NATIONAL CERTIFIED TESTING LABORATORIES

8350 PARKLINE BLVD. STE. 12 • ORLANDO, FLORIDA 32809 • TELEPHONE (407) 240-1356
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AAMA/WDMA/CSA 101/I.S.2/A440-11
AAMA/WDMA/CSA 101/I.S.2/A440-08
ASTM E1886-05
ASTM E1996-05/09

TEST REPORT SUMMARY

Rendered to:

Deceuninck North America, LLC
351 North Garver Road
Monroe, OH 45050

PRODUCT TYPE: XO – Sliding Glass Door

SERIES/ MODEL: 623/620 Vinyl

Title	Summary of Results
Primary Product Designator AAMA/WDMA/CSA 101/I.S.2/A440-11 AAMA/WDMA/CSA 101/I.S.2/A440-08	Class LC-PG65: Size tested 2438 x 2438 mm (~96 x 96 in) - Type SGD Class LC-PG65: Size tested 2438 x 2438 mm (96 x 96 in) - Type SGD
Positive Design Pressure	+3120 Pa (+65.0 psf)
Negative Design Pressure	-3120 Pa (-65.0 psf)
Operating Force (in $motion_{max}$)	63 N (14 lbf)
Air Infiltration	0.1 L/s/m^2 (<0.1 cfm/ft^2)
Water Penetration Resistance Test Pressure	[1]468 Pa (9.75 psf) 432 Pa (9.0 psf)
Uniform Load Structural Test Pressure	+/-4680 Pa (97.5 psf)
Forced Entry Resistance	ASTM F842 - Grade 10 Pass

Note: [1] Achieved with sill extender

Test Completed: 09/28/16

Reference must be made to Report No. NCTL-210-4044-02A dated 11/07/16 for complete test specimen description and data.

For National Certified Testing Laboratories

Mark Bennett
Manager of Testing Services

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

ASTM E1886-05 & ASTM E1996-05/09

STRUCTURAL, IMPACT & CYCLING PERFORMANCE TEST REPORT

NCTL-210-4044-02A

REPORT TO:
Deceuninck North America, LLC
351 North Garver Road
Monroe, OH 45050

REPORT NUMBER: NCTL-210-4044-02A
REPORT DATE: 11/07/16

PRODUCT:
X/O – "623/620" Sliding Glass Door

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Report Number	NCTL-210-4044-02A
Report Date	11/07/16
Report To	Deceuninck North America, LLC 351 North Garver Road Monroe, OH 45050
Date Testing Started **Date Testing Completed**	09/23/16 09/28/16
Specification	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 ASTM E1886-05 & ASTM E1996-05/09
Performance Results	AAMA/WDMA/CSA 101/I.S.2/A440-11 Class LC-PG65: Size tested 2438 x 2438 mm (~96 x 96 in)-Type SGD AAMA/WDMA/CSA 101/I.S.2/A440-08 Class LC-PG65: Size tested 2438 x 2438 mm (96 x 96 in)-Type SGD

Description of Specimen Tested

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

Model/ Series	“623/620” Sliding Glass Door
Configuration	XO
Frame Size	Overall 2438 mm (96”) wide by 2438 mm (96”) high
Panel Size	Active Lite & Fixed (1) 1232 mm (48.5”) wide by 2375 mm (93.5”) high
Viewing Area	Active Lite & Fixed (1) 1035 mm (40.75”) wide by 2159 mm (85”) high
Frame Type	Rigid Vinyl (PVC)
Joint Construction	Frame & Sash Mitered, welded Frame Butt jointed and secured using (3) #8 x 63.5 mm (2.5”) Phillips pan head self-tapping screws at each corner through jamb to horizontal member. A sill gasket was used between main frame members that had an overall measurement of 115.9 x 52 mm (4.563” x 2.047”).

Main Frame Head & Jambs
The profile measured 129.2 x 51 mm (5.088" x 2.007"). The frame jamb used a frame in interior jamb track, 54.1 x 26.7 mm (2.128" x 1.051") on fixed panel frame jamb and exterior jamb track on active panel frame jamb.

Main Frame Sill
The profile measured 129.2 x 51 mm (5.088" x 2.007")

Panel
Rails and Stiles
Mitered and welded corners. Overall measurement 101.6 x 44.6 mm (4" x 1.755")

Panel Interlock
Interlock attachment had and overall measurement of 50.9 x 57.9 mm (2.002" x 2.279"), was snap fit onto panel stile and was secured using #8 x 19.1 mm (0.75") Phillips pan head self-tapping screws.

Glazing Components

Overall	25.4 mm (1") nominal
Glass Thickness	(1) Lites of 5 mm (0.1875") nominal tempered glass to the exterior (1) Lite of laminated glass to the interior
Laminated Glass	(2) Lites of 5 mm (0.1875") nominal annealed glass separated by a 2.29 mm (0.09") Kuraray America "Sentry Glass Plus" interlayer
Spacer Type/Size	9.5 mm (0.375") Desiccant-filled stainless steel spacer (Type SS-D)
Glazing System	Exterior glazed with a "SikaFlex 552" and a snap-in rigid vinyl glazing bead that had an overall measurement of 9.1 x 24.8 mm (0.36" x 0.977").

Weatherstrip

Type	Fin pile weatherstrip
Size	298.5 x 19.1 mm (11.75" x 0.75")
Location	Active panel lock rail

Operating Hardware

Locks

Type	Gemini II lock w/2450 trimplate
Size	298.5 x 19.1 mm (11.75" x 0.75")
Location	Active panel lock rail

Keeper

Type	Gemini 1" tall keeper
Size	260.7 x 10.1 mm (10.265" x 0.399")
Location	Main frame interior jamb track

Roller

Type	Adjustable roller
Size	191.1 x 50.8 mm (7.525" x 2")
Location	At each end of the active panel

Auxiliary

Type	Rail insert
Size	39.5 x 50.1 mm (1.555" x 1.971")
Location	Panel bottom rail
Type	Rail interlock
Size	46.9 x 29.1 mm (1.845" x 1.145")
Location	Interior main frame head track

Type	Sill cover
Size	54.5 x 36.8 mm (2.145” x 1.447”)
Location	Exterior sill track
Type	Sill extender
Size	5.7 x 17.8 mm (0.226” x 0.701”)
Location	Interior sill on top of sill leg
Type	Snubber
Size	45.2 x 31.5 mm (1.78” x 1.242”)
Location	Exterior fixed panel frame, screwed in placed between main frame jamb and panel stile. Also employed on head between main frame head and panel top rail.
Type	“HD” L bracket
Size	50.8 x 76.2 mm (2” x 3”)
Location	Bottom of fixed interlock panel
Type	Nylon bracket
Size	254 x 44.6 mm (10” x 1.755”)
Location	Top of fixed interlock panel secured using #8 x 63.5 mm (2.5”) Phillips flat head screws
Type	Sill insert
Size	45.7 x 16.7 mm (1.8” 0.656”)
Location	Exterior sill track

Reinforcement

Type	Stile and rail reinforcement
Thickness	49.9 x 39.5 mm (1.965” x 1.555”)
Location	Active and fixed panel stiles and rails
Type	Fixed and active panel reinforcement
Thickness	50.1 x 39.5 mm (1.971” x 1.555”)
Location	Interlocking stiles
Type	Aluminum square tube
Thickness	25.4 x 25.4 mm (1” x 1”)
Location	Interlocking stiles

Weep Description

Type	Weep slot
Size	25.4 mm (1”) wide by 6.4 mm (0.25”) high
Location	50.8 mm (2”) From each end of the exterior sill face

Interior Surface Finish White Vinyl (PVC)

Exterior Surface Finish White Vinyl (PVC)

Sealant

Location	A silicone sealant was employed around the perimeter of the frame that sealed the specimen to the wood test buck (Interior & Exterior)
Material	Silicone

Insect Screen A custom screen was employed on the frame

Installation Method The specimen was installed in a 50.8 mm x 304.8 mm (2” x 12”) spruce-pine-fir lumber test buck using:

(1) #10 x 50.8 mm (2”) Phillips pan head screw was located on the head and sill approximately 165.1 mm (6.5”) from each end and 304.8 mm (12”) on center thereafter and on each jamb at approximately 165.1 mm

(6.5”) from the head and sill and approximately 355.6 mm (14”) on center thereafter. The exterior perimeter was sealed with silicone sealant.

Test Results - AAMA/WDMA/CSA 101/I.S.2/A440-2011 & 2008

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

Initiate Motion	=	81 N	(18 lbf)
Allowed (Normal Use$_{11/08}$)	=	200 N	(44.96 lbf)
Maintain Motion - Opening	=	63 N	(14 lbf)
Maintain Motion - Closing	=	63 N	(14 lbf)
Allowed (Normal Use$_{11/08}$)	=	100 N	(22.48 lbf)
Latches	=	31 N	(7 lbf)
Allowed	=	100 N	(22.5 lbf)

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

Paragraph 5.3.2.1/ 9.3.2 — Test: 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/A440-2011 and 2008 for air infiltration at 75 Pa (1.6 psf).

Maximum Allowable	=	1.5 L/s/m^2 (0.3 cfm/ft^2)
Air Infiltration Rate	=	0.1 L/s/m^2 (<0.1 cfm/ft^2)

Paragraph 5.3.3/ 9.3.3 — Test: Water Penetration Resistance ASTM E547-00(09)

3.4 L/ (min• m²) (5.0 gph/ft²)

No Leakage after 4 cycles of 5 minutes at 432 Pa (9.0 psf)
(Silicone bead used on bottom rail of fixed panel and closed cell foam in the weep holes.)

No Leakage after 1 cycle of 15 minutes at 468 Pa (9.75 psf)
(Silicone bead used on bottom rail of fixed panel and closed cell foam in the weep holes.)

NOTE: Tested with and without insect screen

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

Midspan of Interlock

No damage after positive	3120 Pa (65.0 psf) held for 10 seconds
No damage after negative	3120 Pa (65.0 psf) held for 10 seconds
Measured Deflection $_{Positive}$	= 27.36 mm (1.077 inches)
Measured Deflection $_{Negative}$	= 28.60 mm (1.126 inches)

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

Midspan of Interlock

No damage after positive	4680 Pa (97.5 psf) held for 10 seconds
No damage after negative	4680 Pa (97.5 psf) held for 10 seconds
Measured Permanent Set $_{Positive}$	= 0.56 mm (0.022 inches)
Measured Permanent Set $_{Negative}$	= 0.38 mm (0.015 inches)
Maximum Allowed (0.4%)	= 9.50 mm (0.374 inches)

NOTE: Deflection and Permanent Set measurements taken on the midspan of interlock over a 2374.9 mm (93.5") span.

Paragraph	Test
5.3.5/ 9.3.5	Forced Entry Resistance ASTM F842-13

Type A SGD Assembly/Grade 10: = Pass

Test	
Hardware Manipulation Test	= No Entry
Test A1	= No Entry
Test A2	= No Entry
Test A3	= No Entry
Test A4	= No Entry
Test A5	= No Entry
Test A6	= No Entry
Hardware Manipulation Test	= No Entry

NOTE: 1. T1 = 5 minutes, L1 = 150 lbf, L2 = 75 lbf, L3 = 25 lbf
2. Loads were held for 60 seconds.

Paragraph	Test	
5.3.6.2/ 9.3.6.2	Thermoplastic Corner Weld Test (PVC)	= Pass

Paragraph	Test
5.3.6.3/ 9.3.6.3	Deglazing Test ASTM E987-88(09)

Active Panel

Stiles – 230 N (70.0 lbf)	
Maximum Allowed	= 90% (100%)
Jamb Stile	= 0.18%
Meeting Stile	= 0.20%
Rails – 230 N (50 lbf)	
Maximum Allowed	= 90% (100%)
Top Rail	= 0.26%
Bottom Rail	= 0.27%

NOTE: The glass bite was approximately 12.7 mm (0.5")

Test Results - ASTM E1886 & ASTM E1996

IMPACT TEST PARAMETERS

The appropriate missile to be used for impact tests was selected in accordance with Section 6 of ASTM E1996 based on the following criteria:

Level of Protection:	Basic Protection / Enhanced Protection
Wind Zone:	Wind Zone 4 – greater than 140 mph (63 m/s)
Assembly Height Above Ground Level:	Less than or equal to 9.1 m (30') basic protection Greater than 9.1 m (30') enhanced protection

IMPACT TEST

Large missile impact tests were conducted using a #2 Southern Yellow Pine 2.4 m (2 x 4) measuring 92" in length and weighing 4100 g (9 lbs) (Missile D) as shown in Table 2 of ASTM E1996. Missile speeds and impact locations were in accordance with Tables 2, 3 & 4 and Section 5.3 of ASTM E1996. For pass/fail criteria, no penetration is defined as 'no tear longer than 130 mm (5") in length and 1 mm (1/16") wide or no opening through which a 76 mm (3") diameter solid sphere can freely pass' per Section 7 of ASTM E1996. All specimens were conditioned at 70° F ± 15°F prior to testing. Missile orientation at impact complies with section 11.2.2 of ASTM E1886.

Missile Type & Weight: #2 Southern Yellow Pine 2x4, Length 92" & 9 lbs.

	Location	Comments	Speed
Specimen 2			
Impact	Midspan of Interlock	No Penetration/ Passed	50.0 Ft./Sec.
Impact	Midspan of Active Panel	No Penetration/ Passed	50.0 Ft/.Sec
Impact	Top Right Corner of Active Panel	No Penetration/ Passed	50.0 Ft./Sec.
Specimen 3			
Impact	Midspan of Interlock	No Penetration/ Passed	50.0 Ft./Sec.
Impact	Midspan of Active Panel	No Penetration Passed	50.0 Ft./Sec.
Impact	Bottom Left Corner of Active Panel	No Penetration/ Passed	50.0 Ft./Sec.
Specimen 4			
Impact	Midspan of Interlock	No Penetration/ Passed	50.0 Ft./Sec.
Impact	Top Right Corner of Active Panel	No Penetration Passed	50.0 Ft./Sec.
Impact	Midspan of Active Panel	No Penetration/ Passed	50.0 Ft./Sec.

Results: After impacts, there was no penetration or separation of glass from the frame. Upon completion of testing, all specimens meet the requirements of ASTM E1996, Section 7.

PRESSURE CYCLING TEST

Unless otherwise specified, the duration of each air pressure cycle is not less than 1 s and not more than 5 s. Dwell time between successive cycles is no more than 1 s.

Specimens 2, 3 & 4

Design Pressure +65.0 psf/ -65.0 psf

Positive Loads

Range of Test	Actual				# of Cycles	Result
+0.2 to +0.5 DP	13.0	psf to	32.5	psf	3,500	Passed
+0.0 to +0.6 DP	0.0	psf to	39.0	psf	300	Passed
+0.5 to +0.8 DP	32.5	psf to	52.0	psf	600	Passed
+0.3 to +1.0 DP	19.5	psf to	65.0	psf	100	Passed

Negative Loads

Range of Test	Actual				# of Cycles	Result
-0.3 to -1.0 DP	19.5	psf to	65.0	psf	50	Passed
-0.5 to -0.8 DP	32.5	psf to	52.0	psf	1,050	Passed
-0.0 to -0.6 DP	0.0	psf to	39.0	psf	50	Passed
-0.2 to -0.5 DP	13.0	psf to	32.5	psf	3,350	Passed

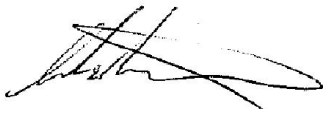
Results: Upon completion of testing, the specimens meet the requirements of ASTM E1996, Section 7. The listed impact test results were secured by using the ASTM E1886 test method and indicate compliance with the performance requirements of ASTM E1996 for the listed test parameters at the following design pressures:

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 F842-04 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

Mark Bennett
Manager of Testing Services



Christopher Bennett
Division Manager

CB/ mb
Attachments
Appendix A – Revision Summary
Appendix B – Drawings

Appendix A

Revision Log

Identification	Date	Page & Revision
Original Issue	11/07/16	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-210-4044-02A)

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.