



NATIONAL CERTIFIED TESTING LABORATORIES

FIVE LEIGH DRIVE • YORK, PENNSYLVANIA 17406 • TELEPHONE (717) 846-1200
FAX (717) 767-4100
www.nctlinc.com

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

TEST REPORT SUMMARY

Rendered to:

NEON ENERGY

230 Park Avenue, 10th Floor
New York, NY 10169

PRODUCT TYPE: Dual Action Window

SERIES/ MODEL: "Dual Action"

| Title | Summary of Results |
|---|--|
| Primary Product Designator AAMA/WDMA/CSA 101/I.S.2/A440-08 | Class AW-PG45: Size tested 1524 x 2515 mm (60 x 99 in) - Type DAW |
| Design Pressure | ±2160 Pa (±45.0 psf) |
| Air Infiltration | 0.1 L/s/m ² (<0.01 cfm/ft ²) – Prior to Cycling 0.1 L/s/m ² (0.01 cfm/ft ²) – After Cycling |
| Water Penetration Resistance Test Pressure | 580 Pa (12.0 psf) – Prior to and After Cycling |
| Uniform Load Structural Test Pressure | ±3240 Pa (±67.5 psf) |
| Forced Entry Resistance | ASTM F588-07 - Grade 10 Pass |

Test Completed: 07/19/16

Reference must be made to Report No. NCTL-110-19251-6 dated 09/13/16 for complete test specimen description and data.

For National Certified Testing Laboratories



DIGITAL SIGNATURE

Jay Leader
Technician



NATIONAL CERTIFIED TESTING LABORATORIES

FIVE LEIGH DRIVE • YORK, PENNSYLVANIA 17406 • TELEPHONE (717) 846-1200
FAX (717) 767-4100
www.nctlinc.com

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

STRUCTURAL TEST REPORT

NCTL-110-19251-6

REPORT TO:
NEON ENERGY
230 PARK AVENUE, 10TH FLOOR
NEW YORK, NY 10169

REPORT NUMBER: NCTL-110-19251-6
REPORT DATE: 09/13/16

PRODUCT TYPE:
DUAL ACTION WINDOW

SERIES/ MODEL:
"DUAL ACTION"



NATIONAL CERTIFIED TESTING LABORATORIES

FIVE LEIGH DRIVE • YORK, PENNSYLVANIA 17406 • TELEPHONE (717) 846-1200
FAX (717) 767-4100
www.nctlinc.com

Report Number NCTL-110-19251-6

Report Date 09/13/16

Report To Neon Energy
230 Park Avenue, 10th Floor
New York, NY 10169

Date Testing Started 07/12/16
Date Testing Completed 07/19/16

Specification AAMA/WDMA/CSA 101/I.S.2/A440-08
NAFS North American Fenestration Standard/Specification for windows, doors, and skylights

Performance Results AAMA/WDMA/CSA 101/I.S.2/A440-08
Class AW-PG45: Size tested 1524 x 2515 mm (60 x 99 in)-Type DAW

Description of Specimen Tested

Note: All dimensions are in the order (Width x Height x Thickness) unless otherwise noted.

Model/ Series "Dual Action"

Configuration Dual Action Window

Frame Size Overall
1524 mm x 2515 mm (60" x 99")

Vent Size 1480 mm x 2470 mm (58.25" x 97.25")

Viewing Area 1330 mm x 2321 mm (52.375" x 91.375")

Frame & Vent Type Extruded aluminum with polyamide thermal breaks

Joint Construction Frame & Vent
Mitered with epoxied aluminum staked-in-place corner gusset

Glazing Components

| | |
|------------------|---|
| Overall | 26.78 mm (1.055") nominal |
| Glass Thickness | (1) Lite of 6 mm (0.230") nominal tempered glass to the exterior and (1) lite of 6 mm (0.220") nominal annealed glass to the interior |
| Spacer Type/Size | 15.37 mm (0.605") Desiccant-filled aluminum spacer (Type A1-D) |
| Glazing System | Interior glazed with a multi-fin vinyl glazing gasket and a snap-in extruded aluminum glazing bead with a flexible multi-fin gasket |

Weatherstrip

| | |
|----------|--|
| Type | (1) Strip neoprene |
| Location | Vent and frame perimeter 44.45 mm (1.75") notch was located at 101.6 mm (4") from the ends of the head |
| Type | (1) Strip gooseneck vinyl |
| Location | Center frame perimeter |

Operating Hardware**Locks**

| | |
|----------|--|
| Type | Single handle (13)-point integrated lock system |
| Location | 1019 mm (40.125") From the bottom of the lock stile with (4) lock points on the stiles, (2) lock points at the top rail and (3) lock points at the bottom rail |

Keeper

| | |
|----------|-----------------------------|
| Type | Metal |
| Location | Frame at the lock locations |

Hinge Hardware

| | |
|----------|---|
| Type | Dual action hinge hardware |
| Location | Top rail/ top of the hinge jamb and bottom rail/ bottom of the hinge jamb |

| | |
|----------|---------------------------------------|
| Type | Pin-type |
| Location | Bottom of the hinge stile/ hinge jamb |

Auxiliary

| | |
|----------|----------------------------------|
| Type | Aluminum drip edge |
| Location | Bottom rail fastened with screws |

Reinforcement

No reinforcement employed

Weep Description

| | |
|----------|--|
| Size | 25.4 mm (1") wide by 7.95 mm (0.313") high with plastic cover |
| Location | 130.18 mm (5.125") From each end and midspan of exterior sill face |

| | |
|----------|---|
| Size | 19.05 mm (0.75") wide by 4.78 mm (0.188") high |
| Location | 120.65 mm (4.75"), 241.3 mm (9.5"), 356 mm (14"), 464 mm (18.25"), 578 mm (22.75") and 686 mm (27") From each end of the sill track |

| | |
|----------|--|
| Size | 7.95 mm (0.313") Diameter weep hole |
| Location | 139.7 mm (5.5"), 152.4 mm (6"), 247.65 mm (9.75"), 997 mm (39.25"), 2289 mm (90.125") and 2302 mm (90.625") From the bottom of the hinge stile |

| | |
|----------|---|
| Size | 4.78 mm (0.188") Diameter weep hole |
| Location | 123.83 mm (4.875"), 133.35 mm (5.25") and 142.88 mm (5.625") From the bottom of the hinge stile |

| | |
|----------|---|
| Size | 7.95 mm (0.313") Diameter weep hole |
| Location | 267 mm (10.5"), 1524 mm (60") and 1918 mm (75.5") From the bottom of the lock stile |

| | |
|----------|--|
| Size | 6.35 mm (0.25") Diameter weep hole |
| Location | 139.7 mm (5.5") and 1861 mm (73.25") From the bottom of the lock stile |

| | |
|----------|--|
| Size | 22.23 mm (0.875") wide by 4.78 mm (0.188") high |
| Location | 171.45 mm (6.75") and 337 mm (13.25") From ends of the bottom rail glazing track |

| | |
|----------|--|
| Size | 19.05 mm (0.75") wide by 6.35 mm (0.25") high |
| Location | 139.7 mm (5.5") From each end and midspan of the bottom rail |

| | |
|----------|--|
| Size | 7.95 mm (0.313") Diameter weep hole |
| Location | 171.45 mm (6.75"), 203.2 mm (8"), 2413 mm (9.5"), 273 mm (10.75"), 298 mm (11.75") and 546 mm (21.5") From each end of the bottom rail |

Interior/ Exterior Surface Finish

White painted aluminum

Sealant

| | |
|----------|-------------------------|
| Type | Silicone |
| Location | Screw heads at the sill |

Insect Screen No screen employed

Installation Method The window was installed in a 50.8 mm x 254 mm (2" x 10") spruce-pine-fir lumber test buck and was secured with (1) #10 x 38.1 mm (1.5") pan head screw located at 152.4 mm (6"), 559 mm (22") from each end of the head and sill and 152.4 mm (6"), 533 mm (21"), 826 mm (32.5"), 1194 mm (47"), 1905 mm (75") and 2356 mm (92.75") from the bottom of each jamb. The exterior perimeter was sealed with silicone sealant.

Test Results - AAMA/WDMA/CSA 101/I.S.2/A440-2008

| <u>Paragraph</u> | <u>Test</u> |
|------------------|--|
| 5.3.2.1/ 9.3.2 | Air Leakage Resistance ASTM E283-04(12) |
| | The tested specimen meets or exceeds the performance levels specified in AAMA/WDMA/CSA 101/I.S.2/A440-2008 for air infiltration at 300 Pa (6.2 psf). |
| | Maximum Allowable = 0.5 L/s/m ² (0.1 cfm/ft ²) |
| | <u>Prior to Cycling</u> |
| | Extraneous Air Leakage = 1.68 L/s (3.56 cfm) |
| | Total Air Leakage = 1.72 L/s (3.65 cfm) |
| | Air Infiltration Rate = 0.1 L/s/m ² (<0.01 cfm/ft ²) |
| | <u>After Cycling</u> |
| | Extraneous Air Leakage = 1.54 L/s (3.27 cfm) |
| | Total Air Leakage = 1.83 L/s (3.87 cfm) |
| | Air Infiltration Rate = 0.1 L/s/m ² (0.01 cfm/ft ²) |

| <u>Paragraph</u> | <u>Test</u> |
|------------------|---|
| 5.3.3/ 9.3.3 | Water Penetration Resistance ASTM E547-00(09) and ASTM E331-00(09) |
| | <u>3.4 L/ (min• m²) (5.0 gph/ft²)</u> |
| | <u>Prior to and After Cycling</u> |
| | No Leakage after 4 cycles of 5 minutes at 580 Pa (12.0 psf) |
| | No Leakage after 1 cycle of 15 minutes at 580 Pa (12.0 psf) |
| | NOTE: Tested without insect screen |

| <u>Paragraph</u> | <u>Test</u> |
|------------------|--|
| 5.3.4.2/ 9.3.4.2 | Uniform Load Deflection at Design Pressure ASTM E330-14 |
| | No damage after positive 2160 Pa (45.0 psf) held for 10 seconds |
| | No damage after negative 2160 Pa (45.0 psf) held for 10 seconds |
| | Measured Deflection ^{Positive} = 0.33 mm (0.013 inches) |
| | Measured Deflection ^{Negative} = 0.28 mm (0.011 inches) |
| | Maximum Allowed (L/175) = 3.84 mm (0.151 inches) |

Paragraph Test

5.3.4.3/ 9.3.4.3 Uniform Load Structural Test
ASTM E330-14

No damage after positive 3240 Pa (67.5 psf) held for 10 seconds
No damage after negative 3240 Pa (67.5 psf) held for 10 seconds

Measured Permanent Set_{Positive} = 0.28 mm (0.011 inches)
Measured Permanent Set_{Negative} = 0.03 mm (0.001 inches)
Maximum Allowed (0.2%) = 1.35 mm (0.053 inches)

NOTE: Deflection and Permanent Set measurements taken on the lock stile over a 673 mm (26.5") span.

Paragraph Test

5.3.5/ 9.3.5 Forced Entry Resistance
ASTM F588-07

Type B Window Assembly/ Grade 10: = Pass

Test

Disassembly = No Entry
Lock Manipulation = No Entry
Sash Manipulation = No Entry
Test B1 = No Entry
Test B2 = No Entry
Test B3 = No Entry
Hardware Manipulation Test = No Entry
Sash Manipulation Test = No Entry

NOTE: 1. T1 = 5 minutes, L1 = 667 N (150 lbf), L2 = 333 N (75 lbf), L3 = 111 N (25 lbf)
2. Loads were held for 60 seconds.

Paragraph Test

7.3.4.2/
5.3.6.4.2 Sash/ Leaf Torsion Test

Concentrated load applied 70 N (15 lbf) held for 10 seconds

Maximum Allowable Deflection = 209.8 mm (8.26 inches)
Measured Deflection = 114.3 mm (4.50 inches)

Paragraph Test

9.3.6.4.3/
5.3.6.4.4 Sash/ Leaf Concentrated Load Test on the Latch Rail

Concentrated load applied 270 Pa (60 psf) held for 10 seconds

Deflection Limit = 1.5 mm (0.06 inches)
Maximum Horizontal Deflection = 1.02 mm (0.04 inches)

Concentrated load applied 400 Pa (90 psf) held for 10 seconds

Deflection Limit = 6.4 mm (0.25 inches)
Maximum Vertical Deflection = 5.59 mm (0.22 inches)

NOTE: Load applied in both directions and maximum deflection reported

| <u>Paragraph</u> | <u>Test</u> |
|------------------|--|
| 5.3.6.9 | Life Cycle Testing AAMA 910-93 |
| | <u>1st Half - Vent / Sash / Panel - 1250 Total Cycles</u> |
| | 2.1.4 Vent/ Sash/ Panel Cycling Testing |
| | 2.2.4.4 Dual Action = Pass |
| | 2.1.5 Locking Hardware Cycle Testing |
| | 2.3 Locking Hardware Cycling = Pass |
| | 2.1.7 Misuse Testing |
| | 2.5.7.1 Stabilizing Arm Load = Pass |
| | 2.5.7.2 Vertical Load Test = Pass |
| | <u>2nd Half - Vent / Sash / Panel - 1250 Total Cycles</u> |
| | 2.2.4.4 Dual Action = Pass |
| | 2.1.9 Locking Hardware Cycle Testing |
| | 2.3 Locking Hardware Cycling = Pass |

This test report was prepared by National Certified Testing Laboratory (NCTL), for the exclusive use of the above named client and it does not constitute certification of this product. The results are for the particular specimen tested and do not imply the quality of similar or identical products manufactured or installed from specifications identical to the tested product. The test specimen was supplied to NCTL by the above named client. No conclusions of any kind regarding the adequacy or inadequacy of the glass in the test specimen are to be drawn from the ASTM E330 test. Forced entry resistance test equipment used is in compliance with Section 7 of the ASTM F588-07 test method. Foam tape is mounted to the perimeter of the test buck prior to clamping to the test wall. It is the assertion of this laboratory that any film employed during testing does not affect measurement values. NCTL is a testing lab and assumes that all information provided by the client is accurate and does not guarantee or warranty any product tested or installed. The results in this report are actual tested values and are applicable to the specimen tested only, using the components and construction methods described herein.

Detailed drawings were available for laboratory records and compared to the test specimen at the time of this report. Component drawings were reviewed for product verification. The bill of materials contains details with any deviations noted. Ambient conditions during the referenced testing are available upon request. A copy of this report along with representative sections of the test specimen will be retained per applicable requirements by NCTL. This report does not constitute certification or approval of the product, which may only be granted by a certification program validator or recognized approval entity. All tests were conducted in full compliance with the referenced specifications and/or test methods. Tests were performed in the order set forth by the applicable standard or specification. This report is the joint property of National Certified Testing Laboratories Inc. and the Client to whom it is issued. Permission to reproduce this report by anyone other than National Certified Testing Laboratories Inc and the Client must be granted in writing by both of the above parties. This report may not be reproduced, except its entirety, without the written consent of NCTL.

National Certified Testing Laboratories

DIGITAL SIGNATURE

Jay Leader
Technician



DIGITAL
SIGNATURE

Robert H. Zeiders, P.E.
Vice-President Engineering & Quality

JL/ dro

Attachments

Appendix A – Revision Summary

Appendix B – Drawings

Appendix A

Revision Log

| <u>Identification</u> | <u>Date</u> | <u>Page & Revision</u> |
|-----------------------|-------------|----------------------------|
| Original Issue | 09/13/16 | Not Applicable |

Appendix B

Drawings

Component Drawings, with Applicable Part Numbers, Manufacturing and Modeling Details, were reviewed (as submitted) for Product Verification. Detailed assembly drawings showing wall thicknesses of all members, corner construction and hardware application are on file and have been compared to the test sample submitted.

(Reference: NCTL-110-19251-6)

See Attached Documentation;
any deviations noted.

Note: The above referenced component drawings (if applicable) along with representative sections of the test specimen will be retained by NCTL per applicable retention requirements. This testing facility assumes that all information provided by the client is accurate.

Description of test specimen No 9 & 10:

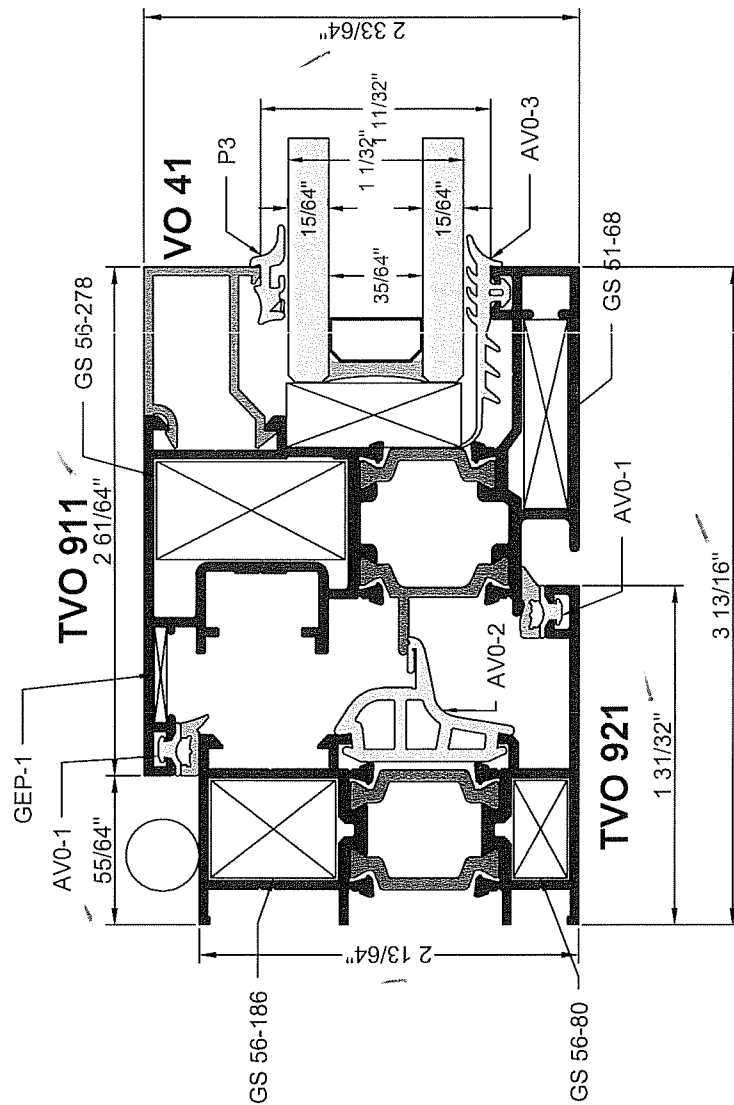
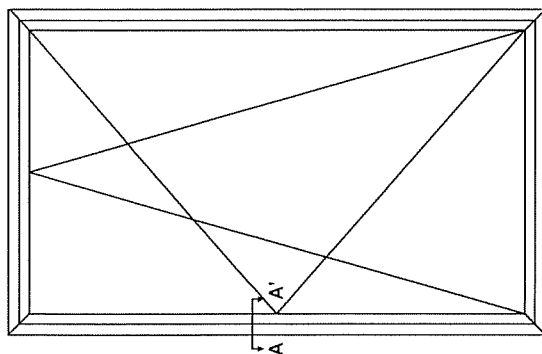
| | |
|--------------------------------------|--|
| Product | Dual action window |
| Manufacturer | Alco Hellas S.A. |
| Date of manufacture | 3/6/2016 |
| System | Ultra 2016 Opening System |
| Type of opening / Opening directions | Active casement; turn & tilt, inward opening |
| Frame material | Aluminum profiles with thermal break |
| Overall frame dimensions (WxH) | 5' 0" x 8' 3" |
| Frame member | Profile No TVO 921 |
| Frame joint | mitred, compressed and bonded with corner connection No GS 56-80 and GS 152-186 |
| Casement member | Profile No TVO 911 |
| Frame joint | mitred, compressed and bonded with corner connection No GS 56-278, GS 51-68 and GEP-1 |
| Additional profiles | Weather bar profile No VO 44, bolted, sealed with resilient sealing, lateral with end caps No AVO-04 |
| Rebate seal | |
| <u>Internal:</u> | |
| Material | Sealing material – EPDM |
| Item No | AVO-01 |
| Corner design | mitred and bonded |
| <u>Center:</u> | |
| Material | Sealing material – EPDM |
| Item No | AVO-02 |
| Corner design | mitred and bonded |
| <u>External:</u> | |
| Material | Sealing material – EPDM |
| Item No | AVO-01 |
| Corner design | mitred and bonded |
| Infill panel | Glass Unit |
| Configuration | from inside to outside: 15/64" glass, 35/64" airspace, 15/64" glass |
| Incorporation of infill panel | |
| Glazing gasket | |
| <u>Internal:</u> | |
| Material | Sealing material – EPDM |
| Item No | P3 |
| Corner design | mitred and bonded |
| <u>Glazing bead</u> | |
| Corner design | Profile No VO 41 |
| Fixing | butt-jointed clamped |
| <u>External:</u> | |
| Material | Sealing material – EPDM |
| Item No | AVO-03 |
| Corner design | mitred and bonded |
| Hardware | |
| Type / manufacturer | NT / Roto |

TEST SPECIMEN COMPLIES
WITH THESE DETAILS.
ANY DEVIATION IS NOTED
REPORT NO. NCTL-110-17251-6
TEST DATE 7/17/16

HORIZONTAL SECTION A-A'

KA. 1:1

TEST SPECIMEN No 9 & No 10

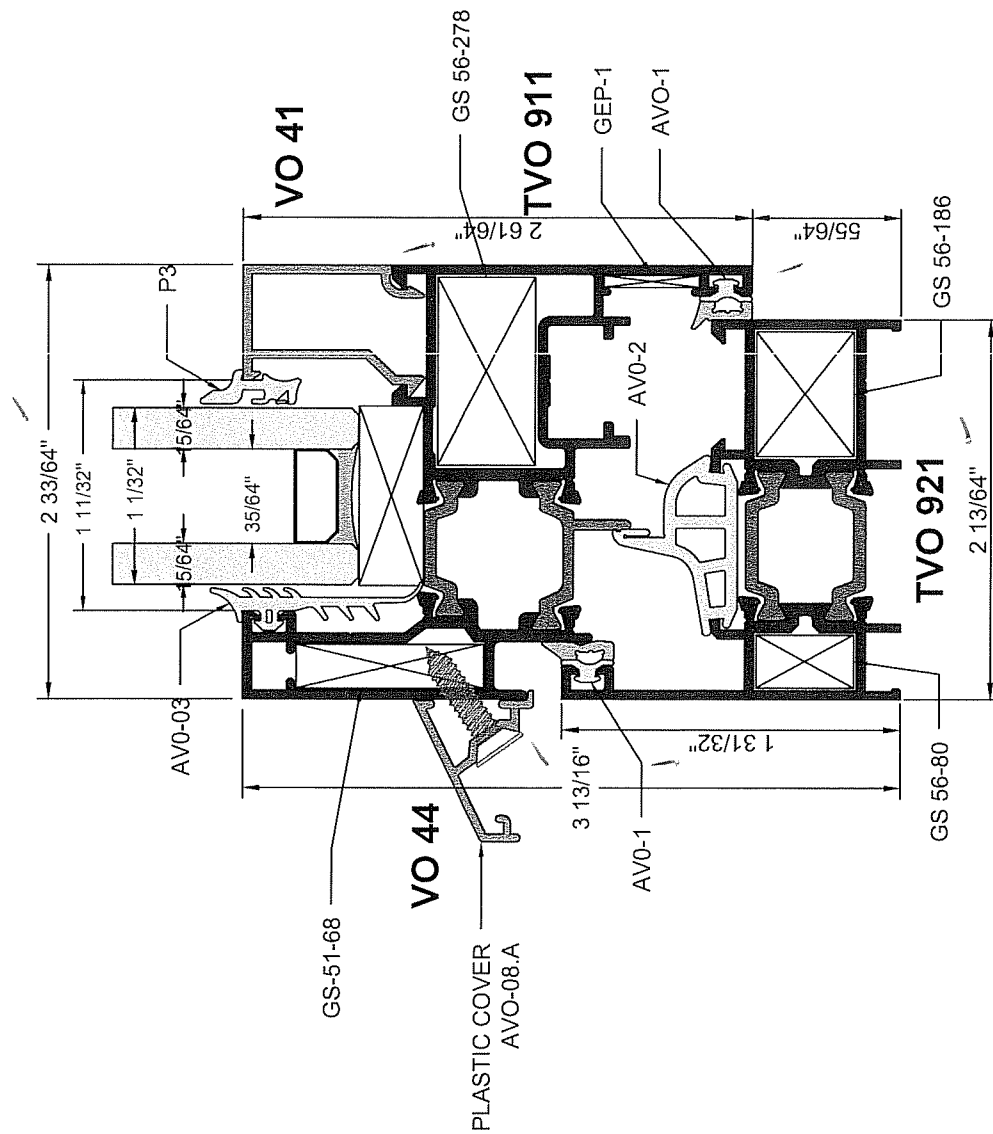
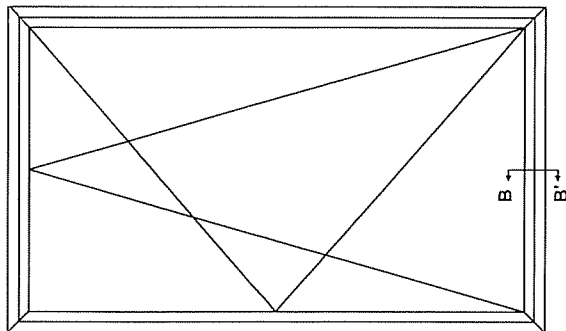


TEST SPECIMEN COMPLIES
WITH THESE DETAILS.
ANY DEVIATION IS NOTED
REPORT NO. NCTL-110-19251-6
TEST DATE 7/19/16

VERTICAL SECTION B-B'

KA. 1:1

EST SPECIMENT No 9 & No 10



TEST SPECIMEN COMPLIES
WITH THESE DETAILS.
ANY DEVIATION IS NOTED
REPORT NO. NCTL-110-19251-6
TEST DATE 7/19/16