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

Manufacturer/Client: Oasis Windows Ltd.	Manufacturer/Client Address: 109-12889 84th Street Surrey, British Columbia Canada
Job Number: W410-1	

Sample Number: 400 Series Picture Window	Description: Width: 2000mm, Height: 2000mm 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: June 12, 2006 – August 28, 2006

REPORT NUMBER W410-1

Edition 1: August 28, 2006
Contents: Pages 1-17, A1-A4

Table of Contents

List of Tables

Sampling Plan/Procedures:

One unused, glazed 400 Series Picture Window complete with all hardware, was provided by the client and examined at the QAI laboratory, then tested between June 12, 2006 and August 28, 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 2006
Spray Rack	SPRAYRACK1	Verified using test procedure described in ASTM Standard E547 in January 2006.
Mititoyo Calipers	CALIPER1	Verified with gauge block before use
Gauge block (0.125", 0.25", 0.5")	GAUGEBLOCK1 GAUGEBLOCK2 GAUGEBLOCK3	May 2007
Dial Gauge	DIAL1	Verified with gauge block before use
Dial Barometer	BAROMETER1	August 2007
Thermocouple	TC-1	June 2007

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 400 Series Picture 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 at 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 composed of nominal 2x6 SPF timber. The center of the buck was built with a rough opening measuring ¾" larger than the test specimen in length and width, framed 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	10.2	Air Leakage	None
2	10.3	Water Penetration	None
3	10.4	Wind Load Resistance	Window obtained C2 rating. Manufacturer requested retest
4	10.4	Wind Load Resistance	Window obtained C2 rating. Manufacturer requested retest.
5	10.4	Wind Load Resistance	August 18, 2006 – Test performed with new installation method. Window was framed by nominal 2 x 6 members (rough opening same size as window) and fastened with 3" screws placed at every second slot in the vinyl flange surrounding the window. Three of four corner welds snapped during blow-out test at 3000 Pa.
6	10.4	Wind Load Resistance	August 25, 2006 – Test performed using the same installation method as test #6. Manufacturer adjusted corner welding machine to ensure welds were being performed to specifications. Result: C2 rating increased to C3.

Summary of Results:

Table 3: Test Results (Window Ratings)

Clause	Test Name	Rating
10.2	Air Tightness	Fixed
10.3	Water Tightness	B7
10.4	Wind Load Resistance	C3
10.5	Safety Drop	-
10.6	Blocked Operation	-
10.7	Sash Strength and Stiffness, Casement	-
10.8	Sash Strength and Stiffness, Projecting	-
10.9	Ease of Operation	-
10.10	Screen Strength	-
10.11	Sash Pull-Off	-
10.12	Condensation Resistance	-
10.13	Resistance to Forced Entry	-

Note: "-" indicates test was not performed

Window Components:

400 Series Picture Window		
Frame:	Size:	Width: 2000mm, Height: 2000mm Vinyl. Part Number BX421. Drawing in appendix A.
	Joints:	Mitered corners, thermally welded, corners cleaned.
Glazing Method:	Glazing Tape	Venture 1/16" x 3/8" double sided foam glazing tape applied in one piece with ends butted together. Corners caulked.
	Glazing Bead	Vinyl. Part Number BX411. Drawing in appendix A.
	Setting Blocks	Dimensions: 1" x 0.75" x 0.54" w/ drainage slot in bottom Located 8-12" from corner of insulated glass unit
Glazing:	Overall Thickness	7/8" thick 2 glass lites – each 5mm clear annealed
	Spacer:	12.7mm (1/2") Bayform thermally broken, desiccant filled aluminum with polysulfide secondary backing seal.
Drainage:	Frame:	See drawing in appendix A

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

Test #1:

	Laboratory Conditions	Standard Conditions
Temperature	18.0 C	20.8 C
Pressure	101.2 kPa	101.3 kPa
Air Density	1.212 kg/m^3	1.202 kg/m^3
Air Density Ratio = 1.004		

CL_f = Crack length = 7.518m
Q_f = Maximum air leakage for fixed rating = 0.25 (m^3/h)/m

Infiltration Results (positive pressure) @ 75 Pa

Metered Air Flow @ 75 Pa[1] (1.57 psf)	0.034 m^3/h
Crack Length	7.518 m
Air Infiltration @ 75 Pa[1] (1.57 psf)	**0.005 (m^3/h)/m**

Exfiltration Results (negative pressure) @ -75 Pa

Metered Air Flow @ 75 Pa[1] (1.57 psf)	0.000 m^3/h
Crack Length	7.518 m
Air Exfiltration @ 75 Pa[1] (1.57 psf)	**0.000 (m^3/h)/m**

Window Air Rating Average

Air Infiltration Rate	0.005 (m^3/h)/m
Air Exfiltration Rate	0.000 (m^3/h)/m
Average Rate	**0.002 (m^3/h)/m**
Rating	**Fixed**

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 recommend method as described in the test conditions section.

Test #2:

Pressure Differential	Time	Comments	Rating
400 Pa	5 minutes with pressure 1 minute no pressure	No water leakage	
400 Pa	5 minutes with pressure 1 minute no pressure	No water leakage	
400 Pa	5 minutes with pressure 1 minute no pressure	No water leakage	
400 Pa	5 minutes with pressure 1 minute no pressure	No water leakage	PASS B4
500 Pa	5 minutes with pressure 1 minute no pressure	No water leakage	
500 Pa	5 minutes with pressure 1 minute no pressure	No water leakage	
500 Pa	5 minutes with pressure 1 minute no pressure	No water leakage	
500 Pa	5 minutes with pressure 1 minute no pressure	No water leakage	PASS B5
600 Pa	5 minutes with pressure 1 minute no pressure	No water leakage	
600 Pa	5 minutes with pressure 1 minute no pressure	No water leakage	
600 Pa	5 minutes with pressure 1 minute no pressure	No water leakage	
600 Pa	5 minutes with pressure 1 minute no pressure	No water leakage	PASS B6
700 Pa	5 minutes with pressure 1 minute no pressure	No water leakage	
700 Pa	5 minutes with pressure 1 minute no pressure	No water leakage	
700 Pa	5 minutes with pressure 1 minute no pressure	No water leakage	
700 Pa	5 minutes with pressure 1 minute no pressure	No water leakage	PASS B7

Alterations during Test:

None

The test specimen obtained a B7 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 20 degrees Celsius, 101 kPa. Deflection measurements were taken at the center position of the jamb. All measurements are in inches.

Test #3:

Try for C2 Rating:
Deflection Test: 500 Pa (inward direction)

Dial Position	Initial Reading	Pressurized Deflection	Final Reading	Deflection
Midpoint of jamb	0.671	0.743	0.673	0.072

Deflection Test: -500 Pa (outward direction)

Dial Position	Initial Reading	Pressurized Deflection	Final Reading	Deflection
Midpoint of jamb	0.667	0.572	0.665	0.095

Maximum allowable deflection = L/175 = 0.425"

Blow-Out Test:

Pressure (Pa)	Time (s)
1000	60
0	60
2000	10
0	60
-1000	60
0	60
-2000	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 C2 Rating

Try for C3 Rating:
Blow-Out Test:

Pressure (Pa)	Time (s)
1500	60
0	60
3000	10
0	60
-1500	60
0	60
-3000	3

Failure of window after approximately 3 seconds at -3000 Pa.

Alterations during Test:

None

The test specimen did not obtain a C3 Rating.

Test #4:
Try for C3 Rating:
Blow-Out Test:

Pressure (Pa)	Time (s)
1500	60
0	60
3000	10
0	60
-1500	60
0	60
-3000	5

Failure of window after approximately 5 seconds at -3000 Pa.

Alterations during Test:

None

The test specimen did not obtain a C3 rating.

Test #5:
Try for C3 Rating:
Blow-Out Test:

Pressure (Pa)	Time (s)
1500	60
0	60
3000	10
0	60
-1500	60
0	60
-3000	10

After pressure was released, the QAI test technician inspected the window and found three of the four corner welds had snapped apart.

Alterations during Test:

The window was framed by nominal 2 x 6 members and fastened with 3" screws placed in every second slot in the vinyl flange surrounding the window. At the request of the manufacturer, the gap surrounding the window as indicated in the test condition section was reduced to zero clearance.

Test #6:
Try for C3 Rating:
Blow-Out Test:

Pressure (Pa)	Time (s)
1500	60
0	60
3000	10
0	60
-1500	60
0	60
-3000	10

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

Alterations during Test:

The window was framed by nominal 2 x 6 members and fastened with 3" screws placed in every second slot in the vinyl flange surrounding the window. At the request of the manufacturer, the gap surrounding the window as indicated in the test condition section was reduced to zero clearance.

The test specimen obtained a C3 Rating.

Try for C4 Rating:
Blow-Out Test:

Pressure (Pa)	Time (s)
2000	60
0	60
4000	10
0	60
-2000	60
0	60
-4000	4

Failure of window after approximately 4 seconds at -4000 Pa.

Alterations during Test:

The window was framed by nominal 2 x 6 members and fastened with 3" screws placed in every second slot in the vinyl flange surrounding the window. At the request of the manufacturer, the gap surrounding the window as indicated in the test condition section was reduced to zero clearance.

The test specimen did not obtain a C4 rating.

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

Not Applicable.

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

Not Applicable.

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:

Not Applicable.

Insect Screen Strength CSA A440-00, Clause 10.10:

Not Applicable.

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

Not Applicable.

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:

Not Applicable.

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 400 Series Picture 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:

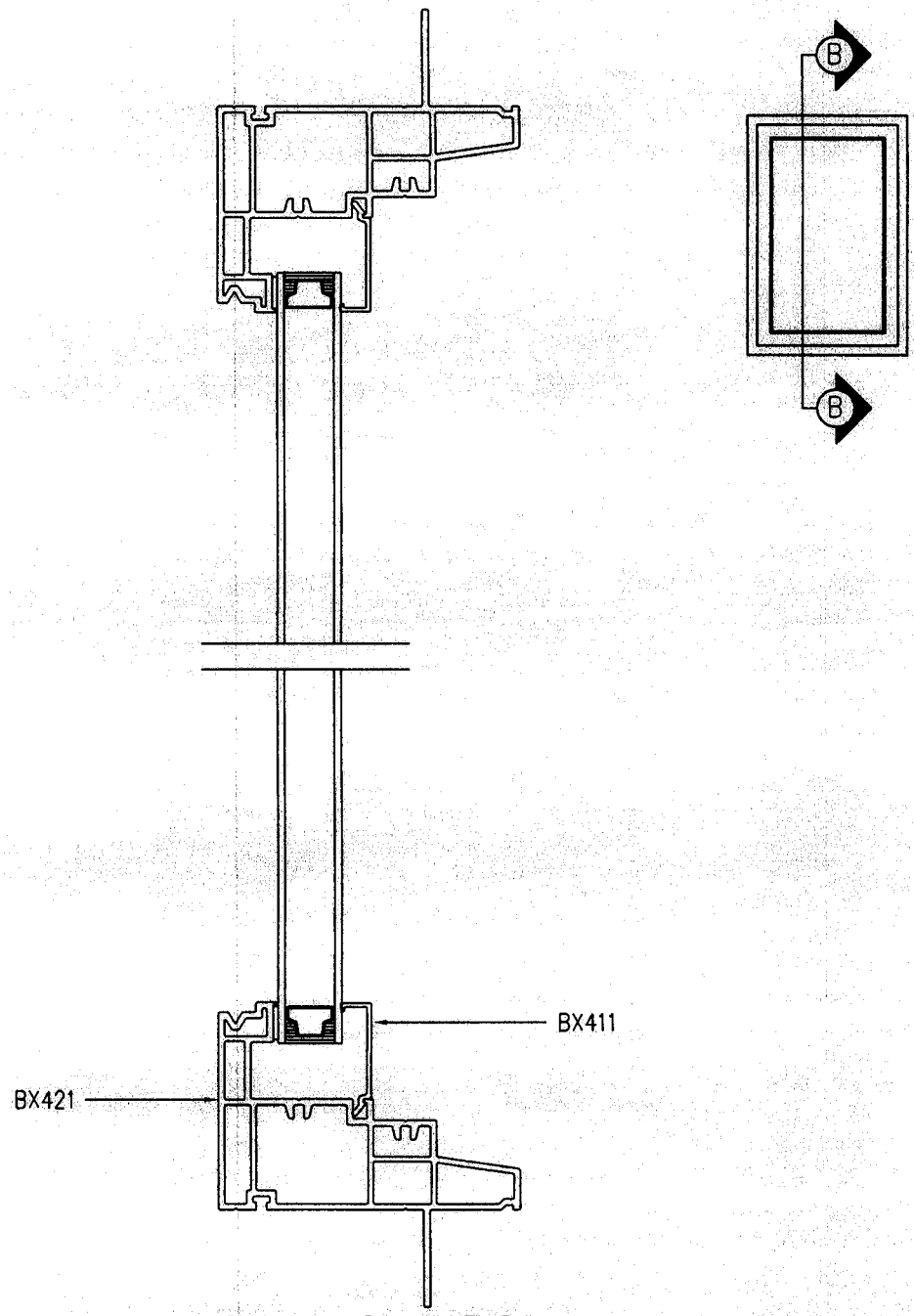
Name (Signature)	KENT ADAMSON Name (Printed)	MANAGER Title	12/09/06 (dd/mm/yy)

Reviewed by:

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

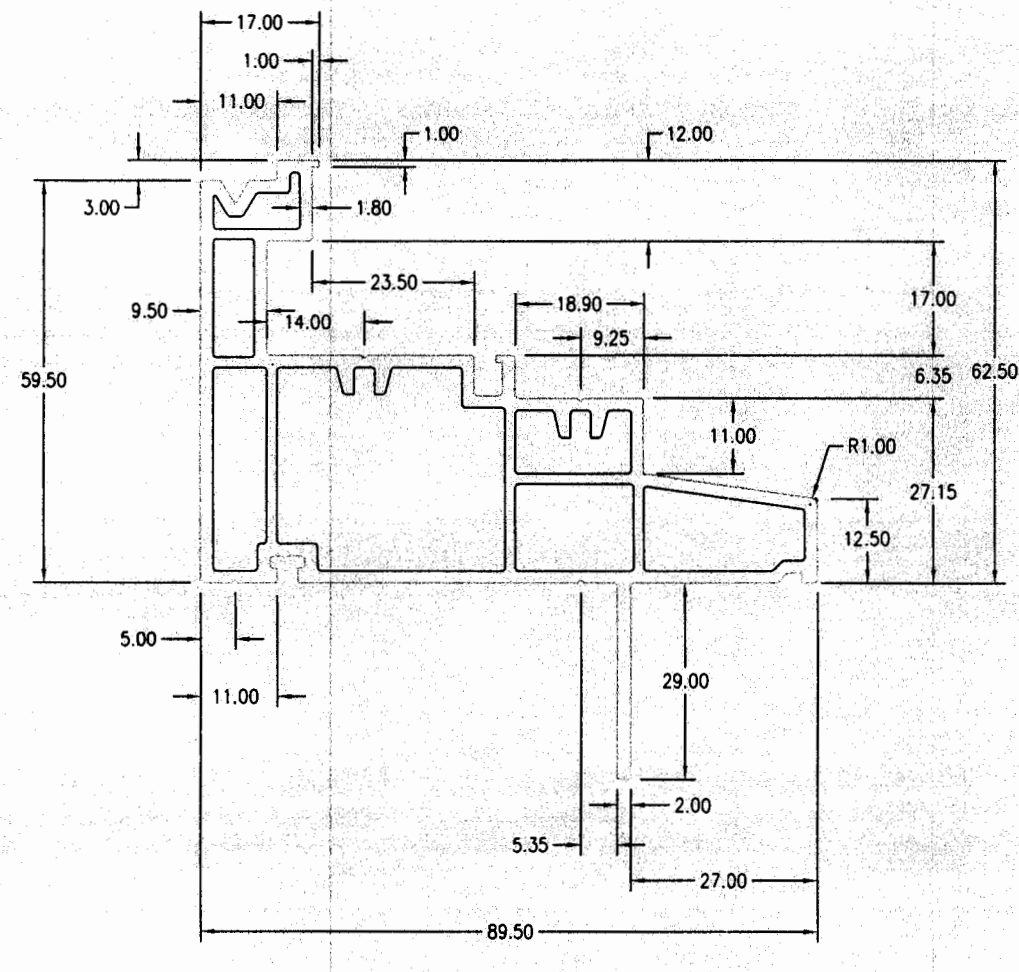
APPENDIX A

Component Specifications
400 Series Picture Window



Horizontal Section B-B

Berlinex Inc. 4350 - 68 Avenue Edmonton, Alberta T6B 2P3 Canada	Approved for:	Part Number:	BX421
	Function:	Description:	400 Picture Window Assembly
		Dwg No./Dwn By:	400 Series Picture / D.Feil
	Dimension:	Date / Revision:	May 16/2006/01
		Drawing Size:	NTS
		Ext. Wall Thks.:	
	Viability:	Int. Wall Thks.:	
		Not Spec. Radii:	
		Area:	
	Date:	Weight:	

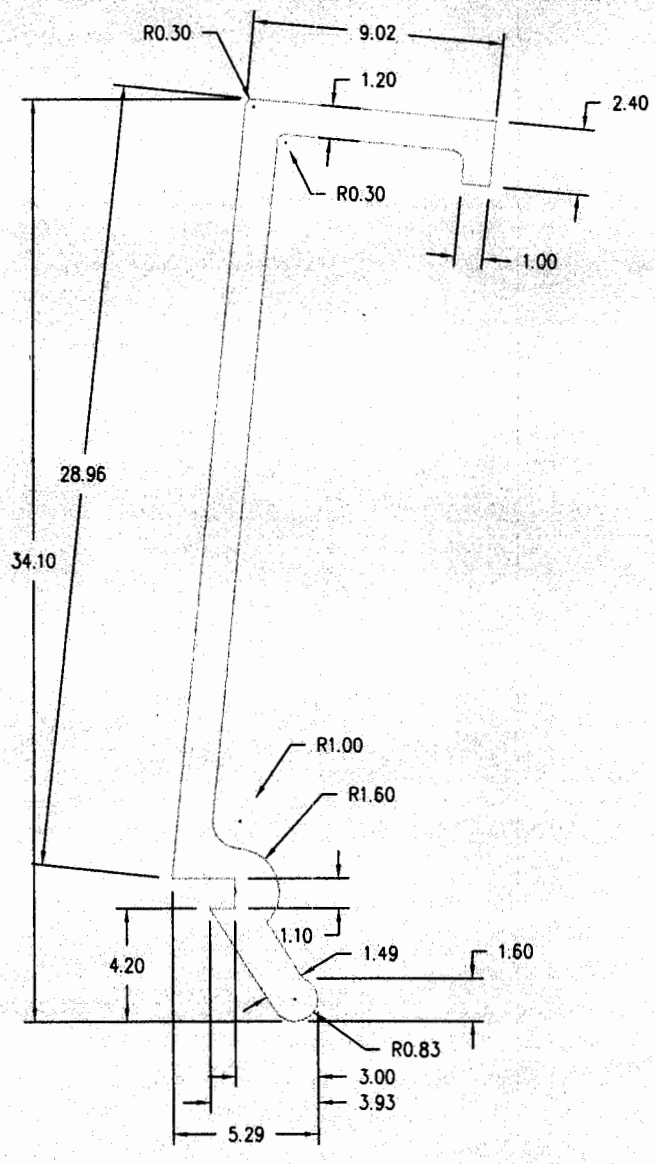


Ext. Wall Thks.:	1.8 mm
Int. Wall Thks.:	1.5 mm
Not Spec. Radii:	0.5 mm
Overall Area:	
Overall Weight:	
Rigid Weight:	-
Flex Weight:	-

R01	CHANGE NAME FROM BX401 TO BX421	MAR 7/06
	REVISIONS	DATE

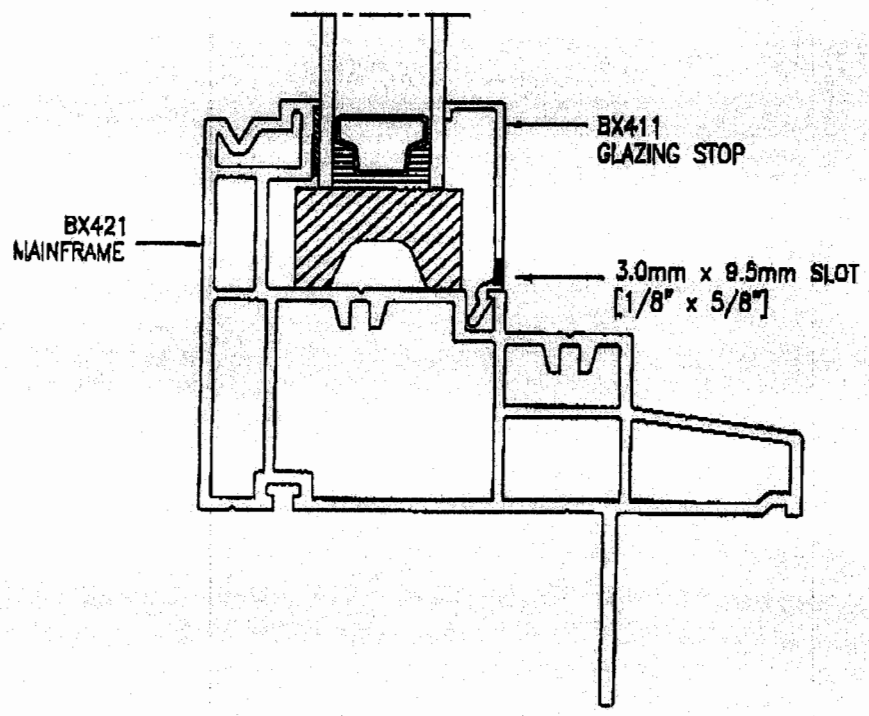
BERLINEX
4350 - 68 AVENUE
EDMONTON, ALBERTA T6B 2P3
CANADA

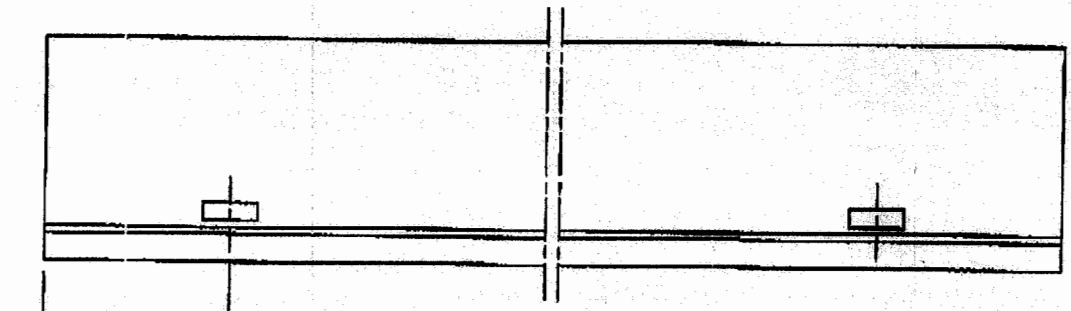
Part Number:	BX421
Description:	MAINFRAME
Dwg No./Dwn By:	BX421
Date / Revision:	March 7/2006/ REV 01
Drawing Size:	SCALE 1:1



SCALE 1:1

Berlinex Inc. 4350 – 68 Avenue Edmonton, Alberta T6B 2P3 Canada	Approved for:	Part Number:	BX411
	Function:	Description:	3/4" STOP CASEMENT
		Dwg No./Dwn By:	BX411 / D.Feil
	Dimension:	Date / Revision:	October 09/2001/02
		Drawing Size:	SCALE 4:1 unless otherwise specified
		Ext. Wall Thks.:	1.2 mm
	Viability:	Int. Wall Thks.:	–
		Not Spec. Radii:	0.5 mm
	Date:	Area:	
		Weight:	





BX411 GLAZING STOP – SILL

3.0mm x 9.5mm SLOT
TYPICAL BOTH ENDS

VEKA CANADA 4360 – 68 AVENUE EDMONTON, ALBERTA T6B 2P3 CANADA	NOTE: The concepts 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 other than for the purpose of the use of the computer product.	Part Number: Description: Dwg No./Own By: Date / Revision: Drawing Size:	BX411 400 Series Drainage – Fixed Lite – (OASIS) 400 Drainage / D.Fail August 28/2006/01 Scale: 1:1