# TEST REPORT

AAMA/WDMA/CSA 101/I.S.2/A440-11
AAMA/WDMA/CSA 101/I.S.2/A440-08

REPORT NO.: 2809.02-109-12

RENDERED TO: TROPHY WINDOWS
Houston, Texas

PRODUCT TYPE: PVC Single Hung Window, Oriel

SERIES / MODEL: S-82

| Test | Specimen #1 Summary of Results |
|---|---|
| Primary Product Designator | Class R – PG40 1105 x 1816 (44 x 72)-H |
| Design Pressure | ±1920 Pa (±40.10 psf) |
| Air Infiltration | 1.0 L/s/m$^2$ (0.19 cfm/ft$^2$) |
| Canadian Air Infiltration/Exfiltration Level | A2 |
| Water Penetration Resistance Test Pressure | 360 Pa (7.52 psf) |

| Test | Specimen #2 Summary of Results |
|---|---|
| Primary Product Designator | Class R – PG50 902 x 2121* (36 x 84*)-H |
| Design Pressure | ±2400 Pa (±50.13 psf) |
| Air Infiltration | 1.1 L/s/m$^2$ (0.21 cfm/ft$^2$) |
| Canadian Air Infiltration/Exfiltration Level | A2 |
| Water Penetration Resistance Test Pressure | 360 Pa (7.52 psf) |

**Test Completion Date**: 3/23/2021

Reference must be made to Report No. 2809.02-109-12, dated 4/13/2021 for complete test specimen description and detailed test results.

**CLIENT INFORMATION**: TROPHY WINDOWS
16261 Hollister Street, Suite #150
Houston, Texas 77066

**TEST LABORATORY**: Molimo, LLC
1410 Eden Road
York, Pennsylvania 17402
717-900-6034

**PROJECT SUMMARY**:

**PRODUCT TYPE**: PVC Single Hung Window, Oriel

**SERIES/MODEL**: S-82

**PROJECT SUMMARY**:

Molimo, LLC was contracted to perform testing on the above referenced product. The results are tested values and were secured by using the designated test methods. A summary of the rating achieved for the specimen tested are shown in the table below.

This product was originally tested by Veka, Inc. as Series SH46WW/ Slope Sill, PVC Single Hung Window, Oriel. This report is a reissue of Report No. 2809.01-109-12 in the name of Trophy Windows through written authorization by Veka, Inc.

| SPECIMEN | SPECIFICATION | PRODUCT RATING |
|---|---|---|
| 1 | 101/I.S.2/A440-08 and 11 | Class R – PG40 1105 x 1816 (44 x 72)-H |
| 2 | 101/I.S.2/A440-08 and 11 | Class R – PG50 902 x 2121* (36 x 84*)-H |

**PROJECT DETAILS**:

**Test Date**: 12/17/2020 - 3/23/2021

**Test Record Retention End Date**: 2/9/2025

**Test Location**: Veka, Inc. test facility in Fombell, Pennsylvania. In accordance with AAMA 205.01, calibration of manufacturers' test equipment is documented under Report No. 2808.01-109-12.

**Test Specimen Source**: The test specimen was provided by the client. Representative samples of the test specimen will be retained by Molimo for a minimum of four years from the test completion date.

**Drawing Reference**: The test specimen drawings were supplied by the client. The test specimen construction was verified by Molimo and was found to be representative of the product tested. Test specimen drawings are located in Appendix C of this report.

**WITNESSES**:

The following representatives witnessed all or part of the testing.

| Name | Company |
|---|---|
| Doug Merry | VEKA, Inc. |
| Cornell Charles | VEKA, Inc. |
| Joseph Allison | Molimo, LLC |

**TEST METHODS**:

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*

**TEST SPECIMEN DESCRIPTION**:

**PRODUCT SIZES:**

| **Test Specimen #1** | | | | |
|---|---|---|---|---|
| **Overall Area:** 1.95 $m^2$ (20.59 $ft^2$) | **Width** | | **Height** | |
| | **Millimeters** | **Inches** | **Millimeters** | **Inches** |
| **Overall Size:** | 1105 | 43-1/2 | 1816 | 71-1/2 |
| **Sash:** | 1054 | 41-1/2 | 727 | 28-5/8 |
| **Screen Size:** | 1175 | 46-1/4 | 721 | 28-3/8 |

| **Test Specimen #2** | | | | |
|---|---|---|---|---|
| **Overall Area:** 1.95 $m^2$ (20.59 $ft^2$) | **Width** | | **Height** | |
| | **Millimeters** | **Inches** | **Millimeters** | **Inches** |
| **Overall Size:** | 902 | 35-1/2 | 2121 | 83-1/2 |
| **Sash:** | 845 | 33-1/4 | 730 | 28-3/4 |
| **Screen Size:** | 819 | 32-1/4 | 721 | 28-3/8 |

**TEST SPECIMEN DESCRIPTION** (Continued)

**FRAME CONSTRUCTION:**

| Frame Member | Material | Detail |
|---|---|---|
| Head, Sill and Jambs | PVC | Extruded |
| Corner Construction | -- | Miter-cut and thermally welded |
| Fixed Meeting Rail | PVC | Coped, butted and fastened with two #8 x 2-1/2" truss head screws at jamb. The entire mechanical joint was sealed with silicone sealant. |

**SASH CONSTRUCTION:**

| Sash Member | Material | Detail |
|---|---|---|
| Rails and Stiles | PVC | Extruded |
| Corner Construction | -- | Miter-cut and thermally welded |

**REINFORCEMENT**:

| Drawing Number | Material | Location |
|---|---|---|
| S-046 | Extruded Aluminum | Fixed meeting rail |
| S-047 | Extruded Aluminum | Lock rail, stiles |

**GLAZING DETAILS**: *No conclusions of any kind regarding the adequacy or inadequacy of the glass in any glazed test specimens can be made.*

| Description | Detail: *All Specimens* |
|---|---|
| Glass Type | 3/4" IG |
| Glazing Construction (Exterior to Interior) | 5/32" Thick annealed glass<br>7/16" Metal reinforced butyl spacer system<br>5/32" Thick annealed glass |
| Glazing Method | The sash was exterior glazed, and the fixed lite interior glazed against a bed of silicone sealant and heal beaded with silicone sealant. The IG was secured with rigid vinyl glazing beads. |
| Glazing Bite | 5/8" |
| Daylight Opening<br>#1 Sash:<br>#1 Fixed<br>#2 Sash:<br>#2 Fixed: | <br>991 mm x 670 mm (39" x 26-3/8")<br>994 mm x 975 mm (39-1/8" x 38-3/8")<br>787 mm x 667 mm (31" x 26-1/4")<br>787 mm x 1279 mm (31" x 50-3/8") |

**TEST SPECIMEN DESCRIPTION** (Continued)

**WEATHERSTRIPPING:**

| Description | Quantity | Location |
|---|---|---|
| 0.187" Backed by 0.270" high center fin pile | 2 Rows | Stiles |
| 0.187" Backed by 0.310" high center fin pile | 1 Row | Sill |
| 0.187" Backed by 0.230" high center fin pile | 1 Row | Lock rail |
| 0.500" Diameter foam-filled vinyl bulb with fin on an offset base | 1 Row | Bottom rail |

**DRAINAGE:**

| Description | Quantity | Location |
|---|---|---|
| 1-3/16" wide by 3/16" high weep slot with open cell foam baffle | 2 | Exterior sill face, one 3-1/2" from each end |
| 1" wide by 1-1/4" deep weep hole | 2 | Sill/Jamb intersection, one at each end of sill |
| Leg height weep notch | 6 | Top surface sill legs (3), one at each end of each |

**HARDWARE:**

| Description | Quantity | Location |
|---|---|---|
| Composite lock | 2 per sash | Lock rail, one 7-1/4" from each end with integral mating groove on the fixed meeting rail |
| Plastic flush mount tilt latch | 2 per sash | Top corners of each sash |
| Metal interlocking pivot bar | 2 per sash | Bottom rail, one at each end |
| Constant force balance system | 2 per sash | One per jamb |

**SCREEN CONSTRUCTION:**

| | |
|---|---|
| **Frame Material** | Formed aluminum |
| **Corner Construction** | Square cut and secured with snap-in plastic corner keys |
| **Mesh Type** | Fiberglass mesh |
| **Mesh Attachment Method** | Flexible vinyl spline |

**TEST SPECIMEN DESCRIPTION** (Continued)

**INSTALLATION**: The specimen was installed into a Spruce-Pine-Fir wood buck. The rough opening allowed for a 1/8" shim space. The integral nailing fin the specimen was sealed to the wood buck with silicone sealant.

| Location | Anchor Description | Anchor Spacing |
|---|---|---|
| Integral nailing fin | #8 x 2" Truss head screw | Beginning at each corner then spaced 8" on center, through the nailing fin and into the wood buck. |

**TEST RESULTS**: The temperature during testing was 19° C (67° F).

**SPECIMEN #1:**

**OPERATING FORCE**: (per ASTM E 2068)

| Test | Results | Allowable | Note |
|---|---|---|---|
| Initiate Motion | 178 N (40 lbf) | Report Only | 1 |
| Maintain Motion (Opening) | 155 N (35 lbf) | 155 N (35 lbf) | |
| Maintain Motion (Closing) | 22 N (5 lbf) | 155 N (35 lbf) | |
| Locks / Latches | 22 N (5 lbf) | 100 N (22.5 lbf) | |

**AIR LEAKAGE TESTING**: (per ASTM E 283)

| Test | Results | Allowable | Note |
|---|---|---|---|
| Infiltration @ 75 Pa (1.57 psf) | 1.0 L/s/m$^2$ (0.19 cfm/ft$^2$) | 1.5 L/s/m$^2$ (0.30 cfm/ft$^2$) | 2 |
| Exfiltration @ 75 Pa (1.57 psf) | 0.8 L/s/m$^2$ (0.15 cfm/ft$^2$) | 1.5 L/s/m$^2$ (0.30 cfm/ft$^2$) | 2 |

Canadian Air Infiltration Rating: A2

**WATER PENETRATION TESTING**: (per ASTM E 547)

| Test | Results | Allowable | Note |
|---|---|---|---|
| 360 Pa (7.52 psf) | Pass | No Leakage | 3 |

**TEST RESULTS**: (Continued)

**SPECIMEN #1:** (Continued)

**UNIFORM LOAD TESTING**: (per ASTM E 330)

| Design Pressure Test | Results | Allowable | Note |
|---|---|---|---|
| Deflection measured at fixed meeting rail<br>+1920 Pa (+40.10 psf)<br>-1920 Pa (-40.10 psf) | <br>17.0 mm (0.67")<br>14.5 mm (0.57") | Report Only | 4,5,6 |

| Structural Test | Results | Allowable | Note |
|---|---|---|---|
| Permanent Set measured at fixed meeting rail<br>+2880 Pa (+60.15 psf)<br>-2880 Pa (-60.15 psf) | <br>1.0 mm (0.04")<br>1.3 mm (0.05") | <br>3.0 mm (0.16")<br>3.0 mm (0.16") | 4,5,6 |

**SECONDARY TESTING**:

| Test | Results | Allowable |
|---|---|---|
| FORCED ENTRY RESISTANCE per ASTM F 588<br>Type: A– Grade: 10 | <br>Pass | <br>No Entry |
| THERMOPLASTIC CORNER WELD | Pass | Meets as stated |
| DEGLAZING per ASTM E 987<br>Operating Direction – 320 N (70 lbf)<br>Remaining Direction – 230 N (50 lbf) | <br>Pass<br>Pass | <br>Meets as stated<br>Meets as stated |

**TEST RESULTS**: (Continued)

**SPECIMEN #2:**

**OPERATING FORCE**: (per ASTM E 2068)

| Test | Results | Allowable | Note |
|---|---|---|---|
| Initiate Motion | 89 N (20 lbf) | Report Only | 1 |
| Maintain Motion (Opening) | 89 N (20 lbf) | 155 N (35 lbf) | |
| Maintain Motion (Closing) | 44 N (10 lbf) | 155 N (35 lbf) | |
| Locks / Latches | 22 N (5 lbf) | 100 N (22.5 lbf) | |

**AIR LEAKAGE TESTING**: (per ASTM E 283)

| Test | Results | Allowable | Note |
|---|---|---|---|
| Infiltration @ 75 Pa (1.57 psf) | 1.1 L/s/m$^2$ (0.21 cfm/ft$^2$) | 1.5 L/s/m$^2$ (0.30 cfm/ft$^2$) | 2 |
| Exfiltration @ 75 Pa (1.57 psf) | 0.9 L/s/m$^2$ (0.18 cfm/ft$^2$) | 1.5 L/s/m$^2$ (0.30 cfm/ft$^2$) | 2 |

Canadian Air Infiltration Rating: A2

**WATER PENETRATION TESTING**: (per ASTM E 547)

| Test | Results | Allowable | Note |
|---|---|---|---|
| 360 Pa (7.52 psf) | Pass | No Leakage | 3 |

**TEST RESULTS**: (Continued)

**SPECIMEN #2:** (Continued)

**UNIFORM LOAD TESTING**: (per ASTM E 330)

| Design Pressure Test | Results | Allowable | Note |
|---|---|---|---|
| Deflection measured at fixed meeting rail<br>+2400 Pa (+50.13 psf)<br>-2400 Pa (-50.13 psf) | <br>11.3 mm (0.44")<br>7.6 mm (0.30") | Report Only | 4,5,6 |

| Structural Test | Results | Allowable | Note |
|---|---|---|---|
| Permanent Set measured at fixed meeting rail<br>+3600 Pa (+75.19 psf)<br>-3600 Pa (-75.19 psf) | <br>0.8 mm (0.03")<br>0.8 mm (0.03") | <br>3.0 mm (0.12")<br>3.0 mm (0.12") | 4,5,6 |

**SECONDARY TESTING**:

| Test | Results | Allowable |
|---|---|---|
| FORCED ENTRY RESISTANCE per ASTM F 588<br>Type: A– Grade: 10 | Pass | No Entry |
| THERMOPLASTIC CORNER WELD | Pass | Meets as stated |
| DEGLAZING per ASTM E 987<br>Operating Direction – 320 N (70 lbf)<br>Remaining Direction – 230 N (50 lbf) | <br>Pass<br>Pass | <br>Meets as stated<br>Meets as stated |

***General Notes**: All testing was performed in accordance with reference test methods.*

*#1: The operating force results listed above represent the maximum force measured among all sash tested.*

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

*#3: Water Penetration testing was performed with and without an insect screen.*

*#4: The deflections reported are not limited by AAMA/WDMA/CSA 101/I.S.2/A440 for this product designation and is recorded for information purposes only.*

*#5: All loads were held for 10 seconds.*

*#6: Tape and film were used to seal against air leakage. In our opinion, the tape and film did not influence the results of the test.*

This report is reissued in the name of Trophy Windows through written authorization from Veka, Inc. to whom the original report was rendered. The original Report Number is 2809.01-109-12. A copy of this report, detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation will be retained by Molimo, LLC for the entire test record retention period. At the end of this retention period, the service life of this report will expire.

Results obtained are tested values and were secured by using the designated test methods. This test 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 permission of Molimo, LLC.

For MOLIMO, LLC:

Joseph E. Allison
Regional Project Manager

Michael D. Stremmel, P.E.
Senior Project Engineer

JEA:dro

Attachments (pages): This report is complete only when all attachments listed are included.
- Appendix-A: Alteration Addendum (1)
- Appendix-B: Air Seal Location (1)
- Appendix-C: Drawings (1)

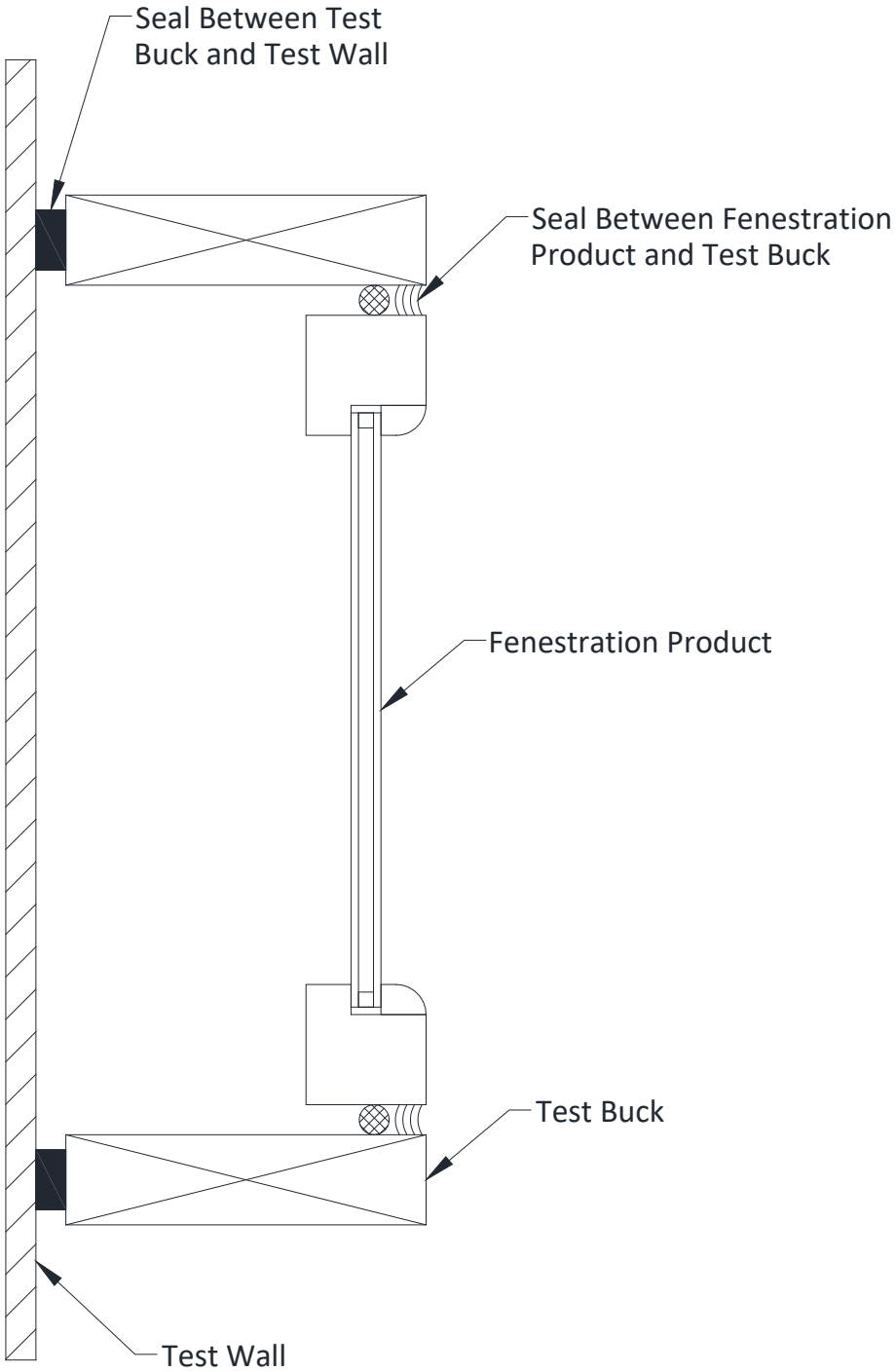
## Appendix A

## Alteration Addendum

No alterations were performed.

**Appendix B**

**Air Seal Location**

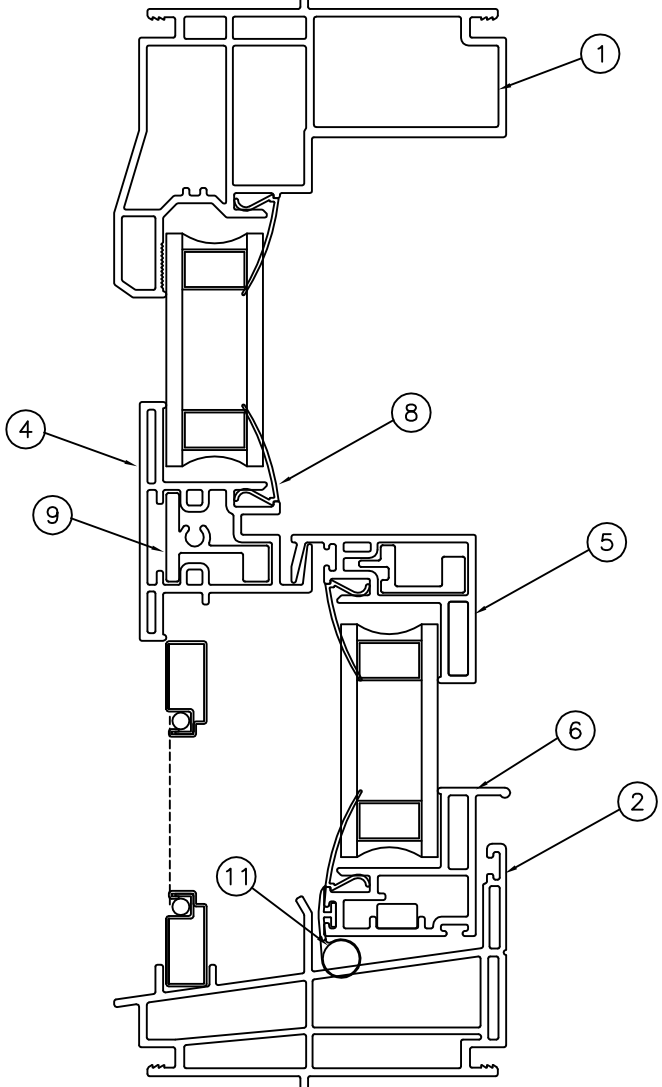


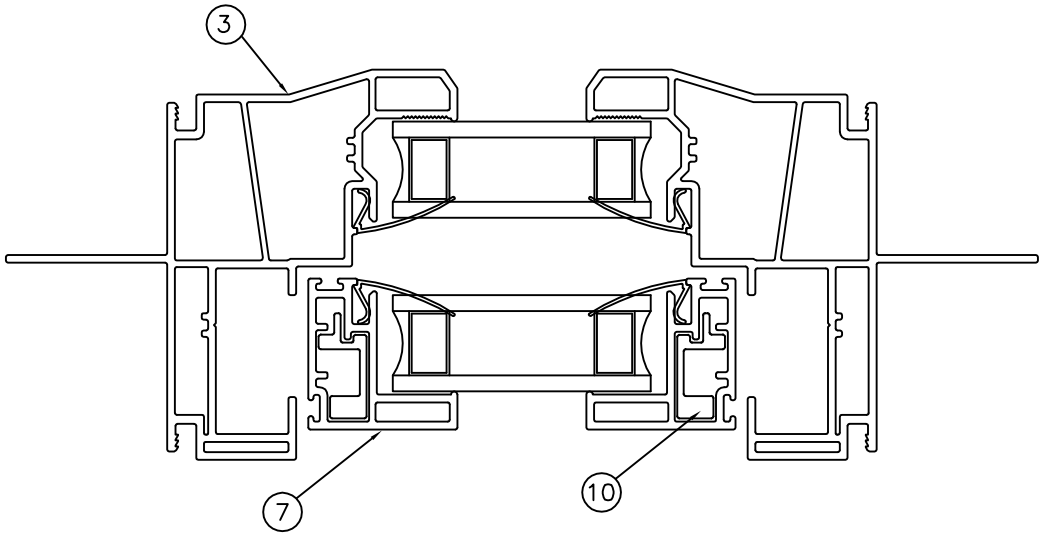
**Appendix C**

**Drawings**

Molimo
Architectural Product Testing

| | |
|---|---|
| Report #: | 2809.02-109-12 |
| Date: | 4/13/2021 |
| By: | M. Stremmel |




*VINYL & ALUMINUM EXTRUSIONS*

| | | | | | |
|---|---|---|---|---|---|
| 1 | SH4602 | FRAME HEAD | 7 | V–705 | SASH STILE |
| 2 | SH4603 | FRAME SILL | 8 | V–716 | GLAZING BEAD |
| 3 | SH4601 | FRAME JAMB | 9 | S–046 | M.R. REINFORCEMENT |
| 4 | V–706 | MEETING RAIL | 10 | S–047 | SASH REINFORCEMENT |
| 5 | SE4636 | SASH LOCK RAIL | 11 | AMESBURY 32684 | BULB SEAL |
| 6 | SE4637 | SASH BOTTOM RAIL | | | |

SH46WW

| REV | ECN. | CHANGE | BY | DATE |
|---|---|---|---|---|
| C | | UPDATED SH4602 TCR#0517–002 | BJF | 13 SEP 17 |
| B | | UPDATED SH4603 | BJF | 18 MAY 10 |
| A | | UPDATED SH4601 | BJF | 13 NOV 08 |



VEKA INC.
100 VEKA DRIVE
FOMBELL, PA 16123

SINGLE HUNG SH46WW

| B–SIZE | BY: BJF | DATE: 10/30/07 |
|---|---|---|
| SCALE: FULL | DWG #: SH46WW (LA3100) | |