

Viewmax Windows and Doors Co., Ltd.

TEST REPORT

SCOPE OF WORK

X2C Manual Casement Window + Fixed Window Assembly

REPORT NUMBER

221125007SHF-002

TEST DATE(S)

2022-12-06 - 2022-12-12

ISSUE DATE

2022-12-21

PAGES

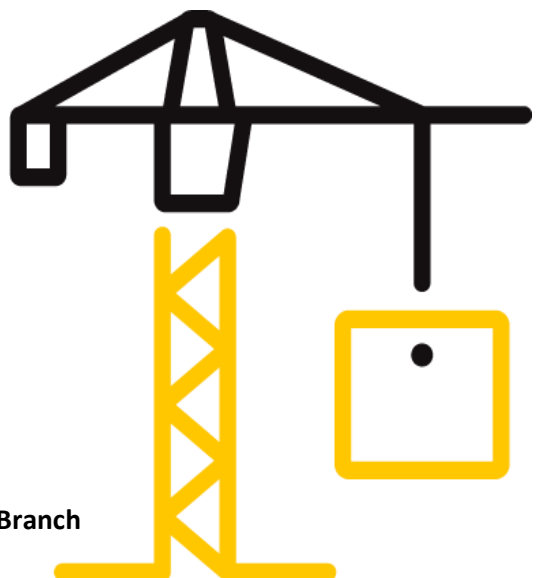
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DOCUMENT CONTROL NUMBER

LFT-APAC-SHF-OP-10k(September 1, 2022)

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Intertek Testing Services Shenzhen Ltd. Shanghai Fengxian Branch



Test Report

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Test Report

Issue Date: 2022-12-21 Intertek Report No. 221125007SHF-002

Applicant: Viewmax Windows and Doors Co., Ltd.
Applicant Address: No.297, Huaxin Road, Yanggu County, Liaocheng City, Shandong Province
Attn: Loius
Manufacturer: Viewmax Windows and Doors Co., Ltd.
Manufacturer Address: No.297, Huaxin Road, Yanggu County, Liaocheng City, Shandong Province
Product Type: Casement Window, Fixed Window
Product Model: X2C
Primary product designator: Class CW - PG30 - Size Tested 827 × 1560 mm (32.56 × 61.42 in.) - Type C,
Class CW - PG30 - Size Tested 1563 × 1560 mm (61.54 × 61.42 in.) - Type FW
Optional secondary designator: Positive Design Pressure = +1440 Pa (30.08 psf)
Negative Design Pressure = -1440 Pa (30.08 psf)
Water penetration resistance test pressure = 580 Pa (12.11 psf)
For Canada: Fixed Window: Canadian Air Infiltration/Exfiltration = Fixed Level
Casement Window: Canadian Air Infiltration/Exfiltration = A3 Level
SUBJECT: Performance testing
Casement Window, Fixed Window

Product Information

Product Name	X2C Manual Casement Window + Fixed Window Assembly	Brand	Viewmax
Sample Description	Good Condition	Sample Amount	1 set
		Received Date	2022-11-25
Sample ID	Model	Specification	
S221125007SHF.002	X2C	2390mm(W) x 1560mm(H)	

Test Methods And Standards

Test Standard	ASTM E283/E283M-2019; ASTM E547-00 (Reapproved 2016); ASTM E330/E330M-2014(R2021); ASTM F588-17; AAMA/WDMA/CSA101/I.S.2/A440-17 Clause 9.3.1, Clause 9.3.6.2, Clause 9.3.6.4.2 and Clause 9.3.6.5.2; CSA A440S1-19 Clause 5.2
Specification Standard	AAMA/WDMA/CSA 101/I.S.2/A440-17 (NAFS 2017 - North American Fenestration Standard / Specification for Windows, Doors and Skylights) Clause 9.3.1, Clause 9.3.2, Clause 9.3.3, Clause 9.3.4, Clause 9.3.5, Clause 9.3.6.2, Clause 9.3.6.4.2 and Clause 9.3.6.5.2; CSA A440S1-19 Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440-17 Clause 5.2, Clause 5.3, Clause 5.4 and Clause 5.5
Test Conclusion	The results met AAMA/WDMA/CSA 101/I.S.2/A440-17 and CSA A440S1-19 requirements specified on Casement Window and Fixed Window, and the results were shown in the following page.

Note:

1.This report relates specifically to the sample(s) that were drawn and provided by the applicant or their nominated third party. The reported result(s) provide no warranty or verification on the sample(s) representing any specific goods and/or shipment and only relate to the sample(s) as seen and tested.

Report Authorized

Fred Bao

Name: Fred Bao

Gio Liu

Name: Gio Liu

Title: Reviewer

Title: Project Engineer

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Test Items, Method and Results:

1 Test Samples

Sample was submitted to Intertek directly from the client. Sample was not independently selected for testing.
Sample was received at the Evaluation Center on November 25, 2022.

A full scale sample of X2C Manual Casement Window + Fixed Window Assembly (Model: X2C) was provided by the manufacturer that was not weathered nor conditioned.

The description of the samples given below has been prepared from information provided by the sponsor of the test.
All values quoted are nominal, unless tolerances are given.

Table 1 Product Information

Product Name	X2C Manual Casement Window + Fixed Window Assembly
Model	X2C
Dimension of Window Frame	2390mm(Width) x 1560mm(Height) x 92mm(Thickness)
Dimension of Window Sash	Operable: 827mm(Width) x 1560mm(Height) x 92mm(Thickness) Fixed: 1563mm(Width) x 1560mm(Height) x 92mm(Thickness)
Profile	PVC Model: The X2C series of all PVC materials Manufacturer: Viewmax Co., Ltd. Aluminum Model: The X2C series of all ALU materials Manufacturer: Hua Jian Aluminum Industry Group Co., Ltd. Shaped Steel Model: The X2C series of all Shaped steel materials Manufacturer: Zhongde Industry and Trade Co., Ltd.
Frame Corner Construction Details: Joinery type	File welding
Reinforcement	Metal Angle code (The profile corner part is reinforced by metal angle code)
Glazing	Dimension: For Operable Part: 647mm(Width) x 1353mm(Height) Type: 30mm thickness, 5mm + 20mm Ar + 5mm Tempered Double Glass with one layer of Low-E; Warm edge strip; For Fixed Part: 1455mm(Width) x 1452mm(Height) Type: 30mm thickness, 8mm + 14mm Ar + 8mm Tempered Double Glass with one layer of Low-E; Warm edge strip Supplier: Viewmax Co., Ltd.
Hardware	Lock Model: SC-03; Chain Model: PK-01; Hinge Model: ZXSLG Supplier: Li Sheng Co., Ltd.
Weather-strip	Not Applicable
Thermal Break	Not Applicable
Drainage	Sizes: 30mmx 5 mm (Width x Height) Quantity: 5
Gasket	Model: (1) 463214; (2) 482120; (3) 482122; (4) 449122; (5) 449522 Material: EPDM Supplier: Jiangyin Haida Co., Ltd.

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Table 1 Product Information(Continued)

Sealant of Glass	Model: 796 Neutral silicone sealant Material: Silicone Sealant Supplier: Dow Corning Co., Ltd.
Installation	The rough opening allowed for a 10 mm shim space. The exterior perimeter of the test specimen was sealed with silicon sealant.

The sample ID number was S221125007SHF.002. The drawings of the representative sample were referenced in Appendix A, the test data was referenced in Appendix B and the photo of the representative sample was referenced in Appendix C.

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Test Items, Method and Results:

2 Test Result

Table 2 Test Result

Test Description	Requirements (Class CW-PG30)		Results		Verdict
2022/12/6					
Operating Force Test AAMA/WDMA/CSA1 01/I.S.2/A440-17, Clause 9.3.1	Max Force to Initial Movement	70 N	Max Force to Initial Movement	23 N	Pass
	Max Force to Maintain Movement	45 N	Max Force to Maintain Movement	12 N	
Air Leakage Resistance Test For Casement Window AAMA/WDMA/CSA1 01/I.S.2/A440-17, Clause 9.3.2 ASTM E283/E283M-2019	Maximum air leakage at +75 Pa	0.5 L/s·m ²	Air leakage at +75 Pa	0.26 L/s·m ²	Pass
	Maximum air leakage at -75 Pa	0.5 L/s·m ²	Air leakage at -75 Pa	0.37 L/s·m ²	
Air Leakage Resistance Test For Fixed Window AAMA/WDMA/CSA1 01/I.S.2/A440-17, Clause 9.3.2 ASTM E283/E283M-2019	Maximum air leakage at +75 Pa	0.2 L/s·m ²	Air leakage at +75 Pa	0.01 L/s·m ²	Pass
	Maximum air leakage at -75 Pa	0.2 L/s·m ²	Air leakage at -75 Pa	0.01 L/s·m ²	
Water Penetration Resistance Test AAMA/WDMA/CSA1 01/I.S.2/A440-17, Clause 9.3.3 ASTM E547-00(R2016)	Minimum water pressure	220 Pa	Test Pressure	580 Pa	Pass
			After water sprayed for complete four cycles in 24 minutes at 580 Pa, there was no water penetration.		

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Table 2 Test Result (Continued)

Test Description	Requirements (Class CW-PG30)	Results			Verdict
2022/12/6					
Uniform Load Deflection Test AAMA/WDMA/CSA101/I.S.2/A440-17, Clause 9.3.4.2 ASTM E330/E330M-2014 (R2021)	Minimum Design Pressure (DP)	1440 Pa	Design Pressure (DP)	+1440 Pa	Pass
			Maximum deflection at Stile of Casement Window	1.4 mm	
			Maximum deflection at Rail at handle side of Casement Window	0.4 mm	
			Maximum deflection at Mullion	1.8 mm	
			Maximum deflection at Glazing	3.5 mm	Reported
			Design Pressure (DP)	-1440 Pa	Pass
			Maximum deflection at Stile of Casement Window	1.4 mm	
			Maximum deflection at Rail at handle side of Casement Window	0.4 mm	
			Maximum deflection at Mullion	1.5 mm	
			Maximum deflection at Glazing	3.2 mm	Reported

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Table 2 Test Result (Continued)

Test Description	Requirements (Class CW-PG30)	Results	Verdict
2022/12/6			
Uniform Load Structural Test AAMA/WDMA/CSA101/I.S.2/A440-17, Clause 9.3.4.3 ASTM E330/E330M-2014 (R2021)	Minimum Structural Pressure (STP)	2160 Pa	
		Structural Pressure (STP)	+2160 Pa
		No significant breakage or damage after ultimate strength was released.	
		Maximum permanent deformation at Stile of Casement Window	<0.1 mm
		Maximum permanent deformation at Rail at handle side of Casement Window	0.2 mm
		Maximum permanent deformation at Mullion	0.3 mm
		Maximum permanent deformation at Glazing	<0.1 mm
		Structural Pressure (STP)	-2160 Pa
		No significant breakage or damage after ultimate strength was released.	
		Maximum permanent deformation at Stile of Casement Window	<0.1 mm
		Maximum permanent deformation at Rail at handle side of Casement Window	0.3 mm
		Maximum permanent deformation at Mullion	0.3 mm
		Maximum permanent deformation at Glazing	<0.1 mm

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Table 2 Test Result (Continued)

Test Description	Requirements (Class CW-PG30)		Results		Verdict
2022/12/7					
Forced-entry Resistance Test AAMA/WDMA/CSA101/I.S.2/A440-17, Clause 9.3.5 ASTM F588-17	Minimum Grade 10		Test Class	Grade 10	Pass
			After test, there was no damage and permanent deformation.		
Insect screen serviceability Test CSA A440S1-19, Clause 5.2	Load to the Insect screens in the outward direction	60 N	No disengagement or distortion occurred.		Pass
Sash Vertical deflection Test AAMA/WDMA/CSA101/I.S.2/A440-17, Clause 9.3.6.4.2	Maximum Sash Vertical Deflection is 2% of sash width	23.4 mm	Maximum deflection at 270N	1.05 mm	Pass
Casement hardware load Test AAMA/WDMA/CSA101/I.S.2/A440-17, Clause 9.3.6.5.2	The Load to the sash	300 Pa	Sash Area	0.90 m ²	Pass
			Load	270 N	
			After applied load for 10s, the sash was properly and fully close. There was no failure of screws, track, or hinge, or permanent deformation of support arms.		
2022/12/12					
Thermoplastic corner weld Test AAMA/WDMA/CSA101/I.S.2/A440-17, Clause 9.3.6.2	When loaded to failure, the break shall not extend along the entire weld line.		Corner Type	Load to cause breakage (N)	Pass
			Frame corner	680	
			Sash corner	849	
			No break was extended along the entire weld line at load to cause breakage.		

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Appendix A: Sample Drawings

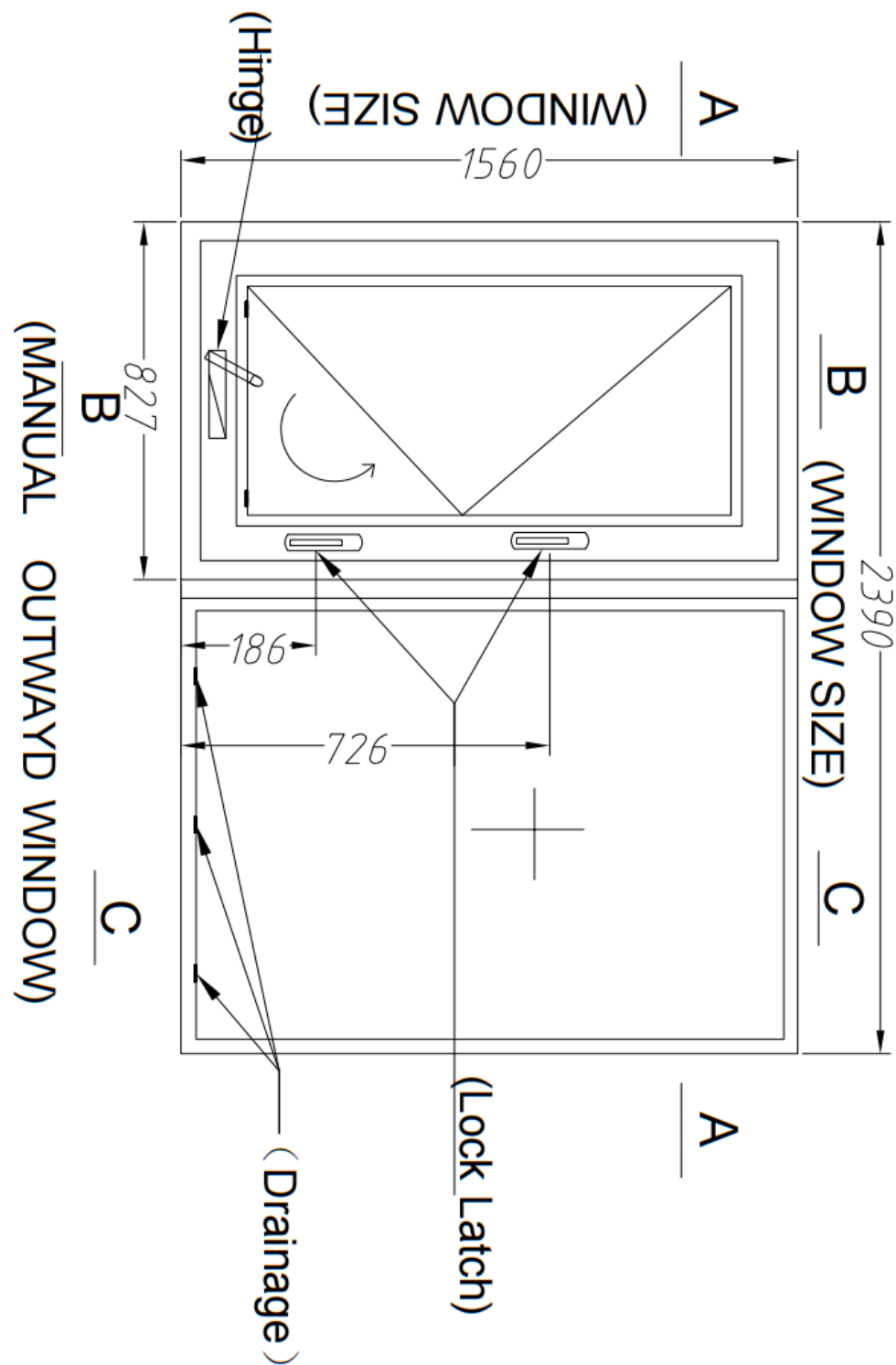


Fig.1 Drawing of Representative Sample

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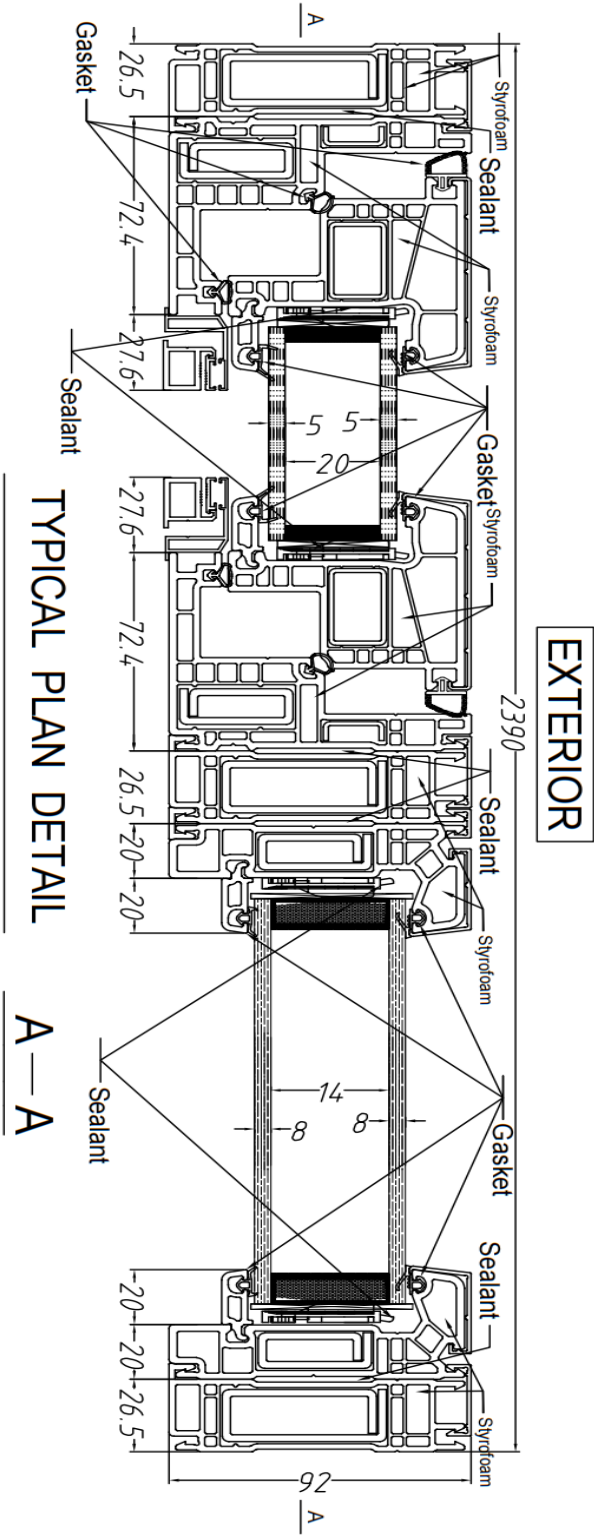


Fig.2 Drawing of Representative Sample

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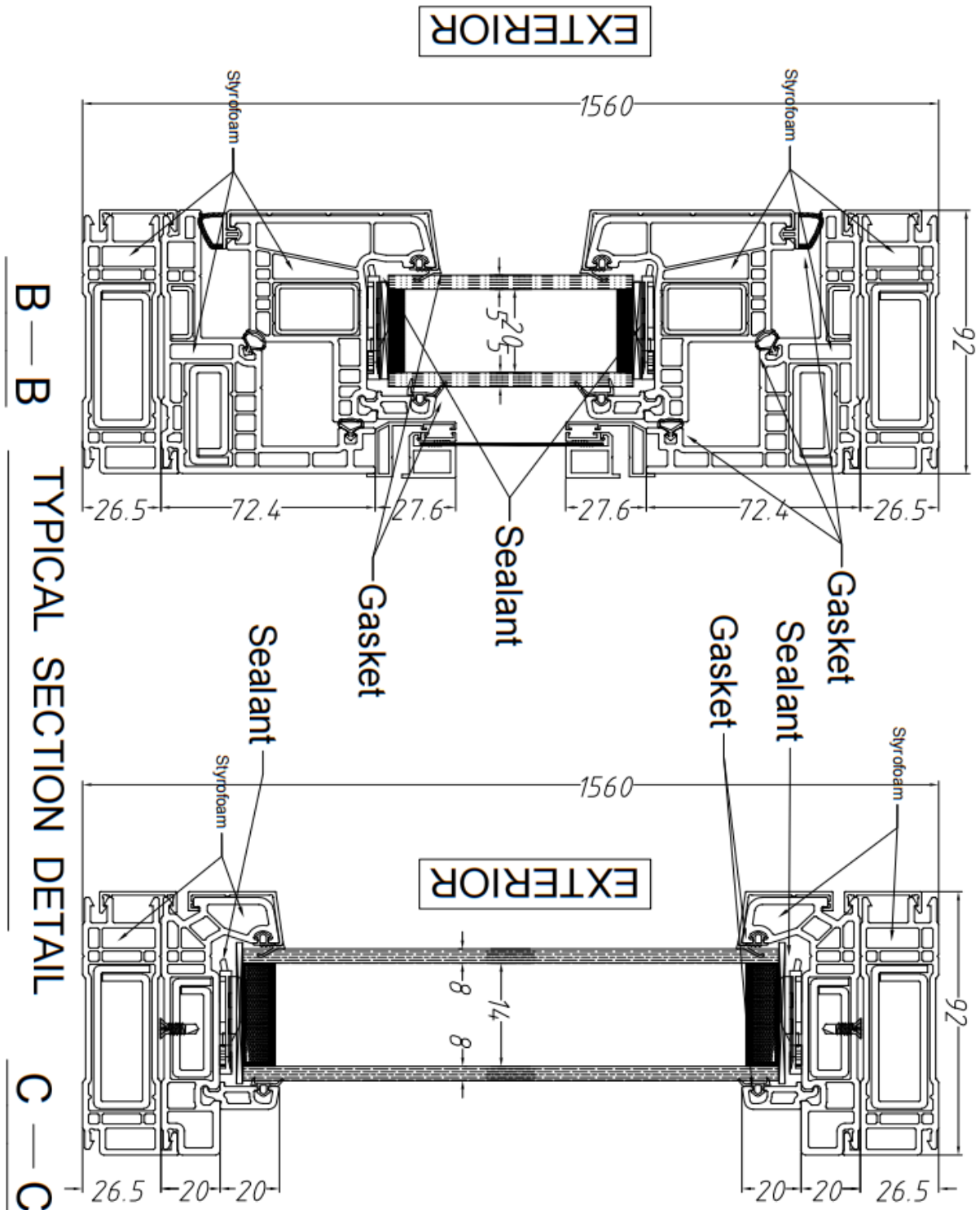


Fig.3 Drawing of Representative Sample

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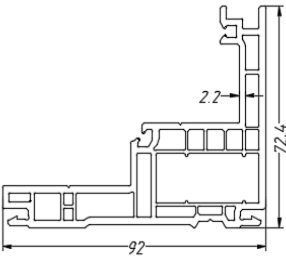
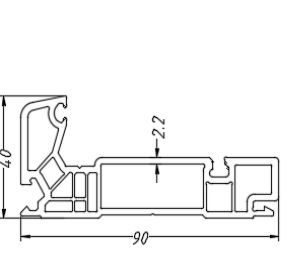
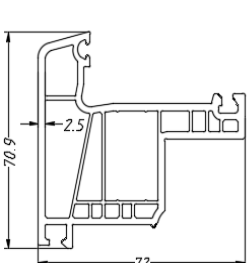
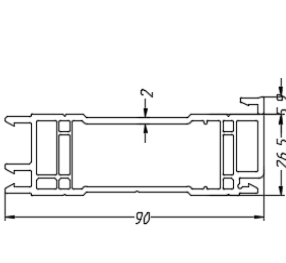
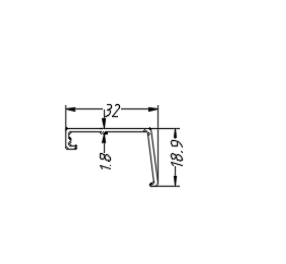
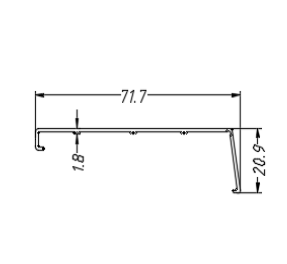
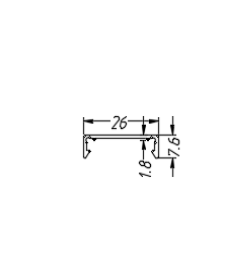
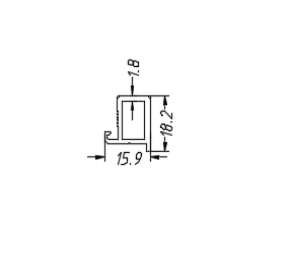
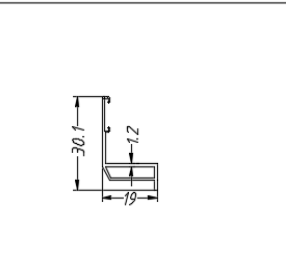
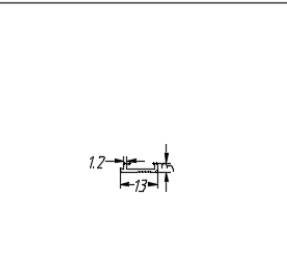
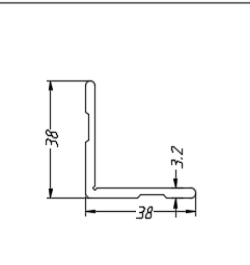
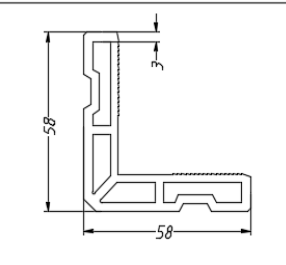
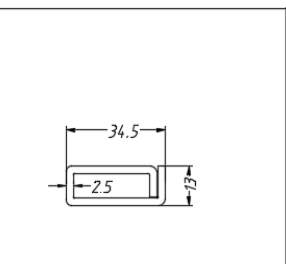
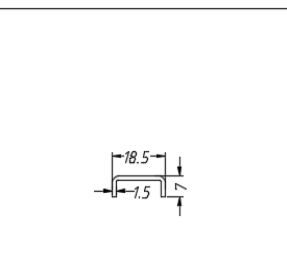
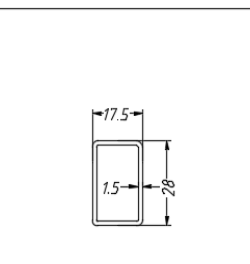
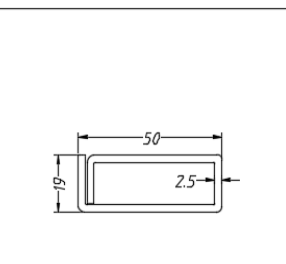
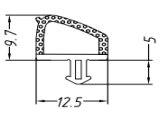
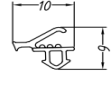
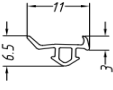
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 X2 FIXED FRAME ALUMINUM PLATE	 X2C OPEN FAN ALUMINUM PLATE	 X2 PADDING PROFILE ALUMINUM PLATE	 SCREEN WINDOW SASH
 SCREEN WINDOW FRAME	 SCREEN WINDOW FASTENER	 ALUM ANGLE	 ALUM ANGLE
 X2 FIXED FRAME STEEL LINING	 X2C OUTER FRAME STEEL LINING	 X2C OPEN FAN STEEL LINING	 X2 PADDING PROFILE STEEL LINING

Fig.4 Drawing of Representative Sample

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 463214	 482122	 482120	 449122	 449522
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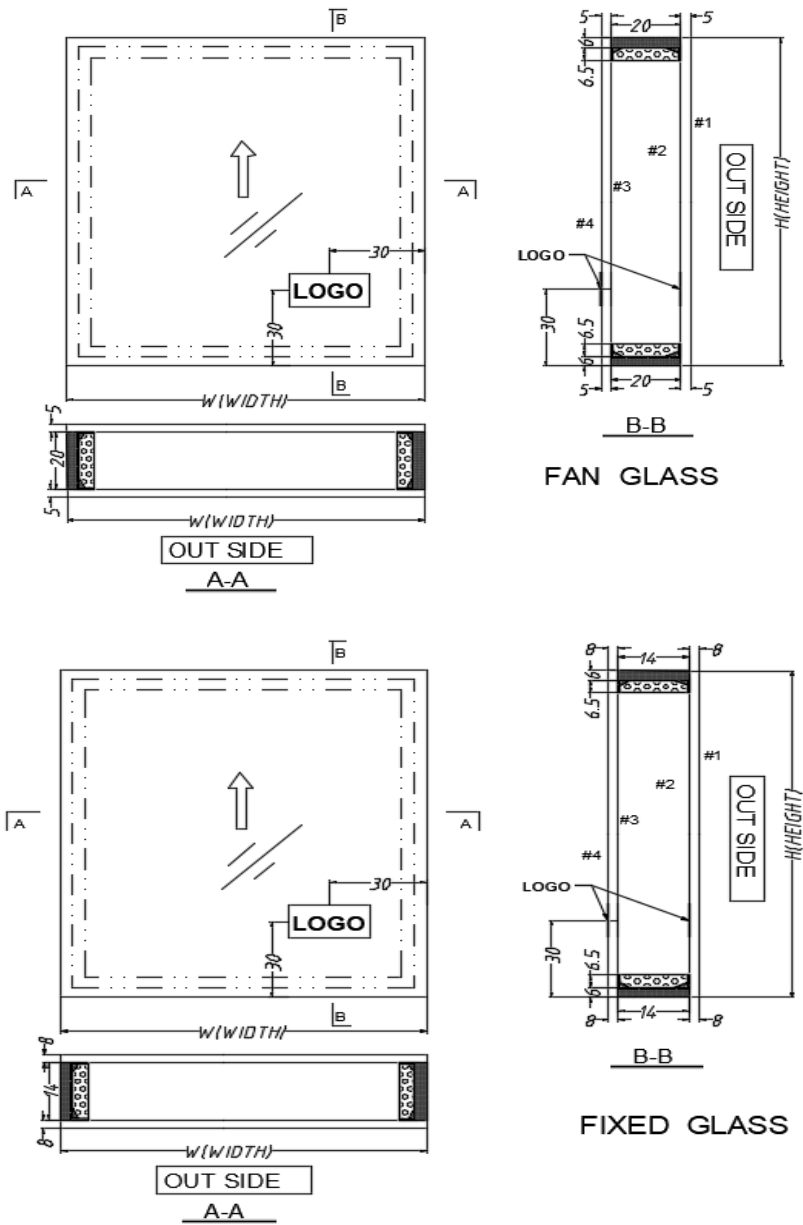


Fig.5 Drawing of Representative Sample

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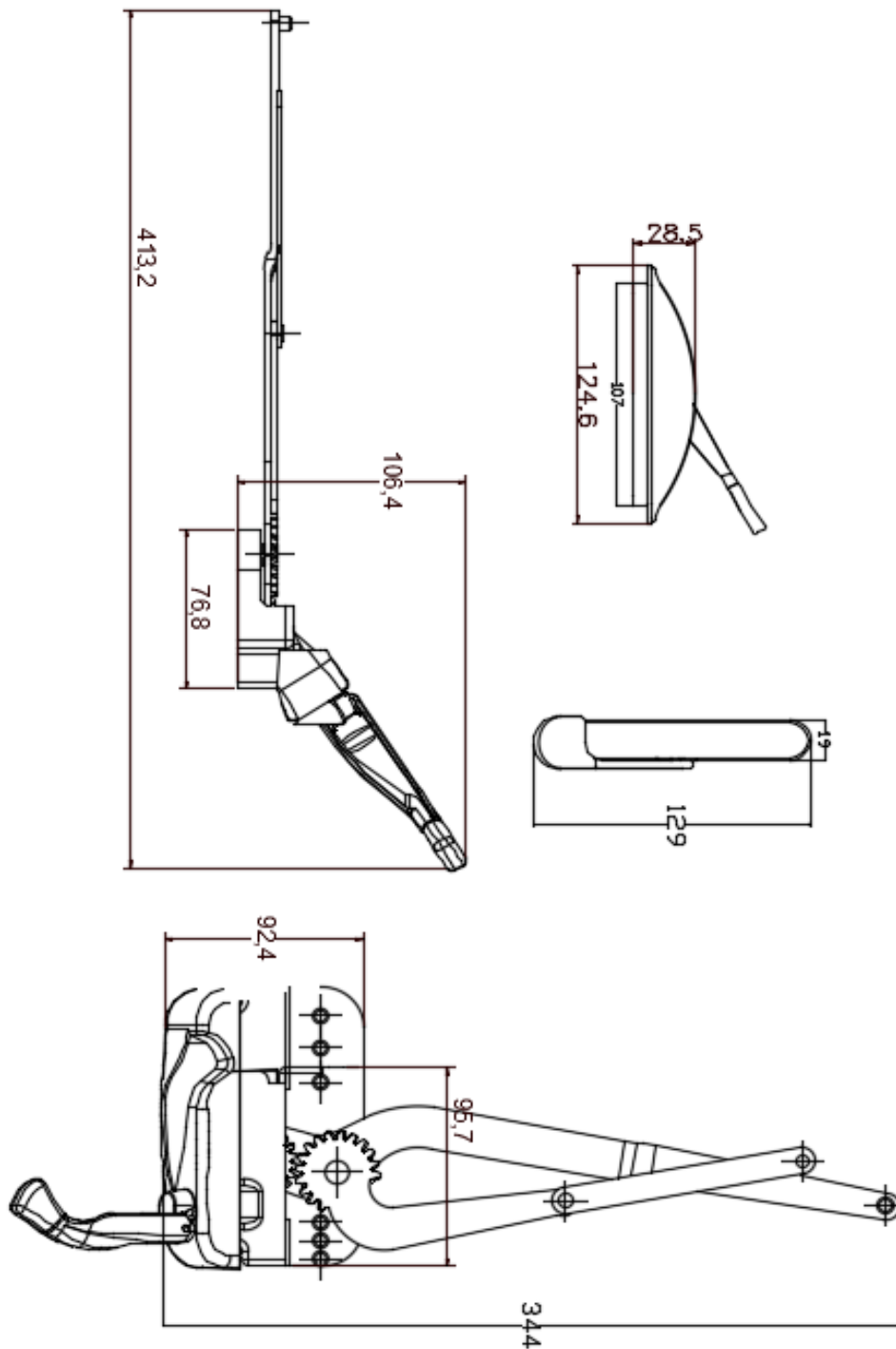


Fig.6 Drawing of Representative Sample

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Appendix B: Test Data

B.1 Air Leakage Resistance Test – Test method ASTM E283/E283M-2019

Area of Casement Window: 1.29 m²

Table B.1 Test Data of Air Leakage Resistance Test

Infiltration rate (75 Pa)	0.26 L/s·m ²	0.05 cfm/ft ²
Exfiltration rate (75 Pa)	0.37 L/s·m ²	0.07 cfm/ft ²
Average air leakage rate (75 Pa)	0.32 L/s·m ²	0.06 cfm/ft ²
Requirements (75 Pa): U.S. (only) maximum allowable leakage for Class CW Windows; Canadian (only) air Infiltration / Exfiltration levels for Class CW Windows (Operable): A3 Level	0.5 L/s·m ²	0.1 cfm/ft ²

The Casement Window met the requirements for Class CW Windows for Air Leakage Resistance Test as per AAMA/WDMA/CSA 101/I.S.2/A440-17.

The Casement Window met the requirements for Canadian (only) Air Infiltration / Exfiltration levels for Class CW Windows (Operable): A3 Level for Air Leakage Resistance Test as per AAMA/WDMA/CSA 101/I.S.2/A440-17.

Area of Fixed Window: 2.40 m²

Table B.2 Test Data of Air Leakage Resistance Test

Infiltration rate (75 Pa)	0.01 L/s·m ²	<0.01 cfm/ft ²
Exfiltration rate (75 Pa)	0.01 L/s·m ²	<0.01 cfm/ft ²
Average air leakage rate (75 Pa)	0.01 L/s·m ²	<0.01 cfm/ft ²
Requirements (75 Pa): U.S. (only) maximum allowable leakage for Class CW Windows; Canadian (only) air Infiltration / Exfiltration levels for Class CW Windows (Fixed): Fixed Level	0.2 L/s·m ²	0.04 cfm/ft ²

The Fixed Window met the requirements for Class CW Windows for Air Leakage Resistance Test as per AAMA/WDMA/CSA 101/I.S.2/A440-17.

The tested specimen met the requirements for Canadian (only) Air Infiltration / Exfiltration levels for Class CW Windows (Fixed): Fixed Level for Air Leakage Resistance Test as per AAMA/WDMA/CSA 101/I.S.2/A440-17.

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Appendix B: Test Data

B.2 Water resistance test – Test method ASTM E547-00 (Reapproved 2016)

No water penetration occurred when the pressure was 580 Pa (12.11 psf)

After water sprayed for complete four cycles in 24 minutes at 580 Pa (12.11 psf), there was no water penetration.

Test result: $P_{\max} = 580 \text{ Pa}$ (12.11 psf).

The tested specimen met the requirements for Class CW-PG30 for Water Penetration Resistance Test as per AAMA/WDMA/CSA 101/I.S.2/A440-17.

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Appendix B: Test Data

B.3 Uniform Load Deflection Test – Test method ASTM E330/E330M-2014(R2021), Procedure A

Span length, L = 1440 mm	Set Points (1-3)
Span length, L = 700 mm	Set Points (3-5)
Span length, L = 1440 mm	Set Points (6-8)
Span length, L = 1420 mm	Set Points (9-11)

Test Pressure (DP), P = 1440 Pa (30.08 psf)

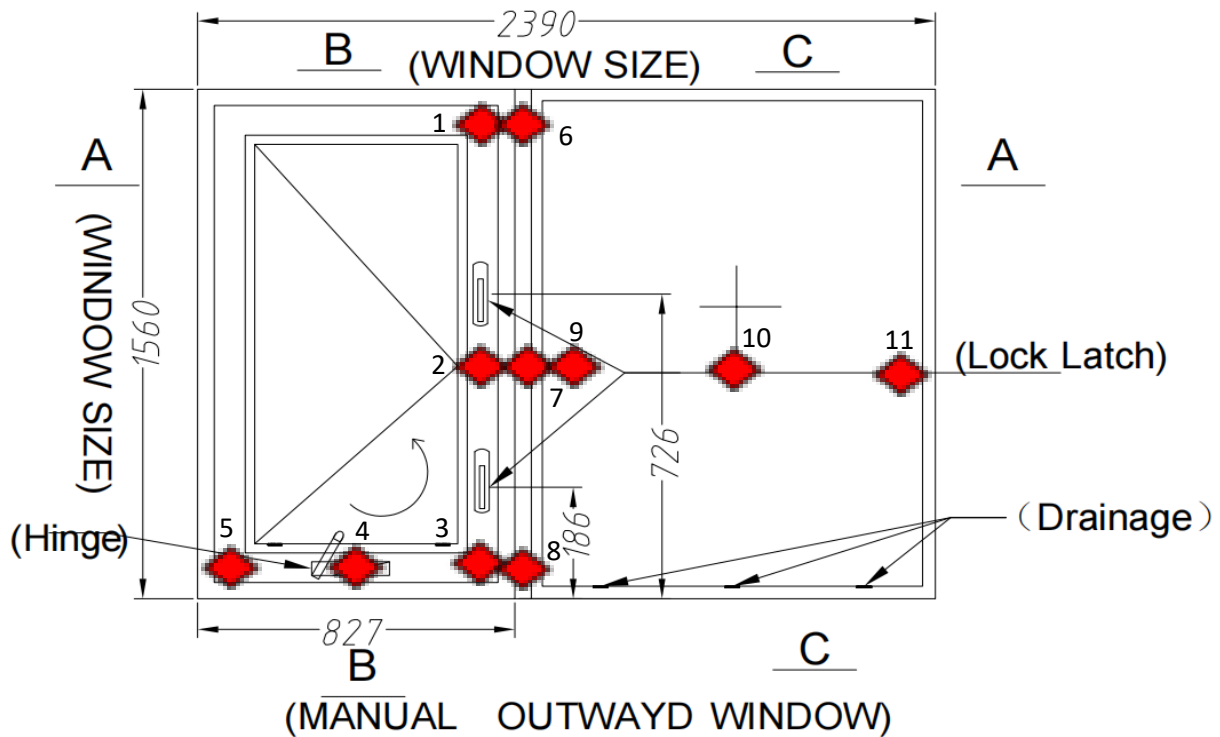


Fig.7 Locations of Displacement Measuring Devices

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Table B.3 Test Data of Uniform Load Deflection Test

Member (mm)		Test Pressure (Pa)	Deflection (mm)			Maximum Deflection(mm)
Item	Span Length		1	2	3	
Stile of Casement Window	1440	+P = 1440	2.5	3.4	1.5	1.4
		0	0.2	<0.1	<0.1	<0.1
		-P = -1440	3.1	3.9	1.9	1.4
		0	0.5	0.5	0.3	0.1
Member (mm)		Test Pressure (Pa)	Deflection (mm)			Maximum Deflection(mm)
Item	Span Length		3	4	5	
Rail at handle side of Casement Window	700	+P = 1440	1.5	1.3	0.4	0.4
		0	<0.1	0.2	0.1	0.2
		-P = -1440	1.9	1.6	0.6	0.4
		0	0.3	0.3	0.2	0.1
Member (mm)		Test Pressure (Pa)	Deflection (mm)			Maximum Deflection(mm)
Item	Span Length		6	7	8	
Mullion	1440	+P = 1440	2.2	3.3	0.9	1.8
		0	0.2	0.5	0.2	1.3
		-P = -1440	2.4	3.3	1.2	1.5
		0	0.4	0.6	0.4	0.2
Member (mm)		Test Pressure (Pa)	Deflection (mm)			Maximum Deflection(mm)
Item	Span Length		9	10	11	
Glazing	1420	+P = 1440	3.7	5.9	1.1	3.5
		0	1.2	0.5	0.3	<0.1
		-P = -1440	4.1	5.9	1.4	3.2
		0	1.6	0.7	0.6	<0.1

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Table B.4 Test Data of Uniform Load Deflection Test for Stile of Casement Window

Test Pressure	Deflection Measurements, mm (in.)			
	Positive		Negative	
	Maximum Deflection		Maximum Deflection	
1440 Pa (30.08 psf)	1.4	(0.06)	1.4	(0.06)
Span length, L =	1440 mm	(56.69 in.)	Deflection limit L/175 =	8.2 mm (0.32 in.)

Table B.5 Test Data of Uniform Load Deflection Test for Rail at handle side of Casement Window

Test Pressure	Deflection Measurements, mm (in.)			
	Positive		Negative	
	Maximum Deflection		Maximum Deflection	
1440 Pa (30.08 psf)	0.4	(0.02)	0.4	(0.02)
Span length, L =	700 mm	(27.56 in.)	Deflection limit L/175 =	4.0 mm (0.16 in.)

Table B.6 Test Data of Uniform Load Deflection Test for Mullion

Test Pressure	Deflection Measurements, mm (in.)			
	Positive		Negative	
	Maximum Deflection		Maximum Deflection	
1440 Pa (30.08 psf)	1.8	(0.07)	1.5	(0.06)
Span length, L =	1440 mm	(56.69 in.)	Deflection limit L/175 =	8.2 mm (0.32 in.)

Table B.7 Test Data of Uniform Load Deflection Test for Glazing

Test Pressure	Deflection Measurements, mm (in.)			
	Positive		Negative	
	Maximum Deflection		Maximum Deflection	
1440 Pa (30.08 psf)	3.5	(0.14)	3.2	(0.13)
Span length, L =	1420 mm	(55.91 in.)	No Deflection limit.	

The tested specimen met the requirements for Class CW-PG30 for Uniform Load deflection Test at design pressure as per AAMA/WDMA/CSA 101/I.S.2/A440-17.

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Appendix B: Test Data

B.4 Uniform Load Structural Test – Test method ASTM E330/E330M-2014(R2021), Procedure A

Design Pressure, P = 1440 Pa (30.08 psf)

Structural Pressure, P = 2160 Pa (45.11 psf)

Table B.8 Test Data of Uniform Load Structural Test

Member (mm)		Test Pressure (Pa)	Permanent deformation(mm)			Maximum permanent deformation(mm)
Item	Span Length		1	2	3	
Stile of Casement Window	1440	+P = 2160	–	–	–	–
		0	0.5	0.3	0.3	<0.1
		-P = -2160	–	–	–	–
		0	0.6	0.3	0.3	<0.1
Permanent Deformation limit, L x 0.3% = 4.3 mm						
Member (mm)		Test Pressure (Pa)	Permanent deformation(mm)			Maximum permanent deformation(mm)
Item	Span Length		3	4	5	
Rail at handle side of Casement Window	700	+P = 2160	–	–	–	–
		0	0.3	0.4	0.2	0.2
		-P = -2160	–	–	–	–
		0	0.3	0.6	0.3	0.3
Permanent Deformation limit, L x 0.3% = 2.1 mm						
Member (mm)		Test Pressure (Pa)	Permanent deformation(mm)			Maximum permanent deformation(mm)
Item	Span Length		6	7	8	
Mullion	1440	+P = 2160	–	–	–	–
		0	0.5	0.8	0.5	0.3
		-P = -2160	–	–	–	–
		0	0.6	0.9	0.6	0.3
Permanent Deformation limit, L x 0.3% = 4.3 mm						
Member (mm)		Test Pressure (Pa)	Permanent deformation(mm)			Maximum permanent deformation(mm)
Item	Span Length		9	10	11	
Glazing	1420	+P = 2160	–	–	–	–
		0	2.0	1.0	0.7	<0.1
		-P = -2160	–	–	–	–
		0	2.2	1.1	0.8	<0.1
No Permanent Deformation limit.						

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Table B.9 Test Data of Uniform Load Structural Test For Stile of Casement Window

Test Pressure	Deflection Measurements, mm (in.)			
	Positive		Negative	
	Perm. Set		Perm. Set	
2160 Pa (45.11 psf)	<0.1	(<0.01)	<0.1	(<0.01)

Table B.10 Test Data of Uniform Load Structural Test For Rail at handle side of Casement Window

Test Pressure	Deflection Measurements, mm (in.)			
	Positive		Negative	
	Perm. Set		Perm. Set	
2160 Pa (45.11 psf)	0.2	(0.01)	0.3	(0.01)

Table B.11 Test Data of Uniform Load Structural Test For Mullion

Test Pressure	Deflection Measurements, mm (in.)			
	Positive		Negative	
	Perm. Set		Perm. Set	
2160 Pa (45.11 psf)	0.3	(0.01)	0.3	(0.01)

Table B.12 Test Data of Uniform Load Structural Test For Glazing

Test Pressure	Deflection Measurements, mm (in.)			
	Positive		Negative	
	Perm. Set		Perm. Set	
2160 Pa (45.11 psf)	<0.1	(<0.01)	<0.1	(<0.01)

After the test loads were released, there was no failure or permanent deformation of any part of the window system that would cause the test specimen to be inoperable. There was no permanent deformation which was in excess of 0.3% of its span.

The tested specimen met the requirements for ClassClass CW-PG30 for Uniform Load Structure Test as per AAMA/WDMA/CSA 101/I.S.2/A440-17.

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Appendix C: Sample Received Photo



Revision:

NO.	Date	Changes
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