISHED PRODUCT.

GLAZING:	PART #	# PER UNIT	SOURCE
DOUBLE FACE TAPE	1/16" X 1/2" AWT**	A/R	ARLON
	1/16" X 1/2"	A/R	VENTURE
LIQUID BACK BEDDING	SBC1M150	A/R	NOVAGUARD
SILICONE	896	A/R	PECORA
	899	A/R	DOW CORNING
GLAZING BLOCKS	1/8" THICK	A/R	TREMCO
SILICONE SEALANT	NOVAFLEX M418*	A/R	NOVAGUARD

SCREWS: NOTE ALL SCREWS ARE ZINC PLATED OR STAINLESS STEEL SHEET METAL TYPE, UNLESS OTHERWISE NOTED.

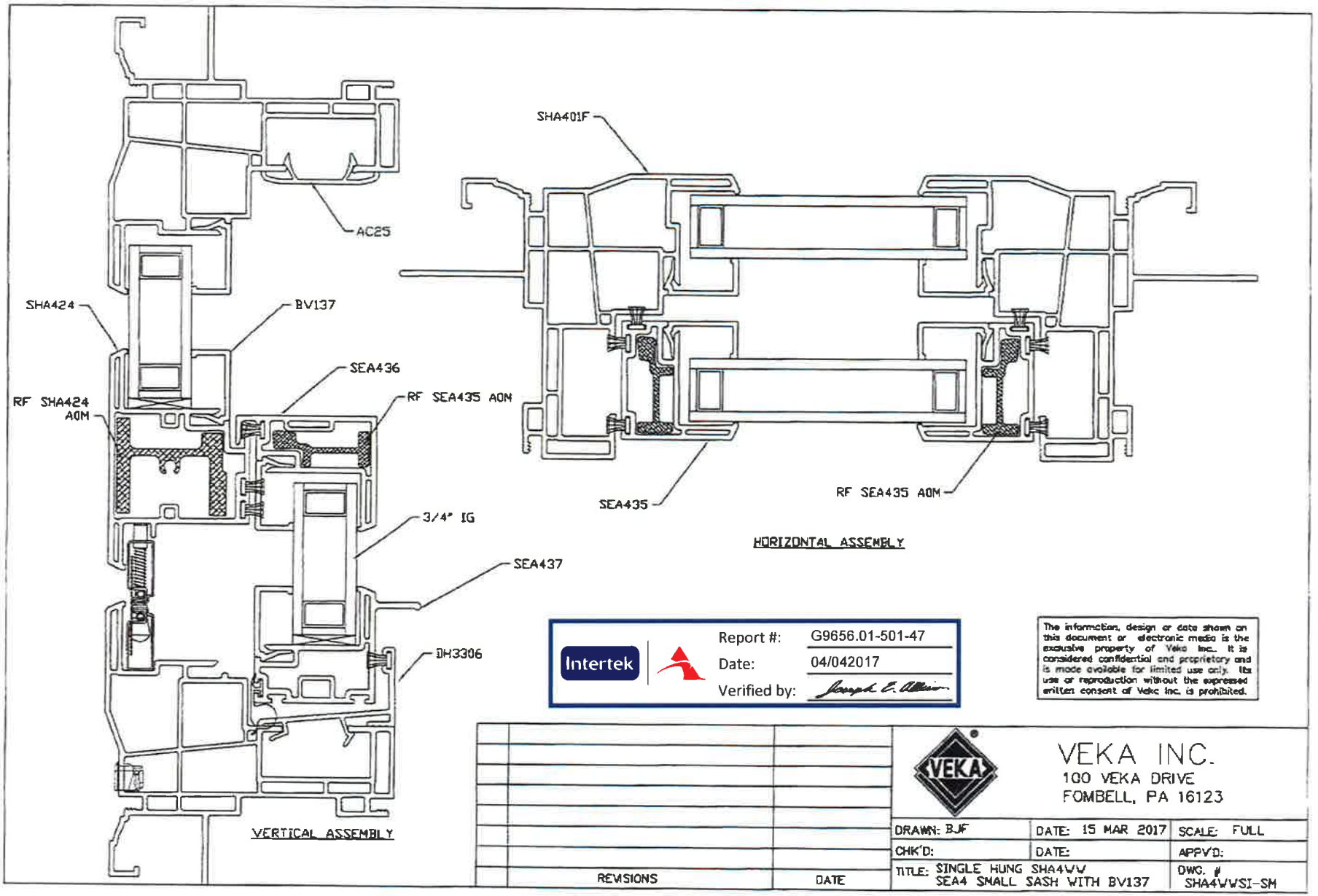
LOCK	#6 X 7/8" FHP**	2-4	MERCHANTS
KEEPER	#6 X 5/8" FHP** self drilling	2-4	MERCHANTS
BALANCE	#8 X 3/8" PHP	A/R	MERCHANTS
PIVOT BAR	#6 X 3/8" THP	8	MERCHANTS
INSTALLATION	#8 X 2-1/2" THP	6	MERCHANTS

** = COLOR
A/R = AS REQUIRED

Intertek

Report #: G9656.01-501-47
Date: 04/042017
Verified by:

03-22-2017



Intertek

Report #: G9656.01-501-47

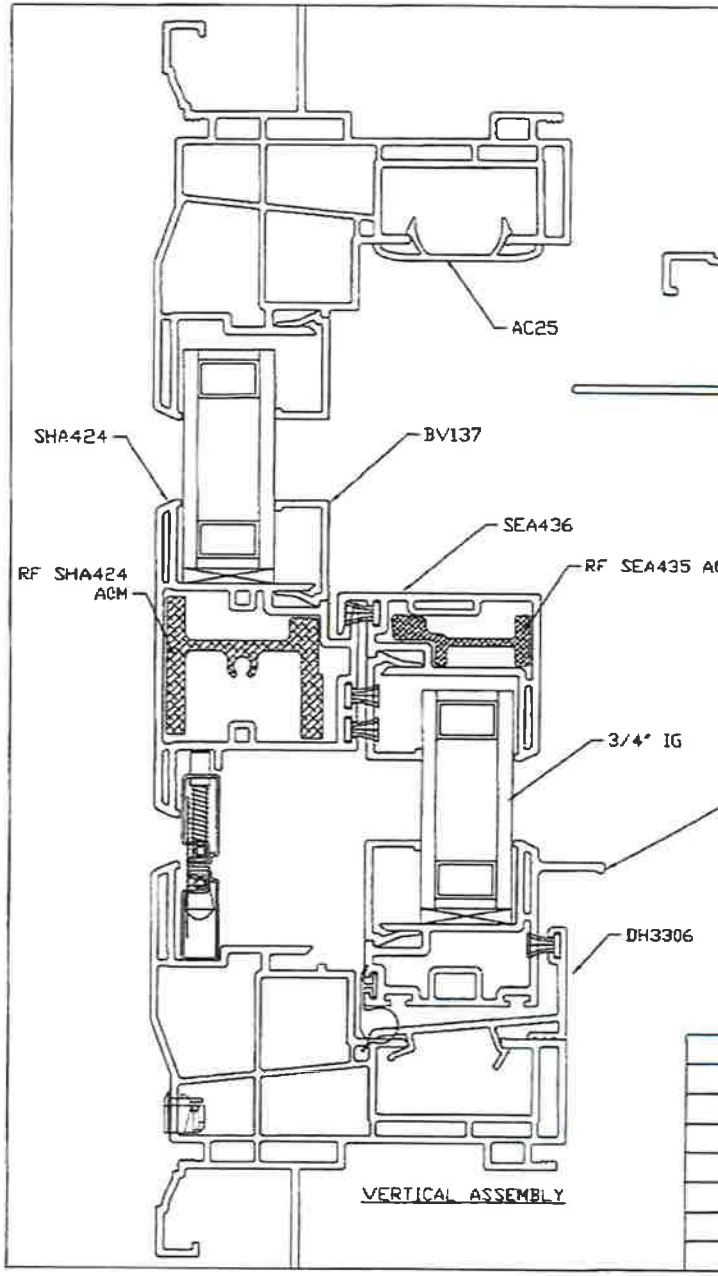
Date: 04/042017

Verified by:

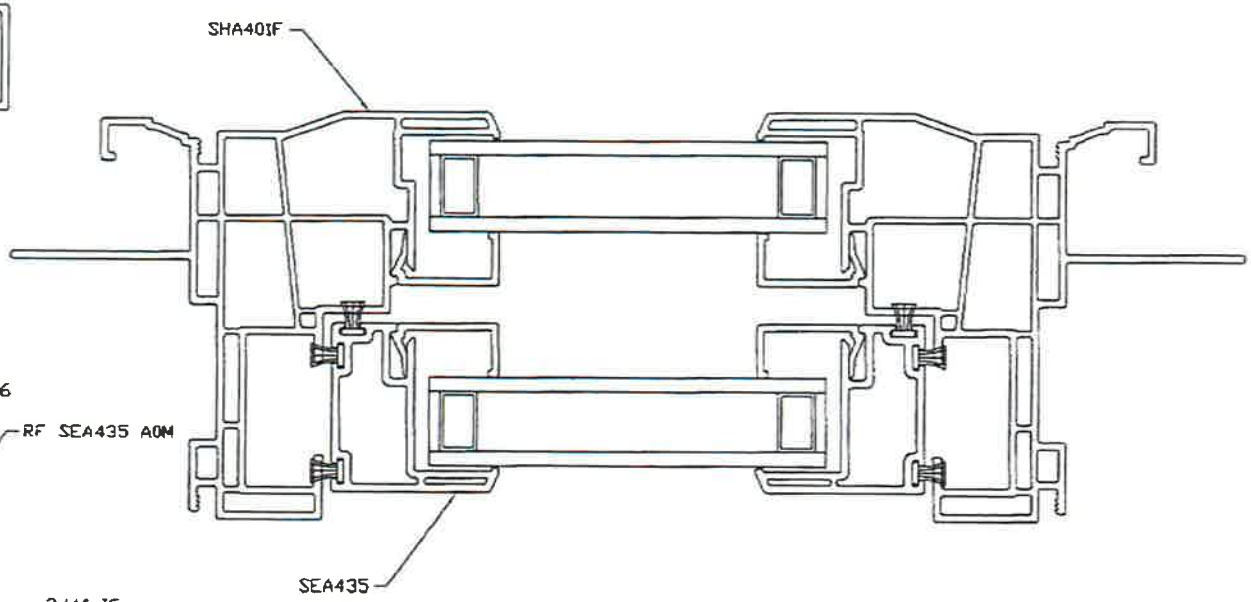
REVISIONS	DATE

VEKA INC.
100 VEKA DRIVE
FOMBELL, PA 16123

DRAWN: BJF	DATE: 15 MAR 2017	SCALE: FULL
CHK'D:	DATE:	APPV'D:
TITLE: SINGLE HUNG SHA4VV SEA4 SMALL SASH WITH BV137		DWG. # SHA4VVSI-SM



VERTICAL ASSEMBLY



HORIZONTAL ASSEMBLY

Intertek

Report #: G9656.01-501-47

Date: 04/042017

Verified by:

REVISIONS	DATE

VEKA INC.
100 VEKA DRIVE
FOMBELL, PA 16123

DRAWN: BJF	DATE: 15 MAR 2017	SCALE: FULL
CHK'D:	DATE:	APPV'D:
TITLE: SINGLE HUNG SHA4WW SEA4 SMALL SASH WITH BV137		DWG. # SHA4WWSI-SM