

**NFRC U-FACTOR, SHGC, VT, &
CONDENSATION RESISTANCE
COMPUTER SIMULATION REPORT**

(Revised)

**Rendered to:
CUSTOM VINYL PRODUCTS, LLC**

**SERIES/MODEL:
DHA4 Double Hung**

Report Number: D4029.10-116-45
Original Report Date: 02/07/17
Revised Report Date: 02/08/17

NFRC U-FACTOR, SHGC, VT, & CONDENSATION RESISTANCE COMPUTER SIMULATION REPORT

(Revised)

Rendered to:
CUSTOM VINYL PRODUCTS, LLC
260 Enterprise Drive
Newport News, Virginia 23603

Report Number: D4029.10-116-45
Simulation Date: 06/05/14
Original Report Date: 02/07/17
Revised Report Date: 02/08/17

Project Summary:

Architectural Testing, Inc., an Intertek Company (Intertek-ATI) was contracted to perform U-Factor, Solar Heat Gain Coefficient, Visible Transmittance, and Condensation Resistance* computer simulations in accordance with the National Fenestration Rating Council (NFRC). The products were evaluated in full compliance with NFRC requirements to the standards listed

**NFRC's Condensation Resistance rating is NOT equivalent to a Condensation Resistance Factor (CRF) determined in accordance with AAMA 1503.*

Standards:

ANSI/NFRC 100-2014: Procedure for Determining Fenestration Product U-Factors
ANSI/NFRC 200-2014: Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence
NFRC 500-2014: Procedure for Determining Fenestration Product Condensation Resistance Values

Software:

Frame and Edge Modeling: THERM 7.4.3
Center-of-Glass Modeling: WINDOW 7.4.8
Total Product Calculations: WINDOW 7.4.8
Spectral Data Library: IGDB 52.0

Simulations Specimen Description:

Series/Model: DHA4 Double Hung
Type: Vertical Slider, Double Hung
Frame Material: VY Vinyl
Sash Material: VA Vinyl w/ All Members Reinforced
Standard Size: 1200mm x 1500mm

Modeling Assumptions/Technical Interpretations:

- 1) To prevent air infiltration, tape was applied to all interior sash crack locations.
- 2) The DHA4 Double Hung is available in both the Equal Lite and UnEqual Lite configurations. These two configurations can be within the same product line, per NFRC 100-2014, Section 4.2.1.I.i. This client only manufactures the Equal Lite configuration, but the UnEqual Lite was physically tested.
- 3) The DHA4 Double Hung is available with both the Decorative and Non-decorative sashes. These two sash configurations can be grouped per NFRC 100-2014, Section 4.2.1.J.ii. This client only manufactures the Decorative sash, but the Non-decorative sash was physically tested.

Specialty Products Table:

The specialty products method allow the manufacturer to determine the overall product SHGC and VT for any glazing option. The center of glass SHGC and/or VT must be determined using WINDOW 7.4.8. The method gives overall product SHGC and VT indexed on center of glass properties. All values used in the calculations are truncated to six decimal place precision.

	No Dividers	Dividers < 1	Dividers > 1
SHGC0	0.003474	0.006221	0.008808
SHGC1	0.763957	0.683298	0.607318
VT0	0.000000	0.000000	0.000000
VT1	0.760483	0.677077	0.598510

$$SHGC = SHGC0 + SHGCc (SHGC1 - SHGC0)$$

$$VT = VT0 + VTc (VT1 - VT0)$$

Validation Matrix:

The following products are part of a validation matrix. Only one is required for validation testing.

<i>Product Line</i>	<i>Report Number</i>
None	-

Spacer Option Description

<i>Spacer Type</i>	<i>Sealant</i>		<i>Code</i>
	<i>Primary</i>	<i>Secondary</i>	
Cardinal XL Edge Spacer	ADCO PIB	Silicone	SS-D

Grid Option Description

<i>Grid Size</i>	<i>Grid Type</i>	<i>Grid Pattern</i>
3/16" x 5/8"	Aluminum Rectangular Grid (Painted)	NFRC Standard
3/16" x 13/16"	Aluminum Rectangular Grid (Painted)	NFRC Standard
5mm x 18mm	Aluminum Contour Grid (Painted)	NFRC Standard
5mm x 25mm	Aluminum Contour Grid (Painted)	NFRC Standard

Reinforcement Option Description

<i>Location</i>	<i>Material</i>
All Sash Members	Aluminum

Gas Filling Technique Description

<i>Fill Type</i>	<i>Method</i>
90% Argon	Single Probe Timed

Edge-of-Glass Construction

<i>Interior Condition</i>	Silicone Seal Between Vinyl Sash Leg and Glass
<i>Exterior Condition</i>	PVC Glazing Bead Against Glass

Weatherstripping

<i>Type</i>	<i>Quantity</i>	<i>Location</i>
Finpile	2 Rows	Sash Perimeter
Vinyl/Foam Bulb Gasket	1 Row	Bottom Rail

Frame/Sash Materials Finish

<i>Interior</i>	Vinyl
<i>Exterior</i>	Vinyl

**NFRC 100/200/500 Summary Sheet
DHA4 Double Hung**

ID	Pane Thickness 1	Gap Width 1	Pane Thickness 2	Gap Width 2	Pane Thickness 3	Gap Width 3	Pane Thickness 4	Gap Fill	Low-e (Surface#)	Tint	Spacer	Grid Type
	U-Factor			Solar Heat Gain Coefficient (SHGC) Grids (None / <1 / >=1)					Visible Transmittance (VT) Grids (None / <1 / >=1)		Condensation Resistance	
1	REINFORCEMENT: E366 / ARG90 / CLR (3mm/6mm) - 7/8" IG											
	0.117	0.500	0.224					ARG90	0.022(#2)	CL	SS-D	N,G,S
	U-Factor 0.30			SHGC (N / <1) 0.21 / 0.19					VT (N / <1) 0.49 / 0.43		CR 57	
2	NO REINFORCEMENT: E366 / ARG90 / CLR (3mm/6mm) - 7/8" IG											
	0.117	0.500	0.224					ARG90	0.022(#2)	CL	SS-D	N,G,S
	U-Factor 0.28			SHGC (N / <1) 0.21 / 0.19					VT (N / <1) 0.49 / 0.43		CR 58	

The Condensation Resistance results obtained from this procedure are for controlled laboratory conditions and do not include the effects of air movement through the specimen, solar radiation, and the thermal bridging that may occur due to the specific design and construction of the fenestration system opening.

Ratings values included in this report are for submittals to an NFRC-licensed IA and are not meant to be used directly for labeling purposes. Only those values identified on a valid Certification Authorization Report (CAR) by an NFRC accredited Inspection Agency (IA) are to be used for labeling purposes. The ratings values were rounded in accordance to NFRC 601, NFRC Unit and Measurement Policy.

Intertek-ATI is an NFRC accredited simulation laboratory and all simulations were conducted in full compliance with NFRC approved procedures and specifications. The values included in this report are not considered in compliance with ANSI/NFRC 100, ANSI/NFRC 200, and/or NFRC 500 unless the associated validation test requirements have been satisfied, as applicable.

This report is reissued in the name of Custom Vinyl Products, LLC through written authorization of Veka, Inc, to whom the original report was rendered. The original Veka, Inc report number is D4029.01-116-45.

Intertek-ATI will service this report for the entire test record retention period. Test records that are retained 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. The test record retention end date for this report is June 5, 2017.

Results obtained are simulated values and were secured by using the designated test methods. 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 product simulated. This report may not be reproduced, except in full, without the written approval of Intertek-ATI

For INTERTEK-ATI:

SIMULATED BY:

REVIEWED BY:

Kristen L. Louder
Senior Simulation Technician
NFRC Certified Simulator

Michael J. Thoman
Director - Simulations and Thermal Testing
Simulator-In-Responsible-Charge

KLL:kl
D4029.10-116-45

Attachments (pages): This report is complete only when all attachments listed are included.
Appendix A: Drawings and Bills of Material (27)

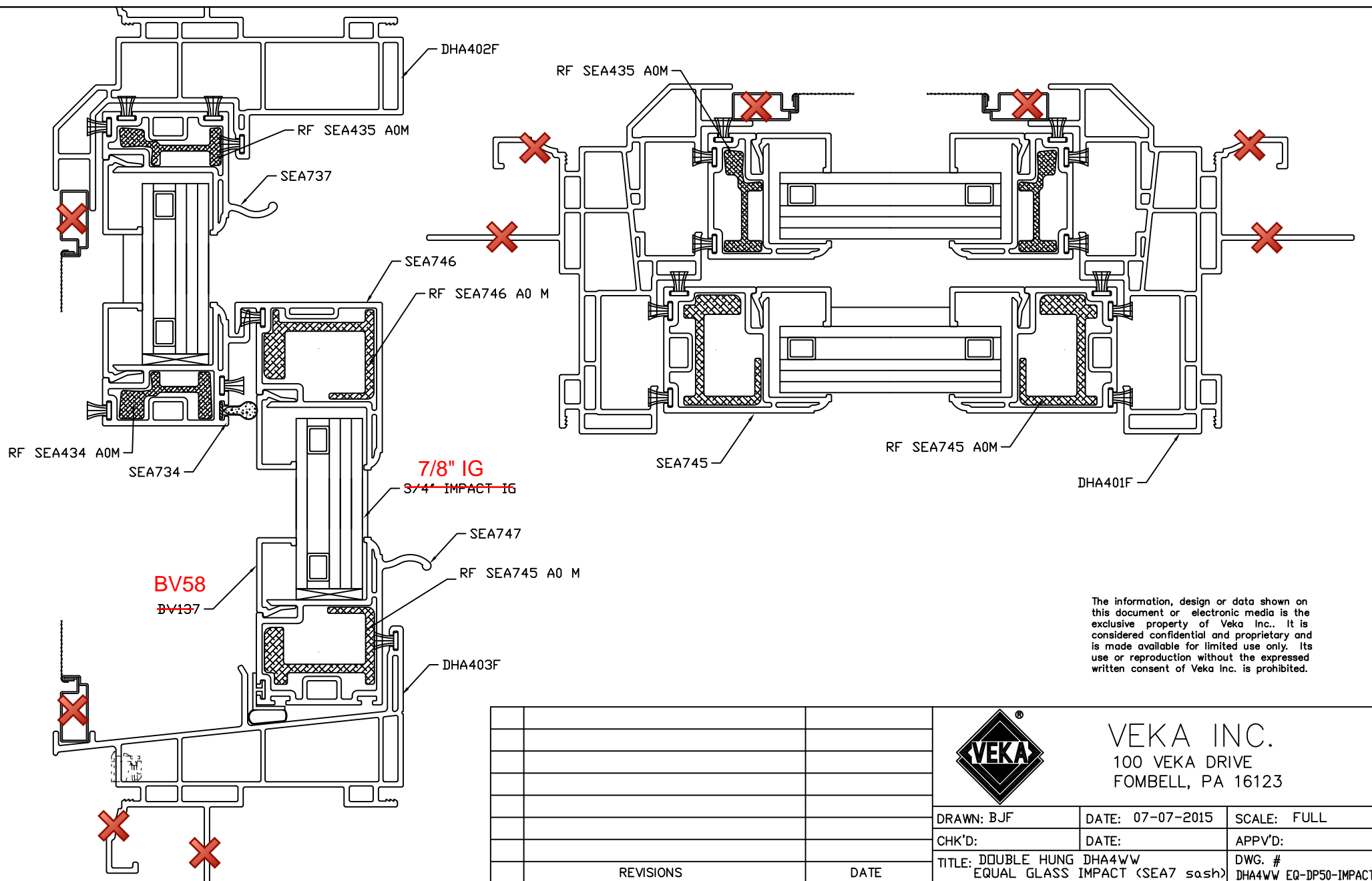
Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
.01R0	01/15/14	All	Original Report Issued to Veka, Inc.
.10R0	02/01/17	All	Report Reissued to Custom Vinyl Products, LLC
.10R1	02/08/17	Pages 2 & 4	Added Option #2 Updated Specialty Products Table

All drawings and Bills of Material used to simulate this product are enclosed in this Appendix
Some drawings may be omitted at the extruder's request.

Appendix A

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VEKA INC.
100 VEKA DRIVE
FOMBELL, PA 16123

DRAWN: BJF

DATE: 07-07-2015 SCALE: FULL

CHK'D:

DATE:

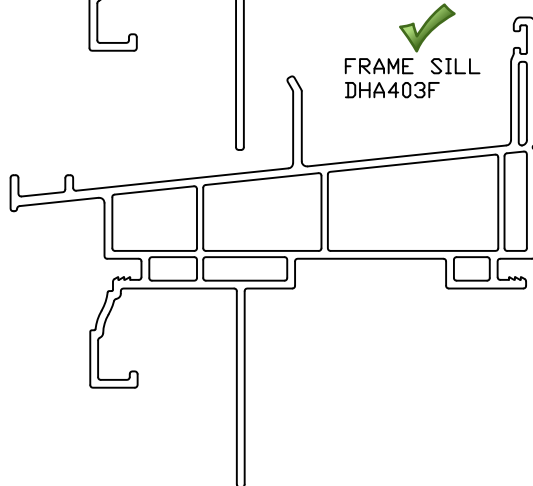
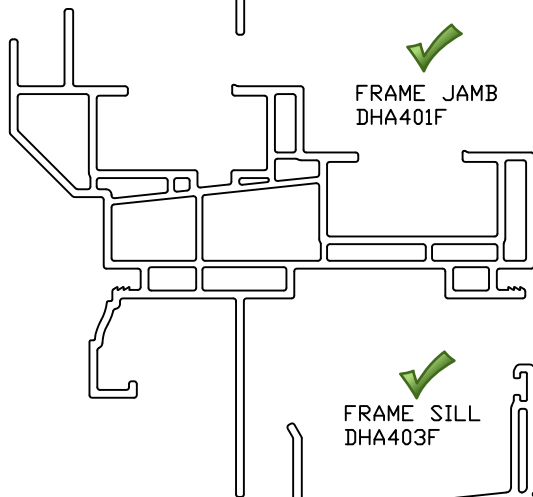
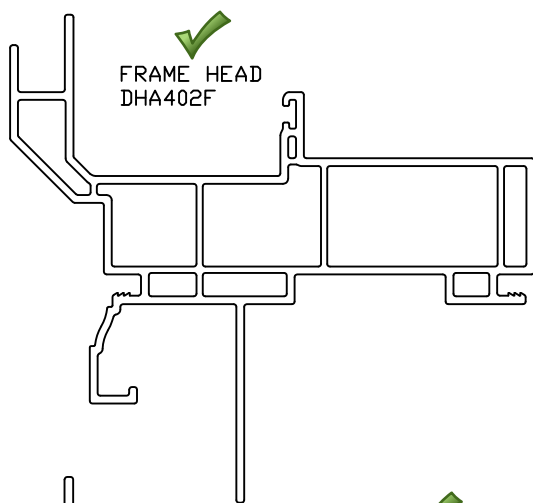
APPV'D:

TITLE: DOUBLE HUNG DHA4WW
EQUAL GLASS IMPACT (SEA7 sash)

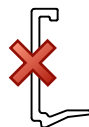
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DHA4WW EQ-DP50-IMPACT

REVISIONS

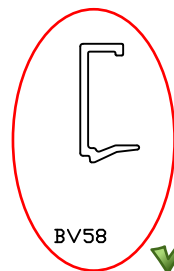
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BV56



BV57



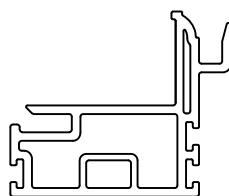
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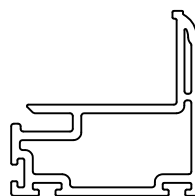
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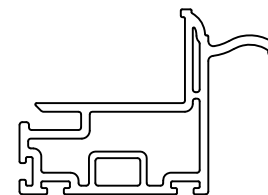
BV137



KEPPER RAIL
SEA734



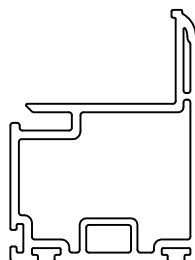
COMMON SASH
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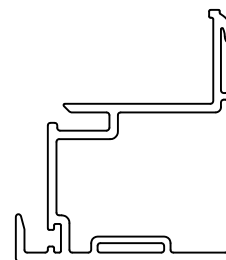
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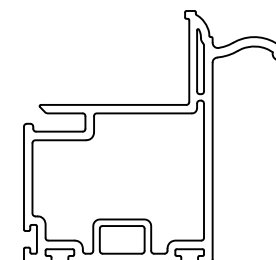
BALANCE COVER
UV17



COMMON SASH
SEA745



LOCK RAIL
SEA746



HANDLE RAIL
SEA747



VEKA INC.
100 VEKA DRIVE
FOMBELL, PA 16123

DHA4WW EQ IMPACT
SLOPED SILL
LINEAL PROFILES
FULL SCALE

Unequal Lite, Non-decorative version