NATIONAL CERTIFIED TESTING LABORATORIES

FIVE LEIGH DRIVE • YORK, PENNSYLVANIA 17406 • TELEPHONE (717) 846-1200
FAX (717) 767-4100
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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: Casement

SERIES/ MODEL: Casement

Title	Summary of Results
Primary Product Designator AAMA/WDMA/CSA 101/I.S.2/A440-08	Class AW-PG60: Size tested 914 x 1524 mm (36 x 60 in) - Type C
Design Pressure	±2880 Pa (±60.0 psf)
Operating Force (in motion$_{max}$)	<27 N (<6 lbf)
Air Infiltration	0.4 L/s/m^2 (0.07 cfm/ft^2) – Prior to and after cycles
Water Penetration Resistance Test Pressure	580 Pa (12.0 psf) – Prior to and after cycles
Uniform Load Structural Test Pressure	±4320 Pa (±90.0 psf)
Forced Entry Resistance	ASTM F588-07 - Grade 10 Pass

Test Completed: 07/19/16

Reference must be made to Report No. NCTL-110-19251-1 dated 08/23/16 for complete test specimen description and data.

For National Certified Testing Laboratories

DIGITAL SIGNATURE

Justin L. Bupp
Laboratory Manager

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STRUCTURAL TEST REPORT

NCTL-110-19251-1

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

REPORT NUMBER: NCTL-110-19251-1
REPORT DATE: 08/23/16

PRODUCT TYPE:
CASEMENT

SERIES/ MODEL:
CASEMENT

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Report Number	NCTL-110-19251-1
Report Date	08/23/16
Report To	Neon Energy 230 Park Avenue, 10th Floor New York, NY 10169
Date Testing Started **Date Testing Completed**	07/11/16 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-PG60: Size tested 914 x 1524 mm (36 x 60 in)-Type C

Description of Specimen Tested

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

Model/ Series	Casement
Configuration	Casement
Frame Size	Overall 914 mm x 1524 mm (36” x 60”)
Vent Size	870 mm x 1480 mm (34.25” x 58.25”)
Viewing Area	714 mm x 1324 mm (28.125” x 52.125”)
Frame & Vent Type	Extruded aluminum with polyamide thermal breaks
Joint Construction	Frame & Vent Mitered and staked-in-place corner keys
Glazing Components	
Overall	26.85 mm (1.057”) nominal
Glass Thickness	(1) Lite of 6 mm (0.235”) nominal annealed glass to the interior and (1) lite of 6 mm (0.230”) nominal tempered glass to the exterior
Spacer Type/Size	15.04 mm (0.592”) Desiccant-filled aluminum spacer (Type A1-D)
Glazing System	Interior glazed with a gasket back-bedding and a snap-in aluminum glazing bead with (1) strip of multi-fin gasket
Weatherstrip	
Type	(1) Strip single-leaf gasket
Location	Vent and frame perimeter
Type	(1) Strip gooseneck
Location	Center frame perimeter

Operating Hardware	
Locks	
Type	Single handle (9)-point integrated lock station
Location	584 mm (23”) From the bottom of the lock stile with (2) lock points on the lock stile, (2) lock points on the rails and (3) lock points on the hinge stile
Keeper	
Type	Metal
Location	Frame at the lock locations
Hinge Hardware	
Type	Pin-type hinge
Location	Top rail/ top of the hinge jamb and bottom rail/ bottom of the hinge jamb
Auxiliary	
Type	Aluminum drip edge
Location	Bottom rail fastened with screws
Reinforcement	No reinforcement employed
Weep Description	
Size	19.05 mm wide by 6.35 mm high (0.75” by 0.25”)
Location	152 mm, 254 mm, 356 mm (6”, 10”, 14”) From each end and midspan of the interior sill track
Size	25.4 mm (1”) wide by 6.35 mm (0.25”) high with plastic weep hood
Location	121 mm (4.75”) From each end of the exterior sill face
Size	19.05 mm (0.75”) wide by 6.35 mm (0.25”)
Location	51 mm (2”) From each end and midspan of the bottom rail glazing channel
Size	19.05 mm (0.75”) wide by 6.35 mm (0.25”)
Location	178 mm (7”) From each end of the bottom rail extension face
Interior/ Exterior Surface Finish	White painted aluminum
Sealant	
Location	Frame and vent corners
Material	Silicone
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 fastened through the frame with (1) #10 x 38 mm (1.5”) pan head screw located 152 mm (6”) from each end and 305 mm (12”) on center thereafter at the frame perimeter. The exterior perimeter was sealed with silicone sealant.

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

Paragraph	Test
5.3.1/ 9.3.1	Operating Force and Force to Latch - Method B (Force Gauge) ASTM E2068-00(08)

Prior to and after cycles

Initiate Motion	=	<27 N	(<6 lbf)
Maintain Motion - Opening	=	<27 N	(<6 lbf)
Maintain Motion - Closing	=	<27 N	(<6 lbf)
Allowed (Normal Use 08)	=	135 N	(30 lbf)
Latches	=	40 N	(9 lbf)
Allowed	=	100 N	(22.5 lbf)

NOTE: The results above represent the maximum force among all sash tested.

Paragraph	Test
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)

Prior to and after cycles

Extraneous Air Leakage	=	1.16 L/s (2.45 cfm)
Total Air Leakage	=	0.53 L/s (1.12 cfm)
Air Infiltration Rate	=	0.4 L/s/m^2 (0.07 cfm/ft^2)

Paragraph	Test
5.3.3/ 9.3.3	Water Penetration Resistance ASTM E547-00(09) and ASTM E331-00(09)

3.4 L/ (min• m²) (5.0 gph/ft²)

Prior to and after cycles

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

Paragraph	Test
5.3.4.2/ 9.3.4.2	Uniform Load Deflection at Design Pressure ASTM E330-14

No damage after positive		2880 Pa (60.0 psf) held for 10 seconds
No damage after negative		2880 Pa (60.0 psf) held for 10 seconds
Measured Deflection Positive	=	0.30 mm (0.012 inches)
Measured Deflection Negative	=	<0.03 mm (<0.001 inches)
Maximum Allowed (L/175)	=	4.29 mm (0.169 inches)

Paragraph	Test
5.3.4.3/ 9.3.4.3	Uniform Load Structural Test ASTM E330-14

No damage after positive 4320 Pa (90.0 psf) held for 10 seconds
No damage after negative 4320 Pa (90.0 psf) held for 10 seconds

Measured Permanent Set $_{Positive}$ = 0.03 mm (0.001 inches)
Measured Permanent Set $_{Negative}$ = 0.05 mm (0.002 inches)
Maximum Allowed (0.3%) = 1.50 mm (0.059 inches)

NOTE: Deflection and Permanent Set measurements taken on the lock stile over a 749 mm (29.5") 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 89 N (20 lbf) held for 10 seconds

Maximum Allowable Deflection = 66.85 mm (2.632 inches)
Measured Deflection = 57.15 mm (2.250 inches)

Paragraph	Test
9.3.6.4.2/ 5.3.6.4.3	Sash Vertical Deflection Test

Vertical load applied 267 N (60 lbf) held for 60 seconds

Vertical Deflection Limit = 17.40 mm (0.685 inches)

Measured Deflection = 10.92 mm (0.430 inches)

NOTE: Load was held for 60 seconds; at the conclusion of the test the specimen properly closed and operated and there was no glass breakage.

Paragraph	Test
5.3.6.9	Life Cycle Testing AAMA 910-93
	1st Half - Vent / Sash / Panel - 1250 Total Cycles
	2.1.4 Vent/ Sash/ Panel Cycling Testing 2.2.4.3 Casement = Pass
	2.1.5 Locking Hardware Cycle Testing 2.3 Locking Hardware Cycling = Pass
	2.1.7 Misuse Testing 2.5.2.1 Ventilator Torsion Test = Pass 2.5.2.2 Ventilator Vertical Load = Pass
	2nd Half - Vent / Sash / Panel - 1250 Total Cycles
	2.1.8 Vent/ Sash/ Panel Cycling Testing 2.2.4.3 Casement = Pass
	2.1.9 Locking Hardware Cycle Testing 2.3 Locking Hardware Cycling = Pass

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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

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Justin L. Bupp
Laboratory Manager

NCTL DIGITAL SIGNATURE

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

JLB/ dro
Attachments
Appendix A – Revision Summary
Appendix B – Drawings

Appendix A

Revision Log

Identification	Date	Page & Revision
Original Issue	08/23/16	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-110-19251-1)

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 1 & 2:

Product	Casement 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)	3' 0" x 5' 0"
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-08.A
Rebate seal	
Internal:	
Material	Sealing material – EPDM
Item No	AVO-01
Corner design	mitred and bonded
Center:	
Material	Sealing material – EPDM
Item No	AVO-02
Corner design	mitred and bonded
External:	
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	
Internal:	
Material	Sealing material – EPDM
Item No	P3
Corner design	mitred and bonded
Glazing bead	Profile No VO 41
Corner design	butt-jointed
Fixing	clamped
External:	
Material	Sealing material – EPDM
Item No	AVO-03
Corner design	mitred and bonded
Hardware	
Type / manufacturer	NT / Roto

TEST SPECIMEN COMPLIES WITH THESE DETAILS.

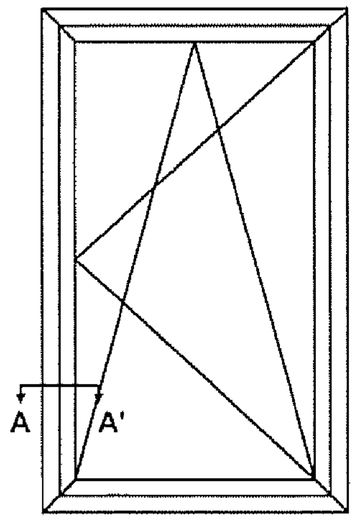
ANY DEVIATION IS NOTED.

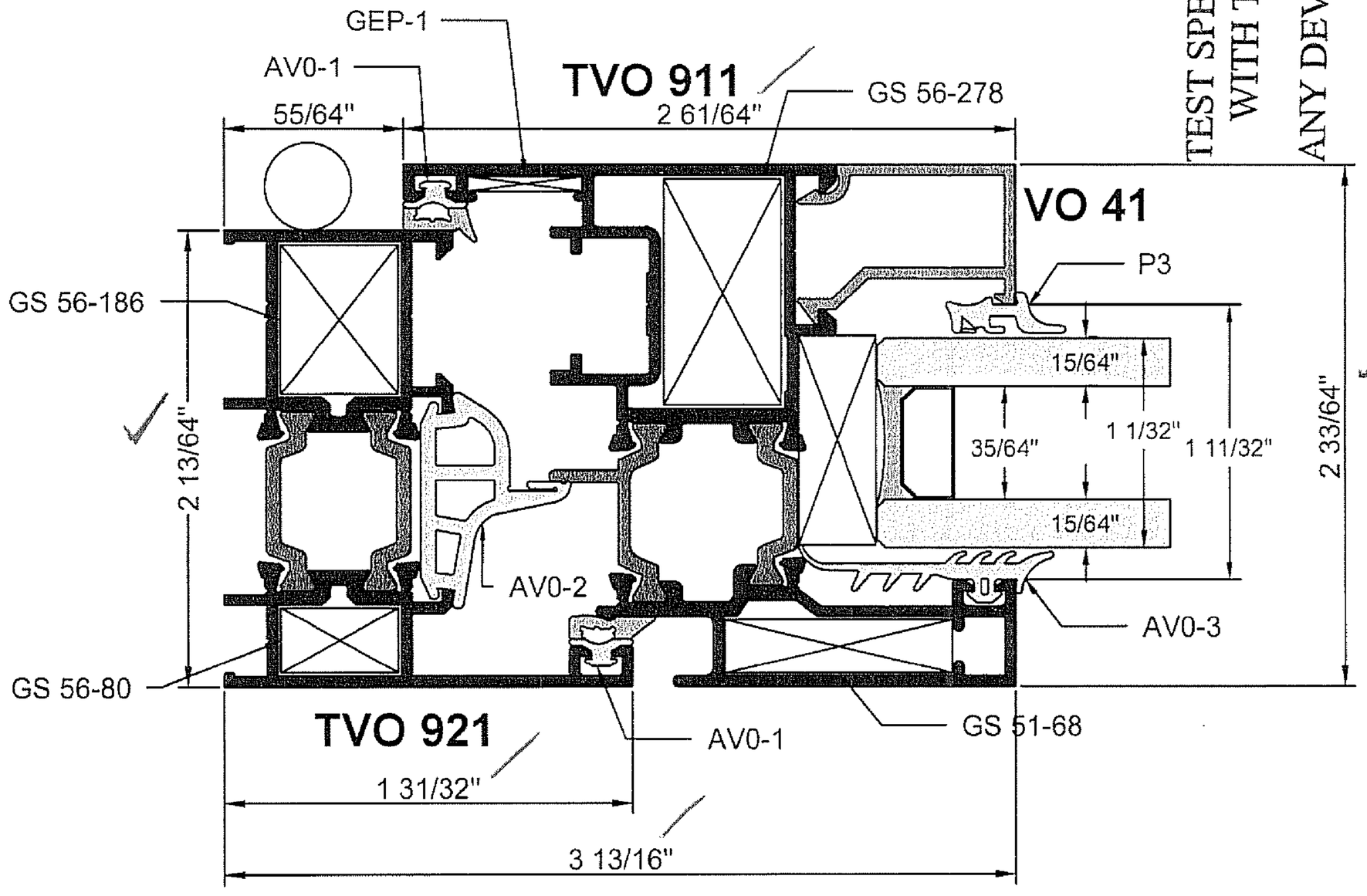
REPORT NO. NCTL-110- 1925.1

TEST DATE: 7-19-16

HORIZONTAL SECTION A-A'
ΚΛ. 1:1

TEST SPECIMENT No 1 & No2





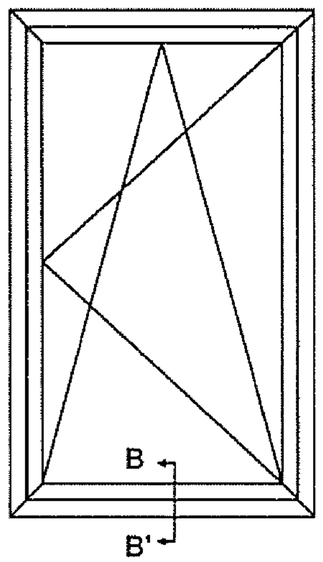
TEST SPECIMEN COMPLIES WITH THESE DETAILS.
ANY DEVIATION IS NOTED.

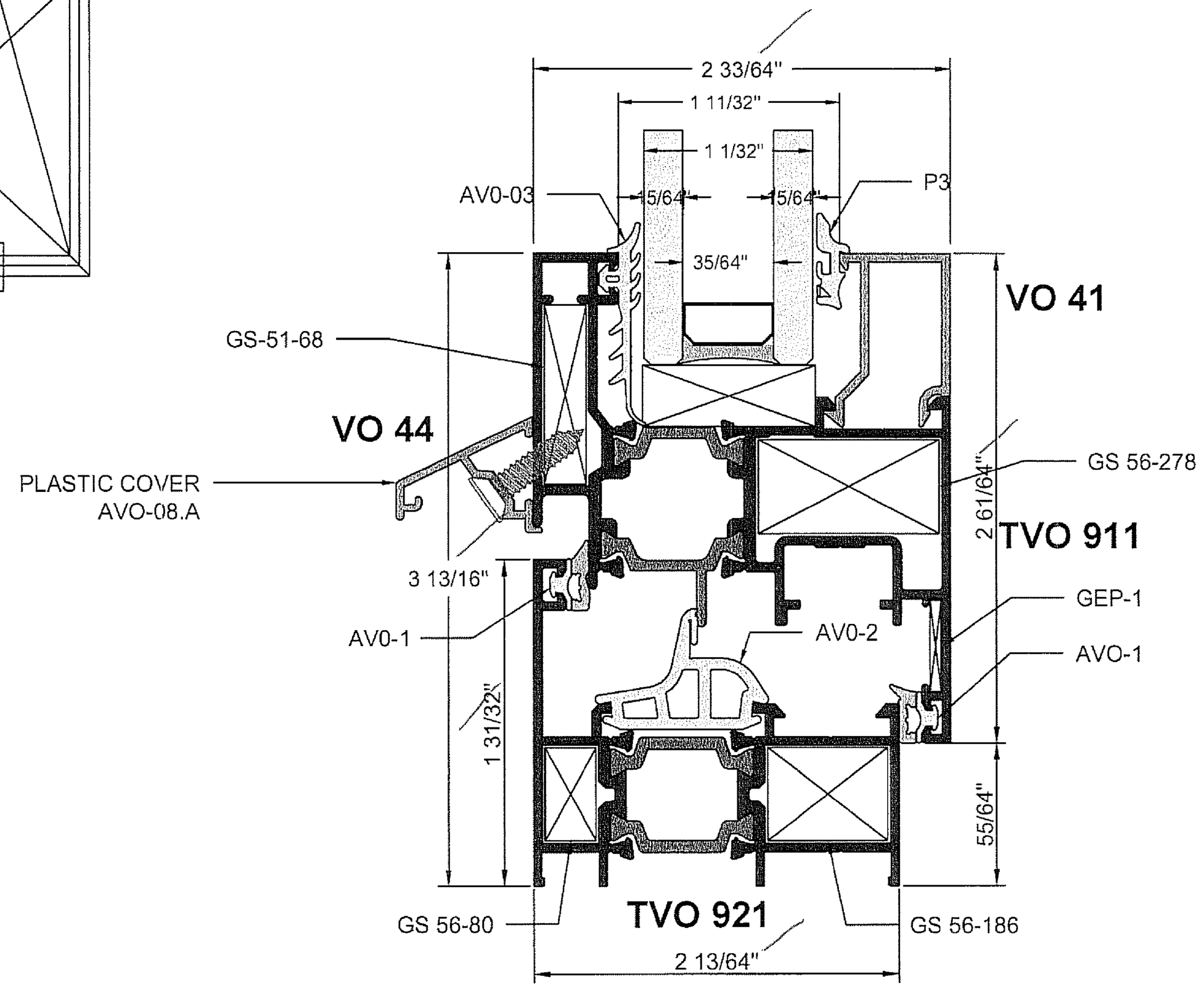
REPORT NO. NCTL-110- 1325-1

TEST DATE: 2-19-16

VERTICAL SECTION B-B'
ΚΛ. 1:1

TEST SPECIMENT No 1 & No2





TEST SPECIMEN COMPLIES
WITH THESE DETAILS.

ANY DEVIATION IS NOTED.

REPORT NO. NCTL-110- 1626-1

TEST DATE: 2-19-16