Test Method: **CSA A440-00 Windows**

Manufacturer/Client: Oasis Windows Ltd.	Manufacturer/Client Address: 109-12889 84th Street Surrey, British Columbia Canada
Job Number: W410-4	

Sample Number: 300 Series Single Hung Window	Description: Width: 1000mm, Height: 1600mm See report for details
Date Received: June 2006	

Test Technician(s): Adam Perczyk	Testing Performed at: Quality Auditing Institute Ltd 2825 Murray Street Port Moody, BC Canada, V3H 1X3
	Date(s) of Testing: July 28-31, 2006

REPORT NUMBER W410-4

Edition 1: August 28, 2006
Contents: Pages 1-16, A1-A8

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Sampling Plan/Procedures:

One unused, glazed 300 Series Vertical Sliding Window complete with all hardware, was provided by the client and examined at the QAI laboratory, then tested between July 28, 2006 and July 31, 2006 as being a typical sample of the model covered in this report.

Test Equipment:

Table 1: Test Equipment

Equipment Used:	QAI Laboratory Code:	Calibration Due:
Omega FL910G (0-2.7 cfm) Air Flow Meter	FLOW3	October 2006
Omega FL911G (0-10.2 cfm) Air Flow Meter	FLOW4	October 2006
Dwyer Manometer (0-250 kPa)	MANOMETER1	Adjusted to zero before test
Dwyer Manometer (0-1500 kPa)	MANOMETER2	Adjusted to zero before test
Dwyer Manometer (0-6000 kPa)	MANOMETER3	Adjusted to zero before test
Tuf-E-Nuf Measuring Tape	LENGTH1	October 2008
Spray Rack	SPRAYRACK1	Verified using test procedure described in ASTM Standard E547.
Mititoyo Calipers	CALIPER1	Verified with gauge block before use
Gauge block (0.125", 0.25", 0.5")	GAUGEBLOCK1 GAUGEBLOCK2 GAUGEBLOCK3	May 2007
Pressure Regulator, Pressure Gauge and pneumatic cylinders calibrated together as complete system.	CYLINDER1,2,3, REGULATOR1,2,3 GAUGE1,2,3	System verified with LOADCELL5
Load Cell	LOADCELL5	Verified with weights. Weights verified with SCALE3.
Excell Scale FA 132 (0-30kg)	SCALE3	September 2006
Spring Balance	PULL1	Verified with weights. Weights verified with SCALE3 before use.
Dial Gauge	DIAL1	Verified with gauge block before use
Dial Barometer	BAROMETER1	August 2007
Thermocouple	TC-1	June 2007
Sash Pull Off Clamp (CSA A440-00, Figure 8)	SASHPULL1	Adjusted and weighed using SCALE3 before each test

Test Conditions:

Quality Auditing Institute Ltd. (QAI) was retained by Oasis Windows Ltd. to perform testing in accordance with the test requirements of CSA A440-00 "Windows" on a representative sample of 300 Series Vertical Sliding Window.

This report includes the tests performed on a specimen of specific dimensions. Actual product performance may be affected by variations in the windows dimensions, assembly details and installation method. The drawings supplied by Oasis Windows were verified by QAI for the window unit tested and are shown in Appendix A.

As directed by the manufacturer, the window specimen was installed in a test buck using #8 x 1 ½" screws 8" spacing along the jambs and sill. A bead of Window and Door silicone sealant was applied to the side of the window flange mating with the surface of the wooden test buck. One full tube (750ml) of silicone was used for each installation.

The wooden test buck consisted of a 84" x 84" square, ¾" plywood surface reinforced with nominal 2" x 6" stud backing. The center of the buck was built with a rough opening measuring ¾" larger than the test specimen in length and width, framed in by nominal 2" x 6" members to facilitate mounting of the test specimen. For each test conducted, the test specimen was leveled and set plumb in the wooden test buck.

Table 2: Test Sequence and Alterations

Test Number	Test Clause	Test	Alterations
1	10.9	Ease of Operation	None
2	10.2	Air Leakage	None
3	10.3	Water Penetration	None
4	10.4	Wind Load Resistance	None
5	10.5	Safety Drop	None
6	10.6	Blocked Operation	None
7	10.11	Sash Pull off	None
8	10.13	Forced Entry	None

Summary of Results:

Table 3: Test Results (Window Ratings)

Clause	Test Name	Rating
10.2	Air Tightness	A3
10.3	Water Tightness	B3
10.4	Wind Load Resistance	C5
10.5	Safety Drop	PASS
10.6	Blocked Operation	PASS
10.7	Sash Strength and Stiffness, Casement	-
10.8	Sash Strength and Stiffness, Projecting	-
10.9	Ease of Operation	PASS
10.10	Screen Strength	-
10.11	Sash Pull-Off	PASS
10.12	Condensation Resistance	-
10.13	Resistance to Forced Entry	F1

Note: "-" indicates test was not performed

Window Components:

300 Series Vertical Sliding Window		
Frame:	Size:	Width: 1000mm, Height: 1600mm Vinyl. Part number BX311. See appendix A for drawing.
	Joints:	Mitered. Thermally welded. Corners cleaned.
Sash:	Size:	Width: 35 ½", Height: 29" Vinyl. Part number BX303. See appendix A for drawing.
	Joints:	Mitered. Thermally welded. Corners cleaned.
Interlock:	Mullion:	Vinyl. Part number BX305. See appendix A for drawing. Fastened with 2 - #8 x 3" screws per end, caulked in place.
	Sash Interlock:	Vinyl. Part number BX323. Part number BX324 is equivalent except pull handle is located in a different location. See appendix A for both drawings.
	Reinforcement:	Steel U-Channel (0.060" thick x 0.75" wide x 0.70" high) located in both sash interlock and mullion. Reinforcement fastened to vinyl members using 10 – ¾" self taping screws. Screws caulked in place.
Glazing Method:	Glazing Tape	Venture #VG116W-L819 (1/16" x 3/8") double sided foam glazing tape. Applied in one continuous piece and butted together at the end with a bead of silicone caulking.
	Glazing Bead	Vinyl. Snap on. Part number BX309.
	Setting Blocks	Dimensions: 24mm x 24mm x 3mm Poly Chlor – 85 durometer flexible PVC 2 setting blocks – each located under glazing unit approximately 50mm from corner
Glazing:	Overall Thickness	¾" thick (19mm) 2 glass lites – each 3mm clear annealed
	Spacer:	12.7mm (1/2") Bayform thermally broken, desiccant filled aluminum with polysulfide seal.
Weather-stripping	Sash:	Primary Seal (face of sash): Amesbury Group #22018745WHGF continuous around face of sash.
Drainage:	Frame:	See drawing in appendix A.
	Sash:	2 – 7.9mm diameter holes under the glazing unit on the operable sash approximately 4" from both bottom corners.
Hardware:	Lock:	1 – "Full Max" cam lock #V1L10LWH Fastened using 4 - #6 x 3/4" zinc screws
	Night Lock:	1 – "Full Max" night lock #V1L22WH fastened to left side of sash meeting rail using 2 – 5/32" aluminum tri-fold rivets
	Sash Balance:	1 pair – "Vangaurd" sash balance #111-1314 with "D&S Hardware" takeout clips
	Insect Screen	Not supplied with test specimen

See appendix A for cross section, assembly, and dimensional specifications.

Test Specifications:

Air Tightness Test: CSA A440-00, Clause 10.2, Test Method: ASTM E283

	Laboratory Conditions	Standard Conditions
Temperature	23.8 C	20.8 C
Pressure	101.7 kPa	101.3 kPa
Air Density	1.194 kg/m^3	1.202 kg/m^3
Air Density Ratio = 0.997		

CL_{op} = Crack length of operable portion = 3.280m
CL_f = Crack length of fixed portion = 3.416m
CL_t = Cl_{op} + CL_f = 6.696m

$Q_{op/A3}$ = Maximum air leakage of operable portion for A3 rating = 0.55 (m3/h)/m
Q_f = Maximum air leakage of fixed portion for fixed rating = 0.25 (m^3/h)/m
Q_c = Maximum air leakage rate for the slider to obtain A3 Rating

$$= \frac{Q_{op} \times Cl_{op} + Q_f \times CL_f}{CL_t} = 0.397 \text{ (m}^3\text{/h)/m}$$

Infiltration Results (positive pressure) @ 75 Pa

Metered Air Flow @ 75 Pa[1] (1.57 psf)	1.355 m^3/h
Crack Length	6.696 m
Air Infiltration @ 75 Pa[1] (1.57 psf)	**0.202 (m^3/h)/m**

Exfiltration Results (negative pressure) @ -75 Pa

Metered Air Flow @ 75 Pa[1] (1.57 psf)	3.065 m^3/h
Crack Length	6.696 m
Air Exfiltration @ 75 Pa[1] (1.57 psf)	**0.458 (m^3/h)/m**

Window Air Rating Average

Air Infiltration Rate	0.202 (m^3/h)/m
Air Exfiltration Rate	0.458 (m^3/h)/m
Average Rate	**0.330 (m^3/h)/m**
Rating	**A3**

Notes: [1] +/- 2.5 Pa Instrument Precision

Alterations during Testing:

None

Water Tightness Test: CSA A440-00, Clause 10.3, Test Method: ASTM E547

Testing performed in accordance with ASTM E547 – 00. Window installed according to the manufacturers instructions for field installation in the test chamber with all operable lites in the closed and latched position. Insect screens were not supplied with the sample.

Test Results:

Pressure Differential	Time	Comments	Rating
200 Pa	5 minutes with pressure 1 minute no pressure	No water leakage	
200 Pa	5 minutes with pressure 1 minute no pressure	No water leakage	
200 Pa	5 minutes with pressure 1 minute no pressure	No water leakage	
200 Pa	5 minutes with pressure 1 minute no pressure	No water leakage	PASS B2
300 Pa	5 minutes with pressure 1 minute no pressure	No water leakage	
300 Pa	5 minutes with pressure 1 minute no pressure	No water leakage	
300 Pa	5 minutes with pressure 1 minute no pressure	No water leakage	
300 Pa	5 minutes with pressure 1 minute no pressure	No water leakage	PASS B3
400 Pa	3 minutes, 25 seconds	Water spilled over sill	FAIL B4

Alterations during Test:

None

The test specimen obtained a B3 Rating

Wind Load Resistance Test: CSA A440-00, Clause 10.4, Test Method: ASTM E330

Testing was performed in accordance with the procedure outlined in ASTM E330 – 02. No conclusions of any kind regarding the adequacy or inadequacy of the glass in the test specimen are to be drawn from this test. Ambient conditions in the lab were 22 degrees Celsius, 101 kPa. Deflection measurements were taken at the center position of the sash interlock as well as 17 ½" to the left and right of the center position. All measurements are in inches.

Try for C4 Rating:
Deflection Test: 1600 Pa (inward direction)

Dial Position	Initial Reading	Pressurized Deflection	Final Reading	Deflection
Left	0.171	0.352	0.172	0.181
Middle	0.442	0.795	0.444	0.353
Right	0.152	0.351	0.154	0.199

Deflection = 0.163"

Deflection Test: -1600 Pa (outward direction)

Dial Position	Initial Reading	Pressurized Deflection	Final Reading	Deflection
Left	0.163	0.024	0.162	0.139
Middle	0.424	0.130	0.421	0.294
Right	0.148	0.082	0.146	0.066

Deflection = 0.192"

Maximum allowable deflection = L/125 = 0.280"

Blow-Out Test:

Pressure (Pa)	Time (s)
2000	60
0	60
4000	10
0	60
-2000	60
0	60
-4000	10

After pressure was released, window showed no signs of breakage, permanent deformation or operational malfunction.

Alterations during Test:

None

The test specimen obtained a C4 Rating

Try for C5 Rating:
Deflection Test: 2000 Pa (inward direction)

Dial Position	Initial Reading	Pressurized Deflection	Final Reading	Deflection
Left	0.155	0.293	0.151	0.138
Middle	0.408	0.789	0.411	0.381
Right	0.123	0.222	0.124	0.099

Deflection = 0.263"

Deflection Test: -2000 Pa (outward direction)

Dial Position	Initial Reading	Pressurized Deflection	Final Reading	Deflection
Left	0.152	0.003	0.151	0.149
Middle	0.412	0.009	0.407	0.403
Right	0.124	0.012	0.121	0.112

Deflection = 0.273"

Maximum allowable deflection = L/125 = 0.280"

Blow-Out Test:

Pressure (Pa)	Time (s)
2500	60
0	60
5000	10
0	60
-2500	60
0	60
-5000	10

After pressure was released, window showed no signs of breakage, permanent deformation or operational malfunction.

Alterations during Test:

None

The test specimen obtained a C5 Rating

Safety Drop – Vertical Sliding Windows: CSA A440-00, Clause 10.5:

The spring load balance eliminated the possibility of the operable sash free-falling from any open position.

The test specimen PASSED the safety drop test.

Blocked Operation Test: CSA A440-00, Clause 10.6:

With the window mounted in the test frame and the operable lite blocked with a 2" strip of 5/8" plywood in the closed position at one end of the meeting rail, the force specified in Table 11 of CSA A440-00 (400 N) was applied to the handle in the opening direction for 60 seconds. The test was repeated with the operable lite blocked in the open position and the force applied in a closing direction.

Deflection of sash with force applied in the opening direction = 0.4mm
Deflection of sash with force applied in the closing direction = 0.5mm

The test specimen showed no signs of failure or permanent deformation.

The test specimen PASSED the Blocked Operation Test

Sash Strength and Stiffness: CSA A440-00, Clause 10.7:

Not Applicable

Sash Strength and Stiffness: CSA A440-00, Clause 10.8:

Not Applicable

Ease of Operation Test: CSA A440-00, Clause 10.9:

The window was mounted in a test frame and the operable lite was moved from the fully closed to the fully open position and back three times to ensure that the lite was operating freely. See Table 9 of CSA A440-00 for test requirements.

Opening Direction:
Force to Initiate Motion = 8.7 lb
Force to Maintain Motion = 8.5 lb

Closing Direction:
Force to Initiate Motion = 3.7 lb
Force to Maintain Motion = 18.0 lb

Force to operate handles = 1.4 lb

Alterations during Testing:

None

The test specimen PASSED the Ease of Operation Test

Insect Screen Strength CSA A440-00, Clause 10.10:

Insect screens were not supplied with the test specimen.

Sash Pull-Off CSA A440-00, Clause 10.11:

Testing was performed in accordance with Clause 11.11 of CSA A440-00.

A weight of 265 N (59.6 lb) was applied to the midpoint of the meeting rail for 60 seconds. The maximum allowable mid-span sash deflection is 7.1 mm (75% of net glazing engagement).

Location	Load	Deflection
Meeting Rail	265 N	4.1 mm

The test specimen PASSED the Sash Pull-Off Test

Condensation Resistance: CSA A440-00, Clause 10.12

This test was not performed at the request of the manufacturer.

Resistance to Forced Entry: CSA A440-00, Clause 10.13:

Testing was performed in accordance with Clause 11.13 of CSA A440-00.

No entry was gained during the specified time of hand and tool manipulation performed prior to and following the application of the following loads on the hardware:

Time (T1) = 5 minutes
Time (T2) = 5 minutes
Load (L1) = 666 N (150 lb)
Load (L2) = 333 N (75 lb)
Load (L3) = 111 N (25 lb)

Test A1 = Pass
Test A2 = Pass
Test A3 = Pass
Test A4 = Pass
Test A5 = Pass
Test A6 = N/A
Test A7 = Pass

Alterations during Testing:

None

The test specimen obtained a F1 Rating

Deadload Deflection: CSA A440-00, Clause 10.14

Not applicable.

Energy Rating: CSA A440-00, Clause 10.15

This test was not performed at the request of the manufacturer.

Window Ratings – Tables of Minimum Requirements from CSA-A440-00 Windows

Table 1: Air Tightness

Window Rating	Maximum Air Leakage Rate (m^3/h)/m
Storm	8.35 (max)
	5.00 (min)
A1	2.79
A2	1.65
A3	0.55
Fixed	0.25

Table 2: Water Tightness

Window Rating		
For use in small buildings	**For use in other buildings**	**Pressure Differential (Pa)**
Storm	--	0
B1	B1	150
B2	B2	200
B3	B3	300
	B4	400
	B5	500
	B6	600
	B7	700

Table 3: Wind Load Resistance

Window Rating		Pressure Differential, Pa	
For use in small buildings	**For use in other buildings**	**Deflection**	**Blowout**
		Sash (L/125)	
Storm	--	--	750
C1	C1	500	1500
C2	C2	750	2000
C3	C3	1200	3000
	C4	1600	4000
	C5	2000	5000

Comments/Conclusion: (Include tests subcontracted, variances from test methods, statement of compliance, statement of estimated uncertainty, opinions and interpretations used and their basis. Attach extra pages as necessary: No of pages attached _____)

Quality Auditing Institute Ltd., with lab facilities located in Port Moody, British Columbia, performed testing in accordance with CSA A440-00 on a representative sample of Oasis Windows 300 Series Vertical Sliding Window.

Test results in this report may not be reproducible in the field. Test results relate only to those products tested.

See Table 3 for a summary of the test results and window ratings.

Person(s) Authorizing Report:

Name (Signature)	KENT ADAMSON Name (Printed)	MANAGER Title	12/09/06 (dd/mm/yy)

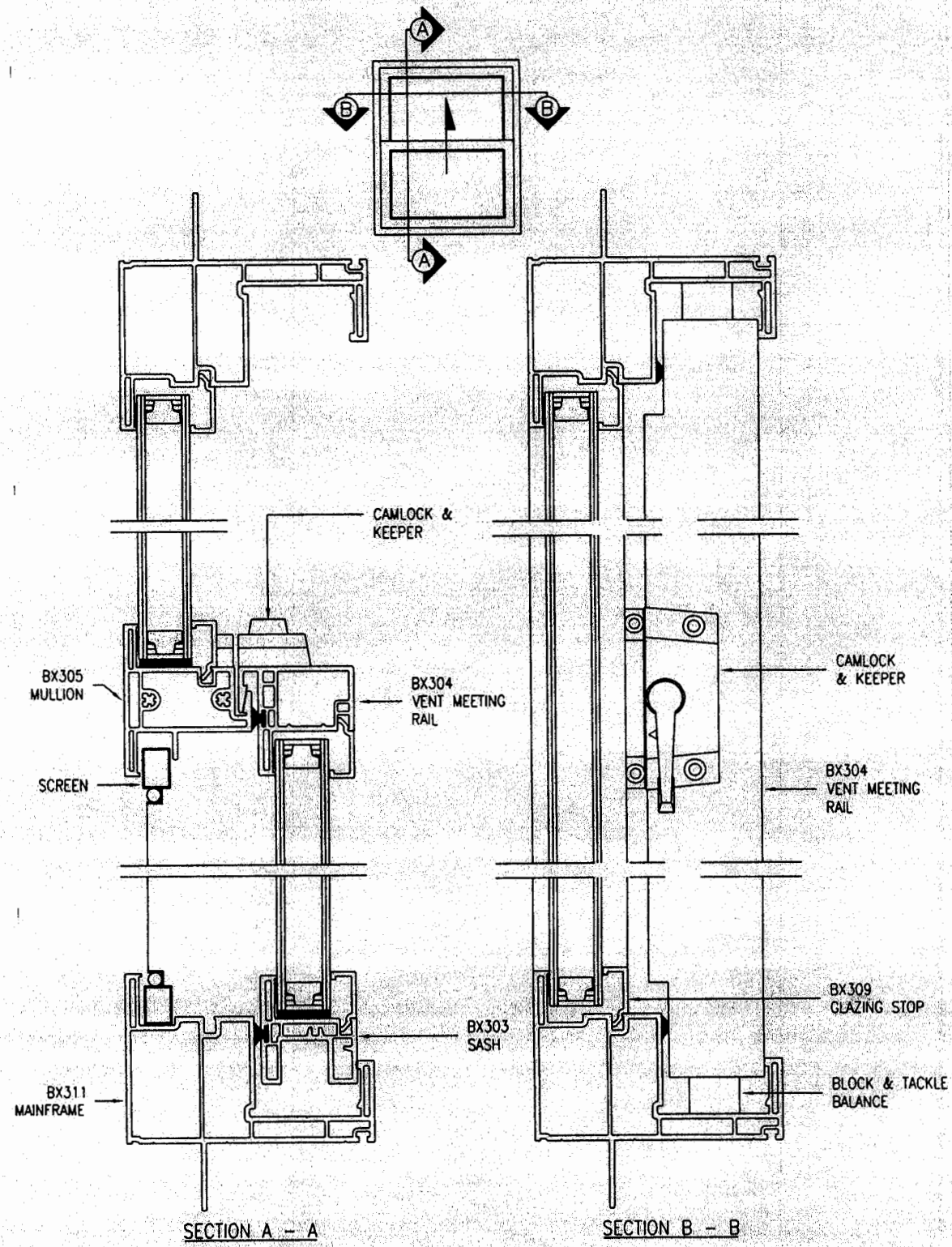
Reviewed by:

Name (Signature)	BEN BARKER Name (Printed)	MANAGER Title	12/09/06 (dd/mm/yy)

APPENDIX A

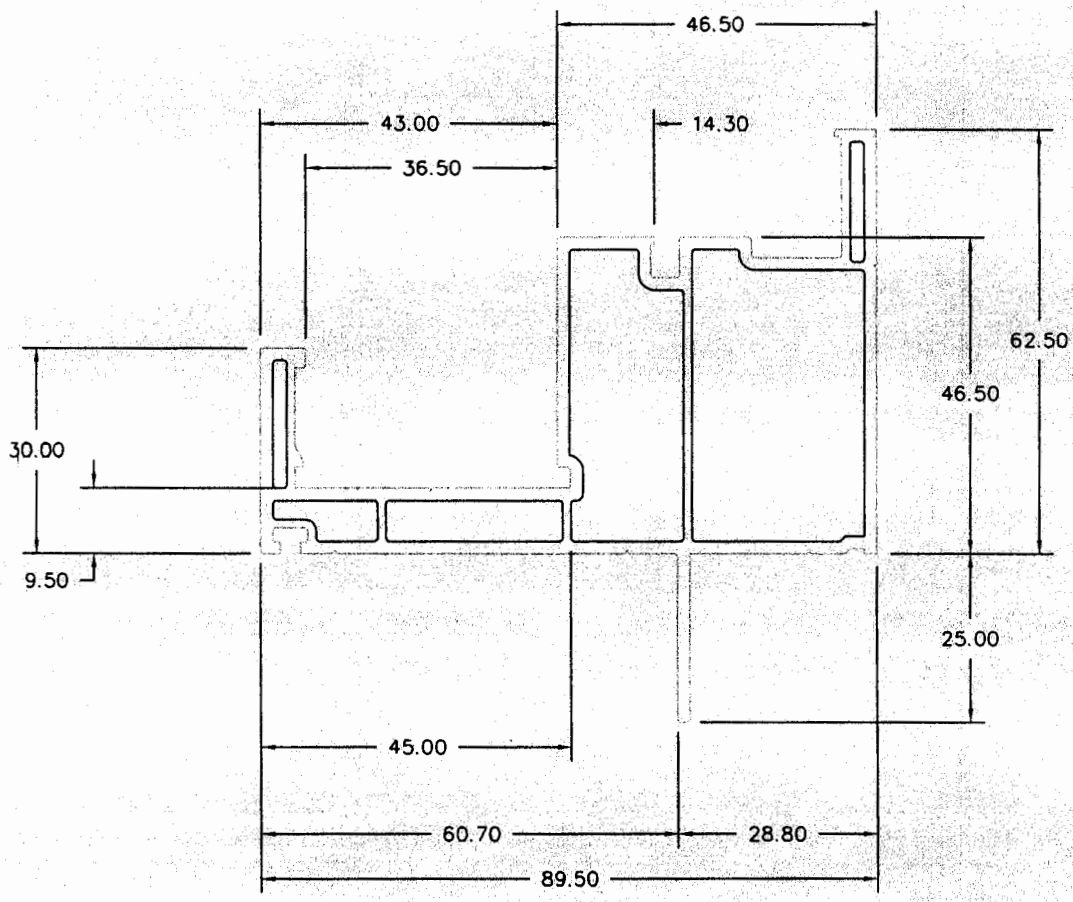
Window Drawings
300 Series Single Hung Window

Page	Title
A1	300 Series Single Hung Window
A2	BX311 Mainframe
A3	BX305 Tilt Mullion
A4	BX303 Sash
A5	BX324 Sash w/ Interlock and Handle
A6	BX323 Sash w/ Interlock
A7	BX309 ¾" Glazing Bead
A8	Drainage

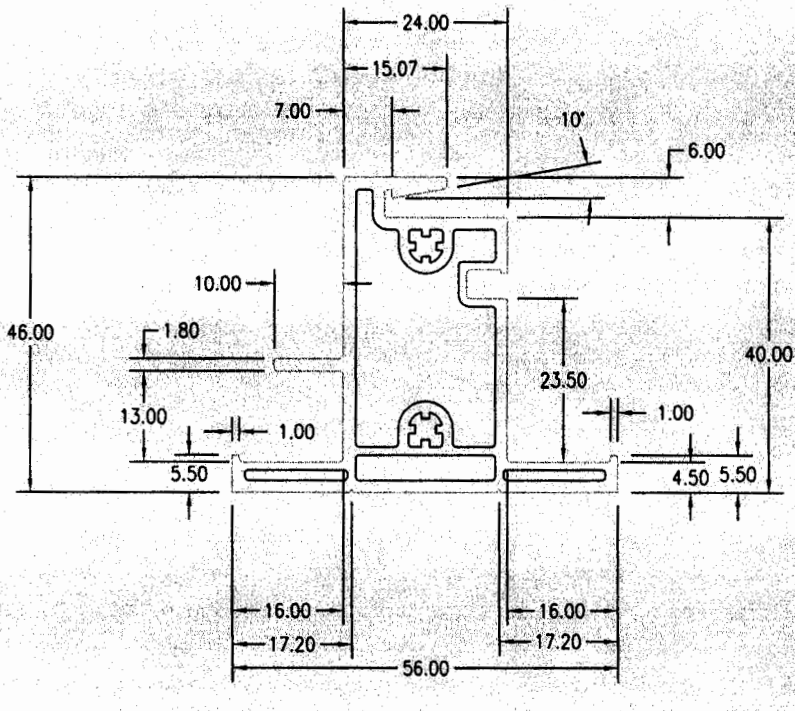


BERLINEX
4350 – 68 AVENUE
EDMONTON, ALBERTA T6B 2P3
CANADA

Part Number:	–
Description:	300 Series Single Hung Window
Dwg No./Dwn By:	300 Series Single Hung / D.Feil
Date / Revision:	January 12/2006/01
Drawing Size:	Scale: NTS



Berlinex Inc. 4350 – 68 Avenue Edmonton, Alberta T6B 2P3 Canada	Approved for:	Part Number:	BX311
	Function:	Description:	MAINFRAME
		Dwg No./Dwn By:	BX311rev4 / D.Feil
	Dimension:	Date / Revision:	October 12/2004/04
		Drawing Size:	SCALE 1:1
	Viability:	Ext. Wall Thks.:	1.8 mm
		Int. Wall Thks.:	1.2 mm
		Not Spec. Radii:	0.5 mm
	Date:	Area:	
		Weight:	

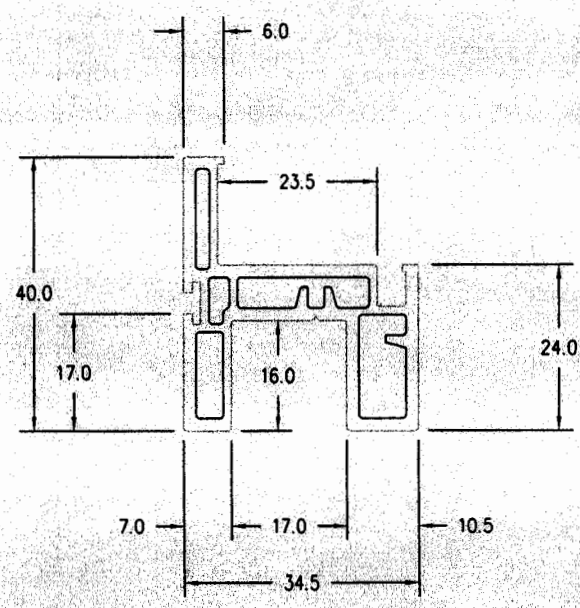


Ext. Wall Thks.:	1.8 mm
Int. Wall Thks.:	1.5 mm
Not Spec. Radii:	0.5 mm
Overall Area:	
Overall Weight:	
Rigid Weight:	-
Flex Weight:	-

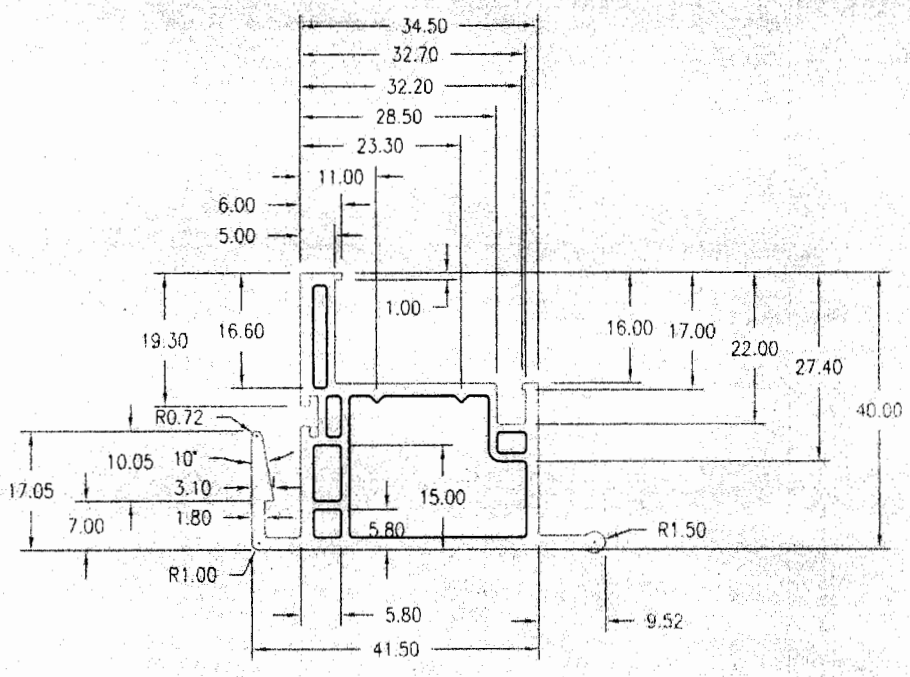
	REVISIONS	DATE

BERLINEX
4350 - 68 AVENUE
EDMONTON, ALBERTA T6B 2P3
CANADA

Part Number:	BX305
Description:	TILT MULLION
Dwg No./Dwn By:	BX305rev8
Date / Revision:	May 25/2004/08
Drawing Size:	SCALE 1:1



Berlinex Inc. 4350 – 68 Avenue Edmonton, Alberta T6B 2P3 Canada	Approved for:	Part Number:	BX303
	Function:	Description:	SASH
		Dwg No./Dwn By:	BX303rev6 / D.Feil
	Dimension:	Date / Revision:	October 12/2004/06
		Drawing Size:	SCALE 1:1
	Viability:	Ext. Wall Thks.:	1.8 mm
		Int. Wall Thks.:	1.2 mm
		Not Spec. Radii:	0.5 mm
	Date:	Area:	
		Weight:	

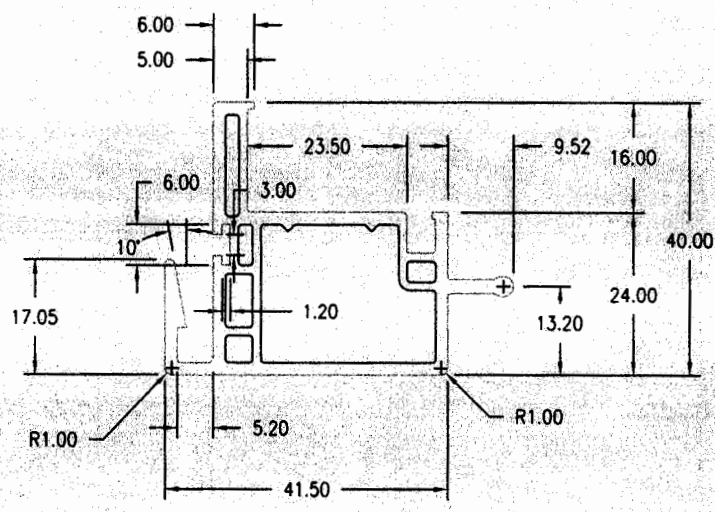


Ext. Wall Thks.:	1.8 mm
Int. Wall Thks.:	1.2 mm
Not Spec. Radii:	0.5 mm
Overall Area:	
Overall Weight:	
Rigid Weight:	-
Flex Weight:	-

	REVISIONS	DATE

VEKA CANADA
4350 - 68 AVENUE
EDMONTON, ALBERTA T6B 2P3
CANADA

Part Number:	BX324
Description:	SASH w/ INTERLOCK & HANDLE
Dwg No./Dwn By:	BX324
Date / Revision:	March 14/2006
Drawing Size:	SCALE 1:1

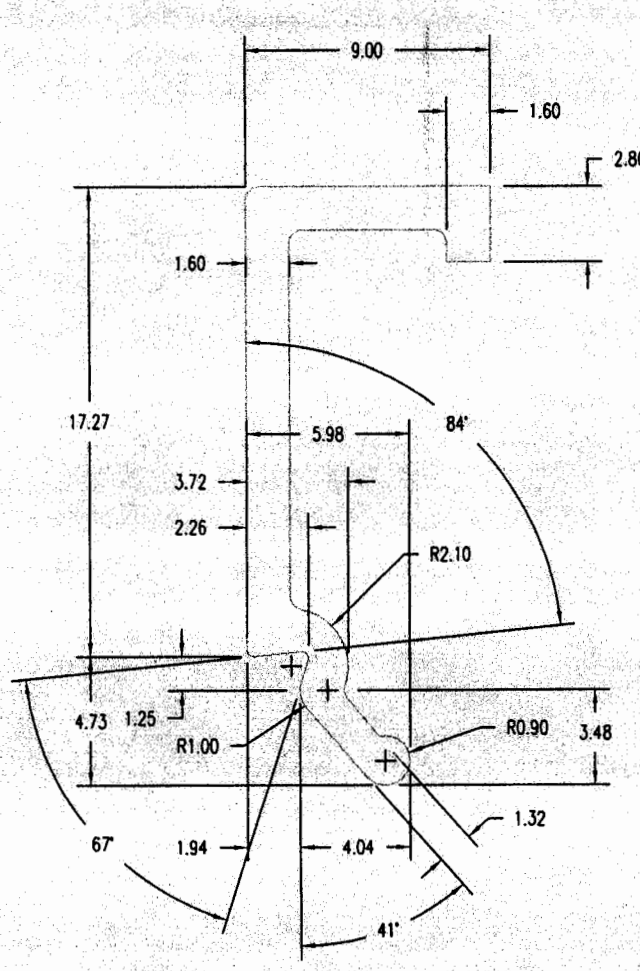


Ext. Wall Thks.:	1.8 mm
Int. Wall Thks.:	1.2 mm
Not Spec. Radii:	0.5 mm
Overall Area:	
Overall Weight:	
Rigid Weight:	-
Flex Weight:	-

	REVISIONS	DATE

BERLINEX
4350 - 68 AVENUE
EDMONTON, ALBERTA T6B 2P3
CANADA

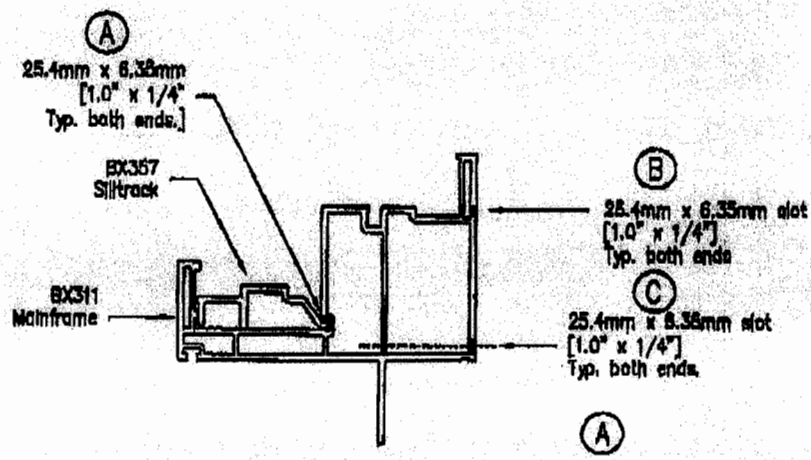
Part Number:	BX323
Description:	SASH w/ INTERLOCK (CO-EX PULL HANDLE)
Dwg No./Dwn By:	BX323
Date / Revision:	November 08/2004/02
Drawing Size:	SCALE 1:1



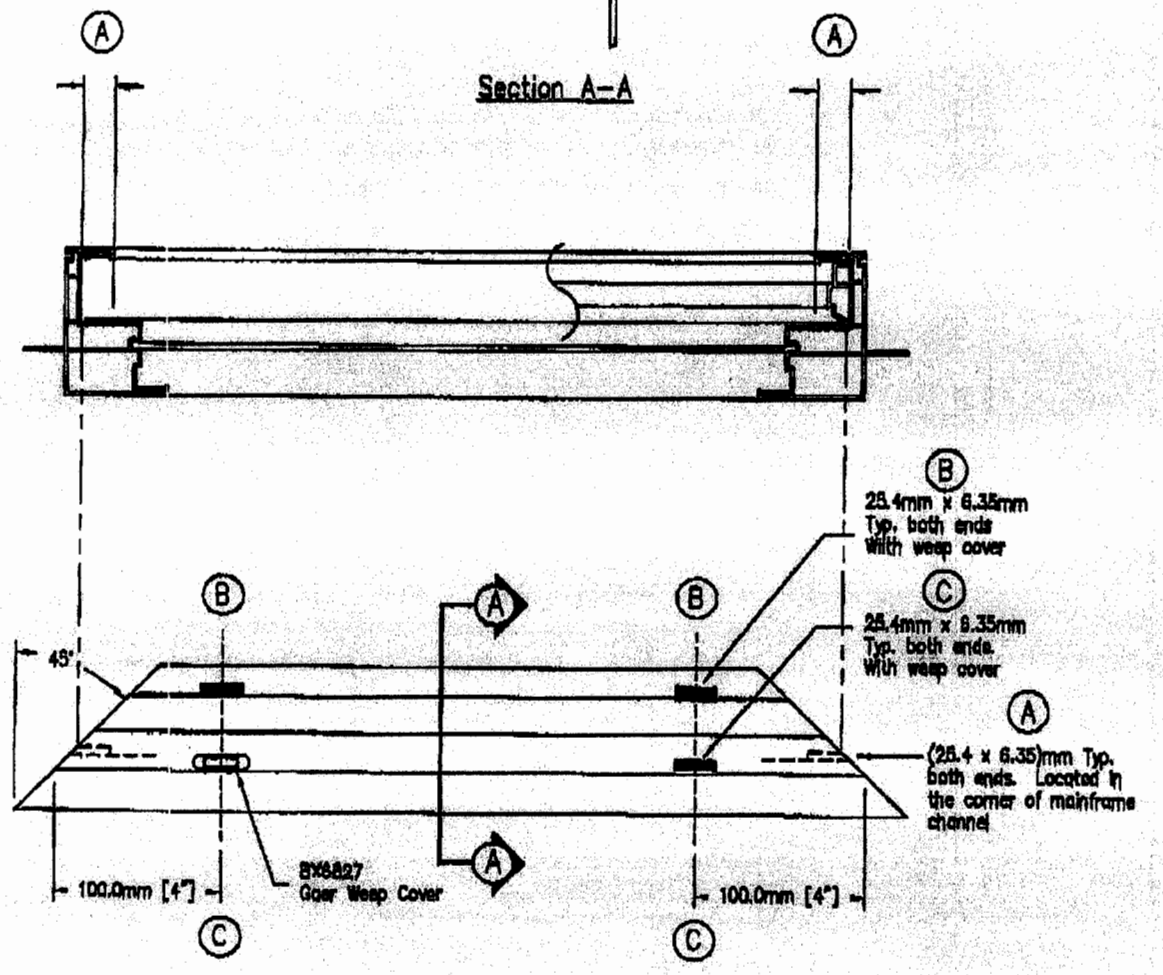
Scale 1:1

Berlinex Inc. 4350 – 68 Avenue Edmonton, Alberta T6B 2P3 Canada	Approved for:	Part Number:	BX309
	Function:	Description:	3/4" Glazing Bead
		Dwg No./Dwn By:	BX309 / D.Feil
	Dimension:	Date / Revision:	October 09/2001/02
		Drawing Size:	SCALE 4:1 unless otherwise specified
		Ext. Wall Thks.:	
	Viability:	Int. Wall Thks.:	
		Nat Spec. Radii:	
		Area:	
	Date:	Weight:	

SINGLE HUNG WINDOW



Section A–A



VEKA CANADA 4350 – 68 AVENUE EDMONTON, ALBERTA T6B 2P3 CANADA	NOTE: The material in this drawing is the property of VEKA CANADA and neither the drawing nor any part of it nor any information contained therein, shall be reproduced or disclosed to any third party except for the purpose of the use of the company product.	Part Number: Description: Dwg No./Dwn By: Date / Revision: Drawing Size:	– 300 Series Drainage – Hung (OASIS) 300drainage1 / D.Fall August 28/2006 Scale: N/S